O. T. LADEMAN.

TRANSMISSION SYSTEM.

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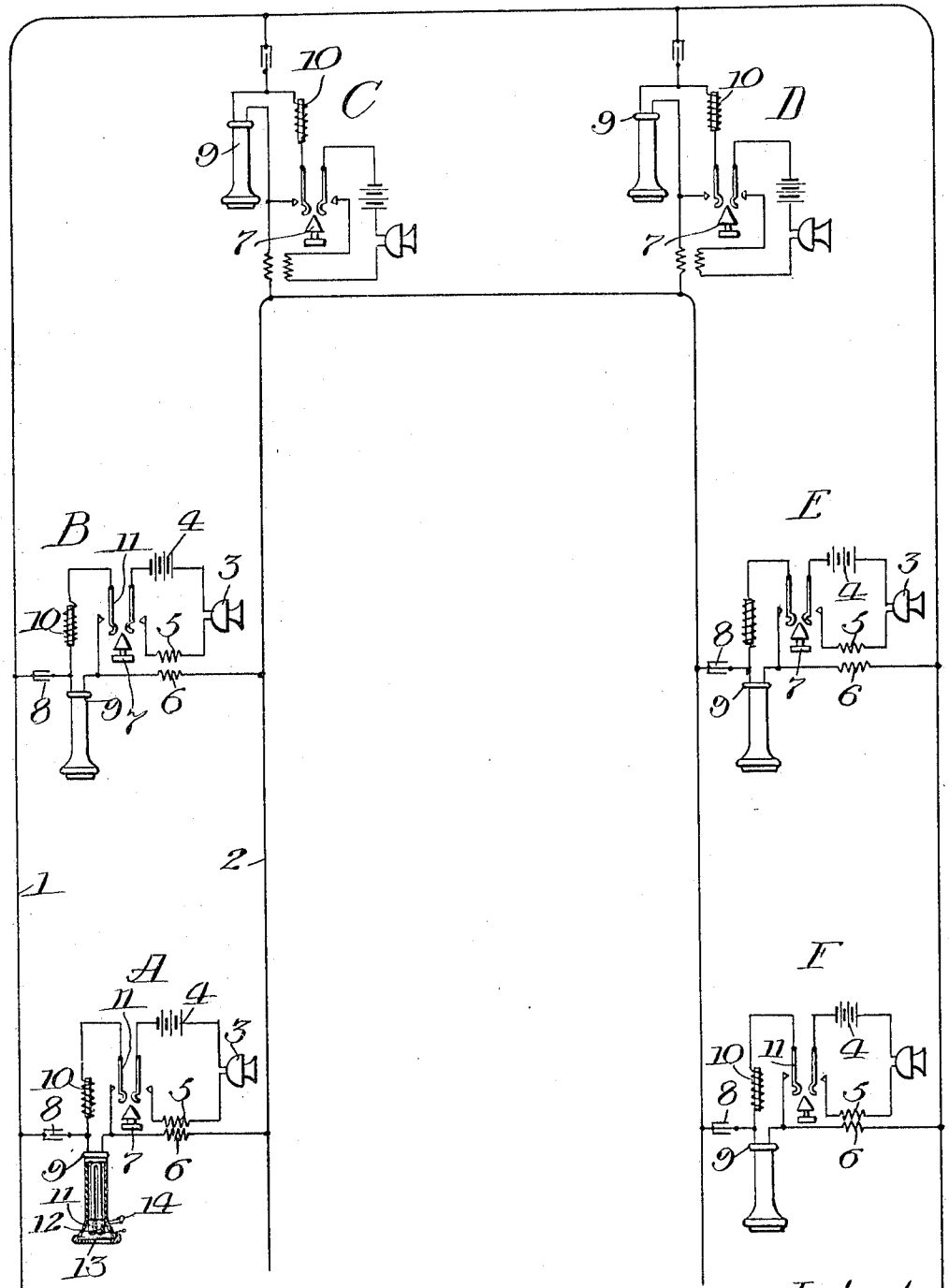

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UNITED STATES PATENT OFFICE.

OTTO T. LADEMAN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO RAILWAY TELEPHONE & ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TRANSMISSION SYSTEM.

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To all whom it may concern:

Be it known that I, OTTO T. LADEMAN, citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Transmission Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephone transmission systems, and has for its object the provision of an improved long distance transmission system especially applicable for use in railway service.

The general object of my invention is to so arrange the various instrumentalities at the various stations as to properly equalize the talking currents which are sent out from the central or transmitting station.

More specifically, my invention contemplates the use of telephone receivers of different effective resistances to the voice currents, depending upon the distance of these receivers from the transmitting station, so that not only will the currents be properly distributed and each receiving circuit be apportioned its proper share of current, but all the available current which is allotted to each receiving branch will be available for proper use in the receiving element itself.

Further details and advantages of my invention will be apparent from the construction, which I will now describe in connection with the accompanying drawing, illustrating one embodiment thereof, in which I have shown a central station A, and substations B, C, D, E and F.

The transmission circuit comprises line conductors 1 and 2, which unite the various stations, and it is contemplated that this transmission system is adapted for use along railways where the transmission conductors 1 and 2 are of relatively high resistance compared to the ordinary talking circuits met with in the operation of telephone transmission. I have shown at each station a transmitter 3, a battery 4, the primary 5 of an induction coil, and the secondary 6 of an induction coil. The local transmitting circuit is closed by means of a key 7, which is depressed when the operator at either station desires to talk into the transmitter 3 associated with that station. I also show a condenser 8 in each bridge circuit, which aids in preventing the deflection of telegraph currents through the telephone circuits. Each station is likewise provided with one of my improved receivers 9, which receiver is in series with the secondary coil 6, and the condenser 8. I bridge an adjustable impedance or resistance coil 10 around the receivers 9, through the interposition of the spring 11, which is adapted for closing this shunt circuit when key 7 is operated. When the key 7 is operated, and the operator talks into the transmitter 3 at said station, the local talking circuit is closed, and an adjustable impedance is bridged around the receiver to avoid the necessity of the talking current passing in series through the high resistance receiver.

The receivers 9, as stated, are provided with coils 12, 12, which coils serve to actuate the diaphragm 13, to transmit the currents into sound waves. These coils 12 at the various receivers are of differing effective resistances to the voice currents traversing the various bridges. For instance, station A has been taken as the transmitting station, which is occupied by the train despatcher, and it is necessary that when he is talking into his receiver, all of the stations B, C, D, E, and F, can properly hear him. For this reason, the receiver 9, at the station B, is of very much higher resistance than the receiver 9 at station F. I find, in practice, that I do not necessarily have to vary the resistances of all the receivers, as I can take a group of receivers nearest the transmitting station, and allot them a certain resistance, and take the next group and allot them a less resistance, and so on along the line. I also find, in practice, that I get good results if wires of different specific resistances are used to effect this result. I can thus make the resistance of these receivers adjustable, as shown at station A, where terminals of the coils are brought out to contact points, and a shunt wire 14 may be used to short circuit various turns, if desired.

Having thus described the preferred embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A telephone transmission system comprising a telephone circuit connecting a

central station with a plurality of sub-stations, a telephone set at the central station, and a telephone set at each sub-station, the receivers of the various sub-station sets having lower impedances as their distance from the central station increases.

2. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, and a telephone set at each sub-station, the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these said receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones.

3. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, and a telephone set at each sub-station, the windings of the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones.

4. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a telephone set at the central station, a telephone set at each sub-station, the receivers of the various sub-station sets having lower impedances as their distance from the central station increases, and switching means for establishing a shunt circuit around said receivers.

5. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, a telephone set at each sub-station, the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these said receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones, and switching means for establishing a shunt circuit around said receivers.

6. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, a telephone set at each sub-station, the windings of the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these said receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones, and switching means for establishing a shunt circuit around said receivers.

7. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, a telephone set at each sub-station, the windings of the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these said receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones, and switching means for establishing an adjustable shunt circuit around said receivers.

8. A telephone transmission system comprising a telephone circuit connecting a central station with a plurality of sub-stations, a local telephone set at the central station, a telephone set at each sub-station, the windings of the receivers of the various sub-stations offering lower effective resistance to the flow of the voice currents emanating from the central station, the farther these said receivers are away from said central station, thereby to more evenly distribute the central station voice currents through the sub-station telephones, and switching means for establishing a shunt circuit of adjustable impedance around said receivers.

9. A telephone transmission system comprising a high resistance telephone circuit connecting a central station with a plurality of sub-stations, and telephone sets at the various stations, said telephone sets having receivers whose effective resistance to the talking currents is adjustable, thereby to effect a uniform distribution of current through said receivers.

In witness whereof, I hereunto subscribe my name this 19th day of January A. D., 1909.

OTTO T. LADEMAN.

Witnesses:
MAX W. LABEL,
O. M. WENNIEL.