

(No Model.)

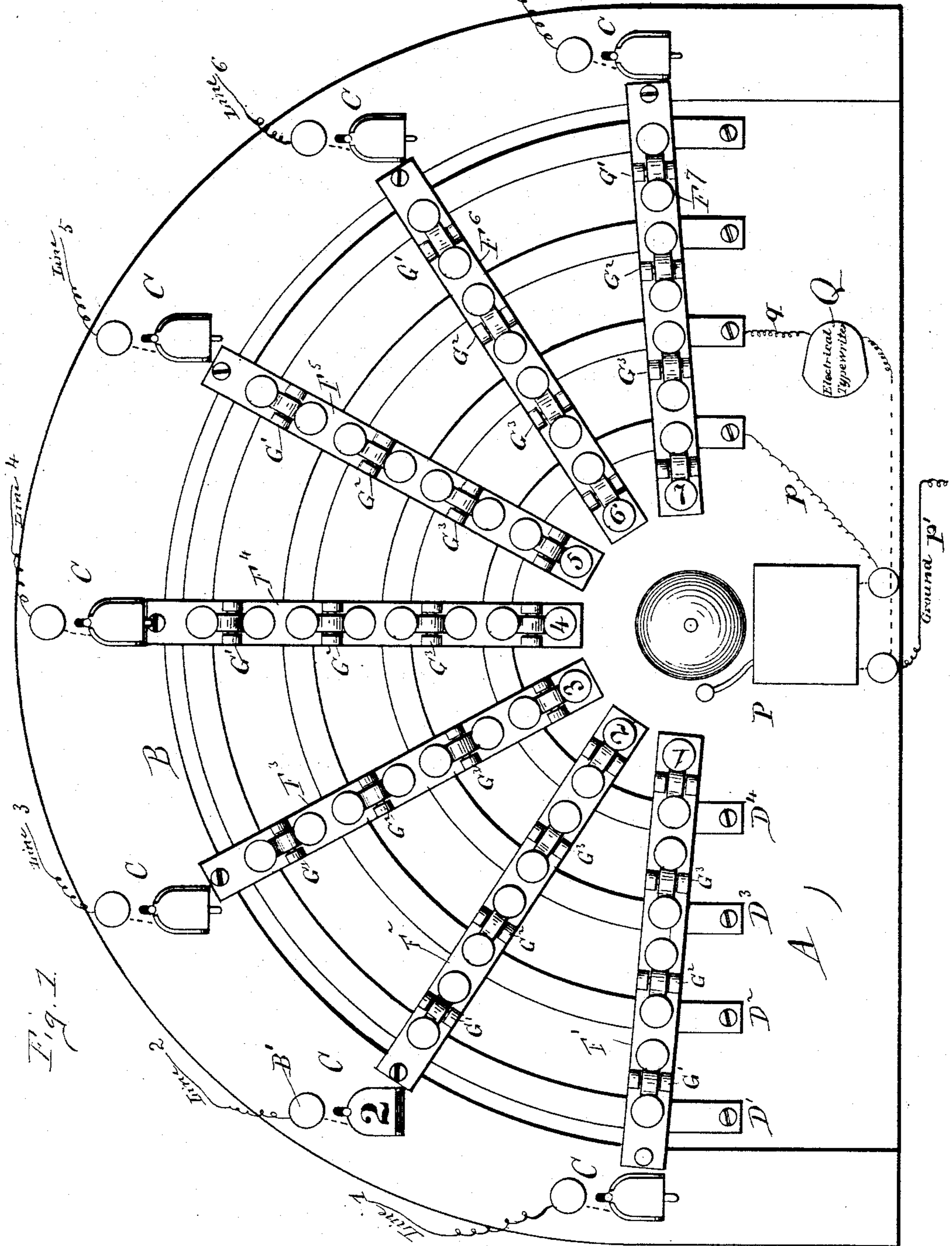
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J. F. McLAUGHLIN.

SWITCH BOARD.

No. 413,083.

Patented Oct. 15, 1889.



ATTEST =
Joseph Barker
Roy C. Bowen.

INVENTOR =
James F. McLaughlin;
By Harding Tichenor
his Attorneys.

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(No Model.)

2 Sheets—Sheet 2.

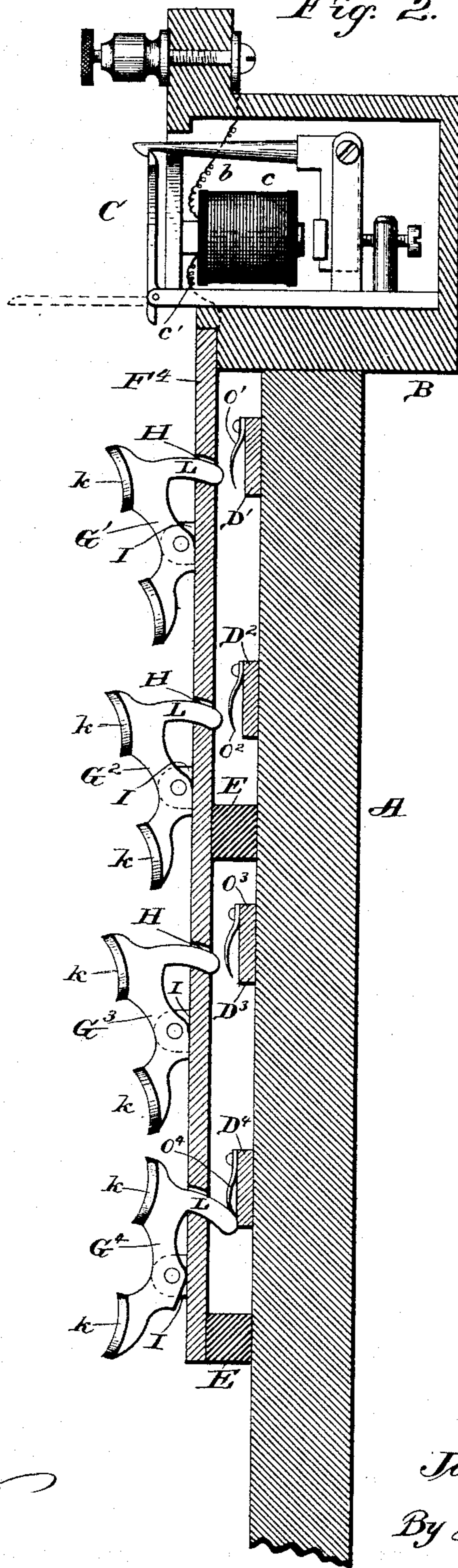
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Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 413,083, dated October 15, 1889.

Application filed December 27, 1887. Serial No. 259,149. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Switch-Boards for Electrical Type-Writers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to switch-boards for central offices in a system of electrical intercommunication in which a number of outlying stations are connected with said central office, each by a separate line, and in which the central-office operator can connect any two subscriber-lines for private intercommunication.

My switch-board is thus adapted for use in telegraphic or telephonic systems, but is more especially designed to be used in connection with a system of electrical type-writers such as has been patented to me by Letters Patent Nos. 363,158, 367,650, 368,411, and 369,954.

The object of my invention is to enable a central-office operator to receive a call at all times from any subscriber, and to put himself into communication with such subscriber without the use of loose or detachable appliances—such as flexible cords and switch-pins—as are ordinarily used in switch-boards of this character. For this purpose I use peculiarly-constructed switch-keys, which, if depressed, will be locked in position until released by a specific act of the operator. By the action of similar keys the operator is enabled to establish connection between two subscribers, and my switch-board thus presents a structure in which all the operative parts are permanently connected and are not liable to be lost or mislaid, as is the case with the detachable appurtenances used in connection with ordinary switch-boards. All this will more fully appear from the following detailed description, in which reference is made to the accompanying drawings, in which I have represented, in—

Figure 1, an elevation of my improved switch-board, with the signal-bell, the annunciators, and other parts used in connection

therewith in diagram; and Fig. 2, a vertical cross-section of the same.

Referring to the drawings by letters, A represents a semicircular board of insulating material, which constitutes the base-plate of the switch-board. B is a ledge of similar material, secured around the curved edge of the board and projecting on both sides of the same, as shown in Fig. 2, and the annunciators C C, &c., with their magnets, binding-posts, &c., are suitably secured to this ledge. These annunciators are of any ordinary or improved construction, and need not be specifically described.

Concentrical with ledge B there are a number of metallic strips D' D², &c., which are suitably spaced, and are secured to the base-plate A by screws or otherwise. Supported upon ledge B and upon intermediate insulating-blocks E E, &c., are the radial metallic strips F' F², &c., one for each annunciator, and extending from the same toward the center of the switch-board, as is clearly shown in Fig. 1. These radial strips are so mounted that there is a space between their inner surfaces and the outer surfaces of the metallic strips D' D², &c., which they cross, and in this respect my switch-board is similar to others of this character.

In ordinary switch-boards of this kind the electric connection between the crossing metallic strips is established by pins which are inserted into holes at the points of crossing, and it has always been found to be a source of great annoyance that these pins were lying about loosely and frequently mislaid. Besides this, the holes in the crossing-strips had to be made to correspond exactly, or else the pins would not make good electrical connection. I overcome this difficulty in the following manner: At the point where the radial strips cross the semicircular strips D' D², &c., I make apertures H H, &c., curved upon the arc of the circle in said radial strips, and switch-levers G' G², &c., of conducting material, are pivoted to suitable studs I I, fixed to the radial strips. These switch-levers have two free arms, each provided with a thumb-piece k, and one of these arms is formed with a curved lug L, which enters the corresponding slot in the radial strip upon which it is mounted, so that if the lever is rocked about

its pivot the lug L will pass through its corresponding arc-shaped aperture in the radial strip, and will make or break contact with a spring O, fixed to the semicircular strip behind the same. In the normal position of these levers the lugs L will be out of contact with their corresponding springs; but if the upper arm of one of these levers be forced rearwardly, as shown in G⁴ in Fig. 2, the lug passing through the curved slot of the radial strip will make contact with the spring O⁴. It will depress said spring, and by the reaction of the latter upon the lug it will hold the lever in the position shown. Thus, if contact is once established between any one of the radial strips and any one of the semicircular strips by the operation of one of the switch-levers, said contact will be maintained until, by the rocking of the lever back to its original position, lug L is drawn back within its corresponding aperture H, and this can only be done by the positive act of the operator. The cam or contact lugs L projecting approximately at right angles to the lever G through the curved apertures H, and within a very short distance of the contact-springs O, a short working motion of the levers G in one direction will be sufficient to establish the contact desired, and a similar short working motion in the other direction will be sufficient to break that contact. For this reason the construction may be such as shown, whereby the two thumb-pieces *k k*, formed on each lever, will at all times be exposed to view and within convenient reach of the finger of the operator, and only one finger need be employed for operating these levers.

P designates a call-bell centrally located with relation to the semicircular strips D¹, D², &c. The helices of the said call-bell are electrically connected with the strip D⁴ by means of the wire *p* and with the ground through the wire *p'*. It will thus be seen that the strip D⁴ forms the ground connection for all of the radial strips F¹ F², &c.

At Q is indicated the position of an electrical type-writer of the construction shown in my several Letters Patent and pending applications in the United States Patent Office, placed in circuit with the strip D³ by means of the wire *q* and with the ground through the wires *q'* *p'*.

The line-wires 1 2 3 4, &c., are secured in their respective binding-posts, which are in turn connected, through the wires *b b*, the helices *c c*, and the wires *c' c'*, with the radial strips F¹ F², &c.

The operation of my invention is as follows: The switch-levers G⁴ at the inner ends of the radial strips F¹ F², &c., are normally closed, as shown in Fig. 2, into electrical contact with the spring O⁴, thus keeping the said radial strips constantly in connection with the ground through the semicircular strip D⁴, as will be easily understood. When an electrical impulse is sent over one of the lines (say, for example, No. 2) from a subscribing

station, the said impulse having passed over its path, comprising the line-wire 2, binding-post B¹, wire *b*, annunciator-magnets *c*, wire *c'*, radial strip F², switch-lever G⁴, semicircular strip D⁴, wire *p*, magnets in the call-bell P, wire *p'*, to the ground, will energize the magnets in the annunciator *c* and the call-bell P and simultaneously ring the latter and effect the drop of the shutter of the former to expose the number of the line, in the usual well-known manner. When the operator hears the call-bell, he perceives by inspection that the numeral of the annunciator No. 2 is exposed, thereby indicating that the subscriber on the line No. 2 wishes to communicate with him, and he presses the button on the switch-lever G⁴, containing the numeral corresponding to the number exposed on the annunciator, thereby breaking the electrical contact with the semicircular strip D⁴, and immediately presses the button of the switch-lever G³ on the corresponding radial strip to make electrical connection with the semicircular strip D³. The path of the current will now be from the strip F² through the switch-lever G³ to the strip D³, and by wire *q* to the electrical type-writer Q, thence to the ground by means of the wires *q'* and *p'*. Thus it will be seen that the electrical type-writer Q is placed in circuit with the line No. 2 and the subscriber on the same line can communicate with the operator; and if, as is generally the case, the subscriber wishes to communicate with a subscriber on some other line, he merely writes the number of the line desired upon his transmitter, and the receiver at Q will reproduce the number so written for the information of the operator, who will then manipulate the switch-levers as follows: For example, if the subscriber on line No. 2 wishes to communicate with the subscriber on line No. 5, the operator will close one of the switch-levers G¹ or G² on both of the aforesaid lines into contact with the same semicircular strip D¹ or D² and open all the remaining switch-levers on the radial strips F² and F⁵. If the semicircular strip D² be used, all the switch-levers which make contact therewith, except those of the radial strips F² and F⁵, must be open; otherwise the current might pass from the strip D² to the ground by means of the strip D⁴.

It will be seen by referring to Fig. 1 of the drawings that when the switch-levers are arranged as indicated above—i. e., the switch-levers G² G² on the radial strips F² and F⁵ in contact with the semicircular strip D²—the path of the current will be from the line 2 through the radial strip F² and its switch-lever G², semicircular strip D², switch-lever G² of the radial strip F⁵, and from said strip F⁵ to the line 5, thus placing the two lines 2 and 5 in direct communication with each other. Should another subscriber call while two are in communication, his line can be connected with any line not in use by simply using one of the semicircular strips which is out of cir-

cuit at that time. The batteries at the terminals of the subscriber-lines may be arranged in any suitable manner, so that the positive pole of one line will always be connected with the negative pole of the other.

From the foregoing it will be understood that either of the lines in connection with my improved switch-board may be easily and quickly placed in circuit with any of the other lines connected thereto without the inconvenience arising from the use of loose or detachable switch-plugs.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a switch-board, the combination, with two sets of metallic strips, one above the other, of rocking switch-keys mounted between ears on the upper set of strips, and having lugs projecting through the said strips and into operative relation to the lower set of strips, substantially as described.

2. In a switch-board, the combination, with

two sets of metallic strips, one set being provided with apertures, of pivoted switch-keys mounted upon and provided with contact-lugs extending through said apertured strips, each key having a thumb-piece on each side of its pivot, substantially as described.

3. In a switch-board, the combination, with two sets of metallic strips, one set being provided with contact-springs and the other set with apertures, of pivoted switch-keys mounted on the apertured strips, each key having a thumb-piece on each side of its pivot, and also having a contact-lug projecting through an aperture in the strip toward one of the springs on a strip of the other, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

J. F. McLAUGHLIN.

Witnesses:

E. L. WHITE,

GEO. H. TICHENOR.