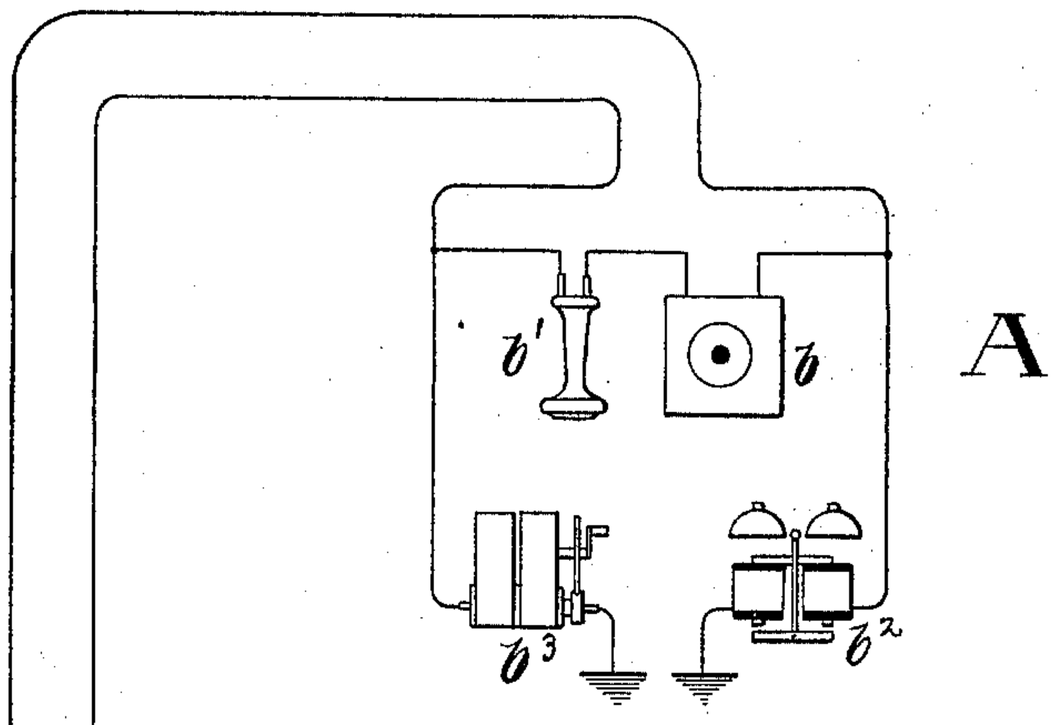
(No Model.)

C. E. SCRIBNER.

TELEPHONE LINE CIRCUIT.

No. 584,415. Patented June 15, 1897.



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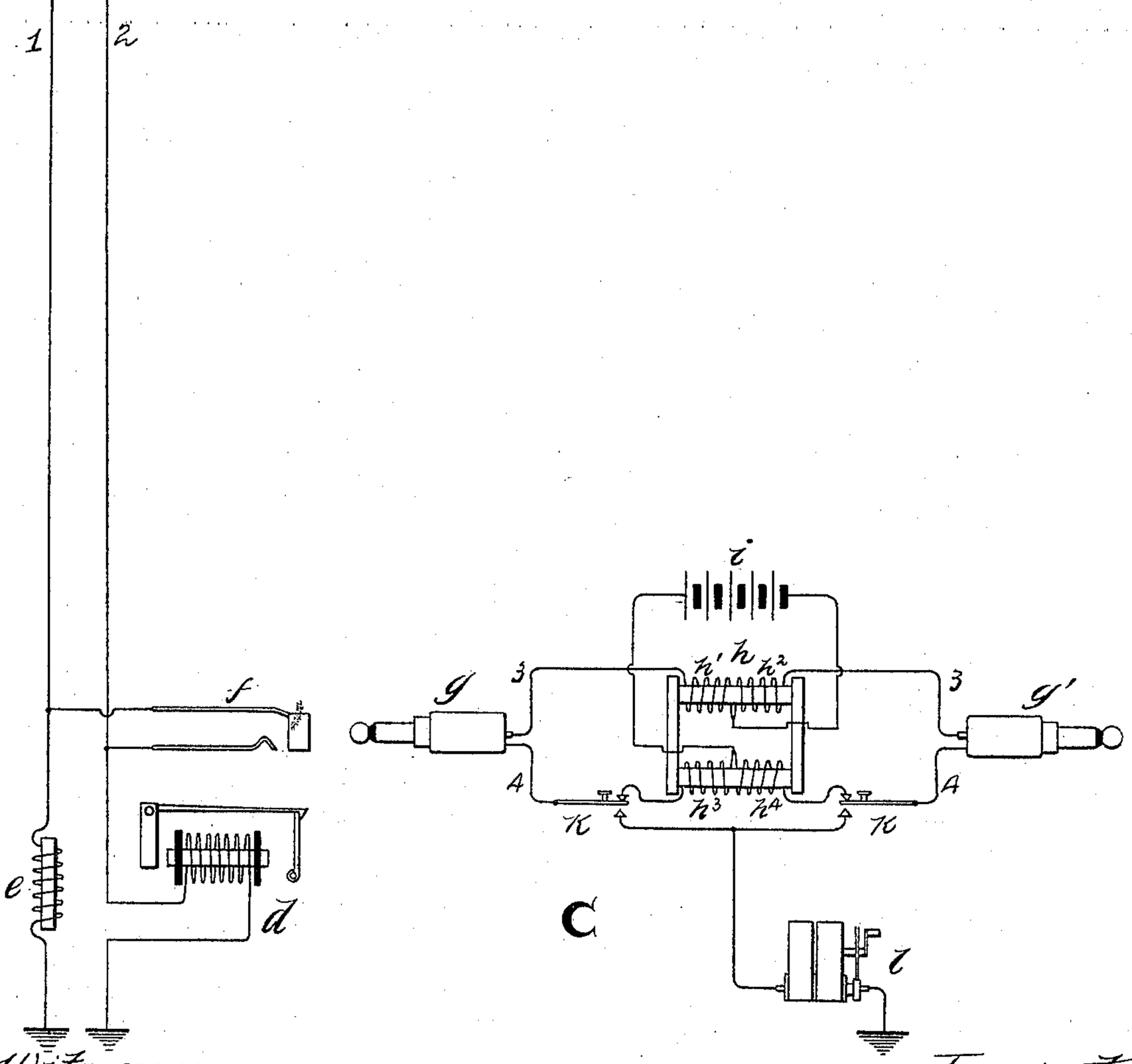

C

Witnesses:
George L. Cragg.
W. Clyde Jones.

Inventor:
Charles E. Scribner.
By Barton & Brown
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

TELEPHONE-LINE CIRCUIT.

SPECIFICATION forming part of Letters Patent No. 584,415, dated June 15, 1897.

Application filed August 1, 1895. Serial No. 557,827. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Telephone-Line Circuits, (Case No. 396,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention concerns the substation apparatus of metallic-circuit telephone-lines, its purpose being to so arrange the telephonic and signaling appliances at the substation as to dispense with all switches without impairing the efficiency of operation of either of the instruments.

My invention is particularly useful in connection with telephone systems in which current for exciting the transmitting-telephone is supplied over the line-circuit during the use of the telephone, although it is not limited to such use.

My invention consists in including the signal-bell, of high resistance and impedance, in a ground branch from one of the line conductors and the generator of signaling-current, also of high impedance, in a similar branch from the other line conductor and in placing the telephonic appliances in a permanently-closed bridge or cross wire of the line-circuit. At the central station the line-annunciator is located in that line conductor which includes the subscriber's generator, while the outgoing signals from the central station are transmitted over that line conductor which is more directly connected with the bell at the substation.

When the substation-generator is operated, very little of its current finds circuit through the telephone and the call-bell to earth on account of the high resistance of this path. On the other hand, only a small fraction of signaling-current sent from the central station traverses the subscriber's generator. When the telephone is in use, no appreciable portion of the telephonic current in the line is shunted through the signaling apparatus on account of the high impedance of these instruments.

I have shown a form of my invention in the attached drawing.

At a substation A are located a transmitting-telephone b, a receiving-telephone b', a signal-bell b^2, and a generator b^3 of signaling-current of the usual type. Line conductors 1 and 2 extend from these appliances to a central station C, where they are connected with the usual apparatus in a telephone-switchboard.

At the substation the transmitting-telephone b and the receiving-telephone b' are included serially in a conductor uniting the two line-wires 1 and 2. The receiving-telephone here represented has usually a resistance of about twenty-five ohms and the transmitting-telephone a normal resistance of one hundred or two hundred ohms. The bell b^2 is connected in a ground branch from conductor 1. This bell may have a resistance of one thousand ohms or more and should be characterized by high impedance. The generator b^3 is in a similar ground branch from conductor 2 of the line-circuit. It also should have high resistance and impedance.

At the central station line conductor 2 is led to ground through an annunciator d. Conductor 1 is here shown grounded through an impedance-coil e, but so far as my invention is concerned it may be left open. Both line-wires are provided with normally open terminal contacts in a spring-jack f in the switchboard.

The switchboard is furnished with a pair of connecting-plugs g and g', which are united through the helices of an induction-coil h—that is, the tips of the connecting-plugs are connected together through a conductor 3, which includes the helices h' h^2 of the induction-coil, while the sleeves of the plugs form the terminals of a conductor 4, including helices h^3 h^4. The point of union of helices h' h^2 and that of helices h^3 h^4 are connected together through a battery i, which is designed to supply current to the substation-telephone during the use of the latter. The strength of this battery may be so adjusted with relation to the annunciator d as not to operate it, or any well-known device may be employed to prevent the excitement of the annunciator

during the connection of the battery with the circuit—as, for example, the inclusion of a condenser in the ground branch with the annunciator. If desired, any suitable form of clearing-out annunciator may be employed.

Keys *k* are included in conductor 4, the switch-lever of either key being adapted, when it is depressed, to open the circuit of this conductor and to connect the tip of the corresponding plug with one pole of a source *l* of signaling-current.

The subscriber at station A, by turning his generator b^3, may transmit a signaling-current to operate the annunciator *d*. As before stated, only a small portion of the generated current will traverse the telephone and call-bell. When, replying to the signal thus transmitted, the operator inserts the plug *g* into spring-jack *f*, the circuit of battery *i* is closed through the transmitting and receiving telephones at the substation, thus supplying current for exciting the transmitter. Fluctuations in the current in the line-circuit produced by the transmitter are reproduced in the circuit with which plug *g'* may be connected, through the medium of the induction-coil *h*, in a well-known manner.

The escape of telephonic current through the ground branches at the substation is prevented by the impedance of the instruments in those branches. At the same time any deleterious influence on the balance of the line which their presence might tend to exercise is prevented by their symmetrical connection with the circuit. The impedance of the two instruments b^2 and b^3 being substantially the same, the electrostatic balance of the line will not be appreciably disturbed by their permanent connection with it.

If the operator should desire to signal to subscriber at station A, she would insert the plug *g'* into the spring-jack *f* and would then depress the key *k*. The current from the signaling-generator *l* would then find circuit over conductor 1 and through the bell b^2 at the substation.

I claim as new—

The combination with a metallic-circuit telephone-line, of a transmitting-telephone and a receiving-telephone in a bridge thereof at a substation, a signal-bell in a permanently-closed branch from one line conductor, a magneto-generator in a branch from the other line conductor, an annunciator at the central station connected with the line to receive current from the generator, means for applying signaling-current to the line also at the central station to operate the signal-bell, a source of current adapted for exciting the transmitting-telephone at the central station, and means for connecting the said source of current with the line; whereby switches at the substation are avoided, as described.

In witness whereof I hereunto subscribe my name this 13th day of June, A. D. 1895.

CHARLES E. SCRIBNER.

Witnesses:
ELLA EDLER,
MYRTA F. GREEN.