(No Model.) 2 Sheets—Sheet 1.

E. W. SMITH.

TELEPHONIC SWITCH BOARD AND CONNECTIONS.

No. 301,529. Patented July 8, 1884.

Fig. 1

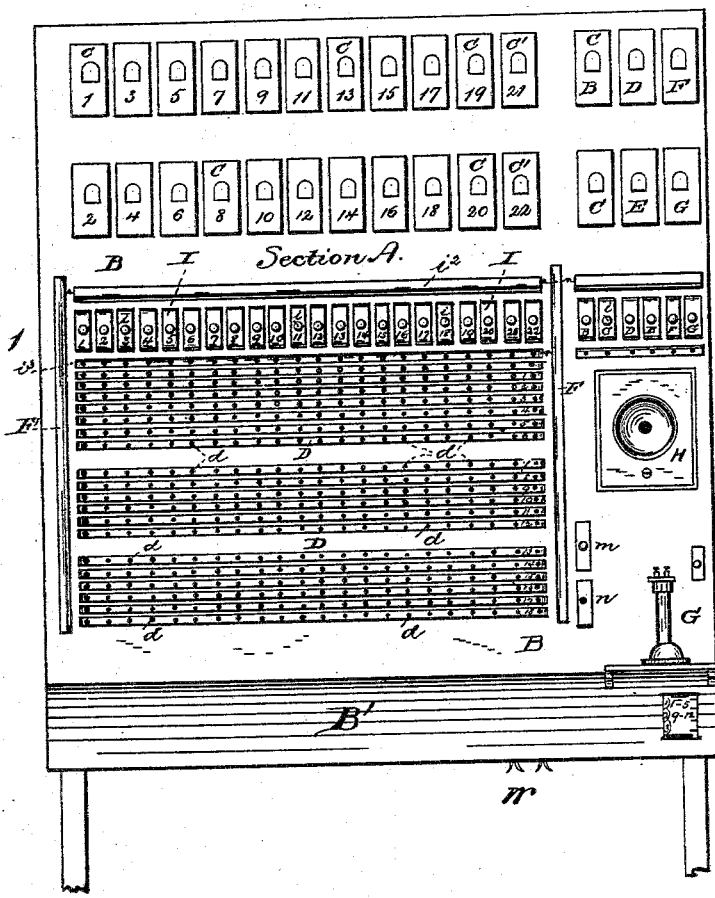

Fig. 2

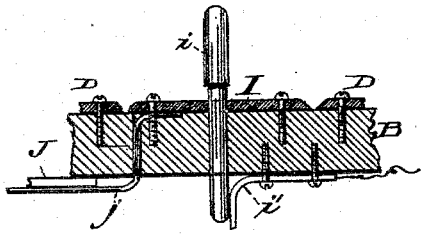

Fig. 3.

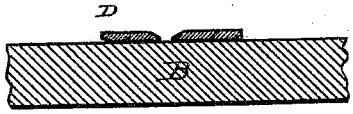

Fig. 4.

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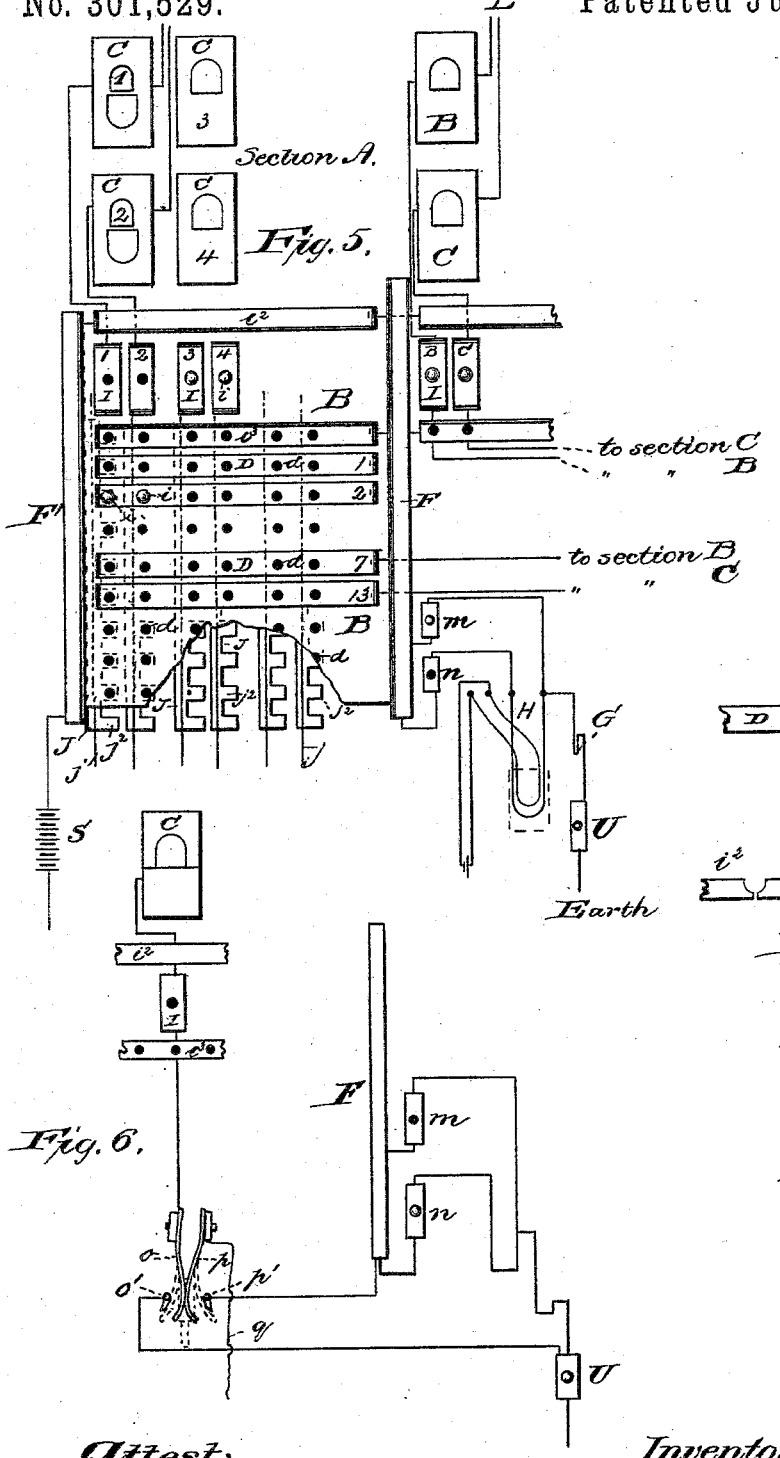

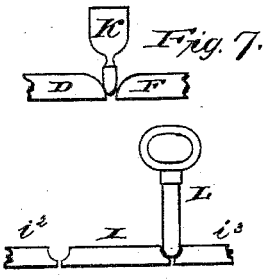

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UNITED STATES PATENT OFFICE.

ELIPHALET W. SMITH, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE OVERLAND TELEPHONE COMPANY OF NEW JERSEY, OF SAME PLACE.

TELEPHONIC SWITCH-BOARDS AND CONNECTIONS.

SPECIFICATION forming part of Letters Patent No. 301,529, dated July 8, 1884.

Application filed February 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, ELIPHALET W. SMITH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Telephonic Switch-Boards and Connections; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to lessen the labor of the operator stationed at the central office in the telephone-service in making connections, &c., and to improve and simplify the apparatus employed therefor.

The invention consists in the means for making temporary connections, and in the construction, arrangement, and operation of the several parts thereof, substantially as illustrated in the drawings, and described and claimed hereinafter.

Referring to the accompanying drawings, comprised in two sheets, Figure 1 is a front elevation of one of the sections containing annunciators, &c., showing the general features of the invention. Fig. 2 is a side elevation of the recording device and section of the table. Fig. 3 is a longitudinal section of the plug or line plates, transverse sections of part of the adjacent strips, and the board to which they are secured. Fig. 4 is a cross-section of the vertical bar and the end of one of the connecting-strips. Fig. 5 is a front elevation of a portion of a section, indicating the electric connections. Fig. 6 is a detailed view showing the manner of looping-in the operator's telephone. Figs. 7 and 8 are detailed views showing methods of making temporary connections, and Fig. 9 is a view of a thimble or temporary connecting-pin.

In carrying out my invention, I arrange the annunciator-case, switch-board, and operator's instruments compactly and conveniently together in sections, one of which (section A) is shown in Fig. 7. Heretofore the several parts of the apparatus have generally been separated, causing considerable labor in making connections rapidly and accurately. In my arrangement the various operations can be conveniently and effectively performed.

In the drawings, B is the frame or board to which the strips, plates, &c., are secured; B′, a shelf or table; C, the annunciators; D, the connecting-strips of conducting material arranged horizontally across the face of the board, provided with perforations, *d*, corresponding in number to the number of annunciators. F F′ are conducting strips or bars placed adjacent to the ends of the horizontal strips and at right angles thereto. G is the receiver, and H the transmitter.

Arranged across the front of the board below the annunciators are plug or line plates, I—one to each annunciator—provided with perforations adapted to receive a plug, *i*, whereby the connection is made from the line-plates on the front of the board to the springs *i′*, secured to the back of the board, said springs being connected with the annunciator and the earth.

Secured to the back of the board, and extending under the vertical row of perforations in the connecting-strips D in a line with each plug-plate, said perforations being continued through the board, are a series of metallic plates, J, having attached thereto the wires *j*, connecting the subscriber's telephone with the switch-board, the said wires coming to the surface of the board at or near the line-plates I, and connecting therewith, as shown in Fig. 3. The ends of the connecting-strips D and line-plates I are rounded or beveled, as indicated in Figs. 3, 4, and 8, or suitably formed so as to secure a good contact-surface, as also the corner or side of the vertical bars F F′ next to the ends of the strips D, and the horizontal strips i^2 and i^3 next above and below the line-plates. The vertical bar F connects with the operator's telephone, and the bar F′ with the magneto or calling battery S, as shown in Fig. 5.

Arranged on the same board, and preferably to the right of the line-annunciators, are the section-annunciators B C D E F G, &c., Fig. 1.

As shown more particularly in Fig. 5, the bars F F′ are placed adjacent to the ends of the strips D, and the strips i^2 and i^3 adjacent

to the ends of the line-plates I. This arrangement permits of the insertion of a conducting-pin between said adjacent parts, making a temporary connection. By removing the plug *i* from the line-plate I, and inserting it between said plates and the strip i^2, making a temporary connection, the circuit between the line-plates and the annunciators is broken, and made between the calling-battery S and the subscriber's bell, thereby ringing him "up;" or the same result may be effected by placing the plug *i* in one of the cross connecting-strips D, as 2, Fig. 5, and inserting a conducting-pin between said strip and the bar F'. In conversing with the subscriber a temporary connection is made by removing the plug and inserting it between the line-plate and the strip i^3, said strip being connected with the operator's telephone, as indicated in Fig. 5. When one subscriber wishes to be connected with another—as number 1 with 2, Fig. 5—the annunciator-drop falls, announcing his number, the current also conveying his call to the operator's telephone through the strips i^3 and F, by the operator making a temporary connection between said strip i^3 and subscriber's line-plate. The operator, in connecting the lines 1 and 2, removes the plug *i* in the line-plate of number 1, and inserts it in one of the perforations on a vertical line with the plug or line-plate of said number in the top group of connecting-strip, as number 2, Fig. 5, and inserts the plug of number 2 in the same connecting-strip as shown in Fig. 5. The lines are now in circuit, the plugs touching the under plates, J, and connected on the face of the board by the metallic strip D. The plates J are formed preferably as shown in Fig. 5, having projections j^2, extending under the perforations *d*, the plates being made of springy metal, thereby affording an elastic and rubbing contact when the plugs engage therewith.

In making a temporary connection I employ a thimble, K, Figs. 7 and 9, having a metallic tip, *k*, adapted to be worn upon the finger, a key-piece, L, Fig. 8, a plug, as shown in Fig. 3, or any suitable conducting medium, the end or tip of the temporary connecting-piece being beveled, rounded, or otherwise shaped.

Under certain conditions it is desirable to cut off either the receiver or transmitter from the circuit. This I accomplish by employing two plates, *m n*, Fig. 5, similar to the line-plates, and connected with the bar F, one, *m*, being connected with the receiver, the other, *n*, with the transmitter, a plug, like *i*, Fig. 3, being used to make the connection through the board, as in Fig. 3. When the plug is in *m*, the receiver is in circuit and the transmitter "off." When said plug is placed in *n*, the transmitter and receiver are both in circuit.

Heretofore in making the connection at the line-plates two springs, similar to *i'*, have been used—one on each side of the plug-hole. In my device the line-wire *j* connects with the plate I on the front of the board, as in Fig. 3, and the connection made with the spring *i'* and annunciator through the plug. By this arrangement the operator can conveniently and rapidly ring up or converse with any one by the temporary connection above described.

In order to conveniently "loop-in" the operator's telephone, &c., in a trunk-line I employ a device (illustrated in Fig. 6) consisting of two springs secured to the switch-board, one of which, *o*, connects with the annunciator C, the other, *p*, with the trunk-line *q*. The normal position of the springs is shown in Fig. 6, the trunk-line and annunciator being in circuit. In looping-in the telephone, &c., the insulated handle of the plug in the earth-plate *v* between the springs, as dotted on Fig. 6, separating the same and pressing them against the contact-pins *o' p'*, thereby making the circuit. Each section may be furnished with one or more trunk-line annunciators, as *c'*, Fig. 1; or the said lines may be arranged on a separate section.

In order that a perfect record may be kept of the number of connections, I employ a device, *z*, Figs. 1 and 2, consisting of a strip of paper or other writing material, the ends of which are attached to two spools, passing through slots in the table B', and reeled from one spool to the other by turning the thumb-piece *z'*. The paper may be divided into a measured number of spaces, and the number of connections determined by measuring the strip, or numerals, as shown on the left of the paper, Fig. 1, may be employed. The several sections are duplicates one of the other, the top group of connecting-strips on each section being used in connecting the subscribers' lines on that section, the lower groups of connecting-strips uniting the various sections through wires, as in Fig. 5. The number of strips in each group, as well as the number of sections, may be increased or diminished, as will be readily understood.

Having thus described my invention, what I claim is—

1. The combination, in a telephone switch-board, with the bar F', connected with the calling-battery, the strip i^2, normally connected with the bar F' and placed at right angles thereto, the bar F, connected with the operator's telephone, the strip i^3, normally connected with the bar F and placed at right angles thereto and parallel with the strip i^2, of the perforated line-plates arranged between the said parallel strips i^2 i^3, and adjacent thereto, and the subscribers' line-wires connected with said line-plates, substantially as and for the purpose set forth.

2. The combination, in a telephonic switch-board, with the bar F', connected with the calling-battery, the strip i^2, normally connected with the bar F' and placed at right angles thereto, the bar F, connected with the operator's telephone, the strip i^3, normally connected with the bar F and placed at right angles

thereto and parallel with the strip i^2, the perforated line-plates arranged between the said parallel strips i^2 i^3, and adjacent thereto, the subscribers' line-wires connected with said line-plates, of the switch-board having perforations therethrough, said perforations being a continuation of the perforations in the line-plates, a spring, i', secured upon the back of said switch-board near said perforations and normally connected with the annunciator-magnets, and a conducting-plug, whereby the line-plates and springs i' are connected through the board, substantially as set forth.

3. In combination, in a telephonic switch-board, the bars F' F, connected, respectively, with the calling-battery and telephone, the strips i^2 and i^3, placed at right angles to said bars and parallel with each other, the strip i^2 being normally connected with the bar F', and the strip i^3 normally connected with the bar F, perforated line-plates arranged between said strips i^2 and i^3 and adjacent thereto, perforated connecting-strips arranged between the bars F' F, adjacent and at right angles thereto, a perforated switch-board, the perforations in the line-plates and connecting-strips corresponding to the perforations in the switch-board, plates J, having attached thereto the subscribers' wires arranged beneath a vertical row of perforations on the back of the board, said subscribers' wires passing through the board at or near the line-plates and connecting therewith on the face of the board, springs i', arranged on the back of the board near the line-plate perforations and normally connected with the annunciator-magnets, and a conducting-plug, whereby the line-plates and springs are connected through the board, all substantially as and for the purpose herein set forth.

4. The combination, with an electrical switch-board having bars, connecting-strips, line-plates, &c., arranged thereon, of a looping-in device for trunk lines, consisting of a pin, p', normally connected with the bar F, the pin o', similarly connected with a ground-plug plate, u, springs o p, normally in contact, one of which, as o, is connected with a line-plate on the face of the board, the other being connected with the trunk-line wire, and an insulating-plug adapted to be inserted between said springs, bringing them in engagement with the pins o' p', substantially as and for the purpose herein set forth.

5. In combination, perforated plates m n, arranged on one side of a non-conductor, the perforations in said plates being continued through the non-conductor, springs i', arranged near the perforations on the opposite side of the non-conductor, one of said springs being connected with the receiver of a telephone, the other with both receiver and transmitter, and means, of conducting material, whereby the plates and springs may be connected, substantially as set forth.

6. The combination, with an electrical switch-board having line-wines j, connecting-strips, line-plates, and annunciators arranged thereon, of perforated plates arranged on the face of said board, the perforations in said plates continuing therethrough, springs i', attached to the back of the board near said perforations, one of said springs being connected with the receiver of a telephone, the other with both receiver and transmitter, and a conducting-pin, all substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of January, 1884.

ELIPHALET W. SMITH.

Witnesses:

CHARLES H. PELL,

F. F. CAMPBELL.