

78. It is made from actual survey and observation by yourself?—Yes.
79. Did you go over the whole of the country affected by the fire?—Yes.
80. And you have shown it all on the plan?—Yes.
81. *Mr. Lane.*] Do you remember particularly going through the oat-crop?—Yes.
82. Did you notice that tongues or strips of fire had run through the crop?—No. When I was there the crop was cut, and it was difficult to follow the exact track of the fire.
83. How long after the fire was it that you were there?—I could not say.
84. Was it some time afterwards?—Yes.
85. Did you walk round the boundary-fences and the oat-crop to see where the fire had gone?—Yes; I followed the burnt fences as far as I could.
86. You did not notice any fire round the edges? Some of the witnesses say it extended round the edges?—In some places the fence is shown on the plan in black and in other places in green. The black denotes where the fences were burnt.
87. Did you notice whether the fire had burnt inside the fences or not? It would burn inside, would it not? Not necessarily.
88. You cannot remember, can you?—If there had been any burning I think I would have noticed it.
89. The paddock was in stubble at the time?—Yes; the crop had been cut.
90. Was it difficult to get at the exact area?—It was difficult to get at the exact forks of the fire, but I got the measurements as near as I could. I spent a considerable time in trying to find out where the fire had gone by walking over the ground and so on.
91. Your survey was made about the 18th January—a fortnight after the fire?—Yes; by the papers you show me I see that that is so. It would be about that time.
92. If there were two or three forks into a paddock you would take the outside, and include them all in your survey?—Yes.
93. You would go round the extreme limit?—Yes.
94. About the 18th January the traces of the fire would be clearly defined?—Yes, with the exception of the crop being cut. If the crop had been standing I would have been able to follow the fire more easily, but having been cut and taken away it was somewhat difficult.
95. That only applies to the oat-crop?—Yes; the grass was easily followed.

ALFRED LUTHER BEATTIE, sworn.

96. *Mr. Poynton.*] Your position, Mr. Beattie?—I am Locomotive Engineer for the Hurunui-Bluff Section of the New Zealand railways.
97. How long have you been connected with the New Zealand Railways?—For twenty-two years and a half.
98. Did you have experience before entering the New Zealand railway service?—Yes, in England.
99. In what department?—In locomotive building.
100. You are familiar, then, with the appliances used to prevent the emission of sparks?—Yes.
101. What appliances are used on the New Zealand railways?—I will describe the appliances used on the New Zealand railways at the present time. I might premise my remarks by saying that as a department we have given very special attention for many years to the matter of spark-arresters. We have not only conducted experiments ourselves, but we are also familiar with experiments that have been conducted in other countries. We never hesitate to copy the good points of other people's appliances if we think they may be adapted to our work here. It is a subject that has received perhaps more attention on the railways in New Zealand than almost any other point of locomotive running. It has been looked on by the department as a matter of very great importance, and the mere question of economy has been subordinated to the more important question of efficiency. The apparatus at present used on the New Zealand railway engines is, in my opinion, as an expert, the most modern and the most efficient known to the railway world. We have every confidence in stating that there is no laxity on the part of the department in connection with equipping the engines with the best-known appliances for the prevention of fire from stray sparks. I will put in, for your information, Sir, a tracing which shows the fundamental idea of spark-prevention. It is a sectional outline of an engine firebox, and shows where the sparks are originally manufactured. In order to effect as perfect combustion as possible we use a firebrick arch, which extends back from the tubes for more than half the length of the firebox. We have also a deflector or baffle-plate projecting down towards the fire from above the fire-door opening. This deflects a current of air into the fire, and the effect of these two appliances is to make more perfect combustion, and therefore to consume the fuel and pass it out in the form of gas rather than in a partly-burnt condition. Therefore the course of the products of combustion is delayed and rendered much more circuitous than if these appliances were not used. That being so, as the products of combustion pass to the funnel there is every probability of them being consumed, so that the likelihood of a spark getting from the fire is considerably minimised by the appliances in the firebox. I have also a tracing of the smokebox appliances used when we are burning hard coal, the effect of which appliances is to prevent any particle of partially consumed fuel from getting away. The size of the hole in the perforated plate or diaphragm is $\frac{3}{8}$ in. by $\frac{1}{8}$ in. In England and on the Continent of Europe it is not customary to put any appliance of this sort into engines when burning hard coal. The tendency of this coal to form sparks when burnt in a locomotive is so very small that practically it may be looked on as free from danger. The consequence is that in England, Scotland, Ireland, and the Continent they do not consider it necessary to put in this spark-arresting appliance, the use of which, I may say, increases the consumption of fuel, because it baffles the egress of the gases, and therefore you have to increase the blast to over-