MINUTES OF EVIDENCE.
# LIST OF WITNESSES.

## Evidence before Select Committee.

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MINUTES OF EVIDENCE
TAKEN BEFORE THE SELECT COMMITTEE ON RAILWAY SPARK ARRESTERS.

WEDNESDAY, 15th AUGUST, 1900.

Members present:

Mr. McKersie, in the Chair;
Mr. Sangster,
Mr. Gavan Duffy,
Mr. Wheeler,
Mr. Graves,
Mr. H. R. Williams,
Mr. Kennedy,

Thomas Hale Woodrofe, examined.

1. By the Chairman.—What is your occupation?—Chief Mechanical Engineer, Victorian Railways.

2. I understand that the evidence to be rendered by the Department has been forbidden, so you might just give it in your own way, and questions can be put to you by members of the Committee afterwards?—I would suggest that course. I have prepared a statement showing the history of the spark-arrester question up to the present time on the Victorian railways and in other countries, as far as I have been able to gather from various scientific papers and discussions of the day. I propose to deal with, first, the various arresters that the Department have used in the Department from the early days. This information has been obtained from effects of the branch from records and from my own personal knowledge. The information dates back to 1892, and I propose to trace the history of the question up to the present date. The descriptions are illustrated by small sketches on the margin of my notes.—[The witness read the following—]

Gentlemen,

STATEMENT RE SPARK ARRESTERS, VICTORIAN RAILWAYS.

With a view of facilitating the work of the Committee, I have prepared a statement which will show the information in the possession of the Department up to date, in connection with devices tried and in use for preventing the escape of sparks from the chimneys and emitters from the ash pans of locomotives in this and other colonies and countries.

A full-sized model of the smoke box of a "Y" class (heavy goods) engine with the departmental standard double arrester fixed thereon, also tracings showing arresters, samples of pitting, perforated plates, &c., used in other colonies and countries, are also exhibited for the information of the Committee.

From the information furnished me by officers of the branch and from records, and also from my own knowledge, I find that the various contrivances used by the Department since 1892 were approximately as follow, and shown by small sketches below:—

No. 1 was a cast-iron conical deflector, fixed near top of the chimney (in conjunction with a wire bonnet placed on top of the chimney), and which were supposed to catch the sparks down into a receptacle built round the chimney. This was a very early application.

This arrester was supplied with engines received from England about 1892, and was not successful.

And was not adopted.

No. 2 consisted of venetian shutters or blind plates placed inside smoke box against the tube plate. They were supposed to throw the sparks down into bottom of smoke box. This arrester was also supplied with the engines received from England about 1892, and had to be abandoned.

It interfered with the steering.

8173.
No. 3 was a conical cage constructed of about \( \frac{1}{8} \) in. round iron, made fast to top of blast pipe, extending upwards into chimney. This was put into use about 1870, and was in use several years, but did not prove very effective in arresting dangerous sparks.

No. 4. About 1875 a curved grid or grating, made with bars of about \( \frac{1}{8} \) in. round wire, spaced \( \frac{1}{4} \) inch, and made fast to top of blast pipe and sides of smoke box, was introduced. This was in use several years and gave better results than those formerly in use.

No. 5 was made from similar material to No. 4, but was flat and fixed horizontally across the smoke box. The wires in this arrester were about \( \frac{1}{2} \) inch apart and spaced the same.

This arrester was in use in 1889, and proved more successful and easier made than the foregoing. That is practically the beginning, I presume, of the horizontal arrester, 1880.

No. 6. Fifteen American engines manufactured by the Baldwin Locomotive Company were imported from America in 1880. This spark arrester consisted of a wire netting \( \frac{1}{8} \) in. mesh on top of the chimney, with a cast-iron deflector, very similar to No. 1. These arresters were used for some years, and did not give such good results as the departmental arresters.

No. 7. "Vortex" blast pipe. Patented by Mr. W. Atkins, Locomotive Superintendent, London and South Western Railway, and fixed in some of the engines in 1880. The inventor claims for the patent that the velocity of the exhaust is reduced and softened, the lower boiler tubes are brought more into action, less fuel is consumed, and spark arresters can be dispensed with.

A large number of engines in England and Europe are, I believe, fitted with the "Vortex" pipes. The ten (10) engines running here with this pipe are all fitted with a single departmental arrester, same as in South Australia. They have some running there, and find they can do with one arrester instead of two.

No. 8. About 1889 some modifications were made in No. 5, and it was decided to fix two (2) grids in the smoke box, one above the other, 5 to 6 inches apart, during the summer months. The wires in the top arrester were placed at right-angles to those on the bottom.

A further improvement was made in 1891, when the diameter of the wire was reduced to No. 6 gauge, spaced 40 to the foot, giving spaces of \( \frac{1}{2} \) inch bars. The wires are held together by transverse bars which vary from \( \frac{1}{2} \) inches to 6 inches apart.

That is practically the arrester shown there. One is used in winter, and in summer the two are used with a conical cage between them.
Two arrerers are used in 420 of the running engines during the summer months, that is, from September to April, somewhat varying with the district.

We leave it somewhat to the discretion of the inspectors, according to the rainfall of the districts.

The spaces between the two arrerers are from 3 inches to 6 inches, and bars are placed at right angles. The space between the two arrerers at the best pipe is enclosed by a wire external cage made of the same material. Great care is taken to cover all hollow and corners with the pipe, etc.

Each engine is supplied with a wire breech for closing the arrerer, and strict instructions are issued regarding its use.

Some of the engines have been fitted with wire netting, 3-in mesh, made of wire No. 12 gauge, American pattern, instead of parallel wires, which have given similar results as regards stopping sparks at the departmental arrerer, but in life and durability are considerably less than that of the outer arrerer; besides, it is very difficult to close it without injury, which is not so with the departmental arrerer.

Trains have been made with an engine fitted with a single fine horizontal grill, 60 wires to the foot, space about 1/2 inch, with movable deflector plates over upper rows of tubes, and external smoke box.

This was effective in regards stopping sparks, especially from wood, but has been found, in practice with coal to require more attention in cleaning than the departmental arrerer, and it was considered that the double arrerer was a more effective arrangement.

No. 10. Trains were made in 1860 of an arrerer used on the Swedish Government railways, which was said to be the outcome of many experiments on the Swedish railways, and adopted by the authorities there.

The railways there run through pine forests, and it is very important that few sparks should be thrown.

By this construction the products of combustion pass through a spark chamber furnished with curved wires, giving a rotary motion to sparks, thereby stopping against the walls before reaching the chimney proper. This was fitted with 420 No. 12 gauge wire, December, 1859, and found to materially interfere with the steering of the engine, and was taken off.

We took a great deal of trouble with this arrerer. We got the Norwegian Consul to get drawings sent out, and made a contrivance exactly to the drawings, but found that with a full load the engine would not steam with it.

3. By Mr. Griffiths.—Has it that effect in Norway?—I do not know whether they tax their engines up to their full capacity or not. They speak very highly of it, but we could not make it do here.

No. 10. Recently one broad-gauge engine and two narrow-gauge engines have been received from the Baldwin Locomotive Company, fitted with deflector plates in front of the top rows of tubes and a wire netting, 3-in mesh, No. 12 gauge wire, placed inside the smoke box. These engines have not been running very long; the results will be carefully watched.

I understand this arrerer is the one generally used throughout America, with various modifications.

4. By the Chairman.—Was it put in the smoke box when the engines were manufactured?—Yes; and came out.

5. Was it in the specifications?—No; the specifications were that they were to be fitted with the best in use in America. I may say that one of our officers, on a trial the other night, reported to me that a great many sparks were emitted.

6. Sparks that would be dangerous in the summer?—I cannot say.

7. You do not propose to stop all sparks, only the dangerous ones?—Just so. That is about all we have tried departmentally. There are a lot of outside inventions which I will deal with presently, but those submitted cover pretty well all we have tried departmentally.

The reasons for the adoption of grids formed of parallel wires as against netting or perforated plates are because the greater durability, lesser liability to choke, and facilities for cleaning, beside which they cannot easily be tampered with.

We consider it a very important thing in a spark arrerer for it to be a fixture so that it cannot be tampered with on the road.

8. By Mr. Wheeler.—What do you mean by that; is there some mechanical contrivance that can be shown out of gear?—Some have doors.

9. For what purpose?—One is fitted with a door for the purpose of getting up steam. I think any such contrivance is fatal to any arrerer. We have a very good and honest lot of men to deal with as to
whole, but amongst a large body of men there may be some who, if they were stuck up on a bank with a book, and could not get on, would feel a very great temptation to open the door. One objection I have to the American arrester—I notice there is a big door that can be opened and shut.

10. By Mr. H. H. Williams.—Is that door in the arrester in the narrow-gauge engines supplied by the Baldwin Company?—Yes. I believe it is not to be in the last compound and other three engines. I might start off this subject, as you will learn, is one that is engaging not only as such, but the American locomotives and European engineers, and is one that is going to be brought up before the International Railroad Congress to be held in Paris next September; the discussion on the various means that the various companies have adopted all over the world with the view of determining which is the best.

Mr. E. Savage, who is reporting on behalf of a large number of European railways to the International Railroad Congress on the subject of spark arresting, concludes—`Fossil fuel offers fine objection to the use of locomotives than wire-work and perforated steel." (See Railroad Gazette, 2053 May, 1899, page 232.)

I mention that as some corroboration of our opinion as to parallel bars being the best.

The Victorian Railways Department has at present about 420 running engines fitted for double spark arresters, and 53 engines fitted for single spark arrester, and 19 engines will single arrester in combination with the "Vortex" mast pipe.

Most of these fitted with single arresters are shunting engines not doing much work, and some American engines.

Most of the double arrester is about 44, fitted and fired.

That is similar to the one in the model you saw before.

Further appliances which are claimed to have an appreciable effect on the diminution of sparks are brick arches in the fire box and plate bars, or smoke shoots at the fire hole doors, which are fitted to the fire boxes of all the principal running engines.

The brick arch is for better combustion and to save fuel; but it is claimed it has an effect on spark throwing.

As a further precaution, the Department, in October, 1895, entirely discontinued the use of wood for steaming, coal alone being used.

Prior to 1891 we used wood in the winter months, but we have discontinued that practice.

11. By Mr. Gove.—Was that the year you had to pay so much for damage?—It was during the great coal strike in 1891.

As regards the devices for preventing cinders falling from the ash pan (though, personally, I do not think cinders from the smoke box, as the cause of fires outside the railway lines, drivers being instructed to take care in this respect,

12. By Mr. Gove.—Was that the year you had to pay so much for damage?—It was during the great coal strike in 1891.

see Instructions)—some cases have occurred of sleepers and broken left on the permanent way being set fire to, and such have been attributed to the escape of cinders from the ash pan.

To deal with this, the Department some time ago commenced to fit engines with fixed wire doors over the opening to the ash pan, such as are fitted on the New Zealand railways (see Railway Gazette, 1890). This appliance materially affected the steering of the engines, and the making of them was discontinued.

13. How many of them were so fitted?—There were fifteen fitted at that time.

14. Including the Great Southern line?—I could not tell you that just now, but we can furnish you with a return showing that.

15. There were fifteen fitted?—Fifteen made with that particular grid. We found it materially affected the steering of the engines. They got warped and chafed, and we discontinued them; we are now trying a movable curved perforated plate in front of the ash pan door—"explaining by means of the model.

16. By Mr. Wheeler.—Would it cost much to adopt it to your engines?—A couple of pounds per engine, I suppose.

17. By Mr. Gove.—They can put it up and down to clean it out?—It has that disadvantage, that it is under the control of the driver.

18. By Mr. Gove.—Has a curved perforated plate in front of the ash pan door, used on the New South Wales railways, has recently been introduced to a number of engines (see 1990), and this is said to interfere with the draught. Sufficient time has not elapsed for me to be able to say if the advantages warrant the outlay.

As far as I can ascertain from examination of published drawings of locomotives, and the discussions at the meetings of the various Locomotive Engineering Societies in Europe and America during the past few years, it does not appear to be the practice to fit English, European, or American engines with ash pan protectors.

I cannot find any information or drawings in regard to it.

The three engines recently received from the Baldwin Company are not so fitted.

In order that the arresters may properly be looked after and kept in order, the following rules and instructions bearing on the question are Inserted:—

19. Spark arresters.—District Loco. Inspectors will arrange as to the months during which engines may be run with single spark arresters. (See instructions 136.) They will also see that every facility is given to the boiler inspector for the examination of all arresters.

20. Prevention to be observed when steaming wood is used.—Should it be necessary to burn wood for steaming purposes, fires must be properly regulated and kept as close as possible; blast pipes must be wiped clean, and drivers should be instructed to run with the chutes as close as possible to prevent sparks escaping from chimney or ash pan. They must also be instructed to carefully examine spark arresters every day to see if there are any holes through which sparks might escape. Use of wood for steaming purposes abandoned in 1890.

21. Spark arresters.—No engine is to be permitted to run unless fitted with a spark arrester or arresters in good condition. They must be kept perfectly clean, and washed with the wire brush supplied for that purpose at least once every day by the fireman; the driver being responsible that this is done. In all cases engines may be run with single arrester, or a pair of arresters, at the months of May, June, July, and August, inclusive, in the northern districts; and from April to September, inclusive, in the southern districts. This matter to be arranged by the District Loco. Inspector. Arresters taken out for cleaning should be carefully shackled with the number of the engine to which they belong, and must accompany the engine whenever transferred to another station.

22. Examining spark arresters.—The boiler inspector has been instructed to examine the spark arresters of all engines every day for duty and assurance for doing so to be given him. He is distinctly instructed that this order does not relieve the Loco. Inspectors, foremen, boilermakers, drivers, firemen, or others from any responsibility in connexion with spark arresters, and they will be held responsible for any neglect of duty in this direction. The boiler inspector has been specially instructed to report any such cases coming under his notice.

23. Cleaning of blast pipes.—During the dry season special care is to be taken to keep blast pipes thoroughly clean for an interval of twelve inches from the top while in position.

24. Boiler tubes and blast pipes.—The tubes of all engines are to be thoroughly cleaned every day, and the blast pipes taken down once three months to permit of those tubes being cleaned, which cannot be otherwise reached.
The blast pipes are to be burned out before being replaced. When the blast pipes of O class engines are removed the nuts of the studs that fasten the cylinders together in exhaust cavity must be carefully tested with a spanner to see that they are secure.

138. Brick chocks and buffer plates to be kept in good order.—Brick arches and buffer plates must be kept in good order, and checked when worn out. The boiler inspector to report any case of neglect.

139. Suitable fire boxes to be supplied.—Locomotive foremen and drivers in charge are held responsible for seeing that the proper and most suitable fire boxes, which will be supplied by the Chief Mechanical Engineer, to suit the various engines used by the Department, are supplied to the crew before their charge. It is said that they are not maintained to good condition.

140. Precautions against fire.—The utmost care must be taken during the dry season to have fire boxes as close as possible, to prevent fire dropping out on the road. The admission of air by the fire box slots must also be carried out to the fullest extent practicable, so as to enable the engine to run with danger nearly closed.

Stack arresters, smoke boxes, caben, and ash pans are to be kept clean, and blast pipes are to be kept clean, and to their full use.

141. Fires caused by knocking out ashes.—Complaints have been made of drivers knocking out their fires on the road with the dampers open, thereby causing the ashes to drop from the ash pan and set fire to the grass. Drivers must run with their dampers as close as possible consistent with getting smoke, and no account must the pricker be set on the fire with the dampers open.

142. Fires to be reported.—Eng ineers must, at all times, keep a sharp look out for fires occurring close to or anywhere near the railway line, and report the same as soon as possible to the locomotive foremen, giving full particulars as to locality and cause of fire, so that immediate inquiry may be made into all the circumstances connected therewith. Reports to be sent by telegraph, as soon as possible, and the nearest permanent way repairer notified. Any driver failing to report fires as here instructed will be severely dealt with.

143. Ash pans and smoke boxes to be thoroughly cleaned before engine is not away.—Before putting their engines away, drivers must see that their fire boxes thoroughly clean their ash pans and smoke boxes, and also that their engines are supplied with sufficient fuel, and thoroughly equipped for the next day's work, unless specially instructed otherwise by the locomotive foreman.

144. Fires to be dropped at ash pits.—Fires are to be dropped and ash pans cleaned at the ash pits at coal stage, and any delays doing their work elsewhere, particularly in the proximity of wood heaps, will be severely punished.

These instructions are to the effect that the drivers, who are primarily responsible, are to see that all those appliances are kept in proper order, and that if they are not, it is their duty to report any defect or anything wrong in the repairs book, after their runs have been taken. And then the foremen of the various sheds are also responsible, and the superintendent is also responsible, to see that the crews carry out their duties, and, as an independent check on those men, I, some years ago, instructed an officer who goes round inspecting the boilers, and who is not under the control of the running men, but under the control of the Inspector, to also inspect spark arresters and report anything he found wrong.

17. By the Chairman.—Did you ever receive any report to the effect that the boxes are not properly looked after, and that there have been cases in fact, I have examined certain boxes in the engine, in a case in particular, when I saw an engine throwing sparks, I noticed the thing up and found the arrester was not in proper order. This is a circular that is sent out at the commencement of the dry season in addition to the usual instructions.

CIRCULAR TO LOCO. INSPECTORS AND FOREMEN, No. 7893. DATED 22nd DECEMBER, 1898.

Circular No. 05/94 is rescinded.

Re: Circulars 54 and 7894, now that the dry season has commenced, please instruct engineers to keep a sharp lookout at all times for fires occurring close to or anywhere near the railway line, and to report the same as soon as possible to the foreman, and foremen, giving full particulars as to locality and cause of fire, so that immediate inquiry may be made into all the circumstances connected therewith. Reports to be sent by telegraph if necessary.

Also please instruct engineers to take every precaution to prevent fire escaping from the ash pan as well as from the arrester, as directed in the above-mentioned circulars.

Several cases have recently come under my notice of engines falling or report fires as above instructed; all drivers are now informed that any future omission of this kind will be severely dealt with.

CIRCULAR TO LOCO. INSPECTORS AND FOREMEN, No. 4595, DATED 22nd OCTOBER, 1905.

Re: Instructions, 95, 97, and 106, and previous circulars, now that the dry season has commenced, please instruct eng ineers to keep a sharp lookout at all times for fires occurring close to or anywhere near the railway line, and to report the same as soon as possible to the foreman, giving full particulars as to locality and cause of fire, so that immediate inquiry may be made into all the circumstances connected therewith. Reports to be sent by telegraph if necessary.

To minimize the risk of fire, the use of standing wood is to be discontinued until further orders. Spark arresters of all locomotives under your charge are to be kept clean and in best class order, and black pipes well cleaned out at least twelve (12) inches from the top while in position. Also please instruct engineers to take every precaution to prevent fire escaping from the ash pan as well as from the funnel as directed in the above-mentioned instructions and circulars.

Eng ineers failing to report fires as above instructed will be severely dealt with.

In November, 1896, this circular was issued without alteration. Since 1896, a committee of all the principal loco. officers meets every month, when the above matters are discussed and dealt with.

As far as we can, the officers and men are impressed with the importance of taking every precaution.

A very large number of inventions for arresting and extinguishing fires have been submitted to and investigated by the Department. I herewith furnish a statement of these dealt with during the last ten (10) years, with extracts from the reports on each. There were a large number before this period. Of course, all the original papers can be readily obtained if the Committee so desire.

I have had this taken from the papers, giving the dates, the names, the trials, and comments.

The list goes to show that 123 proposals have been submitted, 29 of which had frequent trials. Some a great many. Of the remainder, many were rejected as being not worth their while, but not all were so rejected. None of those that were tested were considered not as efficient as the departmental appliances.

I have enclosed a copy of the original instructions.

18. By Mr. Wheeler.—Have you charged all the inventors forthwith trials?—Since a certain date.

19. By Mr.智能手机.—And those who were offered trials and declined, on what grounds, and why do they decline—because they had to pay?—I imagine that was the cause. They were bid if they paid that they could have a trial, although, perhaps, we did not think much of the invention.

20. By Mr. Wheeler.—How many trials have you given to the 29 referred to?—They are various, some ten or twelve.
21. By the Chairman.—Will the information take long to give us in regard to the 29?—They are all here in the paper.

22. By Mr. H. H. Williams.—In the long list of all the patents, applications for which have been made for trial, will you indicate by some mark the 29, so that we could look over them?—I is all made clear, the name of the patentee, description of arrester, trial, and comments on it. I will read the first one on the list, that of W. D. Davies. I do not know anything about this personally, as it was before my time—[reading from the list handed in]. Without the papers I do not know what was done in that matter, whether there were other trials or not. The next was an invention by Mr. Crabtree—[reading again from the list]. The third was by Mr. Cowdroy. The next one is introduced by Mr. W. R. Shaw, I think the manager of the Phoenix Foundry, but since dear—[reading further from the list].

23. By the Chairman.—Will you indicate by some mark the 29 referred to in the list you have handed in?—I find on the face page there is a summary of all those that have had a trial, so you can trace them from there. There are not only those that have had trials, but the number of trials each have had. Of course you can get any further information you require from the Department. I might say, before leaving this, that there is naturally a great deal of difficulty in convincing any one of the inability of their inventions, and that sometimes gives rise to disputes, correspondence, and statements of unfairness; but I may say we have every desire to be fair, or to give every one every facility for trying their inventions. When I went to the Department in 1895, I went with a free mind and a free land. I was not in favour of any spark arrester. I only wanted the best, and I gave full facilities for all those inventions that came under my notice to be tried.

24. In the case of any of the gentlemen who applied for trials, were their inventions in use in any part of the world formerly, or are they now?—I cannot say now, but I think it is exceedingly probable.

25. Some have applied to the Committee who have tried in use?—I am reminded that Mr. Allbon has one in use on the Dungog line. His trials are shown in the papers. These trials are shown in the papers. They have not been successful in that the coal has not been steam with coal.

26. You notice the man Oakley used coal and reported more favourably?—Yes.

27. By the Chairman.—You know on the Moonah and Dungog line they use wood and coal, and they use that arrester?—Yes; I know that. If you wish that particular file of papers or any other, we have them, and they can be produced. I have merely condensed them from it. I go on to say in my notes:

There is the extreme difficulty, if not impossibility, of convincing inventors of patents. Many of these know nothing of the conditions under which the contrivance has to work. Further, a contrivance which might be fairly successful on trial might utterly fail under every day conditions.

The next information I have to give is a description of the arrester used in the adjoining colonies. They are shown here, and I have a tracing of them which is made in such a form that they can be easily compared. The Committee can have that if they wish. Of course there are no two of them exactly alike, but the Committee can compare them for themselves.

Of the arrester used in other colonies the following are the descriptions as shown by drawings presented to the Conference of locomotive officers held in Adelaide last year:

New South Wales.—Double arrester, horizontal and vertical conical wire, No. 12 Birmingham wire gauge, size of mesh 3₁₈ inch.


Queensland.—Plate, 1 inch thick, perforated with 5 in. holes, 3 in. pitch, with reflector plate.

West Australia.—Horizontal setting on iron frame, wire, No. 16 wire gauge, 4 members per inch; size of mesh, 3₁₈ inch.

Tasmania.—Horizontal plate, 1 inch thick, perforated with 1½ in. holes, 3 in. pitch, and vertical conical arrester—wire, No. 9 G.W.G., 6 in. pitch at top.

New Zealand.—Class "B." This arrangement consists of a plate perforated with rectangular holes 1 inch square, fixed horizontally across the smoke box above the top row of tubes. Class "W." For soft coal burning. These engines are from the Baldwin Company, America, and the spark-arresting apparatus consists of a conical cone with conical top fixed on top of chimney proper, by which the products of combustion are deflected, the sparks striking the outside shell of chimney and dropping into a space between inside and outside shells, and thence back into smoke box by means of ciñier scoop. The top of exhaust tubes is placed very low, and a short adjustable pendent chimney fixed on top of exhaust, thus distributing the draught evenly through upper and lower rows of tubes.

30. By Mr. Goss.—Is that a similar one supplied in the engines supplied to us?—Similar to those that were supplied originally, as far as the conical arrangement is concerned. I may state that the last two years we have had endearances of the leading railway officers of the various colonies. The locomotive men have met, and have discussed kindred subjects: the traffic and permanent-way officials; and afterwards the Commissioners.

Tracings of the above are also attached, also tracings of the New Zealand ash pan arrester and the one now in use by the Victorian Railways.

The question of spark arresters was fully discussed at the conference of principal railway officers and Commissioners, held in Adelaide in February and April last, and the following minute was recorded—

"In all the colonies either perforated plates or wire screens are laid horizontally in smoke boxes. In some of them an additional conical spark arrester or horizontal screen is used. In a few of the colonies screens are used in front of the ash-pan doors to catch cinders which might otherwise escape."

"Cheese for compensation for damages alleged to be caused by sparks are not recognised in any colony."

Of course each one thinks their spark arrester the most efficient, but we all thought either of them complied with the law.

31. By Mr. Green Duffy.—You state facts in the minute, but do not make any recommendation?—No.

32. Did you attempt to arrive at any decision?—The question was disaffectionised as to which was considered the best, but no decision was arrived at. It was generally agreed that each one complied with the law.
33. Do you keep minutes of your conferences? Would the discussion be obtained? —Yes, I think so. I will endeavor to get it for the Committee.

34. By Mr. Wheeler. — Have any colony since that conference adopted any other plan of their own? — I think not, because the Forests Commission appears to have been in communication with its members, and the description of the nests of bats given agrees with what was exhibited at the conference.

35. By Mr. Eberlin. — The practical result was that each colony thought its nest the best? — Yes, though I do not know that there was any positive statement to that effect.

36. By Mr. Eberlin. — They did not agree to that, but that they were good enough? — Yes, that was the outcome of the discussion. For instance, there has been a law case in New Zealand lately. I have got what they say about the spark arrester there; they have a similar arrangement. Would it not follow if the same steam could be got it would not serve the other purposes that were more essential?

37. By Mr. Wheeler. — Have you their plan? — Yes.

38. By Mr. Eberlin. — Rather from what you said, in New South Wales especially, besides the horizontal arrester they have a central arrangement. Would it not follow if the same steam could be got it would not serve the other purposes that were more essential?

39. By Mr. Wheeler. — You use one in winter, and when the dry weather comes you put the other in? — Yes.

40. Are your engines all fitted that way? — Yes. As regards the English practice, they do not seem to be very much used.

41. By Mr. Eberlin. — In England it is generally holding in some part of it? — Yes; but there have been some very large fires there. This is what Mr. Webb, the Chief Mechanical Engineer of the London and North-Western Railway, says:—

"The London and North-Western Railway Company owns 2,700 locomotive engines, and does not use any kind of so-called spark arresters in the smoke box. In the engine of this company we rely upon the brick arch and deflector door plate to prevent the escape of sparks. We obtain the latter by the arrangement of chimney bars in the smoke box. Each bar is made straight through all the tubes, but the general arrangement of the fire box pipes and the internal chimney bars is the deflector door plate. The introduction of a grid or other device or horizontal, in the smoke box of a locomotive engine necessitates the flue being divided, and in the locomotive, it is found that this increases the risk of ashes being thrown from the fire box through the smoke box; and the flue box being divided, etc., causes the whole of the result to be in favor of having a smoke box with a deflector door plate, whilst the deflector bar-hole door plate, forms an effective smoke preventer; in fact, we consider the whole arrangement an essential part of the modern well-burning locomotive."

As a matter of fact, we have the brick arches, the deflector bar-hole door plate, and the grid in addition.

On American railways, as we are all aware, the subject has been most extensively treated for years; every conceivable form of screens, baffles, extinguishers, curtains, cages, large deflector doors, etc., have been tried, during the last 40 or 50 years.

In 1883, a committee of the American Railway Men’s Association inspired by the question of spark arresters, and reported that the United States Government had at that time granted more than 600 patents for spark-arresting appliances, and over 500 others for improvements in appliances for conserving smoke, and yet no authority had said that any of these 600 improvements were worthy of general adoption.

The committee revised and discarded 115 patents, which were given with illustrations in the proceedings referred to.

In December, 1889, or six years later, Locomotive Engineering, an American railway paper of authority, states that—Unfortunately, there is a natural conflict between devices designed to promote free draught and those intended to prevent spark throwing, and the conflict between the two passes of dust from the fire box to the atmosphere, and the obstructives put in to prevent these gases from carrying ashes along, has led to a multitude of inventions that have been applied to the front end of locomotives.

No inventors’ arrangement has yet been produced which entirely prevents spark throwing. We have seen a few devices that prevent spark throwing, but they were not patented by the engines from burning freely enough to sell a ton of coal.

There are very few locomotives in Europe equipped with spark arresters.

From my reading of the discussions on the subject the above is the opinion of most of the American locomotive engineers.

I observe that the subject of spark arresters is to be discussed at the meeting of the International Railway Congress to be held in Paris in September next.

Mr. E. Davis, on behalf of a large number of European railways, will report as follows:—

"The treatment of firebox end openings and extended front ends in their relations to the arrest of sparks, and the obstructives offered to draught contain nothing essentially new. The devices used are various forms of setting, with the ends of the pipes were held vertically, some horizontally, and others at varying compromising angles.

"Mr. Green, on behalf of the United States and other American railways, will report, amongst other conclusions, that for preventing fires caused by sparks from that fact—"

"The baffle plates and setting should be so designed as to extinguish the sparks, break the current, and then discharge them into the smoke air.

"Systematic and competent inspection of firebox arrangements and the setting, at regular intervals consistent with a permanent record showing the condition of the time of inspection and the repairs made, will be the best solution of the trouble and fires."

"It will be seen from the conclusion 22 in the latter’s report that after all that has been done of trials of a multitude of inventions, one of the precautions recommended is the setting of baffle outside the firebox, thus practically admitting that the American constructors are perfect.

"The arrestor most generally used on American engines is the deflector plate in front of the top rows of tubes, combined with a rigid wire netting in various forms and under the smoke box."

Mr. Green, in above, reports that certain pipes may be substituted in the future for the deflector.

44. By the Chairman. — When you speak of cutting the grass, you refer to chipping between the fences? — Yes; and the landowners in addition put two or three fences.

That would not be much protection? — Probably if the grass was bent between the fences it would increase the protection.

45. That is on the private land outside your fence? — Yes.

46. By Mr. Green. Deflector. — Can you give us to understand what a deflector plate is? — It is sometimes called "extinguisher plate," or "grid." The tendency is for the baffle to pass the fire through the upper rows of the tubes; the idea of the deflector is to baffle this and cause it to flow through the lower tubes, and thus distribute the hot better."

"See Railway Gazette, page 435, 30th June, 1900.

"See Railway Gazette, July 23, 1901, August 10, 1901."
48. Are any of your engines fitted with them?—No, not all; but there are baffle plates at the fire box end.

49. I thought you said they were built with brick arches and baffle plates?—That is another plate. The object of it is this: when they open the fire, instead of the cold air going in where they shut down on the fire. In Mr. Webbe's case, of which he speaks, that plate is fixed on the fire-box door. We use a separate plate. That is clearly the information I have in connection with railways. I thought that I would say what my opinion of a perfect spark arrestor is.

The requirements of a perfect spark arrestor, in my opinion, are:
1. That it should prevent all sparks from escaping from the chimney that would set fire to goods, etc., on trains, or grass, &c., adjoining the line.
2. That it should not interfere with the free steaming of the engine up to its fullest tractive power, and without increasing the consumption of fuel.
3. That it should be strong and durable, easily fixed, and easily kept clean and in good order.
4. That it should not be capable of being manipulated or tampered with in service.
5. That it should provide easy access to the tubes and other fittings in smoke-box.

I consider that the sectional arresters, used in proper order, fairly comply with four out of five of these conditions, and even the double arrestor does not very appreciably increase the consumption of coal.

I do not say that it does not interfere with the coal consumption to a certain extent. The double arrestor does, the single arrestor does but very little. The double arrestor somewhat increases the consumption of fuel.

50. By Mr. Garrett Duffy. Could you fix the percentage of increase?—No.

51. By the Chairman. Every one would interfere more or less with the draught; that was the opinion of Mr. Webbe?—Yes.

52. The putting in of a grid obstructs the draught?—Yes.

53. By Mr. Wheeler. Can you give an idea of the consumption of coal when you have the two arrestors in use, the additional quantity of coal used?—I have not taken that out, but I dare say about 1 per cent. of 1½ per cent.—something like that. The only other remarks I wish to make are, that I was under examination by the Forests Commission, and all my evidence is there, which could be taken if you wish. Then I wanted to say that I thought the use of compound engines would lessen considerably the liability to spark showing. Compound engines are on their trial just now, but they are coming into use largely in America. I read the advertisements the other day that about half the engines in America are being made compound. They are being used on the Continent too, though in England they do not seem to be taking much to them. The object of them is to economize steam. The steam is used in two cylinders, and the effect is the steam is exhausted at a low pressure, and the blower has not the same tendency to draw the sparks through the tubes as in a simple engine. We have two or three of those compound engines on trial, and proposals to make some of them.

54. By the Chairman. Have any of the Prussian engines finished yet?—One is finished and delivered; but not complete yet. The original point is this: For the entire doing away with sparks, it appears to me that the use of liquid fuel is the solution of that difficulty, provided, of course, that the petroleum referee could be got at a cost not prohibitive. There is no doubt that liquid fuel is the ideal fuel, in which there would be no sparks, a lesser amount used, a lesser quantity to assist, and no smoke, and other advantages.

55. By Mr. Garrett Duffy. Where is that used?—On the Great Eastern Railway in England for many years, on a great number of steam-boats, and on the Russian railways. It has also been experimented with in the States, and in Germany.

56. By the Chairman. Have you any idea of the relative cost? Of course, it would be dear, there. Yes. I am speaking of petroleum reform.

57. By Mr. Garrett Duffy. They are making petroleum from the Moe coal and experiments are now going on in Germany with it. But have you the Shell Transport Company supply, among other products, lubricating oil and even manufacturing the oil? The manager of the company told me some time ago that he expected to be able to deliver liquid fuel here which would compete with coal, but, of course, that remains to be seen.

58. By Mr. Garrett Duffy. Would the engines want to be converted?—Yes, a very little attention of the boilers, and tanks instead of coal bunkers.

59. Do you suppose some of the engines in the worst districts could be used in the summer time. Even if it were dear the extra expense would not be very great?—I do not know; it depends on the price they could deliver it at. Would it be done delivered here at £1 to £1 5s., a ton of good quality before it could look at coal.

60. By the Chairman. You said you did not think that fire originated from the fire boxes?—Yes, that is my opinion—that is, free, adjoining properties.

61. Of course, you must be assuming that the grass is burnt between the line and the fences?—Yes; of course, that would be part of the assumption.

62. Because, supposing there was a very strong hot north wind, as on the 23rd December last, when several fires occurred, do you not think it would be sufficient to carry the live embers and sparks large enough to cause fire, even across the line, and into the tubbocks outside?—It is exceedingly desirable. They fall between the rails.

63. By Mr. Wheeler. Do you not chip outside the rails? I saw men at work the other day just outside the permanent way. A little way from the sleepers you could!—Yes.

64. That would effectively stop the fire from going over?—I should think it would; I should think the cinders would keep inside the rails.

65. Was that the object you had in view in doing that chipping?—It is for drainage. Every well-kept road should have the cess kept clear for drainage.

66. Still if it is not done all along the line?—Yes. I think it is done generally.

67. By Mr. H. F. Williams. Do you not clear the lines of all growth just before the summer?—Yes, they are all waded.

68. All through the year, not only through the summer time?—Yes.

69. By Mr. Wheeler. You tried that scheme on them, did you not?—Yes.
71. How did you find that answer?—It answered in some forms, and not in others, and it was very expensive.
72. Was it more costly than usual?—Yes.
73. What did you pay for it per ton? I understand you got it from the Pyrites Works?—My recollection is about £6 per ton.
74. You used it in solution?—Yes, and conduct soil with it.
75. That cost more than actually weeding?—Yes; it is some time ago since I had to do it with, and there have been trials since. The other officers could tell you exactly about it. My recollection is that it was too expensive, even if efficient, and it was not efficient with some weeds.
76. Perhaps you could not get water handy always?—Yes, that was the difficulty, the time taken to fill the tank.
77. By Mr. Greaves.—You mentioned that you did not think that fires were caused by the ashes or cinders from the ash pan; is that correct?—Yes; that is, the outside of the houses.
78. Your reason was that you thought the cinders dropped between the rails on the permanent road?—Yes.
79. I think you also stated that in some districts or places sleepers were set on fire and burned, and had to be replaced.—I do not know whether those particular sleepers had to be replaced, but we had cases of burnt sleepers.
80. If that was the case, we will assume they had to be replaced. Would they burn as once, or would it take some time to consume a sleeper before it was put out?—It would depend on the character of the sleeper, and the age of it.
81. Do you know the D-shaft line?—Yes.
82. The sleepers there were trees cut in two. On that line there is a fact that you suffered largely from the fans of sleepers going on fire?—I do not know.
83. If a sleeper goes on fire, and the fire lasts, in hot weather would it be possible to extinguish the fire or spark which started the fire between the rails, or would they go, in hot weather with a high wind, into adjoining paddocks?—Yes, it is possible.
84. Then it is possible that fire might originate from that cause?—Yes.
85. Do you know whether it is the view of the company driving the engines that very few sparks come to the ground alive; that when a spark goes from the funnel it is soon cold?—Yes, that is what we think with the double arrester.
86. Are men who drive the engines paid a consideration for doing the most work with the least coal?—No.
87. Do they get nothing extra?—There are consumption sheets published every week showing the men who have the lowest coal. We class the engines on the different roads, and the man with the lowest coal and oil consumption is shown in the margins. We do that for the establishment of a spirit of emulation among the men.
88. Supposing that you established a certain spark arrester, would that not to a certain extent more or less diminish the heating power of the engine?—If you stop all sparks, you stop all smoke.
89. Therefore would it not be to their interest if the men were paid in character on consideration not to have a spark arrester if they could do so with safety. Would they not get better results with a spark arrester?—They would, of course. In connection with that subject, I say, we have the consumption sheets of each engine, and each particular engine, keeping them as much as possible alive, and the men's names are published each month.
90. That is not to his discredit?—No, but the losses of their engines are fixed, and the time. If a man is behind time, or does not take a full mark, he is taken to account.
91. By Mr. Wheeler.—What is the difference between burning on one line with a heavy gradient and on a line comparatively level?—The difference in load.
92. You make the load up so much more and there is the same coal used?—There would be a little less.
93. On heavy gradients there would be less loads?—Yes.
94. And on the local roads you put on more, so the consumption would be about the same?—It would very.
95. By Mr. Green Day.—The Chairman mentioned fires on the 23rd December, and the assumption is the fires were caused by some defect in the engine. There were three fires caused by the same engine, or when the same engine passed along the line, and there was supposed to be some defect in it. Could you produce some reports concerning that engine by the driver of it?—Yes, we can produce all the papers.

The witness withdrew.

Walter Stanton, examined.
104. Can you give us any additional information to that already supplied by Mr. Woodroffe?—No, any more than that I traveled all of the adjoining colonies and New Zealand, and saw the spark arresters in use, and examined them and got a great deal of information, which was readily given by the officers in charge of the engine.

105. This information, I presume, has been tabulated and given to us by Mr. Woodroffe.—Yes.

106. There is nothing that you can say to supplement what has been already given?—No, I think not. I can, perhaps, explain the model now in the room to the Committee if they desire it.—[Explaining the system.]

107. By Mr. Sangster.—Do you think if the spark arresters were not used in the smoke box you could increase the size of the exhaust?—Not much. In the Y class engines the original drawings show 42 inches in the blast pipe. We have increased that to 2 inches; that is because we have a lighter steam pipe here than at home.

108. By Mr. H. R. Wilson.—Is it possible for a driver if he goes out with a double freight, if he has difficult steaming, to take one of these girls out?—No, he would have to have special tools to do that.

109. You have never found that to be done?—No, not unknown to the loco engineer. It would be the duty of the men who clean the fire boxes and smoke boxes to report that if it should have been done, as these operations are carried out every night.

For witness withdrawn.

Henry Lewis, examined.

110. By the Chairman.—What is your occupation?—Locomotive Running Superintendent, Victorian Railways.

111. Have you formed your evidence?—No, I cannot say that I have. I have heard Mr. Woodroffe's evidence, and I agree with all he said. I may mention that I have had an exceptional opportunity of testing some of the spark arresters that have been tried by the Department. In addition to being a mechanical Engineer, I have the advantage of being a driver on the main line passenger trains, so I think I understand the subject as well as anybody.

112. You have seen tests made of the various arresting devices in the other colonies?—No, not in other colonies; my experience is confined to this colony.

113. Have you any experience of the other arresters other than as a driver?—I have tested them myself. I think all of them submitted for testing I have made the tests.

114. Were the arresters in use in the other colonies issued here?—No.

115. You have had no experience of those?—No.

116. You are in a position to express an opinion as to their merits as compared with those in use in Victoria?—No.

117. You are in a position to express an opinion in regard to those submitted to the Department?—Yes.

118. Do you consider any of these have any particular merit?—No, I do not.

119. There is one we wish to-day, the invention of a Mr. Lovel. Your report on that seems to be favorable?—It might be favorable in regard to its catching the sparks, but if the engine was not steaming well it is useless.

120. It appeared from what you said, that it did not seriously interfere with the steam?—It is a long time ago now, and I can hardly remember. I have recorded on every test I have made, and prepared to substantiate every word I have said.

121. Some consider better than others as arresters, but they interfere with the steaming?—Yes.

122. Do you consider that fires do originate from the locomotives in any way, either from the furnace or the fire box?—I do not.

123. Are you aware it is admitted by the Department that fires have originated?—Yes, and the engines have been blazed.

124. Taking the Department's own admission, they have admitted that the fires have originated?—Not from any accident from the locomotives. I am not aware that they have admitted that.

125. Neither from the furnace or smoke box. We have a return furnished to the Forests Commission admitting so, and that claim has been made?—Yes, I was not aware of that.

126. There was a case at Bussel? I think I gave evidence there.

127. It was proved to the satisfaction of the court that the fire had originated from the locomotive?—I did not know that. The verdict was in favor of the Department.

128. On what grounds?—That the Department had taken all the precautions possible to prevent sparks, and that the spark arrestor used was the best known.

129. As a matter of fact, was it not proved that the fire originated from the locomotive?—I do not know of that. We have evidence,—for instance,—the evidence in this case,—of admission by the Department itself that fires had originated, and they had paid compensation. I will ask the secretary to read the statement I refer to by the Department.

The Clerk.—In 1890-91 the amount paid for grass fires caused by locomotives was £3,253 10s., and the same year for damage to freight in transit, £1,204 13s. 4d. In 1891-2 26d. was paid for fires caused by water from locomotives. There is a doubtful case, £28 3s. 6d., compensation paid. Since that nothing has been paid by the Department for damage caused by sparks from locomotives; there has been no damage to freight in transit, but not for grass fires.

130. By the Chairman (to the witnesses).—According to that, there was only £26 paid since 1891. We cannot accept 1890 as a fair test, because wood was being used then very largely. There was a sum of £28 paid in a doubtful case, but I think the doubt would be very much in favor of the man owning the pannier. However, the facts remain that fires have originated, and there was the case in Bussel in which I am not prepared to state definitely of my own knowledge, but I have heard repeatedly that the fire originated by a locomotive. The point is—how do you think the fires do originate. If you do admit,
for the sake of argument, that they do originate from the locomotive, where do they come from—the funnel of the fire box?—With regard to the fire box, I may state there is one thing that Mr. Woodroffe did not mention, that is the Holborn's lay line they never had an ash pit, and the fire dropped on the line. I do not believe they ever used an ash pit, and no fire I ever heard of originated from those engines.

131. Then you think, if they do originate from the engines, it is from the funnel?—Yes, if at all. If the ashes come out on the top of a tank, they may roll down the tank, but I never knew of engines to roll outside the fence.

132. If a strong blast wind were blowing might they not be carried outside the fence?—They would not go outside the fence. The impetus would be in the direction the train was traveling.

133. You opinion is that those do not originate from the fire box?—Yes.

134. If they do originate from the locomotive it must be from the funnel?—Yes.

135. By Mr. Garden Duffy.—The Department have never experimented with any spark arrestor in use in any other colony or country?—Not that I am aware of.

136. And you have conducted all the trials?—I have conducted most of the trials on the Victorian railways since I have been in the Department—38 or 39 years—and I have been in the running breach for 26 or 47 years.

137. By Mr. Wheeler.—Are you still in the service?—I am on holidays now, but am still in the service.

138. By Mr. Kennedy.—Have you subjected an engine under those conditions to any practical test as to the possibility of ashes coming from the ash pit causing fire?—We can see that from engines running every day on every day trains whether the ashes come out of the ash pan or not.

139. Put us to the liability to cause a fire in grass or timber, or inflammable material such as grass blown up by the wind on the side of the line. Have you had any practical test as to the possibility of fire originating under such conditions?—We have a practical test every day, as the trains run every day, and we could not have any other test. If the grass is dry, and alongside the line, I live closer touches it, that would cause fire.

140. Are you satisfied that ashes with sufficient vitality to cause the fire in dry grass, coming from the ash pit?—Yes. They escape on to the permanent way, and perhaps a little further, but I have not known them to go beyond the fence. There would be sufficient vitality in them sometimes to set fire to dry grass.

141. By Mr. Garden Duffy.—Have you known it where set on fire?—Only where a driver broke the regulations, and knocked the fire out on the line.

142. We know that sleepers made of timber just cut last on the Donald line were set on fire; have you heard of that?—I hardly credit it, and a sleeper could be set fire to by ashes from the ash pan. It can only be done where the driver knocked the fire out of the ash pan and the ashes roll out of the same.

143. By Mr. Wheeler.—Is that done when standing or running?—Standing at stations or sidings.

144. What is the reason they made an alteration in the ash pit?—The only thing I can say is, they want to be doubly careful.

145. The driver can command it at any moment wherever standing?—Yes.

146. Therefore there is no security if he wants more draught he will get it?—If he is likely to stick up for want of steam he will use it.

147. By the Chairman.—That is where we want your opinion. It is alleged that the drivers, when they find themselves in a tight place, often throw open the fire box to get an increased draught. Would that modify your opinion?—The driver is justified in opening the damper as wide as it will go.

148. What would be the effect of his doing so?—The ashes are more liable to roll out of the ash pan.

149. Would not that be more liable to cause a fire?—There would be a greater number of ashes coming out of the ash pan, but no great liability of ashes getting outside the fence.

150. Would it be more liable to cause fire on the permanent way?—If there were any very dry stuff such as grass or other material, it would have a tendency to set fire to it certainly.

151. Have you control of the men who burn off?—Nothing whatever; that is the permanent-way branch. I have nothing to do with them, but all to do with the engines outside of the Newport shop.

152. By Mr. Sangster.—If a driver finds himself in a tight place for want of steam, he would open his damper as far as he could. He might have coal that was dirty, and the stoker might put in his dart and touch it up, and there is a liability of ashes getting out, and with a stiff breeze blowing, would there not be a tendency to lift them over the permanent way?—No. The way they get over is that they bounce, but I have never known any to get to the boundary fence, and the only time I have known them to lift the permanent way is on a bank when on the down grade.

153. Have you ever tried getting an engine in such a position, and putting the dart in and having people to watch the effect?—If that were done while the engine was standing, not a sleeper would leave the rails, and if they did they would go into the 300-yard way.

154. By Mr. Wheeler.—Have you ever known a sleeper set fire to?—Yes, I have. When fire has been dropped, or even stirred up, as Mr. Sangster states, the cutters of the ash pan would set fire to a sleeper, but I have never known a sleeper set fire to when the engine was travelling by the cutters from the ash pan, because it would only be one or two more and there; those could be no quantity of them at a time.

The session adjourned.

Adjourned to-morrow, at two o'clock.
THURSDAY, 18TH AUGUST, 1890.  

Members present:

Mr. McKenney, in the Chair;  
Mr. Bower;  
Mr. Gaynor Duffey;  
Mr. Grays;  
Mr. Drinkwater.  

Charles Ernest Norman, examined.

155. By the Chairman. — What is your occupation? — Engineer for Existing Lines, Victorian Railways.

156. Have you formulated any statement? — No.

157. I understand that you would prefer Mr. Sims to give the complete evidence, as he has been examined previously? — He was examined before the Forests Commission, and gave evidence on a somewhat similar subject as you are on; and, as he was asked for certain evidence, he gave up some particulars, and would be ready to give evidence before you.

158. We thought we would like to ask you, as head of the Department, some questions; one as to the times fixed for burning off the grass between the railway line and the fence. In the regulations the hours shall be from two to six; — Not before two o'clock. That is in accordance with the Police Offences Statute, the part dealing with the careless use of fire. We follow that rule.

159. That is the basis of your regulation? — Yes, to comply with law.

160. Of course, you are aware that this gives a great deal of dissatisfaction; a great many feel the hours are not correct ones, and earlier hours would be more suitable? — We feel that very many ourselves. We would greatly prefer to have a fixed time to burn off when the conditions are most suitable, instead of being compelled to lose the morning, when the wind is not so strong as it is the afternoon, and we have to wait till after two o'clock.

161. There is another point; you fix a certain day, and instructions are sent out to the gauger that on a certain day he shall burn a specified portion of the line, and when that day comes, no matter what sort of wind is blowing, a hot wind or anything else, he has to proceed with the work? — No; the gauger has no such instructions. The responsibility rests on him to select the best time. By the law he has to give 24 hours' notice to the adjoining landowners, and by the time the 24 hours are up, the weather conditions may change. There may be exceptional circumstances, and he should wait until the conditions change, and give fresh notice.

162. Is he at any time without the freedom to do that? — Perfect. Not even the inspector in charge of a district in which the gauger is working in that respect.

163. By Mr. Bower. — Along the line, in the railway reserves, in many places there are stumps that have been there for a great many years, and are dry. I understand that every year the grass is cleared from around those stumps? — Yes, that is part of our instructions to the gauger. The gauger has to see that the grass is cleared for 3 feet along the railway fence, and 3 feet around the stumps or buildings of a character that might take fire.

164. How long has that been in force? — For at least ten years.

165. By Mr. Wheeler. — If the money that has been expended for clearing round the stumps has been devoted to them, it would have been better if it might have been 3 done in the first place, but year after year they go on taking the stumps out for firewood, and they are disappearing by degrees.

166. Would it be a good policy to take the stumps away? — I have not gone into the cost. There is no cost in our clearing round the stumps it is done by the ordinary gaugers. The matter is not of sufficient magnitude to save any additions to the staff.

167. It was alleged that the locomotive fire for was started by a stump, and although no fault of the men who took the ordinary precaution of damping the stump when they left, but at midnight a breeze sprung up; evidently a spark still there was fanned into a flame, and the stump threw up sparks which went into the high grass in the field adjoining, and it was in the hills before it could be stopped; it then occurred to the farmer that, as the stumps are so old and like timbers, it might be better to take them out? — I think it is well worth looking into, as to whether it would not pay the Department to burn these out in the proper season.

168. By Mr. Wheeler. — Where would you get the wood to burn these out? — We could get the wood alongside in many cases.

169. It would cost more than grubbing them; it would be a costly proceeding? — I do not think so.

170. Would there be any liability of those stumps getting on fire by a spark getting into the decayed stumps? — A stump would have to be very dry for that to happen. I have not heard of any cases of that.

171. By Mr. Grays. — Do what extent are stumps damaged by fire? — By bush fires?

172. Any fires? — We seldom have any cases of them being damaged from causes, excepting in cases where coughs stand for some time and the ashes drop out of the fire box. For instance, at stations the ashes drop down and harm the sleepers a good deal, or near them, and they have to be taken out, but we have never had any cases of sleepers burnt on the lines, except by bush fires. There may be an odd case that I never have been. We might have one sleeper in a 100 miles of line, but we have had bush fires, such as in the celebrated bush fire down in Gippsland a few years ago, and on the Camperdown line, where sleepers were burnt.

173. You mean ex fires that came across the line? — Yes.

174. It has stated that a great number of sleepers were burnt on the Donad line in consequence of the sleepers not being sawn sleepers, but split from the ordinary wood without the bark being taken off; is that true? — I never heard of it. That must be before my time. The sleepers on the Donad line were rough, cut into any shape, but all sawn.

175. By Mr. Wheeler. — Which are the more liable to take fire? — The split ones I should say; there are more splinters about them.

176. By Mr. R. Williams. — You were in America last year? — Yes.

177. When there, did you make any inquiries as to their spark catching affairs? — I did not go into the spark catching question. I am sorry I did not, but I had good many things to go into. It is outside my business. I made inquiries into matters outside my branch, but not the spark catching question.

The witness withdrew.
178. By the Chairman.—What is your occupation?—Chief Assistant Engineer for Existing Lines.

179. Have you formulated your evidence; would you like to make a statement to the Committee?—Only so far as that, I think the best evidence I can give is to read a few notes that are issued to inspectors and gaugers, bearing on the subject, as they seem to me to be so completely so somewhat exclude the subject: the book I intend reading from is issued from the Existing Lines Branch, and it gives instructions for the guidance of inspectors. It is issued not only to inspectors, but to all gaugers as well—[reading as follows]:—

180. The clipping of grass along railway branches by a width of 8 ft from fence line, whether the land is leased or not, is to be done before grass burning is commenced.

181. Every precaution and vigilance must be assured to avoid the occurrence of fire on railway property.

182. No one is permitted to burn grass in the vicinity of the railway. Grass is to be burnt early in the season, and, if possible, to be burnt by the railway company, who can do it more efficiently.

183. Inspectors and gaugers are responsible for the proper seeing of notices on all owners or occupiers of land subject to the railway, and it is a serious breach of regulations if they neglect such instructions.

184. Inspectors must take care that all grass and rubbish lying between the fences on any part of the railway property shall be burnt off whenever the weather may so permit and be done so as to prevent the spreading of fire from the railway into the country.

185. Every precaution is to be taken to prevent grass fires in other buildings, whether occupied or empty, from spreading to the railway.

186. Grass which has been properly clipped and burnt off prior to the time the fire started, shall be considered as burnt off and not as a new fire.

187. Everyone is required to see that the railway is properly attended to and that grass is not left in an untidy state.

188. You are requested to take notice that it is intended to burn the grass within the railway fence and contiguous to your land on the day of the week next after this, and that the requisite precautions will be observed in doing so.

C. R. NORMAN,
Engineer of Existing Lines.

RAILWAY DEPARTMENT,
EXISTING LINES BRANCH,

You are requested to take notice that it is intended to burn the grass within the railway fence and contiguous to your land on the next day of the week, and that the requisite precautions will be observed in doing so.
182. Do you confer with Mr. Norman that the law should be amended?—Yes; it would be much to the advantage of the Department if we had a free hand in regard to the time. I am sorry that the prevailing wind is one side in the morning, and from another in the afternoon. If you can only commence burning off after two o'clock you may have the wind contrary to what you want, and by waiting the grass gets very dry, and that sometimes sets the grass fire, in a very awkward position.

183. Then accords, perhaps, for what I speak of?—We would appreciate the information very much if made.

184. By Mr. H. R. Williams.—Do you find that the railway is made use of by tramps, to work over the line?—I must admit I have seen men walking along the line, but it is contrary to the regulations.

185. Do they camp under bridges, and so on?—We are in the office, and I do not know, but it is not permissible. I must say, in travelling along the line, I have seen men walking alongside the fence.

186. As these men ever been prosecuted by the Department for trespassing?—I think so, on the coal line at Koomburra, where they gave some trouble, but I was encouraged to be such a place being in winter that the only clean place was the railway line, and I do not think anything was done to them.

187. By Mr. Hower.—Approximately, how many cases during the last five years have you had of damage done by fire?—A return is being prepared giving you all that information. I do not know whether it is here yet; if not, you will have it is a day or two. I think something like £200 has been paid in compensation during the last five years.

188. Could you give an idea of the proportion of the claims made and the amount paid?—I could not tell you that.

189. Suppose that after a gang has started burning on a hot day the wind should change, what provision is there; leave water on the spot or anything to put the fire out?—I think they have bags and accounts, and if they have, how long have they seen them lasting out a fire.

190. Do they bring water to it?—I am not sure about water.

191. If you did burning off in the midst of a hot summer, next to fields of ripe standing corn, would it not be dangerous?—I think they have water available to wet their bags; that is my impression, but I would not be sure about it.

192. Did you hear the question I asked Mr. Norman about the stamps?—Yes.

193. What do you think of the suggestion that the stamps should be taken out at once?—I think it would be a very good thing, if it is not too costly.

194. Are they not so old and so dry as to be a great danger; is it not often the case that these stumps catch fire, and the fire remains after the workmen leave in the evening, and is smouldering secretly, and they cannot not notice?—It is a possible case, and I think it would be better if the stamps were removed; but Mr. Norman is going so inspired into the matter.

195. By Mr. Grevous.—They burn some stumps?—Yes.

196. You say that a notice had to be given, and Mr. Norman explained why the two o'clock was fixed as being in accordance with the Police Offences Statute. A man goes notice?—I hereby give you notice that I start at two o'clock to never to burn. And if they make changes they must give fresh notice, to remove the notice?—Yes.

197. If it were given at no earlier hour is it be a much greater convenience, both to the man occupying the land and the men who have to be sent to exting the fire?—Yes, very much.

198. By Mr. Hower.—If the men burning off between two and six found, when their time came to leave off at six o'clock, that the wind and other conditions were favorable for burning, would they knock off at that hour?—I think they are bound to knock off burning at that hour. They would remain in attendance after that, if necessary.

199. What I mean is, would they just knock off, at the end of the day's work, in the midst of a fire, and then begin again, and do the other half of that section the next day?—If I understand you rightly, they would have to do that. They cannot start burning after six o'clock. It must be between two and six, and if they have not finished at six o'clock they must resume another time.

200. Do you not think provision should be made in the care of a section 5 or 6 chains in length if you had three-fourths of the section burning, and I chain or 2 remaining, do you knock off promptly at six o'clock?—No, it is only sometimes in such weather, and sometimes later; sometimes in the summer it is a longer day's work. It is the same length of day, but they commence earlier.

201. By Mr. Grevous.—Is it not a fact that the notice points out where they are going to commence, at such and such a milepost?—Yes.

202. They say?—I beg to give you notice it is the intention of the Department to commence burning at such and such a milepost?—Yes.

203. What do they have in those summer days when they principally burn; have they different times at different seasons of the year?—Apparently, the rule provides that they must begin later and work later.

204. While burning off?—Yes.

205. On an ordinary day they finish their work at fire o'clock?—At half past four.

206. On. "burning" days they remain for a longer time?—As long as necessary to put the fire out.

207. The usual termination of their day's work in five o'clock?—No, half past four, and sometimes in such weather, and sometimes later; in the summer it is a longer day's work. It is the same length of day, but they commence earlier.

208. By the Chairman.—Are the lines kept perfectly free of weeds between the rails?—I cannot say that they are.

209. Of course, we do not know whether the state of things we have heard of exists at the present time, but I have heard of lines with the grass growing up between the sleepers, and the live oaks fall down and set fire to them?—It would be impossible to keep all the weeds down, but if a man has several miles of line under him he endeavours to keep them down.

210. Do you know whether such a state of things is possible, as the weeds growing up to such an extent that the fire falling from the fire boxes would set fire to them, and some of the fire blows across the fence?—I do not think it is very probable.

211. Do you think it is possible?—Of course, that may be possible.
213. By Mr. Gavan Duffy.—What is your allowance of men in proportion to mileage?—For a single line a gauger and two men would have about 5 miles.

214. Is that the usual proportion? I thought it was a mile a man.—Of course on the double and heavier lines it is a little less mileage to a gauger. In some cases it is even more than that.

215. Is there any general provision allowed in railway statistics?—It depends on the amount of business done. If there is only one train a day the line does not require as much attention as if there were many trains.

216. By Mr. Graves.—Is not that varied very much in management. When you were on the economical system, were there not many men less employed on the gauge?—Yes, I think so.

217. Is it not a fact that they reduced one man in every five?—They did make a reduction, but I do not know to what extent.

218. You do not know that the weeds, when that was done, became a very dangerous item in the matter?—No, it was before my time.

219. By Mr. Bower.—Is there about the since number of men employed in a gang in New South Wales as here?—I think the practice is about the same.

220. By Mr. Graves.—The head gauger has to go over every portion of the line absolutely every inch of his section, once a day?—Yes, once a day; I am not very sure whether the gauger has to do it absolutely.

221. He is responsible if he does not go he must send some other man?—The gauger, or one of the men in the gang, has to go over the whole length of the section.

222. By Mr. Bower.—Who is responsible for any unreasonable or negligent act in burning off?—The gauger of the length.

The session withdrew, Adjourned to Wednesday next, at ten o'clock.

WEDNESDAY, 22ND AUGUST, 1900.

Members present:

Mr. McKenney, in the Chair;
Mr. Bower,
Mr. Gavan Duffy,
Mr. Graves,  
Mr. Kennedy,
Mr. Staggetter,

Henry Parsons, examined.

223. By the Chairman.—What are you?—Inspector of Permanent Way on the Victorian Railways in charge of portion of the Gippsland district, based at Sale.

224. How long have you been in the position of inspector?—Over eleven and a half years Existing Lines, and about three years on Construction.

225. Have you been in other districts during that time?—Only six months from Caulfield and Middleboro and council Montothington way.

226. Your experience is confined to the Eastern district of the colony?—Yes.

227. Have you had any direct experience in connexion with fires that have been alleged were created by railway locomotives?—There have been fires in the district supposed to have been caused by locomotives.

228. Did you make inquiries into those cases yourself?—No, the mode is to report to the Melbourne office. We endeavour to find out what particulars we can, but have not found any direct evidence that the locomotive caused the damage.

229. When the allegations were made you reported to your chief?—Yes.

230. Were you then instructed to inquire into those cases?—As soon as a fire occurs the instructions are to make ourselves acquainted with the origin of the fire, if possible—we do that.

231. When you did make inquiries as to the origin of those fires?—Yes, as well as we could.

232. How many did you have to inquire into?—I dare say a dozen or more.

233. Where persons alleged the fires were caused by the locomotives?—No. There have been no claims with the exception of one; that is the box Cowwar fire, but the inquiries would take place independent of any claim sent in by the property-holders.

234. What would cause the inquiry to be instituted?—To endeavour to find out the origin of the fire as well as possible.

235. Without any prompting on the part of the landholders?—Yes.

236. Or any claim or allegation on their part whatever?—Yes.

237. Do I understand that your Department inquires into the origin of all fires that have been destroying the grass and pastures close to the railway line?—We endeavour to do so as well as we can.

238. Without any complaints being made by the landholders?—Yes; that is a standing instruction.

239. In carrying out these inquiries have you ever had occasion to believe that the fires were caused by a railway locomotive?—It is very doubtful.

240. Have you ever had any evidence such as you could regard as direct evidence that the fires were caused by the railway locomotives?—In one instance I believe I lost.

241. What happened in that case?—It was a very dry day; the men were on the look out for any fire occurring on the length the engine passed and a fire occurred immediately after the engine passed. The enquirer said he was on the fence watching it, but I had only the reporter's word for it.

242. Did that cause much damage?—It burnt several hundred acres of grass.

243. Did the Department pay compensation?—Not that I am aware of.

244. Did they refuse to pay it?—I am not aware that there was any claim.
245. In making such inquiries, you are instructed to obtain evidence as to whether the fire originated through a railway locomotive; what would you call direct evidence. If it could be proved that the fire originated about ten minutes after the train passed close to the fence, would you call that direct evidence?—It may be direct evidence that the fire came from the train, but not direct evidence that it came from the locomotive.

246. If it started five minutes after?—Even if it started immediately, that is no direct evidence that it came from the locomotive.

247. If it started five minutes after?—I do not think that is direct evidence that the fire originated from a cigar being thrown out, or anything of that description?—I do.

248. Suppose the fire originated outside the fence, would you think the last of a cigar would have been thrown that far?—I should think not.

249. Would you call that direct evidence?—A cigar or a match might be blown there by the wind.

250. Would you regard as direct evidence that the engine had creased the fire?—I do not know that I could express an opinion on that.

251. It would have to be that a spark was seen to leave the engine, and seen to touch the grass and start the fire?—That would be direct enough.

252. Would anything short of that be?—I do not think it would.

253. Then it is practically impossible to get direct evidence that any fire has been lit by a railway locomotive; that was the only experience that you had where it was admitted that it came from the locomotive?—No, we would not admit it even then.

254. On what grounds?—We were never asked to admit it.

255. Your own employé said he saw the fire start?—Yes.

256. And he attributed it to a spark from the engine?—The fire commenced immediately after the engine passed.

257. What did the reporter attribute it to?—He would not give an opinion; he simply reported in the usual way.

258. That the fire had started immediately after the train passed?—Yes.

259. He did not express an opinion as to whether it was a spark from the engine, or an ember from the fire box, or a cigar butt?—In this case it was simply an engine without any vest.

260. Then it had to come from the engine in some form?—Yes, in this case.

261. By Mr. Kennedy.—Have you had any actual tests, under your own observations, as to the possibility of escape of sparks of a dangerous character, or cinders from the fire box?—That would be more for the cognizance to say.

262. Have you had any carried out under your observation?—No.

263. Then you cannot say from your own observation as to whether it is possible whether sparks of a dangerous character can escape through those openings that are in use, or through the ash pans, as ordinarily used on the line?—No; I cannot say for certain. There is no test, but it is difficult to trace them.

264. Under your own observations, have any tests been carried out as to the possibility of fire arising?—No.

265. By Mr. Gregory.—You said that the reporter reported a fire; did you go to see it?—No, I sent a gauger to count fencing posts burnt, &c.

266. Did you go to that at any time?—I passed by it in my custodial duty.

267. Did the fire take place on the line?—In the pathlock.

268. Then the probabilities are that that was a spark?—Yes, there is the possibility.

269. Can you say as to those other fires whether they were outside or inside the fence?—Outside the fence.

270. Have you found, in your experience, that cinders from the engine, from the ash pan, have set fire to the permanent way under your management and control?—Not directly. Still, I am of opinion that the cinders do drop from the fire boxes.

271. Do they sometimes burn the sleepers?—Not the sleepers; the may ignite the grass: I do not say they do, but it is possible.

272. Sometimes those fires smoulder for hours and hours?—They would not smoulder very long.

273. By Mr. Kennedy.—You are in charge of the burning off?—Yes, the gaugers are under my charge.

274. The regulations, I understand, provide for your burning off in the summer between two and six?—Or later, if necessary.

275. Suppose you are burning off, and the wind has changed about six o'clock, do you continue the work after six, if necessary, or do they knock off?—The gaugers are instructed; it is left to their judgment. If they can, with advantage to the Department, burn off to advantage, they do so; but as they choose.

276. They knock off when it is safe?—Yes.

277. There are a considerable number of stamping along the line in the reserves?—They are getting fewer every year.

278. You are not making any attempt to take them out?—Only in a few cases; some gaugers do; we stop round the stamps every year.

279. How many years have you been doing that?—Several years.

280. Are those stamps dry now?—Yes.

281. In fact, they are like tinder?—Some of them are pretty dry.

282. In burning off, after a day's work is finished and they are putting out the fires, is there not a great danger of sparks lurking in those stumps and being blown into a flame about midnight in the summer by the breeze that comes often at that time?—The idea of chopping round them is to keep the fire from getting a foothold.

283. Have you ever known of a stump igniting during the night?—No; it may occur once or twice, but not to my knowledge.

284. In my district there was a case where a stump remained in the midst of the burning off which was supposed to have been put out, but at midnight a breeze sprang up and put the whole country afire; would it not be safer and more economical for the country if the Department took the stamps out entirely?—In the long run I dare say it would.
285. If there are standing crops where the line runs through in the summer, do you still continue burning off the grass on the reserve?—We have only a few cases in my district with standing crops near the line, along the line; it is mainly grass.

286. You have had no experience of the districts where the crops are growing along the line?—Only in one case on the Baudasee Flats; the land on the line in that case was cropped by the tenant and the crop is cut while green.

287. Do you think the safest way of controlling the grass on the reserves is by burning off?—I think the system adopted by the Victorian Railways cannot be very much improved on, because it is a fire-break throughout the length and the width of the country, a national fire-break. If there were no burning off, a fire would come from the bush, cross the line and go over a very extensive tract of country, whereas at present when a bush fire is approaching, the line inspectors see the smoke, and they do what they can to arrest the fire and put it out.

288. How many men are usually in charge of the burning out?—There are gangs, some three, some four.

289. What is the length of a section?—Four men, 6 miles.

290. Might they be burning on a hot-wind day?—No; that is against the regulations.

291. They may burn in the middle of summer?—Yes, in suitable weather when the wind is blowing in the right direction.

292. Suppose that in the midst of their work the wind changed, and the grass suddenly got beyond their control, what provision have you for extinguishing the fire?—None at all.

293. Do you not take tanks of water?—The ganger may take a bucket or two of water on his trolley to wet the bags.

294. Is it not rather dangerous when there are standing crops and the grass 2ft. 6in. in the reserve, that you have in the middle of summer no provision to check a fire that may get beyond your control?—It certainly would be better to have some provision; but what could you have?

295. You could have a truck of water?—It would be very expensive. An engine with water train would have to be employed.

296. You have no provision to check the fire with water if it is to be beyond the control of the gangers?—No. If there is no provision would be for every land-owner to try and protect himself as well as for the Department to protect him. Our experience is that the land-owners do not care about it at all; they are not even present. They get 24 hours' notice to be present. There are only two persons in my district who do anything to prevent fires coming from the railway on their property, and this on only 5 miles out of 130 miles that I have. The land-owners practically do nothing. The Railway Department have to do everything.

297. By the Chairman.—As to those land-owners who do nothing, do not you think they have a right to expect that if the Department is burning off it will prevent the fire encroaching on them; they naturally look to the Department when burning off to do the work locomotives?—The Department do all the work, and then take every precaution that is possible, within reason.

298. But do not you think that the land-owners have the right to expect that if the Department undertakes to burn off, they will do the work without applying to them?—Yes, I think that it is only reasonable that every man should try to protect himself.

299. If they think there is danger; have you known any cases in which the fire has got away from your men?—Only once, and if it is alleged it has got away.

300. Do you not admit that it did?—The ganger was present; I was not. He admitted that it burnt a few acres on the side of the line; that is the only case of the kind I can remember.

301. You are compelled, according to the Police Offences Statute, to burn off after two o'clock; you cannot burn before; do you think that condition hampers you in burning off?—Yes, I do, very much. I think that is a mistake.

302. If that is so with the railways it is so with land-owners generally, that according to the Police Offences Statute one can burn off earlier than two o'clock in the day; you think you should be at liberty to burn off at any hour of the day that suits you by giving due notice to the adjoining land-owners?—Yes.

303. By Mr. Greaves.—You said that the land-owners did not take much interest in the matter; is it not common sense that having got notice it is then for them to be prepared to protect their own property?—I should think that to be the object.

304. You said the line acts as a break for fires; are you aware whether it is a fact that constantly fires come in towards the railway, and stop at the railway fence in consequence of this break?—Yes, The witness withdrew.

William Ley, examined.

305. By the Chairman.—What are you?—Inspector of Permanent Way, stationed at Seymour.

306. I have charge of the North-Eastern district—from Essendon to Avenel and Rushworth.

307. How long have you been inspector?—Eleven years.

308. Where have you been stationed during that time?—Seven years on the relieving staff all over the colony.

309. During that time have you had occasion to inquire into the origin of any fires alleged to be caused by a railway locomotive?—Not to make technical inquiries from the adjoining property-owners, but from a railway point of view I have made inquiries.

310. Have you had to make many such inquiries wherein it was alleged the fires were caused by the locomotives?—I can only remember two.

311. Did you inquire into these cases brought under notice by the gangers?—Yes, a number of those—I have not any idea of the approximate number—there would be a dozen, or more.

312. In regard to those two particular cases, were there any railway officials associated with you in the inquiries?—Yes; there were Mr. Tavener, the surveyor, and the district inspector. The case was at Tungamah some years ago—almost forgot about it. The result of the inquiry at Tungamah was that the fire broke away from the ganger when burning off.

Did the fire do much damage?—Yes, it burnt some 150 acres.
313. Was any compensation allowed to the persons who suffered?—I cannot say.
314. What was the date of that inquiry?—I cannot give that without referring to my diary. I will send the particulars to the Committee.
315. Did the Department admit that the fire had been caused through the fire getting away from the ganger?—Yes. The recent case is the Bradford.
316. What was the result in that case?—I cannot say what the result is. I was not appointed to take the evidence of the Board, but only to render assistance in my capacity as Permanent Way Inspector.
317. You knew the felling was there; was there no direct evidence of fire?—Yes.
318. Can you tell us what would be regarded as direct evidence that the fire had been caused by a spark from a locomotive from the fire box at the felling? If a train passed and a fire broke out ten minutes afterwards, would you think that direct evidence?—I would hardly think that direct; if I were present and observed the conditions and surroundings I might be able to say.
319. What is the evidence of the last witness?—Yes.
320. Do you endorse his views in the matter that nothing short of seeing a spark leave the engine and alight on the grass would prove it was caused by a locomotive?—Yes, I think that would be evidence.
321. Do you endorse his views in the matter that nothing short of seeing a spark leave the engine and alight on the grass would prove it was caused by a locomotive?—Yes, I think that would be evidence.
322. If a person were standing close by and saw the circumstances of the piece where the fire originated he might be able to determine them.
323. You agree with him that it is very difficult to get direct evidence?—Certainly.
324. In regard to the sparks from the felling or fire box going from the engine, are you in a position in that matter to enable you to express an opinion as to whether the fires are more likely to originate from the fire box than the furnace?—Of course there is always a certain liability of the fire getting out of the fire box of a train traveling at a great rate, but I have never known of a case where the fire has been spread outside the railway fence from that cause.
325. Would you regard it as an impossibility for a spark to be dropped by a train and conveyed by the wind outside the fence?—In some places it would be almost an impossibility; in others the line is much narrower, and there are embankments.
326. In such cases it would be possible?—It may be.
327. You heard Mr. Parsons say as to the hour of burning off; do you approve of his views?—I certainly think we are hampered as to burning the grass, two o'clock being the hottest part of the day, and there is more likely to be a change of wind at that time; the danger is increased by having to comply with those conditions of the statute.
328. You have noticed in the weather conditions that frequently in the forenoon the wind is blowing from the south in the summer; I understand you burn off in order to take advantage of the wind, to have the wind blowing towards the railway?—The regulations and instructions to gangers are that in no case is a fire to be lit when the wind is blowing contrary to the side of the line where we want to burn.
329. It might so happen when you wanted to burn on the south side of the line that the wind might be blowing for several days from the south in the morning and the north in the afternoon; the result might be that you might not be able to burn one side of the line for several days, and during that time the grass would be getting rapidly dry and into a dangerous condition for burning; has that ever happened in your experience?—It happens every year.
329. You regard that as being almost entirely due to the regulations under the Police Offences Statute?—Yes.
330. By Mr. Greene.—You heard the evidence of the previous witness where he said the landowners do not take any care about the matter; do they on your line?—No.
331. Is your district the fires would be disastrous to the landowners?—Yes.
332. In the engines on your line, have they protection to the fire boxes?—Yes, as far as I know.
333. Was that precaution taken believing that damage might be done by the engines?—I cannot say; I know it is a precaution.
334. You think it has been so?—Yes.
335. Have you seen the sleepers burned by the fires on any of the lines?—Yes, I have noticed sleepers charred by the fire.
336. If ainder falls on a particular kind of ironwork it does not burn so quickly, but on grey or red box it would number for some time?—There would be a tendency for it to smolder; it could not create a flame owing to being surrounded by the ballast.
337. Have you ever seen the stumps that have been burning a day or two after a fire?—No.
338. Do they not take water to put these out?—Yes.
339. That water is brought up on a trolley?—Yes; it is obtained at the gwo-houses, or where water is stored on the line.
340. They take sufficient to put out those stumps?—Yes; they are all chipped round. I know on the Goulburn Valley line they have been burning the stumps off there for the last twenty years.
341. They are principally box, and when they get sight they will smolder for days?—Yes, you must use the water to put them out if they should happen to get alight when burning off.
342. Of those stumps would burn for feet into the ground?—Yes, if left alone.
343. Was it suggested to you that there could be anything done to mitigate those fires?—Yes. One thing I would suggest is that we be empowered to use our discretion as to the hours of burning, and that the property-owners be obliged to render assistance when we are burning. We are compelled before we can start any fire to give them in person 24 hours' notice that we intend to burn. It is a common thing for us to supply notices six or seven times, owing to the wind being unfavorable, and in some of those cases the people take up so much assistance. There are some isolated cases where the farmers take the precaution to plough along the line, but in 90 per cent. they take no notice of the notices.
344. Do you know whether the owners adjoining put plough furrows outside the line to protect themselves?—There are a few who do.
345. Do you know that private owners who burn on the land have to give notice to their neighbors? — Yes, I know there is no notice required to the Department when they are burning off.

346. Consequently the railway is damaged by fires coming across it?—Certainly.

347. You do not know how these fires arise?—No.

348. Would not a survey be as likely to be called in question for the damage as you would?—Yes.

349. You think the cause ought to be shorn?—Yes.

350. And made compulsory on the owners to attend when you are burning off?—Yes.

351. By Mr. Lower.—Do you not think that if you were burning in summer it might be a great inconvenience to the farmers to have to leave the circuit? If you had to do it in the future you have in the past, give notice six times without being able to burn off, would not that be a loss to a farmer in the middle of harvest?—Yes. The notice says:—We will burn, weather permitting.” If the wind is blowing on towards his property, he will know we will not burn.

352. He might make arrangements to go and then find you did nothing. In that case he would employ a hand six times to take his place?—Yes.

353. However, you think that the main assistance could be given to you and protection to the farmer himself by his being on the spot?—Yes.

354. As to the stumps, would it not be a safer thing and cheaper in the long run to take the whole of the dry stumps out?—It would be much safer, but when you come to consider that, there would be some million of stumps on the lines throughout the railway.

355. Is it a very great danger considering the dryness; I speak of when the lines were first made and their being burned out from year to year?—The majority of those in new would not burn; they are big solid stumps that would take a considerable amount of fuel to light them. The telegraph poles and the bridges are all danger points, and stumps have to be chopped round to prevent fires.

356. That shows you think the stumps a danger?—Yes.

357. Every year they are becoming drier and more dangerous?—They are getting fewer every year. We have removed hundreds of them the last few years in the winter time.

358. Do you think there is any experience it would be better if the Department took the whole of those stumps out once?—Yes. I think it would be better; it would obviate the necessity of chopping them round.

359. By Mr. Graefe.—I suppose the objection to taking out the stumps would be the extra expense to the Department?—Yes.

360. Have you any idea about what the current price for taking out stumps is, ordinary stumps?—No.

361. Would you be surprised to learn it is about 2s. a stump?—I have no knowledge of that.

362. Do you know that contracts are let by farmers and the Railway Department at that price to take them out?—No.

363. By the Chairman.—Do you give notice to the landholders on both sides of the line when burning off?—Only the side adjoining the owner where we intend to turn off.

364. The wind is blowing from these landholders towards the line?—Yes.

365. If the wind suddenly got very strong, which would be in most danger, the one across the line or the one behind the wind?—If the breeze was strong in the direction of the burning-off considered the wind dangerous, he would have the fire put out.

366. Still, as a matter of fact, do you think there is very little danger of fire breaking out in the direction from which the wind is blowing?—Yes. There is a large element of danger in setting fire to the railway ground during summer months, but we use the utmost vigilance to keep it under proper control.

367. Have you known a case where a fire did get away during the burning off?—That Tasmanian case was the only one.

368. Do you not remember a better that fire originated from sparks across the line or burning backwards from the side he was burning?—It originated on the side he was burning.

369. Do you remember whether it was due to change of wind?—It was an embankment of 12 or 14 feet. In burning along the cutting it would not have such a clear course as in the open plain, and it was in a case of that sort where it broke away from the gauger.

370. In that fire at Broadford there was any definite allegation as to where the fire came from?—No.

371. By Mr. Graefe.—You have been eleven years in your present position. I notice the tracks are used and worn out and that they used to be eleven years ago. Are there instructions now, more than in the past, to keep the lines clear?—Not. My older instructions. The only fresh instructions that I can think of are in existence now and were not eleven years ago that the system of weeding is kept distinctly separate from other items of maintenance. For instance, repairing a line, repairing the fences, cutting the grass, all those things are kept separate; each gauger keeps the items separate in his diary.

372. Is it not more expensive now in keeping the road between the rails cleaner than it was some years ago?—Some five or six years ago, speaking from memory, when Mr. Wheeler was Commissioner of Railways, he authorized some poisoning process, and the weeds were allowed to grow; that is how the roads became so dirty: it has taken years to clean that off.

373. It appears to me like the North-Eastern line is as clean as a walk in a garden; it was not so some years ago; was that advancement made to prevent the sleepers or to protect from fire?—It is one of the essentials of maintenance to keep the line clear of weeds in the interests of drainage and dryness of the road bed.

The crimson wattle.

John Egan, examined.

374. By the Chairman.—What are you?—An engine-driver, stationed at North Melbourne. These last two years I have been reusing on the suburban lines; before that on all lines, the North-Eastern and Ballarat, and all other main lines.

375. There has been a difference of opinion expressed to the Committee as to whether fires are more likely to originate from the sparks of the fan or from the fire box—which do you think is the more likely to exist dangerous sparks?—The sparks come from both, but if the regulations are carried out properly, mang coal, there are very few sparks from either.
375. Is it possible for a live spark to be carried from the coal box to the grass outside the line?—I do not think so, if the regulations are carried out.

376. Not under any circumstances?—No.

377. Such as the train passing over an embankment and the box being opened to get a good draught to get over a peck; would it be possible then?—There might be some drop down the bank, but if the instructions are carried out as to the dampers no harm would result.

378. Suppose the instructions are not carried out, would it be possible then?—Not if the instructions are carried out.

379. If a man has a difficulty in getting his engine up a stiff embankment?—You require more draught on a flat; if it is harder steaming than going up a bank; you get a bigger blast on the fire, and the engine steams better.

380. There is more strain on the engine?—Yes.

381. You require a greater blast getting up a pinch than on the level ground?—Yes. If any sparks came up it would be from the funnel and not from the ash pan. The only possibility of fire from the ash pan would be coming down an incline where the engine is rolling, and if the damper is down to the first notch they will strike the damper forward and will not go outside the line, but will stay in between the rails.

382. Do you think it is possible for sparks to come from the funnel to create a fire outside the fence?—I have never seen it.

383. In your experience you have never known of a fire to originate near a line which there was reason to suppose was caused by the locomotive?—Only once, on the Ballarat-Hallam line. On that occasion I do not see how it was possible for the fire to originate with the engine, because there was only one van on.

384. Have you ever known any of the rolling-stock behind the engine taking fire?—No; I have seen tarpaulins, not on the train but stowed at stations, burnt, with little holes on them.

385. Would they be as far from the permanent way as the fence usually is from the line?—Yes, about four tracks.

386. And have you ever known cases in which tarpaulins were burnt on the train behind the engine?—No.

387. Or trucks of straw set on fire?—I have heard of cases, but have no personal experience of it.

388. Have you had any experience of other spark arresters besides the one now in use by the Department?—Yes.

389. Some inventions that the Department has been asked to adopt?—Yes.

390. Have you tested them?—Yes.

391. What one have you tested?—Mr. Anderson's.

392. You need an engine with that one?—On one occasion.

393. How did you find it?—It was in 1893. I put in a report the day after it reference to the trial, and I almost forget the circumstances; you can get that report. There were some ten of twelve arresters tried, some we could get 3 or 4 miles with, and some 8 or 10; others we got to Wunghnu with; but we had to stop to replenish with wood, and they all put wood sparks out of the funnel.

394. Did you find that those arresters you tried were more effective in preventing sparks than the one used by the Department?—There was one that precluded the sparks, but also prevented steam and everything else.

395. Of course, there would be no difficulty in inventing a spark arrester better than the departmental arrester, but might prevent the steam too?—Yes.

396. Do you think any of the arresters tried were equal to the departmental arrester?—No, I think the departmental one gives the most satisfaction.

397. Can you give particulars about any other arresters?—There was Allibon's; we could not get along with that at all.

398. It is still in use on the Moama line?—He was on the engine, and I left with 140 lbs. of steam at North Melbourne, a first-class fire, and I dare not put any water till I had gone some distance; if I had put any in anywhere else it would have stopped. There was another trial at the Royal Park; I had the same experience there. We had 200 tons of coal on. There is a grade to Footscray right from South Kensington.

399. Not a heavy one?—It is heavy enough with it load on.

400. It appears strange that a spark arrester that has given satisfaction for a number of years, and is still used by a private company running from Moama to Berilup, and carrying heavy spark loads, should have given you that result. They use nothing but wood there?—We were steaming with wood on this occasion that we used Allibon's arrester; we used wood on all the trials.

401. That is not so good for keeping up steam as coal?—No.

402. You had experience during the coal strike; was it not a fact that during that time the ordinary trains were frequently stuck up with the departmental arrester?—Yes; not actually stuck up, as they went on to a spot where they knew they could stay, and fired the fire up again; the fire boxes were not constructed for wood. We had to stop after going 2 miles, and then fill the box up again.

403. It was not such a great failure on the part of Allibon's if you got as far as Summerby?—We only got as far as West Footscray with his.

404. Do you remember whether you had to stop at Footscray on any occasion during the coal strike with the departmental spark arrester?—No.

405. As to any of the other arresters, do you remember the particulars?—They were mostly all the same. Some we got to West Footscray with; we had to fill with water there.

406. Was Mr. Allibon present himself?—Yes, to the best of my belief. As all inventors were on at the trial of their arresters, I think Mr. Allibon was also.

407. Did he supervise the firing?—He did not object to anything; he looked on, and saw the fire before we started.

408. You say you only know of one fire caused by the engine you were on?—They put it down to that. I could not believe it was that, because I had only a very light draught on. I reported that I saw no fire on the journey to Ballan, but on coming back I saw where about some had been burnt; it had been noticed, I suppose, by somebody.
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By Mr. Graves.—Can you suggest anything that would make those accidents less numerous?—No, I do not see that the Department can do any more than they do. I have been driving seventeen years.

410. You say you did not see, from trials, any arrestee that impressed you as more advantageous than the Railway Department arrestee?—That is so.

411. That present improvement that we have the model of here was not all adopted at once?—In the winter time the Department only uses one grill, the bottom one; that is fixed lower. It is more perfect now than it was at the commencement.

412. Are fires less numerous now?—Yes, I very seldom hear of a fire.

413. Can you suggest any way of giving greater protection?—No. The regulations of the Department are very strict in the summer time; the box to be kept like that—[explaining]—the fire boxes worked close, and the damper working at the first not.

414. That means the protection that when the cinders drop they drop down on the track?—Yes; there are three notches on the engine—[showing]. There is only a small space there between the ash pan and the damper. Anything rolling down hits the damper and goes to the ground.

415. Are not the sparks more numerous onclimbing up an embankment?—The idea is in that case it is from the funnel, but I do not see how they come out of the ash pan going up an embankment.

416. As to opening to get a draught, you say that is not done going up a bank?—No. I feel the engine steams better going up the bank.

417. What is the reason they stick up going up the bank?—Sometimes it is caused by an engine being overloaded, and other times by the fire getting thick and getting low in steam; some coal steams leave a black smoke, and that is why I use the box with dirt, which makes it more difficult.

418. That cagel—[pointing]—has to be cleaned out?—Yes. When cleaning out the ash pan you clean it with a hose.

419. That is the opinion of the driver whether he uses it or not?—It turns up with the damper. I have not been driving with one like that.

The witness withdrew.

John Mitchell, examined.

420. By the Chairman.—What are you?—Engine-driver, stationed at Princeton, running through on the Great Southern line through to Port Albert. I have been driving between sixteen and seventeen years.

421. By Mr. Graves.—As to that ash cage, of which we have a model, what is the object?—To prevent cinders from falling through the fire bars on the line.

422. Is that any detriment directly or indirectly to the engine working?—It is detrimental to the engine if you have bad slack fuel, because it drops through the bars, and that cage gets full up and prevents the draught.

423. Then if it is not full it is even slightly detrimental?—Yes.

424. Is that permanently fixed to it, or can any driver move it so that he can run without it?—Yes, he can lift it and keep it on. It is under his control. He is supposed to keep it there in the summer months.

425. Is there any benefit to a driver who has a certificate in being the man who will do the most work on the least fuel?—No. They bring out the consumption sheet quarterly, and each man is placed on this sheet according to the amount of fuel and oil he uses.

426. Supposing that you drive and go a certain number of miles, and use 20 tons of coal, is the man who goes the same distance and uses 18 tons of coal supposed to be a better driver?—It is only for the matter of accounts, because there are great differences in the engines. I might with one engine run 100 miles on 5 cwt. less coal than with his engine, snagging the same load.

427. Then it depends on the engine?—Yes, and the driver also. Some drivers might work an engine a little heavier than others.

428. Do you know of your own knowledge that any fires have been caused by the cinders dropping down on the line?—I have never known of fires being caused outside the railway fences, but I have witnessed fires being caused from the ash pan or the fire inside the railway fence, not the sleepers alone, but the grass.

429. On the Great Southern line there are always fires during the summer?—Yes.

430. I suppose, last year, the fires either by the railways or other sources improved the value of the land hundreds of thousands of pounds?—Yes.

431. So they are not so particular as on the Great Northern line about the fires; they rather like them?—Yes.

432. Can you suggest any way by which this damage may be lessened?—I can only suggest that the railway line inside of the fences be kept much cleaner than it is at present.

433. That means extra expense?—Yes.

434. How many men are there engaged?—Three men in each gang on the Southern line, and they have about 7 miles of railway.

435. What do you mean by clean?—I would not take the stumps into consideration so much as the undergrowth, the scrub, and grass.

436. You think that the fires would be less frequent if the Railway Department expended money on keeping down undergrowth?—Yes.

437. By Mr. Bower.—Is that ash cage fitted on to all the engines?—No, not all; it might be fitted on to one-third of the engines they have in use.

438. Is it a recent innovation?—About two years old.

439. I suppose it is designed to make a further check?—Yes.

440. Has it been found, in your experience, in effective check?—Undoubtedly, it is a more effective check.

441. Why hasn't it been extended to the other engines?—I cannot say.

You mentioned that you would save coal on one engine and on another not. Suppose you had three engines of the Y type, all of the same pattern and driven by the same man, would they all steam
sake?—No. With one engine you might have no trouble to get along at all, and with the other engine be struggling the whole way. It might be the difference in the construction, or the engine might be out of order, the pistons or valves might be blowing through; many things might cause it.

443. Is it true that engines have humour?—If you had three new engines they would be all different in the steam power?—I cannot say that.

444. You think, from your experience, that the use of ash cages might be well extended?—Yes, I think so.

445. By the Chairman.—Do you think that engines are like watches, in two of the same make there might be a great difference?—Yes, a great difference; one may turn out a good one and the other a duffer, though they both look the same.

446. By Mr. Bowes.—What improvement would you suggest in the system of burning off?—Speaking for the line I am on, I should suggest that a gang of men be sent; there is scrub and undergrowth there 3 and 4 feet high.

447. From the stumps?—No, the undergrowth from the scrub cut down when the line was constructed; it is always growing up, and that requires to be cut down every year; it is impossible for three men to keep the line in proper order for 7 miles, and keep that scrub cut down.

448. By the Chairman.—Have you ever known cases in which fires were alleged to have originated from the locomotive you were in charge of?—No.

449. Have you had any experience at all as to fires of that description?—No; I have often reported fires; according to the regulations, if we see a fire on the line, or outside, within a reasonable distance, we are supposed to report it, and call the attention of the permanent-way men to it.

450. You know of cases of fires caused within the line from sparks from the fire box?—Yes.

451. Not from the funnel?—No.

452. In that case it ignited the grass?—Yes.

453. Have you tried any of those other arresters?—Yes, I used Thornton's, and found it not very well. I tried that on the Great Southern line; I was running with it for three or four months in the summer time.

454. Were any fires caused through it?—No.

455. Were there fewer sparks emitted than from the departmental arrester?—Yes.

456. Did it interfere with the steam power of the engine?—I did not find it so.

457. Your experience of it was satisfactory?—Yes. I put in a report to the Department at the time to that effect; that was about six years ago.

458. Do you think Thornton's was as good as the departmental?—I think it was superior.

459. By Mr. Graves.—In what way is it superior to the departmental?—For one reason, the spark arrester is self-cleansing; it is a chain spark arrester, attached round the funnel, and the whole time the engine is running it shakes like small chain mail, the spark cannot get through.

460. To keep the power of the engine in any way?—I did not find it so. The one I had it attached to was a good steaming engine, one of the best. I never had any difficulty in any way with the steam.

461. The shaking kept it clear of dirt?—Yes.

462. And the spark went through that chain mail and the shaking kept it clean; that is the whole invention?—Yes; it was one of the old B class engine, 443.

463. Would that be a more difficult class to work than Y's?—No; it could be attached to any engine.

464. What portion of the engine was it attached to?—[The witness showed.]—The draught has to pass through it; I tried it with wood, and with the use of coal you could give full steam with a fair load on going up a bank of 1 in 50, and you would hardly recognise a spark from the funnel.

The witness withdrew.

James Keogh, examined.

465. By the Chairman.—What are you?—An engine-driver.

466. What line are you stationed on?—Running between Bendigo and Melbourne. I have been on that line, off and on, seventeen years. I have also been on other lines.

467. Have you known any fires caused, or alleged to be caused, by an engine you were in charge of?—Yes, on one occasion only; that was on the Heathcote line; there were reports obtained; I do not think there was any departmental inquiry.

468. Did the land-owner complain and claim damages?—No put in a claim for 5 acres of grass consumed.

469. Was any damage allowed?—Not that I am aware of.

470. You are not aware whether it was proved that the engine had caused the damage?—They came to the conclusion that the fire was not caused by the engine.

471. Do you think it is possible for a fire to originate from the fire box, a spark to be blown across to the grass outside the fences and ignited?—No, because if the coal came out of the fire box it would be forced in the direction you are running, that is along the line, not at the side; out of the funnel it could blow sideways. I do not think with the spark arrester we have now, if it is in good order, that a fire could be caused by a spark from the funnel; they are very strict as to keeping them in good order at Bendigo; it is possible a fire might originate from the fire box.

472. Have you had any experience as to any of the other spark arresters?—Yes. I have tried two other than the departmental; I do not know the names, but they were both failures.

473. By Mr. Bowes.—Do you think that fires might be caused and put out before you came back and you know nothing of them?—It would be possible. A fire might occur after we passed and be extinguished before we came back and we not know anything about it.

474. You have heard of only one complaint?—Only one since I have been driving.

475. Is your engine fitted with an ash cage?—No; they are not generally adopted.

476. Have you ever tried an engine with one?—Yes. I think they stop coal from getting out and are effective. When you examine them after you run a certain distance you find cinders in them, but that is not to say they were alight when they got in.
477. Live coals do fall in them?—Yes.
478. In the engine you have at present the live coals drop on to the permanent way?—They could. 479. They do?—I have not seen; I have seen coal drop on to the permanent way and jump about, but it has always occurred in the direction we are running; it does not matter.
480. Would there be long grass growing at the time it would fall out?—It is always burnt off in the summer time, but should the coal escape there is always danger. On the Benalla line they burn off the grass before it gets too dry.
481. Then with the present appliances there is always an element of danger both from the funnel and from the ash pan?—From the ash pan it is probable the ash could get away without that grate.
482. In your experience do any large embers get up through that appliance into the funnel?—No, not with the spark arrester; should they escape, you are then only 5 to 7 feet from the funnel, and then they go out. I have never seen them reach the ground with that spark arrester.
483. By the Chairman.—Did you get stuck up giving the coal strike through using wood?—No, I have never stopped on a locomotive yet.
484. By Mr. Kennedy.—Do I understand you to say in your experience that coals practically from the time they cease to ascend are dead?—Yes, as soon as a spark leaves the funnel, and the upward progress is stopped, it begins to vaporize, and the spark is dead instantly.
485. By Mr. Bourne.—You think the danger is greater from the ash pan than the funnel?—Yes.
486. You think that would be entirely prevented by having that grate?—It would be an additional preventive, but that is under the control of the drivers; they can keep it up or down as they like.
487. Would they need to remove it to get the draught?—I think not. An arrangement like that would soon get dirty, and choked through the dust and grime thrown on it.
488. Taking one of these on the express train and with good coal, would they need to clean it between Melbourne and Benalla?—No, I do not think they would; they have to try it up at the station when they were standing.
489. That is a simple operation?—Yes.

The witness withdrew.

Edward Fitzgibbon, examined.

490. By the Chairman.—What are you?—Engine-driver, for about sixteen years; I am stationed now at Benalla, running on the Sydney express from Benalla to Melbourne.
491. Have you been long on that line?—All my time since I went into the service; I was in Melbourne on the suburban lines for about three years.
492. Have you known of any fires alleged to have originated from the engine while you were in charge?—Yes, once, between Violet Town and Euroa.
493. Was much damage done?—About three-quarters of an acre burnt.
494. Was any claim made on the Department for damages?—Yes.
495. Was there an inquiry into it?—No, that I am aware of.
496. Did the Department refuse to recognize the claim?—No, there was only the usual reporting between myself and the solicitor of the Department.
497. Did you report that in your opinion the engine had caused the fire?—Yes.
498. What is your opinion of the present arrester, do you think it is effective?—I think it is a good one.
499. Do you think that any dangerous sparks can be emitted by an engine fitted with this arrester?—I think not.
500. Do you think there is danger from the live embers from the ash box?—I think it is possible there may be.
501. Carried by the wind to grass outside the line?—Not outside the fence; I do not think that possible; they may be carried to the grass within the fences.
502. You think there is more danger of fire originating from the ash box than from the funnel?—Yes.
503. Have you had any experience of any other arrester?—No.
504. By Mr. Graser.—Was it the fire on my property you referred to, Fulham's Creek station?—Yes.
505. When was it?—Threes or four years ago.
506. It was before the inclosing was cut down?—Yes.
507. By Mr. Singer.—You say it is possible for live embers from the ash pan to fall the grass within the fences, and not outside?—Yes.
508. Why could not they go outside if the wind can carry them from between the rails, and fire the grass beside the fences?—It is not possible for me wind to carry them outside?—If the engine is going slowly the ember stops where it escapes, and going down a bank, the train goes so fast the ember cannot get from between the wheels, say, 30 miles an hour; it would not have a chance to get off the track.
509. By the Chairman.—Have you noticed grass between the rails?—Yes, not likely; they keep the lines very clean now to what they used to.
510. You were driving another engine before you drove the express?—Yes.
511. Do you think the engine on the express train is more likely to cause fire than the others?—No, I think not.
512. By Mr. Graser.—Have you an ash cage?—They are not placed on the express trains yet. I do not know whether they are going to be.
513. By Mr. Bourne.—Would not a fire that caught in the railway reserve extend to the grass outside?—It might; it would depend on the wind.
514. If a strong wind were blowing the coals far from the ash pan, would not they be likely to be blown on to the reserve at the side of the line?—They might.
515. If you had that ash cage, do you think it would be more effective than the present ash pan?—It would prevent the ashes dropping on to the track. I do not think it would interfere with the damagio if it were kept thoroughly clean.

The witness withdrew.
James Holkinson, examined.

516. By the Chairman.—What are you?—An engine-driver.

517. How long have you been engaged in that?—Nearly 30 years; all the time on the Victorian railways; I am stationed now at Prince’s Bridge at present; I till the duties of a foreman.

518. Have you had experience of most of the lines of the colony?—Yes, the North-East, Great Southern, and Bundling.

519. Have any fires been alleged as caused by the engines you were in charge of?—No.

520. Were no complaints put in?—No.

521. Do you know of any case where a fire started beside the line after your train passed that you saw when you came back?—On the North-Eastern, I remember, in the summer it was a common occurrence for fires to spring up beside the line, and a common occurrence to see a vagrant camp beside the line.

522. Can you recall those two circumstances together?—Yes.

523. Was there a common occurrence to see no engine running past?—Yes. The engine you were in charge of was always stabled with a griddle arsenic.—There have been various descriptions. The first spark answer I remember was about 25 years ago; it was a complete answer; it caught all sparks, and one could possibly escape; this is the one we use now. It was a cage adjusted in the spark box; we caught them there, not once escaped.

524. Did it have any prejudicial effect on the steering of the engine?—Yes, we had to cut a hole in the cage and let them escape; we could not get the trains back into the stables till they were let out. It was a useless affair as to the running of the train; it was condemned like a very good man; I do not think they gave it a name; I think it was about the first that was ever tried.

525. Was that before the one that is in use now was adopted?—Yes, I think it was the first experiment tried in the Department.

526. Mr. Woodhead said the first had a deflector at the top of the funnel.—Yes, something on the American principle; all of those proved to have their drawbacks.

527. Was all the apparatus inside the funnel?—No, it was simply a cage adjusted over the blast.

528. What was the next you had experience of?—The griddle that is in use now is the one I have had most experience with. The others that have come into the sheds we have had a certain amount of knowledge of.

529. Did you conduct any test yourself or any of those others?—No.

530. You cannot speak from experience of those?—No.

531. Do you think, admitting for the sake of argument that an engine may start fires that they would more likely to originate from the funnel or the fire box?—I do not think there is much danger of sparks or ashes from the fire box.

532. You heard Mr. Mitchell state that on the Great Southern line fires were caused within the fences by spouts or sparks from the fire box?—Of course, if the grass is allowed to grow within the rail embankments, there is considerable risk of ashes falling into the fence, but the construction of the ash pan with a lip, and the draught as you run has a tendency to keep ashes back till they die out, but any one washing a train travelling along the line can see that any fire falling out of the ash pan would generally follow the engine and follow the train; it will not leave the train on either side owing to the suction from the train, and if even got behind the last vehicle you can see by papers, or anything like that, that the express train will gather them up and carry them along; so engines cannot get away till the fire is practically knocked out of them.

533. Do you think fires are more likely to occur from the funnel than from the fire box?—As far as fires occurring, I suppose there has been such a thing, but I think the proportion of fires that occur from the sparks is very small in proportion to the claims that are put in.

534. Do you think fires are more likely to originate through sparks from the funnel than through sparks from the fire box?—More likely from the funnel.

535. By Mr. William Duffy.—Some engines would be too heavy to be worked along?—They generally follow. As they strike the ground between the sleepers they generally bounce, and once they start bouncing the current of the train keeps them bouncing and carries them along with it; you can watch them for yards and yards.

536. Are not the heavy ones left behind?—I do not think it makes much difference, because the draught is very heavy when the train is running.

537. Is it a common practice to open the fire box going up a pinch?—In working the damper you can work it either in going up a bank or going along a flat; the greatest difficulty in keeping steam up is going along flat country against heavy wind; climbing banks is easy in proportion to flat country.

538. We have large experience of trains not going up a bank?—That is quite possible, because the load of a locomotive is almost the maximum, a fair weather load.

539. Suppose the driver is overweighted, and comes to a bank, and has to make a special effort to go up, could he do anything dangerous to an engine in the way of opening the damper or fire?—No; you can open everything wide open. In climbing banks or pulling trains, as a rule, engine-men always prepare to have a good supply of everything in good order to run.

540. Suppose a case where they were not quite prepared, would they then open the fire box and cause the danger?—No, they could not, because they have not the same draught. They do not use the same steam as they do along the flats, the blast is so low; there is a great space between each exhaust, whereas among a flat it is one steady row of exhaust, and the rate you are travelling at gives you so much increased pressure of air from the force of pressing underneath, whereas you lose that on the banks. If an engine-driver runs short of steam on a bank, which may be through inexperience of the fireman, he gets the idea that they must have something enormous to give up a bank, and as a result they get so much coal in the box that they do not know what to do with it, and it is too fierce, suitable for generating steam. Instead of running and letting, as it should be done, and they lose it all, or to have it fall into the smoke, he has got to underburn it before it can be put out. Naturally a stiff pressure is required to its full extent to keep the load going, and the fire’s not sufficient to keep it up. The steam reduces in pressure, and the water must be kept up therefore the train comes to a standstill.
542. The general impression is that the engine-driver, in a deficiency of that sort, throws open the fire box.—No; it is generally the fault of putting on too much fire; he has to wait and burn up the fire to get the force enough to make the fire box. He has to go up by the force that is in the boiler.

543. The impression is that at these banks a larger display of fireworks is seen?—Simply because the exhaust from the cylinder is much greater; the driver opens the exhausts so much more than running along the flats, therefore the blast from the top of the cylinder is so much heavier in that it causes a more irregular blast from the surface of the fire.

544. Then there is more danger from sparks at the bank?—Yes, from the funnel, not from the fire box.

545. By the Chairman.—Is the fire box floor ever opened under such circumstances to improve the draught?—The higher you raise the damper the more the draught, and the faster you are running, the higher the damper and the greater the force draught under the fires.

546. Would there be greater liability of fire embers falling out under those circumstances?—The more the draught going on to the ash pan, the greater the pressure on the lip, and that keeps the embers back, forcing them back; the greater draught going in under Just, the less liability of the embers to get past, because as they come down near the lip the great pan force draught going in drives them back, cuts them over again until, after doing a journey of 100 miles, you might have half a barrel load of ash in your pan when you come to the terminus, all dead and thoroughly extinguished. You have noticed that they all carry the lip in the front; the ashes fall into that hole, and along the edge of the lip, and the force draught comes in. The draught is so great that at a high rate of speed, with a head wind, it requires a good strong pull to raise your damper, to force it against the current; therefore, that strong current passing over the edge of the lip, the embers cannot get out unless they pass that force draught.

547. By Mr. Roopen.—Assuming all the engines to have one spark arrestor, would one engine give more sparks than another?—Yes; there are no two engines alike on the railways. The spark arrestor may be the same, but the working of the engine may be different, though they might be engines constructed by the same contract and out of the same firm.

548. They would give a different experience with the same spark arrestor?—Yes, every engine has its own peculiarities.

549. Would it be a very great variation?—No, not very great; it would be reported, and they would notify defects when they were brought under notice by the men running the engines.

550. Then a good spark arrestor might still be defective if the engine were not equal to its work?—The spark arrestor may have, in one case, half the number of sparks out double the number in another, and yet be doing the same amount of work.

551. You mentioned that the embers falling from the ash pan burned, but do not you think that the swirl which kept them within the lines under the carriages while the train was passing would be similarly strong enough when the guard's van had passed to swirl them out to the side of the line?—I have never known them leave the track; I have watched them. I remember one instance where quite a showerful of fire dropped while running, through the burning of the fire bars, and it allowed a lot of good fire to fall through. The embers that fall generally are the refuse; the fire is above the embers, but when the two fire bars burn off it brought down the live fire with it. I watched the effect in that case, and I do not suppose there was a particle of it left more than 6 feet away from the train—you could see the reflection of it underneath the train while you were running, but I have never known them to leave the train or travel away from the train.

552. Would not vary with a hot wind coming across the train?—It would vary according to the rate of speed. If you were going slowly with a strong cross-wind it might have an effect, but I do not know that any inquisitive results would follow.

553. By Mr. Green.—I understand your experience is that very few fires are caused on the railways by all the engines, etc.—As far as I know.

554. It is possible that swagmen along the line have caused fires?—I am sure of it.

555. I think you drove on the Great Southern line?—Yes, I opened that line.

556. You have seen fires constantly on that line?—I saw the heaviest fire the other side of Foster.

557. You know the steep bank coming up the Hoddle Range?—Yes.

558. The dried undergrowth grows quite close to the carriages?—Yes, and it grows very quickly. How do you think these fires occurred?—The whole country appeared to be on fire.

559. Have you any recollection of the fire being confined along the side of the railway there?—No.

560. You think the fires that came close to you when driving were not created on the railway but came across to it?—I cannot say.

561. You know of no case where the fire was confined about the side of the railway?—No.

562. By Mr. Kennedy.—Have you had any departmental tests as to the embers or coal escaping from the ash pan?—No. Of course, the better quality of coal supplied to the engines the less danger there is of embers or sparks.

563. When a train is leaving slowly near a station and a strong cross-wind blows, it takes the embers out to the side of the line at the crossing?—That is possible; there would be nothing to prevent them going with the wind.

564. Is it a usual thing for fire bars to shift in the fire box and let out an undue proportion of embers?—Not shifting; they do sometimes burn the ends off them; engineers generally watch for things of that sort, because it causes trouble for them, and they take the precaution to examine them at the sheds when the fires are laid, and they are then put in order; but sometimes there is no telling the cause. The fire will get in between the bars and burn the ends off, and there then is nothing to keep the bar from dropping.

565. In stoking, have you found the possibility of moving the bars, or so storing them in their position, as to cause an undue proportion of embers to go through?—The grid is so adjusted that the bars are made to give a clearance between each bar. Each bar carries its own lug, and they are so constructed that when the full number is put into the box the box is full; the lugs are close to each other, and that gives the regulation quarter of an inch between the bar.
567. Has your experience shown you that the life of even new fire bars is very short, that you find them bent at the two adhering together, instead of being the proper size?—Such a thing can be done in one case; the whole set of bars can be destroyed. I have known such an occurrence on a locomotive.

568. Do you use that cinder easter?—They are fitting those to engines as they go down to the Newpora shops for repairs; I believe the whole of the main line engines are sent out with those grids.

569. Do you consider that an improvement?—I think it is a great improvement in the regulation of the draught in itself, because in running round curves on long lines you vary in the current. Sometimes the wind is direct ahead and sometimes across, and with the wind blowing from the same direction, if you regulate your draught from the damper for a cross-wind you want a great deal more damper than with a head-wind, and with those variations of curve, you have a variation in the fire with those cases. I think the wind is regulated through having to pass through those small holes; and the saving of ashes falling on the line is another advantage.

570. By Mr. Greaves.—You said the engines were examined—suppose you start as you have done is the morning at seven and at five o'clock get to Port Albert, and you hand over the engine to the cleaner, have you to examine the engine yourself?—The cleaner at Port Albert simply cleans, the driver is responsible all the time for the engine fill he gets back; there is a shed day. The run to Port Albert takes twelve hours, and the run back twelve hours; in order to give the driver a rest day, they give him a sheds day; you go in the shed, and do all the necessary work to your own engine, inspect the re-fitting to see everything is in good order before you go away the next morning. That is the rule with the main line men, and if the men cannot do it themselves, there are other responsible men who do the work.

571. So that if there is anything wrong with the spark arrestor or the bars it is your duty on shed day to see that it is all right?—Yes. This gridiron spark arrestor has one good quality. It is the case with all bars on the railways; anything that is adapted must be made self-acting, unbreakable, and not requiring any attention, because the engineman has enough to do on the road to attend to the compulsory things. With this spark arrestor, if you do not give it a brush, and keep its face free from coal, the fewer sparks can get through, the narrower the spaces get, and the harder it is for you to get steam—you can allow it to close slightly—therefore you keep it clean for your own safety, and if you do not clean it, you have no sparks at all, and have to answer for not getting along well enough in your stoking.

572. By Mr. Sangster.—You say your regulation bars are close up; do you take the bar out with any class of coal?—The bars can be taken out.

573. Is there any class of coal used on the Victorian railways through which you require to take the bar out?—Yes; the engines that are burning this light class of coal are supposed to have a broader log to keep the bars further apart than the ones burning Newcastle coal. The engines are not supposed to be running with the spaces between the bars; the logs are supposed to be made suitable for the coal the men have to burn.

574. By Mr. Garner Duffy.—Is that class of coal more dangerous than the ordinary class for causing fire?—The lighter the coal the greater the danger I think.

The witness withdrawn.

Mr. Garner Duffy here took the Chair.

Patrick Moogue, examined.

575. By the Chairman.—What are you?—As engine-driver in the Railway Department. I run over all the lines, principally the South-Eastern—the Great Southern; we generally run to Nyora on that line, goods trains.

576. Have you known fires to be caused on your line?—Yes, on one occasion I knew a fire to occur in a truck of firewood as I was coming from Heyfield; we were burning wood; it was at the time of the coal strike, and coming to Traralgon I noticed a fire out on one of the trucks, and I think it must have come from the engine; that is the only instance I know of fire coming from a locomotive; I am not sure that is the case, but it was my opinion; we were burning wood on the engine. I have known of no cases where we have the ordinary coal.

577. Have you seen fires alongside the line?—Yes.

578. Have you noted how they were caused?—No.

579. Assuming that fires are caused by the engine, would you think it more likely they were caused by sparks coming through the funnel or the ash box?—Through the funnel if they occur at all, because sparks or embers coming from the ash pan, as a rule, drop into the 5 feet between the rails, and, as a rule, between the rails very clean.

580. Assuming that there were dry grass or any inflammable matter on the track, a fire might be easily caused?—Yes.

581. There would be enough cinders coming through to cause a fire in that way?—Yes.

582. You heard the evidence of the last witness as to the difference in steaming along a flat and up a rise; do you agree with what he said?—Yes, to a great extent.

583. You think if the danger of sparks getting out does occur it is less likely on a rise than a flat?—Yes, from the ash pan, but the danger from the funnel, if there is any, is the sparks will come through going up a hill because of the greater draught; the liability is less through the ash pan, because you are travelling at a lower rate of speed.

584. A train slowing down into a station, or out with a cross-wind then the cinders out of the ash pan might fall outside the track; have you had experience of that?—No, I think it would be hardly possible for them to fall outside the rails; they might, but in my opinion it is rather far-fetched.

585. I suppose, from your position on the engine, you could not fully see what became of the sparks once the engine passed?—If you are looking for them you would, but in the ordinary course of things you would not see them at all; you could stand on the side of the engine and look at them if you wished to make an experiment.

586. You sometimes do try experiments with the bars?—No; we know what they are without trying any experiments.

587. Suppose you had bad coal, would not you take out a bar?—No.
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P.B. Kinkaid,
3d August, 1900.

389. Have you ever done it?—No. The only way with bad coal is to wait at the station and clean your fire.

388. Have you had any experience of arrangers besides the one to use by the Department?—Yes, two others. I do not know the names of them; that would be about 1892-3; I know one was so good at all, I was travelling with it and had to stop half-a-dozen times on the way to Woodend. The engine, a Y, had a boll funnel, and the spark arresting was placed on that funnel; it was a close mesh, a wire rope, too close to allow a spark to escape. It would catch sparks, but it caught everything else, but the engine would not generate enough steam to draw the train. I stopped at St Albans for about 25 minutes; I was doing water; the water was leaving my boiler; the decrease of water means the decrease of power.

389. Did you try that or more than one trip?—Two trips; I sent in a report on it. I think that would be in November or December, 1893. I did mention about the defective spark arresting, because I took a trip to Woodend and late coming home, and I put it down to this defective spark arresting, the way it is interfered with the engine steaming. I was a couple or three hours late.

391. What was the other spark arresting?—I was fishing on that with Ryan, a witness to-day. I made only one trip to Sunday. I do not know the nature of that.

392. By Mr. Sangster:—What spark arresting had you when the truck caught fire?—The present double-grid departmental spark arresting. They took one of those grids out in winter time. It is very difficult to steam engines with the double one, because the mesh of the wires prevents any draughts getting to the coal.—[The witness subsequently sent the following memorandum with reference to his answer to this question:—]

VICTORIAN RAILWAYS—LOCO. BRANCH.

Memo for C.M.R., Spencer-street,
Subject:—Spark Arresters,
North Melbourne, Station, 16th September, 1900

Six,—R. truck taking fire coming from Horsham. I do not recall now whether the spark arresting was a single grid or a double one, or if it was a grid at all. In fact, I cannot call to mind what kind of arresting was in use at the time, as this incident occurred about ten or eleven years ago, therefore I wish to correct the evidence given before the Committee on this point.

I am, yours obediently,
V. B. MORGAN, Driver.

27th September, 1900.—The C.M. Engineer.—Forewarded by J. T. Hall, Loco. Foreman, North Melbourne.

395. By the Chairman:—When you put on the second grid in summer, what difference does it make?—It means you have double the resisting power against any sparks that might try to come out. You may turn a little more coal. We take the same load, but we very often have to stop at stations, and wait to fill the boiler with water, and have another go.

396. You would not be as late as with that other one you tried?—No.

397. Even with the double grid you are late?—Sometimes. The other witnesses have said that engines will steam differently. One engine might steam with this double grid very duly, and take one out and the engine will steam well.

398. By Mr. Greaves:—Have you ever seen one with that double grid, when that was your reason for being late?—Yes. I think so. I cannot call to mind any particular case.

399. Have you assigned that as the reason for being late, the double grid of the spark arresting?—No, I cannot remember any case.

400. You say it does cause delay, that under equal circumstances with the double grid you might be delayed by that cause?—Yes. On good trains there are a good many opportunities to keep the grid clean, any, Broadford. They stop at every station and do cleaning. You know you are in difficulties with the spark arresting; it is dirty, and the first thing you clean it, and it will hold good for another 30 miles. The next opportunity you clean it again. I have known engines going from Beechworth to Ballarat, where they had difficulties; that is a very heavy hill. Before that is 15 or 16 miles is completed the spark arresting is dirty, and you have a lot of trouble with the single one, or with the single one if it gets dirty; the double is more likely to get dirty than the single.

401. By Mr. Sangster:—What class of coal is the most likely to make the grid dirty, the New-
castle, Ottaway, or Coal Creek?—The Coal Creek would fill it up quickest, because it is the heaviest, and so much more would stick on this gridiron. That is my individual opinion, without making actual tests.

402. By the Chairman:—Do the fire bars often burn through?—Very seldom; I have had them only once or twice.

601. If it did occur, the live coal might fly about on the track?—Yes.

602. By Mr. Sangster:—Supposing you had coal inclined to cinder, and coming with as much of a load as your engine could take, and having a lift the fireman put it in an extra draught, is there not a likelihood of that stuff going into the ash pan?—Yes, it, if get down on to the bars and you ruled them.

603. Then would not there be a good deal of those embers going out of the ash pan if it was pretty full?—Yes, these would be a danger of it getting out.

604. You do not think it would loose the rails?—No; I am very strong on that: I do not think it would get beyond its rails.

605. By Mr. Greaves:—What is the distance of the drop from the pan to the surface of the soil?—A foot.

606. By Mr. Wheeler:—You have tried only two of the new spark arresters?—Yes.

607. Have you seen most of the new inventions that are at the Railway department?—I have seen some of them.

608. Could you give us an opinion as to those you have seen; are they likely to be as good as the gridiron you have in use now?—No.

609. Have you seen any yet equal to what you are using now?—No.

610. You consider that the best spark arresting you can get?—It is the best I have seen.

611. Have you seen any in use in the other colonies?—Not practically; I have an idea of what they use, but I have not seen them.
619. You do not know of your own knowledge that they have anything better than ours?—No.
620. I suppose an engine steams better with one grid out?—Yes.
621. But it is safer when the two are up?—Yes, as far as the sparks are concerned.
622. You said you had never noticed fires take place from the ash pan; you know they open at the ends and let the ashes out; is there no danger at that time of the fire flying out when the engine is travelling at a good speed?—Yes, there is a danger of the fig dropping out. I have seen sleepers on fire, and do not know any other way they could have got on fire except that.
623. By the Chairman.—You have never tried any actual fires except those two?—No.
624. By Mr. Wheeler.—You are satisfied that the two you tried would be of no use?—Yes.
625. You do not know who were the inventors?—No; I did not have much of a practical trial of one; we only went to Woodland, and could not get enough heat with the wood, because of the leak with in the engine. They took that out, but I did not run the train the next night, so I cannot say the effect when the engine would be working heavily on a heavy grade; that is the time when there is the chance of sparks through the funnel.
626. By Mr. Sawyer.—Was the inventor on the engine with you at the time you had the test of the bell-mouthed funnel with the small mesh in the armor?—I was not testing; I simply had the engine give me to run. The next man who took the engine was going to Seymour, and he went only to Essexden, he said he would not go without another engine; he did not want to spend all his lifetime on the road, so they took the thing out the next day; it caught the sparks right enough, but you could not get up any steam.

The witness withdrawn.

Adjourned.
MINUTES OF EVIDENCE
TAKEN BEFORE ROYAL COMMISSION ON RAILWAY SPARK ARRESTERS.

WEDNESDAY, 12th SEPTEMBER, 1900.

Members present:
M. K. McKeezie, Esq., M.P., in the Chair;
The Hon. J. G. Duffy, M.P.;
T. Kennedy, Esq., M.P.;
J. Morrissey, Esq., M.P.;
G. Sangster, Esq., M.P.;
The Hon. H. R. Williams, M.P.

Ebenzer B. McTaggart, sworn and examined.

620. *By the Chairman.*—What are you?—District traffic superintendent in the Victorian Railways.
621. Have you been long in that position?—Three and three-quarter years.
622. In that position do you travel round the different lines and come in contact with bush fires that have been occasioned by engines or otherwise?—Yes; if such things were to happen, I would have experience of them.
623. Has any fire been caused during the time you have been in your present position that was alleged to have originated through a railway locomotive?—Not in the district over which I have supervision.
624. What were you, prior to your being in your present position?—Immediately before that I was station-master at Seymour, for three years. Two years before I was at Seymour I was at Bendigo, and for eight years before that I was a travelling telegraph inspector.
625. You would have many opportunities then of knowing about these things; do you know of any fires originating close to the line that were said to be caused by engines?—Yes, several.
626. Was any complaint made to the department?—Not to my knowledge; that would be outside my special business.
627. Were there any court proceedings?—Not to my knowledge.
628. You have no knowledge as to whether sparks are likely to originate from funnels or fire-boxes?—Practically no.
629. *By Mr. Kennedy.*—What is your present district?—The Midland, the headquarters are at Maryborough, reaching from Warrnambool to Sydenham.
630. *By Mr. Morrissey.*—No fires have occurred in your district?—No, I do not know of any.
631. *By Mr. Sangster.*—Has any damage been done to the rolling-stock or goods?—No, I know of no case.
632. *By the Chairman.*—You do not know of any case in which taranplings were burned or trucks set on fire through sparks from the engine?—I cannot recall a single case. My knowledge extends only to my own district. If any case of that kind occurred, it would be reported through me by the guard of the train or the station-master, but I cannot recall a single case.
633. You refer only to the time you have been in your present position?—Yes, that is all.

The witness withdraws.

Thomas Norris, sworn and examined.

634. *By the Chairman.*—What are you?—Inspector of permanent way in the Victorian railways, stationed at Ballarat East. My district is from Braybrooke Junction to Ballarat; Ballarat to North Geelong; Ballarat East to Buninyong.
635. How long have you been in your present position?—About thirteen and a half years. I was eight years at Footscray—I had then Braybrooke Junction to Warrnambool, and part of the time Braybrooke Junction to Sunbury and Bacchus Marsh.
636. During your experience has there been any fire close to the line that was alleged to have been caused by an engine?—Yes, a good many.
637. Do you know of any complaints having been made to the department?—Yes.
638. Any claim for damages?—Yes. I suppose there have been about a dozen, as near as I remember.
639. Were any damages obtained from the department in any case?—I do not think so. I have no knowledge of any of them being sustained.
640. You have not any knowledge in connexion with the engines at all?—No; that is outside my province.
641. Your knowledge extends to burning off along the line?—Yes.
642. Do you agree with me evidence that the fixed hours for burning off are a hindrance; that they restrict your operations very much?—I do; they very much restrict it; it does not give us time to get the grass burnt off quickly in the season; the hours are too short.
643. We have had evidence that the wind blows in the right direction sometimes up to noon, and afterwards it changes so that you cannot take advantage of it, and in the meantime the grass gets so dry that when the wind is favorable again there is greater liability to the fire spreading?—Yes.
644. Have you known any case in which the fire escaped from your control?—Yes, between Inglister and Ballan.
Did it do much damage?—It burnt some 60 acres of Mr. Igles’ land.

Was there a claim for damages?—There was; I cannot say whether it was sustained or not.

Do you remember what the cause of its getting away was?—It was said that a rabbit ran through the bushes and took the fire into Mr. Igles’ paddock.

What was your opinion as to the stamps along the line?—Should they be grabbed out altogether, rather than burn round or cut round?—I do not know; it would be profitable where they are thick, but where there are a few it would. We chip round them, and burn some of them out in winter. They will all be cleared down gradually.

Are they a source of danger in burning off?—Not much. If one takes fire the men put it out before it leave it. There is very seldom one left on fire of late years.

It was alleged that at Wangaratta a fire was caused through a stamp that was supposed to have been extinguished blazing up in the night?—That is not very likely to occur.

Your opinion is that fires do not frequently occur in that way?—No, there is not a great danger of it.

It would be better to take them out when there are not too many?—Yes.

Do you remember which was the most disastrous fire that occurred during your experience that was charged to the railways?—We have had no very big fire. The most that was burnt in my district at any one time was something like 500 acres, between three and four different people. That was at Rockbank. That was charged to the railways; it was alleged that a locomotive caused it. The line repairs were not burning off at the time.

What was the greatest difficulty the people who made this allegation had in sustaining their charges?—The men in that case said that the fire was burning some 20 or 40 yards from the fence when they came up to it, outside the railway fence altogether.

How long after the train had passed was this fire noticed to be burning 30 or 40 yards away?—To the best of my belief they said twenty minutes afterwards.

How much was burnt at that time?—Not very much burnt at that time; the wind chopped round and took it away afterwards.

Was it not reasonable to assume that the engine was the cause of the fire?—It was there anything in the neighbourhood that the fire could be attributed except to the engine?—Two men were alleged to have passed before the fire.

Before or after the engine?—Before the engine.

The fire would have got a good headway then?—It had a good headway, but there was not much burnt at the time the men came up to it.

Was the engine-driver examined on that occasion?—He is always examined when there is a fire. I cannot say what he said.

What is the class of timber along the line where the stamps are?—We have all classes, but in that particular place it was all box. There is not much timber about Rockbank at all, but any stamps there are box.

Have you found any cinders alive on the permanent way?—Yes, sometimes.

Where did they come from?—They must come from the ash-pan. I have not often found them alive.

In any particular section of the line more than others?—No.

Have you paid any particular attention to the localities in which you have seen them, whether it is approaching a bank?—No, I did not notice. I have found fire coming down an incline where there was no steaming at all.

Was there sufficient to allow the cinders to cause a fire?—It did cause the grass to burn close by.

You believe those cinders had fallen from ash-pan?—I thought so.

The witness withdrew.

Harry W. Hawkins, sworn and examined.

What are you?—Claims officer in the Victorian Railways. I have been in that position a little over fifteen years.

During that time, have there been many claims made on the department for damage done to goods injured by fires caused by sparks from the locomotive?—Not to a great extent.

Have you had much damage done to your own stock during that time, such as tarpaulins, tracks, and so forth?—That would not come under me, except where it was line catching fire, which would burn the rolling-stock and tarpaulins, but tarpaulins and wagons destroyed by fire without goods being in them would not come under me at all; that is under the Chief Mechanical Engineer.

Do any claims for fires caused by locomotives, such as brush fires, come under your notice?—No, only claims for goods. Speaking generally, I think there have been about four or five cases where it was alleged that sparks from the engine had caused the damage, and from my general recollection I have a general idea that it was not clear. There was an allegation that the wool or straw was damp, thus causing the fire. In case of claims I remember, the fire happened to have occurred right in the bottom of the track where sparks from the engine could not get to it.

In the case of wool it would be remarkable for it to take fire on the track, because it is on the tracks such a short time, and there are so few cases of spontaneous combustion in wool from the time it leaves the station until it arrives on the market in London. In one case the fire seemed to occur right in the middle of a track of wool; that was wool belonging to Dennys, Lascelles, Austin, and Co., of Geelong. They assured me it was impossible for spontaneous combustion in wool, but a year or so afterwards I saw an account of a shipment in which it did occur. I admit the probability of a fire occurring in that way is rather remote.

What was alleged in regard to the straw?—The same thing. Taking the last five years altogether I think only about four or five claims have been cast in for damage alleged to have been caused by sparks from the engine—the other claims for fire were from other causes altogether.
674. *By Mr. Morrissey.*—What claims during the mail train strike?—No; we had to pay those claims. There was burning wood at that time.

675. *By Mr. Williams.*—During the last three or four years you have had a good many accidents that were directly attributable to sparks; have there not been several wagons burnt? There was one accident between Epsom and Chawton in which you lost two or three trucks?—Yes, but they were not filled with goods.

676. They were filled with straw?—Yes. I do not remember that we paid anything in that case. During the winter season it is a very common thing for the trunks containing live to get burnt, and the tarpsauls too. Taking the last five years, very few claims have been made through that cause.

677. From this return that has been produced it appears that most of the claims were during the time wood was used on the railways?—Yes; since coal has been used I can only recollect one case in which a spark from the engine caused a fire. That was coming down from Belfrat.

*The witness withdrew.*

Henry D. Scoot, sworn and examined.

678. *By the Chairman.*—What are you?—Engine-driver on the Victorian railways.

679. What lines are you driving on?—Any lines; lately, the North-Eastern principally.


681. Have you been long driving?—About twelve years.

682. During that time has any fire originated close to the line that was alleged to be caused by your engine?—I do not remember any.

683. Have you tested any of the other inventions for spark-arresters?—No, I never ran any test trips. I run one or two trips with some of them in.

684. Do you think the departmental spark-arresters serve the purpose for which it is intended?—Certainly.

685. Do you think it possible for fires to originate from sparks coming from the engine with the present arrester?—No, I do not think it is possible.

686. Either in grass or goods exposed in trucks?—Not with the double arrester that we have.

687. Is it possible for fire to originate from live embers falling from the ash-box?—I do not think so; they would fall only on the permanent way.

688. You do not think it possible for them to get outside the permanent way?—No.

689. Not if a strong wind was blowing?—There is a slight possibility, but the wind would have to be very strong.

690. Mr. Mils was locomotive superintendent during the time that you have been driving?—Yes.

691. You were firing before that?—Yes.

692. Is there any difference in the instructions given to the fowmen now in regard to the coal, as there was when Mr. Mils was superintendent?—I could not say. I think some order has been removed.

693. Is it not a fact that when Mr. Mils was locomotive superintendent the coal used in the engines was screened?—No, I do not think it was in my time.

694. It is not screened now?—No.

695. When that loose coal is stovelled in does it not go off in small explosions?—Some sort of coal will.

696. Is there not a greater likelihood of larger sparks escaping if it were screened coal?—Yes, but they have to get through the arrester, and there is also a brick arch that throws them back into the flames again.

697. Some get past the arch?—Yes; we know that from the names that are in the smoke-box.

698. When you have gone up in the morning and come back in the evening have you seen that the grass has been burnt close to the line during your absence?—Yes, I have seen some big fires.

699. Was it alleged that those fires were caused by your engine?—Not by my engine.

700. By any engine?—Yes, I heard of one about eighteen months ago, a big fire on the North-Eastern line.

701. *By Mr. Williams.*—Do you always use the double-grid arrester with the good trains?—Always in the summer months.

702. Have you not had any of your tarpsauls or trucks set on fire?—None on trains that I have been on.

703. Is not all the Victorian coal screened at the mines?—It is supposed to be. I believe it is screened, but what they call at the mines screened coal and what we call screened coal is very different; they call it coal at the mines, and we call it slack coal.

704. All the coal put into the trucks passes over the screen?—Yes, but I believe it is a quarter of an inch size.

705. *By Mr. Morrissey.*—Does the coal deteriorate in transit between the mines and here; should it be again screened?—No. There is very little danger of getting any slack if it is screened. The only danger with soft coal would be dropping it from the trucks on to the coal stage.

706. When are the sparks ejected from the ash-box?—There is no particular time that you can state.

707. Can you keep them from the ash-box if you desire?—Yes.

708. When do you put on the blazing that drives them out?—It is not the blaze that drives them out; it is the fire-bars not being close enough together, or being burnt that causes it.

709. If the fire-bars are in good condition, the ejection of sparks from the ash-pan would be a rare occurrence?—Yes.

710. Do you have the coke fired over the ash-pan?—Yes; we have some of them fitted on the good engines.

711. Would that stop any ember from escaping?—Yes, they would all fall into it.

712. Would that interfere with the working of the engine?—It would make it harder to get steam. With some engines you can get steam easier than with others, though they are built in exactly the same way.
By Mr. Kennedy.—The fire-boxes and enginemen are subject, to a general overhaul.—Yes. If there is anything wrong or anything wanted we are supposed to look it each trip.

714. Is it possible for the fire-bars to get out of order on a trip?—Yes.

715. By Mr. Marrs.—When do you become aware of the necessity for the examination of the fire-bars?—On a fire start before you have had occasion to make examination as to the cause of it?—You can only overhaul the bars when the fire has dropped out—you can tell if they want examining beforehand, but you can only do it when the fire is out.

716. How often is the fire cleaned out?—Nearly every trip.

The witness withdrew.

Thomas John McConnell, sworn and examined.

717. By the Chairman.—What are you?—An engine-driver on the Victorian Railways. I have been in that position for about 22 years.

718. Where are you driving now?—I am running the Adelaide express between Swan and Melbourne; one day I come to Melbourne, and the other day I go to Swan.

719. Have you driven any of the testing trips to test spark-arresters?—Yes, I have. I drove the coal before that;—On the Swan line, and the Geelong line, and the Ballarat to Maryborough line. We ran for two or three months through to Castlemaine, but they altered the running afterwards.

720. Have you ever run on the North-East or Gippsland lines?—No.

721. Have you done any of the testing trips to test spark-arresters?—Only one that I remember, about 23 or 24 years ago. I was firing at the time. It was a spark-arrester from New Zealand. It was a complete failure.

722. What is your opinion of the departmental arrester?—I think it is effective, with proper care and attention.

723. Is it impossible for sparks to get through to do damage?—It would be very hard, except it was very dry material. It would be a very fine spark that would get through the double spark-arrester and the bird-cage as well.

724. Do you use the double spark-arrester and the bird-cage as well?—Yes, they do in the summer time always; at this time of the year there is only one arrester used.

725. Do you think it is possible for cinders to escape from the fire-box that will cause a fire?—Occasionally they will, because you may have your fire-bars attended to too-day, and the bars may go wrong in one trip. The heat burns the log off, and that bar may drop through and make a larger opening, but if the bars are in thorough working order very little fire will come through.

726. Have you ever used the cage in connection with the fire-box?—No; I have seen it on one or two engines. I do not think it has been on more than half-a-dozen engines.

727. Do you know if there is any difference in the regulations now as to the use of screened coal, from what were in existence to Mr. Mil's time?—I think so. When Mr. Mil's was power the coal was screened during the hot weather. I have seen the men-screening it on the coal stage; I do not see any men screening it now.

728. Is the coal that you get now screened?—It is supposed to be; I cannot say whether it is. In transit the coal gets knocked about; in shovelling coal out of trucks, especially soft coal, it will get fine; men tramping over it and pulling it about with rakes will all make it fine. It may have been screened at the other end, but sometimes it has not the appearance of being screened when I get it. With the job I am running on we get the pick of the coal.

729. Did the coal present the appearance of screened coal when Mr. Mil's was there?—Yes, the screenings were on the stages.

730. Is small coal liable to create more sparks than screened coal?—It is lighter, and it goes through the tubes into the smoke-box more easily than the rough coal, but it should not get through the spark-arrester any better than the other coal.

731. It would throw more sparks against the arrester than the other coal?—Yes.

732. In your opinion, it is scarcely possible for sparks to get through the funnel that would create fire, but it is possible for cinders to escape from the fire-box that might cause a fire?—Yes; it is possible for cinders to come through the ash-pan, but it would be of very rare occurrence, if the fire-bars are looked after properly, which they are every day.

733. By Mr. Sangster.—In the case of your noticing that your fire-bars are defective, is there any trouble in getting new fire-bars?—No trouble at all. You have only to put it in the book, and it is attended to immediately before the engine goes out. If I were away from home I would get the orders from the boiler-maker and do it myself, but at the depot where you live it is always attended to at once, if you put it in the book.

734. By Mr. Kennedy.—What is the regulation space between the bars?—I cannot say; I should think it was about half an inch.

735. You run passenger trains altogether now?—Yes.

736. When you were running goods trains did you have any fires on trucks?—I cannot recollect any; I have seen a truck with a lot of bark in it, and I have seen the bark on fire.

737. Have you had any fires in the trucks that composed your train?—Nothing serious.

738. Have you had any fires that it was necessary to report?—No; there might be a small spark got in, but I would take a bucket of water and put it out.

739. Where did the sparks originate?—They must have come from the engine, I should think.

740. By Mr. Sangster.—Was that during the time the double spark-arrester was on?—I do not know; it was in the very hot weather.

741. By Mr. Kennedy.—You cannot remember an instance in which the fire was of such a serious character that it was necessary to report it?—No.

742. Have you any opportunity of determining from actual observation whether cinders fall from the ash-pan or to the line?—Yes, you will often see sparks come from the ash-pan on to the permanent way—you will see them at night-time.
743. Is there sufficient vitality in those sparks to cause a fire if they fall on inflammable material? —
It would have to be very dry material; so on the permanent way there is nothing of an inflammable nature.

744. It has been stated that it is hardly possible for those sparks or cinders to escape from between the rails owing to the motion caused by the movement of the train, and the height of the rails, standing some 6 feet 6 inches over the sleeper—Is that correct? —Yes, I think so; the underpass is in the opposite track. If you are travelling at a high rate of speed the velocity with which the spark or ash comes out of the underpass might possibly make it rebound over the rail.

745. By Mr. Morison.—How far from the engine was the truck that contained the tank which caught fire? —I cannot say.

746. You believe that fire to have been caused by a spark from the engine? —I do not see where else it would have come from.

747. If that spark had gone in another direction and landed in a puddock of dry grass or material of an inflammable nature, it would have caused a fire to originate there? —It is quite possible.

748. Is it not very probable? —Some of the stringybark is like touch-paper; the fire might have been caused by the fireman or myself smoking.

749. You assume the risk would have been minimized if the coal were screened? —I think if the coal were screener it would minimize the risk very much; fine coal has a greater tendency to go through than rough coal; but I do not know that it would make very much difference if the double spark-arrester is kept in good order.

750. If the spark-arrester is as effective with fine coal as with rough coal, is it not as well to take the coal as it comes from the mines? —It is always considered by the drivers that the coarse coal is the best to use, but I do not think it is impossible for sparks to get through the double spark-arrester.

The witness withers.

Mr. Williams here took the Chair in Mr. McKenzie’s absence.

Charles Henry Powell, sworn and examined.

751. By the Chairman.—What are you? —An engine-driver; I have been driving for between eleven and twelve years.

752. Have you had much experience with spark-arresters? —Only with the departmental one.

753. What has been your experience with that? —I have never seen any fire occur from my own engine.

754. Have you seen fires alongside the line, but I could not say that they were caused by my train.

755. Have you been driving passenger or goods trains? —Principally goods trains.

756. Have you had any fires in the tarpaulins on your trains? —No.

757. Have you had much experience of cinders getting from the ash-pan and burning on the line? —I have seen a little of that when the bars are out of order.

758. Is that frequently the case? —No; I do not know how long they keep in order, but they do burn away occasionally.

759. When sparks and cinders get on the lines is it likely that they will ignite the grass alongside the line? —If there was dry grass about and any live wood did roll out into it I suppose it would ignite, but in the majority of cases as summer approaches the grass alongside the line is burnt, and the ashes does not get the chance.

760. By Mr. Sangster.—Is it not a fact that a lot of cinders get through even if the bars are in good condition, or how do you get the dirt out of the ash-pan? —It stops there until we force it out with a pike.

761. At Seymour the pan is cleaned over the pit, and the same at Melbourne.

762. If you are running a heavy train, and the coal is not very good, do you put up the ash-pan? —You might take it over the top, but you do not go through as you usually take the top over.

763. By Mr. Morison.—Where have you been driving? —I have been all over the lines running out of Melbourne; I have always been stationed at Melbourne. I have been driving on the North-Eastern line for twelve months or more.

764. Did you see the fires that you have seen before your engine passed or afterwards? —Before.

765. I never saw a fire a short time after my engine had passed.

766. In those cases was the Railway Department charged with having caused the fires? —I believe there have been enquiries on the North-Eastern line of the engines during that time. I remember once got some correspondence as to the train I was on; they reckoned my train passed five or ten minutes prior to the fire starting.

767. Was a train lodged for damage done by that fire? —I could not say.

768. About how often do the bars get out of order? —Perhaps once a month or six weeks.

769. Is there anything in particular that gives provocation to the bars to get out of order? —I could not say.

770. By Mr. Kennedy.—Is it not customary if the fire is not burning well to stir up the ash-pan with the pike? —No, we take the ton over. When the engine starts to fly she gets very dirty and very thick, and you would have a job to get on the back unless you dropped the fire and drew it altogether.

771. Before it gets to that stage, is it not usual for the fireman to make an attempt to get the draught right through, and does not the draught come through the bars? —Yes, it comes through the bars.

772. Has not the settlement of the dirt on top of the firebars to be avoided by the fireman? —Yes; but it is very seldom we use the pike on the journey.

773. It is not essential to keep your firebars free in order to insure a draught? —Yes, but it is impossible to do that. On the North-Eastern line half the journey is pulling and the other half is rolling. From the top of Kilmore Junction to Seymour it is rolling nearly all the way.

774. It is not absolutely essential in order to keep your fire going effectively, that your firebars should be absolutely clear from any settlement of dirt, so there must be a continual firing; the burnt material is continually dropping into the ash-pan, and a certain proportion of that must be alive? —It would be so if the bars were too wide; but there are times when there is too much dirt in the fire-box that you cannot see the fire at all. If you start away clean, and the fires are free, you will see the collection of the fires, but afterwards it gets all dead with the dirt, and that stops you from seeing the collection of the fires.
772. Do you not stir the fire-box frequently?—We do not do it if we can do without it; as a rule we stop, fill up our boiler with water, and use the fan and force the steam.

773. You say you have had no fires at all in trucks attached to your train?—No.

774. No instances of tarpaulins or goods becoming ignited?—No.

775. By Mr. Morrissey.—You said there was one fire in relation to which some correspondence took place between yourself and the Department; what was the nature of that correspondence?—I was asked about a fire that occurred in a certain place. It was between Kilmore East and Wandong last summer.

776. What was your reply?—I told the facts of the case—that I saw nothing of it myself.

777. By the Chairman.—What is your opinion of the screened coal?—It is screened as well as it used to be?—I cannot say much about it. I was only just commencing in the Department when Mr. Mirra left.

778. Is the coal well screened?—We would like it screened as well as it can be.

779. Since you have been driving, have you noticed any difference in the character of the coal?—Sometimes we get inferior coal. The trucks are run up on to the top of the stage, and the coal is dropped down; the big stuff rolls off and the small stuff stays in the centre; when the large stuff is used you get the fine stuff.

The witness withdrew.

William McFarland, sworn and examined.

780. By the Chairman.—What are you?—An engine-driver on the Victorian Railways. I have been driving for about nine years.

781. What has been your experience with regard to the spark-arrester used by the Department?—I consider the double spark-arrester with the cage not only stops the sparks, but it stops the smoke and stops us from getting on. We have greater difficulty in the summer months than during the winter, when the single arrester is on.

782. Have you had any experience with any other spark-arrester?—A number of years ago I was on engines that were fitted with the Thornton arrester, but I took very little notice of it.

783. Have you had any accidents through fires in the rolling-stock and goods?—No, I have never had to answer any correspondence in regard to fires.

784. The spark-arrester has answered well?—Yes.

785. Have you had any cinders fall out of the ash-pan?—I have seen them come out occasionally, but not to do any damage. I have never been charged with doing any damage.

786. By Mr. Nangie—Do you agree with Mr. Powell that you do not require to get the air through your bars at all—that you can leave the dirt there?—No; on the road I have been running lately we cannot get to Woolwood with the class of coal we have been using; as a rule, we have to clean it out either of Sunbury or Gisborne, and frequently twice; it would be impossible to get through without.

787. If you put your pricker in on the journey, are you not liable to get cinders through the bars, even if the bars are in good condition?—No doubt you do; you lift the bars for that purpose; these are tippers in the bottom of the box for that purpose. There is no big on one end, so that they tip it up readily to let the refuse out.

788. In that case, a good many fires cinders must go through into the ash-pan?—Yes.

789. If you had a cage on, it would be almost impossible to get steam up?—We clean the ash-pan out before we leave.

790. If you had a cage on the front of the ash-pan, it would help to stop the draught?—No doubt it would stop it, to some extent; but I have had very little experience with the cage.

791. Did it reduce the steaming power of the engine in any way?—No.

792. It would be effective in stopping cinders from going through?—Yes; the object of that is to stop the cinders in running. In drawing the fires, that cage would be lifted up.

793. In running with the cage on, if you found your draught was bad, there would be an inclination to lift the cage, so as to get a better draught and precise more steam?—Yes; but I have found no difficulty in the few trips on which I have had it.

794. By Mr. Kennedy.—In reference to the difficulty in steaming with the double grid and the cage, is there a cage in the smoke-box to prevent the escape of sparks?—The cage is in the smoke-box, between the two grids. The cage is objectionable in the way of getting steam in the summer time; it is only used in the summer time.

795. What is the difficulty with the cage?—In keeping it clean; it stops you until you do clean it. It makes you stop at stations that you would not otherwise stop at.

796. It's a hindrance to the steaming of the engine if it is cleaned?—No; but that is the objection. It gets so dirty.

797. In what length of journey would it get dirty?—I am running principally on the main line, and we frequently have to stop before we get to Sunbury. That is with a heavy goods train.

798. When is that?—We usually get to Sunbury in from one hour 25 minutes to one hour 45 minutes.

799. What time is occupied in cleaning it?—Very few minutes. There is a steel brush used; I suppose the whole time of cleaning it would not be more than five or six minutes, but there is the delay in having to stop the train and start it again.

800. By Mr. Morrissey.—Is it not the fact that cinders come out of the fire-box in greater quantities when you lift the cage than when you are not putting on special stress to get better steam?—I have never lifted the cage except when drawing the fire; I have never lifted it when running.

801. By Mr. Kennedy.—Do you consider the coal is in a proper condition now, or would screening improve it?—No doubt screening would improve the quality.

802. There would be less danger of the emission of sparks?—Black coal will go through a smaller space than lumpy coal.

803. What districts have you been driving in?—At present I am driving on the main line, and to Bacchus Marsh and Geelong.
Have you been in the dry districts?—Not to any great extent.

In stimulating the rate of speed, do you frequently have recourse to the pricker?—With drivers that is the last resource.

Does the use of the pricker drive sparks and cinders through the firebars into the ash-pit, and from there to the line?—No, the pricker is put in as a rule after bad firing, when the fire has become slack, either through bad firing or slack coal. It is generally used as a temporary expedient to get over a steep gradient. It will not last long; it destroys the fire.

What effect has the pricker?—It opens the fire sightly, and it makes the dark spots into bright ones. Your fire may be uneven, and it spreads it and makes it level.

Will it drive out a greater quantity of cinders?—No, it would not be put through to that depth; if you did that you would probably allow more cold air to get through, and it would do you more harm than good.

John Joseph Kewish, sworn and examined.

By the Chairman.—What are you?—An engine-driver on the Victorian Railways. I have been driving for sixteen years.

Have you had any particular experience with regard to spark-arresters?—I have been using them all the time.

Is the arrester effective?—Yes; if you make the mesh any closer it will mean that there will be no steam at all.

You know any fire to be caused by your engine?—No; and I have been running through the Winterm in the wheat season with crops on both sides of the line.

Have you had any fire on the train?—Yes, I had one in the sleeping-car.

Was that due to a spark?—Yes, a spark from the engine. It was at the time of the strike, when we were burning wood. A spark got underneath the canvas, and the draught was so great that it ignited. I stopped the train and put it out.

Do sparks and ashes get out of the ash-pit and drop upon the line?—It is possible they may do so. There are places set apart for cleaning the fires and smoke-boxes, and that work has so right to be done anywhere else.

Is it done elsewhere?—If so, it is the man's own fault; a proper firman never uses the pricker at all.

Have you had any experience with any other spark-arrester except the departmental one?—There was a greater called Anderson's. I think, I did not use it, but I heard of it, and that was quite sufficient for me.

There were objections to it that an experienced engine-driver could discover at the first view?—I know it was perfectly useless, because its action was by steam, and it would destroy the vacuum in the smoke-box, and if you destroy the vacuum you cannot get steam. By using that jet in the smoke-box at such a low level below the blast it would destroy the vacuum. Even if the smoke-box door itself is drawing air it will destroy the vacuum to a certain extent. I believe that with this arrester it took about six hours to go 10 miles.

Did you see it at the time they were testing it?—No, I saw it before it went to town at all; before it was put on the engine it was put on a portable engine.

As far as your personal experience goes, you think the present arrester, taking into consideration the steaming power of the engine, is sufficient or prevent all fires?—I do; I do not see that there can be any better, providing it is properly looked after and kept in proper order. The ash-pit is supposed to be kept clean and washed out.

Would there be more danger when using wood?—Certainly.

What is your experience with the coal—is it as well screened as it used to be?—It varies; sometimes we get a good shipment, and at other times it is not good. Sometimes it may be very rough, and yet the quality not be good; we call it bimcan or "dead-up"; no matter how much you put through it a trip, three parts of it will remain in the fire-box.

Is that coal from another colony?—I have never used any Victorian coal yet.

Is the New South Wales coal from the last pits they have there?—I cannot say; all I know is that at times it is not coal, it is only dirt. That is only in occasional cases. Coal cannot be bought here and handled three or four times without producing a certain amount of dust, and that fine stuff is only dirt; it is not coal at all.

By Mr. Kennedy.—You think you could not have a more efficient spark-arrester?—Not to get along. You may have one as good. I have had one myself, but I could not say it would do the same work as this one. I have never seen a better one than the one used at present.

Do you agree with the previous evidence with reference to the tendency of this eago and grid to get choked, and the necessity of stopping to clean them within a certain time?—That bears out what I say, that the grid is so close and so effective that it stops too much; it gets full up, and you have to use the wire brush to free it. When it gets stopped up with fine dust and soot from the fire it has to be brushed off, and in that case you must stop, because you cannot get steam.

Then now can you say it is the most effective arrester it is possible to get?—I do not say it is the most effective; I say it is the best I have seen.

An efficient spark-arrester should prevent sparks without materially diminishing the speed of the engine?—Yes.

You say you could not have a more effective spark-arrester than the one in use?—I have had no experience with any better. If you close the mesh up any more, you will make it too small, and if you use the steam or spray you will interfere with the vacuum.

Do you agree that there is a tendency for this arrester to become so choked up as to interfere with the steaming capacity of the engine?—It has not occurred to you that some means might be devised of having the arrester cleaned automatically?—It could be cleaned automatically, but it does not take a minute to clean it; you have only to open the door and rub the wire brush over it.

The witness withdrew.
831. Is not a certain amount of time lost in stopping the train to clean it?—No, I have never lost any time in cleaning it; we can always do it at the stations where we are stopping. With a heavy goods train you may have to stop.

832. Where are you running now?—In the Wensum area; it is fairly level country.

833. By Mr. Morissay.—In your experience, do the fires get frequently out of order?—Sometimes the lag will break off; it might go on one trip, or it might last for a couple of months.

834. When the lag is broken off, is it possible for sparks to get through?—The bar drops down and leaves a bigger hole.

835. A great many cinders may drop through that hole?—Yes.

836. And fires may originate through that?—I cannot see how the cinders could get out into the grass; they might fall between the rails and bounce about, but there is the distance from the rails to the fence, which is generally burnt-off in the summer.

837. You say a competent fireman was never occasion to use the pricker?—Very rarely; it causes the fire to clog.

838. May we infer from that that the drivers are negligent in the care of their engines when the pricker is used?—No; there are cases in which the fire might get clogged through dirty coal.

839. If the material put into your charge is properly taken care of, the engine in good trim, and the spark-arrestor in proper order, it is impossible to improve on existing conditions?—I would not say it is impossible. I do not say there might not be some other invention.

840. Have you heard of such a thing as the consumption of sparks in some part of the engine before they reach the fence?—No.

841. Is it not possible to consume the fire of the sparks before they reach the cage?—It may be possible—there has been a jet or spray used.

The witness withdrew.

E. B. McTaggart, recalled.

842. The Witness.—On thinking the matter over, I remember one case where there was no doubt that a small grass fire was caused by the engine. That was about 2 miles out of Wallon, on the Kilmoro side.

843. By the Chairman.—Was that attributed to sparks from an engine?—It could be attributed to no other cause.

844. Was much damage done?—No; very little.

845. Had the Department to pay?—I could not say, it was out of my district. I was coming across from Kilmoro to Wallon. The train I was in was a short goods train, and shortly after we got past we saw smoke issuing from the grass between the line and the fence, and on our return we found the fire had spread into a small paddock of about 3 acres between the railway and the road. It took some time to put out, but there was no danger, because the railway on one side and the road on the other prevented it from spreading.

846. By Mr. Sangster.—How long ago is this?—It was in the second week of February of this year.

847. Was the double spark-arrestor on the engine?—I could not say.

The witness withdrew.

Adjourned to-morrow, at Eleven o'clock.

THURSDAY, 14TH SEPTEMBER, 1900.

Members present:  
M. E. McKenzie, Esq., M.P., in the Chair;  
J. Morissay, Esq., M.P.;  
G. Sangster, Esq., M.P.;  
The Hon. B. R. Williams, M.P.;  
John William Bolger, sworn and examined.

848. By the Chairman.—What are you?—A ganger at Trudgdon. I have been there about a fortnight; before that I was at Rosedale for four years; previous to that I was at Ravenswood, where I was in charge at different times; and I was a repairer on the Mirboo line for twelve months.

849. During that experience have you known any fires to escape from control when you were burning off?—No.

850. Do you find the restriction as to the hours interferes with the work?—Yes, considerably; we would like to be able to turn off at any time.

851. What is your view as to the treatment of stumps on the line?—Where it is practicable they should be chipped round. Since I have been a ganger I have always chopped round them when it was possible. No doubt, on some lengths it would be almost impossible, because there are such a great number of stumps and trees, but where there are only a few it should be done if it does not take too much time.

852. You chip along the fence, and turn between that and the rail—do you think that is a sufficient protection?—Yes, providing that in places where the grass is heavy there is also a swathe mowed. In the length I am on, the grass grows to a height of 5 or 6 feet in some places, and in that case we mow a swath along with the scour, and turn is as soon as it dries—that is, inside the chipping, along the fence; there is 3 feet or 4ft. 6in. chipped besides that.

853. Have you known any fires to occur along the line, where you were in charge, that were alleged to have originated from a locomotive?—No, not during my experience.

854. By Mr. Morissay.—Have you seen a fire start near the line?—Yes, several.

855. What was alleged to have started those fires?—In different cases I have known it to be some one making a fire or a cigarette. As a rule it is put down to the engine, but I think it is in most cases the bolt of a cigar or a cigarette, thrown out through a carriage window that sets fire to the grass.
855. It would have to be a good throw to get outside the fence?—The grass is not a great distance from the rail.

857. I refer to the fires outside the fence?—I have not seen a fire start there.

858. Do you think it would be an advantage or an extra precaution in the prevention of fires, assuming it were possible for a spark from the engine to ignite the grass, to chip a piece of chain from the fence in the properties through which the line passed?—I have known that to be done in Roseville. Mr. Pearson used to do that in Kilmanagh; he ploughed two or three furrows every year, but he has not done so lately.

*The witness withdrew.*

Charles Jones, sworn and examined.

863. By the Chairman.—What are you?—A railway ganger. I have been in that position for twelve years. I have been stationed all the time at Broadford. Before that I was a repairer at Nagambie for eight years, and previously to that I worked in Geelong.

864. Have you ever known a fire to get away from your control when you were burning off?—Never.

865. Do you agree with the evidence of the previous witnesses as to the hours for burning off?—I think the gangers ought to be allowed more discretion. I believe in giving notice, but the notice is too long.

866. Do you believe in the gangers being at liberty to burn off the grass whenever the weather is suitable?—Yes.

867. You often send out notices that you intend to burn off on a certain day, and when the day arrives the weather is not suitable?—Yes; then before we can start again we have to give another notice, and go through the same form.

868. How many hours’ notice do you give?—Twenty-four hours.

869. A clear day must be lost?—Yes.

870. What is your view as to taking the stumps out—are they a source of danger?—I never knew there to be if they are chipped round. I have known cases where we did not notice a stump at night, but it has always looked to the first thing in the morning. With stringy bark and gum there does not seem to be any danger, but the old box stumps sometimes get alight and burn.

871. Have you known a fire to originate close to the line that was alleged to have been caused by an engine?—Yes, I know of one last summer, in December.

872. Were you in charge of that length?—Yes.

873. Do you know anything about it?—I reported the matter, and was examined as a witness.

874. Were you close to the spot at the time?—Yes.

875. Do you think it was caused by the engine?—I think it was; it started in three separate places.

876. Have you ever found any live embers on the line after an engine has passed?—No; but I have seen indications of it by a sleeper getting alight.

877. Was that at a station or between stations?—Between stations. Sleepers that have been laid down for 20 or 30 years are very dry, and I have found them alight in the summer time.

878. Have you noticed any embers outside the rails, indicating that they have been blown away from the fire-box?—No; I have noticed patches burnt where there was any rubbish; I have not noticed any embers—you would hardly notice them among the herbage.

879. You are frequently on the line when trains are passing: do you think, from your experience, that it would be possible for embers to be blown away from the fire-box under the trains and reach the grass outside, if there were a strong hot wind blowing?—I do not think so.

880. It is possible for sparks to escape from the funnel?—Yes; that occasion there were three distinct fires, and my impression was that the engine caused them, as a train passed at the time.

881. Do you think the sparks that caused those fires came from the fire-box or the fire-box?—I could not say; the fires started 6 or 7 yards outside the railway fence.

882. What was the distance between the three fires?—Just about a quarter of a mile in one case. The fire that did the damage started about half a mile from the Glenburnie school-house.

883. Did you see the three fires?—Yes; we extinguished the first one, and as soon as we saw the others we distributed the men and went to them; but the one on the hill was far away, and got a hold before we could get to it.

884. Did the fire look as if it had been lighted one after the other in the direction in which the train was travelling?—Yes.

885. By Mr. Williams.—Do you have sleepers 30 years old in the line?—There are sleepers in the down road that I suppose have laid nearly 30 years, and they are good timber still. The timber was matured before it was put in.

886. Though you believe sparks from the locomotive set fire to the grass, you do not believe those sparks came from the fire-box?—No, I do not think that would be possible, because there would be some indications on the line.

887. By Mr. Morrissey.—Were there some portions of the grass on the line not burnt at that time?—Yes.

888. Was the surrounding country very dry?—Yes.

889. What was the occasion of the delay in burning off?—There were patches of kangaroo grass, and the weather has been very favorable to burn it. Under our instructions we have to give notice, and when the notice is up the weather may be unfavorable for burning that particular piece. If we could get at it when the weather is favorable we could burn it off.

890. During the earlier portion of your time at Nagambie do you recall a large fire that was alleged to have been caused by an engine?—Yes.

891. There was compensation paid in that case?—Yes, I believe so; it was on the occasion of the opening of the line.

*The witness withdrew.*
John Eaton, sworn and examined.

888. By the Chairman.—What are you?—A ganger, stationed at Broadford. I have been eight years there as a ganger; before that I was stationed at Timamba for about eight months. Before that I was an acting ganger occasionally. I was a repairer at Longwood for about eight months, and at Beveridge for about nine years.

889. During your experience at those places have you known any fires to escape when you were burning off?—No.

890. Have you known any fires to originate close to the line, that were alleged to have been caused by a passing engine?—Not that I know of; people have complained that fires were started by locomotives. I have known of fires starting close to the line, but not many.

891. Were any claims made for compensation in those cases?—Not that I am aware of.

892. Do you think any of those fires were caused by passing engines?—I could not say; I was not close enough to say whether they were or not.

893. Have you observed any sleepers charred or burning?—Yes, I have found them on fire; not many, but at odd times, perhaps half-a-dozen times.

894. The sleepers have caught fire?—The sap was burnt off.

895. Was it not possible for some sparks to have been blown from those burning sleepers on to the grass outside?—Yes, in a heavy wind it might happen; sometimes sparks will blow a long way.

896. Would it be possible for live embers to be blown from the engine on to the grass outside the fences?—No, I do not think so.

897. Why could not the live embers that fall on the sleepers blow on to the grass outside?—The embers are much heavier than the sparks.

898. Do you agree with the evidence given about burning-off—that you should have greater liberty as to the hours?—Yes.

899. Are there any suggestions you can make in regard to the prevention of fire?—No; we are very well protected by chopping and mowing where the grass is long. Perhaps, if the land-owners would burn a strip, or help the repairers to burn off, it would be more protection. It is very seldom that the land-owners come to the burning off at all; the majority of them take no notice.

900. Why, Mr. Morrissey?—Why do you burn off along the line?—To comply with the Act.

901. For what reason is that regulation enforced?—I suppose to prevent fires taking place.

902. To prevent what from starting fires?—I suppose it is that, in case of a spark from a locomotive falling on the grass, it is better to have it burnt off.

903. If it is considered as likely, by the Department, that sparks which would cause damage come from the engine, from time to time, either from the funnel or the fire-box?—Yes, I suppose so.

904. Do you think burning a strip outside the fence, at some distance from the fence, would be an additional precaution?—It has been done. Sir William Clarke used to do it.

905. Would it be wise for the Department to carry out that duty, if the land-owners consented?—Yes, I dare say it would.

906. Would it minimize the number of fires starting?—I think so. In very hot weather, when there is a high wind blowing, and the train is passing through a district that you consider is inflammable, are you on the look-out for fires after the train has passed?—Yes; that is one of our most important duties in summer—to look after the fires.

907. By the Chairman.—What is your opinion as to burning off the stumps?—In some places the stumps are very numerous. Where there are any large stumps, they should be burnt down, if they are close to the railway fence.

908. Do you think they are a source of danger?—They are, if they are not properly protected from fire; we chip round the stumps when we burn off the grass.

The witness withdrew.

Charles Dodge, sworn and examined.

910. By the Chairman.—What are you?—A ganger, stationed at Tangala; I have been there about fifteen months; before that I was at Tatura for twelve years as a repairer—that was my first appointment.

911. Have you known any fires to escape when you were burning off?—No.

912. Have you known any fires to originate close to the line?—Yes, one or two.

913. Were they alleged to have been caused by passing locomotives?—Yes.

914. Was compensation claimed?—No; I do not think so; they did not do much damage.

915. How many acres of grass did they destroy?—I could not say; I was not working on the length where the fire first occurred.

916. Can you say whether they were caused by an engine?—I cannot.

917. Was it generally supposed in the district that the fires were caused by locomotives?—I think so.

918. Was it grass or crop that was burned?—A good deal of crop and hay was burned.

919. Why did not the owners apply for compensation?—I could not say.

920. Do you agree with the evidence given by the previous witnesses with regard to the restrictions of the hours for burning off?—Certainly.

921. You think you should be able to burn off at any hour you liked?—Yes.

922. Have you any suggestions to offer as to any improvement in the means of preventing fires?—No; we comply with the necessary regulations. Our district is a very dry one, and we chip from 6 feet to 7 feet wide along the fence. There are very few stumps there.

923. Have you found any sleepers on fire?—At Treadwell I have seen one or two that had been on fire; I never saw them absolutely on fire—the sap had been burnt off.

924. How much sap would there be?—Perhaps half-an-inch on the outer edge—perhaps it would only extend for a foot.
925. Have you had any experience with split sleepers?—Ours are all hewn sleepers.
926. In some parts of the country they split them, and pare them down?—We have not any of those
927. By Mr. Sangster.—Having sent a notice to a landlord that at a certain time you will burn off, if the wind is not favorable at that time you cannot burn off without giving another 24 hours' notice?—No.
928. In many cases when you do give notice the landlord does not turn up?—You never see any one.
929. Surmise the regulation allowed you to burn off at any time, and the notice were altered so as to read—"At the first favorable opportunity, when the wind is in the proper quarter, we will start to burn off," would that give you a better opportunity?—Yes, certainly. The notice might say—"The 15th or following days"; now we are barred from that, we have to send a fresh notice every time. Under the present arrangement we may lose a week before we can get a bad piece burnt off.
930. And in the meantime the danger is increasing?—Yes, certainly.

The witness withdraws.

William Cool, sworn and examined.

951. By the Chairman.—What are you?—A gauger, stationed at Kybaran; I have been there for eighteen months. I have been on the repairs for thirteen years. I was at Kybaran for two years before that, at Echuca for fifteen months in the mill for two months, at Mountview East for eight years, and Carlishe for seven months.
952. Have you ever had a fire get away from you when you were burning off?—No.
953. Have you seen fires originate close to the line?—Not during my experience.
954. Have you ever seen sleepers burning?—Yes, a few; perhaps seven or eight.
955. Where were they burning in such a way that if there had been a hot wind blowing, sparks might have been conveyed to the grass?—No, I do not think it would be possible for a spark to blow outside the fence from a sleeper; the distance is fully a chain, and the road is outside the line. It would have to be a very strong breeze that would carry a spark that distance.
956. There might be something on the line that would be ignited?—Yes, if the grass was not cleaned off it might be carried in that way.
957. Sometimes the grass is not all taken off, there is sufficient grass on the line to afford fuel to a fire?—Yes, sometimes.
958. Can you make any suggestions as to improvement in the way of taking precautions against fire?—No; I think the Department takes all necessary precautions now. They chip a track along the boundary of the fence, and where the grass is very heavy they make a swath or two swaths inside the clipping, and as soon as that grass is it is burnt off.
959. Has it been proved in some instances that fires were caused by engines?—Burning strips outside the fences would be an additional precaution, I should think. If the public have the idea that the engines throw sparks over the fence. I have seen the buns of cigars burning along the line within the fences, 4 or 5 feet from the rail, thrown out of the windows.
960. Have you seen them outside the fence?—No.
961. Did it hardly be possible to throw them outside the fence?—No; it is a clinic from the line to the fence.
962. Your district is a flat one?—Yes.
963. By Mr. Williams.—What was the origin of the fires in the sleepers?—Embers dropping from the ash pan.
964. While the train was in motion?—Yes.
965. We have had evidence that that very rarely occurs, and that whatever leasing there might be from the ash-pan would not take place at the stations?—You do not see it in many cases; I have only noticed it on the Bendigo and Echuca line.
966. What kind of sleepers are the ones that usually ignite? —Roggan; they were very old sleepers; some of them had been in the line ever since the line was made, and with the dry rot on them they are very easily ignited in the summer time.
967. Do the engines give evidence of emitting a great number of sparks when going through the country at night?—I have never noticed them at night-time.
968. By Mr. Morrissey.—Are you instructed to be on the look-out for fires after a train has passed in the summer time?—We have to take great precautions. We are on the watch for fires.
969. It would not surprise you if a fire started after a train passed in very dry weather, with a high wind blowing?—No.
970. If a fire did start after a train passed, you would come to the conclusion that the train was the origin of the fire?—Not in all instances.
971. Supposing there was nothing to warrant the assumption that something else had originated the fire, the conclusion would be that a spark from the engine had caused it?—I cannot say.
972. Do you consider the clipping of a strip of land outside the fence for any distance would at all minimize the risk of fires?—No doubt it would be a precaution if a fire did break away from the line, as it is supposed they do.
973. In the case of fires that have started outside the railway line, how far from the fence have they started?—None have come under my notice.
974. By Mr. Sangster.—If you did see a fire start outside the railway fence, would it be your duty to get your men as quickly as possible, and beat that fire out?—Yes.
975. On private property?—Yes; those are our instructions, to prevent it from destroying the railway property.

The witness withdraws.

Adjourned.
Wednesday, 13th September, 1869.

Members present:  
M. K. McKenzies, Esq., M.P., in the Chair:  
The Hon. J. G. Duffy, M.P.:  
The Hon. J. H. Graves, M.P.:  
J. Morrissey, Esq., M.P.:  
G. Sangster, Esq., M.P.:  
The Hon. J. H. Wheeler, M.P.

Matthew Myers, sworn and examined.

Q. By the Chairman. — What are you? — Railway ganger, stationed at Tatum. I have been there about four years. I was ganger before that at Wangaratta three years. I have been on the railways altogether fifteen years. Before Wangaratta, I was at Tumut and Tatura; at first I was at Wodonga for two years.

Q. During your experience, have you known of any fires breaking out close to the railway line on your length? — Yes.

Q. How did those fires originate — were any alleged to be caused by the engines? — People said it was caused by a spark from the engine.

Q. Was that alleged in more than one case? — Yes.

Q. Can you say in how many? — Two cases, as far as I can remember.

Q. Did those fires do much damage? — One burnt about 35 acres of grass and about 50 or 60 acres of wheat; that was at Burnside. The other was also at Burnside. The other burnt about 10 acres of grass.

Q. Were any claims made in connection with those fires? — I think there was a claim in one case, the first one.

Q. Was it sustained? — No, I do not think so. There was an inquiry. I cannot say the findings of the Inquiry; I was examined in connection with it.

Q. What was the purpose of your evidence given then — did you think the fire was caused by the engine? — I was 4 miles away at the time the fire started.

Q. Was it generally supposed in the district to have been caused by the engine? — It was.

Q. Have you seen any sparks flying from the funnel or fire-box in a dangerous way, calculated to set fire to? — I have sometimes seen light sparks at night, but not in the day-time.

Q. Have you seen sparks at night of such a nature that it was not sure that the engine had been flying in the day-time they would have possibly caused a fire? — I have often watched them, but they go out before they reach the ground.

Q. On a warm day they would not go out so readily? — I cannot say that.

Q. Have you ever found the sleepers on fire? — On one occasion; that was at Wangaratta, just after the train arrived from the station, after the goods train.

Q. It had not been caused by the embers falling from the fire-box while the train was standing? — No, it was going along.

Q. Was that sleeper burnt? — The sleepers were burning strongly.

Q. So strongly that if there had been a strong wind sparks might possibly have been carried into the grass over the fence? — Not from the sleepers. The railway fence was a chain away, and the grass was burnt off.

Q. Could not a spark have been blown across the strips just was burnt up? — I think not from the sleepers.

Q. Have you found other sleepers charred, showing that they had been on fire? — Lots of them are charred. In burning off with the grass it chars the sleepers.

Q. Have you found them charred, showing that the charring was done by embers falling from the fire-box? — In that Wangaratta case that was so — in any other case I do not know it. The cause is that case was something in connection with the ash-pan.

Q. You have read the evidence to the limitation of the hours of burning off; you agree with that? — Yes. I would like to have a free hand in burning off, because we are supposed to give 24 hours' notice, and when the time for burning off arrives the wind may not be favorable; we have been waiting for a fortnight to burn, and the grass getting into a dangerously dry condition all the time.

Q. Would the stumps along the line, would it be advisable to take them out? — We chop those out every year, and run a fire through, and put our anything that is sight. We always wait some hours after burning off; never leave a spark behind.

Q. At Wangaratta there was a fire caused by a stump on a warm night; you think that would be possible? — Yes.

Q. That was supposed to be extinguished, but was not so? — Yes.

Q. Would it cost much to take up the stump? — No; I think not. It would be expensive, of course, in country like Gippsland; but in some parts of the Goulburn valley it would not, there are so few in the acres.

Q. By Mr. Wheeler. — You said as to the fire that people said the fire had taken place thorough the engine; now you have any knowledge yourself of anything of the kind; have you ever seen any time a fire caused by sparks from the engine direct? — No.

Q. You merely took 2 second-hand from what the people said? — Yes.

Q. Were they interested people; those who owned the grass? — It was general conversation at the times when to the fire, I was 4 miles away at the time, and when I got there the people were saying the engine lit it.

Q. Were there the people whose bird was affected? — They were the adjoining people.

Q. Did they any interest in the land that was burnt? — No; they were amongst the people. There was a Mr. Christie Ford; the fire started in his paddock, and the Fords and all their neighbours seemed to blame it to the engine.

Q. As to the sparks from the ash-pan, you say you have seen sleepers on fire caused by that? — Yes.
987. Would that be likely to cause fire over the rails, outside of the rails, in case of a strong wind, where the sleepers have got on fire and are burning? — If the grass was not burnt off on the line, it would be likely to set fire to that grass you refer to.

988. Have you ever seen a case of that kind? — No. That was the only one case where the sleepers were ignited that I have mentioned, and the grass was all burnt there.

989. Have you any idea what it would cost to take out the stump? — No; some parts there are very few, and in other parts a good many.

990. What would a good-sized stump cost to take out — say, one 4 feet through? — Some of them you just light, and they burn out; others you have trouble with. The easy ones are the box.

991. As to the ash-pan, when the engine was travelling, is it possible for the sparks to blow outside if there is a cross wind? — I do not think so — they must fall down between the rails.

992. Do you think that fires occur from that more than from sparks from the engine? — I could not say.

993. You have never seen a fire caused by sparks from the ash-pan? — No; only that case where the sleepers were burnt.

994. By Mr. Greenes. — Was the section of line you speak of on the Melbourne side — Both sides of Warragatta, from the Beechworth junction to the Three-Mile Creek — about 6 miles.

995. Does the cost of burning stumps depend on the age of the stump and the character of the wood? — Yes.

996. Do you know that the Government have made contracts for taking stumps away? — No.

997. When you went down to that fire did you form an opinion where the fire had commenced? — I went to the starting point.

998. How much was burnt? — About 26 acres of grass and 59 or 60 acres of wheat.

999. Did the fire commence in the wheat? — The grass was on fire first, and it was put out. The fire was out when I arrived there, and I was about twenty minutes there when the second fire started.

1000. The second fire came from the first? — Yes.

1001. Did the people all agree that the fire was caused by the engine? — Yes.

1002. Have you any reason to believe that they were stating what was not correct? — I could not say.

1003. Have you formed an opinion as to whether their statement was correct that it came from the engine? — I do not know what caused it. The grass was burnt off between the line of rails and the railway fence some six weeks before the fire took place, and the fire started out in a paddock clear of the railway. It was proved out that I started a yard or two in the paddock outside the railway fence.

1004. Was there any fire near the crossing? — Five chains from the morning belonging to Mr. Ford.

1005. By Mr. Wheeler. — When you went to the fire, were there any men working on the adjoining land? — Yes; Mr. Lynch was taking his wheat crop off.

1006. Had he a number of men employed? — There were a lot of men when I got out, his son, and I think some other men.

1007. Do you see many swagmen going along the line? — In harvest time there are a lot.

1008. Do they go on the line? — They do; we put them off, but they get on again.

1009. Do they ever make fires? — Yes. Last year I saw a fire blazing away and found a swagman with his fire asleep. The grass was burnt off inside the line. There was a strong wind blowing on to the grass paddock. I made him put out the fire, and ordered him off from the line.

1010. By Mr. Greenes. — Do they sleep under the cutaways on the line? — Yes; there is a big bridge there. They camp round the bridges.

1011. By Mr. Duffy. — Did you send in a report about that fire to the Department? — Yes.

1012. In what way did you make this report? — I reported it to my inspector, telling him there was a fire there.

1013. Did you say how it originated? — I just said there was a fire there after the passing of the train. I did not say it was caused by the train. I gave no reason for the starting of the fire. But the public opinion was that the fire was caused by the train. — Yes.

1014. You had no reason to doubt it; there was nothing impossible in it? — There was nothing impossible; I did not know what it was caused by.

1015. By the Chairman. — How long after the train had passed was it before the fire broke out? — I could not say to a few minutes. It was about twenty minutes after the train left. There was a fire there and the fire was caused about twenty minutes past twelve.

1016. How far was it from the line to the crop where the fire broke out? — It must have been 20 chains.

1017. Were men working at the crop not have been likely to be on the railway line.

Witness withdrawn.

Andrew Petrie, sworn and examined.

1018. By the Chairman. — What are you? — A railway gauge, stationed at School-houses lane Tallangatta. I have been there close on four years.

1019. Where does your length extend to? — About 57½ miles back to Seymour.

1020. You are the gauge in charge of the length where the fire broke out on the 30th December last year? — Yes, I was one there at 1 mile away.

1021. Did you see the fire start? — No, not quite.

1022. Did they start just immediately after the train passed? — A few minutes.

1023. Did their presence the appearance of having started one after the other in the direction in which the train went, that is, was the one closest to the river the fire that started at first? — I could not say that — we just saw the smoke at the same time — I went up to help to beat them out.

1024. Did the area of grass that was burnt indicate that the nearest fire to the bridge was the one first started? — I sent two men at that, and went to the other myself.

1025. There was a strong hot north wind blowing? — Yes.
1027. Did the fires break out on the side of the line to which the wind was blowing? — Yes.
1028. Close to the line? — Yes; one that raised the smoke was about 30 feet from the rail.
1029. Was the fence at that particular point close to the rails of the permanent way? — Yes, it comes in very close to that point.
1030. Then 30 feet from the fence would not be far from the rails? — No, about 60 feet.
1031. Is there a rise at that particular place, a grading? — No, there is a fall just there.
1032. Coming towards Melbourne there is a rise? — That is on the up line.
1033. There were two fires? — Yes.
1034. How far were they apart? — About half-a-mile.
1035. Is there a rise where the other fire broke out? — No; it is pretty well level grade there.
1036. Is it approaching the grade? — Yes.
1037. Are the engine drivers in the habit of firing up at that particular point, in order to get up steam, to get up this grade? — I do not know that they are; I never noticed.
1038. Have fires broken out there before? — Yes, every year.
1039. Is it a coincidence that the fire has broken out just before the train has passed each time? — No.
1040. Have they broken out when the train has not passed? — Yes, two broke out on the Sunday when there was no train running at all at that particular point.
1041. To what do you attribute that? — The owner of the ground burning a tree out in one case, and the other one I think it was a poisoned rabbit; the phosphorus set it on fire.
1042. On that particular day no owner would be likely to be burning out a tree! — No, he had set fire to it.
1043. Do you think that fire was caused by the train? — I could not say that. I thought the train set fire to it, because I thought there was too much time from the time I saw it to the time of the train going by.
1044. How long was it before you saw it after the train passed? — About seven minutes. I think on such a day it would show itself very quickly.
1045. You did not see it just as it started? — No, but it was a very small place when I saw it first.
1046. Did you see any swagmen along the line? — Yes, there were swagmen came along that morning—there was one half-an-hour previous to that fire.
1047. If you think the train could not have lit it after seven minutes, how could it be a swagman after 30 minutes? — I would not say it was the swagman. I did not say it was either one.
1048. Were you examined by the officer who was sent out? — Yes.
1049. Your evidence I presume was practically the same as now? — Yes.
1050. Was any other point taken up that I have not asked you about? — As to having the line properly chipped and burnt, and I said that that had been done previously.
1051. Have you in the course of your experience found sleepers on fire? — Yes, pretty often; perhaps a couple of times in a week sometimes.
1052. That would amount to a very considerable sum? — That is not all the year round; that is only a week now and then in the hottest part of the year.
1053. Have you ever found them charred, showing that they have been on fire? — Yes, a few; generally, we find them burning.
1054. That shows you on your length? — That is what I am paid for.
1055. Do you think there is any danger of the woods between the rails catching fire, and the grass catching fire that way? — If the woods are not properly burnt it might be.
1056. Even with the best gangers, there are sometimes weeds on the line? — Yes, but we generally have them pretty clear at the season of the year when they will burn.
1057. Have you had experience in other places as ganger? — Yes; I have been on the repairs 20 or 24 years.
1058. Have you ever before known of fire breaking out close to the line? — This is the first time—
that is, on my own length.
1059. On this length fires have broken out every year? — Yes.
1060. By Mr. Morissev. — When noticing what gave rise to a fire on a sleeper, have you noticed the cinders on the line; would they be live coals? — I have never seen them alive.
1061. What would be the largest you noticed? — Not very big.
1062. As big as a pigeon's egg? — That would be as much as they would.
1063. In summer, you are generally on the watch for fires? — Yes.
1064. Particularly at what time? — Towards afternoon, when the wind is hot.
1065. Is it not generally after the passing of a train? — We look after the line at all times in the summer time.
1066. Do you think there is a greater probability starting close to the line after the train has passed? — Naturally, any one would think of looking specially then.
1067. Then, you think it is possible for a train to start a fire? — I would not say that, but I look for my own protection in case of anything happening.
1068. You cannot say what set fire to the grass at Seymour? — No.
1069. If you owned the land, would you form the same opinion as they did? — I would not swear to it, but I did not see any reason that would lead me to believe the train did it.
1070. Was not it a remarkable coincidence that the fires started almost simultaneously after the passing of the engine? — I think three fires against one have started far away from the fence; some five claims and some 20 claims away, and the wind blowing in some cases towards the midway from them.
1071. What do you think caused these fires; was there anything in the vicinity that looked like it? — I saw nothing. In one case the owner of the land said he saw a box of matches that had been crushed by the cattle and set fire to.
1072. By Mr. Wheeler. — You say you have seen sleepers burning? — Yes.
1073. What do you think set fire to them? — I suppose the cinders from the ash-pan.
1074. Would that be likely to set fire to the grass outside? — I do not think so.
1075. You said that on your length every year a fire broke out? — In the paddocks adjoining.
Have you ever seen at any time a fire start directly an engine has passed by? No, not directly.

You said just now that the fires had started on your length at times when the engine was running at all?—Yes.

What set fire to them?—I explained that a man set fire to a tree on his own ground, and in the case a rabbit did it, and the other a box of matches.

What is your opinion, that these fires take place from an engine from the funnel or from the ash-pan?—I cannot form an opinion on that. I would not like to say that either one of them set fire to any places.

Then in reality you have never seen a fire started by an engine?—No.

By Mr. Grave. You stated that you burn off at certain times; are you of opinion that you ought to have a free hand as to the hours of burning?—Yes, the grass gets too long as it is.

In very hot weather, and when the ground is very dry, very little sets a fire going?—Very little.

When you give notice you are going on a length you go up in your trolley?—Sometimes.

How do you set the ground on fire?—I mostly get a piece of split wood and carry it from place to place.

Is it a fact the smallest blaze will set fire to it when it is dry?—Yes.

You have seen a man put a wax match on it, and set it on fire at once?—Yes, I have seen that.

You have heard that matches dropped on the place have set fire to the grass?—Yes.

Have you heard of the sun's rays through broken portions of buildings setting fire to grass?—I have heard people say so, but I am not of that opinion myself.

Is it difficult to ascertain the cause if it breaks out in the centre of a paddock?—I cannot account for it, only that matches may be dropped.

By Mr. Duffy. After the fire, did you discuss it with your friends?—Not particularly.

Had you no talk about it amongst yourselves?—I heard what the people said. Some of them said they were of opinion that the rain did it, but they would never swear to it.

What did you say to them?—I said, you need be cautious when you blame a thing of that kind for anything.

You gave the same cautious opinion that you have given to-day?—Yes.

The public generally appear to think, and not unreasonably, that where a fire is caused immediately adjoining a railway line on a hot-windy day, it is caused by the train that has passed by?—They will say that whether they think it or not.

By Mr. Wheeler. You have not suggested that matches thrown out of a train may set fire to the grass—is that possible?—I think there is a doubt about that because we burn out patches of grass as soon as we can. After we came here, I think it is impossible for a match thrown out to do it.

By the Chairman. Is it not possible, if the wind has not been favorable for you to burn, that that might happen?—No doubt. Sometimes we get drives a bit, but we try to get through it before it gets too far.

By Mr. Wheeler. In the event of the grass being perfectly dry, is it possible that a thing of that sort could take place?—Yes.

In that case, would it not be known that the fire had originated within the line?—Yes, the grass would show it itself.

By Mr. Grave. Can you say whether the Railway Department let the grass along the line for people to cut?—Yes, they do.

Are they in the habit on the North-Easters line of advertising in the season that the grass will be let for people to cut where you are?—Yes.

Therefore a man can cut it when it is very long?—He is given a certain time to take it away. A month now from me the time he is given. We chop and burn it if he does not take it away.

The wild oats get very strong there, it is green to-day and in a week it may be ripe?—He has to cut it while it is green, otherwise we burn it.

By Mr. Duffy. Do you know the regulations under which that grass is let?—They render for a certain distance; he is given a certain distance, and he has to take it away the day he eats it; if not, we burn it. I burn two or three little shacks last year.

By Mr. Mordary. What length of time are they given to remove it?—I think it is a month from the time.

Just now there are mows printed, and they are calling for tenders now.

Say the summer came in prematurely suddenly and dried up the grass, has the purchaser of the grass the power to claim it up to the expiration of the time?—No. My rates cause me to burn it if I see any danger.

The witness withdrew.

Edward Stanley, sworn and examined.

By the Chairman. What are you?—A grazier stationed at Donnybrook. I have been three years there. I have been on the repairs nearly eighteen years. I was first between Charlton and Wynyard for six months then at Melbourne for six years, and then four years back at Wyndham, twelve months at Yar Yean South, and three years and a half at the Goulburn Valley, between Shepparton and Numurkah.

Have you found any fires originating close to the line?—None on my length, from Shepparton to Numurkah.

Any other place?—Yes, where I am now, and at Donnybrook also.

Have fires occurred frequently where you are now?—Yes, two in 1897, and one in 1898, and more last year or this. I am speaking only of my own length.

Were there any fires on the run anywhere close to you?—Yes, further away, 2 miles on the Beveridge side—that was last summer.

Any other?—Last year two started in a paddock just off ahead of my line. I went to that. There have been no others close to my length since I have been there along the line.
1112. But fires have occurred there pretty frequently the last two or three years?—Yes.
1113. At the fire in 1887, was that close to the line?—About half-a-chain in from the fence and the padeck.
1114. Did it burn much?—I only speak from hearsay. They had about 5,000 acres of grass country, not much copy; there were fences also. I did not hear of any buildings.
1115. Was there a claim made on the Department?—Not that I am aware of.
1116. Was it alleged then the fire was caused by the engine?—The owners say just that; but they always blame the engine, as a rule.
1117. Were you close to where the fire broke out?—No; 2½ miles away. The repairer's wife, living on the line, pointed out to me where it broke out. There was a fairly strong wind from the northwest blowing at the time.
1118. Did it break out on the south-east side?—Yes.
1119. The way in which the wind would have blown the smoke from the fence?—Yes.
1120. Was the fire observed long after the train passed?—When I saw it if was half-an-hour after; I saw the smoke.
1121. Did you hear, or what you regard as reliable authority, as to how soon after the train passed the fire broke out? The engineer's wife said about 12 minutes; it was close to her house.
1122. She may have been in the house and it burning, without her observing it?—Yes.
1123. Was there much burnt when she saw it?—It had travelled 300 or 400 yards when she saw it, that is as near as I can remember, her evidence.
1124. Did you say she had never any suspicion about just then?—No; but afterwards, when I went in the padeck, I came across three of four youths, with grass, smoking in the padeck.
1125. Did you hear any one shouting?—No.
1126. The next one was when?—Another in about a fortnight after, in the same year; it started about a chain from what was left of the grass.
1127. Were you close to the fire then?—I was at dinner—it was in the middle of the day; the wind was blowing about the same as before.
1128. Was it long after the train passed before the fire appeared?—On the second occasion it was about half-an-hour before I knew anything about it.
1129. Had it burnt much then?—Yes, a good way.
1130. How far?—From half to three-quarters of a mile.
1131. That would not be had travelling in the class—did any one else observe it earlier?—No; the same woman again observed it first.
1132. How long was that after the train passed?—I think about the same time—the husband and two or three other men were about a quarter of a mile down, and the smoke was on them.
1133. Was any claim made on the Department about that fire?—Not that I heard of.
1134. Did you prove anything beside grass—5,000 or 6,000 acres of grass and some fences.
1135. Are there pretty large, buildings there?—Yes. Mr. Baker was the owner of the padeck where the fire started—he is a big Dailyman there.
1136. The land is used for grazing purposes?—Yes.
1137. Did you yourself form an idea as to these fires; did you think they were caused by the engine?—I could not form any idea.
1138. Was any suspicion there the second time?—I did not see any.
1139. Was the general opinion amongst the men about that the fire had been caused by the engine?—Yes.

1140. Have you noticed sleepers on fire?—Yes, one or two in all my experience, and once I remember while at Donnybrook the fuzzy or dusty stuff was burning on the sleepers; it smoked, but did not blaze. I have not seen them change, indicating they had been on fire.
1141. Could that fuzzy stuff be carried over the rails?—Inside. The wind does not get at a very well—it is possible the wind might catch it.
1142. Is it possible that the colder might fall on the weeds between the sleepers; is it possible for that to be ignited and carried over the fence?—If the weeds are dry; but at Shannopan we used to have it dry, that is, and I never saw a fire in it.
1143. If the colder that sets the sleepers on fire and falls on that grass, would it have caught?—Yes, the dusty stuff as easily as fire to grass.
1144. You agree with the evidence of previous witnesses as to the limitation of the hour—that you should have a free hand to burn off at any time?—I do not agree as to burning off before dinner, because you might get over a good bit of it before you have your dinner, and there might be embers left while you were having your dinner.
1145. Evidence has been given that you must have the wind in the right direction?—Even so, if it rises there might be danger, because of the long time before night. In the other cases, beginning at two, the evening is coming on.
1146. You have to wait for weeks sometimes for the wind in the right direction, and you might get it in the morning sometimes; should you not be at liberty to burn then, if desirable?—I should not care myself to burn off before dinner—sometimes it could be done with advantage—it would do if it were left optional.
1147. By Mr. Morris—During your experience in burning off in the north, have you found the wind less variable in the morning?—Yes, but you can rely on it more in the evening.
1148. Can you say you find much variation in temperature between two and five, except when a south wind comes along?—Yes, it gets a good bit cooler where I am, at Donnybrook. I mean, if the fire did get away from the night would soon go on us, and yet can beat the fire at night.
1149. You stated that the landowners all say, when a fire starts adjacent to the line, that it is started by the train. If you were a farmer, would not you come to the same conclusion?—I might say so.
1150. To what might they attribute it more rightly than the train?—I could not say. They always blame the engine, no matter what starts the fire—that is my experience.
1151. On the date of the fire did you notice the sleeper on fire at Donnybrook?—No.
1152. Did a fire ever get away from you in burning off?—No.
1155. Have you known of its getting away from any of the gaunters?—I have only been told.
1156. Was much damage done?—No; about 40 acres at Tallygaroopna.
1157. Was compensation paid in that case by the Department?—Yes.
1158. By Mr. Wheeler.—Have there been with the gaunters kindled a fire?—No. When it came their tent had laid down their guns, and were smoking cigarettes.
1159. Did any one of the people in that case see the fire start?—No, they did not say so.
1160. Then it must be more serious?—Yes.
1161. Have you seen a spark from the engine or ash-pan set fire to the grass?—No; I have been on the line eighteen years.
1162. On those particular hot days you speak of you have never seen a fire take place from the engine direct from the funnel, or the ash-pan?—No.
1163. By the Chairman.—Was there any one near at all at that time?—Only this woman.
1164. And she was in the house?—Yes.
1165. So there was no one who possibly had seen it?—No. The station officials saw it after it started; they are about nine miles off.
1166. By Mr. Moroney.—If you were there at the time the fire started, and the smoke came from the fire-box, do you think you could have seen it, and said it came from the fire-box?—No, I do not think so.
1167. By Mr. Smigley.—Did you ever see sparks at night from the funnel?—Yes.
1168. Have you seen cinders falling from the ash-pan?—I cannot say I saw them fall.
1169. Have you seen them or the line afterwards?—Yes, often; but I could not say they were hot when they fell.
1170. You know they come from the ash-pan?—Yes, but I think they would have been put out—the coal might have come off the bunker of the engine.
1171. Several of the gaunters have said that they have seen several sleepers on fire; if that is so, we want to know, if possibly, how they got on fire?—The sleepers on their length may be old and dry, and they may get more burnt than where the sleepers are good.
1172. What would burn them?—The cinders, I suppose.
1173. Did you ever see tarpanius on the trucks on fire through sparks from the engine?—No.
1174. By Mr. Duff.—You cannot see the sparks in the day-time at all?—No.

The witness withdrew.

Peter Alexander, sworn and examined.

1175. By the Chairman.—What are you?—Acting rolling-stock inspector.
1176. You have charge of the department which has to do with any damage done to the rolling stock by fire?—Yes.
1177. Have you charge also of any damage done to the stock, such as the tarpanius?—No, only the vehicles.
1178. Have you been long in that position?—I have been acting only for six months, but I have been about the rolling-stock for 14 or 15 years.
1179. Any damage done would come under your notice?—A good deal of it; not necessarily all of it.
1180. Within the time you have been acting as inspector, has any damage been caused?—Yes; I have seen a number of vehicles that have been burnt.
1181. How were they supposed to have caught fire?—A good number of them have been burnt with, which we could easily see, and a number have come in the repairs shops that have been on fire, but I do not know how. In some cases we have seen roofs burnt which I think were probably caused by sparks—roofs of trucks and carriages.
1182. Many cases of that description?—No. I have roughly looked up my notes, and during the past five years there were about ten cases.
1183. Which would you have to do difficulty, in your own mind, in saying were caused by the sparks?—Yes, as nearly as I could judge.
1184. But there are a considerable number of trucks some in damaged by fire as to which you do not know how it was caused?—Yes.
1185. How many cases of that?—Perhaps about 20 or 30 cases the last five years.
1186. They never send in a statement as to how they are damaged?—They come in for repairs, and in many cases I do not see the report. I report it has been damaged by fire, and it is repaired.
1187. A mark that would light on the roof of a truck or carriage, and set it on fire would have to be a pretty considerable one?—In most cases, where the roofs are in good order, it certainly would require a considerable sized spark to set it on fire; but in some instances, such as cattle and sheep trucks, the cause, in some instances is not so well covered with white lead and frayed at the edges, and with the wind it is sometimes a little woolly, and it would not take much to start it.
1188. Were some of those carriages that came in like that?—Yes; I never saw a roof that was really well covered and in first-rate order take fire. Any of them I recollect were of that nature I have described.
1189. It is a considerable distance from the funnel of the engine to the roof of the nearest truck or carriage?—Yes; from 40 to 50 feet.
1190. Is that further than from the funnel to the outside of the railway fence?—In a great many instances the fences are further away than that.
1191. Do you know of the damage done to any other stock by fire?—No. I know a spark light on the footboard of a carriage and did no damage, because it was put out, but evidently there had been a spark there.
1192. Have you known any other damage by sparks?—I have known trucks to have been burnt by the stray getting on fire and burning the truck.
1193. Were these closer to the engine than other trucks?—They always carry straw or hay near the engine.

1194. Why?—Because they reckon that the safest place, and if they had to cut away, it is easiest to get away with those vehicles, if they were on fire, than if they were in the middle of the train.
1193. Then I assume that the other trucks that caught fire were probably second, or third, or fourth from the engine,—they might not be on a train where there was any straw.

1194. But if the truck closest to the engine is the safest, as you say?—I say it is safer because, in the event of its getting on fire, it can be cut away from the train.

1195. But I understood you to say the sparks were likely to blow over on to it?—I did not say so.

1196. Is it a fact that the sparks are skiller to blow over this, and light the others at the back?—I cannot say that.

1197. That does not come within your province?—No.

1198. In connexion with repairing the trucks that have come under your notice, to what extent have you noticed damage on the most damaged truck?—I have known the trucks to be destroyed absolutely.

1199. Did an inquiry take place as to the cause of the fire?—Very likely. In many cases I do not know anything about that; solely from hearsay. There were some trucks on fire at Haverhill, three badly damaged. I was not at the inquiry.

1200. Is it usual for the Department to hold an inquiry?—Yes.

1201. Were you ever examined in connexion with an inquiry of the sort?—No.

1202. What notice of the Department would hold those inquiries?—The district loco. inspector and the district traffic inspector.

1203. By Mr. Stringer.—Would you be called on to report the amount of damage to each vehicle?—Yes; that would be sent in writing.

The witness withdrew.

Daniel Barnes, sworn and examined.

1204. By the Chairman.—What are you?—Foreman and tarpanuin and saw maker at Newport.

1205. When any damage has been done to tarpanains does it come under your notice?—Yes, under my immediate notice.

1206. Do the tarpanains frequently get damaged by sparks?—No; occasionally by fire, but not by sparks of late years.

1207. When they are damaged by fire, how is the fire usually caused?—I have no information on that subject; I merely know that the tarpanuin has been returned from traffic, having been damaged by fire.

1208. You do not know whether it was a spark or not?—Sparks; I have noticed some good few years ago; they burn like little ink spots, almost as if a shower of hail fell; they burn a little hole a quarter of an inch in diameter, sprinkled over the crown of the saw steel; that I take to be spark damage.

1209. If it is not sparks, how is the tarpanuin likely to be set on fire?—I have known many tarpanains to be used as little shelter sheds. Men put those out all over the system, and I have been always of opinion that a number of them have been burnt in that way from a fire, perhaps, inside the tent that they have been rigged up with the tarpanains.

1210. How long have you been in your present position?—Ten years.

1211. You say some years ago; were tarpanains more frequently damaged by sparks then?—There were a considerable number damaged during the period they were using the wood fuel; about the time of the coal strike we had a lot of spark-damaged tarpanains.

1212. Apart from that?—I had only one case of spark damage during the past five years.

1213. Is some extraordinary that so many trucks have their roofs damaged by fire and yet the tarpanains not so?—In the case of the tarpanuin, in many instances they are ridged so that possibly if sparks did fall on them, it might, in the majority of instances, fall of again.

1214. You think the tarpanuin would not be readily ignited by the spark?—No, I think not. I have found them perforated with a little round hole; I suppose the spark dropped through them. I do not regard them as very inflammable unless they were laid edge on; the fire will not creep down on them.

1215. By Mr. Wheeler.—You say it was during the coal strike mostly?—Yes.

1216. Were you using wood then?—I was under that impression. They appeared to emit sparks on the tarpanains pretty freely at that time.

1217. What do you mean that some years ago the tarpanains were burnt?—I referred to when they were using wood.

1218. Have you noticed lately a lot of those small holes?—No, not for the past five years have I seen any spark holes in tarpanains. I have only one that appears in my book, and that was in 1895; it was made in 1893 and it came in. It is registered "destroyed by sparks.

1219. Are you speaking from memory or looking up the records?—From both.

1220. Yet remember only one tarpanuin as returned "destroyed by sparks" in the last five years?—Yes.

1221. Have you any return made as "damaged by fire"?—Yes, but they had no spark marks.

1222. It might have originated by a spark?—That is possible.

The witness withdrew.

John Richard Haskell, sworn and examined.

1223. By the Chairman.—What are you?—An engine-driver. I have been driving about twelve years—believe that I was freeman for five years. I have been close on nineteen years altogether in the Department.

1224. During that time have you ever known of any fires to originate close to the railway line that were alleged to be caused by the engine you were on?—No. I have had reports of fires at different times to answer on several occasions, but they were not, in my estimation, caused by the engine.

1225. Still they were alleged—people said they were caused by the engine?—Yes, according to the reports.

1226. Has that happened many times?—I do not think so. I can remember two occasions.
1227. Where are you driving now?—To Seymour from Melbourne irregularly—the last two weeks on a passenger train.

1228. What other lines have you had experience of?—Nearly all the lines running out of Melbourne—Gippsland, Benalla, and Ballarat.

1229. In those cases to which you have referred were the claims sustained?—I could not say.

1230. The engine was damaged severely?—As far as I remember there was a good deal of damage I regret.

1231. Do you know whether the fire originated close to the line?—According to reports—I only knew about the fire afterwards.

1232. If a fire were caused by a spark from your engine you would not know of it at the time?—No.

1233. So the engine-driver could not tell whether his engine caused the fire or not?—I should not think so.

1234. But when he comes back in the evening has he a fire close to the line, if any one says his engine caused it, he could not contradict it?—No.

1235. He would not have any specific knowledge on the subject at all?—No.

1236. Do you think it is possible for sparks to be emitted from the funnel large enough to set fire to the grass in the adjoining paddocks?—Not with the present spark arrester on.

1237. Is it possible for a vehicle to escape from the fire-box out of the ash-pan and be conveyed on to the grass outside the fences?—No.

1238. We have had precise evidence of fire engines falling on the line and setting fire to the sleepers is it possible for any of those to be carried by a strong wind and set fire to the grass beyond the fences?—I should think not.

1239. Have you conducted any of the tests of the spark arresters inventions?—Yes; not exactly the test trains, but I have had engines fitted with spark arresters that have been running with them.

1240. In the tests that were said to be an improvement on the one in use?—Yes. I had Anderson’s for a good while running to Woodend; a couple of months, I suppose.

1241. How did you find that set?—It was not very good at the start, we improved it as we went along. It seemed to be getting possible at the finish. I only had it a couple of trips at the finish, when it was was in proper order. Previous to that I had a job with it often. I had it and clean it or we would have been stuck up; it was impossible to get steam with it. (I) it was brushed.

1242. First of all he had a spark extinguisher?—I never had anything to do with that.

1243. Did the arrester interfere with the drainage?—Yes, it stopped drainage and sparks and all when it was dirty.

1244. Is it more liable to get dirty than the departmental arrester?—I did not have it long enough when it was in its perfect state to say, but previous to the improvements I had to brush it once or twice going to Woodend.

1245. Have you to brush the departmental one?—Pretty often where there are two grids in.

1246. As frequently as Anderson’s?—I could not say that. I should prefer the departmental one to Anderson’s as far as the cleaning is concerned.

1247. Was it as effective, or more so, as to arresting the sparks?—I could not say. There appeared to me to be not much difference between that and the departmental one in that respect. In my judgment there was very little difference in that regard—if there was any advantage it was on the side of the departmental arrester. I should not think it would require cleaning as frequently as Anderson’s.

1248. Could it be cleaned more readily?—No; Anderson’s could be cleaned more readily.

1249. Is that a matter of consequence in an arrester?—Of course, the easier the better.

1250. That is a matter of some importance in an arrester?—Yes; I should think so. I do not know whether any improvement has been made since I used it.

1251. Did you try any other arrester besides Anderson’s?—No.

1252. By Mr. Wheeler.—You and you ran it a couple of trips after it had been perfected?—Yes.

1253. What had been done to it to make it better?—The holes were counter-drilled from the inside, and the further a spark went in, it would free itself, and was not so liable to choke up.

1254. Is there a door in this arrester?—Yes.

1255. Is that desirable in an arrester?—No; for one good reason—anybody could open it, and leave it open to get a draught.

1256. When the steam goes down, it is a temptation?—Yes.

1257. You have driven engines with different spark arresters belonging to the Department?—Yes; they have had several during my time.

1258. Which do you think the best of the whole lot?—The gridiron one.

1259. You have seen the others in the Department, the same as they use in New South Wales and South Australia?—I have seen the different ones here, but I do not know the ones they use there.

1260. Have you seen the patents of those?—No.

1261. Do you think there is any better arrester to be got than the one the Government are using now?—Not as far as my experience goes.

1262. Would you prefer driving with our present spark arrester to any one you have seen?—Yes.

1263. Is there liability with the present spark arrester for fire to be thrown out to set fire to grass?—No; that is the only fault with it; it is a little hit the other way, in my opinion. It is a little too close with the two grids in. In the winter, with one it acts fairly well; in summer, with the two grids, it does a different job, and it requires more cleaning.

1264. By Mr. Sangster.—In Anderson’s spark arrester, you my there is more trouble in getting up steam?—Yes; when it gets dirty.

1265. When you have the double grid is with the departmental arrester, does it make a considerable difference?—Yes.

1266. You think it very effective in stopping sparks?—Yes; and in stopping the engine as well, with the two grids in.

1267. Have you tried with the so-called “cage” on the ash-pan?—Yes.

1268. Does that tend to stop the draught?—No, not so far as I can see.

1269. And it would be an absolute preventive of cinders falling through?—Yes; I think it would be an utter impossibility for them to get through with that one.
1271. Cinders can get through without that?—They would have a greater chance of falling out if the coke were not put on.
1271. By Mr. Duffe.—We have had evidence as to trucks and turnpikes being damaged by sparks—have you any experience of that?—Only once, during the steel strike we had a coal truck on fire, caused by the smoke. I have never seen any turnpikes on fire; that was a truck on fire. I have never seen any trucks on fire that was not caused by sparks.
1272. We have had evidence as to laying set on fire; have you had experience of that?—No.
1273. When making up your train, if you have hay, where do you put it?—Next to the engine.
1274. Why?—The departmental rule is they think it is safer.
1275. Why is it safer?—If it should catch fire, it is more easily uncoupled from the train.
1276. Would it be safer, also, because the sparks are carried just past the nearest trucks from the furnace?—I think that is the departmental idea.
1277. The departmental idea is that the nearer the trucks to the furnace the safer they are?—I think that is the idea.
1278. As to Mr. Anderson's, I understand it gets dirtier rather more quickly than the departmental one?—I said the latest improved one was much better. When I ran it I found it got dirtier quicker than the departmental one. With the double grid on the departmental one we have to stop and clean it pretty often.
1279. How long does it take?—We open it up and put the broom round; you have to stop when you do that.
1280. There is not much time lost in that?—No.
1281. The departmental one is, practically, as easy to clean as Mr. Anderson's?—Mr. Anderson's is not quite so easy to clean as the departmental one with the two grids in.
1282. Which is the more effective as to the sparks?—I think the departmental one.
1283. Which interferes least with the steering?—There is very little trouble with other as long as they are clean.
1284. By the Clerk.—Do you see cinders come on your engine?—In the majority of cases I do not think it is coal at all; it is sand, and if you screened it you would have a lot of sand and no coal. The New South Wales is the slackest of the two.
1285. Used it to be screened when Mr. Mira was at the head of the railways?—Yes.
1286. Are there fewer sparks from the screened coal?—Yes.
1287. Do you think it would be advisable, in the interests of the Department, to have the coal screened?—Certainly, if it could be done. I know it used to be done some part of the year, but it has not been done for a long time.

Ernest Robert Stidlington, sworn and examined.

1288. By the Clerk.—What are you?—An engine-driver; I have been driving about fourteen years; before that I was fireman for about three years.
1289. Where have you been working?—Most of my running has been done between Portand and Ararat, and the branches to Warrnambool, Colacoma, and Casterton.
1290. Have any fires occurred close to the line?—Yes, on several occasions.
1291. Were they alleged by the land-owners adjoining to have been caused by the engine?—Yes, in a good many cases they were.
1292. Were claims made on the Department?—I believe so; I could not say from my own personal knowledge. I have had to answer a report or so to say if I knew anything about the fire occurring, but beyond that I could not say.
1293. Were you able to give any information?—No, not from my own knowledge. On several occasions the fires were started on the opposite side of the line to that on which the wind was blowing, so it was a near impossibility for the engine to send the sparks to the place where the fire occurred.
1294. On other occasions has the fire occurred on the side to which the wind was blowing?—Yes, more frequently. On one occasion the manager of a station sent in, that he considered the engine was to blame for causing a fire where I had been running for two miles with steam on, the dumper shut, and the regulator down, as how the engine could have caused the fire I could not say.
1295. Do you know of any case in which the fire started close to the line?—Yes; I knew a case some years ago, before these late-date apparatus were in use; we were running with a more open box. I was coming up the curve to Wickhiff, and after passing about half-a-mile I saw smoke rising in a parboil and the fire started. My impression was that that fire was caused by a spark from the engine, but that was an exceptional day; there was a heavy north wind blowing and the grass was exceedingly long. The land-owners had taken no trouble to burn the grass off, it was sticking through the slit of the fence; that was six or seven years ago.
1296. Have any improvements been effected in the apparatus since then?—I remember when we had no apparatus at all—had only a sort of screen over the top of the funnel.
1297. This apparatus has been in use for 25 years?—No, it has not. I have not been driving for that length of time, and for years I had an open box. If it was in use, it was not so in my district.
1298. More recently they have put on a double grid?—They started with a single grid, and they have got a double grid now for their own safety, but my personal experience is that one is quite sufficient. I have not had any interference; I saw nothing to give me the idea it was caused by anything else. I saw it from the footpath. It was not a quarter of a mile away when I saw the smoke rise.
1299. Was there any other occasion on which you thought the fire was caused by the engine?—I cannot remember any. I have seen plenty of places burnt on the coal, or the return journey, and there may have been trains passing between the time I went and the time I came back again. I could not say that that was caused by the engine. I have seen the repairs burning off, and I have known cases when the fire got away from them. I know one case last year where it got away from the repairs; they were burning off on the other side of Brauneholme, and they let the fire get away.
1301. Did that do much damage?—It took a strip about an inch wide, and how far across the paddock I could not say. It was only grass land; there was no fencing or property destroyed.

1302. Do you think there are sparks emitted from the funnel now that would be likely to cause fire?—No. I do not think, if the arrester is in proper order, any spark could escape that would do any damage outside the fence.

1303. Is it possible for any cinders to escape from the fire-box?—There is a tendency for cinders to roll out from the fire-box, but I cannot say if they would go farther than between the rails. I have never seen them go any further.

1304. Have you tried the cage for catching the cinders?—Yes, I have had one on the engine.

1305. Is it an improvement?—It is too shallow; it blocks the draught from the ash pan. If you run 20 miles with it and do not lift it up and let the ashes out, you will get no draught from the fire unless you raise the damper. If you run with the damper in the first notch it only gives you an inch or an inch and a half between, and the ashes block that up. It ought to be deeper; if it were deeper it would be a great improvement.

1306. Have you tried any of those spark arrester inventions?—I do not know of any particular invention. I remember the first we had on the engine was the wire gauze on the funnel, but I do not see that that was any use at all. I considered it a nuisance, because it blinded a man with the smoke and dust and everything that came back on the footplate. If you were looking ahead you would be blinded in a few minutes. I did not see any difference with the sparks; they came out just as usual, but it made a difference in the steaming of the engine—it used to stop her altogether. Some of them were slightly bellowed in the tube, and others were the same as the arrester on a threshing machine; very ugly, cumbersome things they were.

1307. Have you tried any of the American arresters?—I think it was one of those that gave the trouble; it was a screen cap over the funnel.

1308. By Mr. Singleday.—Have you tried any later patent?—I tried one, but I did not consider it a success; I do not know whom it belonged to. We ran it only a short time, and it was taken off.

1309. How did it act?—I did not look at it. It had a bad effect on the steaming qualities of the engine, the same as the gauze one.

1310. You think the present arrester in use by the Department absolutely stops all dangerous sparks that would be likely to set fire to anything alongside the line?—Yes; from my experience of it I consider the arrester at present in use the only one I have seen; they could only make one improvement on it, that is to make it self-cleaning, and then it would be perfection. The only trouble with it is it has a tendency to choke.

1311. You would not agree with the evidence that lots of fires had been caused when that arrester was on?—No doubt fires have been caused when it was on, but I would not swear that they were caused by the engine.

1312. Not even if they occurred on the trains, and rolling-stock was burnt?—I would not say that. I have had a truck burnt on the train myself about two and a half years ago; it was a truck of pressed straw. The peculiarity of that was that the fire burst out in the body of the truck, and the straw was about four tiers high, pressed down with tar papers. The fire burst out in the middle and came right through, instead of starting at the top as you would expect. That is the only case I have seen except when we were burning wood; I saw a truck of chaff get alight, but you could not expect anything else with the shower of sparks that used to go out.

1313. You do not think it was a spark from without that caused that fire?—I do not think so. I was under the impression that it was either caused by combustion of the straw, or when they had been loading it a match had dropped on the floor. Men carry loose matches about them.

1314. By Mr. Duffy.—Do you use screeves' coal?—We have not used screeves coal since Mr. Mirl's time, but I think it would be an improvement if we did; in hot weather it was a great improvement. The stuff we get now is black sand and not coal; it goes straight through, it is much more dangerous because it is mixed with all sorts of rubbish, and it goes straight through. It is not so effective for steaming, it clogs and it gets caked, and a good portion of it goes through into the smoke-box without being properly burnt.

1315. Have you had any other fires occur on your train?—Only on one occasion, coming in Glen Thompson, when we were burning wood. A truck with some blacksmiths' materials got alight as we came into the station, I think it must have been a spark from the wood that did it. Since we stopped using wood I have had no fires of any kind in either trucks or carriages.

1316. There has been no fire reported as having occurred after you have taken the train in?—Every year there are fires reported as occurring on the road after trains have passed. I never knew a case to be reported of any fire in the train itself since we left off using wood.

1317. By the Chairman.—Did you hear the evidence given this morning by Mr. Alexander as to the roofs of trucks and carriages?—Yes.

1318. Do you not think it possible for sparks that would set fire to the roof of a carriage or truck, if the wind were blowing into a paddock, to set fire to the grass?—It would, if the sparks got that far, but I am doubtful if it would. It is not that there must have been something wrong with the arrester. I am sure no spark will get through to that arrester that will set fire to anything of that kind.

1319. Mr. Alexander said there were 20 or 30 cases?—Yes; but we got no evidence that the engines had the mischief examined to see that the arrester was in proper order. Sometimes the wires get bent, and that would allow a spark to get through. The only way they could find out whether the engine did it would be to know which particular engine the fire was supposed to be caused by, and examine the arrester when she came in; but there may be half-a-dozen engines over that particular piece of road before the office got any information about the fire. You could not tell what damage was done to the arrester yesterday, because it would be all right to-day when you started.

1320. If 20 or 30 fires were caused in ten years through the arrester being out of order, would that come to any observation?—No; I do not suppose he has anything to do with the purpose. He has all the rolling-stock; he has nothing to do with the locomotive branch. He has to do with the repairs to the rails.
1331. He says there are 20 or 30 cases in which the roofs of trucks or carriages have been damaged by fire within the last ten years. If those fires were due to the arresters being out of order, that would point to the fact that the arresters must be frequently out of order.—You have nothing to prove, unless you examine it yourself, that the arrester is in order.

1332. How often are the arresters examined?—The driver is supposed to examine his arrester every day before he goes out, but I may be ordered to go out with a strange engine the moment before she has to go out, and I have no time to examine that arrester. There may be a hole in it, for all I know.

1332. Does that then happen?—Yes, very often; and very often you have to change engines with a man on the road, and you do not know how his engine is; you have to take it on trust.

1334. That points to the fact that there is no certainty as to the condition of the arresters?—If a driver is asked if he inspected it, and he says he did, you must take his word for it.

1332. Is he asked every day?—I do not suppose he is.

1336. If any fire is caused, he is asked?—He is as a rule. Sometimes he is not, because the foreman, or whoever is in charge, will examine the engine himself to make sure.

1327. By Mr. Duffyy.—Is anybody but the driver responsible for the condition of an engine when it leaves the shed?—Yes, the engine of the boiler men is responsible, and the driver is partly responsible, but the driver is mainly responsible to see that the engine is right before he leaves with it.

1332. The responsibility is divided?—Each of the officers has to send in a monthly report to the Department of the condition of the engines, arresters, and so on, and if they do not examine them they cannot do it.

1339. By the Chairman.—If they examine them a day or two before the month is up, that serves the purpose?—I would not like to say that; I do not suppose any one of the men concerned would make a false statement.

1330. All he has to do is to say the arrester is in order at the end of the month; he has not to say if it was in order all through the month?—He has to examine it at certain times, and certify it is correct, as it ought to be.

The witness withdraws.

David Jones, sworn and examined.

1341. By the Chairman.—What are you?—An engine-driver, running from the North Melbourne shed to Woodend and Geelong generally. I have been driving for eleven years.

1332. How long have you been firing and driving?—About fifteen years altogether.

1333. What lines have you been on?—All the lines out of Melbourne, and the North-Eastern lines. I was at Benalla for about ten years.

1334. Have any fires occurred close to the line since you have been driving?—I have seen fires as we have been passing.

1335. Were they alleged by the land-owners to have been caused by the engine?—Only on one occasion, coming in between Grovedale and Benalla one night.

1336. Was any claim made on the Department?—I heard so.

1337. Were you asked to make any statement in connexion with it?—I was asked for a report as to whether the fire was burning there at the time. It was not, because I saw the fire after I had passed with the train.

1338. If it were caused by your engine, you could not see it?—I would not know until it got away some distance.

1339. When did you see it?—I was going home, in the evening, about half-past seven at night when we passed the place.

1340. You saw it on the return journey?—Yes.

1341. Did the people in the district believe that it was caused by an engine?—I was told so.

1342. What was your own opinion?—I do not know; there was no fire there when I passed with the engine, but before I got to Benalla I looked back and I could see the fire close to the line. I do not know if my engine caused it.

1343. Is that the only case in your experience?—Yes, with the exception of the time of the strike, when we had to burn wood.

1344. Do you think it possible for sufficient sparks to escape from the funnel to do damage?—Not with the spark arresters in good condition.

1345. Is the spark arrestor often out of order?—At times; if a man has trouble with the engine he might go to clean the arrester, and in a hurry and bend one or two of the wires—that is the only way in which they are liable to get out of order.

1346. If he does that must he report it?—Yes, or put it back into its proper position again.

1347. Can he do that?—Yes.

1348. Would he have to take the arrester out?—No, it is a fixture; he cannot take it out.

1349. Have you tried any of the new inventions of arresters?—I had one that ran for about a fortnight—that was the one with a bell funnel coming down to a point.

1350. What was your opinion of it?—It worked very satisfactorily.

1351. Was it equal to the departmental one?—No, I would prefer the departmental one; it is a cleaner one—in the other case the soles and smoke came down into your face.

1352. Do you agree with the previous evidence in regard to screwed coal?—Yes. To prevent sparks the coal should be screened.

1353. Do you regard it as better for steamng purposes when it is screened?—Yes, it would be better for every one concerned; we would use less of it, so it would be an economy.

1354. Is there any danger of cinders escaping from the fires-box and doing any damage?—Not with the patent they have on now—the cage; it is a very good idea.

1355. Can it be improved in the direction the previous witness stated?—I could not say; I have never had much experience with it.

1356. By Mr. Stugger.—Most engine-drivers have the idea that the spark arrester is so efficient that sparks, to do any damage, cannot get through—is that your opinion?—That is my opinion. I have not had any experience with other spark arresters.
1357. You think sparks cannot get through the present arrester that are likely to do any damage to the engine and its works?—No, especially when the double arrester is in.

1358. Now, with the spark-tube system there have occurred that were admitted to have been caused by sparks when the double arrester was in?—No, certainly not in good order.

1359. Do you think it is possible for the sleeper on the line to be ignited?—It is passing, if sparks are not given off the points. There is only one or at most two points of engine in which the spark can get out; the X class is one, and the O class is another.

1360. What is the difference between them and the Y class?—The bottom of this was shooting, and in the Y class it is flat; the flaking of an engine with a shooting ash pan is bound to send the ashes out.

1361. Is it not the difference in the bars?—No.

1362. By Mr. Duff.—Is screened coal less dangerous than unscreened coal?—Yes, I should think so.

1363. And the same quantity will go further, so there is economy in the use of it?—Yes, and it is more effective in steam power.

1364. Can you give any idea of the difference in steam power between an engine with one grid and an engine with two grids?—Yes, with two grids the mileage at the top gets checked up, and that prevents the engine getting enough heat to burn the coal.

1365. Taking 100 as representing the power with one grid, to what would it be reduced with two?—On some engines you could get along with two grids as well as with others with only one.

1366. Take an average engine with one grid you can steam at a certain rate; with two grids you cannot steam as well; what would the difference be?—With the double spark arrester they would get dirty, and the engine would not steam as well.

1367. To what extent?—Sometimes you cannot get along at all. I have had to stop on the road between stations and clean the grids.

1368. Would there be 20 per cent. difference?—I could not say.

1369. Is there a material difference?—I know that with some engines we have had to stop and clean than Melbourne and Sunbury, and twice or three times after that before we got to Woodend.

1370. By the Chairman.—And you have to use more coal?—Yes.

1371. Would the difference be appreciable?—We could hardly notice it unless the coal was weighed out; it would not be so much that we would notice the difference in our coal bunkers when we got back.

1372. By Mr. Duff.—There would be a difference in the steam power?—Yes.

1373. Have you had any fees on your trams or carriages?—Not since the coal strike, when we burned wood; there were plenty of them then.

The witness withdrew.

John Ryan, sworn and examined.

1374. By the Chairman.—What are you?—An engine-driver, running on the suburban lines between present, but I have been on all the lines running out of North Melbourne. I have been running altogether between 17 and 18 years as fireman and driver.

1375. Have you had any experience of fires originating close to the line?—Only on one occasion, on the Bellarine line, just the other side of Geelong, about seven years ago.

1376. Was that alleged to have been caused by your engine?—I believe so. There was no inquiry—said I was an inquiry whether I saw my fire box. I said the grass was not burnt when I went past, but when I came back about half-an-hour of grass was burnt. I told them I did not think it was caused by the engine, as I had no load on. I had got over the back, and was on a flat piece of road. It started about 15 or 16 feet outside the railway fence.

1377. Who discovered it?—The gatekeeper; it was 300 or 400 yards from the gates.

1378. Did the gatekeeper put it out?—I could not say.

1379. Have you tried any of the inventions for spark arrester?—Yes; I conducted nearly all the tests, I think.

1380. Have you used Anderson's arrester?-I used it with wood, the one he made first; it was something after the style of the one he has now, but he has improved upon it. The one he is using now I have never tried.

1381. What other than those that you have tried?—We did not know the name of the inventors. The chief inspector simply told me to run to Woodend, or as far as I could get on the road, to see how the invention would answer, and to report all particulars as to steamings, and so on. There was one, Mr. Allibone's, which I think we used on the Deloraine railway. It did not act at all. It was a good spark arrester, but we could not get any steam with it. Another fatal objection to it was that the funnel was low, and you could not look through the window—the smoke hung down so that you could not look back; in a passenger train the passengers would be smoked. I got in a report to that effect, and there was a delighted trip with coal. Mr. Lewis, Mr. Jacks, and Mr. Allibone were on the engine. We went as far as Braybrook, and they were satisfied it would not do for a passenger train. I asked Mr. Jacks if they ran trains with this spark arrester, and he said they did, but their funnel was 20 inches taller than ours. We could not use the funnels that they used on the Deloraine line, on account of the bridges; ours were 20 inches taller, and thus made the smoke hang about the train.

1382. Did you try any other—Thornton's?—I did not think much of it. There were numerous sparks pretty large sparks, and after examining the smoke-box I found it choked up with wood; there were all wood trials. The wire brush would hardly clean it; if you touched it with the brush it shook about. I found the easiest way was to tap it with a hammer, and thus that you destroyed it. The rings were iron, and with the iron expanded and the rings came loose. Mr. Thornton said if the invention was a success he would have steel rings instead of iron.

1383. Did you use that one frequently?—I never use it one night on the main line, and one night on a trial up the Royal Park back. We tried three there one night—Mr. Thornton's, Mr. Allibone's, and the departmental one. The sparks were more numerous from Mr. Thornton's than from either of the others.

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1894. You only tried it twice? —Yes, and each time with wood.
1895. Did you try any others? —There were tests being going on for six or eight months, and I tried them nearly all except Mr. Anderson’s and Mr. Tyre’s.
1896. Do you know anything of Mr. Crabtree’s? —No I never tried it.
1897. Do you agree with the evidence as to the use of screened coal? —Yes, it would be a saving in every way: it would be a saving in the sparks and an economy in the steaming; it would be easier to handle, and far better in every way.
1898. ‘By Mr. Anderson. —Have you tried any other arresting, or any of the destroyers? —I tried one spark destroyer that belonged to one of our offices, Mr. Newell. It was an arresting cage, fitted something like Thornton’s, and a jet of steam from the boiler shot up against the arresting. The water was supposed to put out the sparks before they reached the arrester. With that arrangement you could not look out of the window —the water was drawing everything. Mr. Lewis was with me, and I thought that there was dirty water in the boiler and the engine was poisoning. I saw there was not enough water in the boiler to make hot steam, and I asked what was the matter, and I found it was the destroyer.
1899. Have you used the cast on the ash-pan? —No, it is not used on our suburban lines.
1900. ‘By Mr. Munro. —Which of the spark arresters is equal to the departmental one in keeping in the sparks? —Mr. Anderson’s was about the nearest to it; his sparks were numerous, but they were light, and went out before they touched the ground.
1901. Did any other come up to that standard? —No, I did not see any.
1902. What would be the difference between the departmental arrester and any of the others as regards stopping power? —I consider the departmental one the best for stopping. In reference to spark arresters and stopping power there is this to be considered —at the time I was on the good traffic man had an engine to himself and he kept his spark arresting cage and had no trouble with it. Under the present system one man may not have the same engine perhaps once a week; the consequence is, the arresters are neglected, something gets on to the grids, and the sparks come there and stick. The lighter you clean it the easier it is. I had one engine for nine years, and I never knew whether I had one arrester on or two as far as stopping was concerned. I am running an engine on the suburban lines now, and I never know whether I have one arrester or two.
1903. We have had some evidence about spark arresters getting damaged; have any such cases occurred under your notice? —No, I have never had any trouble.
1904. Have you had any of your trucks catch fire? —No.
1905. ‘By the Chairman. —In taking charge of an engine from another driver have you found the arrester out of order? —No, I have never had to report an arrester yet.
1906. The engine-driver is responsible for the arrester? —Yes; but the fireman does the cleaning.
1907. ‘By the Chairman. —Does the engine-driver inspect it himself? —He looks to see if there is anything wrong with the arrester; if he does not he instructs the fireman if he sees anything wrong to tell him; he might not look every night, but he would look three or four times a week.

The witness withdrew.

Robert Grant, sworn and examined.

1908. ‘By the Chairman. —What are you? —An engine-driver, running on the suburban lines. I have been about eighteen years on the engine, and during that time I have been running on nearly all the lines running out of Melbourne.
1909. Have you had experience of fires originating close to the line? —No.
1910. Were any fires alleged to have been caused by your engine? —No.
1911. Have you had any experience with fires alleged to have been caused by engines, whether your own or any others? —No, none at all.
1912. Have you had anything to do with testing arresters? —Yes; I have been on two or three of them. The first one I was on was known as St John’s Church fire. I believe it came from the Age office. That was a failure. Then I had a few trips on Thornton’s, and that was a failure.
1913. Why? —It would not steam.
1914. Did it serve its purpose otherwise? —I only had it on the Royal Park bank.
1916. Did you find it difficult to clean? —No.
1917. You only objected to it that it interfered with steaming? —Yes.
1918. What others did you try? —I had two or three trips with Peter Tyre’s. That was first class.
1919. Was it equal to the departmental arrester? —Yes; it was superior to the departmental one, and steamed better.
1920. That was a distinct improvement on the departmental one? —Yes.
1921. Did you use it (promptly)? —I had it about a fortnight.
1922. Do you know why it was not adopted by the Department? —No. A board, comprising Mr. Buzley, Mr. Lemon, and Mr. Mills, inspired it into it. That was about fourteen or sixties years ago.
1923. Did you try any others? —Only the departmental ones.
1924. Were any of these any good? —The one in the one now is not a bad one.
1925. Did you try any others invented by officers of the Department? —No; those were all tried. I agree with the previous witness in regard to the use of screened coal? —Yes; it would be a great improvement.
1926. The coal is not screened now, whereas formerly it used to be? —Yes; it has not been screened for the last sixteen years.
1927. We have had evidence that it was screened when Mr. Mills was locomotive superintendent? —Yes.
1928. Do you think it possible for sparks to escape from the funnel and cause a grass fire? —No, I do not think so with the departmental arrester.
1929. We have had evidence that fires have been caused in that way? —I do not think so.
1930. Is it possible for cinders to escape from the ash-pan? —Yes.
1425. Is it possible for spiders so creeping to be carried into the mudlocks adjoining the line?—No, I do not think so.
1426. They would be sufficient to ignite any inflammable material on the line, such as dry sleepers?—Yes.
1427. By Mr. Sawgert.—When making those tests of spark arresting, did you have to make any written reports to the Department of your experience with them?—No. In the first two I was the foreman; the driver would have to make the report.
1428. Was there anybody else on the engine to see the test?—There were Mr. Milne, Mr. Durack, and Mr. Lemon; they were seeing three or four of them.
1429. You have never made a written report yourself?—No.
1430. Have you made the cage on the ashpan?—No.
1431. Have you had any trouble or earnings set on you?—No.
1432. Where were you driving at the time of the strike?—Up to Ballina.
1433. Was there damage caused then by burning wood?—No.
1434. Did you see the present spark arresting?—Yes.

The witness withdraws.

Herbert Hollows, sworn and examined.

1435. By the Chairman.—What are you?—An engine-driver. I have been running on all lines from the North Melbourne shed; in present I am on the suburban lines. I have been on the footplates over 27 years.
1436. Have you had any experience of fires originating close to the line?—Never whatever.
1437. Do you agree with the evidence as to the use of screened coal?—Screened coal has every advantage; it would be as economic as well as a preventative of sparks.
1438. Have you made any of the test trips?—No.
1439. Do you think it possible for sparks to escape from the funnel and set fire to the grass?—Providing the spark arrester is in good order, I think not.
1440. Would spiders escape from the ash-pan?—Each firebox has a lug forged on each end of it, which is supposed to keep the bars a certain distance apart; and, so long as these are the regulation distance apart, I do not see that any ash that would get through the bars would do any damage. A leg may break off or get displaced, and then an ash could get through.
1441. By Mr. Sawgert.—You have not tried any of the other spark arresters?—No. The only spark arresters I have had anything to do with is the gridiron.

The witness withdraws.

Adjourned.

THURSDAY, 29TH SEPTEMBER, 1890.

Members present:

M. K. McKechnie, Esq., M.P., in the chair;
The Hon. J. G. Dufty, M.P.;
The Hon. J. H. Grace, M.P.;
T. Kennedy, Esq., M.P.
Thomas Hale Woodruff, sworn and examined.

1442. By the Chairman.—As to the screening of coal; we understand that coal some years ago was screened, and that now it is not; is that so?—Not that I am aware of. The coal supplied under the present contracts is screened at the mines. There is a particular way in which that has to be screened—a particular screen it goes through. There is an inspector at Kanangra who sees that done, and also one at Newcastle.
1443. Was the coal some years ago screened at the mines or down at the railway?—I have not been able to get that information. I saw in the papers a statement that the coal was screened on the stages, but from what I have ascertained, the facts appear to be that prior to 1874 the coal was screened by the contractors and delivered in bags, bag and all. After that it was delivered in bulk for a few months. I am informed that they screened the coal—since reassignments of coal had a large proportion of slack; but since then I am informed that no screening was done on the stages. That was in 1874. I should give you the name of one of my men who was engaged on the coal stage at that time and who has a communication from the stokerkeeper. I furnished him with a clipping from the newspaper and asked him if he would inform me whether it had been over the practice of the Department to screen coal for running engines on the stages, and if so, apply the following information:—"When was it instituted? If it was followed throughout the course of the year when it was discontinued, and the reasons for the practice?" He copied:—"I cannot find that it was over the practice to screen the coal on the stages for the purpose of supplying locomotives. Mr. Carter, of the North Melbourne stage, who has been nineteen years connected with the coal industry, has no knowledge of such a practice. About 30 years ago the coal supplied by contractors at Specimen street was screened by them in their yards and delivered in bags." Since that I saw one of our old coal superintendents, Mr. Brown, and he informs me as I have told you just now. I do not know whether that particular coal delivered in bulk at that time was screened at the mines or not, but I think it is pretty evident that we did screen it. We may have done so on one or two occasions, but not beyond that. We are very particular about getting screened coal.
1444. What proportions of Newcastle and of Kanangra coal do you use?—I cannot tell from memory exactly, but I think the last contracts are based upon about one-third Newcastle and about two-thirds Victoria, but owing to the inability of the Victorian companies and the troubles with the mines and mines, they have not given their full supply, and recently, I understand, about one-third of our coal has been coming from Newcastle.
1452. Which coal do you find the most liable to crumble away?—I think there is much of a unevenness as far as the Shortman and Junee coal is concerned. The Coal Creek coal is much harder. 

1453. We have had unanimous testimony from the drivers that the coal used now is very fine, almost dust. You know there is an extreme difficulty in getting coal just now. We have got it where we can, and we are trying to get our coal stages fully stocked in case of complications that seem to be looming in the distance. So double the coal we are getting just now is carrying a lot of slack. I called the attention of the storekeeper to the matter, and he says the contractors are giving the best coal they can get.

1444. You have no knowledge of the coal having ever been treated differently, as to screening, from the present time?—No. My knowledge only goes back to 1399.

1455. Who was your predecessor—Mr. Allsop Smith.

1456. We were informed it was in Mr. Mil's time—That was before Mr. Smith. I could give you the names of old officers who could tell you. Brown is one. Carter is another, and I could furnish some others. Driver Murray, one of our sub-formen, I hasten, and he said he did not recollect anything about it, and he has been in the service a great number of years.

1447. We have also bad evidence that the use of screened coal would be an economy, as well as bring an advantage as to keeping down sparks and so on; would you agree with that?—Of course, there would be less trouble in working, but it would be a very big contract to thoroughly screen the coal.

1458. Do you think the saving in the coal would compensate for the expense?—No. I think to screen the coal systematically, which would have to be done, as it is no use doing it piecemeal, it would cost for six months at least $20,000.

1449. We were told it was screened four months in the year in Mr. Mil's time—the summer months—in order, primarily, to guard against sparks?—Was that generally?

1450. Yes, we understood it was generally every year?—From inquiries I cannot find that anything of the sort was the case. 

1451. By Mr. Wheeler.—When you get the proportions of two Newcastle and one Victorian, do you mix them?—We keep it as separate as we can.

1452. When they take coal for firing, do they take part of one and part of the other?—In some cases it is unavoidable, but generally they do not. In the western district it is all Newcastle coal, because of the carriage. It is sea-borne to there.

1453. By Mr. Greaves.—Is it at Geelong?—We take delivery at Geelong.

1454. And then it is merely the difference between this and Geelong?—Yes; a difference of 4d. a ton. It is 13s. 6d. in Melbourne and 13s. 10d. in Geelong for one class of coal, and 14s. 6d. and 14s. 10d. for the lighter class.

1455. By the Chairman.—And it saves the carriage by not in addition to the 4d.?—They deliver it there at that rate.

1456. By Mr. Wheeler.—Do you get any at Fairbairn?—No.

1457. Or the Lakes' Entrance, and take it up the river to save carriage?—All that district is supplied from Kurnever. I presume it would have to be brought from Melbourne and Sydney. Steamers would not call in there.

1458. By Mr. Greaves.—How many contracts have you?—Two; Outtrim and Creek Coal, at the contract price.

1459. Is the specification on which they deliver so much per ton; and with regard to the slack, is that the same for the Newcastle as for the local contracts?—Yes; they are screened in the same way.

1460. What is the difference of price?—The Coal Creek is 9s. 9d. delivered at the pick mouth into our trucks, and the Outtrim about 11s. Of the Newcastle coal there are two qualities; the first is 13s. 6d. at Melbourne; delivered at the Australian wharf into the trucks, and 14s. 10d. at Geelong; and the other is 13s. 6d. at Melbourne on the same conditions, and 13s. 10d. at Geelong.

1461. Would you take more Victorian coal if you could get it?—Yes.

1462. Then they do not supply up to their contracts?—They have not recently.

1463. You do not take nearly the quantity you would take on that account?—Not nearly. They have a clause which protects them in case of flooding out, or breakage of machinery, or strikes.

1464. There are no strikes, surely, in Victoria?—There is one latent at present.

1465. By Mr. Sampson.—Under ordinary circumstances, in getting the coal do you think you get more than the 15 per cent. of slack?—I do not think so, taking it all round. We have complaints from here and there from one stage or another about the undue quantity of slack, but generally, when we have inquired into it, we have found that although one stage may have had more than its proportion allowance there may have been a little less, and the allowance is 15 per cent. so that, and, as you know, in taking the stuff to the ship's hold one or two trucks may have more slack than others.
1466. By Mr. Green.—Is there a duty on coal?—There is a small duty of Is. a ton; that goes to the Master Tax.

1467. By the Chairman.—The Victorian coal would have to pay the same if it were brought by ship to the valley?—Yes, but I do not think we pay that shilling; we are exempted.

1468. Have you given any further consideration to the question of liquid fuel?—Yes; we are making experiments at the present time.

1469. Have you any additional information you can give?—Yes, that there is no difficulty in using liquid fuel.

1470. As to the price?—I have not the particulars as to that yet.

1471. By Mr. Green.—It is sure to come sometime—I think so. It is being discussed very earnestly in England now.

1472. That would cure all our troubles?—Yes, a great many of our troubles.

1473. By Mr. Sangster.—Have you any knowledge with the present spark arresters whether the Newcastle, Con Colleen, or Oatmeal coal is most likely to foul the arrester?—No, I do not think we have any direct evidence one way or the other. A soft coal would naturally clog the arrester more than a hard one.

1474. By the Chairman.—There is nothing else you desir to add that would be of value to the Commission?—No, I think not. I will send you the particulars of the coal we are receiving this last month, and also copies of the documents. That will contain information as to the screens.

The witness withdraws.

David Anderson, sworn and examined.

1475. By the Chairman.—Are you the inventor of a spark arrester?—Yes; I call myself the patentee. I have taken out a patent for it.

1476. Have the arresters been tested by the Railway Department?—Yes.

1477. Was it used long by them?—For a period of eight months; from 29th December, 1893, to the 10th June, 1894.

1478. In constant use?—Except when laid up for any small thing for one or two days, when I made an alteration. You may say it was in constant traffic. It was in use all through the winter.

1479. What lines were it on?—Twenty-six times on the Gedling line, the remainder on the Woodell line. While it was running it ran every day to Woodend, and had two additional trips during the half hour to other places. I left off taking account of the trips when it came to 90. I kept a diary, and I have drawn up a type-written statement taken from that. Now that I keep a diary I cannot remember dates. I adopt today the usual mode of the Argus,—I am in the place where I am demanded of conscience to speak the truth, and therefore the truth I speak, impinge on whose list. I was here yesterday, and heard John R. Haskell's evidence, and since I went home I have made a few notes on it.

2 He John R. Haskell and his evidence to-day, 18th September, 1890,—I did not intend to produce the copy from my letter book (page 263) till I heard Haskell give his evidence to-day, which is very different to what he told us when he was using my arrester in 1886 and 1887, as recorded in my diary and other documents, which I will read from the type-written statements I have drawn up for the information of the Commission.

1480. You are going to read what Haskell said to you at that time?—Yes.

1481. We cannot receive that, that is no evidence; what he told you at that time or what either of the drivers told you?—That is a strange thing. I took it at the time. I may explain thus I have been in the habit for 30 years of keeping a diary and recording my proceedings. I have here my diary recording the conversations with the drivers, and I am told that evidence containing a diary is accepted in a court of law. The authority for that is my friend, Dr. Morrison, of the Scotch College.

1482. We would hardly accept him as an authority on points of law?—I only wish to do it to show that I was authorized by Mr. Woodroffe. I asked permission to get a general pass to go on any engines I liked. He said I could not do that, if he did every lawyer would want it. I was authorized by Mr. Woodroffe to get the reports of the drivers direct from them.

1483. You only got verbal statements?—That was all.

The committee room was cleared.

The Commission adjourned.

The witnesses and the press were again called.

The Chairman informed the witnesses that the Commission had come to the conclusion that, as he would not have an opportunity of obtaining witnesses, they would give him as much latitude as possible, and allow him to read his statement, within reasonable limits.

1484. The Witness (continuing reading).—Haskell told me that he could teach my arrester from the inside of the cage by opening its door, and that this was of great advantage in clearing the back of the arrester, which, however, as a matter of fact, never requires much. It soon, therefore, as a surprise to me when he showed to-day that he thought the door was a temptation to drivers to open if they required space for such a reason, forgetting the fact that if a driver were guilty of opening the door in summer, when the grass is dry, he would set the whole country on fire and as no sparks that can do damage can escape, even when wood is used, through one-eighth inch perforations, the fact that he set fire to anything would convict him of opening the door. Mr. Woodroffe makes great capital of this door in the cage as an objection to my arrester. However, Mr. C. L. Watt, a man of great experience in the running and standing of engines, declares it to be an 'excellent provision,' and evidently thought the drivers would use common sense for their own sakes (see his accosted report, which I produce). Such conflicting statements have been made, and are being made, on this subject, of finding out which is the best arrester, that it looks as if the only way to decide the matter is by 'competitive trials' by competent and disinterested men outside the Department. As I informed the chairman to-day, I have never received from the Department a single report of any of the drivers who used my arrester from 29th September, 1890, to about 10th June, 1894, when it was taken off. I consider I ought to have received all these reports, and that you will sanction the Department to give me copies. Haskell stated to-day that the tapering of the holes improved the arrester very much, but that he only used it for a few days after this improvement was effected, which statement is correct. This interview is also in my diary of 16th December, 1890. 2 [Handing in certificate from Mr. C. L. Watts.]
ANDERSON'S SPARK ARRESTER.

The Chairman and the Members of the Regional Commission on Spark Arresters.

Gentlemen,

As I have already reported the results of the engine-drivers who have used my arresters from 29th, September, 1893, to about 15th, June, 1894—period of over eight months—and as I have serious problems to make of the effect of the Better Protection, I think it better to wait until I have had further time to perform the experiments I have in hand, and to prepare for them, from any opportunity of examining no one on the subject. During the whole eight months I was only able to get three instances on the footplate of No. 411 engine—the one used for the trials. On 10th November, 1893, I applied to Mr. Woodford for a general engine for him, and he said that he would not allow me to go on the engine, but would keep a record of the engine's trip, and I could get information from the driver. Therefore I went to the North Melbourne running shed, and got this information from the drivers, and wrote it in my diary shortly after I received it. The extracts from this diary are therefore a true account of the opinion of the drivers, although some of them, when examined before the public board, consisting of the Honourable H. E. Williams (the Minister) and the Honourable L. C. Orton and S. Williamson (Mr. E and Mr. O., R.M.), said they had heard some news from the shed. The facts, as far as I can say, are put in the most simple language, and I feel that the facts are a matter of no importance. I have given the opinion of the drivers as they gave it to me, and you can judge between us, and I confess the subject is one of no importance. In the diary the connections "R.M." and "N.M." stand for running shed and North Melbourne, respectively.

Extracts from my Diary of Friday, 25th, September, 1893.—Trip to Sunbury with wood, D. Anderson on engine. Left North Melbourne at 3.45 p.m., arrived at Sunbury 4.46 p.m. Woodford and Jack on 411 engine; drove John Ryan. Stopped fourteen minutes at St. Albans and eight minutes at Sydenham to fill fences with wood. The arrester acted splendidly; it failed but once. Plenty of sparks, but they were all dead,『falling』. Some bad by Benowo passenger train, with A. M. Sylva, Woodford, and Jack on 411 engine. On the way back Woodford said he would not put the engine with my arrester in general traffic. The wood was good split box; load, 270 tons.

Note on 30th, 7th November, 1893.—On this occasion we were above the street, 1 hour 30 minutes on the trip. I went to Sunbury to collect wood in order to fill the sheds and the fences, in order to fill the fences in every minute. 

Wednesday, 6th October, 1893.—Went to running shed, arresters up at 4.45 to 5 a.m. to Geelong with full load.

Thursday, 7th October, 1893.—Went to R.M., and found that the arrester was perfectly clean. Thomas Hale, the locomotive foreman, said—"Do you want your arresters altered in any way, Mr. Anderson? I said—'No, I have asked Mr. Woodford to put these arresters in my engine, and I am going to use them. I have examined and set up the arrester, up at 4.45 this morning. It will not be adopted, I see. I will have them in the next car, and I will not put them in."

Note on 10th, October, 1893.—Went to R.M., at 2.15 p.m., and the arrester went to Geelong again after night. Tom Taylor, "lighter up," told me the engine steamed well. I saw on the bridge at North Melbourne, and saw engines on 45 C. D. engines of 45 engines, 50 trackers, leaving off at 1.45 p.m. Passing through, in the engine, I saw a man putting off at 1.45 p.m. Premier, at 11 a.m. I advised him to write to Patterson. Patterson then a boiler should be applied. Wrote to Patterson.

Thursday, 11th October, 1893.—Received letter from J. R. Patterson. Went to R.M., and was told that 1111 went splendidly to Geelong on Friday, and that the driver, Jack Golds, said it steamed far better than his old engine. He saw engines on and 45 engines. On Saturday, the engine left Geelong at 4 a.m. and Poulter took the engine to Woodford, and at 4.45 p.m. same day, Ricardo took it to Geelong. On Monday and Tuesday, Poulter took it to Geelong, and at 4.45 a.m. to day saw one pass with 38 loaded trucks, and 50 20 tons, and 8 6 tons, and 8 engines, in 45; he was seeing splendidly.

Sunday, 13th October, 1893.—Was informed that Poulter took the engine on 11th and 12th to Geelong, and he says the engine steamed better than on any other day, and that the arrester was never cleaned till the engine came back from Melbourne, and then only a few of the boxes had particles of coal in them. He stated that before reaching the various stations he had to make sure that he had to open the grate-box door to moderate the steam. He found the engine was "washed out" this morning again, and he made steam very rapidly, and before doing the engine was perfectly clean. Poulter went to Geelong at 4.45 p.m. I saw his pass, again showing of very much.

THREE TO GEELONG WITH STEPPING POOLS.

(See Anderson on Engine.)

Thursday, 30th October, 1893.—No. 411 left Melbourne at 4.45 p.m., and arrived at Geelong at 7.35 p.m. (seven minutes before time). Left Geelong at 12.15 a.m., and arrived at Melbourne at 4.45 a.m. on Friday. The engine steamed splendidly, and Poulter, the driver, said that something could be better. At Geelong put some wood, saw to show sparks, Poulter said that any driver could do no more, and that most of them used oil long before they reached the ground. Driver, John Power, fireman A. Cook, guard Thomas Macfarlane.

Note on 10th, November, 1893.—Went to Woodford, who said he was going to the committee on the engines to go on the engine. Saw Murray, who said that that wooden Woodford needed he would him up him. Went back to Woodford, who said that he had trouble with the engine, and that he would do nothing more for it, but that he would do nothing more for it. The engine was No. 411, and North Melbourne at 4.45 p.m. drawing 50 trucks. She was blazing off at the safety valve.

Sunday, 18th October, 1893.—Saw Power, who said that last night was the morning, his trip to Geelong and from Melbourne, and that the arrester was never cleaned till the engine came back from Melbourne, and then only a few of the boxes had particles of coal in them. He stated that before reaching the various stations he had to make sure that he had to open the grate-box door to moderate the steam. He found the engine was "washed out" this morning again, and he made steam very rapidly, and before doing the engine was perfectly clean. Poulter went to Geelong at 4.45 p.m. I saw his pass, again showing of very much.

STEPPING POOLS TO GEELONG.

(See Anderson on Engine.)

Monday, 20th October, 1893.—Received notice from Woodford giving me permission to ride once on the engine. Engine No. 411 left Geelong at 4.45 p.m. and arrived at Geelong at 2.35 p.m. (seven minutes before time). Left Geelong at 12.15 a.m., and arrived at Melbourne at 4.45 a.m. on Friday. The engine steamed splendidly, and Poulter, the driver, said that something could be better. At Geelong put some wood, saw to show sparks, Poulter said that any driver could do no more, and that most of them used oil long before they reached the ground. Driver, John Power, fireman A. Cook, guard Thomas Macfarlane.

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SIXTH TO GEELONG.

(See Anderson on Engine.)

Thursday, 26th October, 1893.—Went to R.M. at 2.45 p.m. Saw Golds, who said there were only a few sparks in the perforations of caille when he cleaned it this morning. Saw Poulter pass N.M. with 40 trucks.

Note on 10th, November, 1893.—Went to Woodford, who said he was Avery sure he could not see Richardson, who was engaged on the bridge, business. He thoughts the matter of spark arresters should be settled, and says—Winston said to Patterson again, "keep on."
Tuesday, 2nd November, 1894. — Andrew told me that he and Helen had a row with the Department at the railway about this morning. It is stated that he received exceptional consideration because his brother is an M.P. Woodcock thinks that the scenario would escape through his protections as easily as the "Grafton" in the afternoon. Sew Powler and Ogden, who say that the engine ran as well as usual Monday, and that the arrastor cannot be seen.

Monday, 5th November, 1894. — W.S. Smith and J. Richardson at 11.15 a.m., but he could not go out with me to see the arrastor at present. 2 reports, he said, to be sent to him.

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Thursday, 9th November, 1894. — Went to W.S. Power who told me that the mule of the driver who took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.

Monday, 12th November, 1894. — W.S. Smith and J. Richardson, who said that he and other drivers and managers, then "W.C.R.2", thought that they were the arrastor. Some of them said he did not know what the mule of the driver took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.

Friday, 17th November, 1894. — Woodcock, who said that the Department was not instructed him to give me a report on the arrastor. I asked him to put it on the Woodford line, and he said he would if there was no difficulty in the tracks. In my letter to Woodcoth today I supposed to run my arrastor against the departments of any other, using the same local, fired, driven, and freeman. (Letter book, page 41.)

Monday, 13th November, 1894. — W.S. Smith and J. Richardson, who said that he and other drivers and managers, then "W.C.R.2", thought that they were the arrastor. Some of them said he did not know what the mule of the driver took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.

Tuesday, 14th November, 1894. — Went to W.S. and Sew Powler, who said that he and other drivers and managers, then "W.C.R.2", thought that they were the arrastor. Some of them said he did not know what the mule of the driver took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.

Wednesday, 15th November, 1894. — Went to W.S. and Sew Powler, who said that he and other drivers and managers, then "W.C.R.2", thought that they were the arrastor. Some of them said he did not know what the mule of the driver took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.

Thursday, 16th November, 1894. — W.S. Smith and J. Richardson, who said that he and other drivers and managers, then "W.C.R.2", thought that they were the arrastor. Some of them said he did not know what the mule of the driver took the engine along 21st night was A. Turner, and that George Morgan took her to Collingwood this morning.
Monday, 5th March, 1894.—Arrester was cleaned this morning. Dick went out with No. 411V at 11.10 a.m.

Friday, 2nd March, 1894.—Told Homewood to repair and stagger the bolts from the inside. Tired a boy to do it.

February, 1894.—Joe Jacka, the blacksmith, who was employed by the arrester, was killed.

Thursday, 15th March, 1894.—Went to R.S. after dinner, and stayed till 5 p.m. about three fourths of the performing time. Tuesday we got up stove D in one hour, five minutes, and she was washed out to-day. Now, the head-lining-up, tell the lady.

Saturday, 17th March, 1894.—Tapering holds a great success. Engine went out last night with 292 tons, and the steamer was only about 1 ton over the heavy grades. This morning the arrester did not operate. Was told to see about getting some fresh water, and was sent for water in the house. Miskell says she has the beat.

Monday, 19th March, 1894.—Told Mr. Davies that the engine seemed well. Could not hear the lady. Patterson, the driver of 425V, told me that he saw Davies pass Langford Junction with 411V, steam bowling off.

Tuesday, 22nd March, 1894.—Went to R.S., and heard that arrester went out with Davies again, and that engine seemed well. Indeed, it was told that he was told by Davies that he (the writer) was to see the engine for a week from tonight last.

Tuesday, 26th March, 1894.—William Constable on engine No. 411V to-night.

Thursday, 28th March, 1894.—Went to R.S., and saw Bill Constable, who says he took 299 tons to Woodend last night. He goes out at 40 a.m. to-night, and is to watch how arrester is. Engine to be worked out to-night.

Friday, 29th March, 1894.—Went to R.S., and saw Bill Constable, who said he took the engine to Woodend without troubling him. He informed Lewis that there is no fault to be found with the arrester, and said if the end had so much coal he would go up-stay at Woodend. In addition to this Constable said—"Well, I like about your arrester is, that the stronger the blin the more chance the cage is in." (This bit is not in the diary.)

Monday, 3rd April, 1894.—Went to R.S.: Saw Andy Paterson, who said that Davies told him—"That my arrester steamed well enough, but had to be cleaned more on the trip to Woodend," to which Paterson replied—"That is nothing, as I have often heard the double 'Gordonia' three or four times, and then cannot steam." Constable reports well of arrester.

Wednesday, 4th April, 1894.—Driver Michael Hamilton went out with No. 411V to-day.

Friday, 6th April, 1894.—Went to R.S. Tom Taylor said he was informed by Wallace that he "did not know he had an arrester in use going to Woodend." Jack Hartshorn took the engine to N.S. at 9 a.m.

Saturday, 7th April, 1894.—Went to R.S. at 11.20 a.m. Taylor says that Haskey told him the engine steamed against at 3.15 p.m., and took out engine at 4.20 p.m. on Tuesday. Monday, 8th April, 1894.—Went to R.S., and was informed that Hamilton says he had to burn the arrester on one trip, but that it was the fault of the coal, and not the arrester. Saw Boyd, chief locomotive clerk, who said he would see Woodhead about putting back ash in 411V.

Thursday, 10th April, 1894.—Went to R.S., and saw Constable, who said he took the engine to Woodend yesterday, to run the engine back to R.S., before cleaning it, and asked permission of Woodhead’s and Lewis to see engine.

Monday, 14th April, 1894.—Went to R.S., and was told by Biellie that 411V was sent to Beulah yesterday, to run the engine back to R.S., before cleaning it, and asked permission of Woodhead’s and Lewis to see engine.

This is the whole of the reports of Mr. Paterson, who was employed by the engine.

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On 23rd February, 1894, to-day.

On 24th February, 1894, to-day.

On 25th February, 1894, to-day.

On 26th February, 1894, to-day.

On 27th February, 1894, to-day.

On 28th February, 1894, to-day.

On 1st March, 1894, to-day.

On 2nd March, 1894, to-day.

On 3rd March, 1894, to-day.

On 4th March, 1894, to-day.

On 5th March, 1894, to-day.

On 6th March, 1894, to-day.

On 7th March, 1894, to-day.

On 8th March, 1894, to-day.

On 9th March, 1894, to-day.

On 10th March, 1894, to-day.

On 11th March, 1894, to-day.

On 12th March, 1894, to-day.

On 13th March, 1894, to-day.

On 14th March, 1894, to-day.

On 15th March, 1894, to-day.

On 16th March, 1894, to-day.

On 17th March, 1894, to-day.

On 18th March, 1894, to-day.

On 19th March, 1894, to-day.

On 20th March, 1894, to-day.

On 21st March, 1894, to-day.

On 22nd March, 1894, to-day.

On 23rd March, 1894, to-day.

On 24th March, 1894, to-day.

On 25th March, 1894, to-day.

On 26th March, 1894, to-day.

On 27th March, 1894, to-day.

On 28th March, 1894, to-day.

On 29th March, 1894, to-day.

On 30th March, 1894, to-day.
Mr. Woodhouse has always been so kind as to give me competitive trials, and this reputation is borne out by the following letter, to which Iprocured an reply.—Bolton, 19th November, 1890. T.B. Woodhouse, Esquire, Chief Mechanical Engineer to the Metropolitan Railway. My dear Mr. Woodhouse,—I am truly pleased to receive your letter of the 10th instant, and I am glad to report of the success of my separate action, which I am now ready to start upon a report of your experiments. I was particularly interested in your recent experiments, and I am glad to hear of your latest success. I must say, however, that I was not completely satisfied with the results of your experiments. I am sure that you have been most careful and accurate in your observations, and I am glad to hear that you have been able to carry on your work with so much success. I congratulate you on your success, and I am sure that you will continue to make valuable contributions to the science of railroading.

Sincerely yours,

[Signature]

[Address]

[Date]

[Note: The letter is not fully visible due to the cropping of the image.]
well that Richard Haskell reported that he "saw my aeroplane 60 times a day from Woolston— that with it the enemy steamers as well as with the departmental aeroplane; that not a single one, even when wood was used as fuel, escaped the visit of our aeroplane for more than a short time, and not in the shadow of the coast, except with very heavy clouds. The Commodore had been in the air, and almost Wheeler and Buttry could work for my brother's account with Mr. Williams when he said he "had the power to appoint a board and would do so."

The DEPARTMENTAL AEROSTEAL.

The origin of the device is lost in the mists of antiquity. Presumably, Tutal Cal, the first architect mentioned in the Bible, made one for his wife, with which he could go to Jerusalem. In the account of Richard's "Lea" it is related by Scott in his novel of "Tristan," that a device of this kind was used by Scott de Lubic to partially Eaton the Jew and make him his slave. The evidence is conclusive. We find on examining the present years' events, that this is the same as now, only that the bear has present cheer and the draught improved. As a further indication the upper girdle of the new aeroplane and the draught-stick are more interfered with. I was not aware until I heard the evidence of Mr. Pengelly of Kew who had unjustly had this evidence by the instruction of the officers of the Department that my aeroplane, for instance, and also interferes with the steering of this engine. Moneague stated that with the second engine the aeroplane had to be turned at least every morning on the road with proper training, which Kewals would kill on the express between Karlstein and Staines the pilot got out at every stopping place and broached or released the aeroplane. Moneague gave us reasons of the aeroplane of an engine having to be detagged only in a section of 15 miles before the engine would start, and yet we are told that it is "the best in the world." Its design is faulty in the first place; secondly, the bars were by the foot, so that instead of being only 1 inch apart they are often more than 3, of which I can give an example: — On the 20th January, 1865, 2nd Mr. S. H. Smith, the late Chairman of the South African Commissioners, to see my aeroplane at North Melbourne, after which I select William Wrenner, the man who attends to the repairs. The engine on which the aeroplane was put on trial, was the 20 square inch engine, consisting of 60,000 feet of 3000 lands of the large engine on my trial of 4th December, 1865, 240 square inches, consisting of 200,000 lands of 3022 square inches area: whilst the draught iron on the "W." chimney in 15 square inches. My line in 1 foot of 1 square inches, which is larger than the area of the chimney, and therefore there is no interference to the draught while lighting up.

Mr. John Matheson, COMMISSIONER OF RAILWAYS.

It is all my experience in connection with the Victorian and South Australian Railway Departments he is the only man I have seen with a considerable knowledge, as to my advice, to take the aeroplane to England, to my knowledge, and to the men who now proceed to England, not to evaluate my engine, and not to express an opinion. Not to say that we are the inventors. He then said "You ought to have been satisfied with the Aeroplane for your land," and I said:"This did not suggest that I should go back to England, but that I should get a new engine of the same character, and I should go," and "Perhaps it will be better to put your proposing returned to you." If Mr. Matheson had studied the report of the drivers he would have seen that Haskell used it, and it gave him every satisfaction 60 times to Woolston—the severest test grade in the colony. Were he possessed of judgment he ought to realize that what we want does not change. I was much struck by a remark of Sir Hartley Williams in his work, "legion without superstition." I have never seen a man who can be proved again, but not by Haskell to meet all requirements, and this could be proved again by him, and therefore it was a scientific test.

Mr. Woodhall.—In his evidence before the South Court in May, 1864, Mr. Woodhall stated that the Department "had to abandon using wood as a combustible fuel."

By my aeroplane wood can be used on the level lines, and coal wood, according to the age of 20th March, 1865, amounting to 45,000,000 a year, and I believe my statements on the wood they are of great advantage to us. I refer you to the 3rd article, and I have every reason to believe in the Linton test and in the Matheson test, and in the Matheson reports which I have under my care.

By my aeroplane steam can be used in the same way, and any one can be made in the same pattern, and every one can be used intermediately in the working hours of any engine of the same type. This cannot be done with the "griddles", which must have a different aeroplane made for each particular engine. I beg to inform the committee, and I have been under the impression for the whole time that Mr. Matheson did not find that wood was the best engine. The arch prevents the small particles of coal (shock) from being thrown through the tubes when thrown into the furnace, and they are thrown back into the fire and are not coming into the fire and are not coming into the fire, but they are saved.

Mr. H. W. Williams, MINISTER OF RAILWAYS.

Monday, 5th November, 1864.—Paragraph in the Argus to-day about the effect that Williams does not see his way to appoint a board for the purpose of examining the expense accounts of the board and all the applications for the expenditure of $2,000,000. On 5th November, 1864.—At present the officers of the Department are prepared to give evidence, in connection with any officers, on the question of damage done by the aeroplane, the aeroplane does more damage than it is capable of doing, and the assurance of sparks as he possibly, and so a safe defence is set up. If it be appropriate, and first place for any kind of aeroplane, it will have to be a report of any kind in the departmental defence of the departmental report and the command. He also said "We are certain that not more than three or four aeroplanes were very desirable. The expense of a board of three committees was not more than $25, for three men would settle the question in a month, and the investor will, of course, pay the cost of all expenses and charges and the wages and the wages of siting the committee.

From Letter Book, page 50, 30th December, 1864.—The Honorable the Minister of Railways.—Sit—I have the honor to inform you, as you are the President of the Aeroplane and the aeroplane on the 7th November, 1864, the number of the three locomotive men to decide on the merits of the aeroplane submitted to the Department. Also that you had had seen Commissioners there should be a board appointed, because investigators had at great expense to themselves investigate the Department less in the case of the Aeroplane Department. I, Mr. Buttry, of the Aeroplane Department. My brother, Mr. A. Anderson, M.L.A., also states that he had decided to appoint a board of three, one of whom felt obliged if he were present, and that you would not appoint a board for the present. I trust to hear from you that you will, without loss of time, carry out your expressed intention, as I consider it is no less and no other invention that the matter should be longer delayed.—Hoping to hear from you soon in reply, I am, etc. [Signed] D. Anderson."
Reply.—"Melbourne, 28th September, 1894. Sir,—Referring to your letter of 22nd inst. on the subject of appointing a board to decide the merits of spark arresters, I am directed by the Hon. the Minister of Railways to inform you that instructions are still coming in, but that he has not definitely fixed upon the Board, but may do so at any time. I have, however, informed Dr. Ryrie, the Chairman of the Muntjens, of your wishes."

Barry, Tuesday, 29th November, 1894.—The Hon. the Member for Ballarat, asked the Address of the Hon. the Minister of Railways, and the Minister replied—"Yes."

Monday, 22nd November, 1894.—Sir, Williams, who said he told the Commissioner a board should be appointed as they had induced inventors to come forward at great expense. The Commissioner told Williams that the drivers reported against the inventors, which is untrue, and I asked him to produce those reports. He said he had not time to take the responsibility of ordering a board, and I told him that if he appointed three locomotive men they would take the responsibility to test a board the three men, engineers of New South Wales, Queensland, and South Australia, and I gave my consent against this course, and said that there were good locomotive men here.

Barry, 30th November, 1894.—Anders, in answer, asked Wheeler if he were satisfied of the results would be approved of by the Commissioner. He replied—"Certainly, and so can Williams." I have had called up the new Act and found I was right in asserting that the Commissioners had no power. Andrews, Wheeler, and Dally went to Williams, who said—"I never said I did not think the power, and I never said that my power was called on," Andrews said—"You have had three men, and I have done with it." He said—"I will not fix the time for the Government in a very much better way than I will. I will appoint a board," and Andrews could not get nothing more out of him. I told him—"I can see now what I could not say before, that there will be a board," and he replied—"Of course, for Williams cannot back out, for Wheeler, Dally, and I swore witnesses to what he said.

Diary.—February, 1895.—J. S. White went with me to Williams, who said to him he would not take the responsibility of appointing a board in opposition to the wishes of the Commissioner, but would lay the matter before the Cabinet to decide on Tuesday next. Sam Williams at Spencer-street the city was having, and he told me the same thing.

From September, 1895.

That is the whole of my statement.

The witness withdraws.

Henry Allibon, sworn and examined.

1895. By the Chairman.—What are you?—Mechanical engineer, reading at Deniliquen. I have been in the Doonhill and Maroo Railway service for 25 years.

1896. How long has your arrester been in use there?—Eleven years.

1898. Were any other arresters tried at the same time?—Yes. We had Peter Tury's, that has been referred to, and Biddle's, and mine; just those three.

1898. The Victorian departmental arresters were not tried?—No.

1899. Yours was selected out of those three?—There was another one, Mr. D. M. Barry's. He and another man and we got it, but it was not very good, but it was not very good.

1900. Are you associated with the company?—Yes, I have been in their service 33 years as engineer for the company; that is from the time it started. I was in the Victorian Railway seven years before I went to the Doonhill and Maroo Railway, and then I went to the Doonhill and Maroo Railway.

1901. Door of your arrester interferes with the opening of the train?—No, not a bit.

1902. It has been alleged that it does?—Yes. I cannot account for it, because we burn nothing but wood, and this is very simple, [shoveling a plow]. We carry as much as 300 tons from the freezing works, dead weight.

1903. What is the rubbing gradient on your line?—It is very nearly level.

1904. What is the gradient in the steepest part?—About 1 in 60, and it is too lengthy.

1905. The trains get up steam approaching that?—Yes, and there is a good approach to get to the top of the bank. We have been in the habit of carrying 13 and 13 trucks loaded, and sleep, two carriages in a van, and cattle, any time to a truck; we take 130 trucks. We run passengers and goods together.

1906. Have any flaws originated close to the line?—We have had none.

1907. Since to have been caused by the engine?—Yes, either by the arrester or by burning off.

1908. Were any claims made against the company for damages done?—Nothing to my extent, I recommend you get all the information you require from the company. Do not trust what I am telling you about that.

1909. Has the company ever had to pay damages caused by a fire from the engine?—Only for a few trucks. There have been a few trucks burned on the line since the opening.

1910. That was their own property?—Yes, or it may be under the Victorian Railway.

1911. How did the fire occur?—It's very hard to call a fire occurs. For instance, in an engine working up sparks, and they catch it in the trucks close to the engine. Then the engines burn oil, and may set fire to something. Suppose you got a truck of oil, and it has been in the truck a fortnight or three weeks, that might ignite and be burned to the sparks of the engine.

1912. Your arrester has been tested on the Victorian Railway?—Yes.

1914. And it is alleged that it was proved to be a failure?—So they make out; but I cannot see where the failure comes in, because I can assure you we have had a lot of trials, in fact we work nothing else winter and summer. We do not take the tender out in the winter.

1915. You were present at the trials in Victoria?—One only. I think there were two or three trials during the time we were trying the brown coal at Princes-bridge. That was all the trials they had then.

1916. It was said it was a complete failure then when you were there?—Yes, it was a failure. I did not suffer at that, because we were using a stove not much bigger than that arm. Firewood passed into the box and the door open all the while. That is not bring all the wood. I was with the all the time, and I say—"Why do you put those men? The Department had given me two men. Whatever you did use could fire with such wood as they had there. It was just little bits of splittings, box, with green bark on it, about half-inch thick.

1917. Have you any evidence to supply us with in support of your arrester to prove that it is better than the one in Victoria?—I have not picked up a whole lot of information in any way.
1507. By Mr. Kennedy.—Do you know whether that spark arrester was on the engine purchased by the Trangie municipality from the Victorian Railway Department?—Yes, they purchased the engine and spark arrester.

1508. Yours was the arrester that was in use on that engine?—Yes.

1509. And it was in use when the municipality were working that line?—Yes, and the Government purchased the lot, arrester and all. I found in the following note of Mr. Thomas Walker Fowler to the Hon. George Coppen, as follows:—

"Modern Chambers, 317 Collins-street, Melbourne. 9th December, 1890.

Dear Sir,

In reply to your letter of 4th inst. re spark arrester, I have to inform you that I was able to get one of "Allison’s" arresters fixed on the Dookie ironway engine on the 1st inst, so that the experiment gained us its utility on that line in a very short time, though it was not seen to be an entirely satisfactory. It will be seen that it will be better on the arrester in September, and it is expected that during that month what it will be formed, and it will be set to work better. I have been able to try the engine and spark arrester before we proceed to the following:

Yours truly,

ThOS. WALKER FOWLER."


I hand in the following note of Mr. Lewis, Loco. Inspector:

"Locomotive Inspector’s Office, Melbourne, 9th February, 1893."

"In accordance with your instructions, I have tested Allison’s spark arrester, which is fixed on No. 12 engine, and I have to report that we can use one trip from Melbourne to Wallan backed on to 7,250 lbs. N.E. grade on the most pressing stations. Nothing but wood was used, and the spark was found to work well and cut off all the way to Victoria’s bank. Starting any spark is enough, but the engine was a little slow in starting. On 5th inst. another trip was run with No. 12 backed on as before for the purpose of testing the departmental spark arresters. I found different wood put on, and on No. 2, which is a double arrester—take it to Wallan. Wood was used from the time of leaving Melbourne, but the motion of the spark was so very quick that I gave instructions to make burning wood after reaching Broadmeadows, so as the country would be hot or fast. As a further experiment, I tried brown coal and wood mixed on No. 12, and learnt as before that the better the卯 sh the engine steamed the better. I attribute difficulty in obtaining smoke more to inferior quality of wood than anything else. In conclusion, I may state that as a wood spark arrester I consider Allison in the best I have yet seen for small-sized cylinders.

(Signed) THOMAS WALKER FOWLER.

The Loco. Superintendent, Melbourne.

[The visitor also showed in plan and exhibited and explained model of his arrester.]—We cannot get a better thing on our railway, and it has been working for fourteen years. It has been patented for thirteen years.

1510. By Mr. Green.—Has it been used anywhere else?—Only that instance that has been mentioned to-day.

1511. By the Chairmen.—How is it that your arrester is so expensive, £17?—It means making a new chimney. There is no bother after you made it.

1512. For the other arresters the average is about £2 10s.,—Yes, but you have to repair them every week. You cannot afford to buy.

1513. The Department’s arrester costs £5. How often do they have to repair them?—I know they take a lot of keeping in order. I have been in the trade for 60 years, and I ought to know something about it. I am a practical mechanic. I served my time on the Great Western.

1514. That is a very serious objection to your arrester, the cost!—I do not know. You cannot get a good article for nothing: I never could. But I do not know what the departmental ones cost, but that governmental one is like a good many more, it is very old. Mr. Clancy, who was engineer for the Hobson’s Bay Railway and for the Government for many years, was the first inventor of this kind. As you call it. That is 36 years ago to my knowledge. It was done at Williamstown.

1515. By Mr. Snaggs.—I understand from the evidence that we have got so far that one objection to the arrester is that the spark drops very low off the point of the funnel?—Yes.

1516. And across the railway carriage vs compared with the departmental arrester where the spark goes up?—I know all about that, but there is nothing in it.

1517. Is there any difference between the height of the funnel in the Victorian Railways and this one of yours?—No.

1518. I understand there is 29 inches of difference?—There is no necessity to be any difference; there should be any difference as long as they clear the bridges. I recollect Mr. Allison Smith saying they would have to miss all the bridges to use Allison’s spark arrester, but there is nothing in that.

1519. We have the evidence before this Commission that there is a difference of 20 inches between years and the Victorian?—It is not necessary. We can make the funnel the same height to suit any class of engines for the Government; it is not necessary for them to be that height.

1520. The conclusion is that through the tuyards on the Victorian being on the regulation height, for the bridges, the smoke drops too low, that is one of the serious objections to the use of this arrester?—That chimney is the same height that Rens and Potock send their engines out here with.

1521. By Mr. Green.—You mean that the height of the Victorian chimneys is the same as those supplied originally to the country?—Yes, just the same class of engine.
1222. By the Chairman.—We had it in evidence here yesterday that the funnel and chimney of your engine was 22 inches higher than the funnel of the engines on the Victorian Railways. Is that statement correct?—If they make that smoke-box 2 feet higher then who is it, it must reduce the height of the chimney.

1223. Does it stand 22 inches higher from the ground?—No. Thirteen feet is the standard height for all engines.

1224. You contradicted the statement that the height of the chimneys of the engine on your line is greater than the length on the Victorian Railways?—Of course I did. Thirteen feet is the standard height for all chimneys.

1225. We were told your was 22 inches closer that standard, is that so?—It might be with some class of engines. You have a large cheap chimney on some engines. If they put a bigger bass, they would not. I have had to shorten that chimney. Thirteen feet is the standard height.

1226. Do the chimneys of your engines stand 22 inches higher from the ground than the chimneys of the engines, the "Y" engines here?—No. Upon my word you are putting me in a fog. Say a bridge is 14 feet high, well the height of any chimney that passes through that must not be above 13 feet. If you have got a big smoke-box on above that, how long must the chimney be?

1227. By Mr. Jaffe.—The objection the engine-drivers made to your patent was that when they looked out the smoke blew directly in their faces, and they could not see. The answer to that was—How do they manage on the Delaware and Monaca line, and they said—"The chimneys there are 22 inches higher. That throws the smoke 22 inches higher than sure does." Is that so, or is it not?—I really can not understand. because, as I say, the chimneys are the same height as the chimneys came out. They were ordered by Mr. Mirl and sent out.

1228. By the Chairman.—The standard, the world over, I understand, is 13 feet?—Yes.

1229. Is that the height of yours?—Yes, that is the height. If that was on the footplate, it would be 13 feet. As far as the smoke is concerned, I do not think there is any difference, because that all depends on the wind.

1230. By Mr. Smaggett.—With the force of smoke coming up, will not the smoke go up higher and clear the engines better in the departmental than as in yours?—Yes, it is bound to do. The closer you bring your injector to work, the better it must send it.

1231. By the Chairman.—The evidence given by Mr. Woodroffe is to the effect that the goods divisional engine has to be renewed every four or five years. That is a pretty good age for an arrester?—Yes; I dare say it would last that time.

1232. How long would yours last?—It will last as long as the engine. You might have to renew the outside case, but not the inside pipes. The chimney is made out of 3/8 in. and 1/4 plate. It is a lot heavier, of course.

1233. Is your arrester used on any other line except the Delaware and Monaca?—No.

1234. Has it been tried by any other company or State?—No. I sent my plans round to Sydney, and I got very good results there, and it is the same thing as Mr. Woodroffe pointed out there, and I believe he has it from Mr. Thow too, that the smoke came over the cab. I went over the Blue Mountains with it myself and we steamed splendidly. We used coal there.

1235. It was tried in Sydney?—Yes. I sent the plans round and they made one and tried it. The result was that the smoke came on the cab. That was the only fault they had to find with it.

1236. Have you any way of improving that?—I have slightly improved it by reducing the top of the funnel, but we did not find any difference. I did not notice it.

1237. By Mr. Graves.—It depends on which way the wind is blowing?—Yes. When I came down last night the smoke was coming into the carriages, and I said "If that is the goods, mine is as good as that."

1238. I understand you to say that you were in the Victorian Railway Service for seventeen years?

1239. When the Delaware Railway was opened, you went there and found that a lot of accidents occurred from the engines working without any spark arresters; they were throwing up such sparks that they burnt the town of the roadmakers?—Yes, 50 yards away.

1240. You then said you had tried these other kind of spark arresters on your line?—Yes.

1241. And that you were not satisfied, and that you put yourself to work to bring out this case that you patented?—Yes.

1242. And that has been in use for fourteen years on the Delaware and Monaca Railway?—Yes.

1243. What is the distance of that?—From Delaware to Edward, about 45 miles.

1244. You have had no accident since you have used it?—Nothing to speak of.

1245. No claims that were dismissed?—No.

1246. You have stated it is a dead level line?—Very nearly.

1247. And when you come to Hill Plains, Atkinson's old public-house, it is all cultivation, and corn running right up to the line?—Yes.

1248. And you have had no accidents with the corn growing up in the hot climate?—Yes.

1249. Do you know any place where the herbages is so likely to catch fire as there?—No.

1250. Are you have had no accident?—No.

1251. I understand that what you explain to the Committee is that there is no great wonder in your invention?—No.

1252. But when the smoke comes up it is diffused from a perpendicular course by the funnel, and thus it goes out into the catching-box of the chimney and it is caught there, and at the end of it there are doors to open and close it. Is that your evidence?—Yes.

1253. You burn nothing but wood?—A little coal.

1254. What wood is that?—Beech principally. It is box forest the whole way, and a little ash.

1255. Have you taken any interest in placing your invention on other railways?—No.

1256. Why was it on the Kildareline line; did they take your spark arrester?—They were in a little difficulty, and I allowed them £50 for the patent right. Mr. Fowler sent it to me. It did not come through the Victorian Government. They filed it themselves. I just sent them the plans.
1577. Was it fitted by the Victorian Railways?—I think not. I think they engaged some one to do it. It cost £17. I never saw it whether it was put on right or wrong.

1578. Were you satisfied with that report in your favour which has been read here by Mr. Lewis?
—Yes. I think so. I was something near the mark.

1579. Was Mr. Lewis ordered to conduct this trial by a Victorian man, Mr. Mills?
—Yes.

1580. Therefore Mr. Mills must have heard it?—Yes.

1581. And you heard nothing of it since?
—No.

1582. Have you heard that the objection there was that it threw the smoke down on the cab, and the drivers could not see the road?
—Yes.

1583. It has been stated since we came here that the objections of the drivers were (two fold). One was that it threw the smoke and prevented the driver from seeing the road; the other is that it could not be fitted to the Victorian Railways, because it would raise the furnaces too high so that they could not use the existing bridges. You have stated in evidence that all chimneys that come out to this country, by the Board of Trade regulations (Bowers and Peacock send out according to tests), must be 15 feet from the road to the top of the chimney.

1584. The bridges, by the same Board of Trade regulations, must not be less than 14 feet high.
—That is so.

1585. Therefore, to comply with those regulations it is all a sham that your chimney cannot be fitted to the engines; is that correct?
—Yes, this is the standing gauge for all these things.

1586. Then, if they send direct to Bower and Peacock, "Send such an engine," it will be all 13 feet from the ground?
—Yes.

1587. Who supplies you with engines?
—Bowers and Peacock.

1588. Some of the engines here have chimneys just like that?
—Yes. They sent us two engines out, and sent spark arresters with them with a custard-like thing in them. We could not steam as far as from here to the top of Omahuru-street with them, and, I think, that was the cause.

1589. As a matter of fact, is not the motion line one of the most dangerous lines you know of for fires?
—Yes, I do not know one that is more dangerous. There are fires every summer in every portion of it.

1590. Do owners do anything outside?
—No, because there is a yard nearly all the way.

1591. You know the flat cultivation paddocks, where the corn grows right up to the fence?
—Yes.

1592. By the Chairman. — Are there any witnesses you would like called in support of your answer if we decide to give it a went?
—I do not know of any except our engineers and our secretary. I would not send the fireman or drivers down to speak of it.

The witness withdrew.

Mr. Anderson thanked the Report of the Fireman, also copies of extracts from press notices, and his own circular, &c.

Adjourned to Wednesday next.

WEDNESDAY, 28th SEPTEMBER, 1890.

Members present:
M. K. McKenzie, Esq., M.P., in the Chair;
J. Bowser, Esq., M.P.;
The Hon. J. G. Duffy, M.P.;
The Hon. J. H. Graves, M.P.;
The Hon. J. H. Whineray, M.P.;
The Hon. H. W. Williams, M.P.

David Anderson, further examined.

1573. By Mr. Thaler. — Have you anything to add to your statement made at the previous meeting?
—No. I have handed in some evidence to the Secretary that I think the Committee would do well to read—something I found out since I last gave evidence—extracts from newspapers bearing on two points. One, the admission by Mr. Woodroffe that on one occasion a fire began through a spark; and the other as to the fire at Clevedon where three trees were burnt, supposed to have been caused by a spark. The sum of £16 was claimed for the damage, but at that time it was not paid. Mr. Williams' statement to the House was that £16 was claimed as damage, but it had not been paid at that time, and it would come £200 to renew the tracks.

1574. Do you wish to add anything else to your statement?—I wish to describe my arrest and compare it with the departmental one. (The witness did so, and handed in a written technical description.)

1575. By Mr. Kennedy.—Do you agree with the officials of the Department that there is a greater tendency for your perforated plates to choke up with dirt than the bars of the grilles?—No, it is the other way.

1576. Mr. E. Sturridge has stated in his report on arrestors in conversation with the Railway Commissioners now sitting at Paris—"Vulcan's roof offer less obstruction to the draught of locomotives that wine-press and perforated plates." I have proved that my arrestor cannot possibly choke if those holes are perfectly stirred. Perforated plates are not new, but to ring or taper them is new. I know every spark arrestor in the world. I have done nothing else for eight years.

1577. Must the engine be stopped in order to clean this?—That is always necessary. Mr. Watt was with Mr. Conner, who was Commissioner of Railways in New Zealand, where Mr. Watt gained his experience on the foot-plate in the running of engines—he did not drive the work, he did it—that is the difference in practice and theory. As to the cost, I could make the whole of that £200 for $40 for each engine—that is, taking the whole $60. The copper costs me 30s.; I put it down at 8d.; the
65
Robert Anderson, 1884-85.

The copper now is worn in, so the copper that cost me £4 at 8d. would now cost £2 more at 1s. making it £12. My arrester practically lasts as long as the engine—the only thing would be the copper would get out of order, but not the strings. There is not a man who will say that anything that goes through my 1-in. perforation can possibly do any harm with my arrester. I would not send travelling through the country with blasting powder laid on the line.

1878. By Mr. Sower.—Did Mr. Woodroffe make any other objection besides the door?—No.

1879. Did you find on your trials that the suction was increased with 7?—No. One man has turned round on me considerably. I have never got the report yet.

1880. What was the experience in the trials that were made of the draughts—was it continuous and free?—I have never received the report, for or against, but there is my experience on the engine. I was on it twice to Geelong and we had to stop on the road to moderate the speed.

1881. There seems to be a great body of copper to prevent the draught going through?—Yes, and in the departmental arrester there is a great body of opposing iron—'chairs is exactly the same space, 1/8 of an inch.

1882. By Mr. Wheeler.—Your appeal was called to the evidence given by Mr. Woodroffe.—Yes.

1883. He strongly concedes that door?—He does.

1884. There is also evidence given by driver Haskell.—Yes.

1885. It appears that Haskell was the man who drove the engine more frequently than any other driver.—Yes; he says 60 times.

1886. He was asked the question as to whether there was any objection to that door, and he said "Yes."—Yes.

1887. The door is under the control of the driver, and he can open it when he thinks proper.—Decisely; it is put there purposely for that—that is the beauty of it. As Mr. Watt says, it is a very necessary adjustment.

1888. Mr. Woodroffe says that is a total objection to your arrester.—Yes.

1889. Mr. Haskell gave very straightforward evidence here, and he also said it was dangerous.—He did say so, but he always told me differently.

1890. There is the report of Mr. Lewis sent into the Department on the 27th of December, 1890.—Your trials commenced in 1887!—No, not this arrester at all—that was a different thing altogether, which I always had in mind. The first time it was tried was the 29th December, 1889—my arrester commenced on the 29th December.

1891. The door was your last improvement?—No; that is in the patent. For the first week or two we ran it without that door; I had the door patented, but did not put it on. At the end of ten days I was informed by Mr. Woodroffe that the engine did not light up well in the stables. Then I thought I could not put on a door of last make, so I got a sliding door made, and she ran until the 17th of March with that, when the new copper was made and that door was put in as it is now.

1892. Mr. Lewis reported to the Department on the 5th of November, 1891.—As a spark arrester the appliance is a complete failure. Engine did not steam freely, and sparks emitted were numerous and dangerous. Spark arrester examined next morning and was found to be cocked, and he concludes further tests useless and unnecessary?—Yes. I contradict it entirely.—I disagree that decidedly. There was not one-third of that arrester cocked.

1893. By Mr. Green.—Have you had the arrester of yours for a long time under notice?—Since 29th December, 1-93.

1894. How often, to your knowledge, has it been tried?—I cannot say the number of times; but from the 29th of December, 1890, to the 10th of June, 1892.

1895. Was it during that time on the engine of the time?—Yes; on 41.Y.

1896. Is it your opinion that the Department is against accepting any new arrester?—My decided opinion, and it is the opinion of everybody, including the men. There is no doubt about that.

1897. Do you think there is "a natural antagonism between spark arresters and locomotive efficiency?"—No.

1898. Here is the sworn evidence of Thomas Forth Railton, given before a Commission in New Zealand on the 13th March, 1890:

"I am the Locomotive Superintendent for the New Zealand railways, and I have held that position since 1888. . . . It has been my business to get the best appliances known to prevent the escape of sparks. With that end in view, I am in frequent communication with all parts of the world on the subject of fire appliances. In the same way other railways communicate with me for my experience. We exchange ideas; and I think that would be stated in Australia and India that the appliances we have in New Zealand are the best known. If the Department tries experiments with new methods, undoubtedly, or fortunately, patents come along with all sorts of ridiculous ideas, and in every case we try them. We tell them to begin with that it is folly, but they go on; and the Department is continuing to try in this direction, and, so far as I am aware, we shall continue to do so. There is a natural antagonism between spark arresters and locomotive efficiency; distinctly." What do you say to that?—I could not answer that question; I do not think it is put properly. If it were—Is there a natural antagonism between spark arresters and officials?—But I think that the arrester does not interfere with the efficiency of the locomotive.

1899. Do you think there is that antagonism on the part of all men connected with railways who try any pattern of spark arrester, that they think it impeded more or less the efficiency of the engine and they are distressed to try it—is there a natural antagonism between spark arresters and locomotive efficiency?—No.

1900. By Mr. Everitt.—Is a perfect spark arrester there would not be any antagonism?—That is what I mean.

1901. By Mr. Green.—Why was your spark arrester taken off?—They do not care to give anyone a show, because they do not like to have any one interfering with them at all. They take it, I think, as a reflection on their ability; whereas I contend that they should not look at it as that light. I consider that Mr. Woodroffe, who is in charge of 1,000 men, has enough to do without inventing, so instead of trying to taboo those things they should give every encouragement. Every locomotive official in New South Wales and South Australia is the same; they never reply that they are satisfied with the one they use.

1902. They do not say it is efficient?—No.

1903. And do they say that if they used any other or accepted others they would be liable for actions if they did not adopt it—that is if your were the best?—They do not say that.

1873.
1604. Is that the reason that if they succeed any other better the use of theirs would be contrary to law, if any damage occurred?—Most absolutely.

1605. Then it is not peculiar to Victoria.—No.

1606. The departments' officers always deny that their engines set fire to anything?—They do most distinctly; and go further than that, they say that nine-tenths of the spark fires that occur in Victoria (Mr. Woolbrooks told me so) were not caused by the engine, but that the complaints were made illegitimately by the farmers and those persons who suffer. I think that was a very wild assertion.

1607. By Mr. Benner.—Were you satisfied with the conditions of the trials given to you with your arrester?—Yes, materially. On the 29th of September they put on a sliding door and I found the copper was too small—a man struck it with a shovel, and I found it dinted. Mr. Woolbrooks put up a notice that Anderson's arrester was not to be struck by a shovel or anything else. On the 17th of March, 1894, I got it made of No. 14 copper to get over that difficulty.

1608. Generally speaking, you were satisfied with the conditions under which your arrester was tried, were perfectly fair?—Yes, I considered I got fair play.

1609. Then it is a conflict of opinion as to the value of the arrester?—That is all.

1610. And Mr. Woolbrooks thinks his efficient, and you think not?—With the reservation that mine was not properly made.

1611. Was it your fault?—No, I did not know till I tried it—till I put on the bigger copper; that it would become dirty; then I got it cleaned.

1612. Mr. Woolbrooks considered the objections he took to your arrester fatal!—Yes; that door is the only real objection to it, and I think that is the only ground on which he can tackle me. I admit if you open that door it is the same as if the arrester were out; and if a man did that he would set fire to the grass wholesale.

1613. By Mr. Wheeler.—What is to prevent a man?—Because he will set fire to the country.

1614. If steam goes down, what is the man to do?—But it will not go down. They could reach the arrester three or four times, the sadness they do with the departmental one.

1615. Was that door fitted on to that design after the reports that were sent to the Department showing that the train had come to a standstill, and that they stopped four or five times on the journey?—No.

1616. There are a number of reports before me, dating from 1892 to 1895, stating that trials had been given and the engine had come to a standstill, and that they were five hours late on one occasion. Was that door put on after the trials were made?—No, not till the latter part of 1893. The other was the Andersen and Naylor extinguisher—that was not the same thing. I have never had the reports.

1617. In July 1893 there was a report by Mr. Jacks!—That was on the Andersen and Naylor extinguisher. I abandoned that entirely; the other one was never behind time.

1618. By Mr. Kennedy.—For what purpose was the door put on?—Because we could not light up in the morning—the departmental one is the same. When the engine is washed out and everything cold; when the coal is set fire to there is the sulphurated hydrogen gas that sticks to those bars, the wet surface, and is clotted, and very often you will find them a couple of hours before they can get up steam with the present departmental one. I have been told that.

1619. You say it takes from two to three hours and a half:—I do not say always. There is a difference in the days—once you can light up very easily than on other days.

1620. In this arrester of yours this door was put on to enable you to get steam up more readily?—Yes, to light up.

1621. Does set the same possibility confound you in steaming after you have the fire alight?—Not since it was altered. After it is alight the man, with either my arrester or the other, can brush out the soot that collects on these bars or in my holes.

1622. You have said you cannot brush either while in motion?—No, you do that in the shed.

1623. The door was put in order that the engine would get up steam more readily?—Yes, and if you examine the men who light up you will find that my contention is 'come out', and therefore there is less trouble and a considerable amount of time in my favour. Mr. Watt goes into that and tells you how long it took to light up. When you open that door it is practically the same as if you had no arrester in, and then the man is not going to take that out with running.

1624. By Mr. Groves.—Do you know of any instance where the actual was actually set fire to by an engine?—I do. I saw that myself at South Melbourne. I saw the fire come out.

1625. Do you know of any time you can trace where the country or a portion of the country inside or outside the railway line was absolutely set fire to by an engine?—That one at South Melbourne is the only one I know of inside the railway limits; the grass was set on fire.

1626. Was that from the funnel or the ash pan?—From the funnel in that case.

1627. Do you believe it is possible to set the grass on fire from the ash pan? I have not much knowledge of that—none of my own.

1628. By the Chairman.—How do you know that fires originated from the engine?—I saw the spark alight—it was a good big one. In my letter headed I called Mr. Woolbrooks's attention to the fact. I said:—'To my certain knowledge on such and such a day your engine set fire within the lines.'

1629. Was that engine fitted with a double arrester?—I cannot say;—it was in the summer—I think it was only the single arrester, but I cannot say; I did not look.

1630. By Mr. Green.—You are positive that on that occasion the grass was set on fire by a spark from a Government engine?—Yes; I saw it set fire to a tussock of grass.

1631. By the Chairman.—You said in reply to Mr. Wheeler that the steaming could not run down, and I understood you to mean that that your arrester could not interfere with the steaming of the train?—That is what I mean.

1632. Is it not a fact that without an arrester in all steam will run down sometimes?—I cannot say.

1633. Is it not a fact that in going up pitches, even though the steam may not have run down, extra steam power may be required for going up gentle gradients?—No doubt.
1615. By opening the door would not they get more steam?—No, not if the arrester were in perfect order.

1616. It causes a greater draught?—But you do not require that.

1617. If the door were open there would be a greater draught?—I do not see that there would be if the arrester is all clear—it is as much draught as the steam can take.

1618. But would not there be a greater draught if the door is open than if not?—No; not if the arrester is clean.

1619. Is not that door put on for the purpose of enabling you to light up quicker by getting the draught through?—Yes.

1620. Would not the same principle apply in giving greater draught if the door is open when you are travelling?—But the cylinders are not working; there is no force.

1621. This door is the particular point as to the use of your arrester, and I am plain to everybody that if you open the door there will be a greater draught, whether it is required or not?—Yes; I grant you that.

1622. If there is a greater draught, will that not affect the furnace and cause a more rapid consumption of coal?—I suppose so.

1623. Then, if the heat and fire are intensified by this draught, will it not cause more steam?—Yes.

1624. And give greater power to an engine in getting up speed?—Yes.

1625. Then is not there a temptation put in the hands of the driver to open the door if he wants more steam?—No, I will not have it in that way; I say it will not. I say, let trials prove it; Mr. Watt puts it that there is a sufficiency of steam.

1626. Will there not be a greater degree of steam if the door is open?—No; I do think there will be in that way.

1627. You have admitted it will cause a greater draught, and that will cause a greater consumption of coal, which means a stronger fire, intensifying the heat and thereby creating more steam, and the more steam you have the greater power?—But if you have too great a draught you throw out the coal uncontrollable.

1628. When the engine is going up a heavy grade with a heavy train behind it, it requires a greater head of steam?—Yes; it requires all it can get.

1629. Then it cannot be excessive. It is under those circumstances that the temptation comes to open the door, and as far as I can gather, the great point as to your arrester is whether the opening of your door is dangerous or not. I do not think it will help your case by too candidly admitting patent facts. There may be circumstances in some other ways that may show that the door is not dangerous, but it seems to me that the point is proved that there would be this temptation to the engine-driver to open the door to get a greater head of steam—that is Mr. Woodroofe's objection?—Yes.

1630. I understand you to say you meant that by saying that the engine-driver if he did now would set the country on fire, and that would be the protection?—Yes, that is the ground I take. I have said all through that if he opens the sparks can get up in a body, instead of going through the arrester.

1631. Is that what you rely on as an answer to the argument that the engine-driver would be tempted to open the door?—Yes. I say if he does so he will set fire to the country. The sparks instead of coming through the perforations will come out in a body, which is a totally different thing—that makes all the difference.

1632. Here is the position then—the country is set on fire?—There would be no doubt of that.

1633. Now, the engine-driver, knowing that the country is set on fire occasionally, is tempted to get a stronger head of steam to get up a bank; so you think he might be tempted to run the risk of the country being set on fire—knowing these things are put down to bans of cigars and swear and things of that sort—he might be tempted to shelter himself behind that?—Not if he knew his business, because he is liable to be brought up for it.

1634. For opening the door?—Yes. It would be no use his saying he did not open the door, because there is the fact that he set fire to the country—the fire could not get through the perforations.

1635. But there are so many people who bring forward evidence that the fire occurred when the train went past, and there would be all possible things such as a cigar butt, a wax match, and so on, and the swallow—That is possible. I put it this way—if there were any necessity for doing this, and the man were short of steam, his duty would be to report against the arrester, and have it taken off. Mr. Watts, as engine-driver, states most distinctly that in those two trials he had my spark arrester did not interfere with the steering of the boiler—that covers everything—I stand by that. I get him there as an expert, and I rely on his certificate.

1636. You cannot expect to accept Mr. Watts's statement on the one side as overwhelming the expert evidence on the other?—No; but I think that evidence is in my favour.

1637. And you would not employ an expert who would be adverse to you—I do not suggest anything—I wish you to have fair play in this matter?—I am sure of that.

1638. We must have the whole of the facts, and it is no use just telling the Commission about Mr. Watts. Mr. Watts is an expert, and as far as he goes it is very good evidence, but there is evidence of experts on the other side?—Of course.

1639. As to this matter about the efficacy of your arrester, you say Mr. Watts says it does not impede the draught in any way?—He says to any appreciable extent; but, I take it, means that all arrester impedes it a little.

1640. I understand you to say just now that if the engine-driver found that he could not manage your arrester he would apply to have it taken off?—It would be an unprofessional judgment that it was too good, and there would be an inquiry; he has no right to open the door, nor I have your instructions should be that.

1641. Instructions are not always regarded?—They ought to be.

1642. If instructions were always attended to, the world would go on very differently?—No doubt.

1643. By Mr. Watts.—If the door were locked, and the key left in Melbourne?—It is impossible to do that.
1604. By the Chairman.—The engine-driver might find that your arrestor is better than the departmental arrestor, but notwithstanding that it was better that he could improve on it at those particular places by opening the door?—I contend that he should not do so—that argument is applicable to the departmental arrestor in the same way.

1605. They cannot open the door?—No; but some of the men say there should be a door to that in lighting up. All a man has to do is to take his spoon, and upon a bar; it is put down to avoid. I may tell you I have known men who have had a large experience of men—once in England they got over the difficulty of the thing—there they have a length of chain, and they drop that down the blast pipe, and by that means narrow the area of the pipe. Many old English drivers have told me they did that—the Department knew nothing of that—by that means the smaller the size of the outlet of the blast pipe the fitter the blast got up.

1606. By Mr. Swarthout.—Are you going to advance that as a reason for doing it?—I have been told by those men that that was what they did.

1607. If you have a blast-pipe, and are carrying 120 lbs. of steam on the square inch, and you narrow the blast-pipe, what is the result?—A sharper blast.

1608. And no detriment to the engine?—I cannot say that. I say it should not be done.

1609. Would that be any detriment to the heating power of the engine?—The sharper the blast the better the fire.

1610. But if you block the steam from going to the other end of your cylinder?—I have only been told that.

1611. By Mr. Williams.—When did you put this door in this spark arrestor? was it in when it was first tried?—No.

1612. What was the reason of putting it in?—It would not light up while in the shed; it took some considerable time. Mr. Woodruff told me he had complaints on two occasions that it did not light up while in the shed; then I put the sliding door in.

1613. On the 27th November, 1893, Mr. Lewis reported: "As a spark arrestor the appliance is a complete failure—engine did not steam freely. Sparks emitted were numerous and dangerous. Spark arrestor examined next morning and found to be choked," and he considers further tests useless and unnecessary—he had had about 20 trials before that—I, Mr. Williams, until I had 20 trials before that—I had only had two trials in 1893. I say, as to that paragraph of Mr. Lewis' it is a great exaggeration; it was partly choked—I was there when it was opened.

1614. How many trials had you before that?—Only two.

1615. When arrestor failed you on the 27th of January, 1893?—This one with the sliding door.

1616. Here is a statement of Mr. Lewis, 5th December, 1893:—"Engine steamed very badly during the whole of the journey, and sparks emitted were numerous. On examining engine next morning found 30 per cent. of hose choked." Mr. Lewis considers it a complete failure, and to make further trials would simply waste of time and money. In consideration of that, driver Davies, fireman Fairless, and Mr. Williams report re examining arrestor the morning after trial and finding nearly all choked up!—It is not only an exaggeration but it is not true—I was there when he opened it.

1617. By Mr. Wheeler.—You charged the Department with giving you inferior wood?—That was the first trial.

1618. On the 27th of December, 1893.—I mean on that occasion.

1619. That was the final trial given you, which took place on the 27th of December, 1893; you then charged the Department with giving you inferior wood?—I beg your pardon. I did not. That refers to the 23rd of November, and then I complained of the wood being bad. I had two trials; on the 23rd of November I had one.

1620. By Mr. Williams.—On the 2nd December, 1895, the Commissioners say:—"No objection to give another trial, but it must be the final, and arrestor taken out then." On the 2nd December, 1895, Mr. Woodruff instructs Chief Running Inspector to arrange for another trial to Woodend. On 3rd December, 1893, Mr. Anderson writes, making charges against the fireman, and says the wood used on trial was of inferior quality. On 25th December, 1893, Mr. Lewis reporting trial says engine steamed very badly during the whole of the journey, and sparks emitted were numerous. On examining engine next morning found 30 per cent. of hose choked. Mr. Lewis considers it a complete failure, and to make further trials would simply waste of time and money. Driver Davies reports similarly to Mr. Lewis. On 9th December, 1895, Mr. Driver Davies and Fireman Fairless and Mr. Williams report re examining arrestor the morning after trial, and finding nearly all choked up!—On 10th December, 1895, Mr. Fireman Stirling, replying to Mr. Anderson's charges, says that on the occasion referred to he did his work to the best of his ability as a fireman, and that the wood was of a superior quality, and the engine used was the best of her class;—What was the trial that was?

1621. On 2nd December, 1893?—I wrote a letter to the Chief Mechanical Engineer on the 3rd of December, 1893, asking that split box of good quality and not roughshank should be used for fuel in the locomotive; so that trial was on the 4th of December; the second one, the one I complained of, was on the 23rd of November—I have Mr. Watt's report of that.

1622. By Mr. Greens.—Are you not an engineer?—No.

1623. How was it you went in for this—were you the gentleman who took an interest in the alteration of gauge?—Yes, when you were Minister of Customs, and you got Mr. Alexander Wilson, to report on it.

1624. Then you took an interest in spark-arrestors, and thought it out?—Yes.

1625. Then you went into partnership with a gentleman?—Yes, an engineer; we went into it together.

1626. You brought out the patent and patented it between you?—Yes.

1627. Was this an improvement or a new idea altogether?—New altogether.

1628. Then we may abandon the first invention altogether?—Yes.

1629. You apparently changed the gauge of the wire till you got it tight?—It is not wire; it is copper gauze.

1630. Till you got what you now consider perfect?—Yes. The perforations were always the same size; I merely thickened the plate.
1689. You then perfected this gating till you got what you wanted—then it had a tendency to choke, and you improved on the by tapering it?—Yes. Allow me to explain. I had No. 17 copper first—this—and I altered that.

1692. And now you believe you have a perfect article?—Yes.

1693. Does it need any improvement?—No.

1694. You desire to have that tested to satisfy the Committee and the public that it is the best?—Yes.

1695. The objection made to it was this done?—The only objection.

1696. The object of the door is to enable the draught to be conveyed to the engine when lighted up?—Yes; it is shut up then.

1697. And if your opinion is not easily capable of being opened?—It never requires to be used.

1698. It requires to be opened in the morning when lighting the fires?—They could do without it; but it is quicker to do it.

1699. You think that as regards elements of danger that charge is quite frivolous?—Yes.

1700. You consider there is no danger in that?—None.

1701. Do you think a man who lost his steam and was bound to keep time would not open it—any he would set the country on fire?—I say further, he does not require to open it; he can get steam up without it.

1702. What would be the great benefit in this; would you expect to be paid by the railway authorities if your invention were adopted?—Yes.

1703. Have you stated any sum you would expect?—No, but in a conversation I had with Mr. Schieler, of the Act, he said—"I hear you want a very large sum for your invention." That was after that trial some years ago, in 1885 or 1887. I said—"That is not so; I never offered it to the Department;" and I said then—"I do not want to leave it to the Department; I will leave it to Parliament;" and he said—"That will never do." That was all that ever passed over the price. What I have said privately has nothing to do with it.

1704. You have never had any conversation with the railway people as to what you were to get if it were successful?—No.

1705. They never tested whether your invention was worth anything?—Yes; they were testing others. They said they wanted a better one than their own, I understood. Mr. Alston Smith said that a good arrester sufficient for the purpose would make a man's fortune. I was pretty hard up at the time, and that was what led me to go on.

1706. Was this ever tried by Mr. Alston Smith?—The extinguisher was—the one we gave up.

1707. Was this patent one?—No.

1708. He knew nothing about it?—Except through conversation with him. He was not in the Department when I tried it.

1709. Who was?—Mr. Woodrofe; and he was Commissioner at that time as well.

1710. Was Mr. Woodrofe then doing his present work in the railways; he is Mechanical Engineer?

1711. He was on the existing lines, I believe. He was not the Locomotive Engineer. He took that position after Mr. Alston Smith left.

1712. It was all during the time Mr. Woodrofe was Commissioner of Railways or Locomotive Engineer that the trials took place?—Yes.

1713. Therefore, his opinion as the head of the Department is the only one that we can refer to for a responsible opinion on this?—Yes.

1714. Who is the next man?—Mr. Lewis; he was inspector at first. Mr. Jacks was Chief Locomotive Inspector, and Mr. Lewis took his place.

1715. Did they go into the matter?—Yes.

1716. They were men of good common sense?—Yes.

1717. Did Mr. Murray ever express an opinion?—He said he thought the Alston the best, and he called the Department—"this unanswerable grand of ours." Mr. Francis was in favour of the Burton. 1718. That is the cost-of-small-one?—Yes.

1719. Those are all three different principles?—They are all different from mine.

1720. Of these, is not your invention adverse to the Government one?—No, I do not think it is like it at all. There is not a cage. There's a horizontal grate.

1721. By Mr. Duffy,—Are those two arresters at the end of the room—[referring to exhibit 1]?

1722. By Mr. GRAVES,—Is that door in the same proportion as in your present development?—No, the man was a bad lanm at it; he could not do the door very well, and he cut 2 lashes off it. That is I 20, whereas my design is 44.

1723. By the Chairman.—In reply to Mr. Graves, you said what you desired was to have another trial?—Yes.

1724. By another trial, do you mean one day or two?—I would like more than one; three days or a week.

1725. I believe the length of the usual trial is three days?—I never heard of that.

1726. Do you consider three trials sufficient?—I think a week would be better.

1727. You have to pay £5 for each trip; the Department charges that?—They charged me £5 twice. They charged one man eight times because he was altering his arrester.

1728. You say yet want another trial?—Yes.

1729. You have had a great many trials?—Yes, for eight months.

1730. And you want another?—Yes, a final trial.

1731. On what ground do you base your application for another trial?—Simply because that large arrester was not properly fitted.
1788. During the whole of these trials or any trial, was not it properly fitted?—It was properly fitted, but not perforated.
1789. Is it the fitting or the perforation?—Both; not the perforation, but the ruling of them.
1790. Was it fitted properly best of the time, or any of the time, or none?—The whole of the time it was fitted right, except at the last trial under Mr. Watt it was not fitted properly.
1791. Was that the only one?—Two, yes, may say.
1792. Then you have another ground for wishing a fresh trial, that the perforation was not rimmed?—Yes.
1793. Was not that completed in the two last trials?—It was not done properly.
1794. You claim that your arrester, as you have now designed, and perfected it, is more perfect than it was when tested by the Department on the last two occasions?—Yes.
1795. Is there any other ground?—Only that it is very much larger than when it was run by the Department, and that makes a great deal of difference; one is 205 inches and the other 740 inches.
1796. Is there any other ground?—No.
1797. You complained before of the wood used?—That was on the first trials; that was during the right months.
1798. Do you base the claim for a new test on the ground that, on one of the test trips, the wood was not of the proper quality?—No, I cannot, because at the last I had the wood was good.
1799. Who fitted it?—A man named Scott. He was not in the railway employment at that time; he was my own man. He knew nothing about copper-smithing.
1800. Did you, at the time when it was announced to you that the tests were unsatisfactory, state that the arrester had not been properly fitted?—No, I did not, because I was told distinctly I was not to have a further trial; it was no use; the thing was finished. I was not allowed to have another trial.
1801. You did not dispute the thing at all?—No, it was no use; I believed they would not give me a new trial.
1802. You want another trial on those three grounds?—Yes.
1803. Under what conditions do you want any special conditions?—There is only one way it can be tried. In my letter to Mr. Mathison I said—":You take a 'Y' engine and run it up to Woodford for a month with your arrester with a good fireman, stoker, guard, and on to the same load and the same result. At the end of the month take mine out and put yours in, and try that for a month under exactly the same conditions, and I offered to pay the whole expense of that trial. Mr. Mathison refused.
1804. By Mr. Gooch.—Was that the occasion when he used that strong language to you?—He only said that "all inventions were a —— nuisance."
1805. By Mr. Gooch.—You ask for a week's trial?—Yes, it depends on whether it is at my expense. I have been seven years here now. Mr. Williams said in the House that I had spent £1,700, but that would not cover it. I think after all the struggle I have had with it would not be a great expense to the country to try it at the Department's expense.
1806. You want a week's trial? under what conditions—in regard to fuel, is there any stipulation?—No, the test fee obtainable.
1807. Any stipulation as to those who are to be on the engine?—I have explained that I do not consider it a proper trial unless mine is tried for a week, and the other trial for a week under the same conditions; you must have competitive trial to see which is best.
1808. Any conditions as to those on the engine?—No, only a good driver.
1809. Do you want to be on the engine yourself?—Yes.
1810. Any expert?—Yes, one or two experts on my side. I conclude the only way to test it is from the outside, not to rely on the Department altogether; they can be there, of course.
1811. You would like to have some independent person in addition?—Certainly.
1812. The Department represented, and you represented, and no independent expert is addition?—Yes; some man considered skilled in this work.
1813. Then you suggest that there should be one of the "Y" engines under exactly similar conditions with the departmental arrester?—Yes, under exactly the same conditions—the same load and the same road. I may mention that Mr. Watt lays great stress on that—that is the only way the matter can be considered a competitive trial—under exactly the same conditions.
1814. By Mr. Graeme.—What is the cost of your arrester per engine?—I say £12 now on the average.
1815. How much a "Y" engine?—More than that, £15.
1816. Did you hear what Mr. Woodcroft said the departmental one cost?—He said £4 5s.

The witness withdrawn.

William Finnah, sworn and examined.

1746. By the Chairman.—What are you?—Examiner of repairs of spark-arresters in the running sheds.
1747. All the inventions come under your notice?—No, but I am supposed to see that they are put right, and do not interfere with the departmental work.
1748. Have you had experience of many of those inventions?—Yes, a great many.
1749. Have you had Mr. Anderson's?—Yes.
1750. Mr. Ablin's?—No; that is on the Derwent line.
1751. What others?—Mr. Thorburn's. I cannot remember the names of the others, we have had so many.
1752. What was your experience of Mr. Anderson's?—I had nothing to do with that as to repairs; I saw him putting it in.
1753. It was not your duty to examine it?—No.
1754. Neither as examiner or repairer did Mr. Anderson come under your observation?—No.
1755. You saw it morally as an officer?—Yes.
1756. You did not try it?—No.
1773. Then your opinion about it would not be conclusive in any way?—No. I was doing the departmental work: Mr. Anderson had to look after his own.

1774. What about the Thoroughs?—I sat that in by order of the Government; that was all I did.

1775. Would you, on account of putting it on, be in a position to say whether it was a good arrest?—I could not say, because I did not run with the engines.

1776. Then your opinion would be of no practical value?—No. We had one arrested, and because it did not answer the young man committed suicide. This is one I took particular notice of.

1777. As in the departmental arrests—how often does such arrest require repairing?—They ought to run for months when they are properly looked after. I seldom have anything to do with them; it depends on the drivers and fitters.

1778. If it is not looked after?—If they do not keep them clean, they are not as good as they ought to be.

1779. Would they require repainting more frequently?—I have to repair them as a rule. Some of the engines run for months without repainting them.

1780. In what way do they get out of repair?—Just the bars and wires where they slide them: in fact, they all get worn in time with the steam. The steam and the smoke wear them, make them thinner; but we have some there that have been in for three and four years.

1781. Do they warp?—No, they do not get such a bent as that. I have to go underneath and at the back, and get my hand at the back behind the two.

1782. Do they come in to such a condition that large sparks could get through them?—If they get through the bottom they could not get through the top grid.

1783. Do they not come in with large holes in both grids?—I do not think the sparks could get through both; I never saw the two broken in that way.

1784. By Mr. Dufty,—What is the gauge of the grids?—Some of them are one-eighth of an inch, and we have two one-sixteenths.

1785. Are they ever out of gauge?—Yes, if they make a hole in one place; if they open them in one place they close the other, and they gain nothing by it.

1786. Who opens them?—I say, if they did open them—if they were any way tampered with; but, as a rule, I find them pretty well perfect.

1787. Sometimes the gauge is altered?—Very little.

1788. From one-eighth it would be to one-fourth?—Oh no, not as much as that. If they do open a little, they lose what they gain the other way.

1789. But the spark will avoid the narrow and go through the place that is open?—As a rule, when the exhaust strikes the spark on the bottom grid they may fall down, but if any go up through that they would be very small, and the other arresting stops them.

1790. What proportion of cases when you examined those grids did you find out of order?—Very little. I examine them every day or every other day. When they come in I take their numbers down and report to the Department. I have to expect them every week—my reports are in the Department.

1791. Why would your report consist of?—Examined such and such an engine spark-arrester and found it good, or if imperfect I repair it.

1792. What does the repair consist of?—Put them straight and wire them down.

1793. I suppose hardly one comes in where the bars are not a little out?—No; some of them I never touch for months. Some of them are continually running, and the heat with the sweating of the coal causes them to get small. I can find nothing else.

1794. What is the life of a spark-arrester?—That I could not give exactly. Some have been in the smoke-boxes now for three years and even four.

1795. Sometimes you have to condemn the spark-arrester altogether?—That is, where they are completely done—are worked out cut-on some good engines they run out some other on the passenger trains.

1796. For the good engines, what would be the age?—Four years, and for the passenger a great deal longer.

1797. Are more records in the Department showing the age?—I expect so. I never kept them. I have never condemned a spark-arrester for age, because when they go to the workshops they go for a thorough examination, and they replace them down at Newport.

1798. Do you see these two cages?—Yes.

1799. Did you produce these exhibits before the Commission?—No. I know one was on top of the stove where I was for a long while.

1800. You know nothing of the history of those two?—No, I am not in the running: I am only in the repair.

1801. By Mr. Grater—Is fairness one of the things you have to look after?—No, but I see that they are kept clean, and if there was repairing I have to repair them.

1802. Who should keep them clean?—The driver is responsible for the spark-arrester being in good order—he sends the freeman to brush it out.

1803. After the brevac, does the cleaner look at it?—No, I look after it.

1804. When the driver breaks it to you, does he complain of neglect or his part, or repair not being done?—Yes.

1805. You expect him to call attention to anything?—Yes, they are expected to brush them every day before they go out of the shed.

1806. You said if the hole was stopped they fixed it out?—A clinker sometimes gets in between the two spark-arrester.

1807. What is the principal nature of the repairs?—Sometimes when the vibration of the engine shakes them, the bars with the sweating get very hot, and they come apart from the bottom. They are wired at the bottom, and I have to keep them in their piece to keep them from sinking again, that is make stationary on the carriages—[showing]—so that they will not alight, and this one at the back the same way.
By Mr. Duffy.—If they did shackle, a larger spark would go through;—No, the spark cannot go through, but the vibration of the engine knocks the arrester about. The top of the box is narrower, so it is like wedged in.

1810. I thought you meant that an individual wire would shake;—No, they are all riveted in.

1811. When you talk about shaking, you mean the wire tray?—When the wires get worn by the heat they get loose.

1812. If an individual wire goes loose it makes a larger aperture;—No, I rivet them.

1813. Before it comes to you there would be a larger aperture for the spark?—No; sometimes they will get out of their place by the heat—we cannot do anything while they are running.

1814. As a matter of fact, there must be a larger opening;—If you left that it would not be any larger.

1815. Suppose that one gets loose and moves one-sixteenth of an inch this way, that makes a larger opening;—Yes, but you cannot see that while you are running. I see now what you mean.

1816. By Mr. Greaves.—Are those interchangeable?—They are of this class, the "Y" ones.

1817. You would not keep the engine till you get the arrester repaired?—If she were going out early shift we might detain her till the evening; we often do that for repairs for the engine.

1818. Is it the practice of the driver to click to his own engine?—As a rule they have engines of their own, and they keep to them.

1819. By Mr. Kennedy.—Are all the spark-arresters under your care?—No, only in the Melbourne running sheds—we have about 120.

1820. Have you any of the engines under your control fitted with the vortex pipe using the one grid all the year through?—They are taking them out now—I think I had about five with only one grid.

1821. What are you doing, putting in the extra grid?—They do that at Newport.

1822. You are abandoning that style?—In the engines from Newport they are taking out the vortex pipe altogether, and they are putting in the original standard pipe altogether.

1823. Do you know anything about the difference of the consumption of the fuel on these engines?—No.

1824. Who is responsible for the care of the arrester in the other sheds?—Mr. Grubb is the inspector who looks after that at all the sheds—he goes all over the country and looks at them.

The witness departs:

Andrew Grubb, sworn and examined.

1825. By the Chairman.—What are you?—Inspector and boiler-maker on the Victorian Railways.

1826. Have you to do with the arrester?—Yes. When I am testing a boiler I examine the arrester and spark-box of the engine, and see that they are clean and in good order.

1827. Do you find them out of order?—Very seldom.

1828. Are they at any time out of order enough to let a large spark through?—No, never.

1829. Any time out of order so that a spark could get through both arrester?—No.

1830. Do you think that a spark that would do damage and light grass could get through both arrester?—No. I have no experience, except as to testing, to see they are clean and in good order, and report to the foreman.

1831. If one told you that a spark large enough to do harm had got through, you would not consider him?—No; the arrester might be defective after I leave the engines-shed. You understand I only examine the arrester on the boilers that I test and examine. After I leave, the boiler-makers in the various engine-sheds and Mr. Fennah are supposed to examine the arrester daily, and they see more than I do of them in the twelve months.

1832. But you see a certain number when they come in?—Yes.

1833. And just in the condition in which they are then?—Yes.

1834. By Mr. Greaves.—You look into every part when examining the boiler?—Yes. I do not pass an arrester unless I examine the running foreman, and he has to instruct the boiler-maker or Mr. Fennah to put that arrester right, under my supervision. Then I write out the boiler certificate, and on it put—"Spark-arrester clean and in good order"; but that certificate cannot go in unless that arrester is put all right. That certificate is signed by the running foreman, press copied in the locomotive's office, and sent on to the Chief Mechanical Engineer.

1835. Are some drivers less careful than others, and their spark-arrester receive more injury?—Yes—some are more careful; some take more interest in their work.

1836. Those men are well known to you?—No, I know very few drivers and firemen.

1837. You know some engines require less repair than others as to the boilers and arrester?—Yes.

1838. Is that confined to any particular roads?—I have not taken particulars notice.

1839. By Mr. Duffy.—You do not pass all the spark-arresters as clean and in good order?—No.

1840. What are the principal faults?—The wires shifted a little on one side, one-sixteenth of an inch. I then tell the running foreman that the spark-arrester wants putting in proper order, and he instructs the boiler-maker to put it in order before it leaves the shed.

1841. How often as you find a spark-arrester out of order in that way?—I have examined, I believe, as near as possible 150 or 160 locomotive boilers since January of this year, and I do not think I have had to complain about more than about six arrester.

1842. What was the fault?—The shifting of the wires is the principal thing, and there are little pieces bolted or to the corner of the arrester that sit on at the corner of the smoke-boxes that sometimes shifts a little, and I have those screwed with a small spanner to make it tight—I judge it by the eye.

1843. You can judge accurately by the eye?—Yes.

1844. Do you make a recommendation, so many wires to be taken out in those arrester or straightened?—I tell them how many are to be straightened, but I never have to insist on any wires being taken away.
1845. Do not they went away?—I never saw any.

1846. After they have been sweating, do not they become thinner?—No! I never saw any wires I had to recommend to be taken out.

1847. When an engine goes to repair at Newport, that is not under you?—No, the deputy workshop manager there and the boiler foreman could tell you about that.

The witness concludes.

Adjudged to morrow, at Eleven o'clock.

THURSDAY, 27TH SEPTEMBER, 1860.

Respondent present:
M. K. M. Kenzie, Esq., M.P., in the Chair:
The Hon. J. H. Graven, M.P.,
G. Sturges, Esq., M.P.,
The Hon. J. H. Wheeler, M.P.,
H. R. Williams, M.P.

Thomas Short, sworn and examined.

1848. By the Chairman.—What are you?—A civil engineer in private practice in Melbourne. I represent the Thornton Patent Armour Chain Spark-arrester.

1849. We have had evidence from one engine-driver favourable to your arrester, and evidence from others very condemnatory. Have you anything to say in support of it?—Yes, I should like to make a statement. The spark-arrester is a very simple one; it consists of chain armour—(showing a piece). The Railway Department have the one used in the trials; it is about 8 feet long by 2 feet broad; it is fastened round the under side of the funnel, with a steel or iron frame (the under side of the funnel means the top of the smoke-box). The plate goes on, and it is fastened round the under side of the funnel, and then brought in the shape of a bag or a cluster of bees to the under side of the cast pipe; it is then fastened round that with a piece of wire. It can be put on in four minutes, and taken off in two—to get at the sides you can take it off altogether. I have a photo. of the model that was made by the Phoenix Foundry, which cost Mr. Thornton £270 some years ago; it is now in Sydney.—Mr. Thornton is dead. I have not had time to get it over, but I have the photo of it, which I put in as an exhibit, and also the chain—(showing in suit).—

* 1850. What does the arrester cost?—£2 the whole thing material and fitting. I might say that the photo is a half-sized model taken from a Y class engine—it has a plate on the photo.—Model half-size locomotive smoke-box Y R., Y class engine fitted with improved Armour Chain Spark-arrester. John Thornton, present.—that's the whole photo. This spark-arrester will prevent all sparks escaping from the funnel which would set fire to the country and burn anything in, or that would injure the goods or passengers, or do any damage within the railway fences or outside. H. The Thornton Armoured Chain Spark-arrester does not interfere with the free steam of the engine up to its fullest service power, and without increasing the consumption of fuel. III. That it is strong, smooth, easily fixed or removed, and keeps itself clean and in good order. IV. That it is impossible to manipulate or cast off with it in service, being a fixture. V. That it is easy of access to the tubes and other fittings of the smoke-box when it is in as usual view. VI. That the cost is only nominal, viz., £210s. fixed. VII. That the arrester is simplicity itself, not requiring a mechanic to fix or take out. Of course a mechanic will fix it and take it out better than an ordinary person, but anybody can do it. VIII. That it is always in motion, thus being self-cleaning. IX. That it is impossible to choke it. X. That it is equally effective for wood, coal, or any other fuel. XI. That the coal does not require screening. XII. That the cost of maintenance is nil. XIII. That the arrester can be taken out in five minutes altogether. XIV. That the sparks are in the smoke-box, and consequently do not go up the funnel. XV. That it is not necessary to clean the line as far as sparks from the funnel is concerned. You could grow crops right up to the line if you chose. I have given these heads, and I will give you proofs which I claim are indisputable—as many living can dispute those points. I am a mechanic and engineer, and you cannot put a question that I cannot answer satisfactorily on those heads.

1851. They have been disputed?—Ne; it was approved by the Railway Department.

1852. Some of the witnesses here have condemned it?—Not according to the evidence I got from the Secretary. Mitchell was the man who made all the trials, and he did not condemn it. I would like to see any evidence if there is any against it, or any further evidence. What happened was this: We approached the Railway Department and all the other Governments in Australia, New Zealand, and Tasmania. I was sent by the Thornton Company as their servant; the Department said—"All right, fix the arrester, and we will try it." It was fixed in the shed at Prince's-bridge, and it ran for some months—I cannot recollect how long—think it was between three and six months. I travelled on the engine myself about once or twice a week, sometimes more often. They travelled it night and day on the Fort Albert lines and we were to examine the smoke-box in the morning and do all that was necessary—it was then recommended, so I understood it was accepted. They asked Mr. Thornton to send in a price to the Railway Department, and against my expressed wish, and against my desires, and also against the wishes of those more interested in the company, he demanded £9000 for it, and that practically stopped it, and rightly so, too. I think Mr. Thornton's demands were very great; he was a rich man, and did not think much of £20,000. I said to him, let us make it £2000, but he would not do it. A letter was written to the Department, and I was afterwards asked by the officials if I thought Mr. Thornton would reduce his offer. I remonstrated, and he said "No" he would not.

1853. In that correspondence in existence?—Yes I would like to be produced. I can produce our side of it.

1854. The letter in which the Department accepted it?—No, they did not do that, they asked me to send it in a price. It was approved in all the trials and it came to business, and I was asked verbally to quote a price.
1885. Have you any documentary evidence that it was approved?—I have all the correspondence.

I know all the officials; they told me, All Thomson was one and Neil Jackson another.

1886. "Telling you" is not business; if it came to business they would write and say it had been approved; I had nothing to do with that either; they said it was not that which they went to the Committee with, they said they went to the Committee to have the offer reduced, and asked me to get Mr. Trow to reduce the offer, but he would not do so, and shortly after the deed was ready, and it was hung up in his estate.

1887. Can you bring any documentary evidence in support of your statement?—If so, that would have considerable weight with the Committee.—Could I apply for the papers from the Department?

1888. The Committee can ask for those?—Mr. Thomson had the better, and to it deals. I will be able to get them—you will find from the correspondence what I say are facts; there is no imagination about it; the reports are there, all made at the time.

1889. Facts are what we want.—You will get them in the departmental correspondence. I am quite satisfied to take their documents for it. We had every fairness and courtesy shown in the trials, and were thoroughly satisfied with what was done.

1890. You do not want any more trials?—We do not, but if the Department do, let them get one fitted.

1891. By Mr. Greaves. Have you the one they tried?—They have it in the workshops. I have never seen it since it was fitted—everything was done satisfactorily and amicably—we never had any trouble. I said under the first head that the arrestment will prevent all sparks. I have seen that demonstrated. The arrestment will not allow any spark to leave the incinerator that can do any damage—if you catch it at the mouth of the funnel you can do that, and it will not burn your fingers. The best proof of that is for you to get on the engine yourself, open the incinerator and let her go up a hill. Under the second heading I say that the arrestment does not interfere with the free steaming of the engine—it is practically impossible for this arrestment to interfere with the draught of the engine. For this reason, the funnel of the engine is a certain diameter—by making this bag larger or smaller we can give you as much as ten times the amount of draught you take or can give you as much as one-third. If you observe the model, you means that this bag has to be broader at the top and longer, and tied slightly lower under the blast. As far as the draught is concerned there is no impediment at all, and she steams as well with the arrestment on as with it off. Before this arrestment was tested by the Government, one was placed on the engine and worked on the Cochkin and Mansfield line by the contractors.

1892. You worked in the summer on the Cochkin and Mansfield line?—All through; they put it on and used it all through the winter.

1893. Was there any fire on the line?—Not where it was used. They had patented it before that all over the world—they spent £2000 to patent it. I say further that it is always in motion when the engine—it is always going like this.—[showing]. You can leave the smoke-box open and see it rattling and wagging, and consequently that keeps it clean and free from corrosion. At the end of the tests on the Government line it was brighter than it is now; the other was perfectly bright when taken out.

1894. What is it made of?—Steel.—[showing sample]. Mr. Thomson sent home through McEwan's and McLennan's and imported 600 of those arrestments, and he had to take what he could get—they just sent out the stuff they had in stock—you can make it stronger and heavier at thinner and lighter, or to anything you like with it. It was tried on tenders and other engines, but of course it was a lighter gauge than this, and it was successful in all the trials. The next thing is this: That it is impossible to manipulate or tamper with it in service being a fixture, because a plate (it is like a hoop) is placed under ties and bolted to the funnel, so that nothing can shift it unless you put a spanner on the nuts and move them. As to the other fastening, where it is fastened on the blast, it can be fastened by a chisel, with a round chisel and two screws and nuts, or by copper wire. The reason we used wire was that we found it easier to adjust and to let and make if you wanted to get into the smoke-box, and another reason was that it fitted close or the blast and did not allow any space to get between the nut and the blast. The copper wire was about 4½ inches diam., and it was just bound round and fastened tightly together, the same as a piece of string, and they used to take a pair of pliers and tighten it up. I say further: That it is just as easy of access to the smoke-box and other fittings of the smoke-box that it is as when out. I have shown that you can take it out in a few minutes—you have simply to unfasten the four screws under the funnel and slide the copper wire, and if you wish to put it back you have four screws to bolt up with a spanner and to tie up, so that your smoke-box is perfectly free. There is nothing to prevent a man getting into the smoke-box and making alterations and other fittings with it in—yes, you have only to push it on one side out of your road. That is what we used to do—we never used to fit it in or take it off, the man used to get it and fix it, and if the closure of the engine wanted to get he pushed it on one side with his hand. The next point is: That the cost is very very low. One arrestment would cost about £2 10s., and the greatest cost about another 10s., in all about £3 ½d.—that is the outside cost. The company have about fifteen of the arrestments which they will be willing to supply at 22 each—for testing purposes we will give free of cost. You can see from the nature of the wire that it does not require an expert to tell you what it is—you see every bit as good a judge of that arrestment as I am. It is simply that wire—your own common sense will tell you whether a spark can get through it, and if it does, what damage it will do. It will also show you that the blast cannot be interfered with by the tremendous stress as against the amount of resistance to the blast—the area of arrestment is 16 square feet and about five-eighths of it or three-fourths is clear draught for you, so that three-fourths of 16 feet is about 12 feet of blast. Next I say: That it is always in motion; that can be seen from the model or the photo. of the model that I had in—it is impossible to keep it stationary. You can fit it in the engine and go while the engine is stationary and stop it with your hand and see the vibration. Next: That it is easily replaced, or any other fuel-burners tried originally with wood. On the Cochkin line they burn wood only. I am not sure that they lit up with wood, or used some coal for that, but I think not. Next: That the cost of maintenance is nil—that the thing maintains itself—there is no cleaning of it, no brushing it with a wire brush, no repairs to be effected. The thing in itself stands, and when it is worn out it has to be replaced.

1895. How long would it last?—With care, six years; with rough usage, I should say six years. Giving the ordinary rough usage by contractors, it would last six years, but it was not all ge; it goes in places or two of steel, and then we put on two more or two of rough, I have sworn you that the arrestment can be taken out and put in in five minutes. I should like you to see that done, see it put in and taken out, and time the man, and see whether I am for out.
1866. Do you know the name of the mechanism who put it in the Government engine?—It was not a man in the Department; it was a man named Cliff, in Mr. Thornton's employment. The greatest test of its being an arrester is that you cannot see any sparks leave the funnel at all. Secondly, when you open the smoke-box, after running from here to Port Albert, you will find the sparks in the smoke-box, not on the grates. If there are not sparks in the smoke-box, and it is practically impossible on a man to have a spark through it with any part, either vertically or horizontally. Further than that, I maintain that with this arrester not emitting sparks and being a spark-arrester—a man is not a spark-extinguisher—a spark-arrester—one has no need to go to the cost of cleaning the line for that purpose, and getting on gauge of 20 and 30 men to clean the grates. I have had 20 and 30 men working myself cleaning the lines for the Government; and, as far as seeing the grass catch fire, I have seen the grass lighted where the engine has been standing, and helped to put it out myself; that was on the Whitefish line, in Miller's pudding.

1870. By Mr. Cowan.—It would not be a saving in that respect, as we have to consider lots of clogs and so on?—We do not go that far; we only claim that it is a genuine spark-arrester; it does not let any sparks out; and it was patented as a spark-arrester, and we only claim that. The place on this model says—"Photo. Model Half-sized Locomotive Smoke-box V.R.—3"' class engine fitted with improved Arrester Chain Spark-arrester. John Thornton, patents." With this arrester it would be impossible to damage the tarpaulins or the rolling-stock, or do any damage at all. As far as fires from the funnel occurring, this will stop that nuisance and not interfere with the engine in any shape or form. I think that is all I have to say.

1889. By Mr. Williams.—You say that no sparks can get through this spark-arrester—you see that the area of all these openings in the elam is more than one-eighth, if not one-fourth of an inch in diameter, I mean the mean?—No, I think you are wrong. I think there is not one-eighth between any two of those links.

1890. If you had a rule you can try it?—[The witness dod so]. No, there is not one-eighth; it is under one-eighth.

1894. Who makes it more than one-eighth—measuring—putting it one way—showing the witness?—These openings are on the angle—you see the light and the sparks come out like that—showing. She is being light that—showing—and they stick on the side—this is boxed together, and put as close as we can—we let it cool right in. We make it 1 foot long, instead of 4 feet, so that it can be boxed together like that, you can hang it as close as you like, you can make it almost solid by putting the links together completely.

1891. Would you reduce the amount of draught accordingly?—Yes, that is so. No doubt it varies according to that surface, but you can only do that by regulating it.

1892. I have seen this, and my judgement personally I think it is the best invention ever referred to the Railway Department, but have you induced any company in the world to adopt it?—We sent it to Canada by a gentleman who came out to gather statistics, sent by some newspaper people from Canada. He took it to Canada, and they tried it there and were thoroughly satisfied with it, but they said there was no work for spark-arresters there; the place was always in a frozen state and wet. But just after this trial was made, John Thornton died; he was the other, and nobody was ever in a position to work it. It was he who took his estate for a long time, and until they got patent nothing was done.

1893. You referred it to the New South Wales and South Australian Governments?—Mr. Smith, of the South Australian Government, and if the Victorian Government approved of it they would adopt it—he was the Commissioner there, not the same applied in New South Wales. When Mr. Thornton died, nobody had any right to the arrester, and it has been lying in a warehouse ever since. I was very angry with Mr. Thornton; in fact, we had a very serious row over the offer he sent in. I said it was nonsense, that if he wanted to have the arrester used that was not the way, to ask an exorbitant price, and I did all I could to get him to come down to £3,000 or £4,000.

1894. You expressed the opinion that this would last working six years—do you think that is a very long time for this to last when always in motion—would not it work out in twelve months with all these links?—No.

1895. With the heat and cold and everything?—No, you would have that steel made so that it would last for twenty years in the smoke-box. This was not specially made; he used the first material that came to his hand; he had no opportunity of asking for it to be made harder or sounder. It was made originally for furnishers' accommodation. The first one he made he bought the furnishers in Melbourne, and since then together with his own bands; it cost him an awful lot of money that way—way he bought them at 6s. a dozen.

1896. I think the arrester I saw in the Department was a larger mesh—the one experimented on in the Department?—That is the only mesh we have ever had—that is a piece cut out.

1897. By Mr. Wheeler.—It looks to me like the same thing.—The best way would be to get McLean Bros, or McEwan and Co. to send up one; they have them in stock.

1898. By Mr. Williams.—That one is in the Department still?—I suppose so; it was taken out of the engine some months after the trial and put in, Mr. Jecks told me so.

1899. For years after it was tried it was in the Railway Office—it may be there now.

1900. I fancy the mesh was a little larger?—I think not, but you can compare them and settle that for certain.

1901. When Mr. Thornton was contracting did he put those on his engines to reduce the liability to fire?—Yes, they were kinds for any fires their own engines made, and he adopted this himself; he got those furnishers, which were the only stitcher material in the country at the time, and fitted them together to hold them in his own engine. I can produce one for you; it is in a dilapidated condition at Mr. Thornton's stable; we bought furnishers about 1½ x 6 at 6s. each.

1902. By Mr. Green.—You said you got some for furnaces?—Yes, we sold some to them for thirsty machines to secure the safety of the stack; I cannot mention any particular district.

1903. That is the ordinary-sized mesh of the ordinary furnishers that is sold for military purposes?—I could not swear that he commenced with furnishers; but I reckon there is a difference in the gauge.

1904. Was it Mr. Thornton who invented it all?—I cannot say; the first man who ever saw me about it was Mr. Thornton.
1885. You have heard it was a man called Folkes, an English mechanic and J.P. at Bowdie, who invented it?—No: it might be.
1886. Was it used by Mr. Thornton within your knowledge on the section he had from Cathkin to Mansfield on the construction of that line?—Yes.
1887. That was used to secure his own safety?—Yes.
1888. And not for purpose of selling?—I cannot say that.
1889. Did you see it on his own engines to secure himself from liability to fine on other contracts besides that Mansfield one?—On the Fallangate: that was the last contract he had.
1890. You mentioned about the Port Albert line; did you go down on that time with this on the engine?—Yes.
1891. Was Mitchell the driver?—I did not know his name then, but I know it now.
1892. Did Mitchell express to you on that trip that he was satisfied with the result?—He did, not to me personally, but to Mr. Thornton and Mr. Jacks. I was with them, and I heard him say—"She steams as well with the arrestor as without."
1893. Was that a specially dangerous line for fire?—I should say so.
1894. Was it picked for that purpose?—I could not say that. Mr. Thornton and myself had passages to travel on that line whenever we fixed; it was on that line some months.
1895. Then Mitchell could give evidence as well as any one?—No one knows better than he about it.
1896. Your description of it is that it is a piece or cone, like a beehive, of steel rings, and that it is not the size of the ring alone that prevents the sparks going through, but the working of the rings interlaced in a single one?—Yes.
1897. So that it is not the size stopping them, but the working of all those together making the aperture so small?—Yes, and it is set at an angle.
1898. The sparks go through that, some out of the chimney in the top. From the material under combustion no spark can go through that, and the sparks are arrested?
1899. You say it does not stop the steering power at all, and that it is easily put on?—Yes.
1900. And that it can be made any size, and the larger it is made the more damaged it will be so the longer it will last?—Yes.
1901. You say the expense would probably be £3 10s. at the outside?—It must be £3, but it would not exceed £3 10s.
1902. By the Chairman.—Is that right, or your former statement?—I say £3 still; Mr. Graves suggested £3 10s.
1903. By Mr. Graves.—Have you also said that when it is fixed in it could be taken out by a man driving along the road if he had fixed it stopped the drought?—No; it is there permanently.
1904. And it can be put on in four or five minutes?—Yes.
1905. You say a working miner named Cliff fixed it for Mr. Thornton?—Yes, and the Department cleaned the engine after that.
1906. Is this patent owned by a company?—No, by the Trustees of Mr. Thornton—the Australian Wireless Fund as one of the two, and Messrs. Thomas and Robert Thornton—all the Thornton family are interested in it; it belongs to the family.
1907. Are you in their employment?—No. I was in their employment for about five years. I was twelve years in the Government service before that, engineer, resident and assistant. I was on all the suburban lines and a good many country lines. I was on the Cathkin to Mansfield runs for the Thorrontons. I saw the arrestor used there.
1908. Then Mr. Thornton used it for his own protection?—He did—he used the same class of stuff, but it was brass-makers.
1909. You say this might be made any strength or quality?—Yes, I could undertake to supply 500 of them from McEwen's and McLean's at £2 each.
1910. Is there any demand from the farmers now?—Nobody has been anything with them since, have been asked simply to come and represent the Thorrontons. I cannot give the names of any people who used the arrestor on the throttling machines. It was used in Sydney also; some were sold in New South Wales and South Australia to farmers for the throttling machines; it was a lighter gauge, but the same principle—it was put over the top of the funnel.
1911. By Mr. Sangster.—You do not know the names of any of the people who used them. You say McEwen's and McLean's have them in stock—we could acquire from them if any one has them?—They imported them for Mr. John Thornton, and he was dead before they arrived.
1912. Not for the purpose of doing business themselves?—No; he gave an order for the 600, and he took 200, and the other 400 were left for future delivery, and McEwen's and McLean's have them.
1913. By the Chairman.—That is why we could get them cheaper?—Yes, that is cheaper than you could import them if you had to pay 35 per cent duty—you would have to duty to pay.
1914. By Mr. Sangster.—Did Mr. Thornton charge a royalty to these people he sold them to?—No, he sold them straight out for £5 or £6 10s. apiece.
1915. Did he sell the whole of the 2000?—Sold, or used all but the fifteen that are still left. I saw them there last night, and you can have whatever you like for trial purposes. These people have had nobody to represent them, and they asked me to come to this Committee and do so.
1916. Have you Mitchell's evidence?—Yes: his evidence was very emphatic; he said it was superior in every respect to the departmental arrestor.
1917. By Mr. Green.—It says here—Have you tried any of those other arrestors?—Yes, I tried Thornton's, and found it not very well. I used that on the Great Southern line. I was running with it for three or four months in the summer time. Were any fires caused through it?—No. Were there fewer sparks emitted than from the departmental arrestor?—Yes. Did it interfere with the steering power of the engine?—I did not find so. You experience of it was satisfactory?—Yes. I put in a report to the Board at that time to that effect; that was about six years ago. Do you think this Thornton's was good as the departmental—I think it was superior?—Then McFarlane is another man—may I ask to get a copy of the other evidence further on?
1891. By the Chairman.—As I told you, I feel confident there were some adverse testimonies.—The men who were interested in the trial of this spark-arrester were Mr. Edward Jacks, the Assistant Loco. Superintendent, Mr. Alf. Linnepau, who was the Superintendent at Prince's Bridge, Mr. Mitchell, the engineer, and Mr. Allum Smith—Mr. Lewis was not connected with it at all. Mr. Lewis was not consulted with in the matter. Are there any other witnesses you would like called who could give direct evidence on the trials made by the Department?—This man Cliff could speak about it, but I do not know where he is.

1892. By Mr. Wheeler.—Was there any other witness but Mitchell?—No: they were perfectly satisfied after he made the tests, and they did not want any further. When Linnepau saw the arrester it was fitted on the engine. I said afterwards—"What about that arrester?" and Mr. Jacks said—"We took it off, and put in the shell."—The witness withdraws.

William Conyers, sworn and examined.

1891. By the Chairman.—What is your position?—At present a consulting engineer in Melbourne, in private practice. I was asked to come here by the North West Water Supply Company.

1892. What has that to do with the arrests?—Have they an arrest?—No, but their apparatus has a spark-extinguisher. I have never seen the extinguisher tried. I had to do with its construction, and can bring drivers here who tried it on the line. It was not made with the view to extinguishing sparks, but that was the result of its working. It was made for the express purpose of bunting the live water spark. Would one supply to the boiler for extinguishing the conduction of the spark, and it gave a very good result. If you will look at its construction you will see there must be a good deal of conduction of the exhaust steam, and the results, as they assert, is the extinguishing of the sparks. I have written a short paper on it, and explained a drawing of the apparatus. They were surprised to find as the result of their experiments that there were no sparks. I will read this paper:

"The heater has an external surface of 30-57 square feet, the whole of which is in direct contact with the smoke-box gases, ranging in temperature from 600° to 800° Fahren."

That is the temperature of the smoke-box.

"In a trial on the South Australian Railways—off the Morris Street—the thermometer attached to feed pipe, between the injector and heater, registered 65° Fahren, while the one between heater and boiler had registered 212° Fahren, showing an increase in temperature of 147° Fahren."

They assured me that there were no sparks.

1893. Has it been tried on the Victorian lines?—Yes, it has had long trials, and I can ask the people representing it to send the names of those who tried it. I had to do with their patent agent in assisting to prepare the specification, and had a good deal to do with the construction of it, but have not seen it working myself. I have been trying to get rid of sparks myself for twenty years—I was head of the New Zealand Railways for twenty years, and I never found a perfect spark-arrester—directly you arrest the sparks absolutely you stop the engine.

1894. That is what the Department says: it is easy to arrest the sparks, but in doing that you arrest the engine also?—Yes, The only thing is to have such small holes that the sparks that get through are so small that they can do no harm, and you must have an immense number of the small holes to compensate for the sectional area of the chimney. In this case they say the sparks are absolutely destroyed. I fed water to the boiler apparatus here. It passes through all these pipes and comes in here to this space—[showing]—there is a flue across here that separates this space. The feed water comes here, and then goes through this pipe to the boiler. The exhaust steam comes up here, the smoke, and is surrounded by all these pipes with cold water in. That of course cools the exhaust steam, and the exhaust steam and gases come in contact here, and they are extinguished through that. [showing]—It was not the purpose of the design, but that is the result.

Mr. Anderson asked that Mr. Conyers might be asked to state his opinion of Mr. Watt.

1895. By the Chairman.—What is your opinion of Mr. Watt's? He was train engineer, was he not? He was train engineer, and was with me some seven or eight years in New Zealand—He is a competent man, of probity and good reputation, and a skilled mechanic. He was employed here for some years as draughtsman on the tramway construction; he practically made all the drawings for the Melbourne tramways—he was brought from New Zealand for that purpose under Mr. George Duncan.

1896. Have you seen the Anderson arrester?—Yes.

1897. Have you any practical knowledge as to this aspect of arrestsers as to sparks?—I stated just now that the only thing is to make the holes as small as possible. You cannot absolutely stop the sparks unless you stop the working of the engines—you may arrest and extinguish, and many people argue that this is an extinguisher. I submit that a perfect arrester cannot be made, but the holes may be so small that the sparks pass that they are rendered practically harmless.

If they are seen, then it is a perfect spark-arrester—if the sparks emitted are harmless—because we do not care how many are emitted provided they are harmless?—Yes, you have seen them come out in showers, harmless ones.

1898. Would you feel yourself competent to express an opinion as to that door in Mr. Anderson's arrester?—I do not see any objection to the door if the ingots are to be fused out of the top.

1899. By Mr. Williams.—And if he is not tempted to open it?—On the road it might be; but I understand in raising steam in the shed it is necessary to open the door.

1900. By the Chairman.—I can understand it would be an advantage there, but it is alleged that there would be a great temptation to the man in charge of the engine to open the door if he required to get up extra steam along the route?—If the arrester does interfere with the actual steam of the engine he would not be inclined to open the door, but if it did interfere I cannot say—probably he would open it.

1901. Is it alleged that all arresters must interfere with that?—As a general measure.

1902. By Mr. Wheeler.—Would you, if you were in charge of the railways here, consent to have a door on a spark-arrester in that way so that men could open if they thought proper—would you think it a wise thing?—If I could get no better answer I would have it. No arrester is necessary, but I do not think it is good to have a door a man can tamper with if he can avoid it; but if the arrester has such good qualities that overrides and compensates for that, I would have it—undoubtedly it is some objection.
1914. Would there be any necessity for the door at all?—I cannot say that without testing in the running shed—I do not know that the door is necessary when on the road.

1915. As a matter of fact, when that door is open, it would create a greater draught?—Undoubtedly.

1916. By opening the door, would it improve too much?—Yes, particularly if some of those small holes are clogged by bits of cinders or rubbish from the smoke—those may get in the hole and stop them up in some degree. In a case of that sort it would be an advantage to have the door open, but I understand that it is always vibrating, and that keeps it clean.

The witness withdrew.

Adjourned.

WEDNESDAY, 3rd OCTOBER, 1910.


William Couper, further examined.

1937. By the Chairman.—Have you any additional evidence as to the cost of fitting Morris's Water Heater?—I do not know what it would cost. A good deal would depend on the cost of copper, but I think from £60 to £70. That is merely a guess, but I think it is not far away. One was made here, and you could get the exact cost from the company.

1938. That estimate was 7 or 8 per cent.—I gave you on the nuisance, some experiments in South Australia, but I was not there—it is merely what has been communicated to me. I gave you the housing surface of the smoke-box.

1919. We would require an autonomy estimate as to the cost and the saving of fuel—Mr. St. Johns, a copper-smith at South Melbourne, can give that—so make it and tell the exact cost. I cannot give an estimate of the saving that might arise; perhaps Mr. Woodrowe could give that.

1941. Mr. Woodrowe.—The Department made a great number of trials of that.

1942. The Witness.—It was tried several times in the Locomotive Department here; they have all the particulars.

1943. Mr. Woodrowe.—There is a full report of the whole of the trials; the cost and everything.

1944. By Mr. Couper.—In reading over the report of a New Zealand Royal Commission I find that there is a person of your name is mentioned there, are you the gentleman?—Yes; I was Commissioner of Railways there.

1945. Do you know the Thomas Forsyth Robertson mentioned here?—I do, intimately—he was the Locomotive Superintendent of the New Zealand Railways, and is at present Locomotive Superintendent of the West Australian Railways—he is a thoroughly competent man.

1946. He says—There is frequent communication with all parts of the world on the subject of the appliances. In the same way other parts of the world communicate with me for my experience. We interchange ideas; and I think it would be stated in Australia and in India that the appliances we have in New Zealand are the best known."—Does he describe what the armour is there?

1947. Yes?—I do not know what they have at this time.

1948. It further says—There is a natural antagonism between spark-arresters and locomotive efficiency?—Distinctly.—Do you agree with that?—Perfectly. "Is it a fact that the soft pan is used only in New Zealand?—The carbon-perforated damper is used only in New Zealand and New South Wales. Of course it may more recently have been introduced in other places, because they have seen in communication with me. In your opinion, is that sufficient to draw all sparks?—In my opinion it is ample to stop all sparks from getting out from the soft pan. How long is it since this particular appliance was adopted in New Zealand?—Twenty or fifteen years ago.—Do you recollect about that?—How do they draw them.

1949. By Mr. Couper.—It had no water at that time.

1950. This man's evidence is reliable?—Yes. I was in the South Island only—Otago and Canterbury—and Mr. Robertson was in the North Island, and the climate is more like the Australian in the North.

1951. I think this evidence was given in Wellington?—Yes, that is the head-quarters. Mr. Robertson is a thoroughly reliable and competent man; I know him intimately and had a good deal to do with him.

1952. It says—As to the spark-arrester you have the deflector and the perforated plate?—We have the deflector for soft coal and the perforated plate for hard coal?—Yes, we laid a deflector when I was there.

1953. It goes on—"What are the objections to using the perforated plate for the soft coal?"—The intention of the deflector for soft coal is this: that the coal is so very light and full of water that immediately it is ejected; it disintegrates into very small particles; the object then is to drive it with a great velocity against the deflector and break these already small particles of carbon into smaller particles and so destroy them."—Could they not be sent through a perforated plate?—No, because it would be a constant stream of gas as they are so small."—"The hard coal can be prevented from sparking by means of the plate?—Yes, hard coal does not disintegrate into such small particles as soft coal?—I agree with that. I may mention that I was employed on the East Indian Railways, and at that time we burnt wood chiefly and we had great trouble with the sparks, but we used the American wire netting. That was some years ago and things have been much improved since then. They do not use wood there now; that was before the mines were opened.

The witness withdrew.
1867. By the Chairman.—As to Mr. Cooper's evidence, have you any information as to the saving that would be effected by the use of his appliance?—That is the Morris Feed-water Heater; we have all the particulars of that.

1857. You tried it on the railways?—Yes. We made a large number of very exhaustive trials exceeding over several months.

1965. What was the general result?—The general result was that there would be a saving under favorable circumstances, and under a certain class of engines, of between 6 and 8 per cent.; but on some running there was no saving at all and unless everything was kept up to the highest pitch of efficiency then it would be useless. We decided that there should be at least two cylinders, or two cylinders one inside the other, and between the two cylinders is where this is placed above the blast-pipe, and on the inside of the cylinder there is a series of water tubes, the blast passes through those and heats the water, but unless these tubes are kept quite clean they lose their conductivity; that is to say, they may not be fitted, and if not fitted with the heater and doing similar work. Those engines were fitted and put into running after inspection and accepted by the company's representative in 1885, and the trial was being run in ordinary service for at least five or six weeks ago, with the results being given a little later on. The following gentlemen have at different times represented the company: Mr. Hood, Mr. H. G. Gordon, A. D. Smith, G. W. Wood, Mr. A. R. Rankin, Mr. J. A. Simms, Mr. J. H. Gordon, of Ashford.

Description of Heaters. (2.) The heater consists of two copper cylinders of different diameters, encased at ends. The small space between the two cylinders is in communication with the feed-water pumps, or injector, and the boiler. The intervening space between the tubes is connected with the inside or the flywheel of the engine, the emitting and evaporating tubes being united in the outside of the cylinder, and those parts of the heater being connected with the tubes in the boiler by a double flanged joint, and also with the boiler by a double flanged joint, and also with the boiler by a double flanged joint. The inside of the tubes is about 150 degrees, and the entering water temperature rates the boiler as found by running under ordinary circumstances, going through the heater in about 150 degrees. When the water is fed to the boiler it is passed through the boiler and heated by the exhaust steam and the waste gases in the smoke-box. Advantages of Feed-water Heaters. (3.) The theoretical advantage gained by the heating of the feed-water is proportional to the difference between the initial temperature of the feed-water as it enters the heater, and the temperature of the water as it leaves the heater. When the water is fed into the heater the initial temperature of the water is about 150 degrees, and the entering water temperature rates the boiler as found by running under ordinary circumstances, going through the heater in about 150 degrees. When the water is fed to the boiler it is passed through the boiler and heated by the exhaust steam and the waste gases in the smoke-box. The evaporating tubes in the heater are in communication with the tube space of the engine, and it might be interesting to compare the advantages and disadvantages of using the heater and of using the hot water system. It appears to me that the heater is a much better system, and that it would be possible to make a comparison between the two systems. It has been found that the heater is a much better system, and that it would be possible to make a comparison between the two systems. It has been found that the heater is a much better system, and that it would be possible to make a comparison between the two systems. It has been found that the heater is a much better system, and that it would be possible to make a comparison between the two systems.
The equilibrium consumption. To be fair, I have taken three engines in each class for each month, and taken their average as the consumption that can be obtained by engines without the boiler, as compared with the engine fitted with the boiler. The boilers will, of course, claim to have the engine fitted with their appliance as an advantage, if their class is not fitted with the appliance. If the data are not absolutely accurate, I consider it fair to compare the average of three engines in each class (which is a considerable proportion of the whole work with the engine fitted). On the latter point I do not insist in the same degree. In the class of 355 L, there were, for the first three months, whilst in the charge of Mr. Paton, considerable saving in favor of the boiler. I had the drivers change—both men being unknown to me, but both being good engineers—with the results that the consumption of the engine fitted with the boiler was cut very considerably, and showed much less saving compared with the three engines with the minimum consumption in that class. As regards the other three engines, 365 L, 365 S, and 344 fitted with boilers, the consumption is actually more than that of the three excellent engines in the same class, doing similar work and not fitted with boilers. A summary of the results is shown in Table marked "CC." Commercial Aspect of the Question. (7) The average consumption of coal per ton mile is now about 50 lbs. This includes the whole of the coal issues to the engine for getting up steam, running, trains, losses, etc., in connection with letting down fire, standing time, etc. The heater is only of appreciable value when the engine is steaming (greatest when steaming heaviest), therefore the amount of coal consumed in getting up steam, losses from starting life, letting down fire, etc., should be deducted from the total to arrive at the net consumption influenced by the boiler. These amounts would, in my opinion, be equal to the same consumption of steam; therefore, on this assumption, the average coal consumption per ton mile affected by the boiler would be 50 lbs., or 15 per cent. Or, say, 42 lbs., per train mile. The total train miles now being run is, at the rate of 1,000,000 per annum, and the average rate paid under the present contracts for coal is about 10 per cent. on the above. What has been deducted from the above calculation is the total amount spent on the letting-down fire, etc., due to the use of a boiler. The estimated cost of a boiler will be of the order of 4,000 to 4,500 per annum, and the fuel saved by the use of a boiler will be from 4,000 to 5,000 per annum. The cost of the increased labor of the fireman and of the maintenance of the boiler will be about 120 to 150 per annum, making the total cost of a boiler from 5,000 to 5,500 per annum. It is therefore, a very fair assumption that the cost of the extra labor of the fireman and the maintenance of the boiler will be about 100 to 150 per annum, which is equivalent to a saving of 400 to 500 per annum. If we assume that the cost of a boiler is 2,000 per annum, the saving will be 2,500 to 3,000 per annum. It is therefore, a very fair assumption that the cost of the extra labor of the fireman and the maintenance of the boiler will be about 100 to 150 per annum, which is equivalent to a saving of 400 to 500 per annum. If we assume that the cost of a boiler is 2,000 per annum, the saving will be 2,500 to 3,000 per annum.
1966. Do you agree that the small and inferior coal casts larger sparks than the superior kind?—I have not found it so in my experience.
1966. By Mr. Greaves.—Do not the American coal or coal in the same engine as the long journeys?—I do not know whether they use wood now; they did for many years, and no doubt they use it now on some of the lines.
1967. Do they not use wood and coal invariously with the same engine on the long journeys?—They say I am not aware.
1968. By the Chairman.—Are your engine-drivers supposed to send in reports as to the quality of the coal?—Yes, they are supposed to report that information to the efficient working of the engine.
1969. If they find the coal inferior they are supposed to report that fact?—Yes; and they do.
1970. We could obtain those reports I presume?—Yes.
1971. About the Thomson arraster—Mr. Short's evidence was very strong in favour of the trials made in the Department?—I have only seen the reports in the paper.
1972. He stated there was no fault found in the Department with his arraster, that all the trials were favourable, and all the report—lies you anything to say in reply to that?—The Thomson arraster was before the Department for a couple of years or so before my time; but I had some trials made of it after I took charge, and they were favourable as to the engine's steaming and also as to sparks being emitted. I was present on one trial myself when the Acting Commissioners, Messrs. Kibble and Murray, were also present. We had three trials fitted up, and ran as far as Brunswick up the Royal Park Bank. One of the engines was fitted with Allibon's arraster, one with Thomson's, and one with the one used by the Department at that time. We travelled in the van, and watched the sparks and general behaviour of the engines, and knew that the engines were fitted with different arrasters, but did not know which was which at the time. We came to the conclusion that a certain engine, the first trial, was the best of the three, and it turned out to be the departmental arraster. There were sparks emitted by it, but no want of steam—the engine steamed freely. In the other, with Allibon's arraster, there were very few sparks, but the engine would not steam well. In the Thomson there were a good many sparks, and the engine was also shy of anyhow ofM.
1973. By Mr. Greaves.—Was that trial made with wood or coal?—Wood. At that time it thought it would be of great advantage to use wood.
1975. He was the man who was in charge of that arraster on the Southern line?—Another question that occurred to me was whether it would last any length of time; you know the class of thing it is. I have a full-sized model of it, which I have tried; it is a bag, and I found with some that I examined that the bag was made right out, and it seemed to me that the construction of the bag was very favourable to corrosion, because the sulphur, coal, and water from the priming would lodge in the folds of the wires forming the armour setting, so that it would be a question of only a few months when the bottom of those bags would rust right out. I thought they would want very frequent renewal.
1976. Mr. Short said they would last from six to ten years?—I do not agree with that.
1977. He said that the constant movement kept it free?—No, I cannot believe the bottom bags would get full of solid and dirt, and would very soon corrode.
1978. Driver Mitchell's evidence was diametrically opposite to it. This is from Mitchell's evidence—By Mr. Greaves.—Does it stop the power of the engine in any way?—It did not last it so. The one I had it attached to was a good steaming engine—one of the best. I never had any difficulty in my way with the engine. The slackening kept it clear of dirt?—Yes, and the spark went through that engine, and the slackening kept it clear, that is the whole invention?—Yes; it was one of the old '11' class engines, 442. By the Chairman.—Do you think Thomson's was as good as the departmental?—I think it was superior, By Mr. Greaves.—In what way is it superior to the departmental?—For one reason, the spark is self-cleaning; it is in plain spark arraster attached to the funnel, and when the whole time the engine is cooking it makes it easier and the spark cannot get through?—I do not know what loads he had behind him. It makes such a difference if the engine is fully loaded; it is only half taxed anything would do.
1979. He said he was driving on the Great Southern line, and I presume you know that is a very taxing line?—I do not know whether he has full loads.
1980. As only one trial a day goes, would it not be reasonable to suppose it was ordinary good loads on such a long distance?—It does not always follow.
1981. By the Chairman.—On some of the days he was going down he must have had a full load on?—Yes, I should say he would have.
1982. By Mr. Wheeler.—Do you know how long it was in use?—No.
1983. Mitchell said he was driving three or four months in the summer time?—Yes. There is a file of papers that would show the whole correspondence in connexion with it.
1984. By Mr. Kennedy.—Take any particular type or class of engine, even with the same arraster attached, is there not a difference in the steaming power of those engines?—Yes; no two engines steam exactly alike although they might be made on the same type of Thomson's, and ours with the one used by the Department.
1985. Then should not each arraster be tried with the same engine for the fire test?—It might be more correct; every driver will tell you there is a difference in engines.
1986. By Mr. Wheeler.—Had the only one Mitchell fitted with the Thomson arraster?—There must have been two or three; one Mitchell was using, and two or three others about Melbourne.
1987. By Mr. Williams.—Mr. Short stated in his evidence last week that after several trials with this Thomson arraster the Department asked the patience to make an offer to the Department, and that that offer was made, but it was regarded as very exorbitant; do you know anything about that?—Yes.
1988. What induced the Department to ask him to make an offer if the arraster was condemned after trials?—I do not know whether they did ask for an offer, but I know an offer was made; the first was something like £45,000. I reported in one case an offer of £20 an engine to supply the articles for that.
1989. By Mr. Greaves.—Is Mitchell now a driver?—Yes, he is still on the Great Southern line.
1990. By Mr. Wheeler.—Do you consider they were used long enough on the lines to form an opinion about them?—I think so.
593.

1991. **By Mr. Grew.—** Are you aware that Mr. Thornton said this to the portable engine-owners as a sort of punch-giving to their engines when they were rastering?—No. Quite recently it was offered to the Department for nothing by Mr. Shortt. I understand that has been patented all over the world, and I was also informed that agents went round to get it tried in other countries, but I did not hear that they had had any success.

1992. **By Mr. Williams.—** Mr. Shortt stated here that the aggregated area of space through this meting was larger than the total area of the smoke pipe, and therefore could not possibly prevent the proper steering of the engine; do you think that is so?—I never had it run out. It seems to me to be very close in places, and in other places you can get a pencil through; and I can claim the lower part of the bag would in a short time be filled up with soot and smoke from the chimney.

1993. **Mr. Shortt said the bag was always moving up and down, and after working for months it would come out brighter than when it was put in on account of the friction, and therefore that extraction you refer to was impossible.** I drew his attention to the fact that it would wear out more quickly through that motion, but he seemed to think not; you do not think it would abate the objection you have?—The cylinder and valves are supplied with oil; the exhaust is of a greasy, dirty nature, and I think all those names would close up.

1994. **By Mr. Grew.—** In your opinion, would that vibration have a tendency to wear out the rings of which the crank-case is made?—I should think not. However, I know I saw one of them. Do not you think they would be taken off?—Yes, if the boiler were over-run on occasion; the bottom of it was completely rotten. I do not know whether we have that one; I will make inquiries about it.

1995. **By Mr. Wheeler.—** How long had it been in use then?—I do not know. It would be under six months?—Yes; I came to the conclusion that they would have to be renewed very soon.

1997. **By Mr. Grew.—** Would the bag corrode that you saw lying by, whether steel or iron?—I understood it had been taken from the engine.

1998. **By Mr. Wheeler.—** It was stated here that they were very easily put in and taken out, that they occupied very little time in that?—Yes; there was much trouble in testing them.

1999. **And that the total cost was very small?—Yes.**

2000. **About £4.** What is the cost of the departmental ones?—£4 the double grid.

2001. **By the Chairman.—** There is a donkey-engines used in connexion with the Westinghouse brake?—Yes.

2002. **The pipe from that exhaust is in the funnel?—Yes.**

2003. **Is there a liability from that to choke the sportures, even in the grid basket, with the steam and oil?** There is always a containment of all, is there not?—Yes.

2004. **Is there not a liability to choke on account of that?—I have not heard it stated that it has that liability.**

2005. **Once I imagine that; grease spire of that description would have that effect?—Yes, of course, the exhaust is the same. The donkey exhaust under高尔夫 the grid in most engines; in some cases it is fixed there, and in other cases quite low down.**

2006. **In some parts of South Australia, for instance, do they not exhaust in some other way?—Of course, they can be made to exhaust anywhere in the smoke-box.

2007. **What is the objection to letting it exhaust somewhere else?—I do not know that there is any objection.** I never found any objection to exhausting in the funnel; however, it can be looked into.

2008. **I understood that there was a liability to choke between the wires in consequence?—The little exhaust would be pretty well spread before it would reach the jets.** In my report I referred to the fact that the French engineers considered that parallel bars were better than setting. In the engine they have exhibited at the Paris Exhibition it is the grid almost, the same as ours. I can forward you the drawings of that.

2009. **By Mr. Green.—** Is that made by a French engineer?—Yes.

2010. **Is that a patent?—I think not, but that is a correspondence that they have come to the conclusion that the grid is a good principle. They use the same sized bars; the only difference is that the space is made three-eighths of an inch instead of one-eighth of an inch. However, all these things will be discussed at our International Meeting at Paris, and reports should be coming to us in a few months.**

2011. **In this particular engine that I propose, embodies the latest improvements according to French ideas in this gridiron basket, and horizontally across the smoke-box.**

2012. **By Mr. Kennedy.—** Do you call your parallel ribs?—Parallel wires; you would scarcely call it a rod; anything more about a quarter of an inch in diameter, certainly three-eighths of an inch.

The witness withdrawn.

John Byrne sworn and examined.

2013. **By the Chairman.—** Did you give evidence before about the Thornton arrestor?—Yes.

2014. **By the Chairman.—** Did you issue a note to the contrary?—Or a two existing one?—Yes.

2015. **What was the result of these trials?—The results were not satisfactory; I almost forget the particulars; I know there were showers of sparks.** All the trials I made were with wool, and one night on the main line there were a lot of sparks; they were very numerous; and there was a final trial on the Royal Park bank between three the Thornton, the Allan, and the Departmental—and for the stoppage of sparks Thornton's was the worst.

2016. **That was the first of your experience of Thornton's?—Yes.**

2017. **Your opinion was that it was not equal to the departmental arrestor?—No.**

2018. **That it emitted more sparks and interfered with the standing?—Yes.**

2019. **Were you in charge of the tests of the Morits water-jet?—No.**

2020. **By Mr. Williams.—** You say the Thornton emitted a good many sparks, and did notsteam well?—Yes.

2021. **Are there any things inconvenient? If there were enough openings to allow sparks to escape, surely there would be a good deal of dirt coming through?—There should be. I did not make the fire up myself; I had a furnace doing all those tests. The first engine I took out was the departmental one; the driver and myself made up the fire, and the other drivers and drivers made up the fire.
in these other two engines to run up the bank. I did not know before I was to take those, but Mr. Jack and I was to take the coal up, and how the fire was built I cannot say, but the drivers told me a better fire could not be put in. Or for the trial on the main line the fireman and myself made up the fire, and the engine behaved as the same there. It may not be the fault of the spark arrester; it may be the fault of the engine.

2021. By the Chairman.—We have had the evidence of a Mr. Robins, New Zealand, read to-day. He stated that slack coal or inferior coal would emit more sparks and larger ones than hard coal; do you agree with that?—I do.

2022. What is your opinion of the quality of the coal used now on the Victorian lines; is it screened?—No. It is supposed to be screened at the mines, but there is a lot very slack.

2023. Is it good quality coal?—The Victorian coal is not equal to the Newcastle coal; we use a mixture of both. We use the New South Wales, which is not the best got from there. Some coal there is almost like bituminous, and fills the box up with dirt, but the A.A. coal we used to get we had no difficulty with at all. We thought nothing of going to Bendigo and back without touching the fire. I have run to Albury without doing that; that is, without introducing the poke to clean it all. The class of coal we get now is inferior altogether.

2024. Are the drivers supposed to send in a report when they find the coal inferior?—I have never done so, and I do not know of any who have unless a delay has been caused through the coal. They send in a report, but the coal has been reported to the foreman, and he has been brought up or the stage to see it. Mr. Burgess was the foreman at the time.

2025. What position does Mr. O'Dea occupy?—He is the night foreman.

2026. By Mr. Greaves—Mr. Mitchell, who gave evidence as to the engine, is he running on the same line?—Yes, the Great Southern line.

2027. Have you lately heard reports as to inferior coal, that the coal contains too much slack and dust?—No, I have heard nothing, but the coal is worse. I am driving on all the suburban stations now—Brighton, Williamstown, and Prahran, and so on.

2028. They have done away with the shed at the Prince's-bridge Station?—Yes.

2029. All the trains now go to North Melbourne after the trips?—Yes; the Port Albert and Warragul trains leave their engines at Prince's-bridge part of the time.

2030. Where does that engine get the coal from?—The night coal at North Melbourne and the midday coal at Prince's-bridge.

2031. Have you heard why there is so much more slack and dirt lately?—No. I have seen complaints about the best coal when we got it at Newcastle—when there was no reason for it. It is supposed to be exported at the pit's mouth.

2032. What becomes of it after that?—I do not know.

2033. Do you know that it is taken in trucks and dropped into the holds of the ships from a great height?—I believe so; but we have slack from the Victorian coal, which does not get so much handling.

2034. If the tender is filled with coal, can you tell whether it is Newcastle or Victorian coal?—Yes. At North Melbourne it is mixed, but you can see the difference. At night-time you cannot see what they are putting on the coal, but in the day-time you can see whether it is mixture or not.

2035. Where does the Newcastle coal land?—At the wharf, and it is all put into the trucks and taken to the stage.

2036. One or two of the drivers spoke to me, and asked me to look at their coal; they said—"Look at that," and quite half of it was inferior slack—is that likely to be an exceptional case?—No, you will see it often.

2037. Is there not a great deal of loss on that kind of coal?—Yes.

2038. Would it not be cheaper to buy superior coal?—It is a loss in time every way and extra work, and that means money. If the coal was much dearer I could not say what the proportion would be, but I think the closer the coal the more economical it is both for the main on the engine and the proportion of sparks.

2039. At first there was a great prejudice against Victorian coal?—Yes.

2040. Has that gone?—Yes; I have some Jumbunna and Ottumara quite equal to the Newcastle. If you get it of good quality, not too small, and keep running—that is what you have not so much wanting. The officers do not like the blowing off at the station, and you drop the damper, and it allows to form a bit of a clinker—that is the objection.

2041. Does it clinker more than the Newcastle coal?—Yes.

2042. Can you get up as much power with it?—Yes, when the fire is clean and it is not clattering.

2043. That prejudice is going away?—Yes. Since the coal strike we have come to the opinion that we could do with almost anything. At that time we used everything that was black in the shape of coal, and when we got a bit of good coal at all we thought it was a great thing.

2044. How many years have you been a driver?—Eighteen years.

2045. Was Mr. Tyer a driver?—Yes.

2046. Did you hear of his spark-arrester?—Yes. I never was on the engine with it. The opinion of the men was that it was the best arrester. It was a cage from the top of the funnel to the blastpipe, fitted on stays, and the rags vibrated and so self cleaning; they do not interfere with the steam intake. One man tried it with wood, and Patterson, another driver, had it for eight months.

2047. There was no noise?—No.

2048. I was told it was simple and inexpensive?—The men who used it said it was the best arrester they ever had. Mr. Tyer did not say it was a spark preventative; he said it was a fire preventative—any spark that got out would be dead.

2049. The man invented it for his own benefit?—I believe so.

2050. By the Chairman.—Did he ever get a patent for it?—No.

2051. Is Davies in the Deputation now?—No, he is in Western Australia.

2052. He conducted nearly all the tests?—He did myself.

2053. By Mr. Rousey.—Was Tyer's ever tried?—Yes, Davies tried it, and Jones, another driver, who is dead.

2054. By the Chairman.—Who is Tyer?—He is dead.
2055. Is there an engine-driver available who has tried it?—Yes, Patterson; he is on the station at Banalla, he tried it only with coal; Davies tried it with wood, there may have been others that I do not know of.

The witness withdrawn.

Richard B. Sewell, sworn and examined.

2056. By the Chairman.—What is your occupation?—I am a retired railway officer. I was locomotive inspector at the time I retired. I was eighteen or twenty years in that position.

2057. What position were you in before?—I was in the Williamstown shops for seventeen or eighteen years. Before that I served my time in one of the largest locomotive firms in England. After being at the Williamstown shops I went to take charge of the Phoenix Foundry, locomotive building, and constructed about 100 locomotives there. Then a portion of the time I was occupying the position of inspector there and was in charge of the Ballarat West sheds at the same time; after that, till I retired, I was travelling inspector, in charge of Ballarat, Bendigo, Maryborough, and all the southern districts. My duties were to see that the drivers conducted themselves in a proper manner, to inquire into any reports, visit the local depots, see the engines that they were fit for running, and so on.

2058. If any fires were alleged to be caused by the engines, would you inquire into that?—Some of them. If there were big fires I had reports, and made inquiries.

2059. Did you have many of these complaints made?—Yes, a good many in the summer time.

2060. How many had you to deal with?—I could scarcely tell from memory—perhaps half-a-dozen during some years, and more frequently than that at the time I retired.

2061. You think for the few years before the coal came there were more fires caused by the engines than latterly?—Yes.

2062. To what do you attribute the change to fewer fires—any improvement in the engines?—Yes, I think there was an improvement in the engines and in the coal.

2063. The evidence we have is that the engine has not been materially altered for 25 years?—Yes; it has; we have now the gridiron stoker. We had for years a cage that went from the top of the blast-pipe to the mouth of the smoke-box.

2064. Was that in use within the last 25 years?—Yes.

2065. Within the last twenty?—I should think so.

2066. Information supplied to me personally from the Department was to the effect that the present engine has been in use for twenty to 25 years with slight modifications?—I do not think so. As almost positive it has not been that length of time. It was scarcely decided what engine would be put in for a number of years. That cage was tried for a number of years, and other stokers were tried by the Department.

2067. In regard to those claims for damage made to the Department, were any of them sustained?—Yes, the Department paid on some of the claims.

2068. Were there some in which there was pretty good evidence that the fire had been caused by the engine, but the Department considered there had been no careless use and therefore did not pay?—I do not understand your question.

2069. There was a case that was decided at Banalla before Judge Chownley in which it was proved that the fire had been caused by sparks from the engine, but as the Department had not been careless, negligently neglectful in any way, but were using what was the best-known stoker, therefore they were not liable—were there any cases of that description that came within your knowledge?—No.

2070. Where the Department discharged itself under the plea of having the best stoker?—No, no case of that sort.

2071. In any case where it was proved that the engine had caused the fire, did the Department pay?—As far as I remember there were claims paid. I would get the reports and go and make inquiry from the drivers and see what sort of coal had been supplied, what the load was, and what grade they were on where the fire occurred, and then I would send my report down to the Department, and it would be decided on there. I had no further responsibility and therefore do not remember any further.

2072. But there were cases within your knowledge where the evidence indicated that the fire had been caused by sparks from the engine?—Yes, several.

2073. What district was that in?—I had Ballarat at Serviceton, Portland and Warracknabeal, and all the branch lines, Bendigo, Swan Hill, and Echuca, and latterly the North-Eastern, to Bendigo; pretty nearly the whole colony except Gippsland. I was travelling nearly all my time with inquiries of one sort and another.

2074. Was it thought the fires were caused by sparks from the chimney or live embers from the ash pan?—You could scarcely tell unless you were there; but I have no doubt that a number of fires have occurred from the sparks, from my own experience travelling on the engine.

2075. You think it is possible for embers falling from the ash pan to be blown out—would you say over the ranges?—Pretty near the ranges when it has been blowing a heavy gale, a strong north wind and the grass very dry and the engine running against the wind, a strong north wind coming in the ash pan, and even though the drivers are told to run with the ash-pan door so close as possible, they have to leave it open a bit, and I have seen it get in and give the embers out in all directions.

2076. That is, if a hot wind were blowing across the line, it would carry them a good distance?—Yes, the momentum of the engine and the wind together would—I have seen them carried that way myself when travelling on the engine—I frequently travelled on the engine when inspecting.

2077. Had you experience of any of the stokers?—I did not personally make any trials with them.

2078. You cannot speak from your own personal knowledge?—I have seen them, but I did not make any tests with them. They have been in my district, and I would get reports from the drivers about them.

2079. What is the impression you formed about Anderson's stoker?—As far as I can remember I had no reports unsatisfactory about it. Many spark-stokers would stick up an engine, and I would hear of that, but there were no reports of that about Anderson's, and it was up there till the engine was culled down again.

2080. You did not form any unfavorable impression about that one?—No, and I would have if I had had any unfavorable reports.
2081. Do you know anything about Thomson's?—That was in my district, running between Mataura and Warrakaukau. I asked the driver to let me have a look at it at the smoke-box, and it was all in bags and stoves like an old ragged dress or tarpaulin, and the driver did not appear to know—the engine would have been just as well without a spark-arrester. It was nearly dry at the time, and I was annoyed with the driver for not reporting it—that was the chief spark-arrester—the links were all broken, worn through or corroded through.

2082. What impression did you form as to its durability?—It had been on only a few weeks. I was notified that this spark-arrester was sent up there, and I went to look at it, and that is the state I found it in.

2083. Would you looking at that arrester made of chain mail, think it would be likely to last or not?—I would not think it would be very durable, but you cannot tell till you put it in the smoke-box and try it—that is all I know of that arrester.

2084. Do you know anything of Tyers'—No; it was never used up in the country districts, I believe.

2085. Any other arrester?—There was one called Alliben's that was run between Ararat and Portland, I think, and the men did not report very favorably on that. I did not make a test of it myself, but they could not make steam with it—that is what the men reported verbally to me.

2086. Did they report about the sparks or smoke from the funnel coming back on them?—The smoke would not rise; they said they had great difficulty in making steam, but the reports sent in by the men was in the Department—I did not see them—I only know from their verbal statements.

2087. Had you experience with the coal supply?—Yes.

2088. Was the coal screened in the summer time?—It has not been done for some years. It was screened formerly on the coal stages at stations. They laid instructions at the commencement of each season from the office to commence screening coal.

2089. That practice was discontinued some years before you left the Department?—Yes.

2090. What was done with the slack coal?—I think it was loaded up in trucks and sent to Williamstown where there was a smith's shop, and some was disposed of in the country locally to blacksmiths and others.

2091. Would the slack coal serve the purpose in the smoke-box?—Yes, it is better in a small job than the larger coal. I have known in the country districts the Department get more for that coal for the smiths than we paid for it.

2092. Do you think there are fewer sparks and smaller from the hard coal that has been screened than from inferior slack coal?—I think so—I am certain there would be less from the screened coal.

2093. By Mr. Williams—How long have you been retired from the service?—About three years.

2094. I said that I did not have any practical trial of a spark-arrester, but I may say I put on one myself—that was the only one I made a practical test with—that was a spark-arrester and extinguisher.

2095. By the Chairman.—One that you invented?—Yes.

2096. How did it act?—I tried it from Stawell with a full load; they loaded up with only wood there, and it came along right, made steam, and everything up the Snowy back.

2097. Was it efficient in arresting the sparks?—Yes.

2098. Did it receive the ordinary trial in the Department?—I do not know—no one instructed anything about it, and I did not trouble about it afterwards.

2099. By Mr. Wheeler.—Did the Department authorize the trial?—Yes, and it was reported on both by the driver and myself.

2100. Why was it taken off?—It was taken off after the engine came down to Melbourne.

2101. Did they give you no reason for that and no report on it?—No, I cannot give a report on it. The idea of it was after the sparks came through the arrester—any small sparks that might escape when travelling near cross or dry grass—there was a spray to turn on to them before they came out.

2102. What would be the cost of fitting the engines with that arrester?—A quantity of these would come to £3 or £4 each.

2103. By the Chairman.—How is the spray provided?—By a small cock the driver had control of. It was just in the bottom of the funnel in a series of small holes in a copper pipe just to damp the sparks. It was taken below the water line and was steam and water mixed, a bore-eighth of an inch the size of the hole, so that it could not get out much steam or water, just sufficient to damp the small sparks that might have escaped through the arrester.

2104. By Mr. Williams.—Would that have such effect on the sparks when steaming up a bank?—Yes, the steam that comes out of the smoke chest has no effect; it is superheated and too dry, but this was a spray taken below the water level.

2105. By Mr. Berrer.—What sort of spark-arrester did you put into the engines in the old country?—They had none there.

2106. Have you noticed the American spark-arresters?—Yes, I saw one on some engines we imported; they were just like Venetian blinds across the takes of the smoke-box, but it was not effective, and did not answer.

2107. How far back is the record in the Department of the test of your own?—Four or five years. The foremost at Stawell at that time was on the engine when the trial was made, and he loaded up the engine with wood.

2108. Do you consider the present departmental arrester is as efficient as it might be made?—No, I think with experiments a better one might be got.

2109. By Mr. Groser.—Have you any doubt that fires do originate from the engine, either from the furnace or the box?—I have no doubt there have been fires from both.

2110. Which do you think is likely to be more destructive of fires?—I should think the chimney the most, but it is only when there is a very strong wind. When it is calm and the driver has a closed damper nearly, there are not many sparks, but in the dome's weather there are the strong winds from the north—if they were going up an incline they would not have plenty of steam, and would have to open the damper.

2111. So with the most careful hand that accident might occur.—Yes.
212. Did you notice from the evidence in New Zealand that all the ash pans had water in to carry the ashes—I do not think there is none in that, because the ashes were dropping a strong wind would have blown out before they got to the water. The proper thing to do would be to have a spark-arrester door in front, and the solid door they have at present. For instance, I would have two doors, a solid one and a wire one, and always have the wire door closed, and regulate the amount of air into the box by the solid door.

213. *By the Chairman.*—What do you think of a cage fitted on to the ash-box to catch all the ashes and cinders—would that do away with the necessity of the second door?—No, I think a second door would be better than that.

214. What do you think of the departmental cage? is it a good idea?—I do not think anything of it—there may have been some improvements since I left the Department.

215. There is it in the corner—[the witness looked at the corner].—That is not a bad idea. I should think.

216. Is that an improvement since you left the Department?—Yes, but good-sized sparks would come through that gridiron. The spark-arrester in the funnel is not more than one-eighth size.

217. At present there is nothing there; that is, any ashes falling out of the ash-box have free access.—This is a suction, what you call the cage—I would prefer that cage lifting boiler up and down as so clean the ash pan. I do not think the drivers would approve of that.

218. I think they do, according to their evidence! I would not have thought so. Nobody does it an improvement on the old arrangement—interfering with the smoke-box of a locomotive is a most delicate thing. An appliance you think might be well cannot be judged until you have wind on a locomotive.

219. Do you know the Morrise apparatus?—No.

The witness withdrew.

*Adjudged to-morrow, at Twelve o'clock.*

THURSDAY, 4th OCTOBER, 1869.

*M. R.* McKeezie, Esq., M.P., in the Chair;

G. Sangster, Esq., M.P.

The Hon. J. H. Wensley, M.P.

The Hon. R. R. Williams, M.P.

Alfred Thompson, sworn and examined.

220. *By the Chairman.*—What are you?—I was District Locomotive Inspector of the Eastern system for about four years. I am pensioned off now—I was in the Railway Department about 40 years. My duties as Inspector were the supervision of the running of the engines, and looking after the Loco. Department.

221. Has your special opportunity of studying the spark-arrester?—Yes, those that were fitted on to engines in my district, the Eastern system—I was personally acquainted with Thornton's, Allibon's, and the Morrise-Smith superheater and spark-extinguisher.

222. What is your opinion about the Thornton?—It is not a perfect spark-arrester, for the simple reason that the meshes allow sparks to go out—the sparks escape through the armature chain. In the trials that we had with wood it emitted sparks very badly; it did not allow large pieces to get through the mesh. Sparks got out, but they very nearly went out before they landed on the ground.

223. Are the sparks emitted from the funnel in that case larger and more dangerous than those emitted through the departmental arrester?—No, they are smaller.

224. Then why is it not perfect as an arrester?—You cannot call it perfect unless the sparks are smothered by a wet atmosphere by spray.

225. Supposing only harmless sparks escape, that serves the purpose?—Yes, it is not so dangerous as the other. In my opinion only non-dangerous sparks would go through it.

226. Did it interfere with the steam ing of the engine?—No, not in any way.

227. Were you a position to form a judgment on that?—The late Mr. Jacks, Chief Loco. Inspector, rode with me on this trial with Messrs. Thornton and Short, and he furnished his report—I did not report at the time.

228. Did you duties bring you into contact with the engine with this arrester on it, to enable you to form a judgment?—Yes.

229. And that judgment was that it was an efficient spark-arrester on the basis that only harmless sparks escape.—No, we did not report it as an efficient spark-arrester, but that it emitted a large amount of sparks, but not dangerous ones.

230. I think the Commission would call that efficient as long as the sparks were not dangerous?—I believe that is in the reports that were sent in at the time.

231. Had you any objections to the Thornton arrester?—Not particularly. There was one objection, the chain armature wire were very rapidly by the friction of the exhaust, because this was a plate round the blast pipe—it was made of a common steel wire, and it rusted and chafed through with the friction and got damaged.

232. Did you think it would not last long?—No, it would not last long. I do not think it would last a twelvemonth without necessary repairs—the holes that chafed through would have to be mended, but the "potelseif" they called it was always on the move, and that chafed through and the damper in the chimney corroded it.

233. There is an apparent contradiction in your statement; if there was sufficient friction to make it work, that would prevent it rusting, would it not?—In the spark-box it is always intended to be damp and moist, and the steel wires would always get rusted, and the friction would break it through.

234. Would not the friction prevent the rust?—No, it was all wrapped up tight, and you could not prevent the friction on account of the nature of its use.

235. Did it rust all over, or was the rusting confined to the edge of the skirt?—Where the folds were there was the most friction.
2186. Mr. Woodroffe said round the edge, the fringe?—Yes, that is where it was wrapped up, and with the double fold there it would be liable to rust more quickly.

2187. What other arrester had you experience of?—Allibon's is a perfect spark-arrester but the objection was that at the trials in New South Wales Mr. Thow said it destroyed the rolling-stock with the smoke—he said with the balloon-shaped funnel the smoke could not get away. It is a perfect spark-arrester; but I had not much experience of it.

2188. Did it interfere with the steaming of the engine?—No, I do not think it did with coal.

2189. Do you know of any objection to it except the smoke?—No. Of course every engine would have to be fitted with a funnel that shaped.

2190. Was the funnel higher than the ordinary funnel here?—They run with a high funnel because they have no overhead bridges at Denillipun. Here you would have to have short funnels, and I think that would be detrimental to it.

2191. Mr. Allibon said they had the funnels the standard height on their line; you have no knowledge of that?—No.

2192. Has you experience of any other spark-arrester?—Morris-Smith's superheater and water-cutter. I think that is the most perfect spark-arrester I ever saw, because it completely smotheres them. It is a spark-extinguisher and an economiser in fuel because it has the superheater round the blast pipe, and the construction of the blast pipe is such that it is bound to put the sparks out.

2193. As Loco. Inspector, you could form a judgment as to whether it was desirable as an assistant to the steaming of the engine—you think it is an economiser?—I do, most undoubtedly. I think it is the best spark-arrester ever invented.

2194. But as an economiser you think it is an advantage also?—Yes.

2195. Do you think there is any objection to it as to liability to get out of order?—Not if it is fitted up properly. The superheater needs to be made properly. They had a lot of trouble with them because they did not have them, and the soft solder leaked and caused a lot of trouble; they brazed them at the latter end, and that overcame the difficulty, because when it was soft-soldered the engine was always leaking, and it had to be held up.

2196. The statement we had before was that it was liable to get out of order readily, and that was due to the fact that it was only put in in a temporary fashion for the sake of the trial, it alters the composition of it.—I do not think there is anything to get out of order if it is made properly, if the superheater is constructed of copper and made well—there is no indication of funnels, only they would have an injector or pump additional to feed this superheater.

2197. You say in the latter end of the time that it was being used they did braze the connections?—Yes.

2198. And after that, did it get out of order?—No; not for some time: of course they had it for about two years or over. It is the latter part they did not have much trouble with it, because they took the precaution to braze and make the joints tight.

2199. Did you have experience of any other arrester?—No. There were Tye's and others, but I did not have experience with those—I have seen Mr. Anderson's.

2200. Did you form any opinion of that?—I formed the opinion that a perfect spark-arrester could not be obtained unless you had a spray to put the sparks out.

2201. Do you think that Mr. Anderson's arrester would render the sparks harmless?—It would reduce the size of the sparks, but it would not be a spark-arrester.

2202. You do not call the departmental one a spark-arrester?—Oh, no.

2203. Would you call it a spark-reducer?—Yes. The only two efficient spark-arresters I know of are Allibon's and Morris's.

2204. Do you think that Anderson's arrester is an improvement on the departmental one?—It might be a little improvement on the mesh, but in all meshes they are liable to clog and block up, and still it is not a spark-arrester.

2205. Which is the better of those two?—There is not the slightest doubt Anderson's is the closer mesh.

2206. Did that interfere with the steaming?—I did not say—the trials were made on the North side.

2207. As Loco. Superintendent, did you have to deal with the coal supplied to the engine?—Yes. Coal is not screened as it used to be, but since they have used Victorian coal, which is of a soft nature, it comes out of the mine and through a skip screen; it then goes into the truck and on to the nag, and that makes a certain amount of slack.

2208. It is not screened on the stoves now?—No, I do not think you would ever get that; it is too expensive—in Mr. Mir's time they did not screen it, but where the coal is run down you top it. There are a great many more engines running now than in Mr. Mirs's time.

2209. But was it screened then in the summer time?—I believe it was in some places for certain months in the year. We never used to screen it on the Eastern side even in Mr. Miris's time—we could always do with 10 per cent., or 15 per cent. of Newcastle coal.

2210. By Mr. Wheeler.—Did you ever try Anderson's spark-arrester on any engine?—No. Mr. Anderson applied for trials to be made on the Gippsland line, but he was delayed from it.

2211. Then as to its being a closer spark-arrester than the departmental one you are merely going on hearsay?—Yes, I have no experience of my own about it.

2212. Do you know there is a door fitted to that arrester?—Yes. The door is very good; in fact, all arrester's that have doors so as to brush them less. I do not see that the door is any benefit beyond that.

2213. No objection in getting more straight or lighting up?—Of course the door might be left open to allow the draught to go through—on account of the mesh being fine—that might facilitate getting up steam when the fire was first lighted.

2214. In the event of steam going down, would there be danger of the driver opening the door?—Yes. The effect if the door were left open would be, of course, that the big stuff could come out.

2215. Do you look out that as a source of danger?—No, because generally the man told off to light up would get familiar with the door, and after he got steam up he would close the door,
2166. Suppose a driver were travelling up an incline with a full load, and found he was getting short of steam, would there be an indenture open that door for him?—No, I do not think he would do that.

2167. By Mr. Smith.—Yes, say that Anderson’s is a better arrester than the departmental one; that Allison’s is better still, and that Morris’s is the most perfect you ever saw?—Yes.

2168. Do you mean to say that you are still of that opinion, that there are three spark-arresters absolutely tried by the Department that are superior to the one the Department are now using?—That is quite correct.

2169. And as far as the Thornton is concerned, did you see any decay or deterioration in the chain arrester?—Yes, in three months it chafed through.

2170. The evidence of Mr. Short is very different from that!—When Mr. Thornton was alive we drew his attention to the spares, and he said that they used box wood at the time they were making the Alexandra line, and I said—"When you have a spark-arrester you must use the wood in the district"—you could not pick box wood. Mr. Short and Mr. Thornton were on the engine at the time that Mr. Jacks made the trial, and we drew their special attention to the sparks.

2171. As to the Morris-Smith arrester, you say it is not liable to get out of order?—No, if it is properly manufactured.

2172. Supposing that any one of the joints of the pipes gave way, is there any way of getting water into the boiler in the meantime?—Yes, the driver has a second check valve so that he can shut it off altogether—the engine would not stick up—he would only lose the value of the heater for the time being. His contrivance was so constructed that it formed a spring-rod and put the spares out, if you turned that off you would see the sparks dying out all over the place.

2173. The spray does not exist when using the injector the same as using the pump?—No.

2174. If anything goes wrong with the superheater, can you use any other injector or pump on the engine?—Yes, a special pump or a special injector. If you got that off you have another injector to feed the boiler.

2175. So you have the one for the heater and one for the boiler?—Yes, you have the two.

2176. You still say that even with the superheater that it is to some extent a better spark-destructor than this, you say that the other two have not got it in a perfect spark-destructor, but that the superheater it still sets to some extent as a spark-destructor?—Yes, but not so perfect. The blast pipe is almost after the same construction as Allison’s, but the return top of the exhaust is on the top of the blast pipe, and Allison’s is on the top.

2177. With this superheater and the amount of steam you could get on on the engines, would it be possible to increase the size of the exhaust pipe?—Yes.

2178. Without deteriorating from the drought?—Yes, that is the principle—he increases the size of the blast.

2179. So you modify the pressure on your cylinder, and give your engine more steaming power?—Yes.

2180. Then it must be a fuel economizer?—That is what it is called, but you must understand the brick arches are fitted into the fire-box of the engine—that is a great benefit. Of course, since Mr. Woodruff has been Acting Chief Mechanical Engineer he has tried to carry this out perfectly with the brick arches, and my opinion is that if the brick arches are put in with the engines it is an economizer—it buries the spares and it steams better.

2181. Have you seen Alice’s patent fuel economizer?—Yes, but I have not had any trials with it. I think his idea was too complicated for a locomotive, but I cannot speak on it—I merely know what his idea was.

2182. It was tried in a locomotive here for some time?—Yes, but it did not come under my notice.

2183. By Mr. Wheeler.—There is a saving in fuel in Morris’s!—Yes. Mr. Morris claimed from 10 to 12 per cent., but the records of the Department said to 10 per cent.; that did not come under me—it was worked up in the office.

2184. By Mr. Williams.—You stated there are three or four spark-arresters better than the one used by the Department—do you hold the opinion that they steam just as well and are also better spark-arresters?—No.

2185. Have you heard an objection against any of them that they do not steam as well as the departmental steam-arrester?—Yes, I have heard complaints; any mesh spark-arresters are liable to choke, either wire or perforated copper, the same as Anderson’s, are more liable to choke than the present spark arrester, and that is my own opinion if you reduce the mesh so small—with anything below one-eighth of an inch it is liable to choke.

The witness withdrew.

Matthew Murray, sworn and examined.

2186. By the Chairman.—What are you?—Superintendent, North Melbourne station.

2187. What are your duties there?—Generally supervision of engines going out of the shed, men coming on duty, and so on.

2188. Do you take charge of the engines when they come in?—No, the men do that; they are under my supervision.

2189. Do you inspect the arresters when they come in?—No, there is a man told off for that; they are under my supervision.

2190. Do they report to you?—They report in the repair book in the sheds, I generally overlook that.

2191. Are there frequently reports of the arresters being out of order?—Not very frequently so present.

2192. Do you remember when the reports were as to the Anderson?—No; I have only held this position for the last three years.

2193. The coal comes under your supervision?—Yes; between myself and the running foreman, Mr. Fall.

2194. What is your opinion of the quality of the coal at present?—At present it is not extra good. Does that mean it is extra bad?—It is not as good as it should be. It has been complained of by the drivers, but there is a threatened strike and we have to take it: the goods drivers particularly complain of it.
2196. What is the ground of their complaint?—Inferior coal altogether, and too much slack. It is something similar to the Ball coal that we are getting now for the goods trains, and that is not good quality.

2197. The coal, apart from the slack, is inferior.—Yes; I reckon it is not as good as the proper Newcastle, the A.A., or the Scottish.

2198. Which coal is the coal just now, the Newcastle or the Victorian?—The Newcastle. The Otho or Jumbunna at first was very good; some of the drivers preferred it to the Newcastle.

2199. Have you any opinion as to the relative qualities of the coal in regard to the emission of sparks—are there more sparks from the Newcastle or the Victorian?—As a rule there are more sparks from the Victorian coal; it is lighter.

2200. You were driving up to when?—Five years ago.

2201. Do you remember as to the coal that was supplied when Mr. Milb was superintendent; was it screened in the summer time?—Twenty or 21 years ago it was screened for a time in the summer. I do not remember its being done since.

2202. Do you think the practice was not continued up to the time that Mr. Milb retired?—No, it was not. I am sure of that. It is not continued now. The coal is screened at the mill's mouth.

2203. Had you any experiences of fires being originated by your engine when you were driving?—No, not one.

2204. By Mr. Saugster.—You say that 21 years ago the coal was screened?—It was screened on the stage. If I recollect right, it was a bad cargo that came in. It was only for that special occasion, I do not recollect its being a regular practice to screen it.

2205. Have you had any experience of other arresters than the departmental?—No; the others were not tested in the sheds; the patrons looked after those.

The witness withdrew.

John Brown, sworn and examined.

2206. By the Chairman.—What are you?—Lighter-up at North Melbourne. There are three shifts there: I have charge of one shift of four.

2207. Do you find any difficulty in lighting the engines with the arrester in?—Yes; a lot of difficulty. With two grills it is hard to get up a fire; in fact, with all the arrester we find it interfaces with the getting up of a fire, that is with cold water.

2208. Do you find any of those innovations better or lighter than the departmental arrester?—No, we find the same generally. There was only one we found in trouble with, that was Tyre's.

2209. Had you experience of that apart from the shed?—No; I have not been out on the road.

2210. Do you know about their liability to get out of repair?—Sometimes they get out of repair—a man goes round looking at them every day; the departmental one gets out of repair just the same as the others—it gets loose.

2211. Have you ever found the arrester in such a condition that the sparks could have got through freely?—No; I never noticed them that much.

2212. Have you the aperture widened very materially?—No.

2213. As to the other arresterers, did you find them in a bad state when they came in?—No; if any were in a bad state we would draw the attention of the foreman to it—I never had to do that.

2214. By Mr. Saugster.—As lighter-up did you have anything to do with the spark-arrester at all, except to try and use your judgment as to the time you would light up?—No.

2215. As a matter of fact you would never see it?—Yes, we would see it, because we would have to keep cleaning it to get up steam; we had not to inspect it—we had always to keep brushing it to keep the smoke clear; it swelled with corroded coke.

2216. With the departmental double grill?—All of them. We had to keep the door open a bit, the spark-box door, to get steam; in fact, we had to do it always.

2217. It has been reported that steam could hardly get up with Anderson's arrester till the door was put in;—I remember that.

2218. And the departmental arrester is equally bad in that direction?—Yes.

2219. As to the Morris-Smith one that would not apply?—I do not know anything about that. There were two sparking arresterers that I know of, Anderson's and Tyre's, and one other I do not know the name of. We had to open the spark-box to get up steam; it was something similar to the one we had.

2220. By the Chairman.—Had you to do with the coal as to screening?—I had before I went in; I was on the coal sheds from 1873 to 1880.

2221. Was the coal screened then?—Yes, thoroughly screened, and in bags up to 1 lb. out.

2222. Screened well?—Thoroughly screened on the wharf; that was when we got it in bags. If there was a shovelful of dirt in it we sent it back; that was all through the year till they started to get it on the coal stage in ball, and then it came right straight from the ship. We received it for about six months; a couple of engines came in, but their engines did not put it, that was all that was ever screened there.

2223. What is your opinion of the quality of the coal in use?—There is as much difference as between chalk and chalk in the coal now and what we had some years ago; it was very good coal, and now it is pretty well all slack. I do not know as to its quality of firing, but it is not the same quality of coal at all.

2224. You know about the quality through lighting up?—Yes.

2225. Which coal do you find the better, the New South Wales or the Victorian?—For getting up steam in the shed you cannot beat the Victorian.

2226. That is for lighting up quickly?—Yes.

2227. As far as you are concerned you prefer the Victorian?—Yes; and another thing it does not smut as much with the spark-arrester in. I can get steam quicker with the Otho than the Newcastle, there is more heat in it.

2228. Are you in a position to express an opinion as to the steaming power of the coal?—No, I only go by the drawing. I have used Victorian coal and Newcastle coal for years. With the Otho and Newcastle I have lighted up with cold water, and I always get it quicker with the Otho.

2229. By Mr. Saugster.—With the same quantity?—I cannot say; I never measured the quantities.
2230. By Mr. Wheeler.—If it would get up steam quicker, would it not follow that it would steam better on the road?—It will not last as long.
2231. By Mr. Wheeler.—You mean you burn more of it?—Yes, I saw a fire up with Newcastle coal and one with Oatram—the one with the Newcastle will last five hours and the other not two hours and a half. The Oatram burns right out, it burns quickly, and is very easy to light up.

The witness withdrew.

Thomas Hulse, sworn and examined.

2232. By the Chairman.—What are you?—A retired officer, formerly chief locomotive foreman at North Melbourne.
2233. I understand you have had experience of Tyrrer's spark arresters?—Yes; I was locomotive foreman at the time that a great number of them were tried down at North Melbourne.
2234. As locomotive foreman, you conducted a number of tests of Tyrrer's spark arresters?—I saw them fitted, and watched the proceedings of the work generally.
2235. Were you on the engine when it was tested?—On one occasion there were a number of them tried between Spencer-street and South Brunswick; some eight or nine of these were tested for two or three evenings.
2236. Were you on the engine?—Yes.
2237. What opinion did you form of Tyrrer's spark arresters?—It is the best I have ever seen or heard of.
2238. In what respects?—It is the best arrestor of sparks and most economical as regards itself, and, as far as I could ascertain, the least cost as regards repairing, cleaning, and all that—it never wasted it.
2239. What was the cost of the arresters itself?—So far as I can judge, it would cost about £3, independent of fitting.
2240. It was easily and quickly fitted.
2241. How long would it take to put in?—The principal thing is a head-shaking that fits between the wires and the top of the smoke-box; this ring has to be fixed to the smoke-box. First, the blacksmith has to shape it, and then it has to be fixed by a mechanic and fitter, but there is not so much difficulty about it.
2242. Does it actually prevent sparks or reduce them to a harmless size?—I reduced them. There is no such thing as a perfect spark arrestor, and those never was, but it reduces them considerably.
2243. Does it interfere with the steaming of the engine?—Not in the least, nor with the getting up of steam.
2244. Do you say it is a bad economiser?—Yes. The driver can run with that arrestor with a larger area of blast pipe than any other arrestor that I have known, and, by having a smaller orifice of blast pipe the engineer works faster, and it is less drag on the fire. As the blast pipes are made wider it lessens the current of the exhaust steam; the smaller the exhaust the greater the drag on the fire.
2245. Has it any other advantages?—It never needs cleaning, and I have never seen it out of order. I had it on one engine, running for nine months on the "O" class engine No. 127, and in the nine months' run by a great number of different drivers I never heard a complaint. I had another that Tyrrer made, a larger engine, with a reduced mesh compared with the present one of the two.
2246. The first was better than the present departmental one, and the later one was better than his first?—Yes, it was better because it did not choke; it had a greater area and was a bigger cage altogether, although the mesh was smaller; you can imagine what a spark of three-sixteenths of an inch would be. This arrestor possessed the advantage that there was less trouble with it, and the drivers had no trouble with it whatever, whereas with others they had trouble in getting up steam.
2247. Do you know anything about the arrestor from a commercial point of view? Who owns it now?—I do not think any one owns it.
2248. Has it been adopted in any other country?—It was adopted in South Australia on the Gencom Company's line. It was working there for a considerable time, so far as I know, very satisfactorily.
2249. Do you not know whether it was tried anywhere else?—It was tried on the Mamma and Deniliquin line. I understood it gave satisfaction there also.
2250. I suppose you heard the drivers expressing their opinion?—Often; it was always favorable.
2251. By Mr. Wheeler.—You say the mesh was three-sixteenths of an inch, and that it did not interfere with the steaming of the engine?—Not in the least. The construction of it is very different from the departmental. Here is a photo of it—[showing the same].
2252. What size were the wires?—If I remember rightly (I would not be certain), I believe they were three-sixteenths wires and three-sixteenth openings, and not liable to open out between the stays. I have a drawing of it on a small scale that would give more detail; it cannot alter in any way whatever. When it is once fixed in it is a fixture for a very long time. In all those cases it fitting in those spark arresters I used to have the first 1ft 6in cold water, to give them all the same chance, to see what time it would take to get up steam, and in this one I could perceive no difference whatever in the time in or out; others again were a considerably long time in getting up steam.
2253. By Mr. Wheeler.—You said the arrestor had been used on the Deniliquin and Mamma line?
2254. By Mr. Wheeler.—Do you know the reason they took it off?—I do not; I have forgotten about it.
2255. By Mr. Wheeler.—What is the peculiarity about this arrestor that does not prevent the lighting up with this wire?—I compared with all other small mesh arresters that do stop the firing?
2256. If you have the gridiron, it is more liable to choke with wrought and it lodges and stops on, and you have to clean. In that other one the construction obviates that.
2257. By Mr. Wheeler.—Do you know who represents this arrestor?—No one; the man is dead, and the patent has run out.
2258. By the Chairman.—Have you formed any opinion as to its durability?—Yes, it is really all that could be considered desirable, for it does not waste our fuel as a great number of them do; it does not choke, and it is always clean. As far as my judgment goes, it should last five or six years.
2259. By Mr. Wheeler.—Have they one of those in the Department?—No. I could not tell you.
2260. What became of the one they tried. I have not seen Mrs. Tyrrer so I know what became of the effects after her husband's death—everything was sold.
2265. How long is it since the trial took place?—I should think about seven or eight years; that was the last trial, but there was a previous trial to that in which the Departmental Board held Tyers's to be the best. Mr. Boddycombe, who was one of the engineers of the Portdesign machine works, was on the Board, and it decided that Tyers's was the best. 2266. Better than the one used by the Railway Department?—Yes, the best of all; six or seven were tried.

2261. In the six or seven tried, did it include the present gridiron?—I would not be certain of that—I rather think the gridiron had not come into use at that time. This would be ten or twelve years ago, and in the last trial it was superior to everything. I must point out with the spark arresters so much depends on the fuel it is on. Take the suburban work, the North-Eastern, and the Bendigo lines—what the engine would do on those lines is as different as chalk from cheese. An engine might work on the Eastern system with a mesh very fine, because she has got the same work to do, the work is lighter; but when it goes on the Bendigo road, going up a hill, the engine has a full pressure and all the cars do all the way up from Melbourne to Woodend.

2262. What line was the arrester tried on?—The Bendigo, and there is a wide difference. An engine working with a spark arrester on the Eastern system could work with a very fine mesh, whereas on the North-Eastern line it would not get steam at all with it.

2263. By Mr. Sangster.—you think that Tyers's spark arrester is the best you have seen, and that it reduces the danger of sparks setting fire to the country more than any other arrestor you have seen?—Yes.

2264. And still it impedes the engine less?—Yes, less than any. It is superior in every respect, so far as my knowledge goes. It is cheap and not likely to get out of repair, as far as I have seen. I was locomotive foreman at North Melbourne for about fifteen years, and I knew that the Department was not using during that time the best spark arrester, either for the prevention of fires or for getting steam, or for economy in the burning of fuel.

2265. By Mr. Williams.—Did you report that to the Department?—Not officially; but I have often spoken to them, and I have told the Chief Mechanical Engineer, Mr. Woodroffe, when I was in the Department, that Tyers's was the best I had seen tried there yet.

2266. By Mr. Wheeler.—Do you know the name of any driver who has used it?—There are so many.

2267. Can you give the names of one or two?—There is one, Darraumelle. I had nine engines fit up at one time with spark arresters, and I had to bring it under notice because I was so crippled, and then the trial of the arresters came—there was the gridiron, Mr. Anderson's, the Thornton, and a lot of others.

2268. By the Chairman.—What is your opinion of Mr. Anderson's?—It had undergone so many alterations, even up to this time—the first was a series of pipes used as a spray.

2269. He dropped that—what was your opinion of the last one?—The drivers used to complain of not being able to get steam with it with the heavy loads.

2270. What about the Thornton?—The Thornton was not a good arrester; in the first place it was an armour clain like a bag put round—it used to choke very much in getting up steam. When it was new it was almost impossible to get up steam with it unless you tried other means that are not usual, that is, by opening the smoke-box door, giving wind and so on. When it became choked there was no draught at all—it prevented the draught going up the chimney altogether. Then again I remember very well the Commissioners came down to the running sheds on one occasion to inspect the spark arresters for themselves. I showed them the bottom of the bag of the Thornton; it had got red hot, and of course then it crumbles up—you could crumble it up with your hand.

The witness withdrew.

Adjourned.

THURSDAY, 28TH FEBRUARY, 1901.

Present:
M. K. McKensey, Esq., M.P., in the Chair;
The Hon. H. R. Williams, M.P.

John Matheson, sworn and examined.

2271. By the Chairman.—What are you?—Commissioner of Railways. I may say that, while in my recent tour through Great Britain and America, I had been before me the views of the Master Mechanics' Association of America, and also learned the practice in England and Scotland, there are various technical points of which I, not being an engineer, cannot give an explanation. I therefore placed all my information before Mr. Woodroffe, who is present to-day, and asked him to put the whole matter in form. They have fires in America as well as here; in fact, the conditions there in some places appear very much akin to those we are troubled with here, viz., a heavy growth of vegetation and seasons of very dry weather. They have a lot of rain at one season of the year and very dry weather at another; consequently forest fires are a terrible scourge. My sympathies are with the people who have to suffer from brush fires here, and anything we can do to mitigate their troubles we are only too anxious to do. I obtained from the Southern Pacific and Pennsylvania Railroad Companies drawings of their smoke-boxes, and also samples of the netting that they use. Those two railways have a quarter of a million miles of track, and have very large quantities of country to go through. The arresters they have adopted is one that has met with the approval of the Master Mechanics' Association of the United States, which is a very important body. They meet regularly, and have conferences at which they discuss all these matters. Their arrester is almost but not quite identical with the one we have in the Baldwin engine that we imported. The engine was fitted up before it came to us with an American arrester, but Mr. Woodroffe thinks, and I agree with him, that it would be desirable to have an engine fitted up identically as they are in America. I do not know how the steam power of the engine is affected, but if it proves a better arrester and does not affect the steam power there is no doubt we should adopt it. It will take, however, a little time to do that, and make observations in regard to it. The general tendency in England and Scotland is to abolish spark arresters.
altogether, and to enlarge the firebox so as to give plenty of steam power, plenty of heating surface, so that they have no difficulty in getting plenty of steam. By that means, as I understand it, the exit of the steam from the cylinders is not so sharp or so hard; it is a softer exit, and therefore not so liable to draw the coal from the firebox, but when I say that I have gone as far as I can.

2725. We understood that you were going to attend a trial of spark arresters in Paris under certain conditions?—There was no such trial that I am aware of; nobody in Paris could tell me anything at all about it. You will see from the list I have given to Mr. Woodruff that in England and Scotland there are several big companies that have their engines fitted with spark arresters, and others have not. There is also a letter from the locomotive engineer of the Caledonian Company explaining his reasons for not using arresters, and I think that will assist the Commission in seeing the drift of the practice going on in England and Scotland.

2725. Is not the real reason for their not using arresters the fact that there is very little danger of engine sparks causing fires in these countries?—They have had quite as much litigation about fires raising as we have had here; it is an unusual thing; if they do not burn grass they burn property. We have not set fire to any buildings here, but in the case of grass perhaps we are open to suspicion, though we do not always admit it.

2727. We understand that the late Premier requested you to go thoroughly into this question?—Yes; and I did go into it thoroughly with the Southern Pacific and the Pennsylvania people. The Master Mechanics' design practically rules America. In South America they have a great deal of heavy grass, particularly in the Argentine, and a gentleman there promised to send me a plan of his arrester, but it has not arrived yet. I can give you no personal information myself; I saw no fires, and made no investigation further than inquiring into the practice in vogue in the various places. I do not profess to have a knowledge of engineering.

The witness withdraws.

Thomas Hale Woodruff, sworn and examined.

2727. By the Chairman. What additional information can you give us on this subject? I have all the particulars that Mr. Mathieson brought out; but I have put them in a concise form. The first paper is a tabulated statement showing the practice in connection with engines in Great Britain, giving particulars of the practice on a large number of lines. [The witness handed to the following papers.]

MIDLAND RAILWAY COMPANY.

Information obtained from various Railway Companies in reply to circular, dated 14th September, 1900, on use of Extended Smoke-boxes, Spark Arresters, and Grates in Ash-pans.

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1 Only on all original engines; abolished on modern engines.
2 Simply so comply with local regulations.
3 All engines formerly so fitted, but fittings removed after receipt of appeal in Sheaf bury case.
4 Between engines have tube plate set back in boiler barrel.
5 From collector plate placed horizontally in smoke-box over top row of tubes.
6 Perforated door fitted inside ordinary damper door to prevent live embers from falling out.
7 Fitted by makers without being specified, and have been allowed to remain.
8 Consists of single horizontal wire netting in line with top of blast-pipe; no particulars as to size of mesh.
CONDENSED PARTICULARS OF INFORMATION OBTAINED BY MR. MATHIESON WHEN IN ENGLAND OF PRACTICE OF RAILWAY COMPANIES USING SPARK ARRESTERS.

[For details, see above.]

SPARK ARRESTERS

The following 21 companies do not fit spark arresters in engines:—
Caledonian (only on original engines, not on modern engines).
Cambrian.
Furness.
Glasgow and South-Western.
Great Central (except on one or two engines simply to comply with dock regulations).
Great Eastern.
Great Northern.
Great North of Scotland.
Great Western (two deflector plates placed horizontally in smoke-box over top row of tuber).
Hull and Barnsley.
Lancashire and Yorkshire.
London, Brighton, and South Coast.
London and North-Western.
London, Tilbury, and Southend.
Maryport and Carlisle.
Metropolitan (on two engines only, fitted by makers without being specified and allowed to remain). Grid pattern.
Metropolitan District.
North British (only on dock shunting engines).
North London.
North Staffordshire.
Midland.

Companies having them fitted:—
Highland.
North-Eastern (consists of single horizontal wire netting in line with top of blast-pipe; so particular as to size of mesh).
South-Eastern and Chatham (Mesh).

The following companies do not use grids in ash pans:—
Caledonian.
Cambrian.
Furness.
Glasgow and South-Western.
Great Central.
Great Eastern.
Great Northern.
Great North of Scotland.
Hull and Barnsley.
Highland.
Lancashire and Yorkshire.
London, Brighton, and South Coast.
London and North-Western.
London, Tilbury, and Southend.
Maryport and Carlisle.
Metropolitan.
Metropolitan District.
North British.
North-Eastern.
North London.
North Staffordshire.
South-Eastern and Chatham.

London, Brighton, and South Coast has a perforated door fitted.

Great Western has grids in ash pans of all engines.

EXTENDED SMOKE BOXES.

The following nineteen companies have no engines fitted:—
Caledonian.
Cambrian.
Furness.
Great Central.
Great Northern (11 have tube plate set back in boiler).
Great North of Scotland.
Hull and Barnsley.
Highland.
Lancashire and Yorkshire.
London, Brighton, and South Coast.
London and North-Western.
London, Tilbury, and Southend.
Maryport and Carlisle.
Metropolitan.
Metropolitan District.
North British.
North London.
North Staffordshire.
South-Eastern and Chatham.

The following five companies have engines fitted with extended smoke boxes:—
Great Western, 300 engines.
Midland, 10 engines.
North Eastern, 30 engines.
Glasgow and South-Western, 4 engines.
Great Eastern, 1 engine.

Mr. McLennan, one of the principal locomotive superintendents in Great Britain, now in charge of the Caledonian Railway, writes as follows to Mr. Mathieson:—

Caledonian Railway Company, Locomotive Department, Saint Rollox, Glasgow, 10th September, 1900.

John Mathieson, Esq., Chief Commissioner the Victorian Government Railways, Australia, at St. Enoch's Hotel, Glasgow.

Dear Mr. Mathieson,—As promised, I herewith send you, under separate covers, general drawings illustrating our latest 18·4 x 20·m. x 6ft. 6in. bogie express passenger engine, whose boiler, as shown, has a diameter of 6·5 ft., and also a diagram showing our standard blast-pipe as used on our passenger and goods engines, with this exception that the latest drawing shows a straight blast-pipe with the nozzle of blast-pipe of 3½ inches diameter, whereas some of the engines of same class are running with blast-pipe nozzle of 3 inches diameter.
I have almost you a tracing of the wire setting which is used on the original Caledonian engines, and I may mention that in all our modern engines built for several years back no spark-arresting appliances have been fitted into the smoke-box, as, from my practical experience, I am convinced that any appliance fitted into smoke-boxes for preventing evasion of sparks is detrimental to the working capacity of the engine, as the blast-passage requires to be correspondingly contracted in order to enable engine to generate sufficient steam.

To overcome this difficulty, I designed engines with large bidders and fireboxes, and put in long brick arch and also deflector plates, as well as wide blast pipes, so as to secure an abundance of steam with a minimum of forced draught.

We make the side-box and corner air-tight, so that sufficient air's admitted from before the fire, while the deflector plate regulates the air on top of fire; and with this and the long brick arch I endeavor to keep all the coal in the fire-box, and prevent it from being drawn through the tubes into the smoke-box and emitted from the chimney in sparks.

I am convinced that this, and this alone, is the only and best method for preventing the emission of sparks.

With kind regards,

Sincerely yours faithfully,

F. P. McIntosh,

Melbourne,

The above appears to he the boiling down of what is done in Great Britain. In all our new engines the bidders have been made of from 26 to 30 per cent. larger capacity, with plenty of heating surface and large blast pipes.

2275. What is the result in regard to the emission of sparks?—If you have plenty of steam and plenty of heating surface the engine is not taxed so much as it would be otherwise, and there is not the same tendency to lift the fire, but I am of opinion that an arrester is still required.

2277. Do you think the conditions of the old engines are sufficiently similar to ours to make their experience of value to us?—I think so; they have as much trouble as we have from sparks. At the present moment they are legislating in the direction of making the railway companies pay whether their engines are fitted with arresters or not. I remember a case which is cited as a standard case, where a fixed mill was burnt, and the fire was alleged to be due to a spark from an engine belonging to the Caledonian Company. Fixt would be more inflammable than even dry grass.

2278. In Great Britain the trains pass the buildings they carry?—Yes; and so do we on the suburban lines, but we never set fire to them; I only know of one case.

2279. The buildings do not come so very close to your lines?—In some of the suburbs they are right alongside of fences, but you never hear a fire on the suburban lines as far as my experience goes; you rarely see any sparks thrown.

2280. Do you not run small engines on the suburban lines?—No; we have powerful engines.

On the Cambowell line we have to negotiate in 40 grades with twelve or fifteen vehicles, the load is as much as the engine can pull. Our trains are becoming too large for some of the engines on the suburban lines, but you never see any sparks thrown.

2281. On the country lines sparks are thrown?—Yes, but not dangerous ones if everything is in good order. If you have hundreds of engines running you cannot be absolutely sure that every arrester is in good order. The next information I have to submit is American. It consists of a series of drawings we spark arresters, of which the following paper gives a description—[Handing in the same, which is as follows—]

VICTORIAN RAILWAYS, Chief Mechanical Engineer's Office,

DEPARTMENT OF SPARK ARRESTERS, ETC., OBTAINED BY THE COMMISSIONERS OF RECENT VISIT TO AMERICA.

SOUTHERN PACIFIC RAILWAY.

DRAWSNS & SPARK ARRESTERS, ETC., OBTAINED BY THE COMMISSIONERS OF RECENT VISIT TO AMERICA.

1. Ash-pan, Class DA
2. Ash-pan, Class DX
3. Split for top of smoke stacks
4. Standard saddle, 15-in. smoke stack
5. Smoke stack, 14 inches
6. Smoke stack, 16 inches
7. Extended front of locomotives, Class CW and ED
8. Arrangement of smoke-box
9. Arrangement of ash-pan for anthracite coal
10. Arrangement of ash-pan for bituminous coal
11. Extended smoke-box, Class G4 and G4a
12. Extended smoke-box and shaking grate
13. Extended smoke-box, Class EZ
14. Extended smoke-box, Class D16, etc.

Noted on drawings—"Allision form of Master Mechanic's approved practice."

This form of spark arrester is very similar to that on imported Baldwin engines, fifteen of which are now under construction by the Phoenix Foundry Company at Allentown. It is proposed to use the same spark-arresting appliance in the boiler-made engines.

See also page 3 (diagram 19) of my evidence before Royal Commission on Spark Arresters.

Baldwin Locomotive Works.

Pennsylvania Railroad Company.

9. Arrangement of ash-pan for anthracite coal
10. Arrangement of ash-pan for bituminous coal
11. Extended smoke-box, Class G4 and G4a
12. Extended smoke-box and shaking grate
13. Extended smoke-box, Class G4 and G4a
14. Extended smoke-box, Class EZ

This shows the usual American baffle-plate before tubes, with inclined single wire setting of the pipe. Does not show anything to prevent ashes dropping out of ash-pan.

This does not show any form of screen for ash-pan doors.

This is the usual American baffle-plate before tubes, with inclined single wire setting of the pipe. Does not show anything to prevent ashes dropping out of ash-pan.

This is very similar to above.

This is very similar to above.
DRAWINGS OBTAINED BY THE COMMISSIONER IN ENGLAND.

CALCOTT RAILWAY COMPANY.

15. Spark arrester
16. Blast pipe, bogie passenger engine

NORTH-EASTERN RAILWAY COMPANY.

17. Spark arrester

Six samples of wire netting, varying from 1-10th mesh to 3-10th mesh.

These are samples of netting used—[producing the same]—but I have no particulars as to what companies use them, or how they are used. Some are very fine—they vary from 1 to 2, by 1 inch in mesh. The very fine netting must be used where they burn wood for fuel.

2286. By Mr. Williams.—The largest sample there is smaller than your meshes?—We use 3/4-inch where we use netting at all. That was sent out with the Baldwin engine.

2287. By the Chairman.—Is there any other information you can give us?—I think not. I have kept a careful record of the published fires, and I find that, so far, there have been very few this season attributed to locomotives.

2288. Have you had any complaint about the fire that started at Longwood?—Not yet. These are the bush fires reported in the Age and the Argus from the 26th of November last up to date. Taking the newspaper statements, without picking them up at all with our own reports, there were 338 grass fires reported, six of which were attributed to locomotives. We have inquired into some of them, and find there is nothing to show that they were so caused. The Birregura fire, I believe, is claimed to have been caused by an engine spark, but we have not completed our investigations in that case yet. As regards the liquid fuel question, we find there is no difficulty in using it if it can only be supplied at a reasonable price, so as to compete with coal, but the difficulty is to get the people to quote a price. I suppose they want to get their works established first, but I am not able to say what will be done in that matter until they start.

2289. By Mr. Williams.—If you had liquid fuel you would not have any sparks at all?—No.

2290. By the Chairman.—Are they going to start in this colony?—Yes; they are building extensive works at Williams-town; they have a huge tank there, 60 or 70 feet in diameter and 60 or 70 feet high, for storing kerosene. The Standard Oil Company are also in the field for distributing oil in bulk.

2291. So far as you know, it will not be dearer than coal?—I should not think so; I fancy they want to regulate the price by the price of coal.

2292. By Mr. Williams.—You would have to alter the fire-boxes in order to use liquid fuel?—Not very much. We would have to brick them round, that is all, thus making a brick furnace. Instead of having fire-bars we would have fire-bricks, and provide tanks and pipes for the proper distribution of the oil.

2293. You would take out the fire-bars and build in with brick?—We would probably build the bricks in on top of the fire-bars. On the Great Eastern lines in England they use oil, and have done so for many years with great advantage.

2294. Are any other important companies using liquid fuel?—No; they have experimented, and proved it is possible and practicable, but I suppose the price hinders them. I expect they get a better price for their residue in America than if they sold it as fuel.

The witness withdraw.

Adjourned.

WEDNESDAY, 3RD JULY, 1901.

Members present:

M. K. McKenzie, Esq., M.P., in the Chair;
J. Bowser, Esq., M.P.,
The Hon. John Gavan Duffy, M.P.,

Alfred Hock, sworn and examined.

2295. By the Chairman.—What is your occupation?—Furnace-builder and bricklayer.

2296. Have you been employed on any railways?—Yes, on the Victorian Railways for about ten or eleven years.

2297. Can you give the dates when you entered the service and when you left, approximately?—I have got my discharge, which speaks for itself. It says, "First-class bricklayer and kept good time," and the dates given are from 5/3/91 to 5/3/98.

2298. You desire to give evidence to-day in regard to some invention for arresting sparks?—Yes.

2299. Is the invention your own?—Yes, patented in my own name.

2300. Will you tell us about it, in your own words?—The nature of it is it is a baffle in the fire-box; a vertical baffle built in the back of the arch in the fire-box. By that means I can keep the gases from being drawn away too hastily as the engine exhausts.

2301. Does that increase the length of the fire-box?—No. It has nothing whatever to do with increasing the length of the fire-box. The length of it is guided by the length of the fire-box.

2302. By Mr. Duff.—What proportion would it bear to the fire-box?—On a fire-box 6 feet it would be 3 feet long. It also keeps the small cinders in the fire-box instead of being carried through the tubes into the smoke-box, and while an engine is pulling heavily up a bank, it keeps the tubes and tube plate and also the smoke-box comparatively clean, as, when the engine exhausts, it only lifts the fire very little, and the sparks are knocked against my baffle and are consumed.
2999. Is that a full description of your invention?—Yes, I think so.

3000. Has it ever been submitted to practical test on the railways?—Yes. I had it running on the North-Eastern line on No. 377: "X" class heavy goods engine.

3001. How long was it attached to that engine?—Six weeks. It ran two weeks in October, and four weeks in November, 1897, six weeks altogether.

3002. Has it been reported upon by the inspectors?—That I could not say. I fancy that it must have been reported on, as my immediate superior officer, the loco. foremen, asked me to submit details to submit to the chief, as he wanted to know how it was constructed.

3003. You never heard anything further about it?—Nothing officially.

3004. As the opinion of the Department?—No, until later on an interview with Mr. Mattockson and Mr. Woodroffe.

3005. What occurred then?—Mr. Mattockson asked me why I did not come to him and ask him if I could take out my patent. He said—"You had the right to take out a patent without asking me." I said I thought as long as I gave the patent to the Victorian Railways, and gave them the right to use it for all time, I was deeding it absolutely to the Department. He turned to his Chief Mechanical Engineer, Mr. Woodroffe, and said—"Do you intend to use it?" and he said—"No; I would not put it in my engines. I would not ruin my boilers with it."

3006. What did he say about using his boilers?—I fail to see, but I could point out later on that they would not damage the fire-box or boiler in any way whatever.

3007. What was the baffle made of?—Bricks. I have here a model of my invention—"providing the same"—and also a model of the arch in use on the Victorian Railways, in New South Wales, and in other parts of the world, so as to explain it to you.

3008. The arches are also brick?—Always constructed of fire-bricks, but on many engines, on some railways, they use lump, what they call fire-lumps. I found by experience on the Victorian Railways that in using lamps, which weigh from a pound and a half to a hundred and a quarter and a little over, the expansion and contraction of that body of clay which they used that they did not last, and you could not get any durability. In September, 1895, the Department and the railways decided to use an arch on which they would only save £2 per engine per year in durability, and my loco. foreman, Mr. Tinsley, considered my idea a very good one, and said, "I will forward this application in and do my best to get you paid for it." That was sent to you in September, 1895. I heard nothing more about it, and it was re-transferred from the Loco. to the Existing Lines, as the Honorable Sir George Turner's Government had come in and we had got back our old pay from 7s. a day to 11s. a day. After going back to that branch for about three weeks, I was sent for by the Chief Mechanical Engineer, and was asked by the chief arch inspector, Mr. Harris, if I would come back into the Loco., as they desired it necessary to have me at North Melbourne, as I seemed to thoroughly understand the arches in the locomotives. I said that I was willing to come back as long as there was no reduction in my pay, as I had been re-reached for a long period and had heavy insurance to keep up, and had little to live on. He stated that the Chief Mechanical Engineer told him if I was willing to go back my pay would be 10s. a day for the present, but, if successful with the small bricks, I wrote about getting the durability, I would be put in charge of all the running seeds throughout the service in connection with the arches, and get a good position. Mr. Woodroffe was willing to do that, I was assured I would be successful, and would take it. I asked Mr. Harris what he would advise me to do, and he said, I would take it. I asked—"You mean tell Mr. Woodroffe I will take the position?"—I then took up the position, and after being there about a week I was re-transferred permanently by the Commissioners. Mr. Woodroffe sent for me, and said, "I have thought over what you wrote about, and if you can get 6,000 miles with that class of engine and the arch you speak of, I will be satisfied, and we will have it adopted." I then got a free hand with my arches—the small brick arches. Before leaving the office I asked him if he would give me a memo. showing the loss of 1s. a day, and effect of the arches. and he asked me to come in at one o'clock, and he had the memos with him. I got about eight or nine days afterwards, which stated that I had been permanently transferred by the Commissioners to North Melbourne shed, and that my wages would be 3 per cent. a day. I then had a trial which ran into fifteen or sixteen months, and I got 19,297 miles as against 3,400 with the departmental arches, and the saving on the heavy goods engines would be 10s. in first cost of construction. My result was nearly six times what could be got from the present departmental design of arch.

3009. That referred to the length of distance you ran? You were speaking about the cost of the arch, and now you go back to running distances?—The mileage of the arches with fire lamps was 3,404 miles—that is with the departmental arch.

310. By Mr. Greaves.—Are they using that arch now?—Yes; and also my design, on the suburban "E" class engines, small fire-bricks. With my design the mileage was 19,297 miles. That was the mileage of one design of arch against the other.

311. That was until it wanted repairs?—That was the life of it. The first cost of my design was from 7s. to 10s. less than the other in material and labour.

312. By Mr. Duff.—What was the total cost?—About 18s. in labour and material for mine.

313. The other would be from 7s. to 10s. dearer?—Yes. If it cost the same money, the mileage is a life saving. The cost of the arches with fire lamps on the "E" class engines was £1.5s. per arch, including labour; for the "X", "Y" and "A" classes the saving would be 10s. per arch. After having such a successful trial as that the Chief Mechanical Engineer, at the finish of the correspondence, which I copied, says, "This evidence is conclusive as to the value of the arches built by Hacket. You will in future have all "E" class engines fitted with the small bricks, under Hacket's supervision." That was in 1897-98. That memo was to my loco. foreman, and the paper was handed to me, and I copied this off. I then went to the Chief Mechanical Engineer, Mr. Woodroffe, and asked him, as I had been so successful, and I had been designed an arch which would economize, ask if he could have his way clear to give me back the 1s. a day, and he told me it was not at his coming to his office and telling him that any engine with a brick arch would save coal, that the brick arches did not save coal. I was a worker and an engineer, but only a mechanic, could not debate the matter, but I mentioned that the saving was stated to be 50 per cent., and this particular engine, 453, on which it was run for six months had shown a saving of something like 3 lbs. per mile.
2314. What proportion of the total amount was that?—That was a matter of 3 lbs. of coal per mile for every mile we ran.

2315. What coal had to be cut and not used?—I was giving what their own vessels chose to show. It simply gives what their sheet shows. It shows this engine used 3 lbs. of coal per mile.

2316. By the Chairman.—You do not know what it amounted to, do you? I know of some engines it is 45 lbs. and up to 60 lbs., a saving of about 5 per cent. The driver of this engine, the improved arch, when he found that it did not consume much fuel, he came to the Chief Mechanical Engineer saying that it did not save coal and that he would not comply with your order, and charge them, which I have. That is a driver Meloy. I have a copy of that, and in the first of that issue of your paper, "The amount of coal it saved surprised me!" The outcome was the Chief Mechanical Engineer had ordered a trial with the engine No. 33, Y-class engine. We possess him for 60,000 miles on the hands of the loco. Inspector, Mr. Loewen, and this engine was to be run for one month, the month of August, 1896, with the departmental crew, September with one of the horses at to, and in the latter with improved arch, and the outcome of that trial was that it showed a saving of 22 lbs. per mile, which the October sheet will show, and which can be prescribed. No other driver was allowed on that engine for the three months but driver McCoyle, showing that it must have been an official test to show that brick arches did save coal.

2317. By Mr. Dwyer.—What is the difference between the brick arch and no arch?—I have not that.

2318. By Mr. Grant.—Is the ordinary brick arch, or what you call the "bumps," better than no arch at all?—It saves a certain amount of coal.

2319. Is that the subject in the Department now?—Yes. To show that the arch brick saves both the Locomotive Engineer, published in New York, United States of America, for October, 1897, in a leading article says, "We do not remember of any appliance used in steam operating that has gone through such a varied reputation on the American Continent as the brick arch used in the fire-boxes of locomotives. That was one of the devices that made use of to enable locomotive coal to be burned in locomotive fire-boxes without causing a smoke nuisance, but it is almost the only one of the early smoke-preventing appliances that has survived the shocks of prejudice and the tests of varied experience." At the Fifth Convention of the Traveling Engineers, Association held at Chicago, United States America, on 14th September, 1897, the following extracts from the report are taken: "Standard practice, and observed an economy of fuel of 20 per cent with the brick arch." "The consensus of opinion was that brick arches give both economy in fuel and prevent smoke." Mr. Simbirz mentioned that no reference had been made to the advantages of steam plants where the smoke nuisance is the brick arch, the benefit being more the brick fire-box, and appliances for regulating the admission of air. While that trial was going on I found in the "Y" class engine, No. 377, heavy goods, how I came to do that was through a conversation with my foreman, Mr. Burgess, who said I wished it was possible to keep the tube plate clean, and the smoke box, to save so much time as to be given on the main line, especially expenses, and having the smoke-box fall of ashes and the smoke spark arrestor burning, having to pull up to clean them. I told him I had a design on it, and I found and had men in charge, I did. He thought it a very good idea, and nothing being tried, and he said, "If you want me, I thank you I would put it in and give it a trial." So I connected it and went on with it and the first trip and I found the engine seemed fresh, and there was nothing with the tubes getting hot, or the smoke-box having ashes in it, or the goods getting black with soot. With that running I was told that Mr. Loewen was trying to take the credit for the arch which I had designed in No. 133, and when ran in the official test in No. 383 and naming my idea, not owing to Mr. Woodhouse not carrying out his promise and giving me the is, a dry back, and I hinting another officer in the Department trying to take away and get the credit for what I had done. I was determined that I would patent this last improvement, and if I got nothing out of it I would get the credit of it and from that all the trouble started. Before the Chief Mechanical Engineer heard it I had patented, he asked me for drawings and full details; and I asked for our month's peace before submitting drawings, and also for an interview he agreed to. He agreed to agree to, the agreement was entered into, and I went to my month's peace before submitting drawings, as I was patenting. I said, "Yes, sir," and he stated that it was the best preserved stock and impoliteness ever perpetrated in the Victoria Government Railways to use their engines for our own purposes, and that of a locomotive for which it repays. "I state, Mr. Woodhouse, before Mr. Loewen, and Mr. Burgess, that I have the right to use it for all time. I am willing to go on, but do not want my idea marked by others outside the house." He would not believe that what I wanted to charge royalty to the Department, and I told him I was willing to go to my lawyer and have a legal document made out to prove my assertion that I was keeping the patent for Victoria to myself. He then ordered it to be taken out of the engine at once. This was on Saturday, and on Monday my boss, foreman said to me, "Have you taken the arch cut? I said, "No, but I am going to do so." He said, "It is a pity, but I suppose you must obey orders." And I took it out. Some of my friends then made it into a little company, and there was a proposal brought, and one was taken to Mr. Mathisson by the Chief Mechanical Engineer, and I got notice if I did not withdraw the prospectus I must leave the service for fourty days. I replied and asked for an interview, which interview I got, and to it I have only reference in the notion that I was blocked, and the whole thing was, as it were, the standard of the Victoria Government simply because it took out the patent; but I was right—as I bare documentary evidence to prove—blously and gladly to the Department of which I was a servant.

2320. Have you it patented?—Yes.

2321. Be the Chairman.—What made you to leave the Department?—After the interview with Mr. Mathisson I, a fortnight after, got a notice stating that I was to report myself back into the Existing Lists at Maryborough. I protested against it as there was no complaint against me as I had designed an arch for saving fuel, she proved one, and I failed to see why I should be treated thus any way, and I said as I had under medical care it was impossible for me to speak up my house, and, I get the reply, "The Commissioner's decision is final!"

2322. By Mr. Grant.—That was to go to Maryborough or go altogether?—Or resign.
3233. They now get that certificate which you read?—I have got leave of absence, as I was not well, and as I found during the time I was in the Department engaged on such business, the work carried out to the satisfaction of the Broken Hill Railway Company, which they accepted and are now using and have been for close on five years. (The bricks are constructed in Melbourne and sent by boat and then packed hundreds of miles inland.) I went to them and showed them how they would allow use facilities to try my patent, while they did not know what I was doing. I was then asked, and when I said I was doing it on the narrow gauge of the section of the line and after the trial treatment I received on the Victoria Railways, I determined I would resign, so it is sent in my resignation, which was accepted.

3234. Did you get that certificate from the Department?—Yes.

3235. By Mr. Duffy.—You were ordered to go to Maryborough within fourteen days, or you would be dismissed.—It did not hold out a threat that I would be dismissed. It was not an ordinary memo. I protested against it, and then I received word that the Commissioner's decision was final—that was against my appeal—and that was all.

3236. By the Chairman.—You have given a very clear account concerning the arch as a fuel-saver, but you have not told us anything about its arresting spark?—Regarding the arresting sparks, the advantage I have got is that instead of having, as we usually have, spark arresters in the smoke-box, and deflector plates and extended smoke-boxes, I am able, without that, in the alteration which has taken place in many parts of the locomotive world, to get a better result by having a tube, which acts somewhat similarly to a deflector plate, in the smoke-box on the back of the arch, and by that means when the engine is pulling heavily I am able to keep the fire quiet, and still give the engine a full head of steam.

3237. Tell us what you mean by keeping the fire quiet?—I mean that each time the engine exhibits it does not tear the fire up. The fire is kept just on a simmer, but it does not tear the fire up and down. The great advantage is to keep these sparks in the fire-box is claimed by many, but, whereas, with the present design, they are lifted up to the top of the arch and also through into the smoke-box, and then out of the funnels. Then it is a common occurrence for an engine, when pulling heavily, to drag the green coal off the sand and lift the fire off the bars on to the top of the arch, and the consequence of that is the engine has a fire on the fenders and one on top of the arch, and the great heat which penetrates on the top of the arch through arches and live coal being drawn there causes damage to the smoke-box, as all the expanding tube ferrules get burned, and also the fire bars in the arch, and also the steam in the steam-gear and is lost, and the consequence is, with the double spark arrester dogged up, the engine will not steam freely, and it is with the utmost difficulty they get along the road, whereas with my tube (the fire-box which is an entirely new idea to anything else yet tried in the locomotive world for stopping sparks), the engine is enabled to steam clean, and so sparks are emitted from the funnel, and you can look out of any part of a train that engine is heading and never get any spark or cinders in your eyes, which shows beyond all doubt that it must retain all the ashes and sparks in the fire-box, otherwise I could not have kept my head there for any length of time.

3238. Is there any more you have to say about the sparks?—There is one point I would like to add in connection with the sparks. With all other designs for stopping sparks, the smoke-boxes and smoke-box doors get bent, if they stop the sparks effectively; I have often seen engines come in with the door all out of shape and the smoke-box bent, which means a great expense and delay to the engine. Also, referring to ashes on the Department's brick arch, I might state that I used to get an iron scrubber made so that when the engines had to run a double trip, and they had no time to cool down them down, my scrubber scrubbed the clinker and ashes and ashes and ashes, and they got more and more out of the arch blocking up the tubes, and which could only be partially done by that means so that she could manage to get through an extra journey until such time as I would be able to get her cooled down and cleaned down properly. I think that on the point of sparks that is about all.

3239. When you first invented this arch you had no idea of arresting sparks, and that it would be effective for that purpose. My main point was to try and keep the tubes from curving up, and also to keep the smoke-box cleaner and to try and economize fuel.

3240. The spark arresting is an incidental effect?—Purely incidental that it turned out such a splendid spark arrester.

3241. It was as a final result that all the unnecessary sparks went out, and we consumed, that keeping of the tubes cleaner?—Yes. Before I built that arch I tried experiments to find out how much my arches expanded, as I knew by building a vertical wall up to the roof of the fire-box without uncertaining the amount of expansion I might do injury. I made various experiments, and I think I might as well tell you how I did it. I took a trolley and placed small pyramids of five-day or ten days' vertical wall, varying from a quarter of an inch to an inch, and fastened by eight weeks' trial, three-eighths was about the maximum of the rise. I knew then what I have to leave there would be no danger from the expansion through having the bars on the back of the arch.

3242. On the other hand you have to give the engine an expansion in this invention. It is not used on the Victoria Railways?—My arches are only used on the suburban "I" class engines.

3243. They are still used there?—Yes.

3244. By Mr. Green.—Is the Railway Department using your patent now and putting them up?—No; what they are using is the arch, for that
depth.

3245. Is that patented?—Not by itself. It is an improvement of that. In forming the tube I form a combustion chamber in front of the tube plate, and when the engine is steaming heavily each time the exhaust of the air and the water in the tube, and so I expect these arches instead of the fire-box to be the future.

3246. I would like to hand in some testimonials I have received from the Broken Hill Company and the Silverton Railway Company, on which they are using my improved arch, but not as it is patented.
2336. By Mr. Duffy. — There is no difference between your arch and the departmental arch but the vertical line which makes it last much longer — Yes.

2337. By the Chairman. — Is this the vertical line that goes as the corner? — Yes. With regard to the Queensland Railway, testimonial, it was, "Commissioners’ Office, Brisbane, 16th December, 1898. Sir,—With reference to previous correspondence re Hacket’s Patent Baffle Arch, I am desired to inform you that the Commissioner is of the opinion that arrangements have been made with Hacket’s Patent Arch in ‘A11’ and ‘B15’ classes of engines. As far as the invention appears to give satisfactory results and in the ‘B15’ engines showed a saving of something like 2 lts. of coal per mile. On the ‘A11’ engines it made no difference at all in the consuming, but it had this important effect, that, in both classes of engine, there was an almost entire absence of cinders and ashes, which are usually emitted from the chimney with an ordinary arch when an engine is pulling heavily, the mouth being that ashes are very much cleaner at the end of the journey than formerly. Perhaps trials have, however, revealed the fact that the patent arch is only suitable, for certain classes of coal, but seeing that our Queensland product is extremely variable in quality, this is a serious drawback.

The unit engine, Class ‘A14’, in which the patent arch was tried on, was the occasion, lost a considerable amount of time on the Downs through the smoke pressure not being maintained, the cause being that all the parts of the lower tubes were choked with cinders. With the ordinary arch this is not at all a serious matter, as the choker can be brushed off with a poker, but, with the patent arch, it is impossible to do this, and I have in consequence been obliged to have the latter taken out of the passenger engine in the Brisbane district, but trials are still being carried on in Townsville with Dowse’s coal, which, of course, never cinders, and also on the ‘B15’ engines at Roma-street. For the reasons stated, it is evident that the arch cannot be generally adopted, and I am not prepared to make any recommendation with regard to it until a more exhaustive trial has been made to check the saving in fuel consumption. I will advise further, say, in three months time.” — I beg to state, or 12 lts. of coal, and on the heaviest read they ran 201 miles and more about 2,000 feet, and that engine the whole time under trial, the coal weighed on and off. The unit run eight weeks without a single stop from the Queensland House to Townsville. If the tapers are put down, then I did not do the same. As a matter of fact (in my own) if the unit had to be taken out of the Brisbane engine owing to the difficulty experienced in clearing them. Shortly after this another one had to be removed from the other unit engine stationed at Townsville, as the tubes of the latter would not remain tight, and the labour of taking down the arch and replacing it again was too great. The third arch, which had been put into a ‘B15’ engine (No. 301), fell into the fire at Cairns on the 22nd January last, and as the driver reported that the engine was stagnating splendidly, and the tubes had also endangered to give trouble through leaking, it was not replaced. The patent arch has undoubtedly its advantages, the chief one being improved burning and the almost entire absence of sparks and ashes emitted. From first to last it is evident in order to make a success of it a superior coal must be used that obtainable in Queensland, and for this important reason I am unable to recommend its adoption. That is signed by H. Horan, Locomotive Engineer. You see by that no considerers where there was better coal and undoubtedly on the wide range I believe a better show is shown than on the narrow. I should certainly get a fair result.

2338. Do you think the Victorian coal is a good coal? — Far superior to anything they have in Queensland, either the local coal or that from Newcastle. With your permission, I will just read the Bridge Hill Foundry, which is another coal company, Limited, Equitable Buildings, 330 Collins-street, July 22nd, 1898. To W. A. Barbour, Esq., Secretary Hacket’s Patent Baffle Arch Co. Dear Sir,—I am directed by my Board to inform you the following report in connexion with the trial on the line of Mr. Hacket’s Patent Baffle Arch. It was not continued to comply with your suggestion and make the trial against each of the ordinary type, through the latter having been replaced towards the close of last year by an improved arch designed by your Mr. Hacket. That was the same as used with McCoy’s engine, and which from its superiority in durability, and to some extent coal-saving, was much used. The following extracts from the latter were made by myself April and May, 1898, which not only the advantages claimed for the ‘patent’ arch are clearly borne out by this trial. Skirlie.—The engines steam quite as well as with old arches. Spark.—The arch reduces the number of sparks considerably, which is a valuable improvement where engines have to travel through gorse or wheat country. As to single-box.—The makes in the smoke-box are reduced considerably, and there is no trouble with the smoke-box doors getting bent and damaged, this has caused much trouble in the past, especially when using coal which contained a large percentage of ashes. Scales.—The ashes are kept perfectly clean and free from bars, and during the trial the engines have not been stopped, whereas with the old arches they had to be cleaned after every trip. Coal consumption.—There is practically no difference in the coal consumption. General.—Generally speaking, I am impressed with the arch, not removing the coal consumption has not been increased. The engine requires living in a different manner, and drivers becoming acquainted and learning the way to get the best results. In conclusion, I have to inform you that the patent arch is being generally adopted by this company.—(Signed) W. MacNicol, Secretary.

2339. That was a comparison not your own arch? — Yes.

2340. By Mr. Duffy. — What coal do they use there? — Newcastle, about the same class as is used here. The patent is not running on the Broken Hill Line. I say in note here—Messrs. The reason why my patent arch is not in use on this railway is that their engines are fitted with a hopper in the smoke-box which tends to make the patent arch useless, as they are entirely different in principle. A patented arch, if utilized, a bridge arch designed by me, which in their report shows coal saving; but if deep or sliding doors are used, the same as in Victorian Railways, my patent arch can be used with all the advantages I claim, it being unnecessary to use baffle plates with my patent arch. It was found that the baffle doors were
being burnt, as they prevented sufficient air being admitted over the fire, and passing between the baffle doors and face of the baffle, the fire burned in the fire. With my patent I do not require baffle plates. They have the baffle doors so as to keep the cold air going—(righting the motto). As they have courses where there is little or no coal, they do not burn. On our railways volume baffle-rooms, which do not last long. There is no necessity for them, because the baffle on the back of the arch does all the work necessary, and the cold air striking on the cold plate they lose their power, and there is an expansion and contraction which changes the tube plate. There is one thing I would like to remark, and that is this: the Chief Locomotive Engineer in the Victorian Railways gave me no possible show to see what were the proofs of my service for stopping sparks. Yes, by the reports, I got on the Broken Hill line facilities to try, and they have an arch of my designing, and they send to Melbourne for them, and ask me to show them when they receive these reports; and I told them that it will not affect the draught. I had a trial with a man from the Railway Department who was the head of my branch with the same kinds of arches by those people, who could see there was some merit in what I had.

241. By Mr. Oakes, the Engineer stated that they tested coal and found the draught, and the locomotive, McCell, for a certain time; their own without an arch, and then with your arch—My improved arch.

242. You stated that years was tested for a longer time before it required renewal which was consistent with the time of the one designed by the Department—Yes, that is right.

243. One lasted a certain number of miles and required renewal, and your眼球 a considerable distance more and then required renewal—Yes.

244. When a broken arch wants to be renewed tell us what has to be done—The engine has to be brought in and cooled down and cleaned.

245. How many hours would that take?—Sery he comes in with a full head of steam, or 50 lbs. or 40 lbs. of steam, it would take about an hour and a half to blow off and cool down, about three hours altogether.

246. And how long would it take to put the arch in?—Three hours.

247. That is six hours altogether—Yes.

248. Therefore, that would be lost in her running time in consequence of the alteration being made—No; the engine comes in; we save what we call "shed-day," and the engine has a proper wash-out day.

249. Therefore, as a matter of fact, if the Hawk's arch last longer without renewal there must be a saving to the Department in the last time—Yes, I have seen an arch put in today in the Department and come through next day, and it has half fallen down from the expansion fitted to the inside of the locomotive, for a certain time; that is the weakest way you can put a fire brick. I have burned all the bricks of any which, or where the expansion is I have all the strength, but in New South Wales, where your standard is, 4½, 8½, they have the lumps similar to what they have on the Victorian Railways. There the arch is designed as my arches is, and I can get more miles out of one by studying the expansion and contraction.

250. By Mr. Duffy.—You feel that the arch is not effective with inferior coal, do not admit that it is otherwise—The answer is yes, it is in the inferior coal.

251. I want to know what is the effect of it is in it tells the Victorian coal—Victoria coal would not be detrimental to my arch. I would favour it before the Newcastle report that the tube is more used, the arch would have to be taken down to clean it; that was right—Yes. In my correspondence the locomotive forecast's report will clear out. You will see when he is reporting to the Loco. Superintendent he says engine such as a number run very badly, and the driver broken in the tube; but they took him off and put another man on, and got the same results with the other engines. He put it down to nothing but bad driving. If a man is so situated that he can't be driven, and with ordinary fair driving such a thing is impossible. There is another point I would like to speak about. Any appliance for stopping sparks on the 4½, 8½ gauge or on a 3½. Six gauge could not be applied on the Victorian Railways, as our boxes are nearly all square, and there are nearly all square; they are nearly as broad as they are long. The consequence would be it would be impossible to have, what is being tried in the old country and other parts, extended smoke-box architect plates and a long brick arch. You could not have a long brick arch, because they have arches here as shown by this diagram—(producing a drawing). The extended departmental arch on the George is 3½ ft. long, and the other comes with a 6 ft. 6 in. I can make the sketch and the other appearance you have in the smoke-box it would be impossible on our railways to have long arches. You have them in six, on seven classes of engines. They have arches on the engine they are speaking of, and which are preventing sparks, from 4 feet to 8 feet. We have fire-boxes 3 feet up to, with the
latest modern engines, 7ft 11½. They have got boxes on the New South Wales engines up to 12 feet, and a brick arch on the Baldwin up to 7 feet. What is applicable on the 4½, 6½, with long narrow boxes is not applicable to our railways, and the consequence is being complicated, on account of our boxes being so short (and there is the difficulty), to put the trunk on the back to get over the difficulty that way.

2345. By the Chairman. — You have placed very important evidence before us in the shape, not simply of your own statements, but in the shape of documents, which show conclusively that this is a subject for serious inquiry, and we must have to inquire further into it. Those documents (from Queensland, the Broken Hill Tramway Company, and the Silverton Tramway Company) deserve our attention, and you may rely that your invention will have further consideration at our hands? — All I want is justice and fair play. I only want my invention to stand on its merits. I have had trials in the Brighton and South Coast and York and Lancashire lines. I am expecting daily to get news that I will have to go home. I think you can see, if the engineers in the old country think it is worthy of a trial, surely with what reluctance I have had here with various engineers there can be no reason why it should not be tried here.

2346. By Mr. Duffy. — Have you documents in connection with these trials? — Only to say that they are finished. I will send them. These reproducing documents are fair copies of the originals. One is dated 19th Oct., and it says, "I have now two trials progressing." This is from an engineer. Mr. Eldridge, I believe a relative of Mr. Chamberlain's. He was out here, and he considered my invention worthy of taking home. He told me they would never believe in the old country, if he told them, the Victorian Railways had had trials to get this thing for nothing and refused them. Therefore, he said, I would like you to give me the value of your correspondence with the Department. They would never believe any trial could be tried in such a natural way, and I believe the whole of my correspondence. Mr. Eldridge says, under date 13th October, "I have nothing more to relate since writing you last re the Lancashire and York railways. The passenger trials have been tried, and have done nothing further till this week. I am now going down to Birmingham again next week to see the Locos. Superintendant of the London and Brighton line." In the next letter of 19th October the gentleman says, "I have now two trials progressing. Since writing you last I have succeeded in getting an unconditional trial with the London, Brighton, and South Coast Railways for 60 days." I have here some other trials taken from the smoke-box of an engine with my invention, and some tests from an engine without my invention. — [producing the same].

The witness withdraws.

Samuel Homes, sworn and examined.

2347. By the Chairman. — What is your occupation? — I am managing Mr. Bell Jackson's place at Timaru.

2348. While managing there have you had any experience of fires that you believe were originated by the locomotives? — Yes.

2349. About what time? — In February. I am not certain about the date, but last February.

2350. What reason have you for believing that that fire was originated by a locomotive? — It started immediately after the train passed.

2351. Did you see a spark or fire coal from the engine? — No. It started in three places on the same track.

2352. Just behind the same track? — Yes. There were three of them; there was just about three chains between two of them, and the other should vary, perhaps, 400 or 500 yards further up the line.

2353. Did you see them start? — Yes. I was fairly close to them.

2354. Were there any one else in the vicinity? — Yes, two men fishing in the vicinity; they were there with myself.

2355. They were not on the spot where the fire originated; could they have ignited the fire? — No. It was not possible for them to do it.

2356. They were not on the spot where the fire originated, but near enough to see it? — Yes.

2357. How far were you away? — Two hundred and fifty to three hundred yards, I think.

2358. You saw the first break out one after the other 2? — Yes.

2359. Assuming that the engine had not them, was the fire fire from the engine a larger fire than the new and the next larger into the one is front? — We did not see what was supposed to be the first until the hot. We were putting them out, and we looked to the fire and saw the others.

2370. You were nearer to where the two started ? — Yes.

2371. As the engine was travelling? — Yes.

2372. You did not see any live coal or anything of that sort? — Not until we had the fire bucketed out, and they were picked up by cinches.

2373. Coal cinches? — Yes.

2374. Where were the coal cinches? — The fire started at the end of where it is pared off at the end of the loading. It did not stop back. It started quite slow, and the wind was blowing it well up the line. He started along the edge of the track, it was paced.

2375. Inside the railway fence? — Just close to the ballasting.

2376. What area was burned by those fires? — Very little. It burnt, I suppose, two chains right up along the line.

2377. It did not spread out on to the adjoining land? — No. on to private property.

2378. By Mr. Duffy. — Did you notice whether they were using the engine? had they the fire-box open? — I did not notice.

2379. Is there a bell there? — There is a bell in the Warrnambool direction, but the train was going towards Melbourne.

2380. You have no doubt at all the engine caused the fire? — I do not know of anything else. I did not see it start, but it started immediately after the train passed. It was a hot day and I was having a conversation with the men about the thing.
2381. What size was the cinder you picked up?—It might be half-an-inch. We picked up several half-size in one way and perhaps the same the other.

2382. Could you verify an article as to whether the man came out of the funnel or out of the fire-box?—I do not think it could have come out of the funnel, by where it was lying near the sleepers.

2383. Did you notice any other cinders about?—We had not time to notice. We came back after the fire and did not find anything to cause it, and we found the cinders fairly warm.

2384. By Mr. Cowan,—You have come here to give evidence as to your belief that the fire is not due to the change of the fire-box from any other cause?—Yes.

2385. Were the men working on the same side of the line as the fire which took place at the edge of the ballast? Were you working on the same side of the line or the other?—That side of the line, but half-a-mile away.

2386. They could possibly have set it on fire accidentally or otherwise?—No.

2387. You saw the cinder was a certain size: do you think it is all likely that that could come out of the funnel?—I do not know how it is constructed. I could not answer that question.

2388. Have you formed any opinion as to whether it came from the fire-box?—I would think more likely out of the cinder box than the other.

2389. This is a fairly level part of the line?—Yes.

2390. The bank good down into the water table?—Yes.

2391. The cinders ought to be fire where the grass was the other side of the paling?—Yes.

2392. How soon after you saw No. 2 fire did you take to get down and put it out? Did you gallop down?—Yes.

2393. You had in your own mind that engine setting on fire?—That was my belief.

2394. The line was perfectly level, and you did not see there taking out the cinder-box?—No.

2395. Did you or the men pick up the cinder?—All three of us. One man picked it up, and we all examined it.

2396. And he said—"This is what set it on fire"—He said—"It was likely this caused it."—Yes.

2397. And you agreed with him?—Yes.

2398. That is the only fire you can speak of?—Yes, the only one.

2399. What are you on the station?—I am managing for Mr. Jackson.

2400. He is your uncle, and you are managing, in charge of the men?—Yes.

2401. Did you or your employer make any report of this to the Railway Department?—I believe Mr. Jackson made a report.

2402. Did you make any claim for damages?—No.

2403. Only interesting that it was set on fire in that way?—Yes.

2404. Was that report made by Mr. Jackson or your representation to him?—Yes, I believe so.

2405. This is the only fire you saw taking place, from what you say, since you have been managing there?—Yes.

2406. Can you give us any information about any other fires said to be caused by a locomotive in that neighbourhood?—I will see if I can hear of anything, and let you know.

2407. By the Chairman.—It must be direct evidence?—I will do my best. You can get the evidence of the men who were there.

The witnesses withdrew.

John Martin, sworn and examined.

2413. By the Chairman.—Where are you from?—Letchbridge.

2414. What are you?—State school teacher and land-owner.

2415. Have you any experience of fires that can be occasioned by means of locomotives?—On the 18th of December last I had about 15 claims burnt.

2416. What reason have you for believing it was caused by a locomotive?—By seeing the fire from the railway, and by what my neighbours told me who assisted to put it out, as I was in Melbourne that day.

2417. You did not see the fire start?—No; I saw the result of the fire on the following day; the Sunday. I wrote to the secretary and gave other instances.

2418. Do you know of other fires starting that you saw start, and that you believe were occasioned by locomotives?—On the 29th December I was at Garigaloo. I was a mile away, and I saw the fire start immediately after the train passed for Geelong. The wind was blowing in a southerly direction, and it burned over 100 acres. I assumed it to be a coal fire.

2419. You saw the fire start?—Not exactly; I saw the smoke. I was under the hill; I was about a mile away.

2420. The fire might have been caused by some person who might have been on the spot at the time, for all you know. Is it just your belief that it was caused by the engine?—Yes.

2421. By Mr. Greaves.—How long had the train passed before you saw the fire?—I was under the hill.

2422. By the Chairman.—Do you know of any other instance?—On Boxing day I was travelling on the Ballarat road about half-past six, and a fire started in Midisworth's run. I was about three-quarters of a mile away. I saw the smoke rising immediately after the train passed.

2423. If there had been any person on the spot would you have seen them?—No.

2424. It would have been possible for some person to have been there and originated the fire without your noticing them?—Yes.
2425. You think the fire, starting immediately after the train passed, was a coincidence and that it originated from the locomotive?—Yes.
2426. By Mr. Duffy.—Where did it originate?—Over the fence, not a chimney away. There was a strong westerly wind blowing at the time.
2427. It was to the eastward of the fence?—Yes; about a chimney from the ballast.
2428. How far inside the fence?—It may have turned back. I did not get on the spot at first.
2429. When you did, how near was the burn patch to the ballast?—It was burning towards where I was going. I got it and started to put it out. I did not go back towards the fence.
2426. By the Chairman.—Did it burn back through the fence to the ballast?—It had been burnt from the fence to the ballast. From the fence to the ballast I think had been previously burnt.
2431. Is there any other instance that you know of?—About the sparks. When I was returning from Melbourne in December I was looking out of the window and I saw a large elder fall. I thought it a strange thing, having read about the spark arrestor and double spark proof appliances, that the sparks should be lying about.
2432. Was it a spark or something more, just a live ember?—It must have been about the size of a marble by appearance. It went up in the air and fell.
2433. Did you follow it with your eye?—Yes; it fell just where the grass had been burnt previously.
2434. In your opinion, it was large enough, if it had fallen outside the fence, to start a fire?—Yes.
2435. Have you had any other experience?—The February previous I was away at some distance and another fire started within three-quarters of a mile, and it burnt my own paddock; that would be February twelve months.
2436. You were not present when the fire started?—No; but afterwards I helped to put it out.
2437. It started close to the railway fence?—Inside. It had not been burnt inside the fence.
2438. How do you know it started there?—Only by the appearance of the smoke and the stuff that was burning.
2439. When you got to it, it was burning outside as well as inside?—Inside I took most notice of.
2440. If it started outside, it may have burnt inside?—It started inside the railway.
2441. How do you know?—The wind was too strong; it was motherly wind for it to be back.
2442. It will burn against the wind, but gradually. You think it must have started inside the fence, or very close to it?—Yes.
2443. Have you any other instance to mention?—That is all.
2444. By Mr. Graves.—How much do you say was burnt?—About 12 acres.
2445. Did you make a claim?—Yes.
2446. Was there an officer sent up to see what damage was done?—Yes; I believe so; I was not present.
2447. Did you claim for damage for 12 acres set on fire by the Railway Department?—Yes.
2448. What was the reply that you got, that they would inquire and let you know?—They acknowledged the receipt of my letter. That was the reply—[handing in a document].
2449. Did you claim it was set on fire by the railway?—Yes.
2450. They never said one thing or the other?—No. The following day we examined the railway, and there was one of the wooden boxes, or boxes, which had been burnt to a cinder, near the place. One of the persons who helped to put the fire out saw it burning, and put it out, with his own.
2451. Are you a State school teacher?—Yes.
2452. Are you on leave to-day?—I applied for leave. After being summoned, I thought it proper to attend.
2453. Did you apply to the Board of Advice, or to the Department?—The Department.
2454. Will your pay be stopped?—Anything I get I have to hand over to the Education Department.
2455. Any pay you get revert to the Crown?—Yes.
2456. By the Chairman.—With regard to the block burning, could it not be set on fire if the fire originated outside the fence and burned back?—No.
2457. Why not?—The steam ballast is up about 2 feet in a sloping direction.
2458. In your opinion, that block must have been acc on fire by the engine, and could not have been set on fire by any fire starting outside the fence?—That is my opinion. At this place it was more like a crop than anything else. The Railway Department had not burnt it; that was on the 15th of December. The wind was blowing my within 2 feet of the iron rail. It was so dry as on the wind. On the following day I received notice from the gaoler that he intended to burn inside the line opposite my land, after the damage was done.
2459. Do you know any reason why the gaoler did not burn the grass off?—No.
2460. In your opinion there were opportunities of burning before?—Yes.
2461. You know according to the regulations they cannot burn before two o'clock in the afternoon?—Yes.
2462. It was on the notice they served on me.
2463. If the wind had been adverse, for instance, they always want to get the wind on to the line, and if the wind was blowing away from the line for nearly a month that would account for their not burning off?—Down by Mooroobool they had it burnt off long before. That was about five miles away.
2464. You think if it was possible to burn down at Moorooroo it would be possible to burn down at your place?—Yes.
2465. By Mr. Graves.—You say the grass was long?—Yes, wild oats, and they had shot.
2466. Is the Department in the habit of putting up, at certain times of the year, grass to let for a certain time?—Not at this place. At other places they may have let within the railway enclosure to different persons.
2467. By advertisement?—Yes.
2468. If this was done in that way would it be a reason for the grass being left long?—No.
2469. They cannot burn a man's grass if they have been paid for it?—Just so.
2470. They know you do let grass, and they do not burn it immediately they get the money?—Yes.
2471. The witness withdraws.
William Smith, sworn and examined.

2470. By the Chairman.—Where do you come from?—Keramburra. I am a carpenter and joiner.

2471. Have you had any experience of fires originating in your opinion, from a railway locomotive?—In one instance.

2472. Please to tell us about it in your own words?—I had been as far as Mansfield, up on the North-Eastern line, and went from there to Tallarook, and came back to Seymour, and got into the express to Melbourne about eight o'clock in the evening. I had been up the line before, and noticed the express trains were generally crowded, and I thought I would get as near the engine as possible, and the carriage there would not be so crowded. I got into a carriage above. It was one of the old-fashioned sets, with four compartiments. I was in the third compartiment from the engine. It was attached to the engine, so I was close to the engine. It had been a winter day, on the 17th of January last. As I was riding along it had been warm, and I thought I would go to the door window and open the window and put my head out and smelt the cool breeze. I stood at the door for some time enjoying the cool breeze of the evening with my hat off, and as we were going along I noticed a bright light, like fire, coming under the carriage. I thought at first sight it was simply the tail-striking fire, as they do sometimes when the brake is on when it is cold. I watched it come from underneath the carriage and fall outside the rail and the ballast and set fire to the grass at once, almost instantly as it appeared to me. It seemed to be a live coal, not only red hot but of white heat, and it was at a fair size and just fell outside the ballast and set fire to the grass at once. It was not outside the fence.

2473. The line had not been burnt off?—I do not think so. It occurred somewhere between Tallarook and Kilmore. I think the train left about a quarter to eight, and this was about seven or eight minutes to nine.

2474. That was an express train?—I think so.

2475. That would not be the express. Did it stop at Broadford and Kilmore East?—I think it stopped twice coming to Melbourne.

2476. That could not have been near Broadford?—It was about three-quarters of an hour after it started. It could not be quite sure about the time, but I think it is left about eight o'clock.

2477. Perhaps you saw a quartet past eight?—Somewhere near eight o'clock.

2478. The reason I wanted to get at it was to see where the fire started?—I believe it was between Tallarook and Kilmore where I saw the fire. I took a particular notice that we passed Kilmore afterwards.

2479. You think it was between Tallarook and Kilmore that you saw the live coal come out from under the carriage you were in?—Yes.

2480. And it was carried by the wind outside the ballast and it fell on the grass, and the grass took fire immediately?—Yes.

2481. You saw this?—Yes. It appeared to fall on a level piece of ground near the line, but there was not much grass where it fell and I do not think it did much damage. I saw the fire light the grass and I watched it. I think we travelled a quarter of a mile and it was still burning.

2482. Do you think that coal came from the fire-box or the funnel?—From the fire-box or furnace. I do not see how it could possibly come from the funnel. I have been under the impression that the fires were caused by what comes from the funnel. Now I think they are caused by coal from the fire-box, because this came from outside the carriage.

2483. Were you going up hill at the time?—No. I think going down hill, and at a pretty fair pace too.

2484. By Mr. Duffy.—You did not notice if they had been firing up the engine, and taking out the coal?—I could not say just then whether they had done that or not, but I thought the matter over myself, and I wondered how a coal of that size got out, and whether it could have been pulled out by the stoker. It was between two and three inches long and an inch thick, red at a white heat.

2485. Do you know of any other cases?—No.

2486. By Mr. Graves.—You have no doubt that that came from the engine?—No.

2487. It was white heat, you say; you must have seen it when it came out?—I was in the third compartment from the engine. It fell and went backwards, and set the fire in a blaze.

The witness discharged.

William Robert Horsey, sworn and examined.

2488. By the Chairman.—Where do you come from?—Jutaburna. I am a grazier.

2489. Have you had experience of fires which in your opinion were caused by locomotive engines?—Yes, on several occasions.

2490. When?—The year of the Gippsland fires, 1898 I think that year on several occasions I saw fires started by the engine as it went along.

2491. Take the instances as they occurred, one after the other?—I might say the line goes right through my property, and the house is seven or eight chains from the line. I have seen a fire start directly after an engine has gone along, not sure, but on seven or eight occasions I have gone down directly and seen where the fire started, and found the embers.

2492. Were they alive?—Yes.

2493. Burnt coal?—Small bits of coal which, to my way of thinking, came from the funnel, because the fire started some little distance from the line, generally on an embankment.

2494. Were the pieces small enough to have come out of the funnel?—About the size of a pea, I should say.

2495. By Mr. Duffy.—Would they be alive when they touched anything?—Yes. Some of the embankments are almost on a level with the top of the funnel.

2496. By the Chairman.—They could not come through the arrester?—Not that size, the size of a pea.

2497. They would come out of the fire-box?—They blow across.

2498. If there was a strong wind blowing it would drive them far enough when they were out of the section of the engine. If any of the skin bags were broken or melted with the wind they would be in that way?—It might be the case, because they have the old-fashioned engines on that line drawing the coal.
2499. The age of the engine would not excuse or explain the arrerster being out of order.—No.
2500. On the occasion when the fire started close to the line can you be paricularly in regard to every case that there was no person in the vicinity who could have originated it?—In most cases.
2501. There was no person on the spot?—No.
2502. You saw the fires start?—Yes; and went down immediately to aid them out.
2503. If any person had been there you would have seen them?—Yes.
2504. Is there a heavy run at this place?—In some places, I have noticed it in both places.
2505. Have you noticed the fireman opening the box?—No, not when traveling, but repeatedly when at a standstill.
2506. Not when passing there?—No.
2507. Did those fires all start, some inside and some outside?—Always inside the fences.
2508. None started outside?—I never saw one start outside.
2509. A man from the fire-box would easily learn from the coal-box, I have seen them start on the banks as well.
2510. By Mr. O'Duffy.—That would be when the tanks would be above a level with the furnace?
—Yes.
2511. In those cases it would be a physical impossibility for the coal to come from the fire-box?—In my opinion it would.
2512. How high would the embankment be in relation to the tank?—I don't know.
2513. WHERE SET FIRE TO?—Yes.
2514. How long would the coming of Type 59 or 109 yards?—In some cases two or three pairs, in others five or six.
2515. I take it that it would be a physical impossibility for a coal falling from the fire-box to get up to the top of the embankment?—In my opinion it would be.
2516. By the Chairman.—Could you go through each fire and the circumstances of each case?
—Some I could that I helped to put out, at least half-dozen.
2517. By Mr. O'Duffy.—Begin at the earliest look and tell us all about it?—In 1893, I believe in that year.
2518. Did you go down on several occasions. The first time would be about December, 1893.
2519. Immediately after the engine passed the few started six or seven times from the fall. I ran down immediately I saw the fire.
2520. How near did it start to the rail?—Two or three yards from the edge of the bank, inside the fence.
2521. You went and put it out?—Yes.
2522. Did you look for any live embers?—Yes, and found a small one about the size of a pea.
2523. Would that be on level ground?—Level ground.
2524. What about the second case?—It started almost in the same manner up on the embankment.
2525. Did you go down and put it out?—Yes.
2526. Did you find any coals?—Yes, a small ember.
2527. About the size of a pea?—Yes. On that occasion it took very little to set anything on fire, particularly the way they allowed the grass to grow up. They have not done anything since. I have repeatedly written to the inspector about my property, and asking him to do something to the grass inside the fence.
2528. By the Chairman.—It could not get through the departmental power unless the arrerster was out of order?—There are different sizes pass: the Yorkshire Hero is a pretty large one.
2529. By Mr. O'Duffy.—What was the next occasion?—The last occasion I saw it was the December before last, the day before Christmas Day. I saw it start about midday, and went down to put it out. That was at the beginning of the cutting.
2530. Could that have been set on fire by a coal from the coal-box?—Yes, in my opinion it was. I did not find any other time that I did not look.
2531. You say the line has never been burned off for six years or seven years in your present.
2532. You have complained to the receiver?—During last summer I had an answer that it would be done.
2533. And it was not?—They made an attempt, but they left it too late. They left it till March, and the grass was too green then.
2534. Is there any excuse that they could make for not doing it at the proper time?—They made none.
2535. By Mr. Sonner.—Why did the receiver say?—He said he intended burning it off.
2536. By the Chairman.—What time of the year would have burnt?—In January, this last season.
2537. By Mr. Sonner.—Are you always on the look-out when the engine goes through?—Yes.
2538. And your opinion is it is the engine that sets it on fire?—Yes, because I can see no other cause. I have seen the fires start and gone down at once.
2539. By Mr. Sonner.—Have you any suggestions to make for the better management of the railway reserves, such as burning off in the middle of the summer and taking out the stumps?—Yes, I think you might have some better arrangement than at present. If they ever cut the grass about Christmas time it would remain green, but instead of that it is allowed to remain, in that place they do not seem to mind it.
2540. Are they taking out any of the old damaged stumps from the reserves?—No.
2541. They have adopted that policy in some parts?—I could not say; the logs are there still.
2542. Throughout the whole of Gippsland if the grass were cut in the early part of the season there would be no smelter from firestarter out?—Not in last immediate season.
2543. Would the grass be so green that it would put out the sparks?—Yes.
2544. The long grass would be a protection to the land-owners?—Yes.
2545. A manhole would be able to pass if the stumps were taken out?—Yes. At the time they were speaking to me about the engine I asked the receiver the question, for I saw some land, and he said he thought it was a protection for the farmers. I said it would be better if they just took outside the rail, and let the farmers have the rest at a rental. He said that was just the reason they would not do it.
2545. By Mr. Greaves.—Do they not get a large rental for that near you?—Yes.
2546. By Mr. Baxter.—If all the stumps were taken out and all the reserves were ploughed, would that be an improvement? If there were a harrow run over it every year that would be sufficient, would it not?—Yes, I think so. On one occasion they ploughed the grass off the land for about a yard from the fence and that prevented it spreading.
2547. Do you think that if the land were once ploughed and harrowed once a year it would be sufficient?—Not in that district. I think the grass seems to come up again.
2548. One ploughing, would that be cheaper than chopping round the stumps and so on as at present?—Yes, if the stumps were taken out to allow it to be ploughed.
2549. How many men are there in your district to look after the line?—Three men and a gauge on that section from Jambenna to Otrion.
2550. Do you think that ploughing and harrowing once a year would be more economical than the present system and safer?—Not more economical than the present system, because they do nothing to it now.
2551. They chip within 3 feet from the line of fence and 3 feet round each stump, do they not do that near your place?—No; they have never rooted it since 1898.
2552. By the Chairman.—If the grass were cut with a stryke would that serve the purpose?—Yes, if they burnt the grass as it was cut.
2553. By Mr. Daffy.—Would you take that land on lease?—No. I offered to lease it if they removed the stumps.
2554. By the Chairman.—Would you have it to cut the grass?—No.
2555. By Mr. Green.—You were asked about clearing out the stumps. Did you clear your own land?—Not the stumps.
2556. Is the large timber there?—Yes.
2557. How much would it take to take out one of your stumps?—It all depends on what method you adopted.
2558. To take them out so that you could say the stumps were gone?—Clearing them out would cost about 1s. to £1 an acre.
2559. By Mr. Bowes.—How much a stump would it cost?—They could do it very cheaply by taking the earth out and burning off the fire.
2560. We had an offer of £1 a stump at our way—They would not be many acres with fifteen stumps on, but they are very large stumps, some 5 or 6 feet through. Still, that is the cheapest way to do it. They say it does not matter what timber it is in clearing out; they will burn out even if green.

The witness withdrew.

Richard Ross, sworn, and examined.

2563. By the Chairman.—What are you?—Engine-driver on the Victorian Railways, driving between Benalla and Melbourne on the express.
2564. How long have you been in the Department?—Twenty-four years is November, driving since 1885.
2565. During that time have you had any experience from fires originating from your locomotive?—I never received any reports as to fires starting from my locomotive.
2566. Have you seen fires starting immediately after your train passed?—No.
2567. Has any claim been made to the Department on that account for damages done by a fire after your train passed?—I believe last year at Echuca there was a claim made for 50 acres of grass. I do not know whether it was a claim or a report, as we were rolling at the time at the foot of the bank. I do not know how it was caused. It was this side of Echuca.
2568. You say, under those circumstances, your engine could not have done it?—Yes.
2569. It was possible for an ember to have got out of the ash-box?—Yes.
2570. Do you think it is possible for sparks to get through the present arrester large enough to start a fire?—That is a difficult question for me to answer.
2571. You would rather not express an opinion?—Yes; it is rather awkward for me. I would rather not criticise anything at present in the Department, as I am a servant of the Department.
2572. When a man comes here to give evidence he is supposed to be protected from any consequences of the evidence he gives?—Yes.
2573. Have you had any experience about live coals getting out of the fire-box; have you ever seen them drop on the road?—Yes; I have seen them drop on the road.
2574. Is it possible for a fire to start that way?—Yes, if they got in the wheels they would be burned out on the road.
2575. You have had experience with Mr. Hawk's arch?—Yes, mine was the only engine that the patent was run in.
2576. How long were you running the engine that had the arch fitted to it?—I had been running her for eighteen months or over with the ordinary arch. The patent was only in her six weeks.
2577. What do you call the ordinary arch?—The departmental arch.
2578. You were running with the patent arch for six weeks?—Yes, that is with the buffer plate.
2579. How do you think the patent arch compared with the departmental one? I thought the patent was very good.
2580. Do you think it saved fuel?—Yes, I could see that from the first.

2581. With regard to stomaching, did it make a difference?—No.

2582. It was just as good with the one as with the other?—Yes.

2583. The only thing there was more coal to be put on with the departmental arch?—Yes, but I had to take the departmental figures for the saving. That showed a saving of 5 lbs. a mile for any other engine on the road from mine. The nearest was 47 lbs., and mine was 43 lbs.

2584. Did you notice with regard to sparks any difference with the patent and with the ordinary arch?—No, I never took notice of the sparks. The second day I was in the foreman and told him that I thought Hrack had solved the spark arrestor difficulty. He asked me why, and I said, "Come and look at the smoke-box," and he came and there was nothing in it. "The sparks had never got through the tubes.

2585. You accepted that as conclusive evidence that there could have been no sparks emitted?—Yes; if they did not get through there they could not go up the funnel.

2586. How long were you in charge of it?—Six weeks. In estimating we took the full two months' consumption.

2587. You cannot say anything about the resistivity of the arch?—No, I never took any notice.

2588. By Mr. Garnett.—Were you handling the same kinds of loads with the two?—Yes, full loads as near as I could reckon.

2589. Was the engine keeping as good time with Hack's arch as with the other?—Yes.

2590. And with a saving of coal?—Yes.

2591. When you said to your foreman,—"I think Hrack's arch has solved the difficulty of the arrester," he was surprised, and you said,—"Come and look"?—Yes; that was Mr. Burgess. He was the man I informed first. I was not well acquainted with Hrack. He was not in the shed. I did not know who he was, but I knew that he was putting in brick arches. I knew nothing about now he put his in or that it was his design.

2592. How did you find the draught?—Just the same—very good.

2593. Was your smoke-box clean on every occasion?—Yes. The locomotive foreman used to send the express driver from Ballarat to have a look, and they used not to credit that we went to Seymour and back without cleaning. They would expect it half or three parts full when we got back, as it would be with the ordinary lump arch.

2594. You had not to clean it at all.—No.

2595. It has been said the driver got some credit in the Department if he did a certain number of miles on a less consumption of coal than other men. Does it come in in the shape of benefit to your pocket?—That is done away with now, but they used to allow something.

2596. It is a matter of consideration for the drivers if they get more miles with less coal?—They used to give a record; now they put it on every month.

2597. Supposing the old practice existed now, would you prefer Hack's arch to-morrow, or the ordinary one, for saving?—I would prefer Hack's.

2598. For convenience for you; you would have less cleaning and more work and less consumption?—Yes.

2599. If you were asked, as a driver, which you would take, you would take that one?—Yes. I formed a splendid opinion of the arch, and was sorry when it was taken out, and my fireman too was sorry.

2600. Mr. Hack showed us two samples of stuff as the residue from the arches. Is that—[showing a small sample]—about what was in your receptacle for ash?—Yes.

2601. Would the large sample be, in proportion, the size of the stuff with the ordinary arch?—I dare say it would.

2602. Is it possible for that residue to come out of the funnel and light on the ground alive?—I can hardly credit that it would. It would be out by the time it landed: it would be dead.

2603. Were you here when a gentleman, Mr. Smith, gave evidence about seeing on your line a large bright flash from the engine come from under the first carriage and set fire to the grass?—No.

2604. He stated that he saw a large coal, very bright, come out, as hot as possible, from under the first carriage, and it fell to the ground and set fire to the grass. Did you ever see any live coals, or any coals fall out of the ash-pans on your line between Benalla and Seymour?—Yes. I have, as I answered the Chairman: I have seen a spark.

2605. Is it a spark or a co销售?—You see a flash; it would land in a carriage or truck wheels, and we could not see it after.

2606. That is an uncommon thing?—It is not so bad as it used to be, since they put tip bars in the engines.

2607. Were they put on for the purpose?—When they had no tip bars it was such a difficulty to get fire out. The fireman would knock a bar out. Now they put the tip bar in he can keep them clean, and when he knocks the fire out he knocks one of the bars out. You had to be continually watching your bars before that.

2608. Were there other men besides you using Hack's invention?—There were eleven men running it on my engine.

2609. Did they ever say to you afterwards that it was satisfactory?—No, they never. I could not tell the men who ran it.

2610. Is it on your mind that they said it was satisfactory or good?—I never met the men. It was at the end of the month I heard. I went away, and a short special would be out, and at the end of the month I would see it in the consumption list.

2611. All your evidence is from what you have seen yourself?—Yes. I might say on the Sydney express I am running now, they have to send men out at Seymour to clean the smoke-box and tanks. That is half the way.

2612. That would not be necessary with Hack's arch?—I could not say, but I would like a trial. It is a heavier train.
261. I suppose your officers could give you instructions to give a report on any spark arresters?—Yes.

261.4. By Mr. Roseby.—You think Hake’s invention deserves a trial at the hands of the Department?—Yes: I thought so at the very first. I had nothing to say in the matter but to run it.

The witness withdrew.

John Blayney, sworn and examined.

2615. By the Chairman.—Where do you reside?—Hughes’ Creek, Mangalore.

2616. What are you?—A grader. I do not cultivate any land.

2617. Have you had any knowledge of fires starting close to the railway line, originated as you believe, by locomotives?—Yes.

2618. Does that apply to more than one instance?—Yes, two instances or three, I think, since the Goolwa Valley line was opened.

2619. Will you take the first instance first and tell us about it?—It occurred in 1889, about the 26th November. I wrote a letter to the secretary six months ago. I made a mistake of a year in the date. It was 1880, I found.

2620. Where did the fire start, within the fence?—Outside the fence.

2621. Directly after a train passed?—Yes. I was watching the train. I make it a habit on rough windy days, because the line goes right through my property. I live close to the line.

2622. It was immediately after the train passed?—Yes.

2623. How far was it outside the fence—20 or 30 yards?—Within a few feet.

2624. Were you far away from the spot at the time?—No, about 50 or 60 yards.

2625. Did you see the spark?—No; it would be impossible.

2626. Do you think that fire originated from a spark or from a coal from the fire-box?—I think a spark. I do not know what sort of spark or coal it might be. I believe the engine threw it into the paddock.

2627. Do you think it came from the furnace or the fire-box?—The furnace. I think it came from there. If my other person close by himself said No; no person, or horse, or anything.

2628. There was, or other ways in which you think it should have originated but from the locomotive?—Not the case. It burnt twelve acres of grass. It could have burnt £200 or £300 worth, only the reapers were there, and we managed it well. We surrounded it and got it out.

2629. Did you spot any claim about it?—No.

2630. Did you pick up any ember or anything of that sort that could have caused it?—I never looked for any.

2631. When did the second fire occur?—I do not know whether you would take it as evidence, but I will tell it as I know it. I generally stop at home to look out for any accident happening, but I was away, and when I came home they said—The engine has set fire to the grass. I went out to see. I was in the habit of ploughing about there and about about a chain from the fence, and the fire had spread to break. I only saw the grass where it was burnt, and they told me the engine set it on fire. That is all I know. I have not the date of that: I do not know the year.

2632. It was in the summer time?—Yes.

2633. How far for the third instance?—It took place two years ago last November, on the 29th November, 1898. I was waiting in the corner of my own garden watching the train till it passed. The railway lines are at the end of the garden, and, just as the train passed the gater or the private crossing I saw, I noticed smoke rising in the paddock. I was then about 80 yards away, and the width of the line from where it was starting. It was a fearful bird day, and it got away. Some man repairing hedges was there and some others, and we wanted the fire out, and it burnt about twelve acres of grass or more.

2634. Was there any person close to where the fire started who could have lit the fire?—Not possibly, because I was there looking at it.

2635. You saw the fire start?—Yes. A little smoke rose up first. There was a strong wind, and I could hardly see. In about ten seconds I ran off to the house to get help to put the fire out.

2636. Is it had not been for the assistance being so near it would possibly have done more damage?—Yes, it would have burnt up my sheep, and fences and grass. It could easily have done me £200 or £300 worth of damage.

2637. Those are all the experiences you have had?—I have had a little more experience than that. The train used to set fire to shrubbery after the line was made, and for a good number of years nearly every day. But those fires always originated about the rails—in the paddock at all. I always came to the conclusion that it was started through embers falling, and we always got it out, and it never did any harm or go into my paddock. For the last ten years I have never known an engine set fire in that way except this last year.

2638. Will you tell us about that?—It set fire to the line that way among the rails, and it burnt a bit, but I got it put out. I saw the smoke, and went up and put it out.

2639. Was this on the line?—Yes.

2640. After the train passed?—Yes.

2641. How long after the train passed?—A few minutes.

2642. Was it grass that burnt?—Yes; long, dry grass. Sometimes the grass does not burn very well when it starts.

2643. It was not burning between the rails?—No; but I could see where it burnt from the rails into the waterbed.

2644. There must have been grass left between the rails?—For the last couple of years it has not been burnt. They used to clean it very well, but the last two years I think there was very little smoke taken. I live quite close and see everything that comes in. I was anxious to bring this under your notice as to how the fires started. I think there is very little danger of fire from embers through the rails. There is very little danger from embers—smoke, because they blow such a wide strip between the fences. If there is any rank growth they generally cut a swath with a scythe, and the flames cannot get within eight or ten feet of the fence to blow over.
2647. You heard the evidence of Mr. Smith about the fire coal. We have had other evidence of the same character to show that live coals through the fire-box are caught in the swarf and carried right over the fence?—I believe that.

2648. By Mr. Bowen.—Was the break in the railway reserve where the fire did occur?—Yes, and long before this. It was chipped early in the season.

2649. By the Chairman.—The chipping was done before you saw the fire?—Yes; the first fire I mean. It is always done before any fire takes place.

2650. By Mr. Bowen.—You have been in the habit of looking out for the fires?—Yes.

2651. I think general among the farmers in the Valley?—I do not think it is, but I make it a rule, because I keep weapons ready to put the fire out in the shape of bags or little poles.

2652. Do none of your neighbours look out for fires?—None of them trouble themselves much.

2653. Is there much Crown lands about you?—No; in all good agricultural land, and all selected.

2654. You do not know of any fires occurring in Crown lands and spreading?—No, there is no Crown lands about me except small gravel reserves about 2 mile away from me. There is one question you asked the last witness about noticing a fire. I consider the engine-driver is about the last man to see a fire, because they are always looking about. The train is some 500 yards, and they see nothing of the fire; they do not generally look behind.

2655. By the Chairman.—Are there any stumps along the line down your way?—Yes.

2656. Has the Department been taking them out lately?—It took out some last summer. They have removed the line there to a man named Symons to cultivate it. I think he is burning the stumps out, or taking them out in some way.

(The witness withdraws.)

Adjourned.

(Taken at Wangaratta.)

THURSDAY, 11th JULY, 1901.


Thomas Mason, sworn and examined.

2657. By the Chairman.—What is your occupation?—Coachbuilder, Wangaratta.

2658. Have you ever seen a fire which you believed originated by a locomotive?—Yes, on the 15th of last December in the evening. I happened to be close to the line when the express train from Melbourne came along. Immediately after the train passed, a fire sprang up close to the rails within the fence, close to the rails. I immediately ran over to put it out. It burnt about 5 or 6 yards up to the rails.

2659. How far were you from where it started?—About 100 yards.

2660. Was there any other person there or could they have been there without your seeing them?—I do not think so. I could see nobody in sight.

2661. Do you not think it possible for any person to have been there to cause the fire?—No, it was impossible.

2662. Did any one else see it or help to put it out?—Yes, a boy came from a dwelling house about 150 yards away with a bucket of water. He helped putting out the stumps.

2663. Have you had any other experience?—No, that is the only one.

2664. By Mr. Duffy.—Could you form any opinion as to whether the spark came from the funnel or the ash-pan?—I think it would be impossible for it to come from the funnel, it was so close to the rails.

2665. Has the place been burnt off?—No, the grass was about 2 feet high.

2666. Did you look about for any coal cinders?—No.

2667. By Mr. Bowar.—Was the fire outside the rail or inside?—Outside the iron rail.

2668. It was not within the two rails?—No.

2669. How close was it to the rail?—Within 3 feet of the rail, at the end of a sleeper.

2670. Whatever set it on fire, if it were from the engine, must have been carried to the spot?

—Yes.

2671. Can you form any opinion whether it was carried there by the motion of the train—was the train going fast?—Yes, at the time.

2672. Did you go to the place afterwards to see if there was any cinder left?—I could not see any. I got a green bush and waved it about, and that might move anything.

2673. You have no doubt it was from the engine?—No.

2674. By Mr. Sangster.—No doubt it was from that train that it took place?—Yes.

2675. Whether from the engine or a carriage?—I do not think it was possible to be from a carriage, because it was so close to the rail, unless it started from underneath.

2676. The railway people raise the question that smokers throw out the butts of cigars from the window?—I should imagine it would have been farther from the fire, if thrown out of the window.

2677. By Mr. Duffy.—Was it a goods or a passenger train?—The passenger express from Melbourne.
By Mr. Brasier. — Could you say whether any one was cleaning out the fire-box at the time?

— No.

Did you know whether sometimes drivers clear out the fire-box on the journey to save time in the shed?—I could not say.

The witnesses withdrew.

Alexander Boland, sworn and examined.

By the Chairman. — What is your occupation?—Farmer.

Do you live far from Wanganui?—Between 3 and 4 miles.

Have you ever seen a fire start that you believed was caused by locomotive?—Yes, on several occasions.

When was the first time?—I could not give the date; I kept no record. It was last summer, between January and February.

That was the first experience?—No, the last.

I want you to tell us about the fire?—I could not say when it was, but some two years ago.

Where was that?—On my premises, where I am living now.

Please tell us about it. Where were you at the time, how far from the line?—About 4 chains from where the fire started.

How soon after a train passed did it start?—It could not have been many minutes. Just after the train passed it started.

Was it close to the rails?—It might have been a chain and a half this side the line in the paddock opposite the railway fence. There was a very strong north-west wind. It was the evening express train on a Saturday night.

Did any one else see it?—Yes, two females that were with me at the time, and Mr. Hughes, the manager of the South Wanganui Creamery. Only for their exertion I might have been burnt out.

Mr. Hughes saw the fire and started to run down from his premises.

Had you a clear view?—Yes, very clear.

Could there have been a possibility of any one causing the fire?—No, there was no one else near.

You imagine the fire was caused by a spark?—Yes, I am almost certain.

By Mrs. Duffy. — Was it night time?—Yes, about eight o'clock in the evening.

Did you notice if they were doing up the fire at the time?—I could not say; I did not take particular notice.

Did you notice if there were sparks coming from the funnel?—I have seen sparks coming from the fire, both top and bottom.

Could you form any opinion whether this particular fire was caused from the funnel or the ash-box?—I think from the funnel. That was about the first occasion.

Tell us about the second occasion?—In the place where I am there is a bit of a rise and they are always stirring up the fire.

How long ago was that, approximately?—I think you could get that from the railway books, because I demanded some compensation from the department. I had about 120 acres of land burnt, and I got some £18 from the department.

Could you tell us anywhere near the time?—I could not tell you. My memory is not good. They must have it recorded in the books. I have kept no accounts.

By Mr. Sweeten. — Is that the only time you got compensation?—Yes, I have been burnt out four or five times by the department.

By the Chairman. — Did you see the fire start?—No. I think some one else saw it. I was near the house at the time.

Of course, the department would not give you £18 without evidence. Did the evidence go to show it was a spark from the engine that originated the fire?—It must have been.

No, it might have been a spark from the fire-box? — I do not know; but the engine set it on fire.

The Department admitted it was the fire from the engine. —Yes; they sent up an inspector to examine.

Tell us about the third case? — The third occasion there was a fire started at Mrs. Robbick's next door, and burnt 12 or 14 acres, and I did not trouble.

Can you tell us the date of that?—I kept no account, but it was some years ago.

Did you see the fire start?—I did not. I was at home, but in the house at the time it started.

My house is 10 or 12 chains from the railway line.

The fire started immediately after the train passed. —Yes, going down to Melbourne. It started immediately after the train passed, because you could see the train when the fire rose.

By Mr. Sweeten. — Did Mrs. Robbick apply for compensation?—No. It started in the corner of her place and went through my place, and went into David Hesley's, and he got compensation. But we is deal since. I think that is about fourteen years ago.

Tell us about the next occasion? — The next occasion I saw a fire start, but could not prove how it started or went out. Last year and the year before it started.

Take one instance at a time; can you tell us how long it is since the fourth time you had experience of a fire starting through a locomotive?—Nearly every year. There has not a year gone by without a fire.

Then it was an annual thing?—Yes, an annual occurrence.

Take the instance you remember as following the last one you have spoken about and tell us about it. Were you close to the line when the fire started?—No.

You did not see at start?—I only saw the fire. It did no damage, because we always keep on the look-out, and the boys generally run down when they see a fire. They are on the look-out in the months of January and February for fires.

Can you tell us about any special occasion when you saw a fire start?—No, that is all I can give particulars. I have seen fires very, very often,
In addition to those you have given particulars of, how many fires started on your land, or close to you, caused, as you believe, through a locomotive?—Three times is the only times I got burnt out altogether, but we have prevented it coming.

I mean fires started within the fences of the line, anywhere that you have known of in addition to the ones you have given already?—I have seen other places, Hopkins, and all along the line, up in Brayley's, two or three times in the paddock adjoining mine, and they put out the fire.

Is your property near a grazing, near a slope of the line?—No, but the line has a rising grade.

Which way does it rise?—To the south.

Is it where that gradient is that the fires generally occur?—Generally, on the average. That is where we watch more than any other portion, because they stir the fire up there.

Have you seen the flames on the engine stoking up the fire?—I have seen the fire from the bottom. We watch the engine, not the people on the engine. It has been at night several times.

Do you think the sparks come from the funnel or from the fire-box?—It depends upon the wind. If it is from the north-west it comes from the fire-box, but generally they come from the funnel.

Is there danger from both?—Yes, but more particularly from the funnel. I have seen it blowing from the funnel.

Have you seen any live embers that you have picked up?—Yes, very often, not after the train passed, but have seen them fall when they were stoking up the fire, or to the line very plentifully. I have seen it coming right across the line to the paddock when a very hot wind was blowing.

Would you call them sparks?—No, only. I have seen the embers coming not exactly into the paddock, but right against the railway fence, when there is a hurricane north wind.

By Mr. Duffy.—You said thought most of the fires were caused by sparks from the funnel?—Yes.

Your latter evidence seemed to point to the fact that they are mostly caused from the fire-box!—I have seen fire from the fire-box, but most of them from the funnel.

Where did they light?—In the paddock. It could light across from the railway to the fence.

The line is the usual width?—Yes, 3 or 3.5 claims.

By Mr. Grattes.—You got £18 compensation?—Yes.

Did you ever apply any other time?—No.

You applied once and got it?—Yes.

There was an investigation about how it occurred, by the Department?—Yes, they sent a surveyor and an inspector.

You mentioned that another neighbour also got compensation; do you know any others who got it?—Not joining me.

You say you consider your place dangerous, and you and your family are generally or the look-out?—In January and February.

You stated there is a kind of incline there?—Yes, a rise.

That you expect, and are on the lookout, when they come to that place they would rake up the fire-box to get up more steam for that place?—That is my opinion.

Do you know it is a regulation of the Department that they are to put on a certain head of steam at all gradients?—I do not know that.

As a matter of fact, you do see the embers coming out where the gradient is?—Yes.

Do you distinguish a coal from a spark?—Yes.

If looking out at night would you not see a bright glow of the coals coming from the fire-box?—Yes, I have seen that many times.

By Mr. Sluiter.—When you were always on the alert when the train passed, and you have told us you have seen the embers falling from the masts repeatedly, I would like to know if you or your family have seen any of the live embers that had not a chance of setting fire to anything?—I have seen them come into the paddock in a hurricane, but have not seen the coal set fire.

You are quite satisfied that the embers can get away from the railway line into the paddock?—Yes, it is in hurricane weather only, when there is a strong north wind.

By Mr. Bannister.—When you say you were burnt out three times, what do you mean; as what would you estimate the value of your loss?—The biggest loss was when I got the £18. The others were small losses, because we always put out a fire.

You have no buildings burnt?—No.

Do you know of any buildings of neighbours that have been burnt down?—No.

It was always grass and fences!—Yes.

By Mr. Sluiter.—Have you had any other fires on your place that you did not attribute to the railway?—Yes, we had a fire last year, a very big fire.

How did that occur?—It came across from Tannineck—a bush fire.

You had no other fires started but those you could account for outside your premises?—That is all.

By Mr. Duffy.—Were the fires caused altogether by the up train or the down train, or sometimes by one and sometimes by the other?—I think both. It was the train from Melbourne that set fire on Saturday night—not the big fire.

Which train caused the big fire?—I cannot say; I have no recollection.

By Mr. Grattes.—Do you see more sparks or coals from the up or the down trains?—I think the coals are mostly from the trains going Melbourne way.

The witness withdrew.

Alexander Albert Delaune, junior, sworn and examined.

By the Chairman.—Have you had any experience of fire starting that you believe were caused by a locomotive, other than those mentioned by your father?—Yes.

More than once?—Yes.

Tell us about the first?—It was about three years ago.
2758. Were you close to where the fire started?—Yes, sitting on the railway fence.
2759. Did you see a spark?—Yes, it was from the engine, not from the fire-box, not the funnel. It was a coal.
2760. You saw it?—Yes, distinctly. There were three or four sparks and coals came out.
2761. You saw it leave the box and light on the grass?—Yes, and the fire started. I distinctly saw it.
2762. Was there any one else with you?—No. I was by myself.
2763. Was it in the day time or night?—At night. The seven o'clock train was going to Melbourne.
2764. Would you see it more distinctly on that account?—Yes.
2765. Was it near your father's property?—Yes, at the back, near the line where he spoke of.
2766. Were they cooling the fire at the time?—Yes, as they do: it is a common thing. I have seen them do it in several cases.
2767. How far from the engine was it, where the coal lit on the grass?—About 3 yards.
2768. The grass had not been burnt off between the fences?—Not on that occasion.
2769. What month was it?—Early in the summer. I do not know the month; it was before they had burnt the grass.
2770. That grade that your father spoke of, is it from one side or both?—Both sides. It is only going from Wangaratta to Melbourne. There is no rise coming from Melbourne.
2771. Have you had other experience?—Yes. One night as I was coming into town about two years ago I saw a fire start up along the line about 2 miles out of town. It was about 5 or 6 chains away, and I went over and put it out. It was immediately after the express coming in from Melbourne on a Saturday night.
2772. Was there any other person near the spot?—No; I saw no one.
2773. Could they have been there without you seeing them?—I do not think so.
2774. Did the fire do much damage?—It burnt about 20 yards along the line, and I put it out. It started inside.
2775. Do you pick on any embers?—No, not that time, but the first time I mentioned I distinctly saw the sparks.
2776. Have you other experiences?—Yes. It was another evening from the express last year that was coming into Wangaratta from Melbourne.
2777. That fire was it the evening?—Yes, about twenty minutes to eight.
2778. Were you close to it?—No; I was about 5 or 6 chains away at the time.
2779. Did you see the fire start?—I looked just after the train passed, and the fire was burning.
2780. I saw there any other person there at the time?—No. Rowley Hughes came down and helped me to put it out.
2781. Do you think it was possible for any other person to have been there to start it?—No, it was impossible. But I was riding in my paddock, and I would have seen any one.
2782. That fire was within the fences?—Yes. The grass had been burnt. It was green, and laid there, and the fire was burning on that.
2783. If the line had not been burnt—The fire would have been much greater.
2784. Are those the only experiences you have had?—I have seen what my father says.
2785. Can you corroborate what he stated in every instance?—Yes. We were always watching to see a fire start, as it might start at any time.
2786. By Mr. Dudgeon.—Which side of the line is your place on?—The left-hand side going down. It is about 21 miles from Wangaratta. There is an accommodation gate just past it.
2787. By Mr. Greaves.—What is the mile-post there—it is marked every half-mile?—I do not recall.
2788. Have you land to the north side of the railway or the south side?—On both sides.
2789. Where are the fires generally?—The south.
2790. Is the house on that side?—Yes.
2791. Have you always made it a rule, both you and your father, to look out when a train passed?—Yes.
2792. When no fire has taken place have you constantly seen coals or sparks fall from the engine?—Yes, several times.
2793. Have you seen on the roadway there ashes from the paa?—Yes.
2794. Do they make it a rule there to rake out the fire-box about that place?—I think so.

The witness withdrew.

James Smith, sworn and examined.

2795. By the Chairman.—What are you?—Cattle dealer and grazier, Springbank.
2796. You occupy land close to the railway line?—Between the Rutherford and the North-Eastern line.
2797. Have you had experience of fires starting on your property?—Yes, a very bad experience. On the 17th of December last year I had 250 acres of grass burnt and nearly all the fences.
2798. Do you attribute that to the locomotive?—Yes, the 7.40 Rutherford train.
2799. What reason have you for thinking that?—I was told by neighbours round; I do not live there. I was told there was no fire when the train was at the Springs, but when she went past the fire started.
2800. You did not see it?—No.
2801. Have you any personal knowledge of a fire starting which, in your opinion, was caused by a locomotive?—Yes, on the 8th of January last.
2802. Were you close to the line?—Yes, standing on the road close to the fence. A clap working for me, named Willie McMillan, and an Indian were there. The train ran through about twenty minutes to ten, carrying passengers—a through express running passengers right through from Sydney to Melbourne. She dropped the fire from the fire-box in three places in about 20 chains. I saw it fall.
By Mr. Greaves.—Is Stewart, the ganger, in charge of the section?—Yes, he is in charge of the main line.

2341. Did you see any fire going on in the main line, and the other on a branch line?—Yes.

2342. You have no doubt the fires took place from ashes?—No.

2343. You say that Stewart's daughter came down and said it was a common occurrence?—Yes.

2344. Did you make application to the Department for damages?—Yes, through Mr. Whitehead, sometime in December last.

2345. What answer did you get?—They did not recognize anything.

2346. Did they make any investigation?—No that I know of.

2347. Do you know of any way he was making application for damages there from?—Yes, Mr. Gleson, barracks, and I were burnt out at the same time by one fire.

2348. Did he get compensation?—No.

2349. Who is Mr. Whitehead?—A solicitor.

2350. You got no compensation?—No. He told me the Department recognised nothing at all.

2351. By Mr. Stogur—Did Mr. Whitehead go into the matter with you fully before he made application to the Department? Did he ask what evidence you had to submit?—Yes, I gave him all I had. I did not collect much evidence. The reason was there was an inspector from town, or Benalla, about the 20th of December, and I was standing on the line with Kelly, the ganger, and I said to Kelly—"Well, you have managed to burn me out at last," and he said—"Well, I lit a fire on the line six times this year, and put it out as I was frightened of burning you out." Up came the patrolman from Springsure. He had no tricolour, and he said—"Who is in charge here?" and Kelly said—"I am." He said—"I want you," so they walked along the line. He was a rather stout man, dressed in light clothes. He walked along the line, and I do not remember whether he said anything.

2352. By Mr. Stogur—Did you look up as to the amount of damages?—Yes, I did. I asked the amount of wood burnt. I said—"About 200 yards." I said about 200 yards were burnt. He asked me how much fence was burnt, and I said about between half a mile and a mile, completely burnt. There would be a chain burnt, and then a few panels left, and so on. The front line was completely destroyed. There was no further conversation with that gentleman. He made no more of it.

2353. By Mr. Duffy—Did he ask where the fire began?—Kelly, the ganger, showed him about where it started.

2354. By Mr. Stogur—Did he ask what caused it?—I said I thought the train. He said—"Would it be possible for any one else to do it?" I said—"I was not there. I was away, but Brannan was on the watch, and saw the fire start." One of the brothers who kept a hotel at the Springs, a man named Walsh, said he came along to track sleepers for the eleven o'clock train, and there was no fire when he came along, and he left the sleepers along with the sheep and when he came it was going nicely.

2355. The ganger was not burning off that day?—No. Kelly was at the Red Hill, at Rutherglen, about 5 miles from the fire, but he was back as soon as any one on the fire. He must have got word from some one on the train, although he would not tell me anything. Men on the line will give you no information.

2356. He volunteered the information that he had put out the fire?—Yes true or false. The very day that I went there after I came from Wodonga, I went to look what damage was done, and Kelly and his men were then burning pieces of grass off the line that were left, and my place was all burnt out.

2357. By Mr. Greaves—Was that before the inspector came—that before.

2358. Would that be the reason, that the inspector was coming?—I thought it was to cover up matters.

2359. By Mr. Stogur—Is the face of Davenport seeing the train pass just before the fire, you did not think it was worth while to go on with the claim?—Mr. Gleson said that the Government were very hard to fight, and it would cost a lot of money. I inquired of solicitors, and they said it would cost £250 to get it into the County Court, and if I lost it would cost me £50, and I was not game to go on; I had not the money to lose.

2360. By Mr. Greaves—Has many men has Kelly?—I think three.

2361. They came on after you were burnt out, and before the inspector came?—Yes, and were burning pieces of grass that were left. There might be 5 or 4 yards square in a patch.

2362. Could they do any good?—No.

2363. As a matter of fact, there would be no use in burning off after the steel was stolen?—Yes.

2364. You think they were preparing for an investigation?—Yes, so they could see no traces of their troubles.

2365. By Mr. Dowse—Was the fire along the Rutherglen line seen by any one else?—Welsh and Davenport and his son: I do not know his name.

2366. Do you know the driver of the train that caused the fire?—No.
2836. You have never spoken to any of them—I would not know them if I saw them off the train.
2837. You did not mention the fires to any of them!—No. I have done so to men along the line.
2838. Did you give the total value of the loss sustained by the fire?—I do not know what
Mr. Whiteside put in. I told him what was burnt. There were 230 acres of grass.
2839. Roughly, what would you think it amounted to?—I would reckon my losses as £200, with
the timber, grass, and fences.
2840. By Mr. Jones.—About £1 an acre?—If the grass had been all it would not have been much.
2841. By Mr. Ross.—Has much damage been caused by burning on the reservoir?—There was a
man in the kitchen at Grants who set fire to the kitchen, and that burnt my house.
2842. Are you satisfied with the means that the Railway Department adopt?—Yes.
2843. Do they not sometimes burn in the middle of summer?—Yes.
2844. Is there not a dangerous thing?—Yes, but the grass would not burn if it was too green.
2845. They could burn it earlier?—They burnt that line, I think, on the 6th December—the
Rotherglen line. I think I was given notice on the 6th that, weather permitting, they would burn.

The witness withdrawn.

James Maclennan, sworn and examined.

2846. To the Chairman.—What is your occupation?—Butcher, being a mile and a half from Wangeratta,
and about 300 yards from the railway line on the north side of Wangeratta, on the other side of
the line from here.
2847. Have you known of any fires starting close to the railway line caused, as you thought, by the
locomotive?—Yes.
2848. More than one?—Yes, on several occasions. I have seen a fire springing up after the train passed
on several or eight occasions.
2849. Do you think you could remember them in the order in which they occurred?—How long was
it from the first?—I have been there eight years, and there have been fires every year.
2850. One every year?—I have seen three in one year that spread up after the train passed. On
our occasion, about seven years ago, at No. 85 crossing, I saw the sparks come out of the funnel of
the engine and set fire to the grass. It was the 12.56 passenger train from Melbourne.
2851. You traced them till they touched the grass?—Yes, I saw them light on the grass and set it
on fire.
2852. Inside the railway fence?—Yes.
2853. What time of the year was that?—I could not say; it was somewhere in the middle of summer,
very hot weather.
2854. Had the grass been burnt?—Not at that place, but lower down it had.
2855. Was there much damage caused?—No; it got out into the common a little way, and a gentleman
from the upper gate, named Fain, ran down, and we put it out.
2856. Tell us about other instances?—I have seen on several occasions a fire light immediately after
a train passed, but never saw any elders or ashes at night, and never noticed them set fire to the grass
in the day time. I have looked out when the train was passing, and on one occasion I saw the smoke on
the ground before the train got properly past. That was the side of the gravel.
2857. If the grass had not been burnt the fire would have spread?—Yes. I would have gone over
and put it out, but I knew it would do no harm.
2858. You have seen several fires start just after the train passed?—A dozen or more.
2859. Did they do any harm?—They never got out of the fence except the first one that got on to the
common, but that did no damage.
2860. You say you have frequently seen sparks and live coals leave the funnels and fire-boxes respec-
tively, and which would have caused fires if the grass had not been burnt—only one instance, from the
funnel.
2861. You have seen them leave the fire-box and fall within the fences?—Yes.
2862. If the grass had not been burnt it would have caused a fire?—Yes.
2863. Is there a gizzard next where you live?—Yes, there is a little, but very slight.
2864. Do the fences rake up the fire there?—I could not say. It is just where they shut from
stems putting into the station.
2865. By Mr. Duffy.—Did you ever see any fire begin outside the fences?—No.
2866. The sparks always fell inside the fences?—Yes.
2867. By Mr. Binnie.—Did you ever put in an application for compensation?—No; it did me no
damage. It never got outside the fence except on to the common.
2868. By Mr. Spurr.—You said you had seen the live embers fall from the ash-pan, but they did
not do damage; they did not get outside the fences, but they would have done damage if the grass
had been there?—Yes.
2869. Would the have done damage if there had been a strong wind blowing?—The grass had been
burnt; but I did not go to see.
2870. Had there been a strong breeze when the embers fell, could they have fallen outside the rails?
—I have seen them fall outside the iron rails 4 or 5 yards at night time. I could see them plainly.
2871. You are satisfied that there been a breeze blowing they could have easily set fire to the grass
along the line?—Yes.
2872. By Mr. Ross.—You have seen so many fires; how it you come to see them all so
well?—I am working alongside the line, and I am always working in one place. The door faces the
line, and every train you generally look to see what train it is or what it is carrying, and you notice a
fire if it starts.
2873. It is an uncommon thing for cinders to fall from the fire-box?—Yes.
2874. But not so common for sparks to come from the funnel?—No.
2875. You have not seen fires that have caused much damage?—No.
John Williams, sworn and examined.

2880. By the Chairman.—What are you?—Farmer, living about 2½ miles from here, on the west side. I do not live on the railway line.

2881. Have you ever seen a fire start that you believe was caused by a locomotive?—Yes, one.

2882. When was that?—At the gate before the One Mile Bridge.

2883. Did you see it start?—Yes. I was riding my horse at the time and I was going across an old cattle crossing and I saw the horse away from the line as the train came, and there was a fire at the time I glanced from the gate, and when I turned back it was blazing up to the top of the gate post out of the cattle box.

2884. How did it start in the cattle box?—Yes.

2885. You noticed it was caused by a coal from the stove?—Yes. There was a lot of dry grass and paper in the cattle box and the fire got out of the box and it was put out. I got a woman out of the other end. The fire was going to Sydney with the soldiers. I think it was the same fire.

2886. When was that?—It was in January last, at the time they were going through with the soldiers for the Commonwealth celebrations.

2887. Were the soldiers on the train?—I could not say. There were a good many carriages on the train. I was riding a young horse at the time and did not take much notice.

The witness withdrew.

Patterson, sworn and examined.

2888. By the Chairman.—What is your occupation?—Farmer and dairyman, South Wagga Wagga, about a mile and a quarter from here. My land adjoins the railway line.

2889. Have you ever known any fire start that were caused, as you believe, by a locomotive?—Yes, several, but this year was the worst of all.

2890. How long is it since you had your first experience?—Thirteen years ago the last fire I saw was there.

2891. And it has been a regular occurrence ever since?—Yes; but this year there have been three times as many.

2892. How many would you think you have seen this year?—I should say at least a dozen times I have seen fires out. In fact, we have not had a quiet Christmas week and up to the middle of January.

2893. Have you ever seen a spark or coal leave a locomotive and fall on the grass?—On the line, I have seen it on the footpath. I have put out several fires out. There is a well on the line and I have used the water from it.

2894. Have you ever seen a coal leave the engine and travel into the grass?—Alongside the sleepers.

2895. You might be perfectly satisfied that those fires were caused by a locomotive, but I want to know if you saw the coal or cinder leave the engine and travel it to the dry grass and then travel to the fire out?—I have seen some immediately after the fire started, and seen a live coal on the line between the rails.

2896. Did you ever see the engine and trace it with your eye until it touched the line?—No, not to come right down to the ground, but I have seen the fires where the cable ran at right angles.

2897. Did you see the fire start?—The first week in January I put out a fire five times within a quarter of a mile on the railway.

2898. We want to know whether you ever saw a live coal or cinder leave the engine, and trace it with your eye until it touched the ground, or some inflammable material, and start a fire?—No.

2899. You have seen a fire coal leave the box and live sparks leave the funnel, and you have gone down and seen the line on fire?—I live within 20 yards of the line, and I will say that nine times out of ten the fires are caused by fire from the fire-box. I have seen very few fires from sparks.

2900. You can put it this way, that you have seen a train pass, before the train passed there was no fire on the line?—None.

2901. After the train passed you went down and found the line on fire?—Yes.

2902. Several times.—Yes.

2903. Did you find fire coal on the line?—Yes, on a few occasions, close to my place. The line is near the place.

2904. What would have come from the fire-box, too large to come from the funnel?—Yes. We thought the engine must have been defective. We looked out for the train, and on this particular Sunday the last witness spoke of, the first Sunday in the new year, several men put out a fire. It was after some special train.

2905. Did you ever see a spark leave the funnel and a fire spring up afterwards in such a way as to indicate to your mind that the spark caused the fire?—No.

2906. You think that the fires in your locality are caused by coal from the fire-box and not from sparks?—Yes, not from sparks. I could not say that I have ever seen a spark cause a fire.

2907. By Mr. Sawyer.—Have you had any damage done to your property by fire?—Only once, occasion an acre or two of grass.

2908. Caused by the fire from a locomotive—that might have been from the funnel. We believe it was, but nobody saw it.

2909. I say you have repeatedly, in a dark night seen sparks from the funnel?—Yes, but they did no damage.
2910. Have you repeatedly seen coalts from the ash-pan?—Yes.
2911. How is the flame about there—level?—There is a little inclination coming up to the chimney.
2912. Do you know anybody near you that has had charge of, or got compensation from the Department?—Mr. Deloros was the nearest.
2913. Knowing the danger from the fire you are on the look out?—Yes, this year.
2914. And you have wet bags ready at hand?—This year was the first time out we had the wet bags and looked out. It was not the practice that we looked out. The first fortnight in January was very bad.
2915. By Mr. Green.—You think there was particular danger from this particular train?—Yes.
2916. Did you look to see that she did not put out too much coal?—Yes.
2917. You said you thought she was defective?—Yes; I thought there was something wrong with the ash-pan or the damper.
2918. And you looked out?—Yes, and we were not disappointed. I divided my family, and we looked out night after night, and in three or four places we put out fires.
2919. You said.—Here is the danger coming?—Yes, pretty well. Nine o'clock at night the first fortnight in January. She came before the express, and also the train coming from Melbourne to Wanganella caused the damage, with the country down train.
2920. By Mr. Priddy.—On those occasions there was nobody about who could have caused the fire?
No one.
2921. It could not have been caused by a light bulb thrown from any of the carriage windows—
I think not. It happened so often this year.
2922. You think it was caused by live coals from the coal-box?—That is my opinion.

The witness withdraws.

Michael Connolly, sworn and examined.

2923. By the Chairman.—What is your occupation?—Farmer, North Wanganella.
2924. Does your land adjoin the railway line?—Yes.
2925. Have you had any experience of fires starting on your land, caused, as you think, by the engine?—I was one to put it out on three or four occasions.
2926. How long ago was the first occasion?—The first was in Deloros's paddock and Robbie's. They got damages from the Government.
2927. Did you see the fire first?—We traced it from within 2 yards from where the grass was burnt on the line. There was a tuft of grass inside the line, and it went right into the paddock from there. The train was just passed. I was working on the line at the time.
2928. How far were you from the spot?—From where the fire started it might be 20 yards at the outside. I was under the Government and so I desired it, but it was traced right enough. Robbie was one who traced it. They were well paid. I was not on my oath when I timed it. If I had been I would not have denied it. I am on my oath now, and I am telling the truth. Several times on the line it used to set fire to the grass.
2929. Was it from sparks or coals?—If the wind was strong the sparks would blow right across.
2930. When working you saw on one occasion fire started by sparks and coals from the coal-box?—Yes. I was working eighteen or nineteen years on the line.
2931. How did you come to leave me?—I had to leave; I was 60 and had to go "over the fence." On another occasion there was a crop in Gibson's, and I helped to put the fire out in it.
2932. By Mr. Green.—You were eighteen years working on the line?—Yes.
2933. Have you a single doubt on your mind that the fire took place from the engine?—No.
2934. Did it from sparks outenders?—Yes, they did.
2935. Which would you think would do it more frequently, the sparks or the coals?—This is the more dangerous.—I think the coal is the worse, unless there was a very strong wind blowing. I think the sparks would die out before they reached the ground.
2936. Do the coals come bright for some time?—They do: they did in my time.
2937. Were the fires more frequent where the fires were traced out by the stoker?—The only fires that took place from the funnel were outside the fence. The grass was burnt at the time, only just where there was a tuft.
2938. On the occasion on which you say it had been burnt, it lighted a particular tuft of grass and went into a paddock and you traced it?—Yes. That was from the funnel.
2939. You form the opinion that it came from both, but most frequently from the fire-box?—Yes. I wish the Government would make some improvement; that is all I form with them. It is about time they did.
2940. Did you hear a witness say that some coals were more dangerous than others?—Lately I had some communication or connexion with them since I left the line.
2941. You see the train passing?—Yes. I am going by the crossing and see them passing.
2942. By Mr. Swann.—During your experience on the line did you ever see any sleepers charred?—I did, just now passing when I was passing they would be on fire after the train passed.
2943. By Mr. Green.—Were you a ganger or a labourer?—A labourer. In the absence of the ganger I was left in charge.
2944. When in charge was it your business to go over the line from point to point, every bit, every day?—Yes.
2945. Did you on those occasions ever find any sleepers on fire or charred?—I did. I was for weeks in charge at times.
2946. By Mr. Roche.—You had charge of the reserves within the fences?—Yes.
2947. What have you had you for burning off?—Fence one o'clock up to six. We were not bad for burning off. From one o'clock up to six. We were not bad for burning off. From one o'clock up to six.
2948. What time of the year did you start?—We used to start before it was fit for burning, and only patch it here and there. Some grass was worse than the rest.
2949. What season had you?—Wanganella.
2950. Were there any crops growing along that section?—Yes, one crop in the paddock I have bought now.

2951. During your eighteen years the fire only got away from you in the reserve once?—Twice in my time.

2952. How much crop was destroyed?—We saved the crop. After the grass was burned all round; Robbie said Delbro got damages, so an acre, I think. There were a good few acres.

2953. Was that because the fire got away from you when burning off?—No, we had it burnt off. I was working within a few yards, and we watched it. They had a lawyer there to prove that in burning off it must have got outside, but we were there. My manager was one of the most careful men on the North-Eastern, from Melbourne to Wodonga. He used to start before the grass was dry. Some are very careless. I have taken notice of that, and it used to run outside the fence but where there are three or four men it cannot do much harm.

2954. Could there be any improvement in the state, so that there would not be so much danger to the crops and pastures alongside?—Yes.

2955. What improvement would you suggest?—I do not know anything except for the farmers to plough and the men should chip further in. There are places where it would cost a man a lot to clear and grub. When I was chipping I used to chip round the posts; now they are lying to the posts, and they may catch fire.

2956. Are there stamps in the reserve?—Yes. We used to chip round them.

2957. Have you seen any stamps catch fire?—Yes; but now they chip round them.

2958. Do you think it would not pay them to take out those stamps better than to chip round them every year?—I think it would pay better in the long run. The stamps are getting that way it would pay them to take them out.

2959. Do you think if they pruned and narrowed the ground within the fences once, say, in two or three years, it would make a great improvement on the present method, and be cheaper?—If they did not make an improvement in the fire-box. If they would take out the stamps and plough the land I do not see how, unless ainder would come from the funnel, there would be any danger. That is my opinion.

2960. What do you think it would cost to take out the stamps?—The way that labor is to be done now it would be cheap enough, if they called for readers.

2961. By Mr. Gossage.—You stated that the stamps were chipped round. Is grey-box principally?—Yes; most of it, unless on the flat, and then it is gum, and you can burn away at them. It is very hard to burn them, but box catches fire easily.

2962. Will it not burn to the end?—You would want to be more with water.

2963. And if it were not put out it would break out in two days with a spring of wind?—Yes.

The witness withdraws.

J. Miller, sworn and examined.

2964. By the Chairman.—Where do you live?—Glenrowan. I am a farmer and grazier.

2965. Does your hand adjust the railway time?—Yes, it divides some of my property.

2966. Have you any experience of fires that, in your opinion, were caused by locomotives?—Yes about two years ago.

2967. Have you had any experience of men?—Previous to that, some years ago, there were fires that we suspected, but two years ago there was a fire that was caused by a spark from an engine.

2968. Do you have any idea of whether, the fire occurred and burnt about 30 acres of ground, and we had to call what assistance we had at hand to put the fire out. The trees were not put out for about two days.

2969. Were you close to where the fire started?—Within 100 yards.

2970. Was there any possibility of it starting in any other way?—No.

2971. There was no other person near?—No.

2972. Did it start within the fences?—Yes, between 50 and 100 yards from the railway fence in the paddock immediately after the train passed. There is a steep incline to climb to the Glenrowan station right opposite our paddock.

2973. Was it a windy day?—Yes, I think about February, two years last February.

2974. Was there any strong wind blowing?—If I remember rightly, it was a calm day in the summer time.

2975. How do you think a spark could reach that distance if it was a calm day?—Nothing would give me the idea that it started otherwise.

2976. Do you remember distinctly whether it was a calm day or not?—It was, in a way. It started up quite suddenly, and I was quite close to it.

2977. We have never had evidence of a fire starting so far away from the fence—I am surprised at that.

2978. Without excluding a reduction on your word, we want to get at the facts!—It started just over the railway fence and about 100 yards from the fence as well. We called assistance to put it out.

2979. It started just over the railway fences—I could not say. It was a distance from the fence and about 8 distance of 100 yards from the railway fence we attacked it.

2980. How far from the railway fence did it start?—I could not say, because when a fire starts wherever it lights on a calm day it burns both ways. 13 years ago when the fire started—I suppose 500 yards. I was on foot. I hailed from the house, 1,060 yards away.

2981. Did you go back there first to get assistance?—Yes, and the fire was burning towards there. There would not be more than ten or fifteen minutes before we attacked it. I did not go home, but crossed and called out.

2982. The fire when a you got to it, was about 100 yards from the fences?—Yes.

2983. The wind must have been blowing in that direction for the smoke to come that way? I could not say that. It had begun in a circle.

2984. If the spark came out of the fences, whichever way the wind was blowing that is the way the fire would burn.—The grass was very long.
2988. The spark evidently went out of the funnel into your pullover, and say it was a north-west wind blowing, it went in a south-easterly direction, hit you on the back, and went back the way the wind was blowing from against it. — Yes.

2987. The way the wind was blowing was away from the railway line. — Yes.

2986. Specifically? I would travel poorer into your pullover than back. — Yes.

2985. If the fire was 100 yards from the fence when you got to it is it reasonable to suppose that the starting place must have been more than half the distance from the edge of the fire then and the railway fence? — Yes.

2986. Had it burnt right back to the fence? — No. We had burnt back to the fence to protect the timber and the trees. It had not burnt quite back.

2990. It would mean 20 or 30 yards from the fence? — Yes.

2991. Did it do much damage? — It was an inconvenience to us and a lot of expense. We had 52 cases milking at the time. We had to stand milking that night and next morning; we had to use the milk for tea and salads.

2992. Did you apply for compensation? — Yes, and the railway people did not think they were liable.

2993. That is the only experience you have had. — The only one where we have made an application for compensation, though provisions to that effect are in the same pullover, and from the engines.

2994. Have you any direct proof? — They started just immediately after the train passed, twice before that. There is a sleep brough to reverse from our property, a railway, the railway station, and on each occasion the fire has occurred it was on these places—about the same spot.

2995. I suppose the fireman was going to get up steam? — I could not say.

2996. Does the train go by at night? — Have you noticed it? — Yes, and on two occasions I remember where it was set on fire by the express or something pushing the pullover, and the other at the gate where the road crosses.

2997. Have you seen the sparks at night? — On one occasion, I saw then fully, and the grass lighted up immediately after the train passed.

2998. Then was sparks from the funnel? — Yes, from what I thought, though I could not say.

2999. You do not think they came from the firebox? — It was my suggestion that it came from the funnel. I did not see it; only the fire occurred immediately after the train had passed, as I stood where the fire occurred.

3000. You have seen a train go by at night. — Have you frequently seen sparks or embers coming from the engine in such a way as to lead you to believe that the grass had not been burnt fires would have occurred? — I could not say.

3001. I have often seen brilliant sparks from the funnel, and I have seen a bluish glow from the door of the engine while they had been putting coals on.

3002. By Mr. Roche: — You had no fires caused by burning off? — No.

3003. That works has always been satisfactorily performed? — Yes.

3004. By Mr. Green: — You stated just now that the fire that you have mentioned was caused, you believe, by sparks from the funnel? — Yes, I am quite confident of that.

3005. Is it the general impression that the fires take place from sparks from the funnel? — I could not say definitely—but from the train.

3006. Has it occurred to you that a fire might take place from the firebox? — From the firebox of the engine.

3007. What, in your opinion, is the cause of the fire? — I cannot say.

3008. Did it ever occur to you that it might occur from the chimney? — No, not until this gentleman mentioned it. I was always under the impression that the fires from the engine were caused by the funnel.

3009. You said the fires were more frequent where there was an incline. In there not an incline from your place? — No.

3010. Did you see them coming out the fires passing that place? — No.

3011. You say there is an incline, and it is just a mile from the Glenrowan station. — Yes.

3012. Do you know the place where Bournon raised the rails in the Kelly business? — Yes.

3013. Do you know Carrow's cutting? — Yes.

3014. Where is your property? — This side of Glenrowan about a mile, where the incline is, and where the rails were lifted would be the top end of our property. There is an incline from there down to the crossing of the Sydney road, and our property would extend to there. It is not so high up as that where I think it is dangerous—before they came to the incline.

3015. By Mr. Roche: — Are you in the habit of watching for fires? — Yes, we have cultivation, and at that time we watch every year about more than.

3016. It is a recognised thing for you to do that? — Yes. This fire that occurred in the evening we went down about half-past four.

3017. Do your neighbours do the same thing? — No; there was no attendance at all. There were no landowners along that line. Our property extends the whole distance of that line. Our next neighbour, Mr. Cameron, is half a mile away.

3018. By Mr. Roche: — We have had any quantity of evidence of oaks or live embers falling from the ash-box on to the sleepers, and going a little distance into the reserve, but no evidence of sparks blowing the distance you say was done in your case. Will you kindly report how far you think the fire came from the ashes? — There are not many ashes, from the ash-box 100 to 200 or 300 yards.

3019. You say it was a calm day? — Yes, sunny, hot, bright day.

3020. It seems a long distance for a live ember, capable of setting anything on fire, to blow— I cannot say anything but that there was no wind.

3021. By Mr. Roche: — How do you remember the calms of the day in February? — Are you quite certain it was calm? Was there no movement in the air? — It was what I would call a calm day.

3022. There was no strong wind blowing.

3023. But there was the mists that come across the gap about five o'clock? — Yes, the usual breeze, and a heavy heat. I remember it was a hot day.

3024. By the Chalometon: — When you came to the fire was it burning strongly? — Yes. The grass was high and it was the same pullover we had the milking cows in. I was driving them in at the time. If there had been a strong wind with the heavy grass you would not get close to it.
3024. By Mr. Green.—When you first saw the fire was there a patch burned?—About the size of this ball when I got to it.
3025. When you first saw it?—It just lit up in a blaze.
3026. By Mr. Bowler.—Have you been troubled with rabbits at all?—Yes, since.
3027. Had you any suspicion they were there?—No, in person at the time.
3028. You cannot account for the fire in any other way than you have stated?—No.

The witness withdrew.

John Bowley, jun., sworn and examined.

3029. By the Chairman.—What is your occupation?—Farmer. I live about a mile from here at South Wanganurra.
3030. Are you a son of the previous witness of the same name?—Yes.
3031. Have you ever seen a fire start close to the railway line which you believe was caused by a passing engine?—Yes, on the railway line.
3032. Between the fences. Between the line and the fences on one side?—Yes.
3033. More than once?—Often.
3034. How many times would you think?—This present summer we have had two or three special trains through our way to Sydney during the Commonwealth celebrations. Our engine used to come every night and set the grass on fire in three or four places in a mile.
3035. That was the engine with the special train?—Yes.
3036. You recognised the same engine?—It was in the same order every night.
3037. We had the Melbourne engine last night?—Yes, from Melbourne.
3038. Do you think it would be scarcely possible for a train to go to Albany that night and go back to Melbourne and back?—It was in the same train every night.
3039. It might be a different engine but the same train?—Yes, it might be.
3040. How many fires do you think you have had this summer?—Fifteen or twenty.
3041. And how many previously?—Three or four, some years, I have put out myself.
3042. That would be more than one every year?—Oh, yes.
3043. How busy would you think it was on an average every summer?—I should think ten. We live almost on the railway line, and always about.
3044. Have any of those fires got outside the fences?—No.
3045. Would some of them have got out if you had not watched them?—Some of them, I expect.
3046. Not the fire taken place between the fences before the grass was burnt off?—Yes.
3047. What prevented it getting out?—All the chopping along the fence.
3048. You took on that as a great safeguard?—Yes.
3049. I suppose you were always on the watch to put it out?—Yes. Last summer we had not been able every night to watch this train. It was a regular thing for about the fortnight that this train ran.
3050. Not right through the summer?—No, only occasionally through the summer.
3051. Have you ever seen a spark or coal leave the engine and cause a fire?—No. I cannot say that I have.
3052. Have you ever found live coals on the line or on the bank inside the fences when you went down?—I have between the rails.
3053. Did you ever find a sleeper or the grass on fire between the rails?—Before they put new sleepers in it was a common thing, because they rotted, and were easy to catch. Now they are new and pretty well covered with gravel.
3054. When a sleeper did catch, a spark could easily blow to the grass outside?—Yes.
3055. Do they saw the grass clean between the sleepers now?—Sometimes there is plenty of grass there now.
3056. Do you regard that as a source of danger?—Yes.
3057. The grass takes fire when the coals fall down?—Yes, quick and lively.
3058. And that would blow up in the grass outside if there was a wind blowing?—Yes.
3059. Do you think that the fire-box or the funnel is the greatest source of danger?—Half and half, I should say. You will often see live embers from the coal-box.
3060. By Mr. Angler.—You constantly have fire in the summer?—Yes.
3061. Inside the railway fences?—Yes.
3062. You very seldom have fires that reach outside the fence?—I have never known it to get outside the fences.
3063. From any source whatever?—No.
3064. The only danger of setting the country on fire is from the railway?—There are other fires beside that, but I have known none along the railway line.
3065. The only fires you have seen absolutely coming under your notice have been caused by locomotive?—Along the railway line.
3066. You have seen a fire start in a paddock from any other source?—No.
3067. You have seen them start between the rails?—Yes.
3068. Have you ever seen a spark from the funnel?—On a dark night you will often see sparks from the funnel; you would not see them in the day time. Often you have noticed them at night?—Yes.
3069. Would you regard that as a source of danger?—Yes, in the weather.
3070. You have never seen anything that you could absolutely trace to them?—There was no fire before the train passed, and after the train passed a fire would begin to form.
3071. You could not say whether it was a spark from the funnel or something from the cab-box?—No.
3072. Can you give us any information, from your own knowledge, of a fire from a spark from the funnel?—No, I could not.
3073. By Mr. Bowler.—Although you waited with us you seek you did not, on any occasion, see a fire directly arise either from a spark or a coal from the cab-box?—No.
3074. How long did you wait into the night?—Until the train passed.
3076. It came regularly — Yes, for about a fortnight.
3077. At what hour?— About a quarter past nine on week nights, and Saturdays it was a quarter to eight.
3078. Although you waited, there were no fires!— I have seen a fire start immediately after that train passed.
3079. How far were you from the line?— On the railway line, or along the fence watching.
3080. And yet you did not see the actual ignition; you did not see the fire absolutely come from the funnel?— I might be 100 yards away.
3081. You heard the noise on the line?— Yes.
3082. Alive?— Yes.
3083. The grass was burnt along in the reserve?— No; it was all dry, and it was still growing there.
3084. And the fire spread from there to your paddock?— It would have if left alone with a strong wind.
3085. Were any fires caused by the burning off?— Not that I know of.
3086. By Mr. Graves. — You said that the embers you found at the side of the line after the special train passed were alive?— Yes.
3087. The engine passed at certain hours during the Commonwealth celebrations for about a fortnight?— Yes.
3088. At the hour you said in the evening?— Yes.
3089. Have you any idea as to whether she emitted more sparks from the funnel or coals from the fire-box than other engines. You know this engine, and you always felt "This is the dangerous engine"? — Yes.
3090. And when you went home you thought the danger was gone?— We watched all of them, but this one particularly.

The witness withdraws.

Michael Connolly, junior, sworn and examined.

3091. By the Chairman.— You heard the evidence of your father?— No, I have just come in; I only heard a part of it.
3092. Do you live with your father?— Yes.
3093. Have you seen coals or sparks leaving a railway locomotive?— No, I could not say that, but immediately after the train passed I have seen the grass in the line catch fire.
3094. Was there any possibility of its being set on fire by any other way?— No, I think it is impossible.
3095. Have you found live coals or embers on the fire?— No, I have not.
3096. By Mr. Bonner.— Were you at the engaged on the morning off?— No.
3097. You have never been employed on the railway?— No.
3098. By Mr. Graves.— Were you living then with your father?— Yes, I am a butcher.
3099. Your father said he was a labourer?— Yes.
3100. Were you living on the edge of the fire?— Yes, in the gatehouse.
3101. Were you living in the gate-house too?— Yes, about ten years ago.
3102. Did you ever from an opinion that the line was set on fire by thermiting, and, if so, how?— Yes.
3103. Did you form an opinion as to whether it was by fire from the funnel or the fire-box?— I should think it would be from the funnel.
3104. That was your impression?— Yes.
3105. And was that the impression of the people round?— Yes. If it is from the engine it is the sleeper. On several occasions I have seen a sleeper on fire.
3106. That fire could only have come from the fire-box?— Yes, in my opinion.
3107. If a sleeper was put on fire in that way might it not smoulder for a few hours and then break out?— It might smoulder a few hours and then break; but I think the funnel is the great danger.
3108. I suppose you often saw, when a boy, the line on fire?— Yes.
3109. And you thought the engine set it on fire from the funnel?— Yes. The man would have to be watching just after the train where sparks fell down.
3110. Have you ever seen a spark blow away and set the grass on fire?— You can see them at night.
3111. You cannot swear that a spark set the grass on fire?— No.
3112. By Mr. Bonner.— On what do you base your opinion that it is from the funnel?— If it came out of the fire-box it could not get so far away.
3113. You have seen your father and the gang burning off?— Yes.
3114. Did you ever see the fire get out of the control of the gang and get into the paddock?— Adjoining!— On one occasion, three years next summer. I think they were burning off at the Three Mile, and there were a lot of reeds in the creek, and the reeds caught fire, and it went into the next paddock, and got away into a farmer's paddock, and into my father's paddock too.
3115. You correct your father's evidence in that respect then?— Yes, if he said that. I did not hear him say that.
3116. Was much damage done by that fire?— I suppose 20 acres were burnt.
3117. Your neighbours all assisted and put it out?— Yes. I was about a quarter of a mile away, and when I saw the fire I went over, and every one thought it came from the fire, that it caught the reeds and set the grass on fire.

The witness withdraws.

David Corcoran, sworn and examined.

3118. By the Chairman.— What is your occupation?— Dairy Framer. Sarah Wanganutta.
3119. Does your land adjoin the railway line?— I read all my land.
3120. Have you had any experience of a fire starting in your land that you thought was caused by a locomotive?— Really I cannot recollect that I have. I have suffered no loss from a fire. I fancy there was a fire started, and we put it out before any damage was done.
321. Have you ever known of a fire starting inside the fences or anywhere that you thought was caused by a locomotive?—Yes.

322. Tell us about the first occasion!—When they were running the line, when they used to burn wood.

323. Can you tell us anything later than that?—I have frequently seen the sparks flying out of the funnel during the hill going towards Glenrowan through Mr. Bellows' postlock and Mr. Rowley's postlock. They had a wooden-valued chimney. It is one continual source of danger in summer time every year since the fences were built. We have to watch the train from the fences as it passes through, more especially the express and goods as they go towards Melbourne. As they rise the hill they begin to fire up, and the main fire they put on the main steam there, and that causes the sparks to fly out of the funnel. I never knew but on the one occasion that any damage was done, that was to Bellows and Rowley and Mr. Robb's.

324. Have you ever known of a fire starting along the line immediately after the train passed?—Several.

325. Alighting steam property?—Yes.

326. Were you slow when the fire started?—No. I suppose 30 or 40 chains away.

327. Do you think those fires could have been caused in any other way than by the engine?—My impression was it was the engine, seeing no one about.

328. Did they start inside the fences on each occasion?—Yes.

329. Was the grass burnt inside the fences at the time?—They make a practice of burning from the drain to the fences, and they leave from the drain up what they call the "creep" for a time, till it gets thoroughly dry. Those are the various things that catch fire.

330. That portion is where it caught fire?—That is where it always catches by the trains going along.

331. On the other occasion the fire started before they burnt off at that bit of grass between the drain and the line?—Yes.

332. You say you never saw a spark or so off, and traced it with your eye till it reached the grass?—I keep your pardon, I did not say that. I said I saw the sparks flying out of the funnel when they were using the bell.

333. Did you ever trace them with your eye till they burned?—No. I would be half-sand away, but that was the cause of the action with Bellows and Rowley and Robb.

The witness withdrew.

Albert George Corson, sworn and examined.

334. By the Chairman.—Are you the son of the last witness?—Yes.

335. You heard your father's evidence?—Yes.

336. Do you endorse his statements or have you had knowledge of the facts mentioned by him?—Yes, second to them.

337. Are you in a position to corroborate all his evidence. You did not see all the fires he saw, but you have seen others?—Several.

338. Besides the one he referred to?—No, not beside.

339. Did you ever see fire in the form of a con or a spark have an engine and not fire to the grass?—No.

340. You only saw a fire start after the engine passed?—Yes.

341. That was on several occasions?—No.

342. How soon after the engine passed?—Immediately.

343. Do you think there was a possibility of those fires being caused by anything else?—No.

344. Write you down on some of those occasions?—Half-a-chance—done to the line.

345. The fire started inside the railway fence?—Yes.

346. By Mr. Gascoigne.—Can you say whether those fires, that you say started immediately after the train passed, were from the spark in a cooler?—I could not say.

347. You have seen sparks and embers coming from a train when passing?—Yes, entering falling down.

348. Frequently, as the fire?—Yes, before the mills.

349. Did you ever see them get out beyond that?—No, but on one occasion I saw a sleeper might outside of the rails after the train passed.

350. Must that have been set on fire, in your opinion, by the engine?—Yes, there was no other cause.

351. By Mr. Sawar.—I suppose your opinion was, from your experience, and that of most of them alongside the line, that if they received any damage they would have a claim against the department, as they knew of no other cause of the fires?—Yes.

352. All the people who have property alongside the line are especially on the alert in the summer months for the locomotives?—Yes.

The witness withdrew.

Ernest Corson, sworn and examined.

353. By the Chairman.—Are you the brother of the last witness?—Yes.

354. Have you seen those fires start to which he has referred?—Yes.

355. Those he particularly referred to?—Yes.

356. Were you with him?—On some occasions.

357. Did you ever see fire in the form of spark or coal leave the engine and set the grass on fire?—No.

358. Has there been any time when the engine passed?—I have been within a mile of the line.

359. How often have it happened that you saw a fire start immediately after a train passed?—I could not exactly say the number of times, but perhaps a dozen times during the summer. On one occasion I saw those fires start within two chains, directly after a train passed.

360. Did any of those fires get away outside the railway lines that you saw?—Not to my knowledge.
3161. All you saw started within the railway fences?—Yes.
3162. Did you ever form any opinion as to whether there was great danger from the fire-box or the funnel?—No; I could not say which was most dangerous. It was my impression that the engine caused it.
3163. How far did they usually start from the iron rails?—On one occasion I saw the end of a sleeper lying about 100 yards outside the rails. Most of the fires started down the embankment.
3164. By Mr. Green.—You said that the fires started down the embankment. You constantly saw the engine passing and watched the engine; did you notice any atler or driver had the fire-box raked out on that incline?—No.

The witness withdrawn.

John Stickley, sworn and examined.

3165. By the Chairman.—What is your occupation?—Butcher and grocer.
3166. Where do you reside?—On the line, about a mile from here. My property starts and runs down about two miles, along the line.
3167. I understand that you have no direct evidence to give us as to the outbreak of fires, but some suggestions to make; is that so?—Yes. In reference to the fires, I am like the other witnesses, I could not swear on oath that the train set the grass on fire, but I have seen the paddocks free from fire, and immediately after a train passed I have assisted to put the fire out. I might say I can corroborate the evidence of several witnesses. Jandlesley has been working for me for fifteen years, and I grew crop for horse-feed, and in going to the slaughter-house I have seen the line burnt, and immediately asked him what fire, and he has said:—"The train set it on fire, and we put it out." I saw the reserve entered and asked the question, and they said:—"We put it out," but I did not see it. Young Banks was there with me when we put it out. I think it is a great source of danger, the Government cutting the small pieces along the line. Last summer there was a gentleman cut a bit of ground behind my property, and he never cut down the grass at all. Of course there is only a little chopping, about 3 feet or 3 feet 6 inches, and if a horse started the fire would carry for chains. I would willingly pay the same rate if the Railway department kept that chopped off. I passed the remark to the engineer:—"Do you consider that safe?" I said:—"If you had your gatherings along the line you would not think it safe. If you do not burn that off I shall have something done." It is not eaten bare enough.
3168. By Mr. Green.—Can they eat it at all, because the regulations is they shall cut it off with a scythe?—They do eat it. The grass has this power. If the grass is cut it will not burn; it is at his discretion.
3169. By the Chairman.—Is it your point that it should not be left to the discretion of the gauge, that they should take the same provision as with their own?—If the grass is not short it should be burnt off for the safety of the adjoining properties.
3170. Is there any other point you wish to draw attention to?—I think the stumps are a great source of danger along the line, and a great source of expense to the department. I have lived here for eighteen years, and have seen the stumps chopped off for eighteen years, and I am sure I could get them cut off with a small piece of paper. I think they would be cheaper and more effective, and they would not have to chip around the stump. I think, furthermore, instead of chopping along the fences if they were to let the property-owners adjoining plant that best they would get it done cheaper and more effectively. That would make a fire break all along the property adjoining the line.
3171. That is a good idea, weren't perfectable?—Yes. Any practical farmer knows that running a scythe along he could do ten times the work that a man could do with a scythe. I made some inquiries as to whether a man could do it with a scythe. I have cleared about 56 acres, and I am told two men with a horse and a scythe could clear out to 20 or 25 stumps a day, and then they would see the small stumps to burn out the anchor stump, and with a horse they could do more. I have legs to deal with, but there are no legs on the railway line.
3172. By Mr. Green.—Is that the mode you propose?—That is the cheapest and most effective. Another thing is it, if the stumps were dug out in the winter, and the roots were exposed through the winter, in the autumn you could burn them out very easily. I have stumps that I could show that I burnt out in May, and they burned down 3 feet.
3173. Is that so?—Yes.
3174. Gum would not burn like?—Yes. I can show you gum that has burnt. Red box is bad, but if a stump is cleared round and three or four stumps put round it it will burn. Any farmer will burn, in the summer time. I am of the opinion of the best witnesses that if you have any gum in your paddocks you are in danger all the time, but I could not say whether the danger is more from the fumid from the gum-palm.
3175. You are acquainted with the people in the northern district?—Yes.
3176. Do you always the opinion that all those bringing alongside the fence are considerable danger of being burnt out by passing locomotives?—Yes, and farther, I can fully endorse Mr. Mason's evidence, because we had a large fire in Warby's Ranges. We all went out Sunday, and the first man I met was Mr. Mason, and he said:—You are not here fighting the fire, but if I and a few others had not put it out near the former the two fires would have met.
3177. By Mr. Green.—You are mayor of the town?—Yes.
3178. And have been a corn miller for many years?—Yes, I have lived in Wangaratta for eighteen years.

The witness withdrawn.

Kenneth Malcolm McKenzie, sworn and examined.

319. By Mr. Whyte.—What are you?—A grocer, residing at Alexandra.
320. Have you any knowledge of fires caused by a locomotive?—Yes; on one occasion I was traveling to Castlemaine, riding along the railway line, and between Harrowood and Yesn, about a mile from the Homestead railway station, a train passed myself and a friend who was with me, and it had only just passed when we saw a fire. There was no one about, it would be impossible for any one to be about and impossible for a fire to be there before the train passed, or we would have seen it. It was all clear country. The train had passed about 100 yards when we noticed smoke on the opposite side of the line.
3181. Outside the fence—Against a post of the railway fence, within a foot of the post. A spark must have landed there and the fire was burning the pole of the railway fence. The gentleman with me, Mr. McDonald, had his coat snapped on the front of the sodding and he took it off and ran over and put the fire out. I ran over too and we kicked the embers off the post with our boots. There was a slight hole inside the post once we reached earth and down put the embers out. There was no possibility of that fire starting but from a spark from the fence.

3185. Was the fire to windward?—It was on the south side of the fire. There was a north-west wind blowing. The spark must have come from the factory. It could not possibly have travelled from the fence. It was a good chain to the post. I did not see what it was it set fire to; it was outside the clipping.

3183. Did you notice if the fireman had shouted up?—No; I did not notice. It was going up hill. He has to prepare for a pretty stiff gradient. There was rather a steep incline at the place, but there is a much steeper grade about 400 yards further on. The Brunswick station is only about a mile and a quarter to a mile and a half from the place, and there is a steep cutting, and they have to put up steam to get over that.

3184. You are confident that the fire could not have been caused by a cigar butt or a match from the train?—No, you could not throw a cigar butt that distance.

3185. There was no one about.—No.

3186. It was not smouldering evidenced by you?—No; McDonald ran across at once. There was only about four or five square meters. We were riding along the road, and I adjourned the railway line.

3187. What distance could you be away?—About three or four miles.

3188. Have you seen a fire start on any other occasion?—No, that is the only occasion when I saw it. I have tried on the scene, what you could get evidence, but that is the only occasion I can give evidence on.

3189. Re: Mr. Greaves.—How far was the train away?—Not more than a hundred yards.

3190. There was no fire between the fence and the rails.—No.

3191. It must have been a very bright spark and it set on fire?—Yes. It was a stringy bark post, and the outside was used had dried near the ground.

3192. Re: Mr. Simpson.—Was that last summer?—No, fire years last summer. It would be the end of December. I was going up to take charge of the shearing board at Cushins; we had finished shearing at Rocky Creek.

3193. Re: Mr. Brown.—Have you had any desire of fire from the engine?—We do not join the line. We are farmers down near Ballarat, and I am a work helping them with fires, and I am, say, without exasperation, that they were in desire. They had no desire of engender. There was one man burnt out, and I think you could get some evidence, and there is no doubt it was from the train. It is going towards Ballarat from Melbourne near the Hold Hills.

3195. Have there been any number of fires?—There were two disastrous fires there. There were others, but they did not get away.

3196. It is well known that fires are caused by engines, and the people are apprehensive every summer, and take steps to prevent themselves. Yes, there is no doubt of that. The engine-drivers make a practice of dousing their engines at certain spots.

[Statutory declaration of Walter J. Smith, of Wingham.]

I, Walter J. Smith, manager of the N. E. Bacon Curing and Refrigerating Co., do hereby declare that I am at the time of December, 1898, I saw three fires start within the railway enclosure between the company's factory and the crossing, which is about 30 paces south of same, just after the down Sydney express had passed. The fires started up for a few minutes only, and then died out—the line having been burnt off, there was not sufficient grass to keep it going, nor any wind to spread it.

About the month of October, in the same year, while waiting for a train to pass, I noticed as it approached on the curve that one side of the engine seemed to be a noise of fire, and when it drew level I saw that one of the driving-wheels showed an almost unbroken circle of fire, apparently caused by the cinders having become lodged around the sides of the rims, between the spokes. I am not clear at this distance as to whether this was the down express or an ordinary passenger train running a short time before it, but believe it was the latter.

I solemnly and sincerely declare that the above statement are, to the best of my knowledge and belief, true in every particular, and I make this declaration conscientiously believing the same to be true, and by virtue of an Act of Parliament rendering persons making false declarations guilty of wilful and corrupt perjury.

WALTER J. SMITH.

Declared at Wingham, in the State of Victoria, this 31st day of July, 1901, before me—Wm. Blackmore, M.P.

The witness withdrew.

Adjourned.

WEDNESDAY, 7th AUGUST, 1901.

Members present:

M. K. McKenzie, Esq., M.P., in the Chair;

Andrew Patterson, sworn and examined.

Re: the Chairman—What are you?—I am an engine-driver on the Victorian Railways.

Have you had experience of the "Trew" spark-arrestor?—Yes, it was fixed on my engine for about a month while I was driving.
3109. What is your opinion of it?—It is a very good arrestor.
3110. Did it prevent the engine emitting any sparks that would be dangerous?—Yes, I think it was thoroughly effective in that way.
3111. Did it interfere with the steering of the engine in any way?—Not at all; I could steam as well with it as with the departmental arrestor.
3112. How did it compare with the departmental arrestor as an arrestor?—I think it is equal to, if not better than, it.
3113. Was there any difficulty in getting up steam?—No, not that I know of—not any more than with the departmental.
3114. Can you give any further information?—No.
3115. What line were you on?—The Melbourne main line.
3116. That is regarded as the severest test for an engine?—Yes.
3117. *By Mr. Eddy.*—What class of engine was it?—0-4-0.
3118. How was it better than the departmental—what are the points of the "Typer" arrestor?—It is a good arrestor for stopping sparks, and does not interfere with the steering of the engine—that is always our trouble with the arrestors.
3119. What is the principle of the "Typer" arrestor?—I could not get into the details of that.
3120. *By Mr. Sleator.*—Had you any trouble as to choking up?—No.
3121. Had you any experience with the departmental arrestor?—I have never had any serious trouble with it. It has to be cleaned with a brush.
3122. Had you to do to that with the "Typer"?—No.
3123. Do you reckon it at all a bad economizer?—I could not say. I was not on it long enough for that.
3124. Have you tried any other arrestor than the "Typer" and the departmental?—No.
3125. *By Mr. Groves.*—Have you any arrestor known in the government service?—Twenty two years. I was born and cleaning before driving.
3126. You were on an engine on the main line with the "Typer" arrestor on it?—Yes.
3127. Were you told it was under trial at that occasion?—No.
3128. Do you know whether that engine was driven by other drivers besides you?—Yes.
3129. Did they remark anything to you about it being a proper spark-arrestor?—I cannot say they did.
3130. Do you know that this arrestor has been noted by the Government over and over again?—I believe it has.
3131. Has it the reputation of being a perfect spark-arrestor amongst the officers in your branch?—I cannot say. I speak only for myself.

The witness withdraws.

John Harrisson, sworn and examined.

3132. *By the Chairman.*—What are you?—An engine driver on the Victorian Railways. I entered the service in 1878. I have been driving about twelve years. I have been in charge of an engine with "Typer" arrestor fixed on it?—No.
3133. Were you in charge of any engine with "Typer" arrestor fixed on it?—No.
3134. Were you in charge of any engine with any other arrestor than the departmental?—Yes.

Anderson's spark-arrestor on one trip.

3135. What was your opinion of the arrestor on that occasion?—I do not think it will be of any use on the Victorian Railways, for the simple reason that it has to be cleaned halfway on the journey—20 or 30 miles away from home.
3136. Was it a trial you were on?—No, it was some time after the trial when the engine was in use.
3137. Was that after the last departmental trial?—I think so.
3138. Your opinion was that the engine would have to be stopped to clean at every 20 miles?—I did not stop at Ballina and cleaned it. The engine was not steaming. I found nearly all the wire stopped up with soot from the coal. I did the same on the same journey at Wingate East, which is 20 or 30 miles from Seaview.
3139. What is your opinion of the departmental arrestor?—It is the best that we have had on the engines up to the present; the only fault with it, as with all arrestors, is that after a journey of 20 or 30 miles they become spark arrestors by stopping sparks and stopping the engine from steaming—they become spark arrestors. All the arrestors that we have had had that fault up to the present—I have only had experience as to two.
3140. *By Mr. Groves.*—It was after the departmental trial you formed the opinion you did of Anderson's arrestor?—Yes, I had only the one trip, and I had to clean it both coming and going, at about 20 or 30 miles from the start.
3141. Was the engine that you drove on that occasion the one that was fitted by the Department for the purpose of testing it?—Yes, it is the best of my knowledge it was.
3142. *By Mr. Duffy.*—Was that after some alterations were made in the pattern?—I cannot say that.

The witness withdraws.

Thomas Biddle, further examined.

3143. *By the Chairman.*—This is the report of the Board that examined several arrestors in 1883. They say as to Typer's arrestor—Two times were made of this invention, and although it cannot be considered a perfect spark-arrestor, it is very effective. The draught was not impeded to any appreciable extent; the train was able to keep good time; and the danger of fire was reduced to a minimum, only a few small sparks being given off. Further on, the Board, consisting of Messrs. J. Brough, H. Lennox, and G. Offaly, in their letter of 29th October, 1884, addressed to the Commissioner of Railways, say:—We now recommend that Mr. Typer be awarded a present premium of £2,000, and that his design of spark-arrestor...
be used on all engines wherever necessary, free from any further claim, unless under the following circumstances, viz., that we further recommend that the sum of £1,500 be offered as a premium to any person who, within twelve months from date, can supply a spark-arrester as much superior to Mr. Tyer's present line to the others under trial, and should such be offered and accepted by the Department after fair trial, then that such premium should be added to that named above (£1,000) as a complete award, and compensation for the absolute use of this design a spark-arrester during the pleasure of the Government." In a postscript, dated 22nd November, 1883, they state: "Having examined this design and engine during the past six or seven months with Tyer's spark-arrester in constant use, we beg to certify that the arrester after such a long-trial is in first-class condition, and equally effective as the first day the same was applied to such engine for our experiments, and that in consequence of it being proved on trial that it offered the least resistance to the draught and generation of steam, it affords a comparative great saving in fuel compared with other arresters under trial." Then, on the 24th August, 1891, Mr. Woodroffe writes:--"Dear Sir, I beg to acknowledge receipt of your letter of 22nd inst. regarding Tyer's spark-arrester. I attach for your information a printed copy of a prospectus issued by Mr. Tyer, which contains a print of this arrester. The Secretary for Railways is now obtaining a copy of the Board's report on Tyer's spark-arrester, which will be forwarded to you. I am endeavoring to obtain one of those arresters, which I believe is at Newport." (Signed) T. H. Woodroffe.

The printed statement attached is a statement of the principle of the arrester, and what steps were taken to inquire into its merits. You can give the Commission any information as to why the recommendation of the Board was not carried out. I cannot say that I can definitely.

3256.-The recommendation was that £1,500 should be given at once to Mr. Tyer on certain conditions--to give the free use of the invention to the Department--and a further sum of £1,500 was offered to any one who brought forward an invention as superior to Mr. Tyer's, as he was to the other inventions tested at that time. In the event of none being able to make such a claim, that the additional £1,500 should be granted to Mr. Tyer as full and complete compensation for him for the use of his invention by the Railway Department. That has not been carried out. Can you give any information as to that? The only information we have is that there was a great controversy going on at the time, and the departmental officials were very much prejudiced against Mr. Tyer in the matter. I know that Mr. Tyer was not what you might term a mechanical engineer. He was simply a driver, and there was a great feeling existing between the mechanics and the non-mechanics, and they did not like anything that a non-mechanics might offer. That is one condition. I was in the Department at the time, driving.

3257. You cannot give any further information than that!--No.

3258. Is there any further information you would like to give as to that arrester?--Yes; I would like to give you some information as to the last trial that Mr. Tyer had of his spark-arrester. It was ordered to Mr. Tyer's engine No. 456, I got instructions from the chief officer that it was to be attached and given a trial. The date of the instruction was the 13th May, 1893. Mr. Tyer fitted it on himself. I gave him a note, he signed it, and it was tried.

3259. By Mr. Langstaff.--What were you at that time?--Loco. superint. I had been driving previously--at the time of the early trials. They were tried very much further back.

3260. By the Chairman.--You were loco. superint. in 1893?--Yes. It was fixed by Mr. Tyer on engine No. 456, and it made its trial on the 22nd May, 1893. John Davies was in charge of it. He is the man who has gone to Western Australia. It was tried on the 25th goods trials, and ran through to Woodland. Davies ran all that month, from the 22nd June of the same year. T. H. Jose and six other drivers had it in charge during it. In July C. B. Holder and six other drivers had it. In August C. Holder, T. Jose, and six others. In September Andrew Patterson ran it all the time up till the 7th, when I received an order to take it off once. That was the last of it. Together there were 24 drivers upon the engine from the 22nd May to the 6th September inclusive. The approximate mileage would be about 10,000 miles. If I ran every day it would be 12,000 odd, but I might have been up a day through the time, or perhaps less. I had no complaint from any man.

3261. Did you hear the drivers express their opinion about it?--Yes; it was the best spark-arrester that had ever been tried, and that it was a pity it was ever taken off.

3262. Did any of them say that it interfered with the steaming?--None. I had no complaint whatever about steaming.

3263. Did they say that it was easier to keep clean than the departmental arrester?--It required no cleaning. They said it was only to be cleaned with.

3264. Was your experience with the departmental arrester?--Yes; there was trouble in cleaning that I--Yes, often, it might require cleaning every day. When the engine is tight-up with cold enter, there is a water-tap that goes into the coal box. This being a flat surface, coal hangs on it and chokes it. Then the drivers have to go and sweep it down. That is before starting: that is a raising steam. Then any spark that may go through a number of them rest on the top of the arrester, accumulates, and have to be cleaned off. That is after it has been doing its work for some time.

3265. When they accumulate like that, it interferes with the steaming power of the engine? Just so.

3266. How does this matter stand? is there any following Mr. Tyer's interest? No one has been looking after his interest. The reason I came up before was that I wanted to give information as to his arrester in the interest simply of the Department, knowing what was going on.

3267. Have you any personal interest in it?--None whatever, directly or indirectly.

3268. Did Mr. Tyer leave a widow?--Yes.

3269. Is she alive?--She is, and is living at Windsor. There is another thing I would like to explain about this matter. Originally, some years ago, the Department invented a spark-arrester which was termed the "grid-iron." It was constructed of about 3 in. square iron. It might be perhaps 6 in. long. There was a difficulty with that, and it was not a good enough arrester for the Department itself. Finding that Mr. Tyer's arrester was a superior one, they abandoned the other and adopted Mr. Tyer's model, which has a less resisting force, being round wire.

3270. What was the date of that?--It was a very long time back. [The witness showed by a sketch the difference of the meshes referred to.]
3251. By Mr. Deff—Do you say that the Department are using something belonging to Mr. Tyer's invention?—It is Mr. Tyer's invention altogether, only put in different form. It is a round wire mesh, and that much of it is actually Mr. Tyer's, from his spark arrester.

3252. The Department are not using the smaller mesh?—Yes, but with this spiral ring between Mr. Woodford's and that recent arrangement is as old as the hills; but I say it is not; and it was not adopted by the Department till after Mr. Tyer's arrester came before them.

3253. By the Chairman.—In your opinion, the Department copied this circular wire from Mr. Tyer's arrester?—Yes. The point is this: with the departmental arrester the difficulty was in a great measure in standing on the road. The drivers have no time to tangle with anything when they are on the road. They want something that will not give them trouble at all. The departmental arrester did give them trouble, and oftentimes my attention was called to it—so to their leasing holes in it with some iron instruments, to give a slight to enable them to get steam.

3254. You mean breaking some of the bars?—No; holding them and widening the mesh. Often times my attention has been called to that, but I could never sheet it home to any one, because they were so often changed.

3255. In making these holes, would they not be likely to break the bars?—No; they will not break; they bend easily when hot. With others, I have known it repeatedly for them to take a number of firearms—one or two as the case may be—out of the firebox to give their vent. This causes the fire to drop through the bars much more easily. There is more surface, and it gives more draught. That means that the collars would matter in all directions when running quickly.

3256. By Mr. Kennedy.—You say the drivers frequently widen the meshes!—Yes; they call them fire-keeper holes.

3257. Could they do that when the engine was in motion?—Yes. They could open the spark-box door when they were on the road. They could do it quite easily.

3258. As to Mr. Tyer's arrester. You say you had no complaints as to interferring with the standing capacity of the engine. Did you have any reports that any fires had been caused?—Not to my knowledge. Mr. Tyer's first arrester was tried on engine No. 127, a O" class, and it was run to the best of my knowledge, about nine months, when the order came to take it off. That is many years ago—in about 1881 or 1882. That was his first arrester. Before the Board was appointed. The first Board was appointed some time since Mr. Tyer's first arrester had been in use, and that is the result that you have been reading in the report from the Commission instructed on that matter. That was the first arrester he put on. That was engine No. 127, and it was on that arrester that the Board recommended its adoption.

3259. By the Chairman.—Did Mr. Tyer improve that arrester afterwards?—Yes. He improved it twice. The last arrester was the largest.

3260. How did he improve it?—He enlarged the arrester and reduced the mesh, which gave it the same, or more, area than the first.

3261. Would not that interfere with the steaming?—No. He made up for that by making it much larger.

3262. Would it not be more liable to choke an amount of the mesh being closer?—It did not choke anyhow.

3263. By Mr. Kennedy.—Did any fires come to your knowledge, or that there was a greater tendency to omit sparks with the Tyer arrester than the other?—I never heard of any. There were fires taking place, but I could not describe any particular fire. It would come within my knowledge, but I did not notice any particular case.

3264. I see in the prospectus attached to the engine by the Engineer-in-Chief of the Victorian Railways that it states that this arrester was fitted on all the Desirglin and Moana engines?—Yes.

3265. Do you know why it was removed?—Mr. Allison adopted one himself; and the thing was to get rid of Mr. Tyer's. I have seen Mr. Allison's, but I cannot speak particularly about its value.

3266. You say that the Allison has replaced the Tyer on that line?—No; I assume under the impression they are not using Mr. Allibon's three now.

3267. Do you know when Tyer's spark-arrester was put on the "O" engine as to any complaints about sparks or hindrance to steaming?—It was no hindrance to steaming; I know; and I never had any complaints about sparks.

3268. Can you give specific information as to the greater probability of fires being caused from cinders falling through the fireboxes as compared with sparks?—If the drivers find a difficulty in steaming, they must make up some other way, if they can; and they will knock out a bar or two bars.

3269. Is it not always possible, or a certainty, that it would be known in your sheds if a fire-bar was removed?—It could not be noticed immediately, but only when the fire was put in again by the lighter-up.

3270. Then could you not know who ripped these bars?—It might possibly go out again the same day.

3271. Are not the fires raked out when the engine comes in?—Yes; the lighter-up would discover it; but it is possible that he might put in more bars, or he might not.

3272. He would see that bars had been taken out?—Yes.

3273. Would it not come under the notice of those in charge?—Yes; the foreman might not inform the manager. I often knew it; but I would not shut it home to any particular driver.

3274. By Mr. Sangster.—Have you noticed a bar itself burnt down?—That is just one of the cases. They would burn it out by accumulating a quantity of fire in the ashpan till the bar was burnt out.

3275. It is easy to burn a bar out without knowing it out?—Yes; quite easy. The fire shales through and accumulates in the ashpan, so that the fire becomes there one mass, and burns the bar.

3276. By Mr. Kennedy.—Had you not an inspector of those arrester in your sheds?—Yes; in your time I appointed a man to look after the arrester, to clean all the tubes, and to clean the spark-arrester.

3277. Then as to this interference by the drivers with the arrester, enlarging the spaces, would not that come under the inspector's notice as soon as the engine returned to the shed?—No; it comes under no one's notice, because it is in the smoke-box, and they never look there.

3278. Is it not their duty now to examine these spark-arrester?—Yes; that is why I put that man on.
2820. Would not be notice that—Yes, he did, and reported to me; but you could not shoot it home to any driver, because the black would never be white and that it was not keen.

2821. Is it not the duty of some one to examine the different parts of the arrestor on each occasion when the engine returns to the shed?—There is no examination in that respect. I have left the service six and a half years ago. During my time there was no inspection of the arresters particularly. The driver examines his engine as regards the working parts of it and sees it away, but the spark-box is not examined. It is necessary to clean the ashes out that have accumulated during the trip in the spark-box. It is customary to empty the spark-box in giving up charge of the engine.

2822. That is done twice?—By the fireman who has been running on the trip.

2823. It is not the special duty of any one to examine these arrestors after each trip?—No; it never was.

2824. You told us distinctly that it was not possible for an engine to leave the shed for four or five consecutive trips with these spaces enlarged?—Yes, that was the position during my supervision at the sheds.

2825. Under these conditions it was not possible to shoot home tampering to any particular driver?—No.

2826. By Mr. Greaves.—Do you specify any particular officer that would be interested in not getting Tyre's arrestor accepted?—No; that existed with the higher officers.

2827. You stated that there was a trial of those different arresters?—Yes.

2828. Was Mr. Muns, at the time you speak of, the head man of the Department?—Yes.

2829. Was he a competitor with an arrestor of his own at that time?—Not to my knowledge. There was a spark-arrestor in his time trial which was supposed to be that of Mr. John Woods, the Commissioner—it was as much his design.

2830. There was one in competition?—Yes.

2831. If it was not Mr. Woods', whose invention was it?—The officers of the Department.

2832. In Mr. Tyre in low circumstances?—Yes; she asked for assistance from her friends.

2833. Are you aware that Mr. Tyre was only a driver, but that there are a number of patentees of very clever things standing in his name today?—Yes; other patents as well as that.

2834. Which have been successful?—They have been used.

2835. Though you say he was not a mechanic, but he did invent other things in constant use.—Yes. While I say he was not a mechanic, I mean he never served seven years' apprenticeship to any branch of trade; but, notwithstanding that, I considered him a good mechanic. He made his living after he left the railway by his mechanism.

2836. Did any one object to Tyre's invention?—I never heard of my objection.

2837. Did any of the drivers ever complain that it was imperfect in any respect?—They never did. They often said it was perfect.

2838. Do you know as to whether there were not any departmental boards, but also outside boards on this Tyre's invention?—Yes, there were.

2839. Did you know Mr. Juneau?—I did.

2840. And Hugh Lennox?—Yes.

2841. And Mr. Elliott?—Yes.

2842. Were those the men who reported it?—Yes; that was the outside Board.

2843. How long was Tyre's arrestor under trial to your knowledge?—Nine months from the first trial, and the second time from the 22nd May to 6th October inclusive.

2844. On the second trial were you in charge of the men?—I was.

2845. And you had instructions to keep it removed?—I removed it on the 7th October, 1893.

2846. You do not know whether Mr. Tyre at that time was trying to get a patent for it?—He had patented it long before that.

2847. By Mr. Duffie.—When the Department ordered you to remove this spark-arrestor, did they give any reasons?—No; simply ordered me to take it away at once.

2848. Do you know of any reasons that actuated the Department in doing that?—It is this. I had an opportunity of judging what was going on, and hearing what was going on, and it was simply, in my opinion, what I do not hesitate to say, a peculiar one. Mr. Woodruff, after the trials, accompanied by Mr. Kibble, Mr. McNeary, the Commissioners, and Mr. Jacks, the Chief Loco. Inspector, paid a visit to the sheds. Previous to this, I had brought it under Mr. Woodruff's notice. I had nine engines laid up fitted with various other trial spark-arresters, and I could not carry on the traffic. I was in a terrible state for engines to meet the demands of the traffic. An engine had to come in and go out at once, knock out the fire, put in a new one, and send her on with another driver. Mr. Woodruff and the others came down to the sheds and inspected the various arrestors after trial, looked in the spark-box, and so on. One engine was running with Tyre's arrestor. I was so sorry she was out. That is Tyre's. It resulted in this: on two days after I got an order to take off all the arrestors that were on trial, including Tyre's. It was departmental arrestor then in existence!—It was, not running daily; and that was the one to be kept on.

2849. By Mr. Sangster.—Can you tell the names of some of the other sides?—The only one that I can remember is Mr. Anderson's. I do not know the names of the others. I remember Mr. Anderson's well, because he was nearly always there.

The witness withdrew.

Arthur James Freeman, sworn and examined.

3111. By the Chairman.—What are you?—Engine-driver, Victorian Railways. I have been that for two years; I was fireman before.

3112-90. Have you had experience of Mr. Heck's brick arch?—Yes, for four weeks. I forced a very good fire in the first place I was there, and we put into the fire to protect the tubes from burning up, and it turned out very successful in that respect, and also after running it two or three days we found that it was a fuel saver. As nearly as I can remember I think that from 6 to 8 lbs. of coal were saved per cwt.
3391. What is the usual quantity burnt per mile?—It varies according to the quality of the coal, sometimes it runs from 47 to 49 lbs., a mile, and sometimes 50.

3392. That would work out about 10 per cent. saving?—Yes.

3393. What effect did it have on the steaming? The engine steamed very freely, in fact, freer than ever before, which was noticed by the departamental agent.

3394. What about sparks?—As to sparks we made it quite harmless after running it two or three days to look, and we saw no sparks whatever, not even a small spark from the funnel.

3395. What was the effect as to keeping the engine clean? The engine was kept clean; there was not a bit of or any about her, and nothing whatever in the smokebox with the exception of about a shovelful or a couple of handfuls of very tiny dust. I was running on the North-Eastern line from Melbourne to Seymour; that was in November, 1897, I was foreman then.

3396. Were you with Richard Ross, the driver?—Yes.

3397. By Mr. Nagle.—Had you the departmental spark arrestor on at the time of the arrest?—Yes, single grid.

3398. Yes, you used the single and double grid many times since?—Yes.

3399. Did you feel it chose sometimes?—Yes; it is very difficult to get along sometimes with the double grid.

3400. Did you find the single grid in the way? Was there much less dust while you had the brick arch?—No, none at all; we did not require to open the fire-box at all, consequently the tubes were kept clean.

3411. Is there any extra trouble to the furnace in fitting with that arch in?—No, none whatever it saves more easily; you do not need to fire the engine as often.

3412. Have you not got the more ease in putting in the fire?—No, it is just the same; only, you would have to keep the fire going, it is not, by knowing it well, in just putting in the iron wire.

3413. By Mr. Duffy.—You mean that the combustion with the back arch and the single grid is best?—I consider if brick arch was introduced it would be beneficial to the department and the agent.

3414. Do you consider there should be a single grid with it altogether? We have always had the one grid in. As to the bridge in the smoke-box at the time there was no seat or dirt around it; therefore, I came to the conclusion that it was not required.

3420. Had you any experience with brick arch with any other arrestor?—No.

The answer withholds.

William Thomas littlewood, sworn and examined.

3421. By the Chairman.—What are you?—Chairman of Directors of the Company who have purchased the Aves Fish River and Spark arrestor.

3422. The invention you represent has been tested on the Victorian Railways?—Yes; it had several lengthy tests under various conditions.

3423. Was there a departmental report in regard to those tests?—No, we were never able to obtain a report, of course figures were taken every day by the men watching the interests of the department and by our Mr. Aves, he is in England at present.

3424. You were never furnished with any information as to those reports?—No.

3425. I understood that Mr. Aves applied for a report but could not get it. What is the nature of the invention?—I will read from a pamphlet.

DESCRIPTION OF APPARATUS.

The principle on which the invention is based is the combustion of any ordinary furnace in a Bessemer furnace; this object being attained by admitting heated air, through a specially designed air jet, into the back end of the furnace, which has vertical openings (slides) cut in it.

The air is heated by the passage of the hot blast and water backsides, to allow enough or less to pass away to the outside. At the back of the arch doubtfully half to each arch pipe with mesh protections opposite every alternate arch in the bridge, for the purpose of circulating air with much heat to be heated in more air, and thus convert the furnace into an inspiratory furnace. This is especially for when using or when furnishing heating.

The pipe at the back of the bridge is connected with a steam pipe running underneath the fire-box, which again is connected with another pipe to the boiler. A valve, next the control of the furnace, is fixed to the pipe from the boiler, which regulates the supply of steam to the furnace.

Owing to the constant flow of air passing through the bridge, it is impossible for the heat to destroy it.

The apparatus is easily worked by the engine.

We do not interfere with the existing arrangements of the boilers or furnaces in any way, we simply remove the brick bridge at the end of the furnace and put in its place our patent air-bridge and apparatus.

Two-thirds of the air admitted into the furnace by the patent air-bridge passes into the cold portion of the fire-box, while the remaining third will pass through the vertical openings (slides) into the gaseous air in 'vertical streams,' thus creating a very powerful blast in the furnace. By this simple arrangement we are enabled to utilize the quantity of oxygen of the air in the combustion of the carbon and hydrogen gases which the fire in the furnace—so that, instead of using 's of the oxygen of the air to the carbon of the fuel,' we are able to use 12 or even more, giving out 14 000 units of heat, we now use two-thirds, or double the quantity of oxygen of the air to the same of carbon of the fuel, which gives out 12,700 units of heat as practically no extra cost. This much greater heat is gained by simply increasing sufficient air in the proper places to some two-eighths of oxygen to be burnt with 6 of carbon with the fuel, so that the more the carbon consumed is burnt before leaving.

In addition to the above, the nitrogen portion of the air (two-thirds in volume), which does not burn, is utilized in another way. From the form it is engendered by the combustion of the oxygen and carbon in the furnace the nitrogen has become highly superheated and given off 12 for the heat passing through the fire-ends and tubes of the boiler, thus greatly augmenting the required steam.

Of course we claim that the apace are speeded in the furnace itself; the boiler is kept clean and there is practically very little stuff comes through them at all. The combustion is so perfect that all sparks and smoke and everything is consumed in the furnace.

3426. What is your estimate of the fuel saved?—We reckon from about 10 to 15 per cent. I might mention as to the sub-plan in our invention, that the air is admitted by flues from the outside of the
engine and the ash-pan is enclosed altogether, and the air is admitted by slits under the bars with the ordinary ash-pan, and we think that prevents entirely the embers falling from the engine—it effectually stops all that.

3127. In this report here it refers to the saving of 50 per cent. in a stationary locomotive engine—the statement made by the Foot Eponymous Company, Sydney—The Sydney Morning Herald adopted that, and they have given a certificate that it saves 50 per cent.

3128. What is meant by a stationary locomotive boiler?—That is the one they use on this paper, the same type of boiler as a locomotive. That 50 per cent cost requires explaining, on the face of it, it is a bit absurd, it makes 50 per cent saving; but they make a large saving on the fuel itself, because they are enabled, by the extra condensation that we make use of, to use inferior cost. They are using anthracite but the most rubbishy coal that they can get, and by that means they are saving largely in their coal bill—that is far less than 50 per cent, it is saved principally. But we have many other testimonies showing a considerable saving. I estimate the saving averages from 10 to 20 per cent. according to the type of boiler.

3129. To fit this invention into the locomotives used on our railways would cost a good deal, would it not?—To fit that engine with the necessary tubes at the time the trams is somewhat expensive but if the whole fit the roundabout saving simply it would be very inexpensive. It would still make a saving of fuel but not the saving we consider we made in our tests, but we maintain it would absolutely stop spurs.

3130. What would it cost as a spark arrestor?—Considerably under £15 each, not more than that to fit it. It would be simply short flux into the ash-pan, and the air bridge, which I think, would cost about £1 or 25s.

3131. How would you get your profit out of that?—I speak of the actual cost; I am not considering the royalty at present.

3132. The departmental arrester, you aware, costs about £4!—It is quite possible I am much overstating the price, but the expensive portion of our arrangement was the super-heater in the smoke-box; but if that, of course, we think it would make an extra saving.

3133. If you maintain that you would still save something in fuel by the arrester!—Yes; I should say 5 to 6 per cent, and you might save a like amount by putting in the super-heater.

3134. What would be the cost of fitting that?—They cost a good deal more than they should at the time of the trial, but the super-heater, I think, would cost £25 additional.

3135. Without using your royalty?—Yes; and by that means, if told, you would save about 10 to 12 per cent. It greatly increases the power of the engine and at the tests that were made it was fully proved that with the biggest load he engine could pull over the hill at Southby quite easily.

3136. Dr. If the proposal is necessary, I will read an article in a newspaper, the Newcastle Journal.—It looks as if private enterprise was going to do for Dunfanaghy what the New Industries Committee has done for Dunfanaghy nearly five years ago, completely failed to do. Within the past two years Messrs. Stewart and Co. have founded the Scottish Central Railways Works, in which an army of people are employed; and now the British Smokes Preventor and Foot Eponymous Company, Limited, whose headquarters are in London, are fitting up works at Dunfanaghy with a view of producing their patent smoke-bridges. For the present, at least, it is intended that Dunfanaghy should be the manufacturing centre for Scotland. In the 'black districts of England and Scotland where the trams and other works are vomiting our whole smoke by night and by day, many smoke-preventers have appeared upon the scene; but the abatement in many cases was so trifling that the apparatus was very soon discarded. No one could witness the demonstration which was made with the British Smokes Preventor Company's apparatus at Messrs. J. and G. Marshall's works at Dunfanaghy on Wednesday, however, without being impressed with the idea that at last the smoke problem has been solved. After the airing of the boiler the chimney at Chyana works was holding forth dense volumes of smoke, and within thirty seconds of the apparatus being turned on all that was black had disappeared, and it seemed as if the chimney had had its connection with the smoke they cut off, and had suddenly become the outlet of a small steam exhaust pipe. The apparatus, so far as smoke abatement is concerned, is a distinct success, and Messrs. J. and G. Marshall's experiment fully bears out what Mr. Garstang, the chairman of the company, said in regard to fuel consumption, at the lunch at the Royal British Hotel, Dunfanaghy, on Wednesday. Mr. Guthrie stated that the average saving of fuel worked out at about 10 per cent. Outside its smoke-prevention qualities, a saving of 10 per cent. in the coal bill at any public work would justify the adoption of the apparatus. The company is a substantial one, with a capital of £100,000, and Mr. Anderson (the managing director) and directors are all men possessing strong business qualifications, and are practical engineers. The shapes and types of the different boilers they have met with throughout the country have presented innumerable difficulties; but every difficulty has been overcome—the apparatus has been made adaptable for any boiler—and this fact proves that the right men are at the head of the concern. The smoke-bridge has only been on the market for a few weeks, and how it has caught on will be apparent from the following sentence, which we quote from Mr. Guthrie's speech of Wednesday:—"Some of you may be aware that we have orders to fit up locomotives on the South-Eastern Railway, the Great Central Railway, and inquiries from other railways for full particulars and estimates. We have fitted and are fitting for many of the principal shipbuilders on the Clyde, most of the principal newspaper newspaper offices in London and Glasgow, and also for work as Dunbar."

3137. Is it actually in use on any railways?—Not at present—that is the latest information about it.

3138. Do you not take your information from the public press, surely! No. It has not been adopted on any railway at present.

3139. Is that the same company that you are directing manager of?—The same patent but a different company.

3140. You have no private advice that it has been adopted successfully on any line of railway!—No.

3141. By the Chairman.—Have you any advice that it is contemplated—bearing that statement!—No, we have no news at present. The only news by this mail, and we have letters to the Secretary of the company that Mr. Allan was writing by the following mail.

3142. By Mr. Dyce.—When was the patent taken out?—1883 or 1894.

3143. By Mr. Garstang.—Did it originate here?—Yes. Mr. Allan invented it; it is a Victorian invention.
434. And he has sold it to different companies, of which you are one?—Yes, we were the first company that purchased the Victorian rights. We have no connection with the Sydney or English companies.

435. All their trams in England have been solely for smoke— foié savour and smoke. It stops the smoke and the grit and sparks and bits of cinders from flying about.

436. Is there not some place in town where it has been used?—Yes, for four years in constant use. It is a very efficient spark arrestor, but we maintain the great point is the combustion with the Bunsen burner.

437. The superheating means that the water is hot before putting it in, and therefore comes nearer to steam when put in?—Yes, every 10 per cent. of heat that you can put into the water before it gets into the boiler is 1 per cent. saving. If you could heat your boiler 60 per cent. in passing through your superheater you save 6 per cent. of fuel. I believe that is the amount.

438. By Mr. Sangster.—You say you had a fairly long trial on the Victorian railways?—Yes.

439. How long?—It extended over some months. I should say about four or five—but during that time the coal strike in Sydney was on, and we had a good deal of difficulty with the coal—various classes of inferior coal were sent along.

440. Did you think you got the trial you were fairly entitled to get?—I do not know that we had anything to complain of; we certainly waited three more days which were refused. We had some things special that we wanted to try at the mails of our tests, but I have Mr. Alves's figures that they had certain savings made on certain days. I imagine this could be proved by the departmental records. I believe that the appearance of the smoke was 21/2 inches, consequently there is less chance of dropping cinders through from the furnace through casing the chimney. I see here in February, 1896, a railway trial averaging 50.33 to 31.85 per cent. On the 8th February they took a load of 283 tons with a nozzle 42 inches, and the condensation was 35 cent. to Wooding and back. On the 10th February, 1896, we altered our nozzle to 34 inches, and we took up 290 tons for a combustion of 28 cent. for 101/2 cent. of coal. On the 11th February we took up 218 tons with the same size nozzle with 30 cent of coal. On the 13th February 259 tons with 30 cent. On the 14th, 248 tons with 30 cent. On the 17th, we opened the nozzle another quarter of an inch, making it 3 1/2. We then took up 240 tons with 30 cent. per cent. On the 18th, 248 tons with 30 cent. The Government tried to open their nozzle 3 1/2 inches, and 1/4 or about the 29th they took up 204 tons with the combination of 36 cent, and on the 31st 217 tons with 37 cent. that was without our patent. I believe that with 24 inches they could manage to do the work, but with 31 they were quite out of it,—[placed them very well indeed.

441. By Mr. Kennedy.—Was it on the same engine that they did the tests?—Yes, engine 332—[showing photo]. I have cause to believe those figures are correct. I might mention that in those tests on the railways we tried several different ways, but this we considered was our best, and we could continue to do this right through, but we made several attempts at what we thought were improvements, but instead of that they were not—they were worse—in some of our tests we saved nothing. These were our best results, and we are quite sure we could maintain them.

442. As a matter of fact you were experimenting with your own patent while the trial was in progress?—Yes.

443. By Mr. Sangster.—Have you this patent attached to any boiler in or around Melbourne at the present time?—Yes, to one in South Melbourne and it absolutely associates the smoke, and they make a very large saving—about 20 per cent.

444. By the Chairman.—How did you come to put it in at South Melbourne?—We applied to them and they agreed to try it, and they have very well satisfied with it. They have had the air bridge in for about four years, and they speak very highly of it. They burnt it once more through carelessess. The air bridge was not incandescent, so you can get them for about £1 or 25c.

445. By Mr. Sangster.—I heard of one case where you fitted one where there had been a complaint by the next door neighbour about the smoke, that they were going to try and compel them to raise the chimney. That is the case I speak of. That is the reason they were glad to avail themselves of it, and they have had no difficulty with it. This chimney goes up within a few feet of their window, and used to smoke in through their window where they bleed ten.

446. Did they give a certificate to the man that they were satisfied with that height of his chimney after that test?—I believe that, but I happened to know that the chimney was not a movement as it was, and they shortened their 6-footers from 5 feet to 3 1/2 feet 6 inches, and did not require anything like the amount of fuel.

447. By Mr. Duffy.—Of course the saving is not all the factor in the case: we want to know what it will cost to make the saving. You can furnish that?—Yes, the only cost for spark arresting in to bringing those short lines down into the adunum and that is finished, and then there is all the extra cost of the air bridge; but that portion the expense would be next to nothing. I should think the department with their large number of similar engines would have the same pattern and make it very inexpensive, possibly a 25 cent note would do it. I will get that information presently.

448. By the Chairman.—You would need to say what it would cost the Department, including your royalty and all charges. I will forward that to you.

The witness withdrawn.

Thomas Hale Woodcroft, sworn and examined.

450. By the Chairman.—What are you?—Chief Mechanical Engineer of the Victorian Railways.

451. You have heard the evidence given today in respect to the Tyner Spark Arrestor. Have you any comments to make upon that evidence?—No, I think not.

452. Are there any points in which you disagree with the evidence?—My knowledge of the Tyner Spark Arrestor is more confined to what took place before I had charge of the locomotive branch of the railways. I understand there was a smear appointed about 1883 or 1884 which reported favourably upon...
is, and I think Mr. Tyer wanted a large sum of money for the use of the barrister, but the then Locomotive Superintendent, Mr. Milb, reported against it. Two of his officers Messrs. Jacks and Harrison also stated that no sparks were emitted in connection with the use of the arresting.

3462. Were those reports put in writing?—I think so, I think they are all attached to the report. I tried to get use of the arresting, but I and we have no samples of it. The one we had appears to have been returned to Mr. Tyer. Tyer's Arrestor was reported upon by his Board, and it was not adopted to be the most effective and the strongest. Other arresting were submitted, but were not considered satisfactory. Then I find:—"Loco. Superintendent (Mr. S. Milb) considers that the report re Tyer's Arrestor strikes him from the committee of officers of the company, and the board have not made any recommendation." Then the Board were asked for a recommendation, and they recommended that a premium of £1000 be awarded to Mr. Tyer, and that his arresting be adopted in all Victorian Railway engines, and that £500 be offered to anyone producing an arresting as much better than Mr. Tyer's, as Mr. Tyer's is the departmental arresting. Mr. Milb did not recommend that, as he considered there was no thoroughly efficient spark arresting known, because in was being temporary expedients. Also only one or two trials were made with Tyer's Arrestor. There are three arrests (latest American Baldwin, Rodgers, and those fitted to the Belgian engines), which the Board did not try. Also re Tyer's Arrestor, that the Board board refused to have anything to do with it, as per letter of 30th January, 1888. I do not know who the Board Board were, and time. He also states reports from Inspectors Jacks and Harrison, that they noticed very large sparks escape when Tyer's Arrestor was used. Mr. Milb further stated that those spark arrests were offered in 1884 at £5 each, which price he considers ample, and they could be fitted to those engines without arresting and being now under construction.

3463. It says they have only been two or three trials; that does not agree with Mr. Bab's evidence.—That was at that time, in 1888. Then the Minister appeared to approve of the Baldwin System's report, and stated that he did not think we had received satisfactory, as also many temporary expedients. Then the Loco Superintendent stated that he communicated with Mr. Tyer, but account of unsatisfactory results received from him, he recommends that the department have nothing to do with it, as per letter of 30th January, 1888. I do not know who the Board Board were, and time. He also states reports from Inspectors Jacks and Harrison, that they noticed very large sparks escape when Tyer's Arrestor was used. Mr. Milb further stated that those spark arrests were offered in 1884 at £5 each, which price he considers ample, and they could be fitted to those engines without arresting and being now under construction.

3464. What do you regard as unsatisfactory?—I presume that it is in connection with the change of £.

3465. The reply might be unsatisfactory, but the question is the arresting unsatisfactory?—I say unsatisfactory.

3466. That was at that time, in 1888. Then the Minister appeared to approve of the Baldwin System's report, and stated that he did not think we had received satisfactory results from Mr. Tyer, but account of unsatisfactory results received from him, he recommends that the department have nothing to do with it, as per letter of 30th January, 1888. I do not know who the Board Board were, and time. He also states reports from Inspectors Jacks and Harrison, that they noticed very large sparks escape when Tyer's Arrestor was used. Mr. Milb further stated that those spark arrests were offered in 1884 at £5 each, which price he considers ample, and they could be fitted to those engines without arresting and being now under construction.

3467. By Mr. Clover.—What answer did he give to that?—The minister that Mr. Tyer wrote to Chief Mechanical Engineer referring to above trial stated that his spark arresting was not of the same kind, and that he had finished a new arresting, of which he wished a trial made. Then the next minute is in 1884.—"As Mr. Tyer did not pay the usual fee for a further trial (although informed of some after an engine had been kept idle for weeks), his arresting was taken off by direction of Chief Mechanical Engineer, and engine put into running." Then Mr. Tyer willed an amount of £20 for testing two spark arresting to engines. In 1884 Mr. Lewis, who was Loco. running inspector, reported that Mr. Tyer was written to three times, informing him that he would have to bear the cost of fitting and proving spark arresting for trial. Then Mr. Tyer was informed again, and there appears to have been no reply, and as far as I recollect there was no reply, and with a number of others the cage was taken over. Then the Commissioner considered that we should decide one way or the other in connection with the arresting, otherwise we were liable for repudiation on the patents if we ran any of the patents arrangements, and most of them were taken out.

3468. By the Chairman.—That was not in itself a confidential act, it was simply a protecting to the department; it did not imply condemnation of the arresting? Not altogether. Then in 1885 the spark arresting was transferred to Mr. Tyer, and on our hands instead to Mr. Tyer, and I know about it. I satisfied myself in my own mind that the arresting did not offer any advantages over what we had got, and I did not go on any further with it.

3469. According to your evidence, the present unsatisfactory position is due to the fact that Mr. Tyer had not paid for a further trial?—Yes; if they had been condemned to that rule, no further trials would have been made at that time.

3470. So it was left without any decision or verdict being given, further than that Tyer's representatives had not paid for a further trial?—Repeating that the officers of the Department have reported against it.

3471. Taking the arresting out of the engine was very, in itself a confidential act—it was not done as showing that the Department disapproved of the arresting, but because Mr. Tyer had not completed with the conditions by paying for a further trial?—If he had continued to the conditions no doubt he would have had a trial.

3472. That was the reason why the arresting was taken out of the engine?—It was objected to.

3473. That must have been the reason, because if he had paid the money he would have had a further trial?—Yes, he would have got a further trial, but I do not think I should have gone to the expense of doing that if I had thought the arresting offered any advantages over the departmental arrests. If I was satisfied that it was a reasonable improvement on the departmental arresting, no doubt I should have continued it out, but my information was quite to the opposite effect.

3474. You might have waived the conditions as to paying for a further trial?—I might even have done that. You must remember that there was a great number of applications at that time for trials of all
sorts of appliances for arresting sparks. Those trials, of course, interfered a good deal with the working of the Department, and it was considered by the then Commissioners that if any one wasted his patent tried he should pay for it.

3410. Was this arrester taken out of the engine simply because it was deemed unsatisfactory, or unsuitable, or because he did not comply with the conditions— I should say it was both.

3411. If he had paid he would have got a further trial—Yes, that is my recollection, but it is a good many years ago now.

3412. Do you say from your recollection of Tyner's invention, that it was inferior or that it did not show any advantages over the departmental arrester—As far as my recollection goes, and my own opinion, it offered no advantages over the departmental arrester.

3413. Do you say it was inferior—I think it would permit larger sparks to escape, and in that respect it would be inferior.

3414. You are not clear on the subject—That is one of the reasons.

3415. Do you make that statement of your own knowledge, or on the evidence of Mr. Lewis and the other officers—On the evidence of the officers' reports, I believe I was one trip behind an engine with that arrester on, and my recollection is that there were a good many sparks emitted.

3416. Were these sparks dangerous—They seemed to me to be rather large sparks.

3417. Larger than the departmental arrester emitted— I should think so. The size of the sparks depends upon the distance between the bars or the openings in the setting, or whatever you call. As far as I have seen of Tyner's arrester, it is a combination of wires like those cage arresters are. It is a somewhat different shape, but beyond that it seems to me the number and size of the sparks depend as in other arresters, upon the distance between the wires.

3418. By Mr. Smeaton—What position did you occupy in the Railway Department prior to your becoming chief mechanical engineer—Chief engineer of existing lines.

3419. There were many spark arresters tried before you took charge as Chief Mechanical Engineer—Yes.

3420. Tyner's and others were tried before you became Chief Mechanical Engineer—Yes; I believe it was running in one of the engines when I became chief; it was brought under my notice with a number of others.

3421. Your opinion was formed principally, if not entirely, on that arrester by the reports from your engineers or officers immediately under you—Yes.

3422. Would you regard your opinions as superior to the engine-drivers and firemen who were using them—Would you expect they would form their opinion from the driver and fireman's report?—They would form their opinion from their own personal observation, and also from the reports.

3423. Would you regard the opinions of the men who was occupying the position of Loco. foreman, and was working directly in contact with drivers and firemen, hearing their report and seeing the engine, as worth anything—Yes.

3424. Did you see Mr. Hulse's opinion on it—Yes; I believe he was favorable to it.

3425. You still have the same opinion with regard to it as you had then—Yes.

3426. By Mr. Grace—This has been produced as Tyner's patent; will you kindly explain what that is (handing a paper to the witness)?—It is a series of circular wires arranged in a frame in a conical form.

3427. This paper you sent in from your room—Yes; that was the only thing I could get.

3428. These are drawings made by your instructions—Yes.

3429. This is supposed to be the first invention—[pointing to the paper].—Yes.

3430. No. 8. About 1888 some modifications were made in No. 8, and it was decided to fix two grids in the smoke box, one above the other, 5 or 6 inches apart, during the summer months. The wires in the top arrester were placed at right angles to those on the bottom. A further improvement was made in 1891, where the diameter of the wire was reduced to No. 6 gauge, spaced 10 to the foot giving spaces of 1 inch bare. The wires are held together by transverse bars, which vary from 3 to 6 inches apart. That is practically the arrester shown there. One is used in winter, and in summer the two are used with a conical cage between them. In that practically the arrester now used—Yes.

3431. Are I correct in forming the opinion that the alteration in No. 8 is by that patent introduced for the first time—Certainly not.

3432. What is the alteration—It is in a series of circular wires.

3433. Did you hear Mr. Hulse say that virtually your spark arresters were these circular wires, and that when was introduced it was practically putting Mr. Tyner's patent—Certainly not.

3434. You said the invention was as old as the hills—So it is.

3435. I understand those wires in Mr. Tyner's patent are moveable—they are supposed to vibrate with the movement of the engine—but these in the departmental arrester are fixed wires. There is a space to be filled up between the two arresters, which must necessarily be circular in form to surround the blast pipe. I take it that whether you surround it with wires meeting, with perforated place, with vertical wires, or with circular wires, it is not the slightest infringement on this patent, and that this patent or arrangement had nothing whatever to do with this. It simply came of itself. There was a space to be enclosed, and it was enclosed in the best and most mechanical way that we knew. I do not think that Mr. Tyner ever claimed that he had a patent for circular wire rings. As mentioned in this report, and as shown in other documents, there are hundreds of these arresters. Sometimes they are made in the shape of cages, sometimes as an elevated cage between the top of the blast pipe and the under side of the funnel, made of vertical wires, and sometimes of circular wires. They are in all shapes and forms, and no one can claim a patent for rings of wires to cover an opening.

3501. By the Chairman—As I understand the case, you say there was a space to be filled between the two arresters—Yes; enclosing the opening through which the blast is emitted from the blast pipe.

3502. It was simply a question as to how it should be filled. It had to be filled either by spiral bars or with perforated iron or steel, or in some other way, but it had to be filled; and you claim that the method was open to any one; that no genius was required to know which to use; that any method would serve the purpose—Yes.
3509. What did you see before I do not know. I have seen this opening filled with netting, with perforated plate, and horizontal rings; sometimes with vertical wires, or it may be with solid plates.

3564. The allegation is that at the particular date the Department "stole Mr. Tyrers' brains," and made use of something he invented. You say they did not—I do not think so, but I was not there.

3505. They used something that they might have used in any case, because it was common property.

—Certainly.

3566. Before you used what is alleged to be taken from Mr. Tyrer's patent, what did the Department use? Prior to that there was only one arrester. About 1889 some modifications were made in No. 5, and it was decided to fix two grids in the smoke box, one above the other, 3 to 6 inches apart, during the summer months, and that necessitated this circular space being closed.

3567. You put in this circular arrangement after Mr. Tyrer's invention had been known to the Department?—Yes.

3508. Can you say who is responsible for introducing the double grid and the circular arrangement?

—I think it was Mr. Allison Smith.

3509. Is there any radical mechanical defect in Mr. Tyrer's patent that would militate against its use on a locomotive?—I do not know of any.

3510. It is your opinion that it is a good spark-arrester, but not better than the departmental one?

—It is no better than the departmental arrester.

3511. Do you think it stands on the same plane as the departmental one?—If the same were spaced the same distance apart, and the wire was where given, it might be as good.

3512. Mr. Hulse told as you went down on a certain date to his sheds, and he complained that he had a number of engines there that he could not use because they were being tried for spark-arresters, and you ordered the engines and the spark-arresters then be tried. Why did you order the engines and the spark-arresters to be removed?—I was going to test the engines, and there was an order from the Commissioner that those engines were to be taken out.

3513. Had he made us his mind then, and if so why? that none of these patents could be profitably used?—I cannot say of my own knowledge what the reasons were, or what the particular engines were. I know there was a general order given at that time.

3514. In ordering these spark-arresters to be removed were you simply following out the instructions of the Commissioner?—Yes.

3515. I presume there will be papers in the Department showing what occurred in doing that?

—There may, or it may have been oral instructions.

3516. When the Commissioner before him the question of retaining or removing spark-arresters, he would act upon some written report?—Yes.

3517. Would that report be available for the Commission?—Yes; anything like that. All the papers have been kept.

3518. Mr. Hulse gave evidence that although occasionally he found out that the meshes of the grid had been enlarged by some of the drivers he could not bring it home to any particular driver, or account of the system of inspection. Is that evidence correct, and if so, is that the practice now?—It is not the practice now.

3519. What is the practice now?—The driver and the fireman are absolutely responsible for the condition of the spark-arresters.

3520. The driver comes in and goes off about his business, and another driver takes that engine.

When the first driver leaves he has to look it over in good order and condition to the second driver—Yes.

3521. After two or three drivers have had control of that engine, if something wrong is found in connection with the spark-arrester, who is held responsible?—The man in whose charge the engine is, in charge of the engine, spark-arrester, and anything else, when he takes it over.

3522. It is his business to look at the spark-arrester and see that it is in good order and condition?—Yes; it is his duty to look at it, and the driver's duty to see that he does so.

3523. He is responsible for seeing that it is done?—Yes; they are paid to do it. Each driver and fireman goes three-quarters of an hour each trip to do that work.

3524. By Mr. Sargent.—Is that practice now, since Mr. Hulse left the Department?—I do not think so.

3525. By Mr. Duffy.—There seems to be no sufficient reason why the report of that 1833 Board was not carried out—that Mr. Tyrer's invention should be adopted, and that he should be paid a certain sum, and that further experiments should be made to see if a better arrester could be found.—As far as I can gather from the papers he wanted too much money for it in the first instance, and the next reason was that the authorities of the day did not think that it was an efficient spark-arrester.

3526. Was Mr. Hulse's report before them when they gave that opinion?—I cannot say.

3527. By Mr. Howser.—Did Mr. Tyrer, or any one representing him, complain at any time that the Department had taken an idea from his patent?—I do not know of it. Mr. Tyrer called upon me once or twice in connection with his arrester, and I have no recollection whatever of his complaining in any way, or referring to it. In fact I do not think he would consider it any infringement on his patent.

3528. He never complained during his lifetime?—Not that I know of.

3529. Do you think that he would know that your improvement was taken from his idea, or seemed to have been taken from his idea, and that it is quite possible, he would know it is quite possible, he may have been influenced by it.

3530. Was the lapse of time before he died enough to let him know whether the Department had adopted an improvement which might be termed an infringement of his patent?—I think he was bound to know. He knew all the men at the shed. Mr. Hulse and he were very friendly, and I should think he would know if an attempt were made to pirate his invention.

3531. You are clear that no complaint was made by him to the Department?—I have not the slightest recollection of any.

3532. By Mr. Sargent.—Did you know Mr. John Bunce?—Not personally.

3533. Did you know enough of him to think that he would be capable of forming an opinion on evidence or on expert knowledge of these things?—He was not a railway man, but as far as I know, he was a shrewd business man.

3531. Did you know Mr. Leemom?—Not personally.
3539. Or Mr. Elliott!—No.
3540. You could not say whether they were capable of giving a proper expert opinion!—Not from a railway point of view, I think, but they were very afraid business went.
3541. They had a great deal to do with making tractive engines!—I do not know that they made tractive engines; they made agricultural implements.
3542. Mr. Green.—In 1852 you were in Mr. Norman's position!—No. I was in the department.
3543. Was Mr. Stanston out here in that year?—Was he not at home on leave of absence?—I do not think so; I do not think he has ever been home at any time.
3544. Is Mr. Stanston directly under you now in No. 44 room?—Yes.
3545. Do you recall him going home, and being paid all the time he was at home!—No; I do not think he has ever been home since he came out.
3546. By Mr. Duffy.—You have heard Engine-driver Freeman's evidence about Hack's arch. Do you come to what he said as to the saving of fuel, and the extinguishing of the spark nuisance by the use of that arch!—No.
3547. What reasons have you for differing with him!—The general one that the whole business is wrong in principle. As far as I understand the Hack patent arch, it is simply a vertical wall of brickwork built on the ordinary brick arch which is attached to every locomotive. Its effect, in my opinion, would be to concentrate the whole of the gases and flames into a certain number, only a small proportion, of the tubes, whereas the effect that most locomotive engineers try to obtain is to get the gases and flames evenly distributed on the tubes, so that each one performs its proper duty. The effect of this arch would be that a great number of the gases operated on by the gases and flames would become choked up and inoperative.
3548. Was that the effect when the experiments were made?—I cannot say.
3549. We are told that fuel is saved and steam generated as well as is other systems, and that sparks are not blown at all in this way that that was not so in the experiments!—I cannot say, but I should doubt it. There is nothing that is more difficult in pulley practice than to determine small differences in the consumption of coal. It requires a very elaborate set of experiments to determine it, because the conditions vary so much. A good furnace can make a difference of from 5 to 10 per cent. in fuel as against a bad furnace, and a good driver can make the same difference. The condition of the engine, the condition of the atmosphere, and the load, are all most important factors.
3550. Experience extending over any period must meet with all these different circumstances!—I do not know anything about those experiments.
3551. The evidence before us is that the dangerous sparks were prevented from leaving the engine by the use of this invention. Is not that so?—I should not think so.
3552. Why not?—You are putting theory against what we know as the results of the experiment!—The stopping of the engine and its efficiency depend very largely on the amount of heating surface, that is, the surface in contact with the flames and gases, and the exhaustion of the moist from them to the water. If you provide an appliance which lessens a considerable quantity of that heating surface, as I am certain this must do, you must lessen the efficiency of the engine, and instead of consuming less fuel, you will consume more.
3553. What effect will it have on the emission of the sparks!—Very little.
3554. Would that little have a tendency towards the reduction of the sparks, or would more sparks be ejected?—It would be against the emission of sparks.
3555. If we find a competent engine-driver, dissatisfied in the matter, giving evidence that after that trial he found a much less number of sparks were emitted, could you show the Committee that that could not be so!—I would like to know the circumstances under which he found this. It might be entirely due to very careful brinage, and due careful management of the engine.
3556. By the Chairman.—This is the evidence given by Mr. Richard Ross, the engine-driver:[reading from Question No. 2585 to Question No. 2545]—have you anything to say to that!—I have no doubt he speaks as he thinks.
3557. By Mr. Sumner.—He speaks from experience and you speak from theory!—He speaks from the experience of a short trial on certain lines.
3558. By the Chairman.—It was a four weeks' trial on an express train. Is not that a severe trial!—Unless exact weight of the vehicle taken and the coal measured exactly and weighed, and the water measured, and the engine run exactly on the same conditions in every possible way—which I do not think they observed at all in this business—it is impossible for Ross or any one else to say whether that answer would vary very much or not.
3559. You knew the averages came out pretty closely, and that would be a pretty fair test comparing it with the month before and the month after, or the same months in the year previously?—As far as I recall the running of that particular train, the consumption was less after the arch had been taken out. I fancy it has taken his consumption from the consumption sheet. That is a rough way of showing the men what coal they use but for uncertain as to whether an appliance is saving coal or not, it is not good enough. In order to determine whether that is a fuel-saver a set of elaborate experiments must be made. I am satisfied as driver can tell whether it saves fuel or not, unless he measured his water and his coal, which those men did not vary in the case.
3560. Although he could not tell accurately, if you take one month with another and you find a difference of 5 per cent. between the amount used and the lowest amount used on any other train, that would be acceptable as a guide, that if it were not conclusive proof!—Unless you know the loads, the assumption would be fallacious altogether.
3561. Surely it is a guide. Express trains are heavier than other trains.—You must know the load, the exact measured quantity of coal, and the exact quantity of water before you can tell anything about it.
3562. We have the evidence of Mr. Green, which has not been disproved, and he is a reliable man, that he was 5 per cent. below the next lowest!—I should like to shock those figures before saying anything about it.
3563. Assuming the figures to be correct, it is good ground for claiming that there was an unusual saving on that train, and that it must be due to some unusual cause. In that particular instance there was the unusual circumstance that there was this brick arch!—One driver may run with 5 per cent. more coal than another. We find very great accountable variations in the running of the very same trains by
different drivers. I could show the loss consumption-shoot, where, with the same train there are differences of 5 and 10 per cent. in the consumption of fuel, though, so far as we can see, there is no reason whatever for the variation. Ross may have compassed his average with some one else who does not run so cheaply as he does.

3565. He said the lowest average?—I could not say. I should want to compare the figures and the loads and all other particulars.

3566. Have the engine drivers access to the returns?—They are published every month.

3567. He has an opportunity of knowing and he has taken the responsibility of making that statement?—I must tell you that those returns are necessarily somewhat rough gauged. They include not only the coal that is used in running, but the coal used in lighting up and all that sort of thing, and you cannot form any thing like an exact comparison on that basis. They may vary 10 per cent. either way.

3568. Mr. Jack says:—"I then went to the Chief Mechanical Engineer, Mr. Woodhouse, and asked him, as I had been so successful, and as I had also designed an arch which economized fuel (an improvement on this arch), if he could see his way clear to give me back the Is. a day, and he told me it was too late to say anything to his office, and telling him that any engine with brick arch would save coal, that the brick archers did not save coal?—I deny that statement. It may have been said in conversation with other things, but I did not make a statement of that sort. It is ridiculous. "I, as a worker and not an engineer, but only a mechanic, could not debate the matter, but I mentioned that the monthly running sheet was truthful, and this particular engine—433—on which it was run for six weeks had shown a saving of something like 3 Is. per mile.

3569. What proportion of the total amount was that?—That was a matter of 3 Is. of coal per mile for every mile she ran. 2855. Why would it be if your arch had not been used?—I was giving what their own running sheet shows. It simply gives what their sheet gives. It shows this engine used 3 destrud something per mile. 2854. By the Chairman.—You do not know what it consumed before?—I do not know on some engines it is 6½ lb. and up to 6½ lb., a saving of about 5 per cent. The driver of this engine, with the improved arch, when he found that it would not construct another for him (owing to the Chief Mechanical Engineer saying that it did not save coal, and that he would not construct any more), wrote a note, which I have—[Note: I am a rough copy. I have a copy of that, and it is in the library of that house. He says, The amount of coal saved surprised me.' The outcome was the Chief Mechanical Engineer had reduced the trial with engine No. 363 by 1½ Is. per mile. We presume he did it. It was put into the hands of the locomotive committee.] Mr. Leech, and his engine was to be run for four months, the month of August, 1857, with the departments' arch, September with no arch in the fire-box at all, and in October with my improved arch, and the outcome of that trial was that it showed a saving of 3 Is. per mile, which the October sheet will show, and which can be proved. No other driver was allowed on that engine for the three months but driver McCay, showing that it must have been an official test to show that brick arches did save coal.

3570. Have you anything to say to that statement?—I cannot remember whether that was or not.

3571. By Mr. Barrow.—Will the October sheet still be in existence?—Yes; but it does not follow that if the October sheet does not show saving there was no saving, unless you know the loads and all the circumstances.

3572. Were those conditions not observed as to the measurement of coal and water?—I cannot say just now.

3573. By the Chairman.—At Question 3535, he says:—"You have given a very clear account concerning the arch as a fuel saver, but you have not told us anything about its arresting sparks! Regarding its arresting sparks, the advantage I have got is that instead of having, as they usually have, spark arresters in the smoke-box, and elevator plates and extended smoke-boxes, I am able, without that, in the alteration which I have made to many parts of the locomotive world to great advantage. In my case the arch is set somewhat similar to a deflector plate, in the smoke-box on the back of the arch, and by that means when the engine is pulling heaviest I am able to keep the fire quiet, and still give the engine a full head of steam. 2872. Tell us what you mean by keeping the fire quiet?—I mean that every time the engine exhausts it does not tear the fire up. The fire is just kept on a burner, but it does not burn the fire up and down. The great advantage of being able to keep those sparks in the fire-box is chemically by no means, whereas, with the present design they are lit up on to the top of the arch and also through into the smoke-box and then out of the chimney. Then it is a common occurrence for an engine, when pulling heavily, to drag the great coal off the shovel and lift the fire of the box up to the top of the arch, and then it is that the engine has a fire on the fire-box, and one on top of the arch; and that great heat which goes on the top of the arch through cinders and live coal being drawn there causes damage to the fire-box, as all the expanding gases females get burned, and also the stay mates in the roof, and half the steam capacity is taken away by the heating surface being lost," Have you any tendency to make upon that?—No; I have nothing to say about it.

"Then again, another advantage I have got over the present design is in the smoke-box. With the present spark-arrestor, an accumulation of ash will sometimes get up and cover three, four, and five rows of tubes, and all that heating surface is lost, and the consequence is, with the double spark-arrestor clapped up, the engine will not steam freely, and it is with the utmost difficulty they get these ash out, whereas with my fire-box (which is an entirely new idea to anything else yet tried in the locomotive world for stopping sparks), the engine is enabled to steam free, and no sparks are emitted from the funnel, and you can look any part of a train that engine is taking and never get a spark in your eye. Whereabouts there is a rise of 1,000 ft. above sea level in 32 miles, and some of the sharpest curves and heaviest gradients in Australia, I was enabled to stand on the cab and Bunter going through the tunnels, or look out from the rear of any portion of the train without getting any sparks, or cinders in my eyes, which shows beyond all doubt that it must retain all the ash and sparks in the fire-box, otherwise I could not have kept my head there for any length of time!—In my opinion there will be a great accumulation of cinders and cinders on top of the arch with this contrivance." I think they found that in the Queensland trials.

3574. Can you say anything about the coal?—Simply because the gases would be concentrated on such a small portion of the tubes that the others would not have their work to do, and they would gradually become choked off. The ashes would accumulate.
5356. Your impression is that Queenstown they did find there was a great accommodation—This is a letter from Mr. T. S. Pratt, the secretary to the Commissioners of Railways in Queenstown.

5357. We have reference to the correspondence between Mr. Pratt and Mr. H. A. H. Hoff, the Honorary Engineer to the Locomotive Engine reports under date of the 16th instant, as follows:—"I beg to inform you that trials have been made with Holt's Patent Arch in "A.4" and "B.14" classes of engines. As at first the invention appeared to give fairly satisfactory results, and as the "A.4" class is being turned out in so great a number of examples, the "A.14" engines have been put to a similar test in the construction, but it had this important effect, that, in both classes of engines, there was an entire absence of cinders and ashes, which are usually emitted from the chimney with an ordinary engine when an engine is pulling heavy, but that for the gathering that engines are very much cleansed at the end of the journey than formerly. Further trials have, however, revealed the fact that the patent arch is only suitable for certain classes of coal, and seeing that our Queenstown product is extremely variable in quality, this is a serious drawback. The main engine, Class "A.14," in which the patent arch was fitted, on more than one occasion has a considerable amount of fire on the Range through the steam pressure not being maintained, the cause being that all the tubes of the boiler were stored with cinders. With the ordinary arch this is not at all a serious matter, as the cinders can be brushed off with a pricker, but, with the patent arch, it is impossible to do this, and I have, in consequence been obliged to have the latter taken out of the passenger engine in the Brisbane district, but trials are still being carried on in Queenstown with "B.14" engines, which, of course, never cinders, and also on the "B.15" engines at Roma Street. For the reasons stated, it is evident that the arch cannot be generally adopted, and I am not prepared to make any recommendations with regard to it until a more exhaustive trial has been made to check the saving in fuel consumption which has been further, say, in three months' time.'

5359. That evidence goes to show that it is not suitable for inferior coal—Certain classes of coal.

5370. By Mr. Burney. He does not mention any tendency to weaken the tubes at the sides?—No; he does not refer to that.

5371. Was the trial long enough to allow that to be tested?—I should think it was. I do not anticipate any weakening of the tubes.

5372. Would they not wear out more quickly?—They would. There would be that effect if the work were concentrated on a certain portion of the tubes.

5373. This is the evidence given by Mr. Hack in Questions Nos. 2298 to 2323 (reading the same). What have you to say to that?—I would like to say in reference to that, that the objection raised by Mr. Mackenzie seems to me to be falling out the patent, though it was strongly against the rules, but to the formation of a company, and publishing for the information of the public the particulars of trials which would appear to the public to be official trials. It was using Government time, materials, and facilities, for the private ends of Mr. Hack and those associated with him. It was that which Mr. Mackenzie took such great exception to. As far as these improvements are concerned, if Government officers were to patent every improvement they make, they would be doing nothing else. That is what we are paid for—we are paid to do our best and to improve as we go on. If Mr. Hack had said, "I want to patent this," and it was thought worthy of a patent, and the Government had not to pay anything for it, there would have been such exceptions taken to it, but it was the fact of forming a company and denouncing people into buying shares on the strength of Government trials that had not been made that we objected to. They were simply trials that had been arranged between Mr. Hack and one or two drivers, which we knew nothing about.

5374. By the Chairman. Your recollection of Mr. Hack's evidence is that you asked him to take a position, for the purpose of testing his invention, for which he got Is. a day less. This is his evidence—(reading Question No. 2305). What have you to say as to his account of that arrangement between you and himself? The history of his transfer to the Loco Department was something like this. When I took charge of the Loco Branch in 1895, amongst the other things that I looked into was the question of brick arches. I found that universally they were using what we call the lump—that is, including the arches being made of small bricks, they were made of big houses; it is an American practice. I found those lump was not satisfactory; they did not fit properly, they were a good deal of waste, and they did not stand well, so I determined to put a man on, the job who understood bricklaying. Those lump were easily put in by labourers, but I determined to put a skilled man on the job, in order that they might be put the lumps have made properly, but that they should be as well made as possible. I also determined to try small bricks. In New South Wales, South Australia, and England they were nothing else. I knew Hack to be a first-class bricklayer and a handy man, so I got him put on to this job, and he was, I think, the first man to go very satisfactorily. He took a great deal of interest in the work. He went to very frequently and put out little improvements, and I was doing my best for him. As regards his transfer at Is. a day, and his statement that he got Is. in the existing Loco Branch, I would like to make inquiries, but I expect it took place in this way. In the Existing Loco Branch the men are allowed Is. a day for expenses; they do not get regular expenses, but that Is. was in lieu of their expenses when they were sent out on outside jobs. Instead of getting 3s. a day while they were away, they got Is. a day all the time. I think that was the reason why they went about, so that Is. a day in the Loco, was equivalent to 1s. a day in the Existing Loco Branch, where a man might be called upon to go up country at any time and pay his board and lodging.

5375. Mr. Hack's evidence went to show that at that time you approved of his archs.—At that time, as I recollect, it was simply a matter of improving an already existing arch—improving the fire lump, re-forming the arch, making the tiger-plates properly, and also building the arches of small bricks. I do not think at that time there was any question of a target arch or anything of that sort. My recollection is that the first I heard of the target arch was in the prospectus of the company. This saving of 27s a year in the arch is altogether absurd.

5376. By Mr. Grant.—It does not save that?—No; I do not think the arches cost us more than £3 a year all round.

5377. Are your existing the lump or the small bricks now?—Lumps principally. As regards our Hack's ideas, it is the tendency now that we have made a few improvements, but we are not using any part of his patent. We are using an arch made of small bricks on some of the suburban lines, but that has been in use for the last twenty years. The reason lamps were introduced was that it did not require skilled labour to put them in, whereas small bricks require a bricklayer.
By the Chairman.—I understand that the use of small bricks was the universal practice before the lamps were introduced at all!—I understand that in New South Wales and South Australia it has always been the practice. I could not say how far back it has been the practice in Victoria, but I know we have used small bricks.

By Mr. Banger.—The evidence is—"I then ran a trial, which ran into fifteen or sixteen months, and I got 13,297 miles, as against 3,900 with the Departmental arches." Is that true?—I do not know; arches have to be taken out sometimes, too, because they are worn out, not because you want to get at the tubes or repair the arches. You want to know all these particulars before you can determine the life of an arch. In my opinion and the opinion of many locomotive engineers although arches are a good thing in themselves, they are largely responsible for leaky tubes and cracked plates, especially on engines that are heavily and continuously worked, and also engines that are running on mineralised water. In the cooling down of an engine you can easily imagine that the brick work takes considerably longer to cool than the thin plates of the fire-box; the consequence is it is in a state of expansion, while the tube-plate is contracting with the cold; something has to give, and it frequently happens that the tube plates crack.

By Mr. Greens.—That is one of the reasons you do not use it!—It is one of the reasons I have an objection to it; there is no means of seeing those tubes—the whole thing is blocked except those small ports and you do not know what is going on; if any of the tubes leak you have to pull the whole thing down. That to my mind is a very serious objection to it; it is a very serious thing to have cracked tubes and leaky tubes.

By the Chairman.—Is that all your statement in regard to the arches?—Yes; that is all I wish to say.

By Mr. Greens.—The Departmental evidence is that fires rarely occur at all, and seldom, if ever, from the Department's neglect. In reading over the regulations I see that there are certain conditions where they anticipate that fires will occur, because they say—"The stoves must be kept in the dry season to have the fire bars as close as possible to prevent fire dropping out on the track, and also to keep the fire bars in the proper position. According to those regulations the Department must have a very strong idea that fires were caused in that way. We take every possible precaution.

Carelessness in such matters would cause fire!—Yes; if there was grass there to be burned. Other regulations provide that the grass is to be burned off as soon as it is dry.

By the Chairman.—Coming now to the case of Alps super-heater and fuel economiser, do you know anything about that?—Yes. I know all about it.

By Mr. Greens.—What is your opinion of it?—I think the simplest way would be to send the report I sent in after a very exhaustive trial. This was written in 1877—Reading the same.

By Mr. Greens.—You had the figures checked over carefully?—Yes. I went into it very carefully indeed. I thought there was something in it at first.

By Mr. Greens.—Eighty pounds seems a very large sum!—That was for the water-heater and flues from the chimney down to the box, and other things.

By Mr. Greens.—A gentleman who was examined on behalf of the Institution gave the amount as £15; do you think £15 would be sufficient for what he explained was requisite?—I do not know what he includes in that. The £80 does not include repairs; they could not tell me what they were going to charge.

By Mr. Greens.—Would £15 be about a fair thing for what is required for the other?—For the air bridge alone I should think it would be ample.

By the Chairman.—Your report deals with this invention principally as a fuel economiser?

By Mr. Greens.—What did you think of its merits as a spark arrester?—They did not claim at that time any arresting property for it, as far as I remember; if there was a better combustion of fuel, there would be lesser sparks.

By Mr. Greens.—As an incidental matter, it proved to be a good spark arrester?—So it was said.

By Mr. Greens.—Do you think the estimate could be carried out?—For the air bridge it could.

By Mr. Greens.—He said £80 for the air bridge and £4 for the balance. This gain of 3 or 4 per cent. is when everything is in a perfect state, and in order to keep all those things in a perfect state of efficiency you want men to look after them, and at the country stations you have not the men; the engineers have quite enough to do as it is at present.

By Mr. Greens.—Stopping it absolutely closed up the ash pan so that there was no possibility of cinders getting out, but not that it was an advantage in running through the country in the summer time. If you close up the ash pan it would be all right, but that is not part of his statement—We ran with no additions on those trials.

By Mr. Greens.—The cinder was always shut; there is no use taking it hot up and letting it in the cold air at the same time?—I think the hot air was taken in from above the fire; I think two-thirds came from above the fire, and one third through the fire.

By Mr. Greens.—What is the air west in through the air bridge?

By Mr. Greens.—The ash pan was closed up, and there was no chance of any cinders getting out; would not it be an advantage if the ash pan was completely closed up in running through the country in the summer time?

By Mr. Greens.—You believe there is a danger of fires occurring through cinders falling from the ash pan?—A very slight danger. If the grass is properly burnt off I do not think there is any danger, but if it is allowed to remain there is a certain amount of danger.

By Mr. Greens.—There is no danger of a cinder being blown into the adjoining puddle?—I do not think so.
3608. By Mr. Greens.—You say that the driver and the fireman are responsible for everything being in order about the engine, and that they are allowed three-quarters of an hour extra time for that purpose. Is it not a fact that they are bound to work eight hours for their trips, and this extra time that makes it up to nine hours is their day’s work?—Yes. Nine hours is their day’s work; they are allowed three-quarters of an hour before and after running for looking after their engine. 3609. They are charged nine hours as a day’s work, and they are allowed time off?—If they work overtime we take it off. 3610. Their average is nine hours per day.—On some of the runs it is. In other cases it is paid on mileage. Express running is paid in mileage. 3611. Is it not a fact that some of the engines are hardly over in at all?—No; they always come into the shed. 3612. Do they not go out again immediately?—Sometimes they do, but the driver and fireman are responsible for seeing that the spark arresting is in good order. 3613. How can they get at it?—They have only to open the smoke-box door.

The witness withdrew.

Adjourned.

WEDNESDAY, 14TH AUGUST, 1901

Members present:

M. K. McKenna, Esq., M.P., in the Chair;

Hon. H. R. Williams, M.P.,

J. Bowser, Esq., M.P.,

G. Songster, Esq., M.P.,

Hon. J. C. Duffy, M.P.,

T. Kennedy, Esq., M.P.,

Thomas George Ross, sworn and examined.

3609. By the Chairman.—What are you?—Loco. Foreman, Arrant.

Thomas George Ross, sworn and examined.

3609. You have been an engine-driver on the lines in the Railway department?—Yes. I have been about 25 years in the service, and about sixteen or seventeen of that a driver, speaking roughly.

3610. During that time did you test any of the outside inventions, that is, inventions that were not adopted by the Department?—I do not know about ‘testing’; I ran engines fitted with them. In one case I was running with the representative of an appliance called the Patent Vertex Exhaust Pipe.

3611. What opinion did you form of that?—A very poor one.

3612. What objection did you have to it?—First, you could not get steam, and you could get plenty of sparks.

3613. It interfered with the steering, and did not interfere with the sparks?—Yes.

3614. Which increased the consumption of fuel?—There was any amount of consumption. It naturally follows that if you cannot get steam you burn a lot of coal trying to.

3615. Did you have any other arresters?—Yes; I never remember running an engine without an arrester of some kind.

3616. I mean any tried by the Department?—I believe I ran Tyers’ and some other. I do not remember at this distance what it was, but it was a poor affair.

3617. What opinion did you form of Tyers’?—Very good, under the then existing conditions.

3618. Did it arrest the sparks?—It did to some extent.

3619. Did it arrest them as well as the departmental one?—Not to my mind.

3620. What about the steering?—It interfered with it less than others. I would not say as strong as “altogether,” but I would say it offered less impediment to the blast.

3621. Did you form any opinion about the consumption of fuel with that arrester in comparison with the departmental one?—No. At the time I was running the Tyres I did not know much about the other. I was on an engine that was known then, and it was, as being very low in consumption. That is a matter in which engines differ very greatly.

3622. What was the number of that engine?—I believe it was No. 127. It is many years back; I could not say to some years the time.

3623. Was it difficult for you to clean?—No.

3624. Was it easier to keep clean than the departmental one?—Yes.

3625. Do you think that the sparks that were emitted were of a size to be dangerous or large enough to be dangerous in the way of igniting grass?—Yes; under favourable conditions; that is, the grass long and dry, the weather hot, and a strong wind.

3626. What is your opinion of the departmental arrester in that respect?—That it is as effective as any I have seen; more effective than the Tyres arrester was in regard to arresting sparks. The difficulty I see with the departmental one is the difficulty of getting rid of the accumulation of ashes between the two grids. On the engines running in our district, we have a simple appliance that we have fitted up that meets that purpose with little risk.

3627. Is the departmental one likely to get out of order?—No.

3628. Was Tyres’?—No; I do not think so.

3629. By Mr. Greens.—Would you just look at those plans supplied by the Department, 1, 2, 3, 4, 5, 6, 7, 8, No. 8 is the middle one. You stated there were two grids in the departmental one, and there is a “birdcage”?—Yes.

3630. Just show which is the upper grid, and which the lower one, in that plan?—[The witness did so.] 3631. Will you read the remark as to No. 8?—“About 1889 some modifications were made in No. 5, and it was decided to fix two grids in the smoke-box.”

3632. You see that is explaining what the new one is, and that virtually is the present appliance?—Yes, I think it is.
3633. One grid is not always used — Yes.
3634. What is the grid that is during the winter months taken out? — The top one.
3635. Show me what you call the "middle"? — That is it [pointing to the plane].
3636. No. 8 does not describe at all the introduction of the birdcage? — No.
3637. Is the birdcage, in your opinion, of the slightest use, or just put there to fill a gap? — Yes, it is of use, and fills a gap, too.
3638. It is of use? — Yes.
3639. And was put there for a useful purpose — I should think so.
3640. And you consider it useful? — Yes.
3641. You are a gentleman of so long service, and your opinion shows the authorities have confidence in you. Suppose that tomorrow a test was ordered of Nos. 1, 2, 3, and 5 spark-arresters; is it a fact that a driver could, by careful driving, or the reverse, in a certain extent affect the result of any spark-arrestor test? Can he make more sparks come out by any particular driving? Yes, always allowing an arrester will let you get steam.
3642. One driver could, with some very small alterations, make it show to a non-expert (because if you were on the headboard he could not deceive you) a different result from another man's driving on the same engine? — He could, but I would think very little of a man who would do it.
3643. Suppose I were put there to watch the result? — You have had a long political career, and I should think you have learned everything.
3644. If a trial is held, should we depend on the driver as to results? — Yes.
3645. How can the results be varied, and how is the driver supposed to do it? — He cannot.
3646. If he was in favor of any particular spark-arrester, he would favor it by his driving if a non-expert were in the box. But I would not do it with you? — I would try and see that he did not do it.
3647. By Mr. Duffy — How could a driver who wanted to favor a particular arrester do that? — Simplicity.
3648. By Mr. Duffy — How would the probabilities or possibilities be? — I could not answer that question.
3649. Would make a difference of 25 per cent, or 30 per cent? — I could make a difference of 25 per cent, on any engine, either with or without an arrester.
3650. If there were a trial of two arresters, you could make a difference of 25 per cent? — Yes, for a while, but I would not last.
3651. As an expert would see what a driver was up to? — Yes; he could not fail to do it.
3652. You mentioned a local appliance you had for assisting the departmental grid; could you explain something about it, how you want to be used? — It is a very simple contrivance. It is the section I have charge of there are very long sections, 15 and 16 mile sections, and with heavy weather and heavy loads there is a probability of the head being hit, the coal is fine and the birdcage. The appliance is used of a simple kind; it is a slight bridge about an inch wider than the birdcage, and 4 inches longer. It is 4 inches longer than it is wide, to give room to move. It is connected with a light rod coming out of the smokebox, and only takes a touch of it to disturb the accumulation of ashes.
3653. That put in by departmental authority — I put it in on my own; I do not think the Department know anything about it.
3654. By Mr. Adams — Do you ever find the arresters damaged in the engines under your control? I have found some damaged.
3655. And the places widened between the bars and the grids? — Yes; it occurred in very rare cases, but it has been impossible for that to occur for some years, for this reason, that as far as we could learn, a man is told off to report on every spark-arrester every day, apart from the driver, and there is a man in my shop who examines them every time they come off a trip, and it is put in the report book.
3656. Has it some other notable point perhaps a wire breaking; it is a slight thing. I can understand, if a spark-arrester is allowed to get bad, it will get as bad that it will fall to pieces. I am assuming it gets ordinary care, and, with ordinary care, there is no reason to suppose it will be damaged.
3657. We have had it on evidence that the spaces have been enlarged between the wires by drivers, and they were unable to shunt it home to any particular driver! — I do not think it is possible. The wires are only about 1/4 inch apart; they are not much more than 1/4 inch wide. The transverse bars are not more than about 8 inches apart, and you could only force them apart between the transverse bars not more than 1/4 inches without breaking the wires.
3658. Since you have been in charge of the shop you have never known of a case where they deliberately interfered with it? — No.
3659. If the possibility of their going out of order is very remote with proper attention — I do not see how they can get out of order with proper attention.
3660. What is the necessity of the birdcages? — I think you will see that it is necessary to keep a clear space over the outlet of the blast-pipe, and that top birdcage is higher than the blast-pipe, and if it were not for that birdcage there would be no clean area for any spark that managed to come down the blast pipe through the space in the second grid over the blast-pipe.
3661. Is this birdcage, as described here, just a circular cage with no new wires top or bottom? — There is one grid on the top, and another on the bottom. The purpose is to blind the space over the top grid immediately over the blast-pipe.
3662. There is an opening in the top grid, but not at the bottom? — Yes, in the top only, a clear space right through without any grid, for that is outside the two grids.
3663. There is a clear space in the top and bottom grid over the blast-pipe? — Yes.
3666. Is there a clear space also through the birdcage?—No. The birdcage is there to prevent a spark that has gone through the bottom grid getting through the top one. Perhaps I could explain it better with a piece of paper (drawing a sketch and explaining the same). The top grid is made in two halves; the blast-pipe is immediately under the open space. The birdcage comes from the bottom grid up to the other grid.

3667. What I want to get at is this—Does the birdcage between the grids give a clear space over the blast-pipe?—[To answer].—[Mr. Sussexer explained the same.]

3668. By the Chairman.—When the top grid is off, what prevents the sparks getting out?—We do not burn green barn, you know.

3669. By Mr. Kennedy.—Have you ever had any experience at all of black's arch?—No, I have never used it.

3670. As to the difference between the difficulty of sparks escaping with Tyre's arrestor and the departmental arrestor, were they tried under the same conditions?—Of my knowledge, the Tyre was confined to the time when the conditions were not the same as now; the loading was not so heavy as now.

3671. Was the Tyre arrestor tried under similar conditions to your own? Were the conditions under which you used the arrestor about on a par with those under which you tried the departmental arrestor?—Do you mean the departmental arrestor now?

3672. No. The arrestor now is not the one that was in use when Tyre's was first tried.

3673. What is the difference?—I think it was just a general plain grid. I almost forget what the first departmental arrestor was.

3674. Has the material used in making the grids been different at all?—No, I do not think the wire has been altered. We know they have been placed closer than they used to be. I know the spark arresters that have been in use for the last five or six years have had the bars brought down to a distance of about 2-inch apart; I would not say exactly, but I think about that.

3675. At the time the Tyre arrestor was used by you, what was the nature of the material used in the departmental arrestor?—Is it square or round bars?—I really could not say.

3676. Getting back to the point we started from, what was the material difference between the Tyre arrestor and the one in use by the Department at that time?—I have not the departmental arrestor at this time was a small plain grid.

3677. I mean for steaming and spark-arresting purposes?—I do not think there was much difference; not enough to impress it forcibly on my mind.

3678. By Mr. Sussexer.—Are the exhaust nozzles all the same size?—They are of different sizes, according to the different sizes of engines, and they are governed by other things.

3679. Has there been an alteration in the size of the 'Y' engine?—There may have been, but I am not aware.

3680. If the exhaust nozzle was extended in the meantime, would that not make a difference as compared with the small nozzle in use then?—The enlargement of the nozzle would make a less forcible blast; you would not create the same amount of sparks with a big or clean nozzle as with a small one, or a dirty one.

3681. By Mr. Gres ves.—As to this stage that you spoke of, I think I have mastered what you said. Would this be a pretty good description—the sage is between the blast-pipe and the funnel? Is that so?—It is right, and it is not right; it is between the top of the blast-pipe and the funnel, and partly under the top of the blast-pipe. I will try and explain it another way. The top of the blast comes some little distance through the bottom grid, up to the top; the birdcage rests on the bottom.

3682. Therefore it is between the blast-pipe and the funnel?—Yes.

3683. It can only be in the middle of the two grids, and is not there when only one grid is used?—No.

3684. It therefore shows to the ascending fire almost a solid body of wire; the sage is over the fire?—Over what fire?

3685. The ascending fire from the blast-pipe?—No; it is not over the blast-pipe.

3686. Does this give room for ventilation; it does not stop that?—Not until it becomes choked with ash; it has arrested.

3687. The draught is not interfered with?—No.

3688. There is no choking of the wires when this appliance of your own is used, which clears it—It will choke until you find you are choking, and then you clean it away with the vibrating wire.

3689. There is no choking virtually if they see what you call the bridge?—No.

3690. Does a string of it, or is it vibrating?—It does not make the birdcage; it moves through the sage, and the motion of the blast moves them through the grid.

The witness withdrew.

Charles Alder, sworn and examined.

3691. By the Chairman.—What are you?—Engine-driver on the Victorian railways.

3692. How long have you been in the department?—Since 1883.

3693. How long have you been driving?—About thirteen years.

3694. During that time have you used any other spark arresters besides the departmental one?—I have a fair knowledge of using one known as Peter Tyre's.

3695. Did you use it for long?—As old trip or two.

3696. What can you form of that arrestor?—It was a very good one.

3697. You found it arrest the sparks?—Yes.

3698. Did it compare favourably with the departmental one?—It worked equally well.

3699. How did it affect the steaming of the engine?—As far as the steaming quality of the engine is concerned, it did not impair it one atom.

3700. Do you think it compares favourably with the departmental one?—It worked equally well.

3701. Just as it easily kept clean?—It never wanted cleaning.

3702. I presume it is superior to the departmental arrestor in respect of cleaning then?—Yes.
3703. As to the fuel: was there more fuel consumed by it, or less, than with the departmental one? I cannot say that the consumption varied at all; I could not say there was any variation in the consumption.

3704. By Mr. Snagge. You say you could not notice any difference in the consumption of fuel between the two? You do not notice the difference when you have a different engine every day. One will perhaps use more than another, irrespective of spark arresters at all.

3705. Is there not a sheet issued as to the quantity of coal burned by each engine for the month?
Yes.

3706. Could it not be told by that difference between an engine using one arrester and an engine using another? Yes, taking it for the whole time it was in, not by taking one day.

3707. Say running as an engine for a month with one arrester, and then a month with the other?
Yes.

3708. Would the driver have a knowledge of that sheet?
Yes, he sees it.

3709. If a certain arrester were used by the department with some sorts of fuel, say with dirty, small coal, would it be liable to choke?
Yes.

3710. More with the departmental arrester than with the Tyree under the same conditions?
Yes.

3711. You think the Tyree arrester would be more likely to keep clean than the other? Yes; the few trips I ran with it I never noticed it choked up.

3712. You have noticed the departmental one choke up?
Yes.

3713. And it was more difficult to steam with her?
Yes.

3714. Did it keep itself clean by stopping the sparks or letting them through. If it arranges them, and they hang on the spark arrester, it will choke; but if they go through, it will not choke. Do you think with the Tyree they went through? The opinion I formed was, the wires were loose a little and vibrated, and let them through.

3715. By Mr. Williams. Did you make long journeys with the arrester? To Woodend.

3716. By Mr. Duff. I think you said you had no experience with any other arresters; I have no knowledge of others.

3717. By Mr. Greens. Where are you stationed now? At the North Melbourne shed.

3718. Who is your bosun, formerly Mr. Hall.

3719. He is responsible that you receive your spark arrester in order, and deliver it up again in order? Yes, to see that it is in good order.

3720. Are your directions as at once report if you do not receive it in good order, and, having received it that way, you are responsible if you do not deliver it up so? Yes.

3721. Is there another whose sole duty it is to see if you have done your duty in those respects in the shed? Yes, there is a boilermaker told off to see.

3722. You heard the evidence of Mr. Hess? Yes.

3723. In your shed have you a man who also looks after the arresters? Yes.

3724. It would have to pass him, if wrong, and you afterwards? Yes.

3725. Would he report you if you brought it in out of order and did not report it? Yes.

3726. So there is a thorough check? Yes.

3727. By Mr. Snagge. Would it be possible for another driver to take it out and for him to be reported if he took it out without reporting it out of order? Yes.

3728. If it came back out of order, that would be the driver who would be blamed, and not you? Yes.

3729. It is examined every time it comes back? It is impossible for him to do so now.

The witness withdrew.

Robert Grant, sworn and examined.

3730. By the Chairman. What are you? — Engine-driving on the Victorian Railways.

3731. How long have you been in the Railway department? About 23 years, driving seventeen or eighteen years, running on all lines out of Melbourne.

3732. During that time have you used other arresters besides the departmental one? Yes, Tyree’s.

3733. Any other? — A short trip with Anderson’s.

3734. What opinion did you form of Anderson’s arrester? I could not get any steam.

3735. What was that due to? — The spark arrester getting choked.

3736. You found a difficulty in keeping it clean? Yes.

3737. Had you to stop the engine in order to clean it? Yes, I had to stop at Tarraville coming from Newport. We were running from Newport to Melbourne round by Braybrook.

3738. Was it a test trip? — No.

3739. You just had it fitted to your engine? — Yes.

3740. You had to stop to clean it? — I had to get another engine to shove me from Tarraville over the bank.

3741. What description of fuel were you using? — Newcastle coal.

3742. Did you open the door, or was it against the rules to attempt to close it in that way? There is a door fitted in Anderson’s, is there not? — I think Mr. Anderson was on the engine at the time.

3743. How did Mr. Anderson come to be there if it was not a test trip? — He met us at Newport to see how his spark arrester went into town.

3744. Was that the last one? It has been improved several times, was that in the improved condition or in the early stage? — One of the early stages.

3745. Was that an arrester or an extinguisher? — That was an arrester.

3746. It was not the improved arrester? — No.

3747. In regard to Tyree’s, did you use that in any trip? — I think I had it about these weeks.

3748. What opinion did you form of that? — It was a good arrester; best class.

3749. It arrested the sparks well? — Yes. I did not see any sparks that escaped that would live till they got to the ground.

3750. Did you find any difficulty in keeping the arrester clean? — No, I never cleaned it when I had it.
3751. How often would you have had to clean the departmental arrester in the same time?—Every
trip.
3752. You did not clean the Tyre arrester at all the whole time?—No.
3753. What effect did it have in regard to fuel?—About the same as the departmental; it was used just
about the same.
3754. Did you take particular notice?—It is a good while back.
3755. Did you give any attention to that respect, as to whether it was using more or less?—No, we
used to sign very nearly the same for the trip to Woodend.
3756. Did it interfere with the steering of the engine?—No; you would not know there was one on it.
3757. Were there any other advantages besides those I have asked about?—No.
3758. You did not notice any other advantages or disadvantages in connection with it?—No.
3759. By Mr. Snagget.—Does the Department give a driver any credit for saving fuel. If you are
running one class of engine for a month, and another engine for a month with the same class of fuel, and
you used more or less, is there any component made on that?—If you run "cheap," you are on the "red"
list. There is a list every month. If I ran an engine twenty trips it is put down to me, and it is put down
every month every mile I ran.
3760. You did not think that of sufficient importance to remember whether the Tyre arrester gave
you any advantage over the other?—No.
3761. There is no bonus given for saving fuel!—No.
3762. Was there ever any bonus in your time?—Not in my time.
3763. By Mr. Grace.—Was there ever a bonus to your knowledge?—No, not that I know of. I
believe there was before I entered the service.
3764. By the Chairman.—Was there an allowance of time; that a man get an advantage in the
manner of time who saved fuel?—I could not tell the conditions.
3765. By Mr. Snagget.—At present it is simply a record on your sheet!—Yes.
3766. Does the same thing apply to other stores?—Yes, the labour and the waste; it is all put down
to your credit, and nothing further. If you are a bit extravagant about the fuel you get a memo, about it—
"Please explain."
3767. By Mr. Grace.—You say you were driving with the Tyre apparatus for about three weeks,
and your memory is that you never had to clean it once?—Yes.
3768. The Government one you have is the other you tried?—Yes.
3769. About how many years ago is it since the three weeks you spoke of; one, two, three, four,
or five years ago?—I could not say exactly what it was.
3770. Was it five years ago?—It was over ten years ago, I should think.
3771. I think you stated that you think it was first-class?—Yes.
3772. During that ten years since, you have been driving?—Yes.
3773. And do you still consider it first-class?—It is the best I have had anything to do with.
3774. By Mr. Kennedy.—During your terms of driving on the different lines, have you any
recollection of its being alleged that fires were caused by the engines you were driving?—No; I have never
had any fires.

The witness withdrew.

Joseph Hinnwood, sworn and examined.
3775. By the Chairman.—What are you?—Engine-driver on the Victorian railways since about 1884.
3776. During the time you have been driving have you used any arrester but the departmental one?
—I think I am a trip or two with the Tyre.
3777. Any other?—No.
3778. Did you form any opinion with regard to the Tyre arrester?—The Tyre arrester seemed to
allow the engine to steam well.
3779. Better than the departmental one?—Yes, while the departmental arrester gets dirty.
3780. The Tyre did not get dirty!—No.
3781. Did you notice anything in regard to a saving of fuel with it?—No; we were running the
engines anyhow at that time.
3782. You thought it was a better arrester of sparks than the departmental one?—No; I do not
think so. I did not see any difference.
3783. You think they were both equally good?—Yes, in arresting the sparks; but it had an
advantage in the steering of the engine.
3784. By Mr. Duffey.—Did you make any special tests, or were they ordinary trips you ran with the
Tyre?—Just ordinary trips.
3785. You know nothing about any other spark-arrester but the departmental and the Tyre?—No.
3786. Have you had any fires caused by your engine?—No.
3787. By Mr. Bowyer.—During a trip had you to go up hill at all?—Yes, to Seymour.
3788. Had you to open the door to let in air?—Yes.
3789. Would there not be more sparks in such a case; would there not be any more severe strain
on the spark-arrester at that place?—I do not think so.
3790. When you stirred up the fire would there not be more sparks?—Yes, by stirring it up, but not
by putting the fire off.
3791. You said there were no sparks with the Tyre, and you have tried it up hill. Our experience
is that going up hill, when the door is opened, there are more sparks; you say, notwithstanding that you
would not open the door and subjected the Tyre-arrester to that test, there were no sparks!—I asked you if I saw
any difference, when I put the fire on, it gave more sparks; stirring up the fire you would have more sparks.
3792. Did you see more with the Tyre when going up hill?—When stirring the fire.
3793. It did not arrest the sparks.—They came from the furnace, that is the fire broken up.
3794. You remember that well?—Yes; it is a long time ago, and not being a special trip, I did not
take much notice.
3795. By Mr. Grace.—Did you drive from Melbourne to Seymour?—Yes.
3796. Do you know Tallarook and Broadford?—Yes.
3797. Don you know of fires being about there?—Yes.
3798. Not caused by the engine you were driving?—No.
3799. Did you hear the evidence given about the wireless grid and the summer grid?—Yes, in the spark-arrester.
3800. Did you hear of some mechanism or wire between the grid which one driver called a sage, and another called the material for filling up the space?—Yes.
3801. What is that material?—It is put there to prevent the sparks going up the smoke-pipe, so a spark must come through the bottom arrester and through the grateron before it can go up.
3802. Did you hear Mr. Loco. Foreman Ross’s evidence as to the invention that they have adopted at Ararat for giving a vibration so that the sage shall be cleaned?—No. I did not hear it.
3803. You have not that in your engine?—No.
3804. You go from North Melbourne to Seymour?—Yes.
3805. You only know that the sage is there?—Yes. It acts like two gridirons. In the winter the top one is taken out and the bottom one is left.
3806. If the wire were kept vibrating, there would be no smoking; but the Tyvek did not require to be cleaned!—No.
3807. Does the department require cleaning?—Yes.
3808. Do you clean it?—Yes.
3809. When?—Before I go out on a trip, and sometimes on the road.
3810. That is on a 64-mile trip, and when you see that she is not steaming well, you say—This thing is dirty, and you clean it out?—Yes.
3811. Do you remember whether it was necessary with the Tyvek?—No. I said only and it is a short time.
3812. The impression I had on your mind was that it would not require to be cleaned?—Yes.
3813. By Mr. Williams,—When asked about the consumption of coal, you said:—We used to run anywhere?—so you mean you keep no register of the coal used?—We put it on the running sheet.
3814. You used it in a general way?—Yes.
3815. Without taking particular notice whether it was more one day than another?—Yes.
3816. By the Chairman.—How long is it since you entered the service?—I entered it in December, 1877.
3817. By Mr. Snagget.—Have you had no experience with any arrester except the departmental and the Tyvek?—No.
3818. Do you know what sort of brick are you have in you furnace, or have you any?—Yes.
3819. Do you know the difference between that and any other arch tried in the department?—I believe there is a difference, but I did not have the pleasure of using the new one.
3820. You use what is known as the ordinary burn arch?—Yes.
3821. You have no experience of any small brick arch, or of Hack’s?—Yes, the small brick arches; we have some of them. They are all small to Hack’s. Some are built with large bricks and some with small. I think there are three with the large bricks and some with the small.
3822. By Mr. Duffy.—You were talking about cleaning the grid; did you observe applications to the summer or the winter grids?—When the two were in the then it wanted cleaning often.
3823. You were asking to the way it wanted cleaning in summer?—Yes, in winter there is only a single one.
3824. And it does not need cleaning anything like so often?—No.
3825. Does it want cleaning at all?—When the furnace opens the fire-box is generally gives it a rub; it will corrode a little, and be generally gives it a rub.

The witness withdrew.

Walter Stinton, sworn and examined.
3826. By the Chairman.—What is your occupation?—Deputy Chief Mechanical Engineer in the Victorian Railways.
3827. How long have you occupied that position?—About three years.
3828. What position did you occupy before?—I still occupy the position of workshop manager, and I have been in that position about thirteen years.
3829. When did you enter the service?—In February, 1866.
3830. The principal thing we want to examine you upon today is upon the cage (I forget the technical term) that was in dispute. Mr. Graves followed it up more closely than any other member, and perhaps he will take your examination up now.—I will give any information I can.
3831. By Mr. Greens.—You said you were working manager?—Is that general manager of all the workshops, including the carriage-building, or only in connection with engines?—Both.
3832. Are the trammen and foremen who are doing carriage and engine work in your branch?—Yes. I have a deputy, but I am responsible.
3833. If you cannot fix the responsibility on any one else, you have to take it yourself?—Yes.
3834. Do you see those plans before yes?—Yes.
3835. Those are submitted to the Commissioner from your Department to show the different advances of the spark-arrester which finally came to be the one adopted, No. 8 there; is that correct?—Yes. There are only some of them.
3836. No, 8 is the one you adopted?—Yes.
3837. Would you read out the description of No. 8, and show how it came there?—About 1889 some experiments were made in No. 5, and it was decided to fix two grids in the smoke-box, one about the other, 5 to 6 inches apart, during the summer months. The grids in the top arrester were placed at right angles to the one in the bottom. A further improvement was made in 1894, when the diameter of the wire was reduced.
3838. Does it not say somewhere that this is virtually the one adopted by the Department?—No, not No. 8; but it is so, with the modification of the bars being placed closer together.
3839. That is the one now adopted?—Yes.
The manner one has two grids?—Yes.

For better precaution—Yes; that is placed there, virtually, to stop the sparks going out.

If a spark got through the first grid, there is a second check—Yes.

There is a certain thing called a cup; is it a matter of use?—Yes.

Is it only to fill up a gap between the two?—It is to prevent the sparks taking a direct cut between the two.

The grids are in two pieces like that—[describing]—Yes.

Is it the most likely dangerous portion for sparks to come?—No, the safest portion; and I will tell you why—because the sparks get nipped with the steam, and in most cases they would be put out.

That makes another abundance of caution?—Yes.

You have taken every precaution to arrest sparks by this arrangement?—Every known precaution.

That is part of your defense in actions for damages—We do not say we did not cause it, but we have taken all known precautions?—Yes.

Did you hear the evidence of any of your officers, saying they did make a further improvement?—I do not think he is correct; there is no alteration.

As a matter of fact, there is some use in the cage, and it is not necessary to fill up a blank?—It is of use.

What is it?—Some parallel bars of iron about 1 inch by 1 inch.

Would you call that wire?—No, bars.

Are they square?—No, not square.

Are they circular?—No, they are put together to form a circle.

They are not originally circular down in the forge, they are ordinary bars, but in a circle they are a cage?—Yes, it is virtually like a bird's cage, like a parrot's cage.

With the top and the bottom one?—Yes.

And it is between the two grids, and comes up a little above one?—No, it stands on the bottom one, and the top one rests on it.

It fits is round hole?—It does not fit in the hole, it is outside the hole, but it covers the hole.

Is it in any part between the funnel and the blast-pipe?—It is between the blast-pipe and the funnel.

Was it you who ordered it to be put there?—Yes.

It was your idea?—There had been one or two fires, and I was asked the question, could any extra precautions be taken, and the foreman boiler-maker sent myself suggested that we should put on another grid so top of the other at right angles. It would be useless getting it there without taking precautions to prevent sparks that have got through the bottom one from going through the hole in the top grid. It would occur to any one if you put another grid you must prevent the sparks getting through that hole for the blast. The cage is wide and parlour of the grid; it is made of the same material, the same wire, only instead of being flat it is circular.

The material that makes the grid makes the cage?—Yes.

Do you know anything of Tyre's spark-arresters?—Yes, I have seen them all, and have them placed in the engines. I would be responsible if they were placed in position in the workshop, but not at North Melbourne. I have heard the evidence given here this morning, and would like to make an explanation. When the Tyre arrester was first introduced, it was a very fine affair, the bars were about 1 inch apart, and they could be very easily disturbed. The later Tyre spark-arrester was one with the spaces between the bars 3/16ths of an inch, with the bars loose, so they could revolve. When you had bars 3 1/16th apart you had no trouble in getting steam because you blow the sparks through the grid into the atmosphere. Since we closed the bars we have stopped the sparks, and keep them from going through, and that is why they want more cleaning than Tyre's. My opinion is Tyre's is not a spark-arrestor; it only directs the sparks into the funnel.

By the Chairman.—The drivers seem to think it is as good as the department one?—I do not wonder they would speak well of it when it is given them less trouble.

On the same principle we might say they would go for the.arrester that would be approved of by their employers, if you go in for motives. I think perhaps you had better have motives alone?—I think the drivers are willing to do their best for the department.

They might not be able to distinguish between the department and the country and those who were not from here?—The fact of our arrester catching the sparks shows it is a better arrester than the other, as a spark-arrester, as it only allows the very small particles to be blown away.

The evidence of every one, as far as I can recollect, of those who used the Tyre's, was that it was equally good, and some said it was actually better than the departmental one as an arrester, besides having advantages in other ways!—I have heard some say it does not prevent the sparks coming out.

The evidence is they come out in such a form as not to be dangerous?—A larger spark must get out through bars 3 1/16ths of an inch apart than through closer bars.

The vibration might have something to do with it?—If there is vibration, the spaces might open, and let larger sparks through.

Do you know of your own personal knowledge that the Tyre arrester allowed larger sparks to escape than the departmental arrester did?—Yes. I have ridden behind the Tyre arrester, and have seen far more sparks coming out of the funnel, and no doubt some of them were larger.

Are you prepared to say that, in your opinion, they were larger?—Yes. I would say a larger spark would get through a pinch space than a closer one; it is only reasonable to suppose so.

There is a certain thing called a cup; is it a matter of use?—Yes.

Are you prepared to say that in your opinion there were larger sparks got through the Tyre arrester than through the departmental one?—Yes, because I have ridden on so many engines fitted with our own; in fact, you seldom see any sparks coming out of ours.

That is not in accord with the evidence we had from the drivers!—I think if you stood at Hawthorne and saw our suburban engines going up the bank you would not see a spark come out of a funnel.
By Mr. Green.-In the day or night?—In the night. I have stood there many a time to see if I could see sparks; that is with engines fitted with our own arrester. On the suburban engines we only have a single grid.

By the Chairman.—Are you aware that bush fires do occur, and are alleged, in fact are proved, to have been caused by engines?—I see all the papers.

In connexion with the causes for damages, and so on?—The drivers' reports.

Do you see the claims for damage?—Yes.

You are aware that fires have been caused by the railway locomotives?—I will not say that.

The department has assisted us?—If we thought it was within our power to do so. If we discovered there was anything wrong with the arrester we would meet their claims. I can give you a case in point; there was a fire up country, and it was attributed to one of our engines, I, at once, under my chief's instructions, despatched our boilerman inspector to catch this engine. He caught it, though he had to travel a good many miles, and he examined the spark-arrester, and found that a portion of it had been removed.

By Mrs. Williams.—By what caused it?—It was done by the firearm.

To get more draught?—To get more draught. In a case of that sort, of course, we doubt we would have any lawful defence.

By the Chairman.—Are you aware that when the department had refused to acknowledge that the engine was the cause of a fire, it was proved in a court of law that the fire was caused by a railway locomotive?—I attended the trial, and I believe the jury said that. We proved we had the best known appliances.

Are you aware that men who were employed in the Railway Department at the time, have actually denied that a fire was caused by the engine, and afterwards, when out of the service, they have said they believe the fire from the engine was the cause?—In my opinion, you could not place any dependence on the word of such a man. I have had all sorts of cases come within my knowledge.

We had that on oath.—I know a case of a man who was short of water, and he took a bolt out of the tank, and wanted to show that the bolt had come out, and that was how he was short of water.

This goes to show that some men think, rightly or wrongly, that it is not a good thing to give evidence against the Department?—Do not think that a man who is afraid to speak his mind conscientiously is any man at all. It would not say much for the Department if it were so.

The Secretary will read this evidence of Michael Connolly question No. 2982—"How far were you from the spot?—From where the fire started it might be 20 yards at the outside. I was under the Government, and so I denied it, but I was tried right enough. Robbie was one who traced it. They were well paid. I was not on my cell when I denied it. If I had been I would not have denied it. I am on my word as to the truth. Several times in the past I was asked to set fire to the grass. Was it from sparks or coals?—If the wind was strong, the sparks would blow right across. When you saw an occasion fire started by sparks and coals from the coal-box?—Yes. I was working eighteen or nineteen years on the line. How did you come to leave?—I had to leave; I was ill, and had to go over the fence. On another occasion there was a crop in Gibbon's, and I helped to put the fire out in it. By Mr. Green.—You were eighteen years working on the line?—Yes. Have you a single doubt on your mind that the fire took place from the engine?—No. Both from sparks and coals?—Yes, they did. Which you would think would be more frequently, the sparks or the coals?—The coals are the worst, unless there was a very strong wind blowing. I think the sparks could die out before they reached the ground. That is just an extract showing that this man was under the impression that it would not be for his advantage to state the fact when he was in the Department?—You see that man was in the existing class, and, as a rule, the men in each branch do not say one another.

What is your own opinion of the Tyrer's arrester?—I think if you placed those wires which apart, as close as we have ours, the driver would have just as much trouble in keeping it clean as he has with ours.

Do you think that by not placing them two apart it would not be as effective as yours?—No, it would allow poorer sparks into the atmosphere.

Is that your opinion, based upon practical observation, of the two arresters in use?—We have never had the Tyrer with plug space.

You have observed it with the present space?—We know when we had some 3/10th in. apart the sparks were blown into the atmosphere, and when we put them 1/6 in. we arrested sparks.

By Mr. Green.—Do you understand to say there is a difference between the two, the Locomotive of the existing lines branch, and that the witnesses who have been quoted would not have done as bad if in your branch?—The men walking the line are responsible for their own work, and it is only reasonable that a man would try to defend that which he is responsible for.

How many times have you had of these arresters?—I have of at least 200 under me.

Supposing that you own the note of the question, whose arrester would you say was the best in merit?—I think an American arrester, that is the wire netting.

Is that the one fitted to the Baldwin engines?—Yes.

The engine that came out for the narrow gauge line?—Yes.

By Mrs. Williams.—Have you then for the compound engines?—Yes, we have had them in use for eighteen years.

By Mr. Green.—Can you say anything about the Tyrer in comparison with your own; your own is best, and the American is second?—Yes.

And whose would you place next?—I think the New South Wales is next.

Have you tried that one?—I have not ridden behind it.

It is similar to your own?—Yes, somewhat similar. I have ridden behind them when they had a perforated plate, but I hear they have abandoned that.

I understood you to say that one of your grids lies flat, that the other is above, and the cage is between?—Yes.

If sparks are going out, which would they be mostly likely to get out of, the flat plate or the round cage?—would they go out straight?—You might look on them like a stream of water. If that were a vertical cage of course the sparks would take a curve, but they would have to go through the bars at a right angle.
5905. The cage would arrest them better than the flat grid?—No. The blast would cause vacuum, and nature allows a vacuum, and the sparks would take the shortest course to get out.

5906. There is no difference whether it is a flat surface or a cage?—No.

5907. The drought would get through it that one better, there are more angles to turn?—No.

5908. By Mr. Duffield,—in what year did you first introduce the grid?—It was our Mr. Jackson who introduced it about 25 or 20 years ago.

5909. And when did you introduce the second grid?—In 1887.

5910. When you introduced the second grid, was it by itself, or was there a cage?—The first cage we put round was a lot of sheeting, but we found so many sparks got through the bottom grid, and jumped themselves up, that I checked up, then we perforated that plate, punched holes in it, and we found that sparks got through too large, and then we introduced the wire mesh of the same material as the grid.

5911. That was after Tyer's invention had been introduced, to the Department?—I might question that we had a similar appliance. I believe it was before Tyer's was introduced. I would like to explain that. The Adams Vortex Blast Pipe was fitted with an arrester somewhat similar. Prior to that we had an Adams Vortex Blast Pipe sent from home to us, which had a grid fixed on pretty similar to the present cage.

5912. Why did you not use that, why did you use perforated iron?—If you noticed, this grid is set down—explaining on a plan. We had had a trial some ten years prior to this date.

5913. Why did you not use it instead of the perforated plate?—If you knew about that, why did you not use it?—Because there was only one gridiron in the case I spoke of at the early date, while there were two in the second. In the first place, it was made all in one.

5914. When you first introduced the second grid, you found it necessary to close round the aperture, and you used perforated iron, and afterwards a cage?—Yes.

5915. I ask how you came to that, and you say it was because before you used the second grid in connection with the vortex, you had a cage?—No, it was a flat grid set down to form a cage.

5916. It was a sort of cage?—Yes.

5917. I want to get at this; if you knew about this cage when you first introduced the second grid, why did you go out of your way to use perforated plates?—I thought a bit of perforated iron was better; I thought it would be the proper thing; but with experience we found the sparks collected round, and we had to take steps to prevent it.

5918. Then you introduced a cage practically the same as Tyer's?—No.

5919. What is the difference?—It is like an ordinary birdcage.

5920. What is the difference between that and the departmental cage?—In the first place, Tyer's wire are loose, and receive, and ours are rivetted together. If he claims that he invented that, he might as well claim that he invented a basket or a birdcage.

5921. What is the difference between the departmental cage and Tyer's? You have given one difference; that is, that the wires revolve in fig, and in the other they are fixed; is there any other difference?—To a certain extent they are made the same way; it is only a common-sense way of making it.

5922. By Mr. Bonner,—in making these changes, were all the engines in the Department fitted with such invention or improvement?—No, only one engine. We would take an engine known to be a good burner, and work it well, and try it with her.

5923. When you put on the plate without the perforations, it only assists you put it on the engine for trial?—Yes.

5924. I noticed you said the steam going up with the sparks would put them out?—Yes.

5925. I thought exhaust steam was dry?—It is very dry when leaving the boiler; it is condensed afterwards. I would not call it wet steam.

5926. You think that the Tyer arrester is more suitable for wood than for coal?—It is not at all suitable for wood. The top of the furnace would be like a squall the whole time.

5927. Tyer says it is suitable for wood, and you say it is for large sparks?—I say it would allow large sparks to get away.

5928. You claim for your arrester that it is more effective because it is dirtier?—The proof that it requires cleaning often shows that it is more effective.

5929. You do not think Tyer's is effective for wood?—No, the meshes are too wide. They were 4 in., and are 4-6ths, or were in the last that was tried.

5930. Do you not think the shape of Tyer's is in its favour if the mesh were smaller?—There is nothing fresh in it. The old Holman's day engines were fitted with arresters, but they were too wide; they extended from the smoke-box to the top of the blast-pipe.

5931. If the mesh were made smaller would it interfere with the steamings?—Yes, if you took it away the engine would steam poor.

5932. Do you think since it was said by the drivers that they could steam more easily with the Tyer mesh than with the departmental one, that if the Tyer mesh were reduced to yours, that the same difficulty would exist?—I think so.

5933. By Mr. Kemble,—The cause of the trouble with your mesh is that the arrester becomes unclean?—Not necessarily.

5934. The departmental arrester on being cleaned at the shop requires cleaning when it gets to Seymour!—Yes, but we provide the fireman with a wire brush, and it simply wants brushing.

5935. When was the mesh on the departmental arrester diminished 1-16th in.?—Six years ago.

5936. There is a difference of 1-16th in. as the space between the departmental and the Tyer arresters?—Yes.

5937. What was the difference between the Tyer and the departmental arresters when the Tyer was tested?—We had 4 in., and they had 3-4th in.

5938. When was it reduced?—At the same time.

5939. What was the width of years before that?—Three-sixteenths.

5940. Practically, were they the same mesh when the test was first made?—Yes, and we had no trouble with the ashes.

5941. We have the evidence of the drivers as to the conditions prevailing with the two. We understand clearly and distinctly that in order to have your arresters effective you put in a second grid in the summer months?—We do; that is a double precaution.
3940. You heard in evidence this morning from one of your locomotive foremen something as to an appliance that was put in to keep the birdcage clean!—The first time I heard of it was this morning.

3941. Do you think there was anything in the principle contained for by Mr. Tyer as to the vibration, keeping it clean, and the tidiness of yours necessitated its being cleaned often!—Anything that could move about would not get so dirty.

3942. And it would be as effective if the mesh were the same!—That has to be proved.

3943. With the mesh exactly the same in the Tyer and the departmental (the vibration with the one, where it is not rigid, will keep it close, and with the other it will not be so) there is there a possibility of a spark escaping through the one, and not through the other!—There is only vibration when the engine is working, so doubt it would dig in the same manner as ours when they were getting steam up, but perhaps it would clean itself when working.

3944. It would keep itself clean, and not allow sparks to go through that yours would it!—It would be the same thing, except that with ours the spaces would get narrower.

3945. You do not rely on that to keep the sparks back!—No, we do not rely on that, we rely on a full tooth of an iron mesh to keep them back.

3946. The fact of the vibration on the one would keep it clean as compared with yours being rigid!—It is only what you would naturally suppose.

3947. When the Tyer was tested in your Department the space in the grid was exactly the same as yours!—Yes.

3948. And they were practically on an equality as to capacity for arresting sparks!—In the Tyer it was a ¾ in.; and in ours 3 1/6th in. In the case the Tyer was 3 1/6th in., and we reduced ours to ¾ in.

3949. When was that!—Six or seven years ago.

3950. By the Chairman.—You said that you regarded the Baldwin arrested as the next in merit as to the departmental arrested.—Yes.

3951. Is it in the same pattern or does it resemble the departmental arrested!—Very much; the one is in wire-setting; and the other is parallel wires; they are practically the same, only there is more trouble in keeping the wire-setting clean. It is more liable to chafe, and instead of the brush sweeping along, you have to knock it with the brush to clean out the holes.

3952. In that respect it is much the same!—Yes, and it is in the same position.

3953. By Mr. Graves.—Do you know anything about recent American inventions for arresting sparks!—We know them all; we get the scientific American papers.

3954. What is the one in most recent use there!—The Baldwin type.

3955. Nothing has superseded that for general use!—Nothing I have seen; in the scientific papers we see it has not been improved from its great extent.

3956. By Mr. Graves.—I see here 15 American engines were imported in 1889. This spark-arrestor consisted of a wire-setting 3 1/6 in. mesh on the top of the chimney, with a cotter pin deflector very similar to No. 1. These arrestors were used for some years and did not give such good results as the departmental arrestors. Is that correct!—Yes. Although the wire-setting was on the top of the funnel it was astonishing how soon it wore out.

3957. Your's is on the same principle to-day, and you still think yours is better!—Yes.

3958. That is the one you were describing to me!—No, the later production.

3959. That is virtually in the same position as yours!—Yes.

The witness withdrew.

Adjourned to Wednesday next, at Eleven o'clock.

WEDNESDAY, 21st AUGUST, 1901.

Members present:
M. K. McKeezie, Esq., M.P., in the Chair;
J. Bonez, Esq., M.P., The Hon. H. R. Williams, M.P.,
T. Kennedy, Esq., M.H.R.

Walter Shilton, recalled and further examined.

3960. By the Chairman.—I think we completed your examination in regard to the Tyer spark arrestor!—I beg your pardon, but I believe some of the drivers are under the impression that I announced some of their evidence could not be relied on when I warned, when I spoke of a driver taking a bolt out of the tender in the early days of the engine. I wished to convey that you could not always rely on the evidence where a man had committed some error.

3961. By Mr. Kennedy.—Where a man's interest is at stake!—Yes. I did not wish to imply that you could not rely on the drivers' evidence.

3962. By the Chairman.—There was possibly a misdirection in what you said and about keeping the Tyer arrestor clean. I think you said something to the effect that drivers might naturally be willing to favour the Tyer, which gave no trouble, and not the departmental arrestor, which gave trouble!—I was referring to a platelayer, and a platelayer is responsible for the track.

3963. It was before we came to that!—I only wish to state I did not indicate that the drivers were unreasonable.

3964. You completed your evidence about the Tyer arrestor!—Yes.

3965. With regard to Mr. Anderson's arrestor, what is your opinion of that!—I only saw it once, I went to the running shed with Mr. Lewis; it was just about to leave the shed, it had been cleaned. At that time we burned a load of wood it getting steam up, and I saw it emitting sparks (I do not say dangerous sparks) as it left the shed. That was the only time I saw the arrestor.

3966. Did you form any opinion about it!—I saw a lot of sparks come out of the funnel. It was in the daytime.
2967. You turned wood then? — They were allowed a lot of wood to get steam up. They were leaving the shed, and there was a lot of a bank from the shed to the main line, and it did emit sparks.

2968. Yes, and you have made many improvements since? — That was the last time.

2969. It was very? — Yes.

2970. You formed the opinion it was not a good arrester? — I formed the opinion that it would not stop sparks.

2971. Did you form the opinion that it emitted any dangerous sparks? — I do not think I formed any opinion that it emitted dangerous sparks; it would be impossible. The holes are small.

2972. What opinion did you form of the steam? — I only knew from the papers, that is all I had to form an opinion on.

2973. By Mr. Grove. — Are you under the impression that Anderson's arrester is likely to be a good one or a bad one, and do you know whether it has any absolute faults, by looking at the specifications. You are on with! will you give the last information you can (as I know you would) as the professional head of that firm? — I think it would be a very expensive arrester to make.

2974. Would it be expensive to maintain? — It would be costly to maintain, compared with the departmental arrester, and I do not think it would save many more sparks from going out than the departmental one would.

2975. Is it complicated? — No.

2976. Is it difficult to attend to and inspect? — About similar to the departmental one.

2977. You opinion is unanswerable to it on account of the expense? — We have a better one.

2978. Would it be expensive to place it on account of its construction? — Yes; it is made of copper and ours is wire.

2979. What is the cost of yours? — About £2 for a single and £4 for a double.

2980. What is the weight of yours, approximately? — That's about pounds for each engine.

2981. Was your opinion as to its longevity? — I think it would last as long as our own, six years.

2982. The life of years is estimated, under fair treatment, at six years? — Yes, quite that.

2983. And the life of Anderson's would be about the same and the cost of it is £21 against yours at £1? — Yes.

2984. By Mr. Deffie. — There is no fundamental objection to the mechanical construction? — I do not think so.

2985. By Mr. Williams. — Did the papers record that the steaming was arrested as well as the sparks? — In the early trials.

2986. And at the latter end? — Not to the same extent.

2987. By the Chairman. — Is the next to the Morris Smith super-heater; have you had experience of that? — Yes, I fitted it to one or two engines.

2988. What opinion did you form of that? — Of course, at first it was fitted as a water heater. At first we thought we had a very good thing in it, but it turned out afterwards to be very expensive to keep in good working order.

2989. Were the objections that you had to that? — One of the principal objections was that the tubes carried away, and it let the water down into the cylinders, and if the engine had been coming down an incline or steaming heavily the cylinder covers would have been blown away. The water heater was above the cylinders and let water down into the cylinders when the tubes broke.

2990. Did you find out some way of making the tubes so that they would not carry away? — No; they all carried away sooner or later. The last that was made was very much stronger, but a carried away I was taken out for that reason.

2991. Is there anything that was done to prevent that? — There was a brass joint, but the copper pipes broke away at the bottom even after the improvement. We proposed to them to put a valve to prevent the water getting down in cases they carried away (was not our observation), and the committee went and patented that.

2992. We have had evidence about the department having patented some outside inventions? — I am only stating facts.

2993. Assuming that this difficulty in regard to the tubes were got over, which has not been done — The pipes carried away.

2994. By Mr. Grove. — Is it a permanent objection? — Copper tubes have that objection. With the constant vibration the copper will get bad and they break off.

2995. By the Chairman. — If that were got over what would you say as to it? — It failed in another case, in lubricating the cylinders, or whatever you lubricate with, is blown out, and when the engine is running down a bank she will suck the smoke and oil down and choke the heater. We found all the pipes in the internal part were choked up with ash, and, with this clogging of fuel and fat, it ceased to become a heater, because the heat would have no effect on it. There was another reason why it was not a success; it interfered with the work of cleaning the tubes. It is very necessary that the driver should keep the boiler tubes clean, and it was so large that it interfered with it. It was a considerable expense to take out, it being necessary to get at the tubes.

2996. Did it serve the purpose for which it was intended, putting these defects out of the question? — Yes, as a water heater.

2997. As a fuel economizer? — Yes.

2998. To what extent did it save fuel? — I should not think more than 2 per cent, to 4 per cent on my average. Of course, when it was new, just out of the shop, it would have a much better effect in heating the water than in a couple of months afterwards you would have to face the average.

2999. Was it a benefit in regard to the water, in getting into the boiler hot instead of cold? — The injector put the water into the boiler heated to a certain temperature and this hotter increased the temperature. We do not like to put cold water into the boiler.

3000. You put it in comparatively cold? — No; the injector would put it in at from 139 to 140 degrees.

3001. At what heat did the water go in with this? — No doubt, it would raise it almost to boiling temperature when the engine was steaming heavily; as other times it would not have much effect. We pass from 23 to 28 gallons of water into the boiler per minute when the engine is steaming heavily.
4092. Would it need an arrestor?—When we were pumping through, it damped the sparks, and when we were not doing that it was like having no arrestor. You are not always pumping; in some cases the engines would be steaming only, and then it would not damp the sparks. It only noted when the engine was steaming and you had the pump or the injector on.

4093. By Mr. Gros. —It has been stated in another answer, do you agree with it, that the expense of this device that we have been asking about is from £27 to £90, and up to £180 each?—These were a lot of alterations made in the engine.

4094. Supposing the evidence was given to-morrow that to fit this device to an engine the expense would be from £27 to £90, what would it correct?—Yes, depending, of course, on the class of engine.

4095. The minimum would be £27?—Yes.

4096. I understood you to say that one element of danger was that a portion of it was constructed of copper pipes. —It is all copper.

4097. The leaking of the pipes is an element of danger and inconvenience?—Yes.

4098. The first duty of the railway men is to carry the public safely?—Yes.

4099. Bearing that in mind, would the defects you speak of be an element of danger?—Yes.

4100. Your last point against the device is inconvenience, the second element of danger; would the element of danger be to a large extent, in the ordinary sense, a factor of more expense?—No.

4101. You have the expense, the element of danger, and now the inconvenience. If I understand rightly, you gave evidence as to the great inconvenience you had when the arrestor was fitted to an engine, that the driver, to do his work properly, could not get to the portion of an engine that it was necessary for him to get at?—Yes, that is so.

4102. And he would have to move a portion of the engine that would be an element of expense?—Yes.

4103. Have I clearly stated the three objections you have to this arrestor?—Yes.

4104. By the Chairman.—Are there any other objections to it?—No, except we would have to have the spark arrester statement in addition.

4105. By Mr. Duff.—Could you give rough idea of the time you would be pumping water on a journey from Melbourne to Bendigo?—The driver has to take advantage of the road. Sometimes in ascending inclines he cannot afford to have his pump or injector on. There would be some portions of the road when they would not be so.

4106. What proportion would that be of the whole length?—Perhaps one-eighth, that is not to be putting water into the boiler. It is an advantage, if you could arrange to be putting water into the boiler always, but we cannot always do it.

4107. By Mr. Steggerda.—Explain what the danger would be in a train if some of the pipes carried away?—The water would get down into the cylinder, and there would be great danger of knocking the cylinder cover off, or you might break the crank axle.

4108. I do not see how the water could get in there if the super-heater carried away?—It is over the exhaust part. You get from the exhaust into the cylinders, especially if the engine is not steaming. That is one of the greatest sources of dirt getting into the cylinders when the engine is not steaming, and the pistons or piston rings get coated with burnt fat and soot.

4109. By the Chairman.—What is the Alves' Patent Fuel Economizer? do you know that?—Yes, fitted it to one or two engines.

4110. What opinion did you form of it?—It was to get similar results to the Morris-Smith water-heater, but it was a lot of pipes just above the blast-pipe. That was to be a water-heater as well.

4111. What objection have you to that?—It was a very expensive arrangement.

4112. Do you know how much it cost fitted to the engine?—I should say it would cost £29 or £30.

4113. Have you any practical objection to it besides the expense; did it fail in any respect?—It did not fail, but we did not get the results east of it that we anticipated.

4114. Was it a fuel economizer?—To a certain extent. I should say, on the average, 2 per cent, or 4 per cent.

4115. Did it act as a spark arrester?—While the engine was having water pumped into the boiler, it acted to a certain extent. It cooled the steam, which would have an effect on the spark and assist to put them out.

4116. You have the same objection in this case as to the Morris-Smith, that when you were not pumping it would not set?—Yes, it had that objection.

4117. By Mr. Gros.—How many engines have you running?—I should say 450 odd in working order.

4118. What is about the expense, supposing this were an efficient arrangement, per engine for setting it up?—I should think from £20 to £25. I am not positive.

4119. I suppose whatever appliance you use for your engines, whatever the type is, it must be uniform; it would not do to have one arrestor on our engine and another on another.—This is not an arrested, it is a coil of pipes.

4120. Whatever one you adopt, whether the Government one or any other, you must have them of the same character running through all your engines?—Not necessarily.

4121. Suppose a place is set on fire by an engine, your defence is —"Oh, we did not do it, or if we did, it is an accident; and, having adopted the very best appliance that we can find out, we are not responsible."—Yes.

4122. If that is the law, why have you not benefited by that law, must you not, if a better one is found, have it universal among your engines?—The Alves was a water heater, not a spark arrester, except by assisting to put the sparks out when the water was being pumped into the boiler.

4123. Does it do that?—Yes, to an extant.

4124. It is not an arrester, but a destructor of sparks?—Under certain conditions.

4125. That is what is claimed for it?—Yes.

4126. Whatever one is adopted on the Victorian railways, whether yours or a better one, it must be universally adopted?—If an engine was fitted with the Alves it must also have a spark arrester in addition.

4127. Is the saving in consequence of raising the temperature of the water and less delay in making it available for steaming purposes?—I do not think it would pay the Department to have it.
4038. The express is about 230—Yes.
4039. By Mr. Sangster.—Do you say the Alves Arrester is simply a coil of pipes forming a fuel economizer?—Yes, a coil of pipes would round.

4040. That is not the fuel economizer I understood. Is there not a patent air bridge?—That is another affair. That was a system of taking hot air into the fire-box.
4041. That is the Alves Patent Economizer?—I was asked about the water.
4042. You were asked about the Alves Patent Economizer?—I understood they were speaking about the water-heater and spark arrester.
4043. Which do you think is the best place to arrest sparks?—There is only one place, in the smoke-box.
4044. You could not arrest them in the fire-box and not let them through?—You could, but the only place is in the smoke-box, in my opinion. This was another patent afterwards which had nothing to do with the other arrangement.
4045. Of course you know better than I do, but my impression is to the contrary.—Some years ago he had a bit of an arrangement. I spoke of the first trials, and then he had the water-heater, and then he had the patent for fuel economizing.
4046. From the evidence that we have here (and I have seen the patent fitted to an engine in the shed, and there has been a trial) my impression is just the opposite way about. I say, Will you excuse me asking the question, because I have been out, but Alves claimed that it absolutely burned too sparks and smoke in the fire-box?—He drew heated air from the smoke-box to the safety-valve, and passed it through the fire in the last appliance.
4047. And sealed up the safety-valve?—Yes.
4048. And had the air burned?—Yes.
4049. Do you think the combustion was better in the fire-box when that application was on?—No, I do not think it could be applied successfully to a locomotive.
4050. By Mr. Bagg—Why?—It was very cumbersome, and if you rob a locomotive boiler of heat in one place you take it to another and it is like robbing Peter to pay Paul. If you could get heated air into the fire-box it would make a great difference to the steam-power.
4051. By Mr. Sangster.—The evidence we had in the stem was easily kept up?—I do not think it did it, but I was not on any of the trials.
4052. Do you know how long a trial they had?—I think it extended over two or three weeks.
4053. Do you know the reason why the trial was stopped?—I cannot say positively.
4054. The evidence we had was there was some strike on in Newcastle, and they could not get the coal to try under the same conditions?—I do not think there is any truth in that. As far as I know it failed.
4055. You do not know why?—No; I was not on any of the trials.
4056. You do not know, as a mechanical engineer, that anything can be done to prevent the sparks going through the tubes?—I have seen a lot of experiments tried, but I never saw anything that was successful in that way.

4057. By the Chairman.—Next is Hack's Patent Brick Arch; do you know anything about that?—I have seen it. There is no difference in Hack's arch from any other except that he built a wall up on a top of the arch extending up to the top of the fire-box. That is the only difference between it and any other brick arch.

4058. Do you think that was an improvement?—No, I do not think it would be; I think it would be a detriment to the fire-box.
4059. Why?—The expansion of the brick arch, when red hot, would make it press against the side of the fire-box. If the crown can give way, if the arch can assume a little greater bow, of course you would not have the pressure on the sides of the fire-box; if you prevent the arch expanding upwards you naturally have a greater pressure on the sides of the fire-box.
4060. Does the arch prevent its expanding?—Yes, if carried to the top of the fire-box.
4061. And I understand it was the other way, that the usual arch was built of bricks?—We have both; the Ballarat people put nothing in the brick arch but small fire-bricks. The engines in New South Wales used small fire-bricks.
4062. Do you put them in on the flat?—No, the arch is built on a frame. Long before Mr. Hack had anything to do with the department we built arches with small fire-bricks.
4063. You are perfectly aware of that?—Yes, we had a trial; small bricks against lumps several years before he had anything to do with the arches. That could be easily ascertainment from the Phoenix Foundry. All their arches are put in with small bricks.

4064. This is from Mr. Hack's evidence:—
2226. When you first invested this new arch you had no idea of arresting sparks, and that it would be effective for that purpose. My main point was to try and keep the tubes from burning up, and also to keep the smoke-boxes cooler, and to try and economize fuel.
2227. The spark arresting is in a incidental effect.—Plainly indicated that it turned out such a splendid spark arrestor.
2228. It was as a fuel saver that all the measured sparks went back and were consumed, thus keeping the tubes cleaner—Yes. Before I built that arch in the first experiments to find out how much my arch expanded, as I knew by holding a vertical wall up to the side of the fire-box, without measuring the amount of expansion I might do injury. I made various experiments, and I think I might as well tell you how I did it. I built a baffle and placed little pyramids of fire-clay at top of the vertical wall varying from a quarter of an inch to an inch, and found by the depression, after eight weeks' trial, these eighteen was about the maximum of the ease. I knew then what to have as there would be no danger from the expansion through having the baffle on the back of the arch.
2229. Did you have any other information you have to give us about this invention? It is not used on the Victorian Railways?—My arches are only used on the submarine "E" class engines.
2230. They are still used there?—Yes.
2231. By Mr. Grange.—In the Railway Department using your patent now and putting them up?—No, where they are using in the arch, for its durability.
2232. Is that patented?—Not by itself. It is an improvement of that, in forming the baffle I form a combustion chamber in front of the tube plate, and when the engine is steaming evenly each time as exhausts it strikes the baffle, and, as I explained, the fire is kept on the square instead of it reaching the fire up.
2233. I want to see it if it is a fact that your arch lasts longer and saves fuel and also saves time?—Yes; and there is a saving in the time of the men who would have to clean out the tubes. There is one thing which I did not point out, that is in designing the arch my idea was to so design it that when expanded it would not break itself in pieces. In my
plan I have in mind, the more it will expand, and that is how I get the mileage I do. You will see on the New South Wales Arc, the small black bricks are 14 inches long, 15 inches wide, and 7 inches thick. Although there are no humps, the train does not exceed a few per cent, and with the expansion taken up, there is no need for a bricklayer. I have all the strength that the New South Wales main line has. The humps are in the Victoria Railways, where they have the standard gauge. To you, they have the humps similar to what they have on the Victorian Railways. These small arcll designed in any such design, and I can get more mileage out of it by avoiding the expansion and contraction.

That is entirely at variance with your evidence. There is no difference between the Back's Arch and our arch, except he has built a wall up from the rear of the brick, extending to the top of the fire-box. 1085. You do not regard that as an improvement?—No. It prevents you getting at the tubes, and I think it would not be an improvement.

1086. Listen to this. 1087. The arches are on the back—Always constructed of fire-bricks, but on some railways, on some railways, they use bricks. What they call fire-bricks. I am by experience in the Victorian Railways that the steam pipes, which weigh from a hundredweight to a half ton and a quarter and a half, come across the expansion, and that both bricks have to go and then last, and you get no setibility. In September, 1886, I wrote to the Department and told them I would design an arch on which they could have some 87 per cent per year, and durability, and my boss, Mr. Thibbets, said he was not a very good man, and said, I will forward this application to my best and do my best to get you the results of it. That was in September, 1886.

1088. I heard nothing more about it, and I was not transferred from the London to the Epping Lines, in the Honeywell Prize. George Turner's commission had come to an end, and we had bought the small arcll designed in any such design. 1089. By Mr. Godden.—Do you say the small bricks were given by the Phoenix Foundry to repair your arch in the ten years ago?—Yes.

1090. Was Back's the Railway Department then?—No.

1091. By Mr. Godden.—Is there any truth in this statement that 10,000 miles can be got out of this arch as compared with 3,400 miles?—I say it is impossible to get as long a life out of one arch with small bricks as with Back's.

1092. Do you say it is possible. The repairs are made by the Phoenix Foundry and that they are the only evidence of that is the difference, do you not?—Yes. I say there is no difference in the arch except that Back's has a brick wall built up on the top of the fire-box. We are using the small bricks as compared with the tubes. You heard the evidence that his arch was made to 7s. to 8s., but in the first case, and it takes a bricklayer to do the other work. His chimney is the first cost, and you get five or six times the running out of it than there is any truth in that. There are so many causes that we cannot work, if you have to take the hammer out for the bricklayer to get at the tubes you want a bricklayer, but the humps may be taken down. 1093. Do you have a brick arch in all your engines.—No, I should say full double-thirty are fitted with arches, other boiler heads or humps.

1094. Then you would have a very good idea of the average life of an arch.—Yes.

1095. The question I am going on is that the life is six times as long in the one as in the other, in mileage. If you take the average there would be no difference.

1096. If you take just one trial there may have been no repairs to the boiler and a very careful driver, and perhaps it was selected as against one or two bad trials. That is only a statement. 1097. By Mr. Duff.—What is the life of an average arch; do you know the mileage.—I should say about three months.

1098. Can you tell the life in mileage.—I should say it would run three months—that would be about 6,000 or 7,000 miles.

1099. That is not 10,000 miles?—No.

1100. By the Chairman.—Is there any way in which we could get the information: Is there any record kept of the arches?—It is booked up in the running-sheds.

1101. I think I could have it built, could not I?—Yes, in the running-shed book.

1102. By Mr. Godden.—Do you think there is truth in the statement that it could be put in the engine for 7s. or 8s. 6d.? We had trials before that, but I proceed you could build a brick arch with ordinary fire-bricks for 8s. 6d. cheaper than with the hump. We proved that ten years ago. You are aware of the explosion under the fire-box, but you have several objections to that, but the principal one is the expansion, that it breaks; by being built in both sides and bottom it cannot expand.—Yes. If it is built to the top of the fire-box it would prevent expansion upwards.
404. Do you think, with the small bricks set on edge, as they are there, would be sufficient room for expansion?—The expansion simply means the arch would assume a different shape, and the expansion would have to go upwards.

405. Would the expansion be so great?—You would have pressure on the arch. If it cannot expand upwards there must be a big pressure somewhere.

406. Another objection is you cannot get to the tube?—Yes.

407. You want to get to the tube-plate very often?—If you sent an engine down into the Geelong district you would have to get at them every week; and we cannot run brick arches on some lines because of the tubes making.

408. On account of what?—On account of bad water; we do not run a brick arch where there is bad water.

409. Do you think the brick wall will assist condensation? You heard the evidence, that instead of tearing the fire up it is kept on the quoin, and you get the very advantage of the fire instead of sending it up the flues?—It would have a considerable advantage in preventing the fire from flaming about.

410. If it did that, would the condensation be better?—Not necessarily. You have to keep the back of the brickwork clean, and a man would not have the same facility if the bricks were wall there as if there were no wall there.

411. With the ordinary brick wall there is an accumulation of ashes?—Yes; we have to provide them with a rake. We mostly leave a small space between the brick work and the tube-plate to allow the accumulation to get down. That is our plan, and if we do not do that we allow spaces in the arch.

412. With this wall of Hack's, do you know if it prevents that accumulation or the tubes blocking up?—I do not think it would.

413. Is there any weight of anything like the same accumulation on the tube-plate, I should imagine?—It has to get over the arch somewhere. With the strength you have it requires pretty heavy duty to block up; it is heavy stuff that blocks it, is it not?—Yes; that is right.

414. Do you not think if the condensation takes place in a proper way there will be less accumulation?—I do not think it is my advantage to build the wall up.

415. With ordinary good water, in Melbourne or anywhere else, would there not be the same drawback as far as the tubes are concerned. How often do they have to rake out your tubes in cleaning or preventing leaking, say to Geelong?—Sometimes after every trip, if they are running on the Cole line where the water is bad.

416. By Mr. Kenny.—Does it apply to tubes that have been running for some time?—Yes. We cannot send a new engine down here. I think the way is to take an engine that has been running where the water has been good and then send it down there to run about twelve months before it goes into the shops. If you send down a new engine you would have your tube-plates ruined.

417. By Mr. Armstrong. You said to-day down there to finish them up?—Yes. There is a coating on the boiler which prevents the chemical action on the tube-plates.

418. By Mr. Crease.—Which would destroy a new one at once; but when it has worn itself out it has a coating on it, and it has more immunity from it?—If we send an engine from the Bendigo district, which is the west district we have, that will be so.

419. The Bendigo district prepares its for the Cole district by putting a coating on it?—Yes; it forms an envelope on the plate.

420. By the Chairman.—What makes the water bad on the Cole line?—You can get_started with the rain out of that water; it is mineral water.

421. By Mr. Crease.—You stated the cost of fitting those water-heaters was from £25 to £200, and they go down to £50?—Yes.

422. What is your departmental arrestor cost?—A double arrestor of the newest pattern about £4.

423. What would be the Tyers cost?—I do not think it would be any dearer.

424. What would Armstrong's cost?—I should say from £200 to £220.

425. What would be the Morris superphosphate cost?—From £30 to £200.

426. And Hack's brick arch?—About the same cost as our own; small bricks about 1½s. or 1s. The fire lamps very is cost; it depends on our contract. They have gone up during the last three or four years. I should say, about a guinea. They are made at Bendigo.

427. Were they originally made at home?—Yes; we never imported any.

428. What weights did you say they were?—Mostly there are only three lamps, and the weight is divided. They would be most likely from 2½ to 3½ each.

The Union Wilderness.

John C. H. Ogier, sworn and examined.

409. By the Chairman.—What are you?—A barrister. I have asked to be permitted to give evidence to-day. I wish to state this, that some nine or ten years ago, from inquiry, I believed that Tyers's invention of a spark arrestor was the best appliance for the purpose of preventing damage by fire to properties through which the railway passed; secondly, that it would save destruction to parts of rolling-stock such as tenderplating, &c.; and thirdly, that there would be considerable saving in the amount of fuel consumed. I formed my opinion from conversation with the late Mr. Conno Newbery, who was appointed to inspect into the matter. Another reason was, because it had been adopted by the railways in South Australia. Afterwards a law came upon the scene, the effect of which was that Tyers's appliance was the best known appliance for arresting sparks, and a verdict was given for the Railway Department. A third ground for my conclusion as to its merits was, that a report had been presented to the House of Assembly in Victoria on or about the 12th August, 1891. I wrote a letter to the Railway Department, who have allowed me to have a copy, on the 11th April, 1892, and indeed therein a letter of Mr. Elliott, published in the Age of 15th August, 1891. That judgment was appealed by the Government and to go into the merits of certain appliances. With respect to the appliances to prevent the escape of fire
from the engines, in the case of Sir John Maynot, against that company, was the best known, and a verdict was given for the company, which had made Tyre’s spark arrestor, because they had adopted the best known method of arresting sparks. I was confirmed in my opinions of this arrrater, first by the treatment that Tyre receives at the hands of the Department, secondly, by the treatment that Mr. Newbery and others received from the Department, and thirdly by the treatment I met with myself. Mr. Tyre was not a person prone to the Department. I am not interested in this appliance and never have been in any shape or form. Mr. Tyre told me once, when he was working on the railways as an engineer-driver, that a complaint was made against him. I cannot tell you what it was, but any one into the matter was investigated by the late Mr. Thomas Fitzgerald, and Mr. Tyre not only exculpated himself, but intimidated those who made the complaint. I think the records of the Department will show that Mr. Fitzgerald complimented him, and said he should have been a lawyer instead of an engineer-driver. Mr. Newbery was appointed to inquire into the merits of this invention, and he explained to me why he thought it was the best device. After he had been appointed to do the work, he was going down to Newport, but when he went to the Railway Department he was told he must pay his expenses as any other passenger, so he went away again. About my experiments: At the time I wrote the letter in question I was referred to a gentleman in the Railway Department. I do not know who, and I was talking to him just as I am talking now, but directly I mentioned Tyre’s name my own frame and stamps and dated about in such a way, that I thought he would have an apposite bit, and I was glad to get something from him. I am convinced one in my opinion that Tyre’s was the best appliance, and that there was something more for not adopting it. I wrote a letter to the Minister of Railways, dated 11th April, 1892, enclosing with it a copy of Mr. Ellice’s letter, published in the Argus of 15th August, 1891, fully explaining the matter. The letter is as follows—

TO THE HON. J. H. WHEELER, M.P.,
MINISTER FOR RAILWAYS.

SIR,—

I refer to our conversation last Monday respecting the saving of money which might be effected by the Railway Department adopting Tyre’s spark arrestor for locomotives.

It possesses those advantages—

1st. There would be no further saving for the大全 (the best known appliance being used),

2nd. No destruction of rolling-stock, switch-work, etc., from sparks.

3rd. There would be very considerable saving in the amount of fuel consumed.

4th. Wood would be used safely as fuel.

5th. Better things would be kept in.

Mr. Tyre informs me that if an appliance were fitted to the locomotives, it would effect a saving of many thousands a year in working the Victorian Railways.

This letter of 11th June last, Mr. Tyre said that his patent might be used by the Department.

Notwithstanding that his supporter was removed, I venture to think that you will cause a full investigation to be made as to some better device, and that you will give in the same case as to the superior advantages of the invention as those persons who have already adopted these spark arresters, and have benefited by it.

I enclose a letter of Mr. Ellice’s, published in the Argus of 15th August, 1891. He was appointed by the Governor-in-Council to keep the merits of various designs some years ago. The late Minister of Railways, Mr. Short, referred to the House on 12th August last, as follows—

"A report was sent in to the Railway Department during the end of 1889, by a board appointed to test the merits of spark arresters, and it recommended the adoption of Tyre’s spark arrestor. That invention was not being used by the Railway Department."

In South Australia it was decided that the apparatus I am mentioning was "the best known method and appliance so to prevent, as far as possible, the escape of fire or sparks." See the report of the case Sir John Maynot v. Tyre, the Railway Dept., South Australia, on 12th June, 1890.

As to the means of which these have been expended, I consider, and, unconditionally, during the last eight years under the hands of compensation for fire-lands, etc., the departmental expertise as equally.

I trust, on reference to Mr. Tyre’s letter and the contents hereof, you will consider his suggestion is far from being unreasonable, and

Yours truly to remain,

Very obediently,

[Signature]

J. H. O’GROVE.

TO THE HON. J. H. WHEELER, M.P.,
MINISTER FOR RAILWAYS.

[Extract from "Argus" of 15th August, 1891.]

SPARK-ARRESTERS ON THE VICTORIAN RAILWAYS.

TO THE EDITOR OF THE "ARGUS."

SIR,—

If you will kindly permit me I will try to put some one right with reference to the questions asked by Mr. Hall, H. L. H. in the House, and the answers given by Mr. Steele, Minister of Railways, on 4th inst., as to the best spark-arrestor, and if wood could be used for the locomotive engines, Mr. Hall said he was informed by the Railway Commission that up to the present time no spark-arresters had been submitted superior to the copy which there was no patent, and that it would not benefit him to use wood.

Now, Sir, as I am the only one left out of the three who were appointed as a Box 10 years ago to test the merits of various designs of spark arresters, which we did on the Victorian Railways, and in place of the other two who are still alive, Messrs. A. Winkler and H. K. (now deceased), I think it only my duty to vindicate our action on that occasion.

The spark-arrestor was patented and used by the Railway department I presume to be the "grilling," which, when used with double wood-logs, gained second place at the trials. The same is true used by Mr. Allensmith in the Argus of 28th August, 1889.

In our first report, dated 24th September, 1889, we merely stated the result of our experiments, being on Tyre’s first, the experimental railroad second, as we have previously stated. Wood was used for both, and we were of opinion that it could be safely used with the Tyre resistor, but not with any other that we tried.

We afterwards received the following letter—"Railway Department, Secretary’s Office, Melbourne, 15th October, 1889,—I have the honor to direct your attention to your valuable service, and report on the matter of a Board appointed to try various spark-arresters. Mr. Gilley would feel under further obligation if the Board will supplement their report by a definite recommendation. I am, etc., P. E. Lamont, Secretary."

We receive a report recommending the adoption of Tyre’s spark-arrestor on all engines, and that he be awarded £1,000 premium, which, it is submitted, is a very small sum, considering the amount it would save the Department in the amount of fuel, etc., and the benefit derived from it. I am informed that the Board, which was as follows, "Having examined this day the same engine with which I have been running for the past six or seven months with Tyre’s spark-arrestor, and after a short evidence that it is not as good as the Tyre, I am now prepared to ask my engine for these experiments. I found the best resistance to the draughts and generation of steam, and does effect a comparatively great saving in fuel consumption."

Kindly yours,

[Signature] 10800 ELLIOTT (Secretary and Editor).

King-street, 12th August.
4110. By Mr. Green.-Did the gentleman you spoke of as being excited show disapproval of Tyer's invention being used?—Yes.
4111. You think he disliked Tyer, or the application?—Yes. I cannot say which, but directly I mentioned Tyer's name he showed disapproval of feeling.
4112. You thought that disapproval of feeling was in consequence of the opposition to Tyer?—Yes.
4113. Do you know, as a barrister, that the defence in all the instances for damage from fires caused by the engines has been?—We have the best known appliance?—Yes; that's the only defence.
4114. Do you think that the gentleman was afraid that that defence could be done away with by admitting that Tyer's invention was better?—No, I do not think so.

The witness withdrawn.

Jonathan Benz, sworn and examined.

4115. By the Chairman.—You have a statement to make, I believe?—Simply a suggestion, if you will allow me to make it, but I will best tender my power of attorney from Mrs. Tyer, to show that I am acting for her—(protesting the same). I wish to show that I am authorized to act for her, and I must thank you for your courtesy in allowing me to be present.
4116. We want all the information we can get, and shall be glad to hear you?—On behalf of this lady, who, I may say, is the sole representative of the deceased man, sole executrix, and probate was allowed to her (there are no children but an adopted daughter, a young girl about 18). I would ask or urge that a retrial be had (inter die) of the Tyer spark arrester. It has been stated by some of the railway gentlemen, it evidences, that the conditions in the work and so on that obtained in 1882, when the Tyer spark arrester was tried, are different at the present day. This is one ground for my suggestion of a new trial.
4117. If you are going on to give reasons why there should be another trial I can save you time, because there will be another trial?—Thank you. I will first call your attention to the fact that this lady is very old and infirm, and in inquisitorial circumstances. It is the custom of the Department that any person presenting anything for trial should share all the expenses, but in this case I would ask that be departed from, and further I may state that Peter Tyer did the trial.
4118. I can save you time in this, because it will be only adhered inventions that will get another trial; that is selected by this Commission, and if it is selected it will be tried under different conditions from what it was before?—There is only another suggestion, and that is, that at the retrial some person nominated by Mrs. Tyer should be on the board—of course, I mean some one approved by your Commission.
4119. We cannot bind ourselves to that, because there would have to be a board appointed?—I understand you.
4120. By Mr. Green.—As long as it is a competent person you, would not object?—I think there should be a competent person, because it has been suggested, to see that is these trials engines can be manipulated, and I put the matter to those circumstances.
4121. By the Chairman.—I can only say that the invention of Mrs. Tyer's late husband will have the same trial as other inventions, and the Commission will see that the trials are carried out fairly, and that the judges appointed bear proper persons.
4122. By Mr. Green.—You do not claim any patent rights for Mrs. Tyer?—They have expired.
4123. By Mr. Deby.—You only ask for some recognition for her if the invention is adopted?—Yes.
4124. By Mr. Green.—You may make no legal claim against the Department?—No, not at all. I have set out what I would suggest.—(Handing in a document).—

Old Exchanges, 320 Collins-street, Melbourne, 29th August, 1892.

To the Chairman and Members of the Royal Commission on Railway Spark Arresters.

Gentlemen,—

I have the honour to say of Mrs. Tyer, widow of the late Peter Tyer, deceased, late engineer, and inventor of "Tyer's spark arrester," for and on her behalf to respectfully submit as follows:

1. That a competitive test be forthwith had of the Tyer spark arrester, necessarily of long duration, but a varied and exhaustive test on the various types of engines now, one on the Victorian railways, and under the control of different drivers, and run over such portions of the lines as calculated to most accurately test such appliances, with a view of course to include the appliances known as the "departmental arrester.

2. This proposal or application on the following grounds:—

1. That it has been alleged by several of the official gentlemen examined by your Commission that the conditions, as to the class of engines and the work done by them at the present day, differ from those existing in 1882, when the Board appointed decided in favour of the Tyer arrester, as the best out of seven of such appliances tested, including the departmental arrester then in use.
2. That the evidence taken by you largely propounded in favour of the Tyer appliance over all others of the kind yet used on the Victorian railways, not only unequally, but in values, or these testifying to the superiority of the Tyer arrester as the practical men on the footboard, and who had same under their personal control and observation; while those who speak adversely of it, or pronounce it inferior to the departmental arrester, do so from theoretical knowledge only, and not actually prejudiced, in favour of the appliance they have either devised, or had a hand in devising, and therefore—well, thus respect I may be permitted to argue equally capable of giving impartial testimony, or arriving at just conclusions on the subject. On the other hand, the testimony of the drivers and others in favour of the Tyer arrester must, I respectfully assert, have great weight, measured as to testify in direct competition with highly-place officials in their department of the Government service, may well be regarded by them as inquired to their own personal interests, and could only be dictated by a strenuous and conscientious determination to seek the truth according to their convictions at all hazard to their positions.
3. That the Tyer arrester be made, fitted, and trialled, as above suggested, by end at the cost and expense wholly and solely of the Railway Department, and at the railway workshops, according to plans furnished by and under the direction and supervision of a competent man to be nominated by Mrs. Tyer and approved by your Committee.
I have this proposal [2] on the following grounds:

1. That in 1886, at considerable expense, Mr. P. Tyer purchased and fitted his arrester, which was tried and approved by a competent board of experts, but that recommendation was not followed by the railway authority, and at Tyer's delay it was refused, on the ground of the cost of the apparatus, and being in the way of money, the original apparatus broken up, and the apparatus of iron. I therefore respectfully submit this: it would be neither just nor equitable, in the circumstances, and I am in a state of case public interest and importance, that the person or his representative be called upon to re-instate the expenses of reproduction.

2. That Mr. Tyer is aged and infirm and in very poor circumstances, and quite unable to defray the expenses of anything but fitting such, and if such case were the present precedent to a refusal, it would be a most lamentable place of depriving his of the justice of further investigation into the alleged merits of his husband's invention, as well as your recommendation of the valuable invention. In either case, I would add, it would be a serious injury to the matter of your inquiry, and also defer the matter of your inquiry, and also defer the claim for consideration or reward to the hands of the State Commissioners, the right to make which might possibly be established if the claim of the Tyer arrester and comparison with others be bad.

3. That the Tyer appliance having been in continuous use, for over a year, and necessarily, by the evidence, doing good service to the State all that time, for which no fee or charge was or ever will be too high to the inventor, it is not unreasonable. I respectfully submit, as the witness is now, that the small trouble and expense be undertaken by the Department in the public interest with fairness to the poor lady concerned.

4. That your commission granted directed a trial as suggested or asked, that an experienced competent man, nominated by Mr. Tyer, whose actual and approved by your recommendation, be present at the trial on the road, not to interfere or take active part therein, but to personally view the preparation and testing of the engine, and the operation and manipulation of such engine and such arrester appliance by the driver and furnace. This suggestion is made, not necessarily as implying a doubt as to the bona fide of any one concerned, but so that no misunderstanding arise or be raised by any other either side, or by any one interested in the subject, furnace, or otherwise of the trial itself.

I have the honour to be, gentlemen,
Your most obedient servant,
J. BURR
Attorney for Mrs. Tyer.

The witness withdrew.

John Crabbe, sworn and examined.

4125. By the Commissioner. — You were formerly an engine-driver in the Railway Department ? Yes.
4126. How long have you been out of the Department? — About twelve years and a half, or about six years in the Department.
4127. How many years were you a driver? — About 23 years.
4128. You invented a spark arrester, did you not? — I did.
4129. Has that been tried and tested by the Department? — Not fairly.
4130. It has been tested? — Yes, it has been on an engine for a couple of months, but it was not tested where I wanted it. It was tested on the Liverpool line.
4131. How is it? You did not come before this Commission before? — Because I got disgusted with the Department, and I chucked it up.
4132. We did not do anything to disgust you? — I thought perhaps that this inquiry would be the same as all the rest have been. I am the inventor of what is called the departmental spark arrester, if every man had his idea, but because I claimed my rights at the time this spark arrester was brought out, I was very near being discharged for claiming them, and the locomotive appointment for the time being took the credit of it; but it is mine all the time. This was in 1878, and I will give you the history of it if you listen to me.
4133. Are you claiming that the departmental arrester is your arrester, or are you here to-day to give evidence in support of some other idea? — I am here to-day for your convenience.
4134. Are you here to support the claim of some other arrester, other than the one in use in the Department? — This is the arrester since the grid was used.
4135. Is it better? — Yes; and another thing, the grid-iron can be made double as good as it is. The present grid-iron spark arrester has too much resistance instead of iron. Instead of having it like thick wire that there is, I think they want to be half the thicknesses, and give double the distance, and it would save, and at the same time as good.
4136. You are very late in coming before the Commission, this is nearly the last meeting of the Commission? — I was so disgusted that I did not care to come, and do not care much whether I am here or not. Here is a sample of what I mean: (producing a sample of some acting).
4137. By Mr. Crease — Will that stop the steam at all? — No.
4138. Is it cheaper than the present one? — Yes. I think I could make as many of them as you like for about 5 or 6 of the outside wire, and put them on the engine.
4139. Is that the principle of it—a separation of the mesh? — No; the principle is a different construction from any other. It gives more area than any other I have heard of or seen.
4140. What size are the spacers? — There is in the specimen I have put before you. I have measured the size of the mesh.
4141. By Mr. Dally — Is that the same size you would use in the engine? — Yes. I cut out the one that was on the engine, for, I think, about two months' running to Liverpool.
4142. By Mr. Sangster — Is it placed in the same position in the smoke-box as the departmental one? — Possibly, but all the advantage for the departmental one, the original arrester, was, to catch the smoke from there up to the chimney at the front and the same at the back. It is four times the area of the departmental one ; it is all along the hole, and this is taken up by a wire from the level of the top of the tube to the chimney. There is only about 2 inches round the smoke-box for the smoke to get round and through it.
By Mr. Gowers.—Why did you not?—Because I was disgusted with the way I was treated; I had not fair play.

Do you think you have a better chance now?—You are tolerably enough and fair enough, from what I can see of you, but we do not know how it will end up. You need not go to any further trouble as far as I am concerned. As regards expense, if you can put none without my expense, I would not go to trouble to put it on. I have got the arrester, but now, if you or the Department like to put it on, I will not be sixpenny in expense.

It is complete.—Yes, but the Department keeps the holes in fine segments, and it can be put together in five minutes, so there are only five holes to be put together.

The witness withdraws.

Mr. Williams took the Chair.

James Joseph Wright, sworn and examined.

By the Chairman.—What are you?—A journalist, but for many years I was a locomotive driver in the employ of the Victorian Railway.

Have you had any experience of the spark arrester tried in the Department?—As much as any man being practical and theoretical.

You came specially to give evidence on the Tyre arrester; what do you know about it?—I have known it for the last twenty years, and I may tell you that when the departmental arrester is compared with it, I nearly smile. There is no comparison. I will put it, the Tyre is infinitely superior to the alleged departmental arrester, which is not an arrester, but simply a screen.

Do you say that from having run it on an engine?—I have run it and all sorts of arrester.

Is it complete?—Yes, I have it saved.

Tyre今日.—Have you eleven years a driver?—On the foot-plate, and also a boiler-maker's assistant in Hambro.

How many trips did you make with the Tyre arrester?—Only two or three, but I know the name of it. It is cheap, effective, self-cleaning, and no spark will do any harm when it will get out. I would like to tell you that the idea of providing sparks coming out of the funnel of the engine is absurd; it is a by-damn. My idea is to smother them up, and so that when they fall on the ground they are harmless, and they will go up in the air. So whenever the sparks come out that is no test; they fall on the grass and are still glowing; it is non-effectual, but if they fly from the chimney and die before they reach the ground that is an effective spark arrester. To effectively prevent the sparks going out you would fill the smoke-box in ten piles. You can fill the sparks with chemicals, but Tyre's is the most effective. Say an engine's pulling one in hand on a windy day, and a lump of carbon comes out, it strikes the arrester and is broken up; it strikes again, and only five fragments come out of the chimney and fall on the ground harmless. That is the theory of the Tyre spark arrester, to smother up the sparks.

Does it interfere with the running?—No. I can install half-a-dozen different arrester, but they would stop the engine. There is another thing about engines, on one engine you can put a smaller mesh than on another. I can understand Mr. Simpson's difficulty. You can put a mesh on an engine, and she will stifle, and the same mesh on another and she will not. It is not the same as a stationary engine, for if you interfere with the draught to any appreciable extent you may as well give up.

We must move. You cannot get from here to Seymour unless you move. You must not interfere with the stinging in any appreciable extent, but it must break up the sparks so that when they fall on the grass there is very little life in them. That is my idea of a spark arrester. I may say, I am of opinion that the spark should be broken before they get to the smoke-box. I think you have some evidence of that. You want more perfect combustion in the fire-box. There should be very little black smoke come out of the funnel. I believe you have had one or two appliances like Bacon's and Richardson's. If you can get more combustion and a quicker fire you will have fewer sparks, but if you have them you will have to kill them at the other end. I am told there are some inventions before you, and if I might suggest, without having an interest in it, they should have a trial to see if you cannot get more perfect combustion. Mr. Fyshpatrick says it costs £50,000 more for coal and consequently the rise in price. It would save 50 per cent. of that if you could get a combustion. I am not an authority, but we tried it with buffer plates years ago. I am not an authority, but I can support it. If you can keep the sparks in the fire-box you will not have the same difficulty in the other end. I have heard a good deal about preheating, and tested Mr. Ogier's evidence, and I think the mistake that Mr. Peter Tyre made was, he should have accepted Mr. Ralston's, Mr. Ogier's evidence, and I think the mistake that Mr. Peter Tyre made was, he should have accepted Mr. Ralston's, Mr. Ogier's evidence, and not another pound or two. I have always told him, and other friends have told him, that he made a mistake. I know nearly every officer, and knew them from the time when I was a boy in Woodhead, and I do not think you could get a better class of engineers. They have no end to serve, and are ungrateful. But of course, it is subordinate suggesting something to his superior, there might be unconscious bias; still, I do not think they could be corrupted.
4155. By Mr. Duffy.—Did you ever experience fire occurring when you were driving?—No, I never had a fire in a very dry line from St. Tarpe to Bourdou, and it was a very dry country. I have not had any fires.

4156. You could put your mother fires were more likely to be caused by coal from the funnel or from the bunker?—I have an opinion that they are from the ash-pan. You drive down a track and you drive very fast, and the composition drains out the embank, and unless the trees are well burned by the fire, they are not driven where the fire is concentrated. That might have prevented. You have to work out these things every trip, but they have nothing to prevent the whole thing from falling coming down a bank. Coming down a bank you set on the cold water and put on the fire, and that is the time the embank come out and the sparks jump about. With the Tyers the spark has to go 60 feet. I have made a rough estimate that £10,000 a year by preventing sparks falling on tracks and on the fire.—Yes.

4157. And goes that perish and have to be paid for as having been used on the track?—You re very day of a track being burned reason. Another thing is, I think I have a right to speak as a taxpayer for many years.

4158. You just said that the improvements in all those spark arresters are not as destructive of the spark itself as they should be: with Tyers there is the qualification of the sparks coming out, but they are harmless sparks?—They are broken up.

4159. That is because when the sparks come out, as they would out of any one, Tyers possesses the power of breaking them up that they are harmless?—Yes.

4160. You state that the sparks that come out of the one adopted by the Railway Department are not broken up to the extent that Tyers' apparatus does it?—I did not exactly state that, but I will state it.

4161. Is that what you mean?—Yes, I mean that; but I will put it this way, I say the departmental apparatus is not an apparatus at all.

4162. You then state, I understand, the reason Tyers' possesses that advantage is, that when a spark comes out it has to strike as many times before it finally comes out, that is it is harmless when it comes out, because it strikes against the obstacles?—Yes, and every one strikes it smaller and smaller.

4163. That is Tyers' apparatus.—Shocking a current?—It is neither they are too right?—That is one of the advantages: it is self-protection.

4164. You see that they are said to be rings and made to strike, and it has the quality of not only breaking the sparks but that it keeps itself clear; is that a fact?—That is what breaks the sparks.

4165. The quality that breaks the sparks I have acquired?—Yes, it has to strike so many times that it breaks the spark.

4166. It being rings and not right, that is the possibility of Tyers' invention over the others, that is it rigid and does not shake?—The construction is a suspension over all the others, but it works. If you look at these pictures there—[showing an illustration to the audience]—you will see these are the different ways that have been adopted by the Railway Department for an arrestor. Look at No. 1 down to No. 8; I have seen another departmental apparatus that would work you laugh.

4167. Look at No. 4; that is said to be one of the best adopted and there are all the improvements until it comes to No. 8. Numbers is virtually the one adopted by the department today?—That is a double screen.

4168. When the double screen was put the invention was put there in the middle. When that was first adopted it was a huge load of iron?—It was adopted twenty years ago, because I have an engine fitted with it.

4169. That is simply an adaptation of Tyers'?—No, that is straight up and down, and Tyers' is very different.

4170. To be as effective you think it should be one that cleanses itself by vibration?—That is in the only similarity.

4171. Is it a quality?—No. There are concentric rings and the spark has to strike them before it comes out. This is only a bird cage not good.

4172. That is not an adaptation?—No, and I do not think the department would be wise enough to adopt any one's patent. I only have my evidence as a private man.

4173. You have given evidence that you think that Mr. Tyers ought to have accepted Mr. Miss offer of £1,000?—That was the gentleman in office before Mr. Allen Smith?—Yes.

4174. How do you know that amount was offered to him? No evidence here is that he could not come to terms with him?—Mr. Milne told me so some couple of years before he died, and Tyers told me himself that he wanted £3,003.

4175. He could have got £1,000?—Yes, that was after the report of that board. Another thing is to the South railway in South Australia. I have seen official documents from the manager speaking highly of the spark arrestor, and that line goes through a very wet country.

4176. Have you not these documents?—I think Mr. Tyers has them. Another thing is there is no money in it; the patent has expired.

4177. By Mr. Bronner.—With regard to the saving of coal and increase in the energy, the coal is a problem that has puzzled the whole world?—Yes.

4178. You do not expect the Railway Department to solve that problem?—Yes, I do. They paid £45,000 this year over and above last year through the increased price of coal, and if you can get anything that will save 50 per cent., by using the oxygen or the air, I should be adoption. I used to run my express to try and save coal for years, and I think that Tyers' invention will save 3 per cent. or 4 per cent. There is another thing that might be put into the fire-box, and you can get better combustion, and you can get more oxygen put in, and that is life and fire, and everything else. When you have the black stains coming out, that is all carbon.
418. You mean a deflector put on the top?—I get it to burn the smoke; and I say you could save £50,000 a year with a proper thing like that. A locomotive is like a wasp engine, you must have waste, or I always think so. It is like something in use in war, there must be waste, but still you must get down to the minimum quantity of waste. Do you see what I mean? We are running to Wanganella; you cannot stop that engine going up Olave's Bank to save a pound of coal. You must keep up the average rate of speed. You want to save the furnace, and secondly to save combustion in the fire-box. That is all I have to say.

The witness withdraws.

Mr. Duffy took the Chair.

Thomas Bassett, sworn and examined.

4187. By Mr. Duffy.—What are you?—Millwright and engineer.
4188. I understand you have invented a spark arrestor which you wish to lay before the Commission?—No. I made it when I had the management of a saw-mill in New South Wales. Fire was continually surrounding us from the spizas. It was in the middle of summer; it was the time the railway was being made from Yass to Cooma. I started and made a spark arrestor, of which you have a sketch.

4189. Can you describe it briefly from that?—We were never troubled with fire after that. What did you do?—I took the part of the chimney divided into sections, and fixed one in the other on the upper part of the chimney with hooks. The depths will depend on the length of the funnel. The only difference I made would be, as shown on the plan, and I would put a perforated plate near the men to prevent the splash of water.

4190. If you wish to continue your description further, I would advise you to send in a further sketch?—There is one thing I found out; I sent it in years ago, and two years after it was sent I met Mr. Wheeler and Mr. Cooper, and they took me down and introduced me to Mr. Bent, and said he intended to hold it over to a board and to me surprise, I saw an account of a trial, Mr. John Bunce was the chairman of the board, and in the evening, after seeing the account of the trial, I saw Mr. Bunce, and asked him about it; and said, I had received no instructions about it. He said he thought all parties had been interested about it. I said I had not, and he said, "Then it is too late now."

4191. By Mr. Bruce.—About what would be the expense of applying your invention?—The expense would be merely the material, I made it in half a day.

4192. How much money would it cost you?—Between £5 and £7 would fix it on the funnel.

4193. By Mr. Bruce.—Would it interfere with the draught?—No, I never had any difficulty with the draught of the engine in the saw-mill. We used gas leaves, and nothing at all ever went away from it.

4194. What might be the effect of a stationary engine might not be effective on express engines going at the rate of 40 miles an hour?—I beg your pardon, an engine rushing through the air creates a space. I have found under fires occur through the ashes falling out of the ash pan from the funnel.

4195. By Mr. Bruce.—Your invention is a funnel which fits inside the other one?—Yes.

4196. And when the sparks come outside the funnel they are deflected and drop into the water, and therefore cannot come out?—Everything goes into the water.

4197. Your meaning is that if one escaped it would fall into the water instead of into the engine, therefore if any sparks came out they could not go into the fire, because they drop into the water?—It is exhausted into the water—(hereby a plan.)

4198. By Mr. Bruce.—How often would it need to be cleaned out?—About once a week. It would depend on the depth. It would not take long; it might be cleaned out every eight. You have only to let your hose run into it for a few minutes. There is a natural law that if a spark falls into water it never rises from it.

The witness withdraws.

David Watts, sworn and examined.

4199. What are you?—A traveller.

4200. You have invented a spark arrestor, which you wish to lay before the Commission; will you explain it?—There is a plan here—(producing the same). There are two fixed gratings, a rocking grating and a top grating, which is directly over the space of the bottom grating, and between the two there is a rocking grating which keeps the thing perfectly clean. It is all shown in the plan, and I have written out a full description of it.

4201. What difference is there between your inventor, and Mr. Tyer's?—I have never seen Mr. Tyer's, but after reading a description of it I can say that it is different altogether from mine.

4202. How is it the invention is perfect?—Mine is a grating—(describing). You will see by the drawing that the suspension of the engine always keeps it rocking and keeps it clean.

4203. By Mr. Bruce.—Has it been tried?—No; I showed it to Mr. Fulke, and he said it was a good thing, and told me to go on with it.

4204. By the Chairman.—You have not had any experiments?—No.

4205. Is it only theoretical?—Yes. I only heard of this Commission last week.

4206. What is the mesh that you use?——(One-eighth of an inch.)

4207. Is it acting?—No, baa, and they can be put closer if necessary.
4212. What is the size of the bars themselves?—About an eighth of an inch, but you can have them any size you like. The size of the bars you use must be such as to cover the spaces in the bottom one.

4213. What advantage has it over other arresters?—It will keep itself clean. If the sparks escape the first one, they have a tendency to strike the second one.

4214. Is not that the principle of the departmental arrester?—No. From what I saw of theirs, the griss were 4 inches apart, in some you can have it as close as you like.

4215. Would it not have the effect of stopping the steam?—No.

4216. What do you base that opinion on?—Mr. Halsey told me that Mr. Tyre's was the best and mine was the next.

4217. Re Mr. George.—He thought yours was very good, and told you to pursue it?—Yes.

4218. But, at the same time, he thought Tyre's was the best?—Yes.

4219. How long was that ago?—Seven years.

4220. I suppose he is of the same opinion now?—I suppose so it.

Adjourned.

By Authority: Rev. S. Young, Government Printer, Melbourne.