(No Model.) 2 Sheets—Sheet 1.

E. H. McFALL.

TELEPHONE CALL AND SWITCH BOX.

No. 297,148. Patented Apr. 22, 1884.

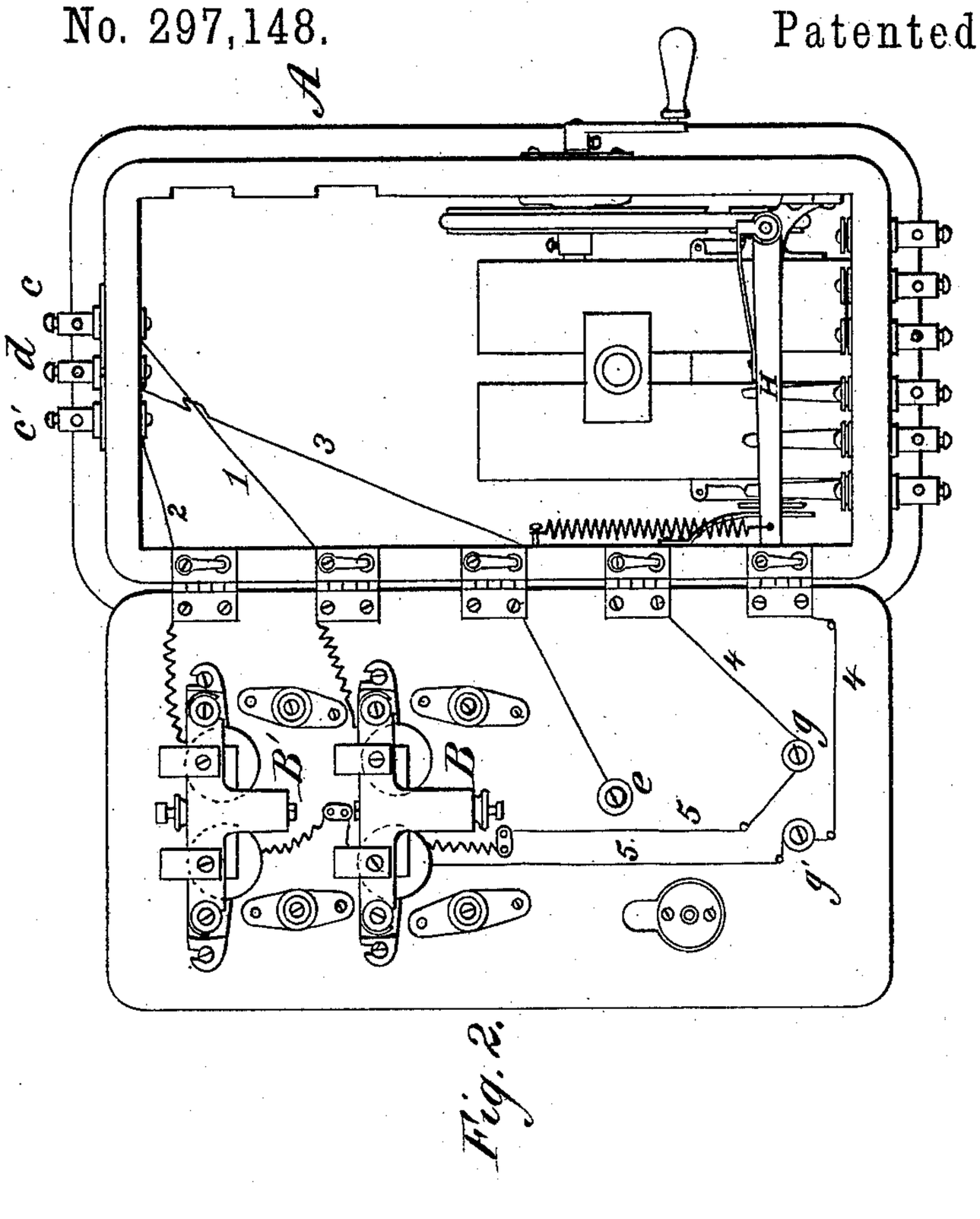

Fig. 2.

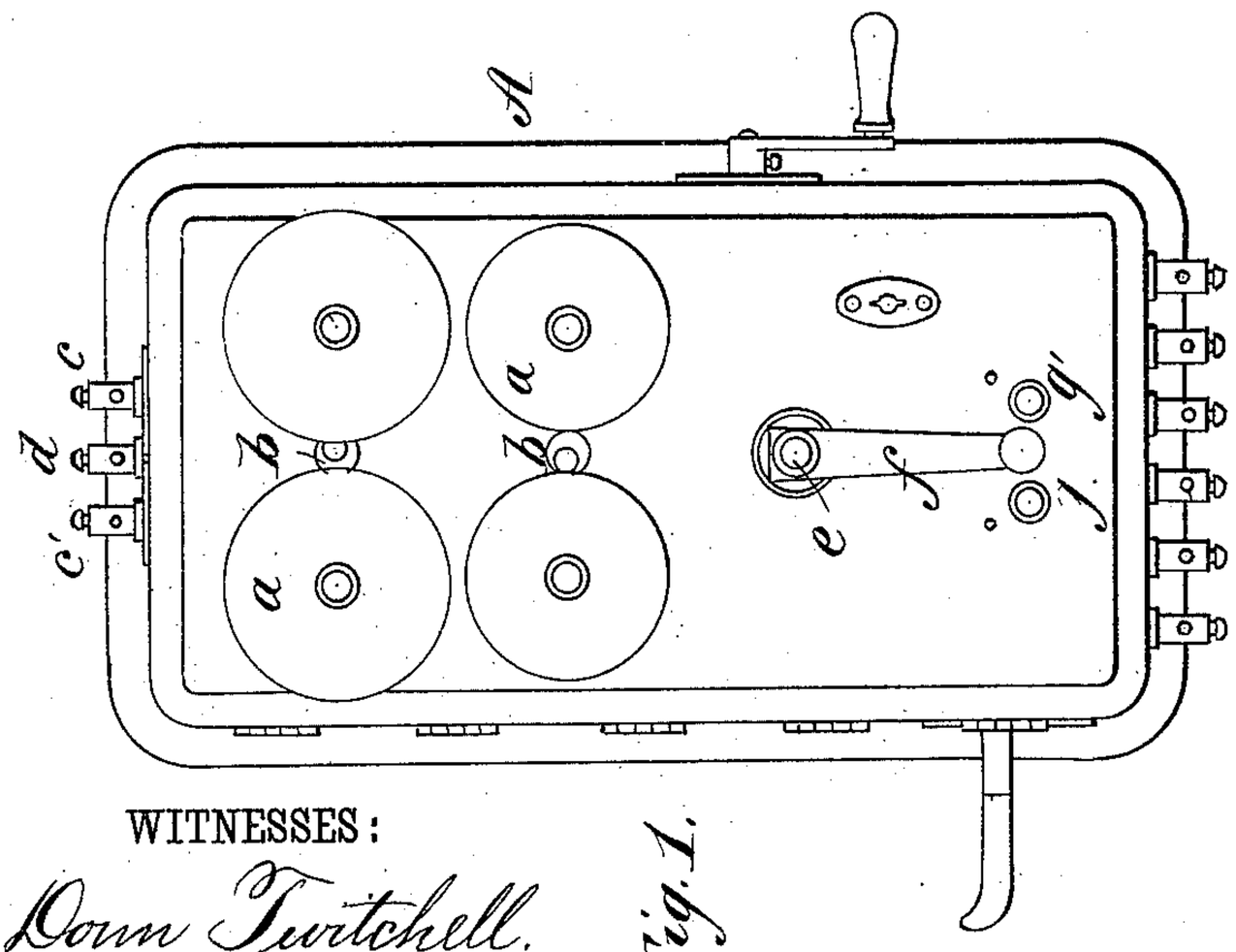

Fig. 1.

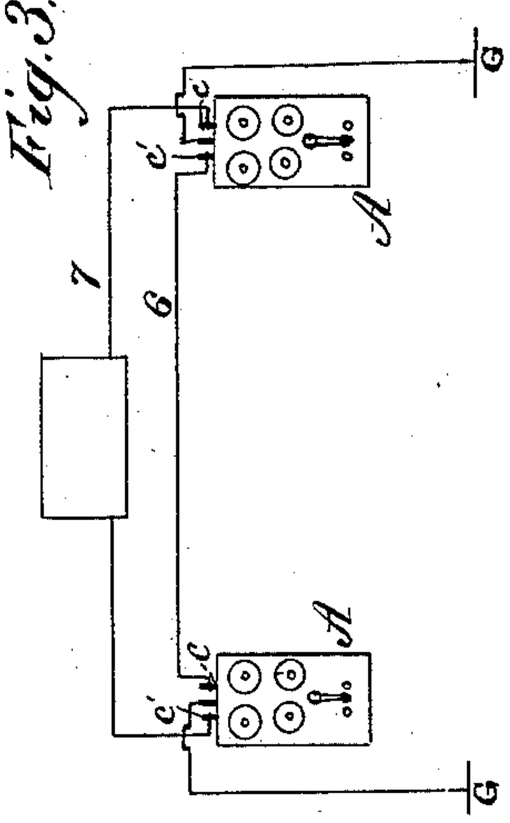

Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

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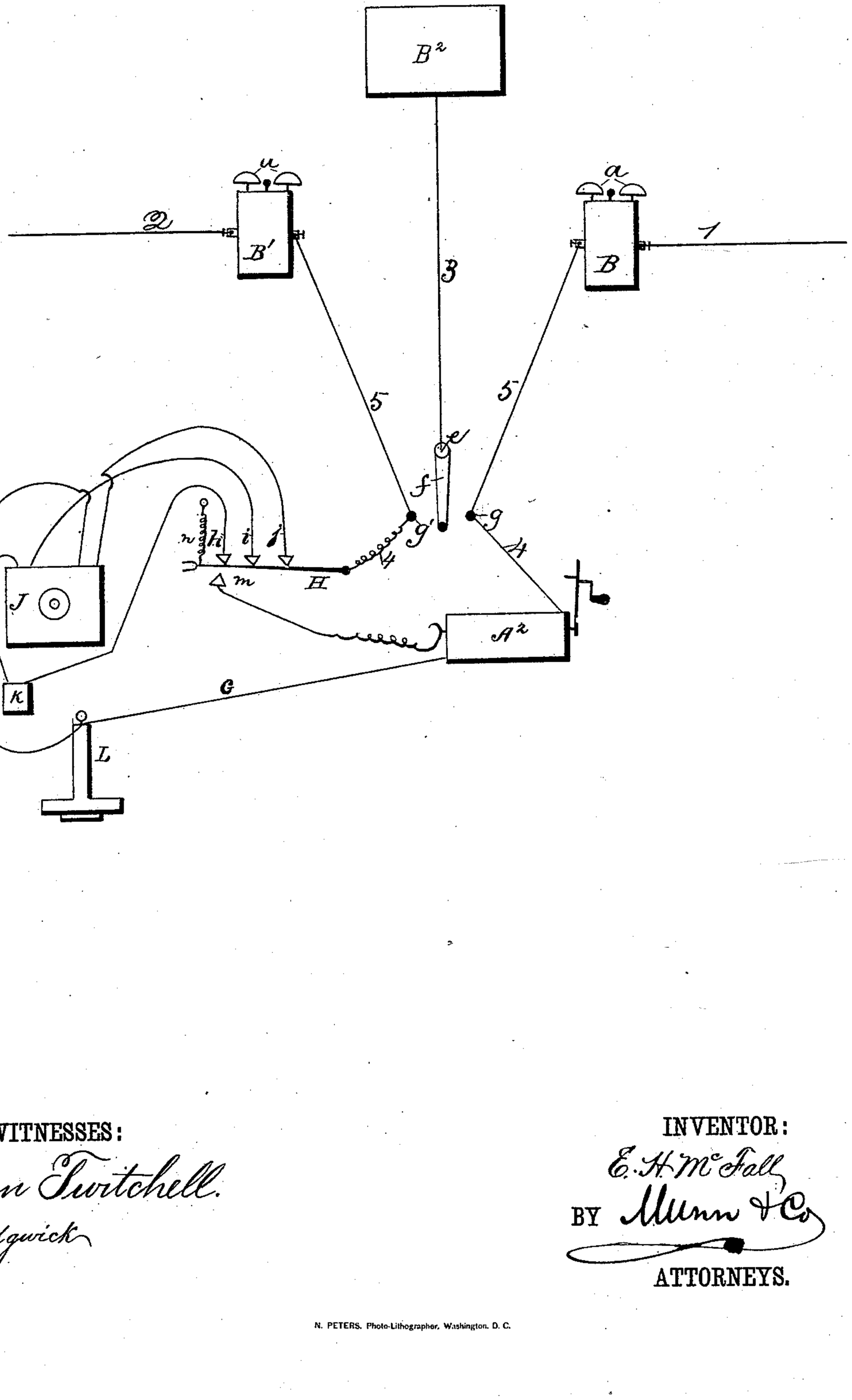
Fig. 4.



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

EDWIN H. McFALL, OF MEMPHIS, TENNESSEE.

TELEPHONE CALL AND SWITCH BOX.

SPECIFICATION forming part of Letters Patent No. 297,148, dated April 22, 1884.

Application filed March 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWIN H. McFALL, of Memphis, in the county of Shelby and State of Tennessee, have invented a new and Improved Telephone Call and Switch Box, of which the following is a full, clear, and exact description.

My invention consists in a novel arrangement of switch and circuit in telephone-boxes, having the object to maintain closed circuit at all times on lines connecting three or more instruments, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of my improved instrument. Fig. 2 is an elevation with the cover of the box turned back. Fig. 3 is a diagram of the circuits. Fig. 4 is a view of the complete circuit, including the magneto-connections.

The box A is of ordinary construction and arrangement, except as hereinafter specified.

a a are two pairs of bells, and *b b* the hammers, fitted for operation by separate magnets B B′.

c c′ are the binding-posts for connection of the line-wires at each side, the posts being connected to the respective magnets B B′ by wires 1 2.

d is the binding-post for the ground-connection, also connected by wire 3 to the pivot-pin *e* of a switch-arm, *f*.

g g′ are buttons having connection with the telephone-transmitter and magneto-generator by wires 4 4, and connected also by wires 5 5 with the two magnets B B′.

In the normal position, with the switch *f* placed between the two buttons *g g′*, the main line is complete, for by placing the switch in the center the ground-connection for the central station is removed, leaving only a ground at each end of the line, thus making a complete circuit from one end of the line to the other; or, in other words, with the switch in the center any one of the three stations can call the others. If the switch is turned to connect with either button and fails to make contact, the circuit is not opened, nor are any of the stations prevented from calling, for it is then just the same as when left in the center. By turning the switch to either button ground-connection is made, so that communication can be had with one side without the knowledge of the other, the side to which it is turned being cut out; but at the same time the cut-out side is not prevented from calling or signaling to the central station, as the bell to which the cut-out side is connected always remains in the circuit of the said cut-out side. For instance, supposing a line to contain instruments 1, 2, and 3, if No. 1 wishes to speak with 3, No. 2 is first notified to put switch in center, and the ground-connection being thus removed between them, 1 and 3 may converse. At the same time, if either 1 or 3 wishes to call 2, it may be done, as the placing of the switch in the center did not cut No. 2 bell out. The switch simply puts either side to ground, so that that side can be called without ringing the bell at the other side. This box is also available with a private line when connection is also desired with an exchange. In that case the arrangement would be as shown in Fig. 3, wherein the private line 6 is connected to the post *c* of one box and to the post *c′* of the other box, thereby connecting one bell of each box, and the exchange-line 7 is connected to the post *c′* of one box and to the post *c* of the other, connecting the other bells of the boxes. The private and exchange lines may, however, be connected, respectively, to the posts *c* and *c′* of each box, as it does not interfere with the working of the switch how the lines are connected. If either line is crossed or broken, the two instruments still have connection.

In Fig. 4, A^2 represents the magneto-generator; B^2, the ground; B, the magneto-ringer from the general office, and B′ that from the terminal station; 1, the line to the exchange, and 2 that to the terminal station; *g*, the contact-point for line 1, and *g′* for line 2; and G, the connection from the generator to the hand-telephone, then through the transmitter to the contact-point *j*, then through the telephone-hook H and connection 4 by contact-point *g′*, through signal B′, and then to terminal station through line 2.

J represents the transmitter, K its battery, L the hand-telephone, and *f* the switch-lever. This leaves the ground off of the line and en-

ables the terminal station to converse with the exchange. At the same time, if the intermediate station should wish to call, he can first take his telephone from the hook, so as to complete his circuit through his telephone without interfering with the conversation going on. By listening, he readily ascertains when the parties have terminated their conversation without interrupting them. This is not possible with the ordinary switch.

If either exchange or terminal station should desire to signal the intermediate station while the switch is in the middle, it can be done, because signals B B′ are always in the circuit. This is a great advantage. When the switch *f* is on contact-point *g*, then the middle station can call the terminal station without ringing the exchange, and the reverse. When the telephone is hanging on the hook H, its weight pulls the hook down and breaks contact between the points *h i j* and the hook, but makes contact between hook H and point *m*, thus cutting out the telephone-circuit and making direct connection from 1 through B by *g* through A² to *m*, through H and 4 by *g′* through B′ to 2, the switch being in the center. When the telephone is taken from the hook H, the spring *n* pulls the latter up, thus breaking circuit from *m* and making contact on points *h i j*, thus putting the telephone and transmitter in circuit. The electric circuit from the exchange to the terminal station does not depend on contact-points through the switch, as the latter does not break the circuit in any case, as it only places a ground on either side of the generator and telephone, to be used on either line without any knowledge on the part of the other of what is being said, or even that a call has been made by the generator.

In ordinary switches the continuity of the circuit depends on contacts in the switch, which often get dirty and fail to close the switch, thus leaving the line on one side open. On the contrary, my switch, if dirty and failing to make contact, does not open the line or interfere with the conversation, as the circuit remains complete, since both the exchange and terminal stations are grounded. Thus the current passes from the exchange through the middle station to the terminal station. This is not possible with the ordinary switch.

This arrangement of switch and circuit is very simple and avoids the trouble arising from interruptions of circuit that arise where the continuity of the circuit depends on a switch or on the care of operators.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

The combination, in a telephone call and switch box, of two magnet-bells, B B′, connected to the line-wires and to the contact-points *g g′*, which in turn are connected to the generator and telephone-transmitter, respectively, and a switch-lever, *f*, arranged between the contact-points and having a ground-connection, substantially as herein shown and described, whereby either side can be cut out, and still the bells remain in the circuit of the cut-out side and the circuit not made dependent on the switch for continuity, as set forth.

EDWIN H. McFALL.

Witnesses:
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