(No Model.)

J. S. STONE.

TELEPHONE CIRCUIT.

No. 580,166. Patented Apr. 6, 1897.

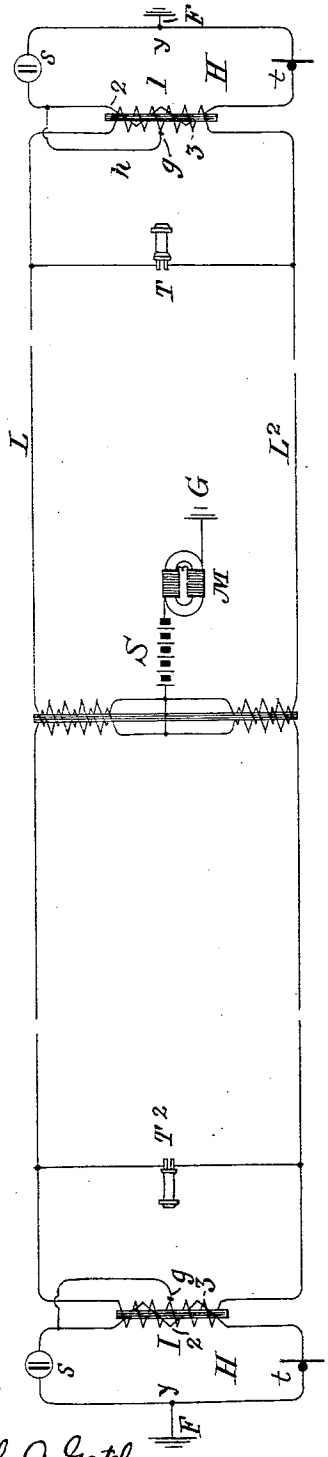

Fig. 1.

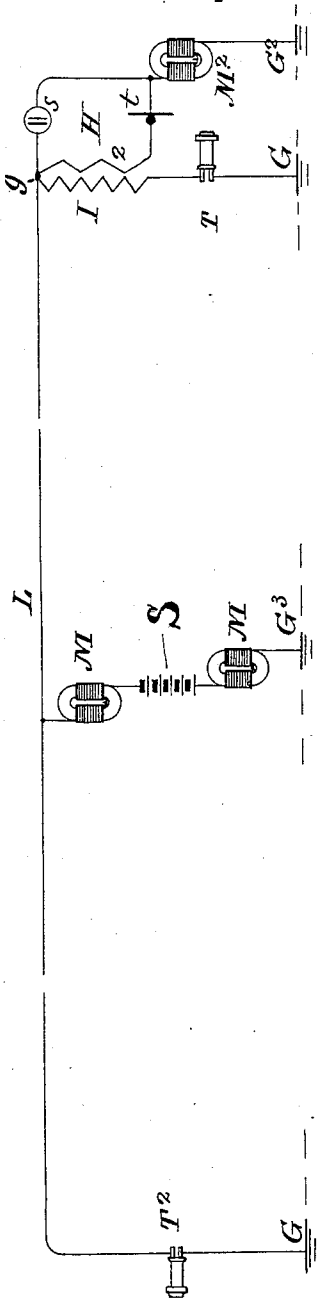

Fig. 2.

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JOHN S. STONE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF SAME PLACE.

TELEPHONE-CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 580,166, dated April 6, 1897.

Application filed June 26, 1895. Serial No. 554,100. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. STONE, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Telephone-Circuits, of which the following is a specification.

The invention relates to that class of telephone-circuits in which current is supplied to the transmitters of substations from a central or common source. It has reference more particularly to the local talking-circuits at the substations and their connection with the conductors of their respective main circuits.

The invention is applicable to telephone-circuits of the said class whether the main talking-circuit, as distinguished from the local talking-circuit, is a single conductor or is metallic, especially in long-distance transmission, since the construction permits of the use of a primary circuit of extremely low resistance; but it is more particularly advantageous where the main talking-circuit is metallic, since in such case it also affords a circuit of low resistance for the supply-current without disturbing the balance of the main talking-circuit.

Figure 1 represents the invention as embodied in two metallic circuits connected for conversation. Fig. 2 represents the invention as embodied in a circuit employing a single conductor.

The application of the invention to metallic circuits will be first described. The two conductors of each metallic telephone-circuit, connected in parallel as a single conductor with one pole of a main source of current-supply, terminate at a substation in the two ends of the secondary winding of an induction-coil. At each substation is a local talking-circuit, including the telephone-transmitter, the primary winding of said induction-coil, and an electrolytic cell. This latter circuit is grounded or connected with the main source of current-supply by a return-conductor from a point between the transmitter and the electrolytic cell, and there is also a conductive connection with the middle of the secondary of the induction-coil from a point between the said primary of the induction-coil and the said electrolytic cell. There is a steady current over the line through the transmitter when at rest. When the transmitter is operated, variations of current are produced in the local talking-circuit, which are impressed inductively upon the main circuit in the ordinary way. The impedance of the electrolytic cell is practically negligible, and thus a short circuit to disturbing currents is produced around the primary of the induction-coil.

As stated above, in Fig. 1 of the drawings are shown two telephone-circuits embodying my invention connected for conversation. Unless stated or obviously appearing otherwise the same letters and figures designate the same parts in each. S is the common battery or source of supply, having one of its poles grounded at G through a retardation-coil M. L L^2 are the two conductors of a main telephone-circuit, connected with the battery S as a single conductor, as shown, and terminating in the two ends of the secondary 3 of a transmitter induction-coil I at a substation. H is the local talking-circuit at the substation, containing the primary 2 of the same induction-coil, the station-transmitter *t*, and the electrolytic cell *s*. A connecting-wire *h* unites a point *g* at the middle of the secondary to the local circuit H at a point between the primary 2 and the electrolytic cell *s*. A wire F connects the local talking-circuit to ground or return-conductor G^2 from a point *y* between the said electrolytic cell and the transmitter *t*. T is a receiving-telephone, shown as bridged between the conductors L L^2, but it may be connected or associated with the circuit in any manner not disturbing the balance. As shown, the two main telephone-circuits are connected at a central station by a split repeating-coil, but this is not essential to the invention. T^2 is the receiving-telephone at the other subscriber's station.

At Fig. 2, which represents the application of the invention to telephone-circuits employing single line conductors, the same letters and figures are used as far as may be to corresponding parts. S is the source of supply, M M are retardation-coils, and L is the main conductor. I is an induction-coil at the substation, where H is the local talking-circuit, containing the transmitter *t*, the primary of said

induction-coil 2, and the electrolytic cell *s*. T is the receiver. The secondary 3 of the said induction-coil is grounded at one end through the receiver T at G and at the other end is connected with the main telephone-conductor L at *g*, at which point the main conductor L is also connected with the local talking-circuit between the primary 2 of the induction-coil and the electrolytic cell *s*. The local circuit H at a point between the electrolytic cell *s* and the transmitter *t* is grounded at G^2 through a retardation-coil M^2. Only the receiving-telephone T^2 of the other subscriber's station apparatus is shown. The source of supply S is grounded at G^3, and the several retardation-coils M, M, and M^2 serve to confine the voice-currents to the main line.

Having described my invention, I claim—

1. In a centralized battery telephone system, the two conductors of a metallic telephone-circuit connected in parallel as a single conductor with the main source of current-supply and terminating at a substation in the two ends of the secondary of an induction-coil, in combination with a local talking-circuit containing the primary of said induction-coil, the telephone-transmitter and an electrolytic cell, the said local circuit being grounded or united to a return-conductor between said transmitter and said electrolytic cell, and united to the middle of said secondary of the induction-coil between said electrolytic cell and said primary of the induction-coil, substantially as described.

2. The combination of a local talking-circuit, at a substation, containing an electrolytic cell, a telephone-transmitter, and the primary of an induction-coil grounded between the said electrolytic cell and said transmitter, with a main telephone-line, one end of which is connected with the common source of current, and the other with the secondary of said induction-coil, and also with the said local talking-circuit at a point between the said primary of the induction-coil and the said electrolytic cell.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of June, 1895.

JOHN S. STONE.

Witnesses:
GEO. WILLIS PIERCE,
JOSEPH A. GATELY.