

(No Model.)

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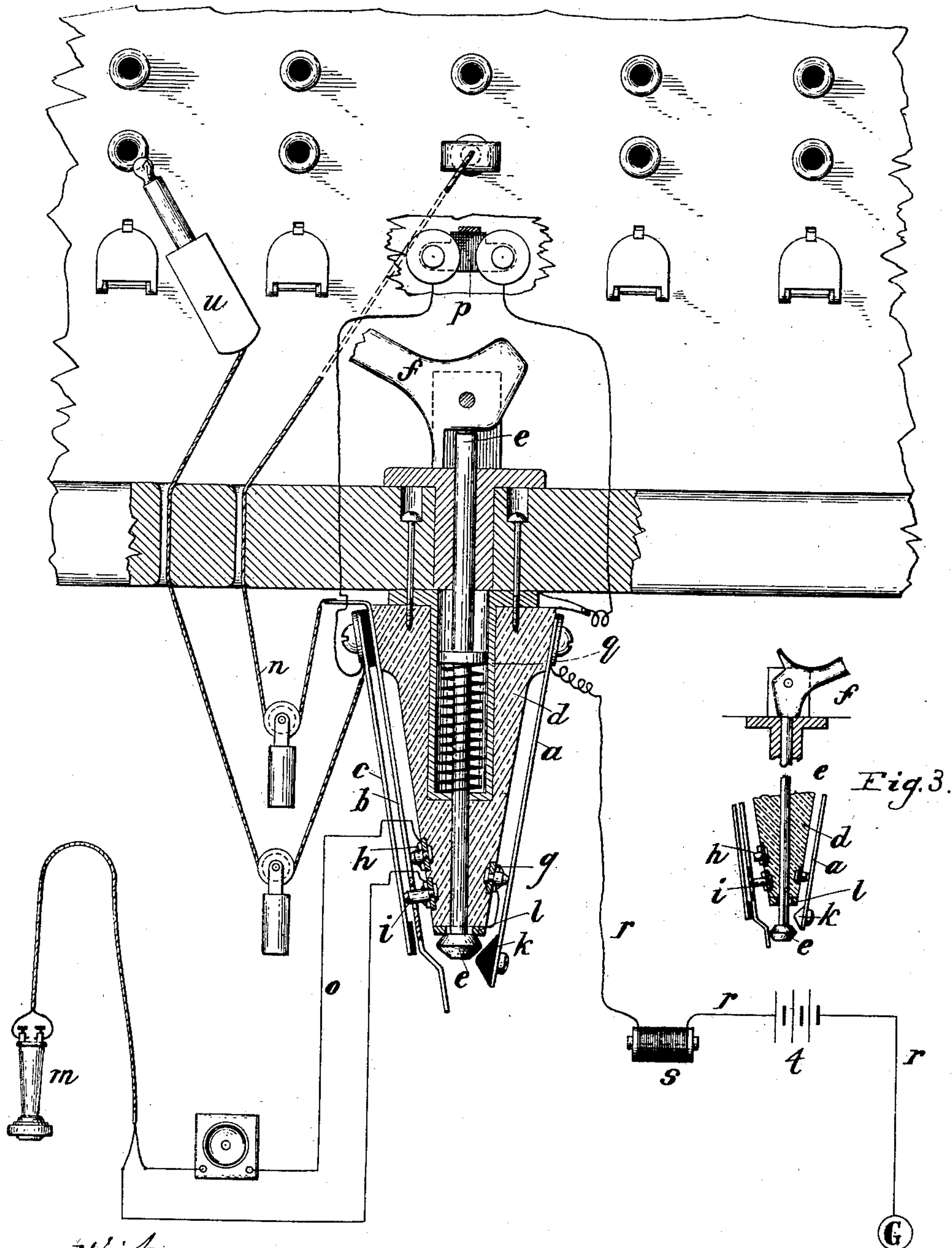
C. E. SCRIBNER.

DOUBLE SPRING LOOP KEY AND CIRCUIT FOR MULTIPLE SWITCH BOARDS.

No. 375,685.

Patented Dec. 27, 1887.

Fig. 1.



Witnesses.

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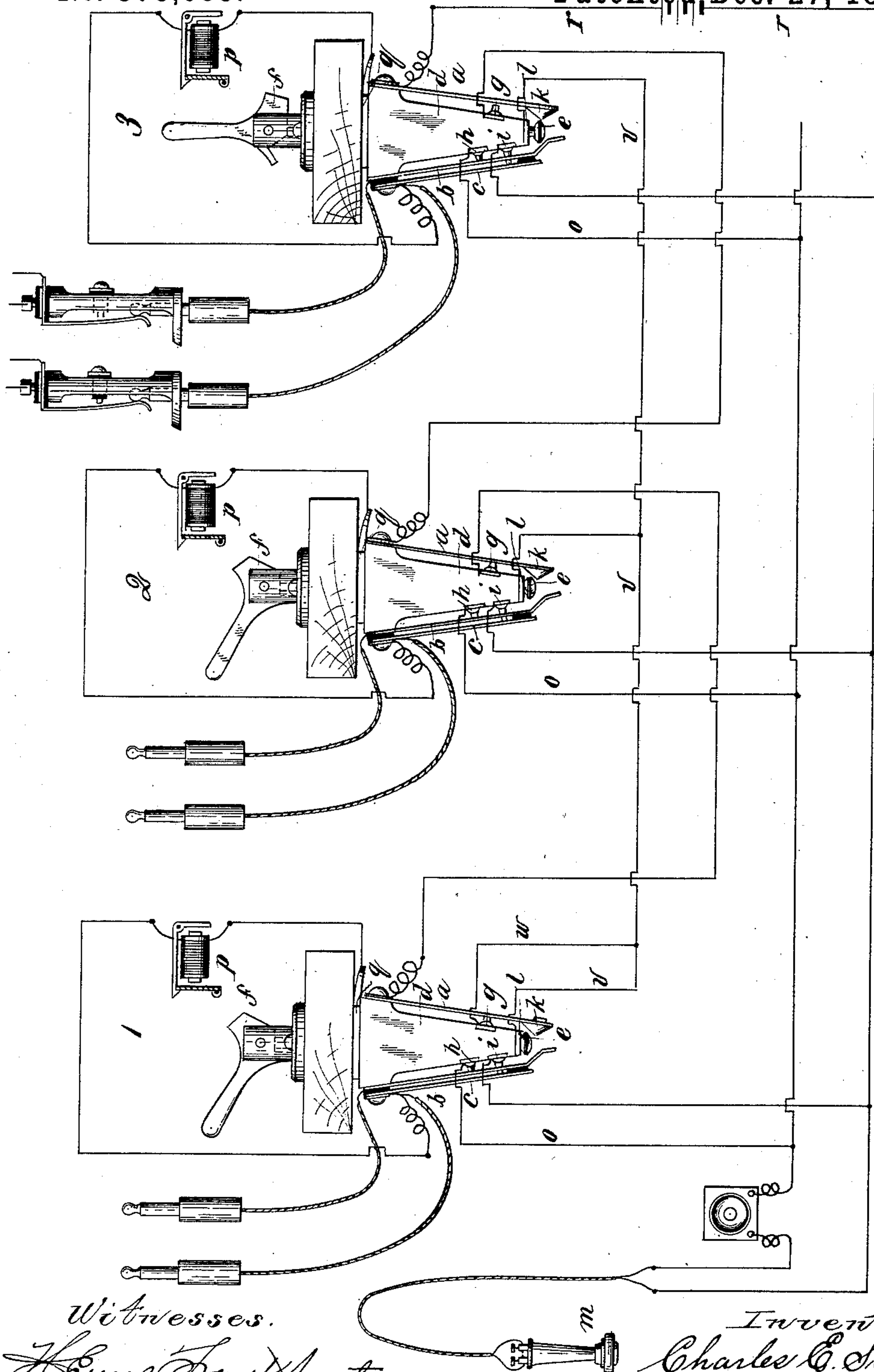
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Henry Frankfurter.  
Saml B. Dover.

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Charles E. Scribner  
By George P. Barton  
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# UNITED STATES PATENT OFFICE.

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

DOUBLE-SPRING LOOP KEY AND CIRCUIT FOR MULTIPLE SWITCH-BOARDS.

SPECIFICATION forming part of Letters Patent No. 375,685, dated December 27, 1887.

Application filed May 12, 1885. Serial No. 165,276. (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 Double-Spring Loop Keys and Circuits for Multiple Switch-Boards, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is to enable the switchman to switch his telephone into the circuit of any single telephone-line or to loop his telephone into the pair of cords connecting two subscribers' lines. In the former case a ground must be provided for the single line at the central office, and in the latter case, when the telephone is looped into a pair of cords, the central-office ground must be cut off. I accomplish all this work by means of the single loop-switch and the circuits which I will now describe.

In the drawings, which are illustrative of my invention, Figure 1 is a sectional view of my switch, a portion of a telephone switch-board, and the circuit-connections at the central office. Fig. 2 is a diagram view showing the circuits between three similar switches. Fig. 3 shows one of the positions of the switch.

Like parts are indicated by similar letters of reference in the different figures.

As shown in Fig. 1, the loop-switch consists of the three insulated springs *a*, *b*, and *c*, mounted upon the block *d*, of insulating material, the plunger *e*, operated by the cam-lever *f*, and the insulated contact-points *g*, *h*, and *i*, against which, respectively, the insulated springs normally rest. The spring *a* is provided with the piece of insulating material *k*. The plunger *e* is shown held up against the metallic piece *l*. When the cam-lever is lifted to its upright position, the plunger is forced down out of contact with the said metallic connecting-piece *l*, and the beveled end of the plunger being forced against the insulated end *k* of spring *a*, said spring will be lifted from point *g* without coming in contact with or changing the position of spring *b*. This middle position of the plunger is illus-

trated by switch 3 at the right in Fig. 2. If, however, the cam-lever is carried over to the right, the spring *a* will return to its first position in contact with point *g*, while the springs *b* and *c* will be lifted from their contact-points *h* and *i*, respectively, as shown in Fig. 3. There are, then, three positions assumed by the plunger—first, as shown in Fig. 1; second, as shown by switch 3 of Fig. 2, and, third, as shown in Fig. 3—and the circuit-connections are different in each of the different positions.

I will now describe the operation of my device. As shown in Fig. 1, the operator's telephone *m* is included in the circuit of the telephone-line with which the cord *n* is connected. This circuit may be traced as follows: beginning at cord *n*, thence to spring *b* and point *h*, thence by wire *o* through telephone *m*, thence to contact-point *i*, thence to spring *c*, thence through the clearing-out annunciator to socket *q*, thence to the plunger *e*, thence to metallic piece *l*, from metallic piece *l* to contact-point *g*, and thence to spring *d*, thence by wire *r*, through the retardation-coil *s* and battery *t*, to ground, as shown.

The point of plug *u* is shown touching the frame of the switch of a telephone-line for the purpose of testing to find out whether the line of the switch is in use or connected at some other multiple switch-board.

The spring-jacks and telephone may be connected and provided with test-circuits, as shown in my Patent No. 305,021, of September 9, 1884. I therefore deem it unnecessary to fully illustrate the spring-jacks and telephone-line circuits connected therewith. If the line wanted is in use, the battery *t* will find circuit through the telephone *m* and plug *u* to line, and the usual click will be heard in the telephone when the test is made, as shown in Fig. 1. If the line is free, there will be no circuit found to line and no click in the telephone, and the switchman will insert the plug into the spring-jack and then throw the cam-lever over to the right, as shown in Fig. 3. The two lines will then be connected together through the cords and clearing-out annunciator, and the ground-connection will be cut off at the metallic plate *l*, while at the same time the telephone will be disconnected from said



cords. By bringing the cam-lever to the upright position, as shown in switch 3, Fig. 2, the telephone may be looped into the circuit of the cords connecting the two lines, while the ground-connection will be broken at point *g*. The operator may thus listen out.

My switch and circuits may be used in connection with the ordinary standard switch-board system, in which no test is required to determine whether a line wanted is in use.

The plates *l* of the loop-switches at a switch-board are connected together and also to point *g* of the first of the series, as shown in Fig. 2. The points *h* of the series of switches 1, 2, and 3 are all connected to one side of the telephone *m*. The points *i* of said series are all connected with the other side of the telephone. The wire *v* connects together the metallic pieces *l* of said series. Metallic plate *l* of switch 1 is connected by wire *w* to point *g* of said switch. Spring *a* of switch 1 is connected to point *g* of switch 2, and spring *a* of switch 2 is connected with point *g* of switch 3, and spring *a* of the last switch—switch 3—is connected with the ground-wire *r*. If, therefore, the spring *a* of any switch is lifted from its opposing point *g*, it is evident that the ground-wire *r* will be cut off from all the plates *l*, and hence from the telephone; and it is evident that this is necessary in order that the operator may listen out. At all other times the telephone remains connected with the ground-wire *r*. The cam-lever remains upright, as shown in switch 3, only during the act of listening out.

If the conversation between the subscribers has ceased, the operator will immediately throw the lever to the left, bringing the switch to its ordinary or normal position, as shown in switches 1 and 2. If the conversation is found to be still going on, the operator will throw the cam-lever to the right, as shown in Fig. 3. It is, therefore, as before stated, only during the act of listening out that the telephone is cut off from the ground-wire *r*.

It will thus be seen that the telephone is normally in the circuit of all the idle cords *n* of the series, so that either of said idle cords may be used at once for making the connection with the spring-jack of a subscriber who has sent in a call without moving the cam-lever, as has been necessary heretofore. Many motions of the cam-lever are thus avoided and much time and labor saved.

I claim—

1. The telephone of the operator, in combination with ground-wire *r*, the intermediate switching device operated by a cam-lever, and the pair of cords and said cam-lever, whereby the circuit of the telephone is closed to ground-wire *r* when the cam-lever is in either of two of its positions, said connection being broken when the cam-lever is brought to its third position to loop the telephone into the circuit of said pair of cords.

2. The series of switches, each provided with the metallic connecting-plates *l*, said

metallic pieces being connected together, the telephone *m*, connected with points *h i* of each of the switches, the ground-connection *r*, connected with spring *a* of the last switch, point *g* of the last switch being connected with spring *a* of the next, and point *g* of the first switch being connected to plate *l* thereof, and the plungers and cam-levers of the switches, whereby the ground connection is cut off from the telephone when the telephone is looped into the pair of cords of any switch.

3. The switch consisting of the insulated springs *a b c*, mounted on the block *d*, the plunger *e*, and cam-lever *f*, for moving the plunger to either of the three positions, the contact-points *g h i*, and circuits, substantially as shown and described.

4. The switches provided with contact points *h i*, including a telephone, a pair of cords with each switch, and cam-lever mechanism for opening the circuit at the telephone contact-points of each switch when the cords of the switch are in use, whereby any cord *n* of an idle pair of cords may be used for making connection with the telephone-line of a subscriber without changing the position of the switch of said idle pair of cords.

5. The combination, with the ground-wire including the battery and retardation-coil, of the spring of the switch to which said wire is connected, the telephone connected with the telephone contacts of said switch, the pair of cords with terminal plugs, and the spring jack switches and connections, whereby when one cord is connected to a subscriber's switch the other cord may be used for testing, as described.

6. The combination, with the telephone switch-board spring-jacks, of a series of switches, 1 2 3, &c., each of said switches consisting of three insulated springs, three insulated contact-points, metallic plate *l*, a plunger, and a cam-lever for operating the plunger, and circuits connecting said switches with the ground and with the operator's telephone, and a pair of connecting cords and plugs with each switch, substantially as shown and described.

7. The combination, with a multiple switch-board and the spring-jack switches placed thereon, of the operator's telephone, a ground-circuit including a battery with a retardation-coil, and intermediate switching mechanism, whereby the telephone may be looped into a circuit between any two spring-jacks and the ground cut-off by a single movement of the switching mechanism, and whereby connection may be made from any spring-jack through the telephone to the ground-circuit, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 28th day of April, A. D. 1885.

CHARLES E. SCRIBNER.

Witnesses:

F. H. McCULLOCH,  
GEORGE P. BARTON.