

bridges is almost negligible, and when forty selectors are bridged across the line, it equals a loss of about one mile of cable.

The first form of talking circuit used (Fig. 10) on a despatcher's wire was the standard local battery circuit. The total impedance of this bridge to talking current is 600 ohms, 300 of which is active for receiving purposes. It is obvious when a number of these sets are bridged across the line, transmission is difficult between widely separated stations.

A great many schemes were tried to overcome this trouble such as using different types of induction coils, and raising the impedance in the receiver. It was, however, finally determined that the best results, both for receiving and transmitting were obtained by installing a switch arrangement at the way station, (Fig. 11), so that when the switch was in one position, the best possible results were gained for receiving, and when in the other, the best results for transmitting. The circuit developed is known as the "Northern Electric high efficiency transmission scheme."

On train wires equipped with this circuit, the despatcher is able to call in on the line, as many way stations as he desires and issue orders to them simultaneously, and the farthest man receives just as good transmission as the man nearest the despatcher.

There will undoubtedly arise in your minds a number of questions that we have overlooked in this paper, and I will be pleased to answer any of them.

Chairman,—

As Mr. Fairlie is ready to answer any questions I should be pleased if someone will start the discussion, without my having to call on anyone in particular.

Mr. Humber,—

One or two years ago on the electric line between Portland, Maine, and Old Orchard Beach they had in use a telephone system by which the conductor on the cars could call up and get his orders for the movement of the car, but, in one instance during an electrical storm a car stopped at one of the sidings and the conductor opened the box and put the receiver to his ear. At this moment a flash of lightning struck the wires, and he was instantly killed. Is there anything to overcome an accident of this kind so that when a conductor stops his car at a siding to phone he does not take the chance of being killed in this manner?