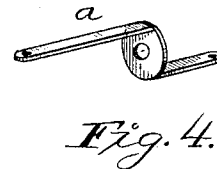
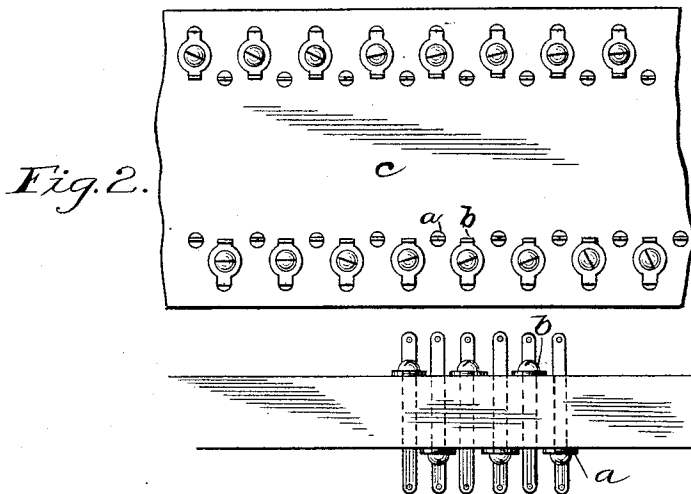
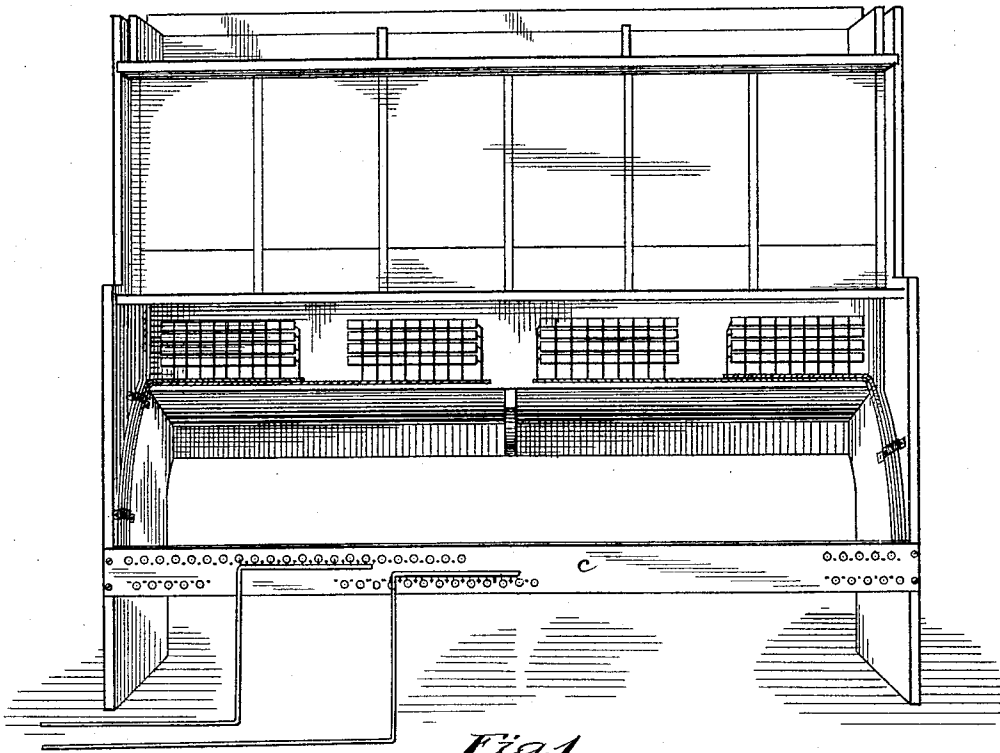


W. M. GOODRIDGE.

ELECTRIC CONNECTION FOR DISTRIBUTING TELEPHONE LINES.

No. 453,000.

Patented May 26, 1891.



Witnesses:
Chas. G. Hawley.
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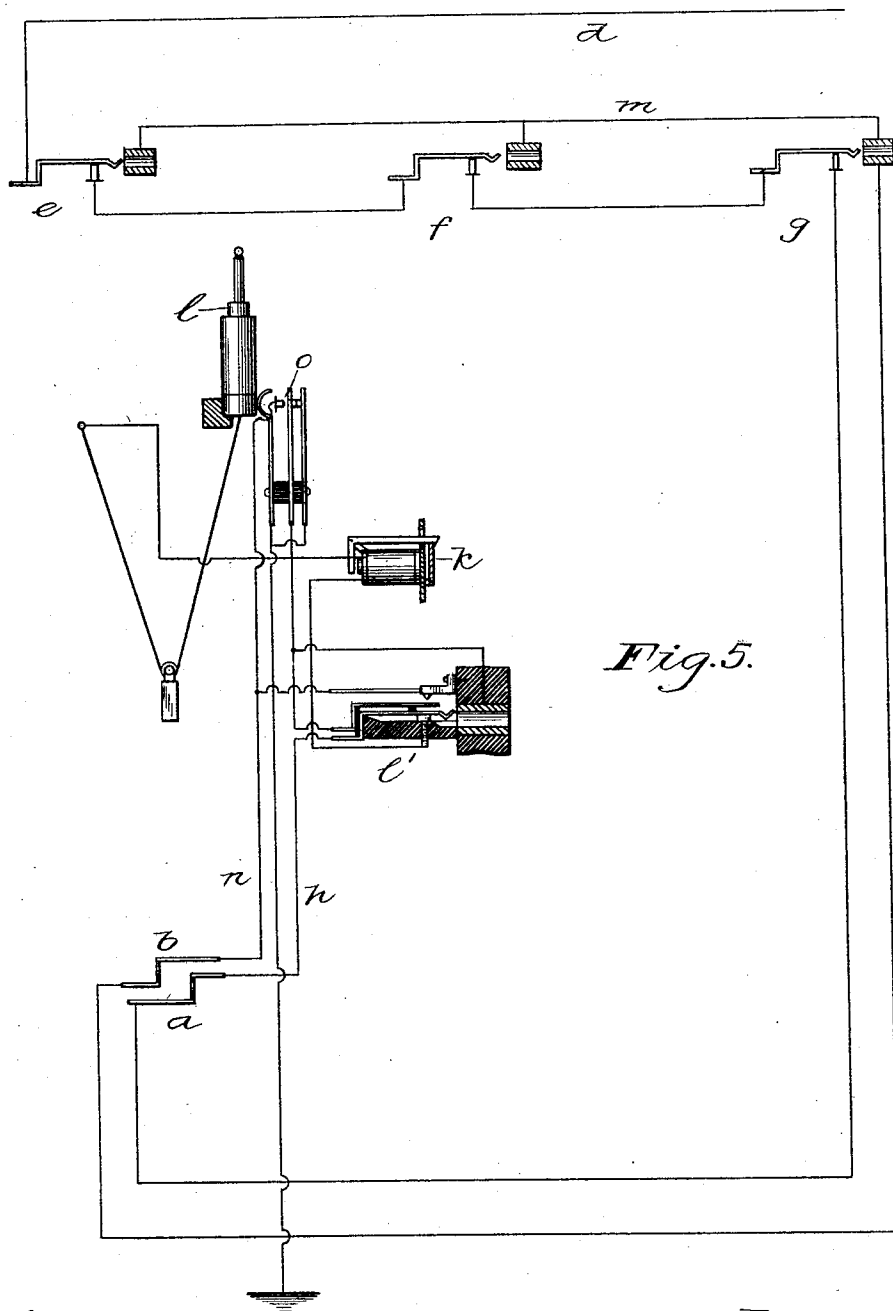
Fig. 3. Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM M. GOODRIDGE, OF HIGHLAND PARK, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF CHICAGO, ILLINOIS.

ELECTRIC CONNECTION FOR DISTRIBUTING TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 453,000, dated May 26, 1891.

Application filed February 7, 1889. Serial No. 298,966. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. GOODRIDGE, a citizen of the United States, residing at Highland Park, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in Electric Connections for Distributing Telephone-Lines, (Case 13,) 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 more especially to multiple switch-board apparatus. As is well known, the lines are connected each with a different switch on each of the boards, and from the switch on the last board through the key-board apparatus to ground. By "key-board apparatus" I mean the answering spring-jack switch, the individual annunciator, the cord, connecting-plug, and grounding-jack, or whatever apparatus may be included in the line at the board where the calls of the particular line are received. In multiple systems, as is well known, the individual annunciators are grouped upon the different switch-boards, so that each operator will have to answer the calls of a particular group of lines. Heretofore the cables have been run at the rear from board to board, and from the last board returned to make connection with the key-board apparatus; and it has been necessary to make the connections between the return portions of the cables and the key-board apparatus after the boards were in place, wires being soldered to the proper connections of the answering-jacks. This has been found very difficult, and the work has proven quite unsatisfactory on account of the want of room to do the work.

The object of my invention is to provide at the rear of each switch-board means whereby the connections with the answering-jacks may be made in the shop, and for this purpose I provide at the rear of each switch-board a strip containing spring-connectors for the different wires of the cable.

My invention will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the rear of a multiple switch-board provided with my

spring-connecting devices for distributing the return-wires. Fig. 2 is an enlarged view showing a portion of the bar or strip and the manner of securing the spring connections thereon. Fig. 3 is a plan of a portion thereof. Fig. 4 is a perspective view of one of the spring-connectors detached. Fig. 5 is a diagram illustrative of the circuit of a telephone-line and its test-wire connected with a switch on each of three multiple switch-boards and extending from the switch on the last board to the rear of a pair of my connecting devices, said connecting devices on the other side being connected with the key-board apparatus. Like parts are indicated by similar letters of reference throughout the different figures.

Referring to Figs. 2, 3, and 4, it will be seen that my spring-connectors *a b* are arranged in pairs near the different edges of the strip *c*, each board being provided with one such strip *c*, placed at the rear thereof, preferably as shown in Fig. 1. There should be as many pairs of spring-connectors as there are annunciators upon the switch-board.

As shown in Fig. 4, the spring-connector *a* is adapted to be secured by a screw upon the strips *c*, one of the springs being longer than the other, as shown, so as to extend through a hole provided therefor in the strip. In this manner a suitable means of attachment for the wires is provided on each side of the strip for each spring-connector. The circuit *d* (shown in Fig. 5) extends through switches *e f g*, one on each of the multiple boards, and from the switch *g* on the last board to the rear portion of a spring-connector *a*, to which the wire is preferably soldered. From the front of spring-connector *a* a wire *h* extends through the answering spring-jack *l'* and the individual annunciator *k* through a strand of a flexible cord to the terminal plug *l*. The heel of this plug *l*, resting in a metallic socket, completes the circuit to ground. The test-wire *m* is connected in the usual manner with switches *e f g* of line *d* and extends from switch *g* to the rear of spring-connector *b*. From the front of spring-connector *b* the test-circuit is continued by wire *n* to the frame or test piece of answering spring-jack *l'* and thence to the contact *o* of the grounding-jack. The circuit of the single line *d*, as illustrated

in Fig. 5, is the precise arrangement now in use at the Chicago Telephone Exchange.

Fig. 1, it will be understood, is a rear view of one of the several multiple switch-boards, or, as it is now more frequently termed, of one of the duplicate sections of a multiple switch-board. The key-board apparatus is placed in front of the board and is not illustrated in Fig. 1. This figure is designed simply to represent in a general way the most convenient position for locating the strip *c*, in which are placed the spring-connecting devices for distributing the return-wires.

Referring now to Fig. 5, it will be understood that the spring-jack switches *e f g* belong to the same line and are distributed in the usual manner upon different boards or different duplicate sections of the multiple switch-board.

By the use of my spring-connectors *a b*, the connections with the key-board apparatus by wires *n h* may be completed in the office before the board is sent out.

The portion of the cable containing the wires between the switch on the last board, as switch *g* and the spring-connectors *a b*, has sometimes been termed the "return-cable," it being understood that each return-cable will contain a given number of wires, preferably forty, when the spring-jack switches are built up in strips of twenty each, so that each cable may contain the telephone-lines and

test-circuits of a single strip. These cables are brought from the last board to the rear of the boards, respectively, upon which their annunciators are placed. The different wires are connected with the rear of their particular terminals, space being preferably left between the rows of terminals upon each strip *c*, so that the cables may be carried along the center between the rows of terminals.

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

1. The combination, with a switch-board, of a strip placed at the rear thereof and provided with spring-terminals, said spring-terminals being connected at the rear with the wires of the return portion of the cable, the front ends of said spring-connectors being connected with the key-board apparatus, substantially as and for the purpose specified.

2. A strip *c*, provided with spring-connectors arranged in rows near the edges thereof, said connectors each being provided with a projection on opposite sides of the strip, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 17th day of January, A. D. 1889.

WILLIAM M. GOODRIDGE.

Witnesses:

ELLA EDLER,

GEORGE P. BARTON.