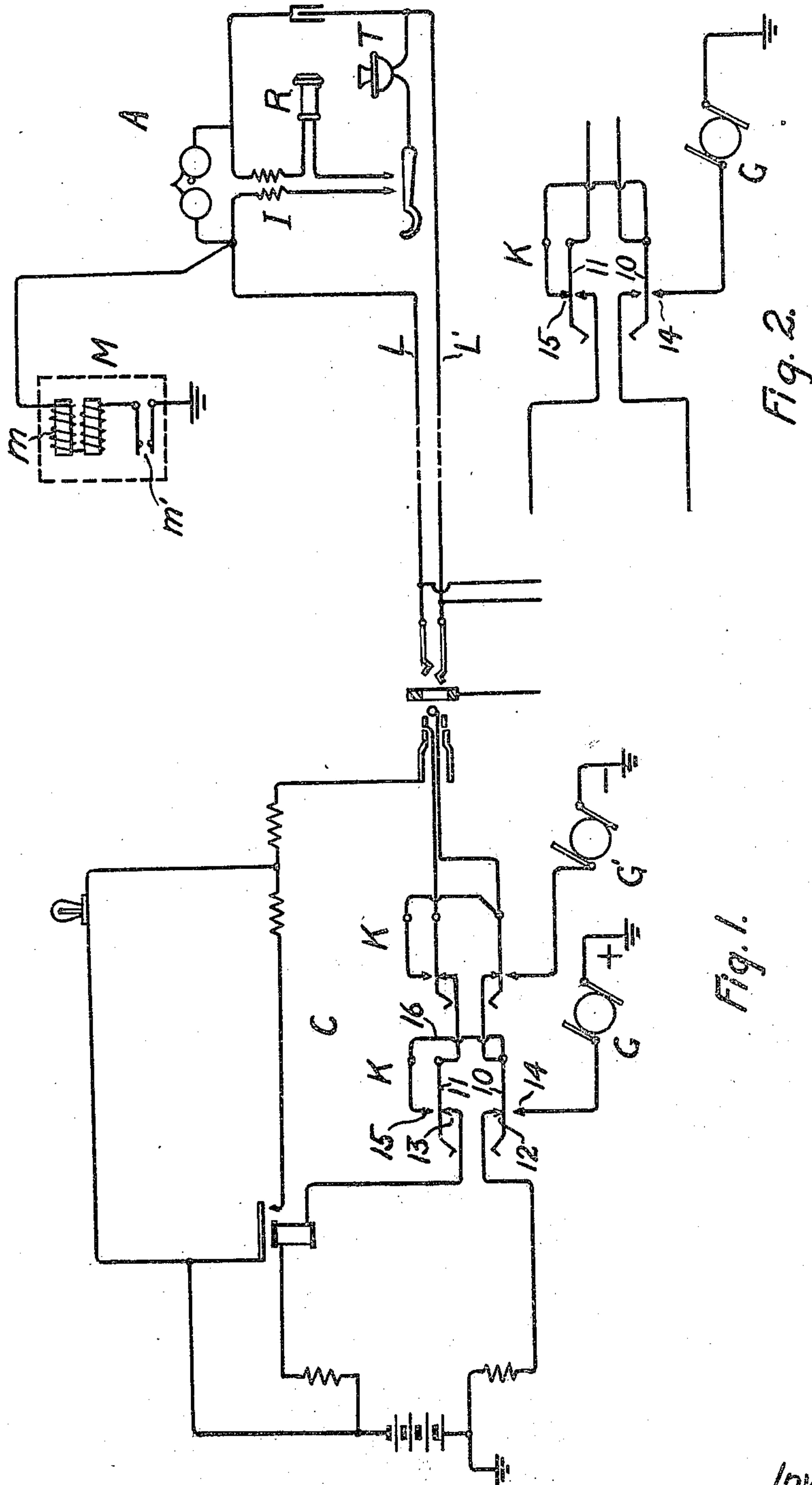


H. M. BASCOM,
 MEANS FOR PREVENTING DISTURBANCES IN SUBSTATION TELEPHONE SETS.
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1,262,912.

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Inventor

Henry M. Bascom,
 by Thomas B. Lockwood, Atty.

UNITED STATES PATENT OFFICE.

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MEANS FOR PREVENTING DISTURBANCES IN SUBSTATION TELEPHONE SETS.

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Specification of Letters Patent.

Patented Apr. 16, 1918.

Application filed December 22, 1916. Serial No. 138,513.

To all whom it may concern:

Be it known that I, HENRY M. BASCOM, residing at Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Means for Preventing Disturbances in Substation Telephone Sets, of which the following is a specification.

In telephone toll systems, in applying to or removing from substation lines a relatively high voltage current to cause the energization of the deposit and refund magnets of coin collectors or the operating magnets of register mechanism, sounds annoying to subscribers are caused by the energizing current flowing through the receiver in charging the capacity which exists between a conductor of the substation line and ground, and by the inductive discharge of the magnets when their circuits are broken. It is the purpose of this invention to provide a simple and effective means whereby such disturbances are prevented.

In the accompanying drawings, Figure 1 illustrates diagrammatically a portion of a cord circuit associated with a substation line and having keys arranged in accordance with one embodiment of my invention, while Fig. 2 is a diagram showing the order of operation of the key contacts.

At C appears a central station operator's cord circuit adapted for connection with a line having the tip and ring conductors L and L' extending to substation A. The latter has the usual equipment of a coin box station, including such a box M with its magnet *m* connected through the coin actuated contact *m'* with the tip side L of the line, the receiver R, transmitter T and induction coil I. In the cord circuit are deposit and refund keys K and K' united respectively to positive and negative sources of high voltage current G and G'. These keys, which may be identical in construction, have their movable members or springs 10 and 11 joined to the tip and ring conductors and normally resting upon the inner contacts 12 and 13 to provide for the continuity of the talking circuit. Outer tip contact 14 is united to the generator and an additional outer contact 15 for the ring spring 11 is connected to the tip spring by a strap or conductor 16. The springs and contacts are so adjusted that when a key is actuated contact 15 is made before contact 14 and upon re-

lease of the key contact 14 opens before contact 15. This is particularly shown in Fig. 2.

With the toll keys organized in the usual manner, with the contact 15 omitted, when one is depressed to close the contact 14, current not only flows from the generator through conductor L, coin contact *m'* and magnet *m* to ground to energize the magnet and determine the disposal of the coin, but also, the receiver R being off its hook, passes through the windings of the induction coil I, hook switch and transmitter T to charge the capacity between the ring conductor L' of the line and ground. This occurs particularly if there is cable included in the substation line, and the current induced in the secondary of the induction coil by the charging current may be of sufficient strength to cause in its passage through the receiver a disturbing click in the ear of the subscriber. A like effect is produced upon the actuation of a key to operate a substation register.

When the operator, having brought about the depositing or refunding of the coin, releases the key, the opening of contact 14 interrupts the current flowing in the winding of the magnet *m*. The self induction of the magnet generates a momentary voltage of considerable intensity, which causes a surge of current into the capacity between the conductor L' and ground by way of the path previously indicated. Again a loud click may be caused in the receiver to the annoyance of the subscriber. This invention removes these clicks. Upon actuation of a toll key the closure of contact 14 finds contact 15 already completed. Consequently generator current not only passes out upon tip conductor L, as already described, but also simultaneously through conductor 16 and contact 15 over ring conductor L', so that the capacities between both sides of the line to ground are equally charged, and there is no difference of potential tending to produce disturbing current through the receiver. Upon the release of the key by the operator after generator current is disconnected by the opening of the contact 14, the conductors L and L' remain joined for a moment through conductor 16. Thus there is a path into the capacity between conductor L and ground not alone by way of the receiver but also over the conductors L

and 16. The impedance of this latter path is much less than that including the induction coil L, so that little current flows in the receiver, reducing the sound therein so that it is unobjectionable.

I claim as my invention:

1. In a telephone system, the combination with a central station, a substation, a receiver thereat and a line connecting the stations, of an electromagnetic device joined to the line at the substation, a source of current, and manually operated means at the central station to apply current from said source to both sides of the line when the receiver circuit is completed for listening to control the device and for maintaining a connection between the sides of the line after the current source has been disconnected therefrom.

2. In a telephone system, the combination with a central station, a substation and a line connecting the stations, of an electromagnetic device joined to the line at the substation, a source of current, and means at the central station to connect the sides of the line and thereafter join the source of current thereto and for maintaining the connection between the sides of the line after the current source has been disconnected.

3. The combination with a telephone substation and its line, of a toll device joined to the line, an operator's key for controlling the toll device and having a movable contact connected to each side of the line and relatively fixed contacts for coöperation with the movable contacts, a source of current joined to one of the fixed contacts, and a conductive connection between the other

fixed contact and the opposite side of the line.

4. The combination with a telephone substation and its line, of a toll device joined to the line, a source of current, and an operator's key for controlling the toll device and having a movable contact connected to each side of the line and relatively fixed contacts for coöperation with the movable contacts, one of the fixed contacts being united to the source of current and the other fixed contact to the side of the line opposite to that with which its movable contact is associated, said contacts being so arranged that the one connected to the current source closes last in the actuation of the key.

5. The combination with a telephone substation and its line, of a toll device joined to the line, a source of current, and an operator's key for controlling the toll device and having a movable contact connected to each side of the line and relatively fixed contacts for coöperation with the movable contacts, one of the fixed contacts being united to the source of current and the other fixed contact to the side of the line opposite to that with which its movable contact is associated, said contacts being so arranged that the one connected to the current source opens first after actuation and upon release of the key.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this eighth day of December, 1916.

HENRY M. BASCOM.

Witnesses:

SAMUEL RASMUSON,
MAY QUINN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."