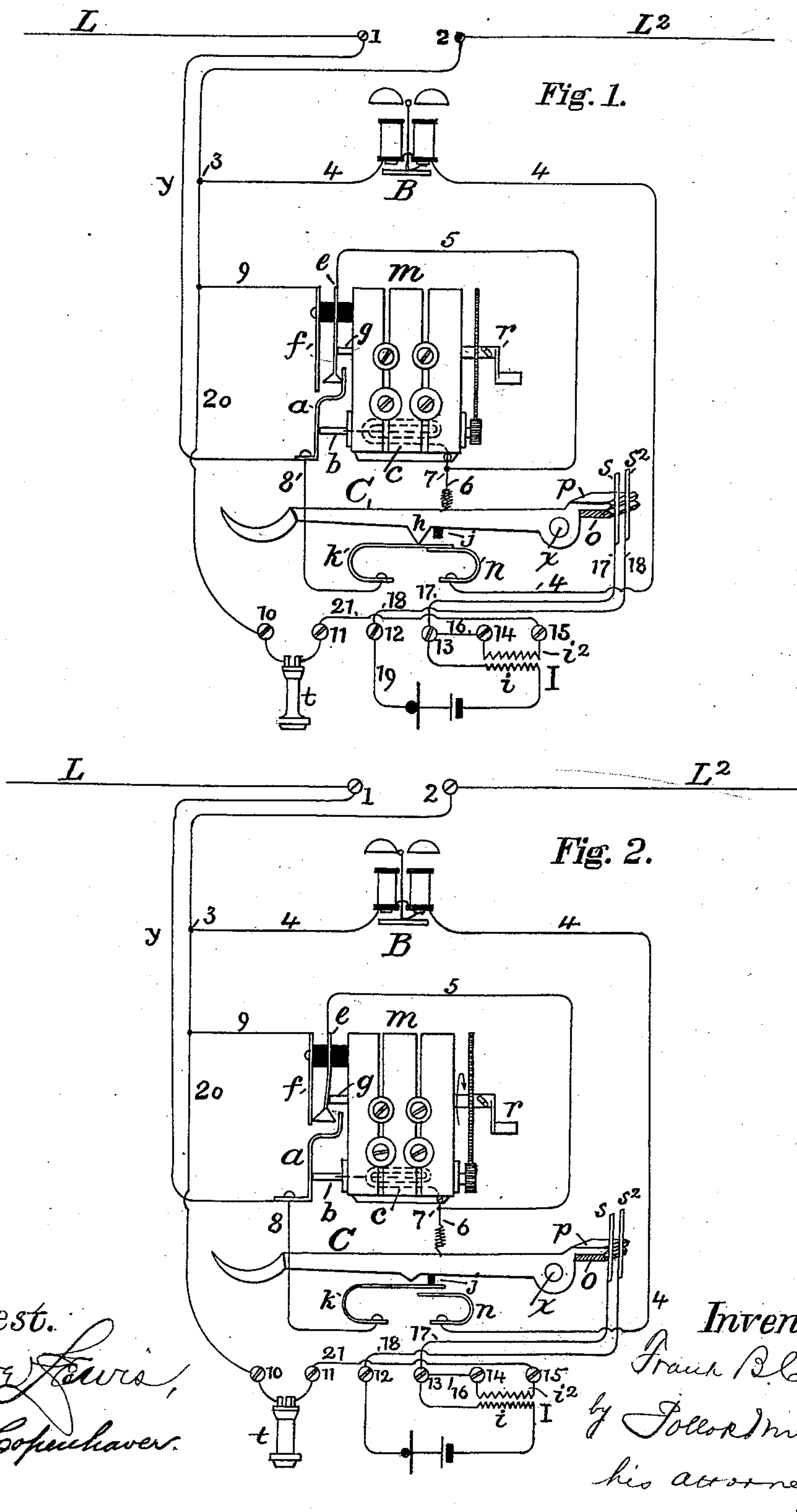


(No Model.)

F. B. COOK.  
MAGNETO CALL APPARATUS.

No. 539,170.

Patented May 14, 1895.



Attest.  
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# UNITED STATES PATENT OFFICE.

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## MAGNETO CALL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 539,170, dated May 14, 1895.

Application filed December 26, 1894. Serial No. 532,985. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK B. COOK, residing at Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Magneto Call Apparatus, of which the following is a specification.

This invention relates to magneto call apparatus employed in connection with telephone lines and circuits for signaling purposes, and especially to a modification of the circuits within the bell box.

It is well known that a standard "magneto bell apparatus" comprises a magneto generator provided with an automatic or manually operated shunting switch, a polarized bell, and an automatic circuit switch operated by the removal and replacement of a hand telephone to transfer the main circuit between the bell and telephone extension branches, and also to open and close the primary circuit of the telephone transmitter induction coil. In the use of the call sending portion of such an organization, when a call is to be made, or a signaling current sent to a distant station, the crank is turned, rotating the driving mechanism, and thereby the generator armature, whose winding at the same time is automatically introduced into the line circuit in series or parallel with the helices of the polarized bell; and the latter is operated as well as the bell or other electro-magnetic device at the distant station; and upon releasing the crank the armature is automatically shunted from the line. The telephone is then removed from its hook switch to listen; whereupon the said switch automatically connects the line with the telephone branch, closes the primary circuit of the induction coil, and shunts or otherwise disconnects the polarized bell.

In some telephonic circuits, where there are more than two stations upon the line, it is desirable to remove the telephone from the hook switch and listen, before ringing the central, or other distant station, in order to avoid the possibility of disturbing persons who may be already talking over the line.

My invention comprises such an arrangement of the circuits in the magneto bell box, that a current cannot be sent from the generator until the telephone has been removed from its hook switch; an operation serving to

remind the attendant of his duty of listening before ringing, whereby he is enabled to find out whether the line is already busy, so that in such event, he may refrain from disturbing by his ring the parties already engaged in conversation.

To this end my invention further consists in arranging the circuits so that the generator armature though adapted for ready connection with the line circuit, is practically cut out by a shunt circuit controlled by the removal from, or the replacement of the telephone upon, its switch hook lever.

It further consists in the combination of a generator associated with a main line, with two shunt circuits, normally short circuiting its coils; one controlled by the driving mechanism, and automatically opened by the operation of the actuating and driving shaft; and the other controlled by the telephone automatic switch lever, and automatically opened by the removal of the telephone therefrom. In its normal condition, that of disuse, the circuit is from the line through both of the shunts in parallel, and through the helices of the polarized bell to ground, or to the next station; and it is impossible to send a current from the generator until the telephone has been removed from the hook switch, as the terminals of the generator armature are united by at least one of the shunts. The removal of the telephone from the switch lever allows the latter to move upwardly, and open one of the shunts; and upon turning the crank, the other shunt is automatically opened or broken; the generator armature being thus introduced directly into the line circuit; all of which I will now proceed to describe in detail.

Figures 1 and 2 of the drawings are diagrams illustrative of the invention, the former figure showing the circuits in their normal condition, the telephone being assumed to be in place upon the switch-hook, although in the drawings, for the sake of indicating the circuits clearly, it is shown as being in a separate position. The lever is, however, in the same position as it would occupy were it depressed by the weight of the instrument. The latter diagram, Fig. 2, shows the circuits as they are arranged with the telephone re-



moved from its support and the generator in operation.

In the drawings referring to Fig. 1, L is the line wire terminating at screw post 1 and extending by wire *y* to the foot of spring *a*, against which the spindle *b* of the armature *c* of the generator *m* presses. The coil of armature *c* is connected by one end to the spindle *b*, the other end extending by wire 6 to the hook switch C, which is pivoted at *x*. A wire 5 extends from point 7 on wire 6 to the circuit changing spring *e*, whose free end rests when the generator is quiescent, upon the spring *a*, making electrical connection therewith. The spindle *g* of the crank shaft bears against the center of the spring *e*. The springs *a* and *e* and wire 5 to the point 7 constitute a shunt around the armature winding *c*. A wire 8 connects the foot of spring *a*, with the foot of the curved spring *k*, the free end of which bears against and electrically connects with the projection *h* of the hook switch, and also upon the free end of the curved spring *n*, from the fixed end of which a conductor 4 extends to point 3 on wire 20 and includes the helices of the polarized bell B. The spring *a*, wire 8, spring *k*, hook switch C and wire 6 to point 7 constitute the second shunt around the armature *c*.

10, 11, 12, 13, 14 and 15 are binding posts between which the wires of the telephone circuits extend. Wire 16 may connect post 13 with post 14 and wire 21 connects post 11 with post 15. The hand telephone *t* is connected between posts 10 and 11; and wire 20 connects post 10 with line binding post 2 from which wire L<sup>2</sup> extends to earth or to the outgoing conductor leading to another station. Wire 9 connects wire 20 with the spring *f*.

*p* is a metal extension from the hook switch, and *o* a non conducting block affixed thereto, by means of which the primary circuit *i* of induction coil I, is opened and closed by the contact of the said conducting and non-conducting pieces respectively, with the springs *s s*<sup>2</sup>, and the main line connected with or disconnected from the telephone branch in a well known manner.

It will be seen that as an electric current enters the apparatus by line wire L, *y*, it divides at the foot of spring *a*, a part going by spring *e*, wires 5 and 6 to the hook switch C, and spring *k*, where it unites with the other portion which goes by way of the second shunt through wire 8 to spring *k*, the entire current from this point continuing by spring *n* and wire 4 through the bell B and by point 3 and wire 20, to the screw terminal 2, and outgoing or return conductor L<sup>2</sup>. The telephone being on the hook, depressing the latter, the primary circuit *i* and the telephone branch are both open at the springs *s s*<sup>2</sup>. In this condition of the circuits no current can be sent to line from the generator as the currents developed will traverse the short circuit through the shunt controlled by the switch lever. When the generator is operated by turning

the crank, the first shunt circuit will be broken by the lateral movement of the spindle *g* in a manner well known, and such lateral movement presses the spring *e* away from spring *a* and into contact with spring *f*, as shown in Fig. 2; but unless the telephone be first removed from the switch lever, the currents generated, as stated above, will pass through the short circuit of which the second shunt forms a part, by way of the armature winding *c*, wire 6, switch lever C, stud *h*, spring *k*, wire 8, spring *a*, and armature spindle *b*, back to the other end of the said winding, and the said currents cannot of course pass to line.

Upon the removal of the telephone from the hook switch, the resiliency of the spring *k* forces the switch lever upward to the position shown in Fig. 2, breaking the contact between the said lever, and the said spring *k*, and also breaking the contact between the springs *k* and *n*. The former spring presses the non-conducting pin *j*, and thereby maintains the upward position of the switch lever and the second generator shunt around the armature coil *c* is thereby in turn broken, and stays open until the replacement of the telephone, when it is once more closed. The switch in moving to the said position closes the primary and secondary telephone circuits by bringing the conducting block *p* into contact with the springs *s s*<sup>2</sup>. Now when the crank *r* is rotated, and the spring *e* transferred from its connection with the spring *a* to one with spring *f*, the armature winding is introduced into the main circuit and the currents traverse the said circuit as follows: line L, *y*, spring *a*, spindle *b*, coil *c*, wire 5, springs *e* and *f*, wires 9 and 20 to L<sup>2</sup>, as clearly shown in Fig. 2, both of the shunts being open and the generator armature left directly in the line circuit. At the same time the bell branch 4 is opened, so that the home bell is not responsive to outgoing signals.

By the construction described, outgoing signals (it is evident) cannot be sent until the telephone *t* is removed from the switch lever C; and as soon as the operation of the generator driving mechanism ceases, the armature winding is again withdrawn from the circuit, and cannot therefore obstruct conversation, because, although the shunt controlled by the telephone switch remains broken until the telephone is replaced, the shunt controlled by the driving shaft is closed as soon as the operation of the crank shaft is stopped.

I claim—

1. The combination with a telephone circuit of a magneto call generator normally connected in, but shunted from said main circuit, generator actuating mechanism, an automatic telephone circuit switch, and means controlled by the concurrent operations of said actuating mechanism and telephone switch for withdrawing the generator from its shunts, substantially as described.

2. The combination with a telephone circuit of a magneto call generator normally con-



5 nected in said circuit, a normally closed shunt from the circuit around the generator a telephone switch lever controlling said shunt, whereby a current from the generator can be sent to line only upon the removal of the telephone from the switch-lever, and means for automatically cutting the generator out of the talking circuit after the same has been operated substantially as described.

10 3. In a call apparatus, the combination of a magneto call generator associated with a telephone circuit; with two shunts normally short-circuiting its armature winding, one controlled by the driving mechanism, and automatically opened by the operation thereof; and the other controlled by the telephone switch lever, and automatically opened by the removal of the telephone therefrom, substantially as described.

20 4. The combination in a call apparatus for telephone circuits, of a magneto call generator; with two shunts constituting normally closed parallel short circuits round its winding, one of the said shunts being controlled by the driving mechanism, and automatically opened by the operation thereof, and closed upon the cessation of such operation; and the other controlled by the movement of the telephone switch lever, as the telephone is removed from or replaced upon its support, being automatically broken on the removal, and automatically closed on the replacement of the said telephone, substantially as described.

5. In a magneto bell apparatus, the combination of a main telephone circuit; an extension branch therefor including a telephone; a second extension branch therefor including a magneto electric call generator; and an automatic switch lever operated by the removal and replacement of the telephone to connect the said main circuit with the said branches respectively; with two shunt circuits surrounding the armature coil of the said generator one of the said shunts including a circuit controlling device responsive to the operation of the generator driving mechanism; and the other said shunt including a circuit controlling device responsive to the movement of the telephone switch lever, whereby call signals may be transmitted only when both of the said shunt circuits are broken, and whereby it is made necessary to remove the telephone from the switch lever before sending calls, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of December, 1894.

FRANK B. COOK.

Witnesses:

A. A. THOMAS,  
L. G. RICHARDSON.