O. T. LADEMAN.

TELEPHONE TRANSMISSION SYSTEM.

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977,657.

Patented Dec. 6, 1910

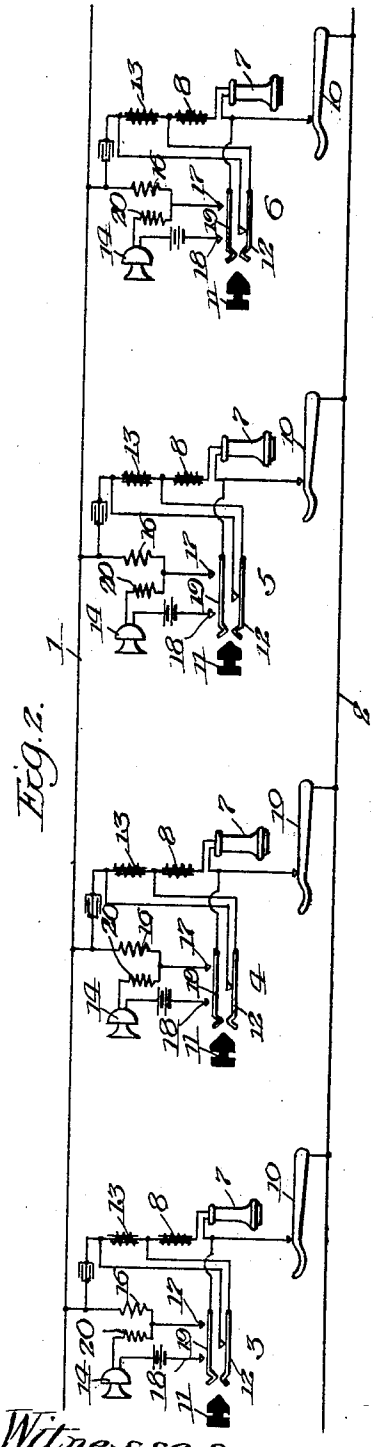

Fig. 2.

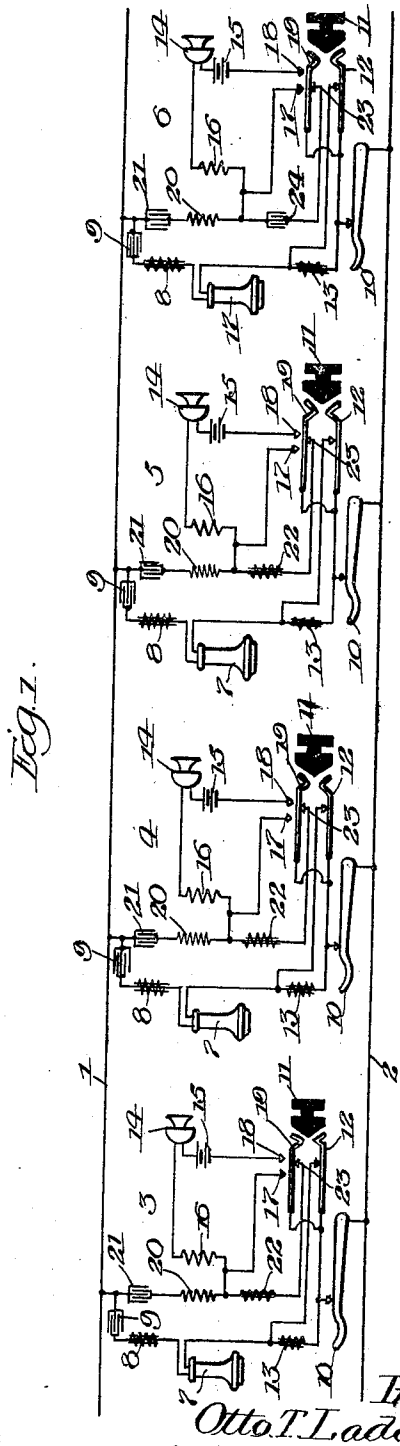

Fig. 1.

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UNITED STATES PATENT OFFICE.

OTTO T. LADEMAN, OF MILWAUKEE, WISCONSIN.

TELEPHONE TRANSMISSION SYSTEM.

977,657. Specification of Letters Patent. **Patented Dec. 6, 1910.**

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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 Telephone 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 arrangement of substation telephone devices in connection with a long-distance transmission line.

In general, my invention contemplates the inclusion of a receiver, in the form hereinafter specified, in a separate bridge between the line conductors of the circuit, and the secondary of the induction coil likewise in an independent bridge across said conductors.

This invention is especially applicable for railway telephone work, and I find that by arranging the devices as aforesaid, I overcome the objectionable interaction and limitations placed upon the apparatus, when the receiver and the secondary winding are in series in the same bridge.

I will describe my invention more in detail by reference to the accompanying drawing, illustrating various embodiments thereof, in which—

Figure 1 represents a system constructed in accordance with my invention, and Fig. 2 represents a modification thereof.

Referring particularly to Fig. 1, I have shown line conductors 1 and 2, as uniting various substations, 3, 4, 5 and 6, I have shown at each substation a receiver 7, which is in circuit with an impedance winding 8 and condenser 9, in bridge with the line wires 1 and 2. This bridge is completed through the switchhook 10, as shown, and also through the push-button contact-making device or key 11, which has a spring 12, whose front contact closes said bridge connection when the transmitter is not in use. When said key is operated normally, a high impedance device 13 is included in the receiver bridge connection to decrease the amount of current which will flow through said bridge to said receiver, when the operator at said station is talking out, thus forcing most of the current over the line wires 1 and 2.

Each substation is provided with a transmitter 14, battery 15 and primary winding of induction coil 16, which circuit is closed by means of the two contacts 17 and 18, when the key 11 actuates the spring 19. The secondary winding 20 of the induction coil is in a separate bridge between the line conductors 1 and 2, and includes the condenser 21 and the impedance winding 22, which impedance winding 22 is cut out of the circuit by the back contact 23 engaging the spring 19. The impedance 22 is preferably very high and is shown at 6, in the shape of a low-capacity condenser 24.

The various talking advantages will now be apparent. Supposing the operator at station 3 is listening and receiving a message, key 11 remains in the position shown, and said receiver is therefore only in circuit with the winding 8 and condenser 9, in a bridge directly across the line wires 1 and 2. The only other bridge across the circuit at this station includes the secondary winding 20 and the very high impedance 22, which practically blocks any currents coming into this station. Now, should the operator at this station wish to talk out by talking into the transmitter 14, he actuates key 11, and thereby places the high impedance 13 in series with the receiver, thus cutting off the current to a large extent, which said receiver would absorb, and which current is being imposed on the wires 1 and 2 by the secondary 20, and at the same time, the actuation of this key 11 closes the transmitter circuit, and eliminates the high-impedance winding 22 from the secondary winding 20, so that the only device in the secondary bridge is the high capacity condenser 21. By virtue of this arrangement, the secondary can be wound to any desired resistance, and likewise the receiver, and by not placing them in the same bridge, they need not be wound to correspond to each other. The secondary is in use when the receiver is not supposed to be effectively in use, and the receiver is in use only when the connection of the secondary to the wires 1 and 2 is unnecessary. The key 11 accomplishes this transmission. It is wise, of course, not to entirely eliminate the receiver 7 from the circuit when talking out, as vocal sounds may be received from the

other end which it is well to be able to hear, even though very indistinctly, so that the operator on finding that the other party wishes to converse, can actuate the key 11 accordingly.

The apparatus at stations 4, 5 and 6 is substantially the same as at the station 3, they being all substations of similar character, with the possible exception of the windings of said sets, corresponding in some cases to the length of the line wire between said substation and the central station.

In Fig. 2 I have shown a modification, which is substantially the same as in Fig. 1, with the exception that the secondary winding is entirely eliminated from the circuit when a message is being received.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not limit myself to the precise construction and arrangement as herein set forth, but—

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a transmitter, a local battery, a primary winding of an induction coil, said transmitter, local battery and primary winding being adapted for interconnection, a secondary winding of said induction coil bridged across said line circuit, an independent bridge across the line circuit including a receiver, and means for at will increasing the impedance of the receiver bridge.

2. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a local transmitter circuit including the primary winding of an induction coil, a secondary winding for said coil bridged across said line circuit, a receiver in an independent bridge across said line circuit, and means for at will increasing the impedance of the receiver bridge.

3. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a transmitter, a local battery, a primary winding of an induction coil, said transmitter, local battery and primary winding being adapted for interconnection, a secondary winding of said induction coil bridged across said line circuit, means for increasing the impedance of the receiver circuit and simultaneously closing the local transmitter circuit, and an independent bridge across said line circuit including a receiver.

4. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a local transmitter circuit including the primary winding of an induction coil, a secondary winding for said coil bridged across said line circuit, means for increasing the impedance of the receiver circuit and simultaneously closing the local transmitter circuit, and a receiver in an independent bridge across said line circuit.

5. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a transmitter, a local battery, a primary winding of an induction coil, said transmitter, local battery and primary winding being adapted for interconnection, a secondary winding of said induction coil bridged across said line circuit, means for decreasing or eliminating the flow of voice currents through said secondary winding and simultaneously decreasing the impedance of the receiver circuit, and an independent bridge across said line circuit including a receiver.

6. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a local transmitter circuit including the primary winding of an induction coil, a secondary winding for said coil bridged across said line circuit, means for decreasing or eliminating the flow of voice currents through said secondary winding and simultaneously decreasing the impedance of the receiver circuit, and a receiver in an independent bridge across said line circuit.

7. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a transmitter, a local battery, a primary winding of an induction coil, said transmitter, local battery and primary winding being adapted for interconnection, a secondary winding of said induction coil bridged across said line circuit, means for increasing the impedance of the receiver circuit and simultaneously closing the local transmitter circuit, means for decreasing the flow of voice currents through said secondary winding and simultaneously decreasing the impedance of the receiver circuit, and an independent bridge across said line circuit including a receiver.

8. A telephone transmission system comprising a plurality of stations united by a common line circuit, each station having a local transmitter circuit including the primary winding of an induction coil, a secondary winding for said induction coil bridged across said line circuit, means for increasing the impedance of the receiver circuit and simultaneously closing the local transmitter circuit, means for decreasing or eliminating the flow of voice currents through said secondary winding and simultaneously decreasing the impedance of the receiver circuit, and a receiver in an independent bridge across said line circuit.

9. A telephone transmission system com-

prising a plurality of stations united by a common line circuit, each station having a local transmitter circuit including the primary winding of an induction coil, a secondary winding for said coil adapted for bridge connection across said line circuit, means for increasing the impedance of the receiver circuit and simultaneously closing the local transmitter circuit, and a receiver in an independent bridge across said line circuit.

In witness whereof, I hereunto subscribe my name this 10th day of July A. D., 1909.

OTTO T. LADEMAN.

Witnesses:
O. M. WENNICH,
JEAN ELLIOTT.