

(No Model.)

L. B. FIRMAN.

MULTIPLE SWITCH BOARD FOR TELEPHONE EXCHANGES.

No. 252,576.

Patented Jan. 17, 1882.

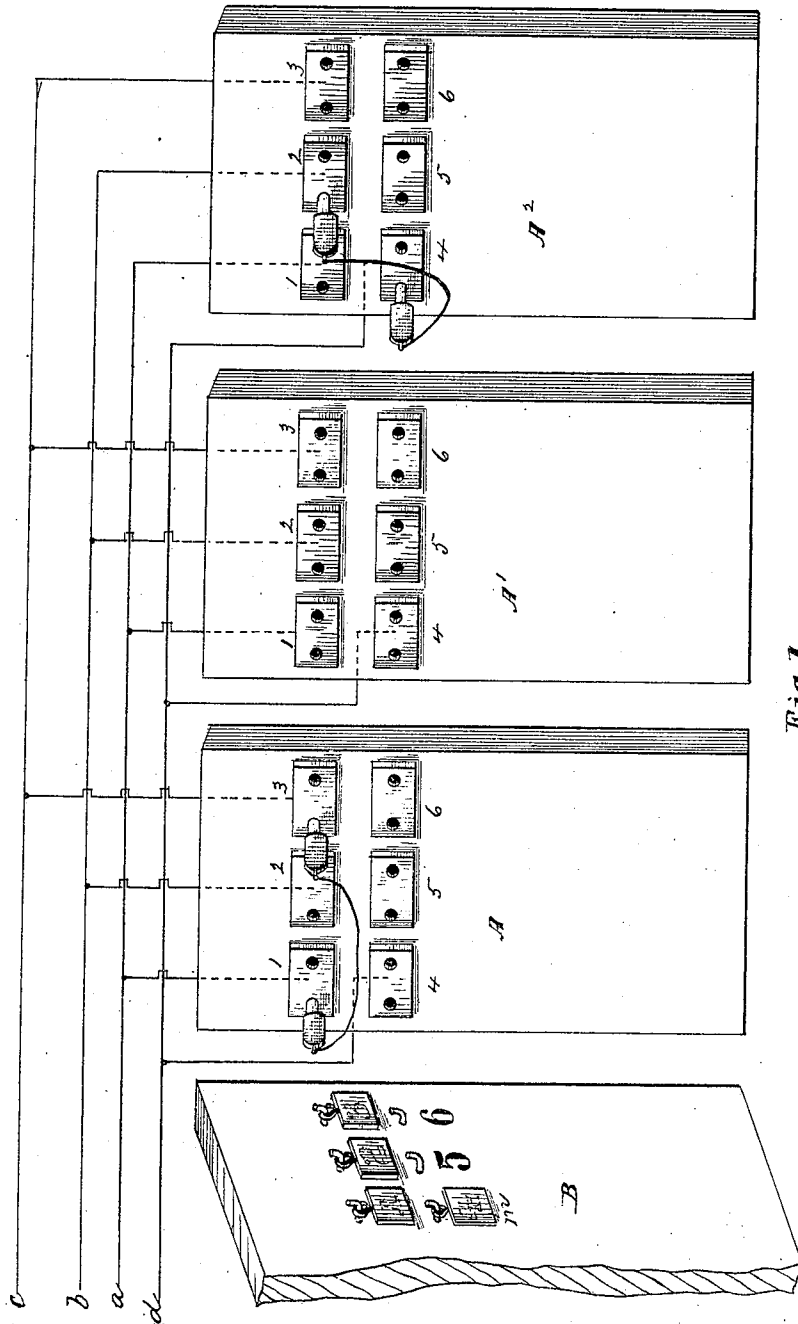


Fig. 1.

Witnesses

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# UNITED STATES PATENT OFFICE.

LEROY B. FIRMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN  
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## MULTIPLE SWITCH-BOARD FOR TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 252,576, dated January 17, 1882.

Application filed January 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, LEROY B. FIRMAN, of Chicago, Illinois, have discovered certain new and useful Improvements in Multiple Switch-Boards for Telephone-Exchanges, 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.

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Prior to my invention the individual lines were grouped upon a single switch-board at the central office, or grouped upon two or more boards. In the latter case trunk lines were used when it was necessary to connect a line of one board with a line of another board. A large exchange was thus divided up into a number of exchanges, which could be worked together, when occasion required, as one, by means of trunk lines between the boards. When the number of subscribers increased, so that a single switchman could not do the amount of switching required, I gave the switchman an assistant. I soon found, however, that a single switch-board would not accommodate the number of attendants necessary to do the switching for an exchange of four or five hundred subscribers.

I find by the use of my new system of multiple switch-boards, as hereinafter described, an exchange of a thousand or more subscribers may be successfully handled.

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My invention consists in providing two or more switch-boards instead of one, as heretofore, and so connecting the several lines therewith that any two lines can be connected on either of the boards, and also apparatus whereby attendants at a given board may without delay see what lines are connected at other boards than their own.

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My device is shown in the drawing, Figure 1, in which  $A$   $A'$   $A^2$  represent the multiple boards, respectively. Each board must have as many terminal plates or switches 12345, &c., as there are telephone-lines. Only four telephone-lines,  $a$ ,  $b$ ,  $c$ , and  $d$ , are shown. They are connected in any of the well-known ways at the subscribers' stations, and are there provided with any of the well-known outfits. When an extra wire is used for signaling the central office the telephone-lines are grounded

at the terminal stations and terminate at the central office in the insulated terminal plates of the switch-boards. The indicator or dummy-board  $B$  is placed in sight of all the attendant switchmen. I prefer to arrange the multiple-boards in line and place the annunciator or dummy-board centrally in front of them, so that an attendant, by looking back, can see the numbers upon the annunciator or dummy. There must be a number or other target corresponding to each subscriber's terminal plate or switch. I have shown the figures 1 2 3 4 5 6 in the drawing, the first four being indicated through the shields or targets  $m$  by dotted lines.

6  
6c  
7  
7c  
8  
8c  
Suppose lines  $a$  and  $c$  are connected at multiple board  $A$  and lines  $b$  and  $d$  at multiple board  $A^2$ , as shown, by cords and plugs. The switchmen at the boards, immediately on making these connections, notify the attendant at the dummy, who thereupon hangs up the shields or targets  $m$  over the figures 1 and 3 and 2 and 4; and, in the same manner, when any line is connected upon either of the multiple boards the figure which indicates its number is covered, and a switchman, by glancing at the dummy, sees what lines are connected. For example, if the subscriber connected with plate 6 were to ask for the subscriber connected with plate 1, the attendant at board  $A$ , before making the connection, must glance at the dummy-board, and in case he should see the target over figure 1 he would know that the line wanted was in use at another board, and, instead of connecting plates 6 and 1, he would notify the subscriber connected with plate 6 that the person wanted is busy.

9  
9c  
The central office may be notified when the subscribers are through talking by the American district system, or by sending a current to line at either terminal station and tripping an annunciator number in the circuit at the central office. As soon as the signal to disconnect is received the switchman pulls out the plugs from the terminal plates or switches and immediately notifies the attendant at the dummy-board to remove the targets.

The dummy-board or indicator should be large enough to accommodate targets or figures which may be readily distinguished by all the

switchmen. Figures may be marked upon the shields or targets, and thus the lines in use may be determined by observing the numbers indicated by the figures upon the targets.

5 I do not limit my invention to any particular form of indicator, provided it is so placed that the switchmen may readily observe what telephone-lines are in use at other boards than their own.

o The same number of the annunciator is disclosed when a given telephone-line is connected, whether the connection is made upon one or another of the multiple boards.

5 There are matters of detail known to all acquainted with telephony that must be left to the judgment of the superintendent. Thus independent lines for signaling are especially convenient in large cities, yet some prefer to use the telephone lines for this purpose with a battery or a magneto-box. In the latter case  
o the telephone-lines are grounded at the central office after passing respectively through a number of annunciators and their respective switches or cut-outs on the different boards.

5 Each station may be provided with a complete metallic circuit passing through an annunciator number and a switch on each board.

I do not limit my invention to any particular system of signaling the central office or running the circuits between the terminal stations 30 through the central office.

I disclaim the clearing-out annunciator in combination with the circuit of two connected lines, this being the subject-matter of a claim in another of my pending applications. 35

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of two or more switch-boards at the central office of a telephone-exchange system, to each of which the same 40 telephone-lines are connected, whereby any two of these lines may be connected together upon either of the multiple switch-boards.

2. The combination of two or more multiple boards to which the lines of the terminal stations are connected, and means, as described, 45 whereby the switchman may readily ascertain what lines are in use.

LEROY B. FIRMAN.

Witnesses:

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