(No Model.) 2 Sheets—Sheet 1.

C. E. SCRIBNER.

ELECTRIC GROUNDING SWITCH.

No. 544,383. Patented Aug. 13, 1895.

Fig. 4.

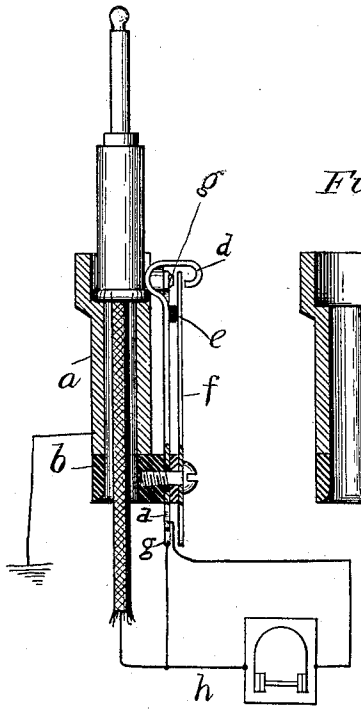


Fig. 3.

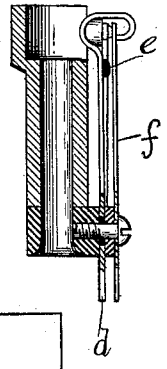


Fig. 1.

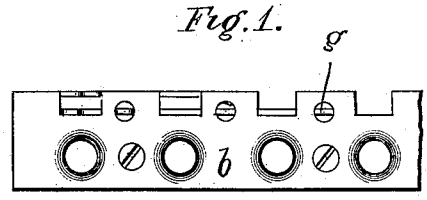


Fig. 2

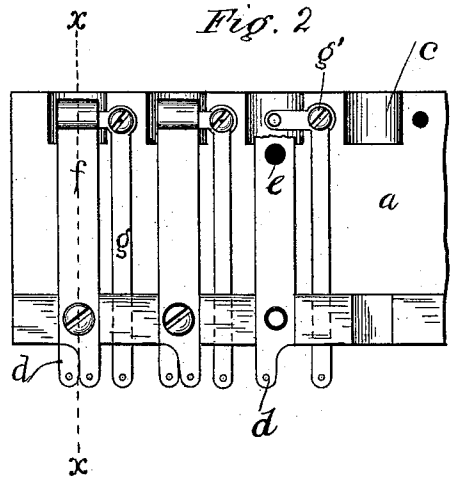


Fig. 5.

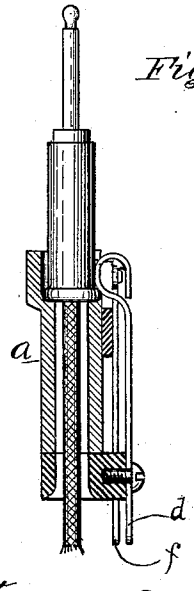
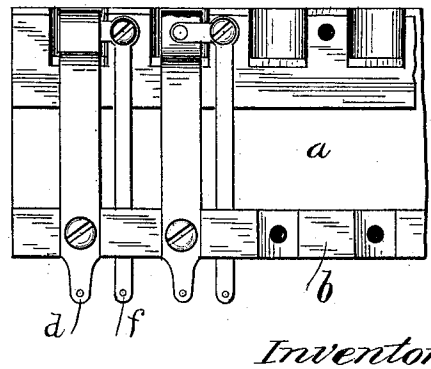


Fig. 6.



Witnesses:
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Chas. G. Hawley.

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(No Model.) 2 Sheets—Sheet 2.

C. E. SCRIBNER.

ELECTRIC GROUNDING SWITCH.

No. 544,383. Patented Aug. 13, 1895.

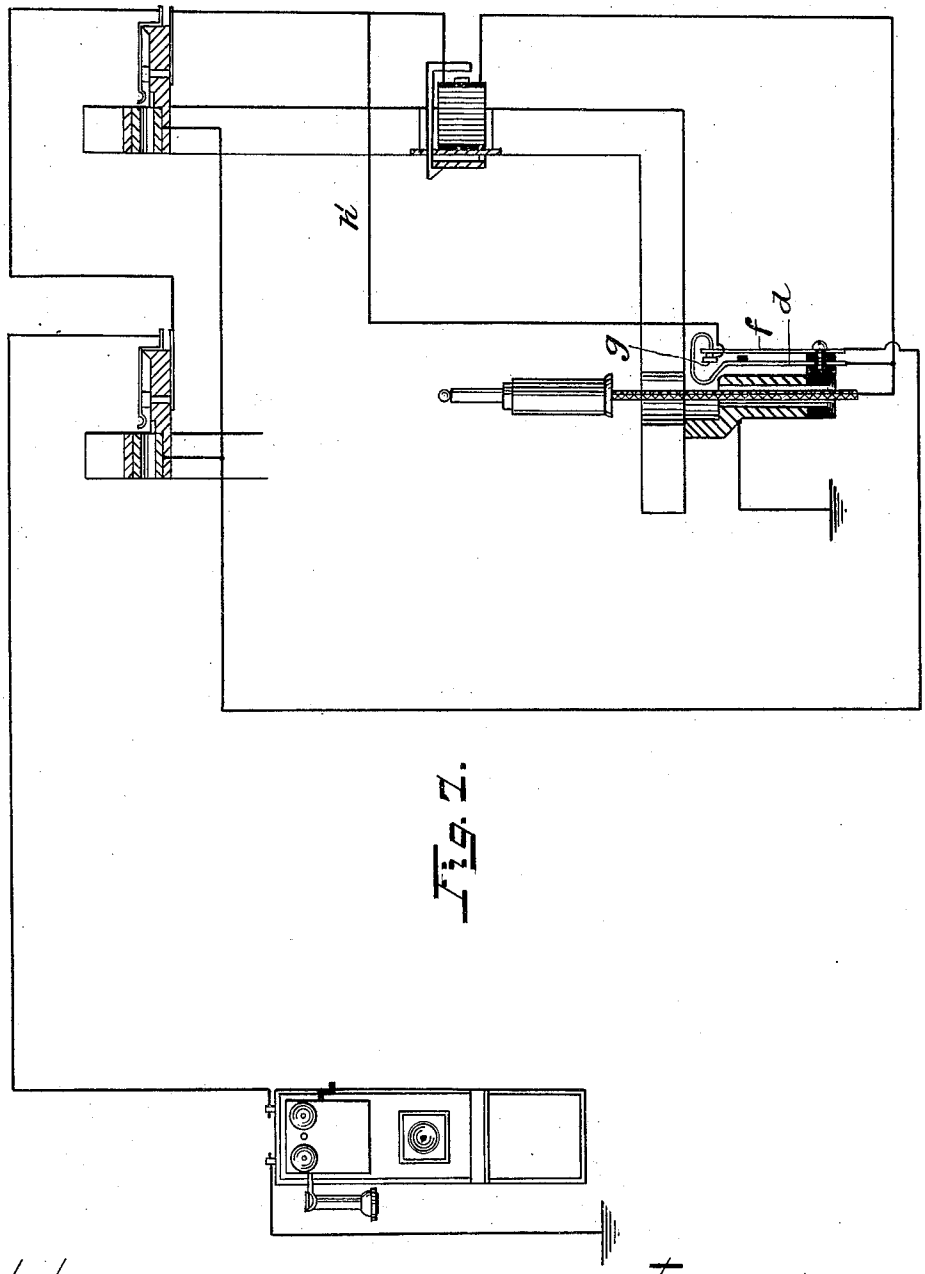

Fig. 1.

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Geo. R. Parker.

Inventor.
Charles E. Scribner.
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UNITED STATES PATENT OFFICE.

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

ELECTRIC GROUNDING-SWITCH.

SPECIFICATION forming part of Letters Patent No. 544,383, dated August 13, 1895.

Application filed December 6, 1887. Serial No. 257,082. (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 Electric Grounding-Switches, (Case No. 141,) 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.

My invention relates to electric switches of the class known as "grounding-switches," since they are so arranged that in their normal position the line-terminal is closed to ground. Such switches have been used as a portion of the keyboard apparatus of telephone-exchanges.

In my Patent No. 330,065, of November 10, 1885, I have shown a grounding-switch as a part of the keyboard apparatus of a telephone-exchange. As shown in said patent, when a plug is moved from its normal position, circuit-changing devices are actuated to change the circuits. My invention herein is designed to furnish more simple and efficient means for accomplishing the same work.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view from below illustrative of my device. Fig. 2 is a front elevation thereof. Fig. 3 is a sectional view upon line *x x* of Fig. 2. Fig. 4 is a view of my grounding-switch and its circuit connections with the metallic heel of the plug which forms the ground connection inserted therein. Figs. 5 and 6 are modifications thereof in which I have omitted one of the contact-springs. Fig. 7 is a diagram showing the circuits of the grounding-switch in connection with a telephone-line and its test-wire.

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

The frame *a* may be of brass, the lower portion being provided with a strip of insulating material *b*, on which the connecting-springs are mounted. This brass frame is drilled out with as many holes for the cords as there are to be switches upon the strip, the upper portion of the holes being enlarged to form a socket, a slot being milled out in the upper portion thereof. The rubber piece is provided with corresponding holes, which are chamfered to prevent wearing the cords, as shown. The rubber strip is wider than the thickness of the brass strip and forms a support for the springs of the switches. The upper or enlarged portions of the holes form sockets *c*, in which the plugs rest when in their normal position.

As shown in Figs. 1 to 4, it will be seen that each switch is provided with three contact-springs. The inner spring *d* is provided with a rubber stud *e*, against which the spring *f* rests when the heel of the plug is inserted in the socket, as shown in Fig. 4. Thus the spring *f* is held out of contact with spring *g* when the plug is inserted. The spring *d* is bent over the contacts of springs *g* and *f*, thus protecting the contacts from any dust that might otherwise reach the contacts through the socket. Spring *f* is so adjusted that when free to move by its own resiliency it will close upon the contact of strip *g*. The strips *g* are secured at *g'* to the brass frame midway between the sockets *c* and insulated therefrom by a rubber washer. The lower ends of strips *g* are passed through the holes drilled in the rubber strip, as shown more clearly in Fig. 1. The strip *g* being equal in width to the diameter of the hole is thus held firmly in position. When the plug is in its socket, spring *d* is forced by the plug toward spring *f*, and the stud *e*, coming against spring *f*, holds spring *f* away from contact *g*. Stud *e* is of such length that when a plug is inserted in the socket strip *f* will stand midway between the bent end of spring *d* and the contact *g*. Hence, when the heel of the plug is resting in the socket, as shown in Fig. 4, spring *f* is insulated from spring *g* and also from spring *d*. Any number of contact-springs required may be mounted together and operated by the movement of the spring *d* when moved by the heel of the plug inserted in the socket.

As shown in Figs. 5 and 6, I have omitted one of the springs.

In Fig. 7 I have shown my grounding-switch applied to a telephone-exchange system of the single-cord type. The subscriber's line after passing through the springs of the different switches upon the switchboards passes

through the annunciator to the cord and plug. At the point where the line connects with the cord it branches to spring *d* of the switch. At a point between the last spring-jack switch and the annunciator a shunt-wire *h'* is branched to point *g* of the grounding-switch. The test-wire of the different spring-jack switches is connected to spring *f*. Upon lifting the plug the test-wire thus becomes crossed with the line-wire to indicate that the line is in use and the annunciator is shunted out of circuit. I simply mention these connections with the springs of the switch to illustrate one of the uses to which my grounding-switch may be applied. It is evident that my switch, as described and shown, may be used with any electric circuits desired. The plug must be positively forced into the socket in order to pass the inwardly-curved portion of spring *d*, which projects through the slot provided in the socket, as shown. When once in place, the connection formed between spring *d* and the metallic heel of the plug is reliable. The heel of the plug may be of any shape desired. It may be enlarged, as shown, or it may be tapering or beveled. The heel is connected in the usual way with the tip of the plug which is connected with the cord. When inserted, as shown in Fig. 4, electrical connection is formed between spring *d* and the frame *a*, which frame *a* is connected with the ground. On removing the plug the ground is taken off and the spring *f*, which may be the terminal of the test-wire, is closed to spring *d* and also to spring *g*.

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

1. The combination with a terminal plug, provided with a metallic heel, of a socket into which the heel of said plug is adapted to be inserted, a hole being provided in the bottom of said socket for the passage of the cord to which cord the plug is attached and a contact spring having a free end adapted to bear upon said metallic heel when said plug rests in the socket, substantially as described.

2. A metallic frame provided with sockets *c* and cord holes, one connected with each socket, the rubber strip *b* provided with corresponding plug holes and wider than the thickness of the metallic frame to which it is attached, in combination with sets of contact springs, one set of springs mounted upon said rubber strip opposite each socket, one spring of each set being bent and adjusted to project through a slot provided in the frame to hold the plugs in place when inserted in their sockets.

3. The combination, with the metallic socket provided with the cord hole, of a plug with its heel inserted in the socket, a contact spring normally insulated from said socket rigidly secured at one end and having a free end adapted to bear upon said heel and to press it against the side of said metallic socket, substantially as specified.

4. The combination with the metallic socket of a metallic spring or presser *d*, a contact spring or connecting piece *f* and a terminal plug provided with a metallic heel; whereby the presser may be connected with the socket or the contact spring *f* by inserting the heel of the plug in the socket and removing it therefrom.

5. The grounding switch provided with the lever or spring *d* having a hood placed above the contacts of said switch to protect the same from dust, substantially as shown and described.

6. The contact spring or lever *d*, the fixed contact *g* and the contact *f* placed between the said contacts *g* and *d*, said contact *f* normally standing out of contact with both contacts *g* and *d* and the plug, whereby when the plug is lifted from its socket said contacts are closed, substantially as and for the purpose specified.

7. The combination with a socket for a terminal plug, of a spring arranged parallel to the axis of the plug projecting into the socket so as to be wedged aside by the insertion of the plug therein, a normally insulated contact spring, a contact point therefor, an insulating stud mechanically connecting said contact spring with the spring in the socket, said contact spring being so arranged that when the terminal plug is removed from the socket, the spring in the socket presses upon the contact spring and forces it into contact with the contact point, substantially as described.

In witness whereof I hereunto subscribe my name this 17th day of October, A. D. 1887.

CHARLES E. SCRIBNER.

Witnesses:
WM. M. CARPENTER,
CHAS. C. WOODWORTH.