

(No Model.)

2 Sheets—Sheet 1.

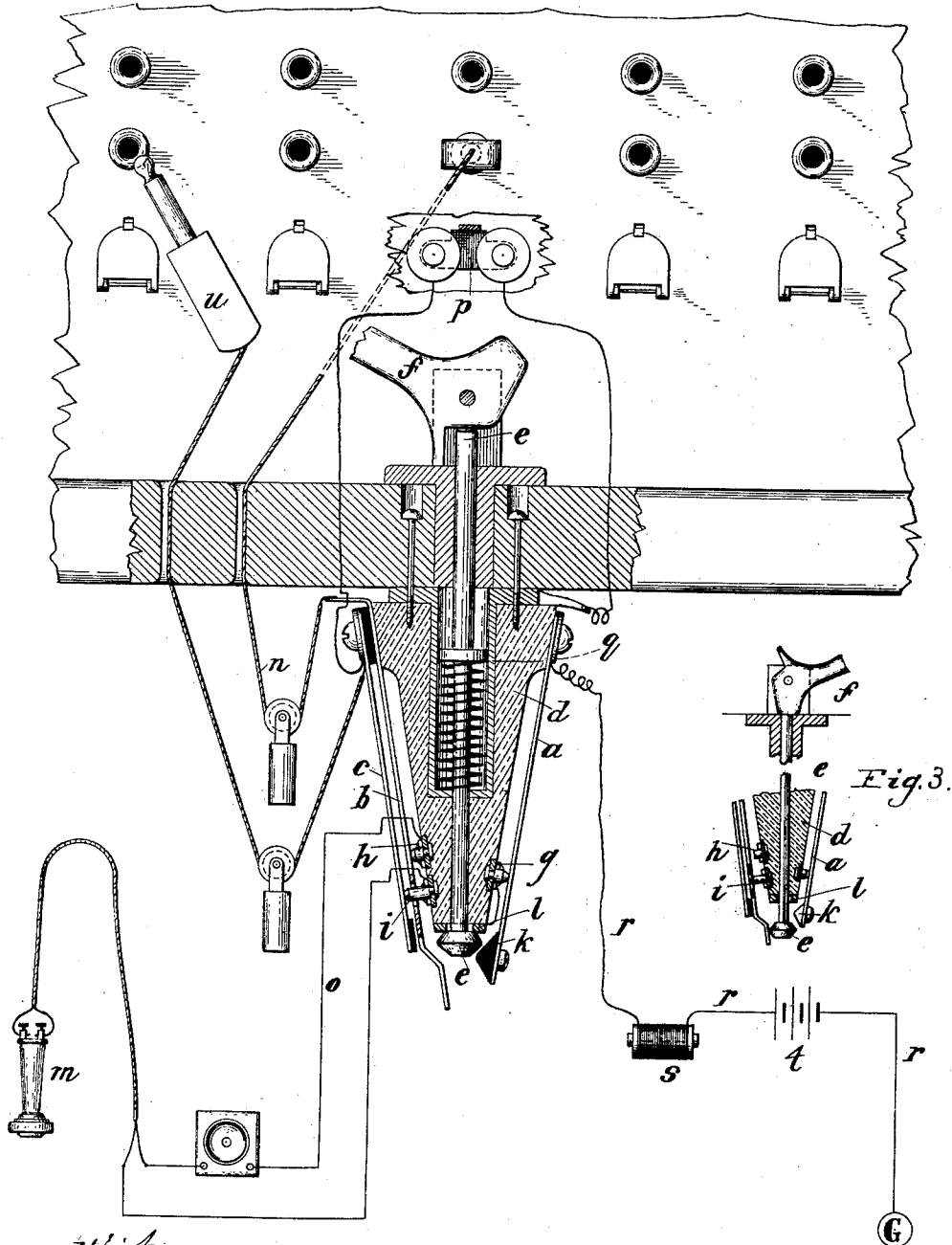
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DOUBLE SPRING LOOP KEY AND CIRCUIT FOR MULTIPLE SWITCH BOARDS.

No. 375,685.

Patented Dec. 27, 1887.

Fig. 1.



Witnesses.

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Sam. B. Dover.

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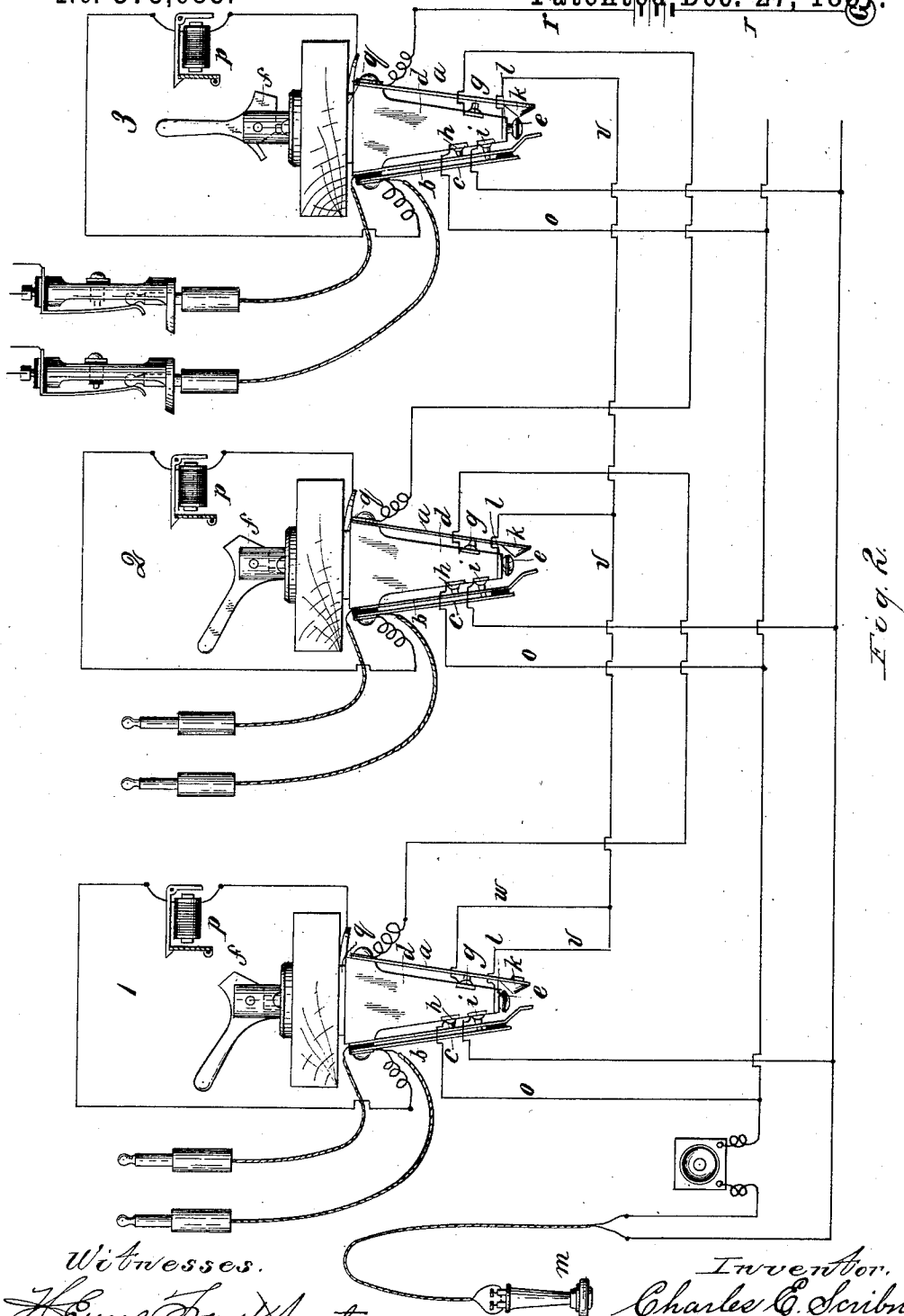
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DOUBLE SPRING LOOP KEY AND CIRCUIT FOR MULTIPLE SWITCH BOARDS.

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Henry Frankfurter.
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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
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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

2
cords. By bringing the cam-lever to the up-
right 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
5 ground-connection will be broken at point *g*.
The operator may thus listen out.

My switch and circuits may be used in con-
nection with the ordinary standard switch-
board system, in which no test is required to
10 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
15 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 con-
20 nected by wire *v* 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
25 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 neces-
30 sary in order that the operator may listen out.
At all other times the telephone remains con-
nected with the ground-wire *r*. The cam-lever
remains upright, as shown in switch 3, only
during the act of listening out.

35 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
40 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*.

45 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 connec-
tion with the spring-jack of a subscriber who
50 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—

55 1. The telephone of the operator, in com-
bination 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-
60 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 po-
sition to loop the telephone into the circuit of
said pair of cords.

55 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*, con-
70 nected 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,
75 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
80 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
85 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 con-
90 nection 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
95 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
100 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
105 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 tele-
110 phone, 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
115 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
120 ground cut-off by a single movement of the
switching mechanism, and whereby connec-
tion may be made from any spring-jack through
the telephone to the ground-circuit, substan-
tially as and for the purpose specified.

125 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.