

TUESDAY, 1ST AUGUST, 1893.

A. I. SUCKLING-BARRON attended and gave evidence.

*The Chairman* : Will you state to the Committee what you know in reference to the subject of this petition?

*Mr. Suckling-Barron* : In 1892 I started from New Zealand and went through America, with the object of inquiring into the various electric tramway and electric railway systems there. I went on to London, and there saw the various lines and modes of construction. In Stockholm, in Sweden, I saw them changing the earth systems on their telephone-lines and putting in the metallic return. I also went to several other cities in Europe, and saw tramways working. In America I saw the very extensive system from San Francisco to San Jose, and at Salt Lake City saw the single-trolley system, and I actually worked one of the cars for a day or two. At Schenectady I saw Mr. Edison, and, in the course of a conversation, he explained that the single-trolley system was the only satisfactory system, and that out of 100 lines there were 92 per cent. worked by this means, the other 8 being on the double-trolley system. I have also the expert evidence given by Mr. Edison himself, when examined by Chief Justice John S. Wise, in the suit of Pelton v. the East Cleveland Street Railway Company, in which suit he was asked whether he had ever been engaged in the actual installation of electric railways within the past three years, and how many of such railways there were in existence in the United States. In reply he said he did not know, but supposed there were between two and three hundred. The actual number is 504, and at the present moment—or during last year—in the United States there are 6,853 miles of lines on the single-trolley system. Six thousand cars are used on these systems, and over a thousand million passengers travelled over these lines in one year. Mr. Edison was asked how many of these railways in America were of the kind known as the single-trolley system, and said that his impression was that 90 per cent. were on that system. The Judge said, "State how many systems of electric railways have been experimented with, and the advantages or disadvantages of each, briefly." He said there had been an enormous number of different systems advertised and experimented with in Europe, in England, and in America, but the only system which had proved commercial outside of the overhead-trolley system was one single case of the Siemens Electric Railway in the suburbs of Berlin. He was asked whether or not, "in your judgment, the single-trolley overhead-wire system is successful, and whether there is any other known system of which the same may be said." He said, "I do not know of any other system that is successful except the single-trolley system at the present time." Then he was examined again at his laboratory in Orange, New Jersey, by Chief Justice John S. Wise. He was asked, "When was the principle that the earth may be used as a return current for electricity discovered, and by whom?" He said, "Somewhere in 1835, by Steinheil, or Morse." He was asked whether the principle was patented by anybody, and he said that Morse attempted to patent it, but did not succeed. He was asked whether the earth has since been used by any and all electrical enterprises desiring to use it, and said, "Yes, it has been of universal use, except in some systems of electric lighting which have come up within the last few years." He was asked, "In your opinion, as an expert upon telephoning, is the grounded telephone the best system available to the telephone service, and, if so, why? and, if not, why?" He said, "No, the best circuit is the metallic-circuit method, not using the earth as a return. This prevents induction and interference of other wires, but is not universally used on account of the fact that the expense for wire is double, although it is used in Paris entirely." I may say that the whole of the system has been changed in Paris from the earth return to the metallic return. If you telephone a person in Paris, no matter what distance, there is no cross-talk whatever, and you hear quite clearly the conversation. In New York they commenced about a year ago to change the telephones from earth to metallic return, and are still engaged in doing so.

20. *Mr. Earnshaw*.] Will you explain the difference?—The earth return is this: A current of electricity can only flow in a closed circuit. A wire leads from the Exchange to each subscriber's instrument. If one person wishes to converse with another, he rings up the Exchange and is connected through. The current flows from the one subscriber's instrument through the Exchange to the other subscriber's instrument, and back by the return circuit to where it started from. In order to save a return wire, each instrument is connected on earth, and the earth is used as the return circuit. If a cablegram were sent from London to New Zealand the current would go by a single wire; the instruments would be earthed in London and New Zealand, and the return current would flow back through the earth. You can understand the enormous saving there is by this system for wire alone. A telephone is likely to be disturbed by leakage from electric circuits, light or power, or by thunderstorms. A metallic return would greatly obviate such disturbances.

21. Would that be from post to post?—Not necessarily. A good many telephones could be connected on to one wire as a common return, and then taken back to the Exchange.

22. So that it does not necessarily mean a metallic return to every telephone?—No.

23. *The Chairman*.] Would it matter what number you had of these single short wires on to a main one?—No; you can put on any number. Of course, if you had to run a great distance on to an earth-wire, it might pay to have a separate one for each instrument. In crowded streets a great number might be put on one return.

24. *Mr. Moore*.] What are the advantages of the double-trolley system over the single trolley?—There are very few. In the double-trolley system, in going round curves, there are great difficulties. In the double-trolley system you have to have two wires, and at curves there is a difficulty in keeping them apart; and unless the wires are run with equal sag, and the trolleys made good contact, there is apt to be excessive sparking. Of course, you have to use heavier poles, which have to be more heavily stayed, and the liability of lines coming down is greater. On a line where there are twenty or thirty cars running, if one were to lose contact a blockade would be probable.

25. *The Chairman*.] Is the double wire more expensive?—Yes, much, and not so efficient.