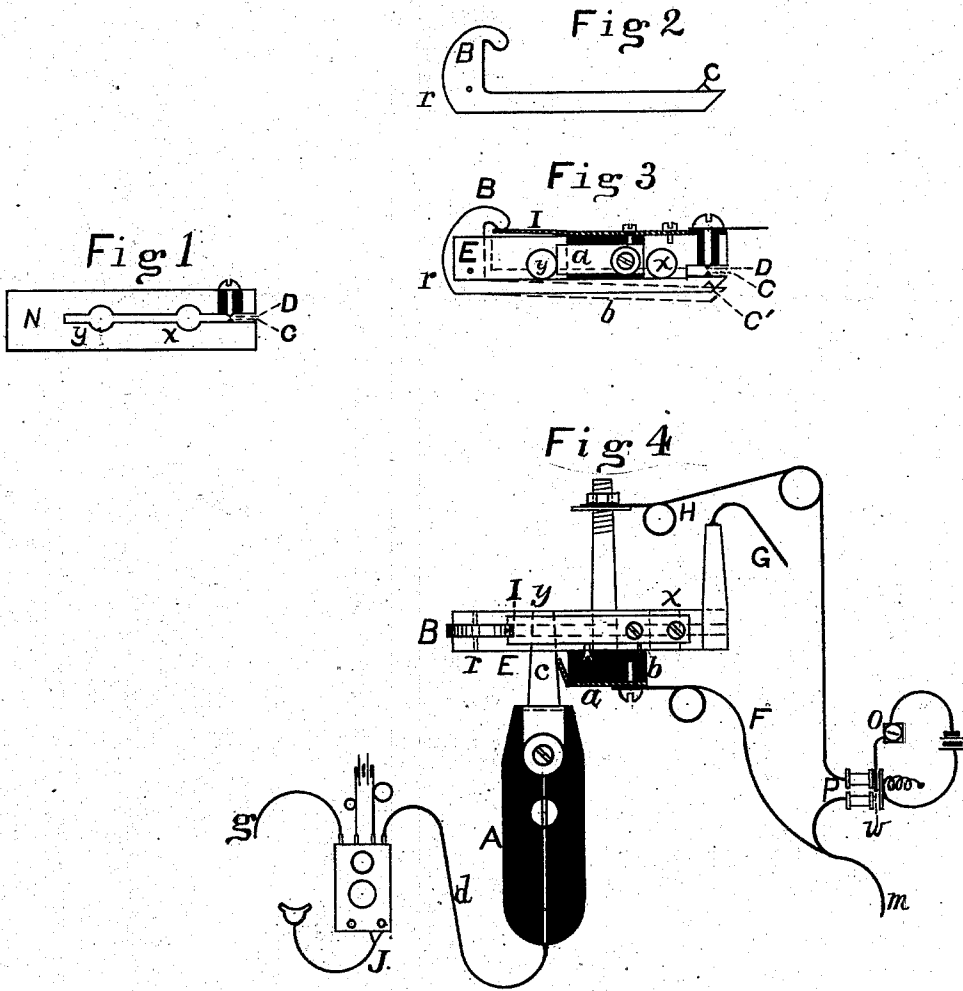


C. E. SCRIBNER.  
TELEPHONE SWITCH.

No. 293,198.

Patented Feb. 5, 1884.



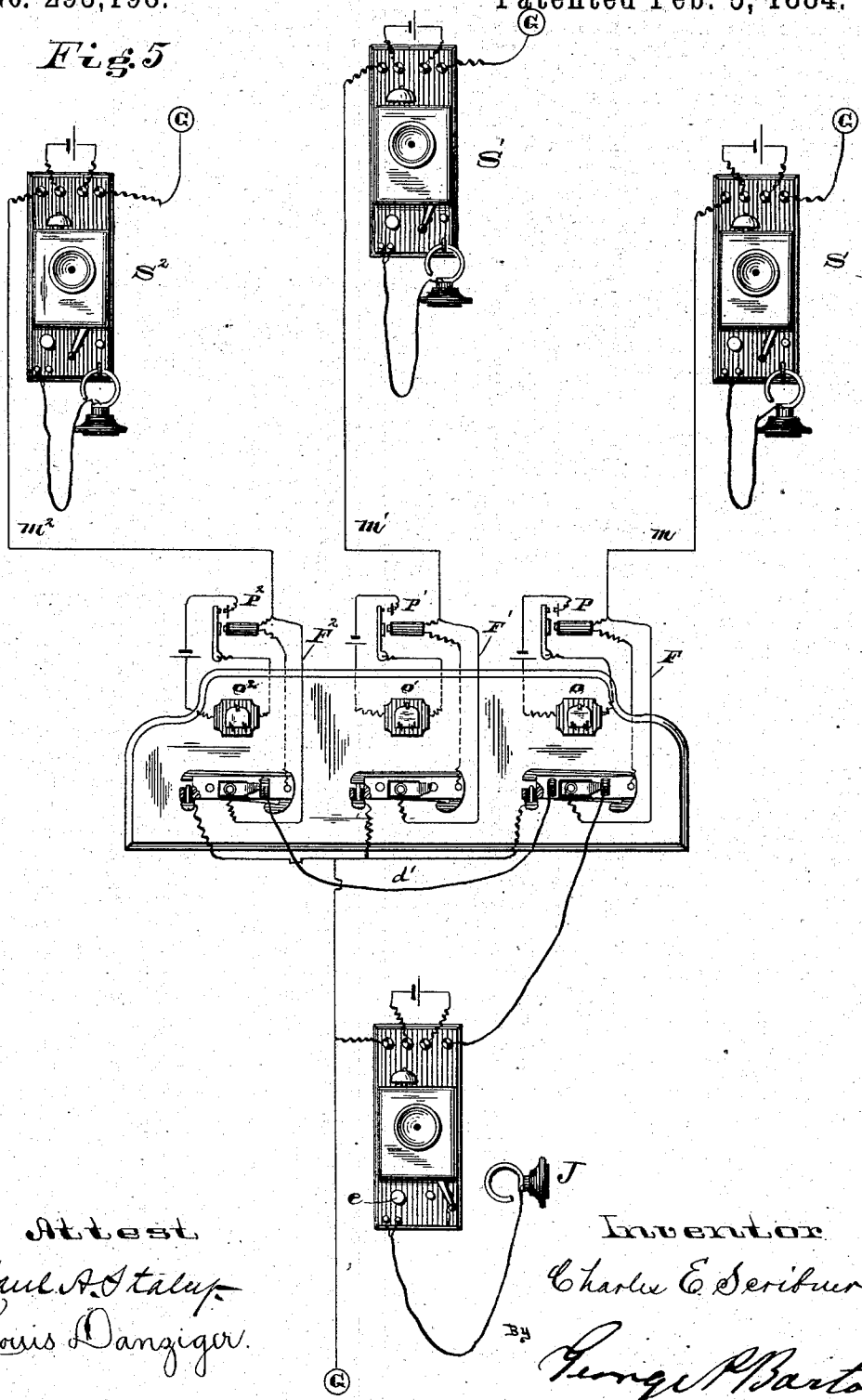
Witnesses  
*Wallace L. DeWolf*  
*George P. Barton*

Inventor  
*Charles E. Scribner*  
 By *Barton & DeWolf*  
 his Attorneys.

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Attest  
Paul A. Stalup  
Louis Danciger.

Inventor  
Charles E. Scribner  
By George P. Barton  
Attorney

# UNITED STATES PATENT OFFICE.

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

## TELEPHONE-SWITCH.

SPECIFICATION forming part of Letters Patent No. 293,198, dated February 5, 1884.

Application filed August 23, 1879. Patented in England November 29, 1879, No. 4,603; in France January 15, 1880, No. 134,596, and in Belgium January 23, 1880, No. 50,413.

*To all whom it may concern:*

Be it known that I, CHARLES SCRIBNER, of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Telephone-Exchange Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part thereof.

In a telephone-exchange system the wires of the several subscribers are run into a central office, where, upon request, any wire may be connected with that of any other subscriber. My invention relates to the means of making these connections. It may, however, be used for any analogous purpose. Prior to my invention the ground-connection was made through a conducting-cord and plug by inserting the plug in one of a number of holes drilled in a metallic strip, which was connected with the ground. Before connection could be made between two wires it was necessary to remove the two plugs belonging to these two wires from the metallic strip, and when the wires were disconnected it was necessary to replace these plugs. This work is greatly facilitated by the use of my cut-out or spring-jack switch.

Figure 1—the original form of a part of my device—is a flat piece of metal, *N*, slit as shown, and provided with holes *x* and *y* and contact-points *C* and *D*, the latter of which, *D*, is insulated, as shown, by hard-rubber bushing. The lever *B*, (shown by Fig. 2 in detail,) in combination with spring *I* and frame or-back *E*, and pivoted to *E*, as shown at *r*, Fig. 3, takes the place of the single piece *N*. In the single piece *N* advantage is taken of the elasticity of the metal. Frame *E* is provided with two holes, *x* and *y*, and a slot, in which lever *B* rests. The inner edge of the lever *B* projects so as to come within the edges of the plug-holes *x* and *y*, as shown by dotted line, and when a plug is inserted in either hole the lever is forced down, as shown by lower dotted line, and the points of contact *D C* are separated, *C* taking the position shown as indicated by *C'*.

*a* is a metallic plate screwed to hard-rubber block *b*, and thereby insulated from the other portions of the switch.

In Fig. 4 is shown the cut-out connected with subscriber's wire *m* and the relay and annunciator *P* and *O*, and also with the operator's telephone *J*, by means of the plug *A*, which is provided with a metallic point, *c*, and conducting-cord *d*. The connections are formed as follows: The subscriber *S*, by throwing on his local battery, sends a current along the wire *m* through the relay *P*, which, closing, the annunciator number of *S* is indicated at *O*, and the current passes along the wire *H*, and thence through the switch to the ground through wire *G*. The switchman, being thus notified by the annunciator, at once inserts plug *A*, as shown, and *S* is in communication with the operator at *J*, *c* and *a* being in contact, as shown. This shorter circuit being formed, the relay *P* and annunciator *O* are shunted, and the lever *B* is forced down by the plug, and points of contact *D C* are separated, as before described, and shown in Fig. 3, and the ground-wire *G* thereby thrown off.

Each subscriber has a separate switch, and we will now let Fig. 3 represent the switch of a subscriber with whom *S* wishes to communicate, and whom we will designate as "subscriber second," *S*<sup>2</sup>. *S* now informs the operator that he wishes to communicate with *S*<sup>2</sup>. Operator, by a speaking-tube or otherwise, communicates the order of *S* to the switchman. The switchman being provided with a cord similar to *d*, to either end of which is attached a plug similar to *A*, inserts one of the plugs in *x* of Fig. 4, and the other plug in *y* of Fig. 3. Operator is now in connection with *S* and *S*<sup>2</sup>, and they are connected with each other. The operator then throws his calling-battery upon both lines, thereby informing *S* that the connection is made, and at the same time calling up *S*<sup>2</sup>. He then listens to the first few words to assure himself that the connection is complete, and then informs the switchman, who thereupon removes plug *A* from *y*, Fig. 4. The parties *S* and *S*<sup>2</sup> are now connected and the shunt is removed from relay *P*. When *S* and *S*<sup>2</sup> are through talking, one or the other of them throws his local battery to line, which closes the relay *W*, thus tripping annunciator-needle *O* and notifying switchman to disconnect their lines. This he does by removing the

plugs at either end of the connecting-cord from the holes *x* and *y* of the switches, Figs. 3 and 4, respectively. Springs *I* now bring the levers *B* to their normal position, and the ground-connections are re-established through the contact-points *D C*.

In Fig. 5, Sheet 2, I have shown the stations of three subscribers, *S S' S''*, connected by telephone-lines *m m' m''*, respectively, with my spring-jack switches at the central office. The switches of *S* and *S''* are shown connected together by the flexible cord *d'*. The operator's telephone *J* is shown included in a branch circuit to ground. By means of the usual push-button *e*, the battery may be thrown upon both lines *m* and *m''*. The operator listens until he finds that *S* and *S''* have commenced talking, and then removes the plug of cord *d'* from the switch of the line of *S*. The circuit between the stations of *S* and *S''* may be traced as follows after the operator has disconnected his outfit: from ground at station of *S*, through the call-box, and by line *m* through the relay *P*, which now serves as a clearing-out annunciator, thence to the frame of the spring-jack switch of line *m*, and from said switch, by cord *d'*, to line *F''*, and thence to line *m''*, and through the outfit at station of *S''* to ground. When the subscribers signal that they are through talking, the operator removes the terminal plugs of cord *d'* from their switches, and their lines are at once, by the action of the switches, closed to ground. In case the subscribers forget to send in the clearing-out signal, the operator connects his telephone in derived circuit to the lines and listens out. The station of *S'* is shown connected with the central office by line *m'* through the switch and annunciator to ground.

I claim—

1. In a telephone-exchange, two subscribers' telephone-lines, each line permanently connected with the metallic frame of its switch at the exchange-station, the switch of each line being provided with an insulated ground-contact point, a contact-piece which closes on said contact-point, and a plug-hole in the frame adapted to direct a plug against said contact-piece, in combination with a flexible conducting-cord provided with terminal plugs, whereby the two telephone-lines may be connected together while the contact-pieces are at the same time disconnected from the ground-contact points.

2. The combination, in a telephone-exchange switch, of a metallic frame provided with a

plug-hole and insulated ground-contact point, a telephone-line permanently in electrical connection with the movable contact piece or lever of the switch, and a metallic pointed plug adapted to be inserted in said plug-hole, whereby the switch-lever is disconnected from the contact-point and connected to the plug-point, as and for the purpose specified.

3. The switch, in combination with the plug and circuits whereby the relay is shunted at the same time the ground-wire is taken off.

4. A switch provided with two plug-holes and contact-points *C D*, in combination with a plug and means whereby the contact of said points is broken when a plug is inserted in either hole, said points closing when said plug is removed—that is, when there is no plug remaining in either hole.

5. A switch consisting of frame *E*, lever *B*, and spring *I*, combined substantially as set forth.

6. A switch consisting of frame *E*, lever *B*, spring *I*, block of hard rubber *b*, and plate *a*, combined substantially as and for the purpose specified.

7. In a telephone-switch, plate *a* and frame *E*, insulated by a block of insulating material, and combined substantially as shown and set forth.

8. In a telephone-switch, the combination of plate *a* and insulated frame *E*, with lever *B*, contact-points *C D*, and a conducting-plug, whereby the circuit is broken at point *D*, while at the same time the frame *E* and plate *a* are connected.

9. The combination, with the telephone-lines connected together for conversation, of a branch circuit to ground at the central office, including a telephone and a switch and plug provided with a flexible conducting-cord, as described, whereby said branch circuit may be connected with and disconnected from the circuit of said united telephone-lines.

10. In a spring-jack switch, the combination, with a normally-insulated metallic piece, of a movable contact piece or lever, a contact-point, and a connecting-plug adapted to separate the said movable contact piece or lever from said contact-point, and at the same time to form an electric connection between said movable contact piece or lever and said normally-insulated metallic piece.

CHARLES E. SCRIBNER.

Witnesses:

GEORGE P. BARTON,

WALLACE L. DEWOLF.