(No Model.)

C. E. SCRIBNER.

TEST PLUG FOR MULTIPLE SWITCH BOARDS.

No. 345,326. Patented July 13, 1886.

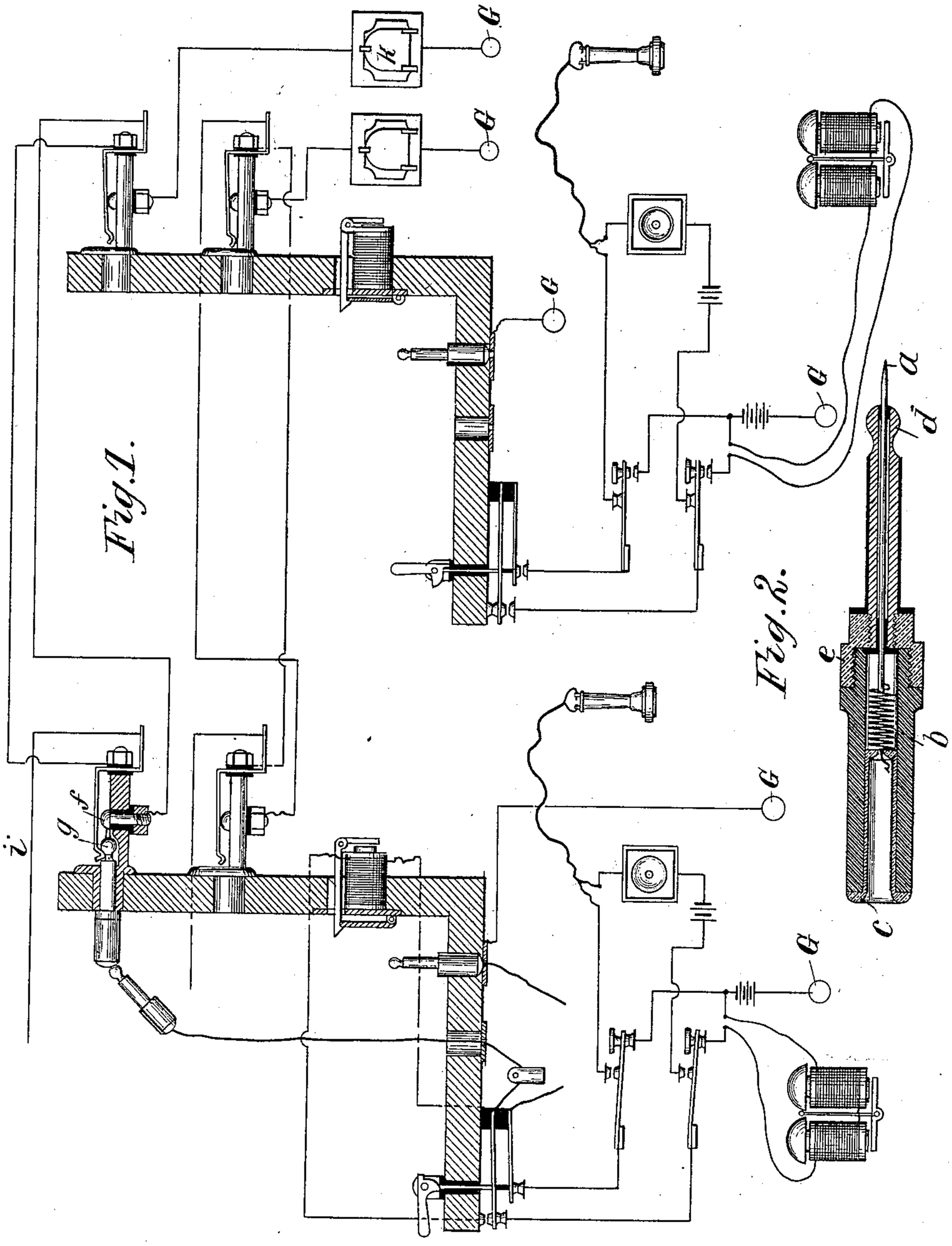

Fig. 1.

Fig. 2.

Witnesses:
Sam.l B. Dover.
Chas. A. Wood.

Inventor:
Charles E. Scribner.
By George P. Barton
Attorney

UNITED STATES PATENT OFFICE.

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

TEST-PLUG FOR MULTIPLE SWITCH-BOARDS.

SPECIFICATION forming part of Letters Patent No. 345,326, dated July 13, 1886.

Application filed April 5, 1886. Serial No. 197,839. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Test-Plugs for Multiple Switch-Boards, (Case 104,) 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 to apparatus at the central office of a telephone-exchange, and, while intended for use in connection with multiple switch-board systems, it may be usefully employed wherever it is desired to readily make the contact-points of switches upon the rear of a switch-board accessible upon the face of the board.

Heretofore the chief operator at an exchange has been unable to make the necessary daily tests of the telephone-lines and their connections on account of the time required to search out the contacts at the rear of the boards, and, moreover, the tests as far as they could be made have been far from satisfactory, owing to mistakes or omissions, which were constantly being made where large numbers of wires were connected with the switch-boards.

My invention consists in a plug having two insulated points, one of which is yielding, and separate connections leading from said points, so that when the plug is inserted in a spring-jack or other device the contact of said device may be readily tested. The points of a spring-jack switch placed upon the rear of a switch-board may thus be led out so as to be accessible at the front of the board, and the operator, by using my test-plug, may rapidly test out all the lines and connections of an exchange without going to the rear of the board or disturbing the cable-connections between the boards.

My invention is illustrated in the accompanying drawings, in which Figure 1 is a sectional view of portions of two multiple switch-boards provided with circuits and connections for two telephone-lines, my test-plug being shown inserted in the upper spring-jack of the first board. In Fig. 2 I have shown a detailed sectional view illustrative of my test-plug.

For detailed description of the multiple switch-board system reference is made to my patent, No. 305,021, of September 9, 1884.

My test-plug, as shown in Fig. 2, consists of a central needle, *a*, which is normally held in the position shown by a coil-spring, *b*. This coil-spring rests in the socket of the rubber handle provided therefor, as shown, against the shoulders provided upon the metallic piece *c*. A yielding needle-contact is thus formed, having electrical connection with the outside metallic piece, *c*. The shank of the plug consists of a tubular piece, *d*, from which the needle is insulated by rubber bushings, which bushings serve as guides for the needle, as shown. On the outside of the shank of the plug, except at the tip, I provide a sleeve of insulating material. The piece or point *d* is connected with an outer plate or connection, *e*, as shown. The points *a* and *d* of the test-plug are thus each connected with a separate metallic piece upon the rubber handle of the test-plug. By inserting the plug in a spring-jack switch the yielding needle-contact *a* is connected with one point of the switch and the point *d* with the other point thereof. The rubber sleeve, as shown, insulates the point *d* from the frame of the switch when the plug is inserted in the plug-hole.

As shown in Fig. 1, the test-plug is inserted in spring-jack 1 upon the first board. It will be seen that the needle or yielding contact-point *a* comes against the contact-point *f*, while the other contact-point, *d*, of the test-plug serves to lift the spring *g* and form contact therewith. Thus point *f* is led out to contact-piece *c* upon the plug-handle, while spring or lever *g* is led out or connected with plate *e* upon the handle. Thus by inserting a test-plug in any switch the lever *g* and contact-point *f* are made accessible for connections upon the front of the board. The points, being thus made separately accessible and insulated from each other, may be tested in any suitable manner.

At the first board I have shown a battery-circuit including a bell, *h*, which, when closed to the point *c*, as shown, will indicate whether the office part of the circuit is in order. If

this part of the line is closed and the connection good, the annunciator *k* will be thrown down at the first impulse from the battery. In like manner, by closing the battery-circuit to contact-piece *e* the circuit of line *i* may be tested. Thus each line and its connections may be tested one after another as fast as a test-plug can be inserted in a switch and connections made with points *c* and *e*, respectively, thereof.

It is evident that my invention admits of many modifications that will suggest themselves readily to any one skilled in the art. The frame of the switch and the construction and position of the points must conform to the position and construction of the switch. The form I have shown I have adopted as the best for testing out the switches and connections of multiple switch-boards in which switches like those shown in the drawings are used. In case the frame of the switch be of insulating material, it is evident that the insulating-sleeve of the test-plug could be dispensed with. Other minor changes might be made without departing from my invention.

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

1. The combination, with a spring-jack switch, of a test-plug provided with two insulated contact-points and corresponding exterior contact pieces or plates, whereby connection may be made with the different points or connections of the switch placed upon the rear of the board by an operator in front of the board, substantially as and for the purpose specified.

2. The test-plug consisting of two insulated contact-points, one of said points being yielding and the other fixed, and corresponding plates or contact-pieces upon the handle or exterior of the plug, whereby connection may be made with either of said points for testing when the plug is inserted in a switch, substantially as and for the purpose specified.

3. The combination, with the needle *a*, of the spring *b*, and the contact-piece *c*, permanently in connection with the said needle, the insulated tube or contact-piece *d*, and the plate *e*, permanently connected therewith, whereby the points of a spring-jack switch may be made accessible by inserting the test-plug therein, substantially as and for the purpose specified.

4. The combination, with the spring or lever of a switch, and its corresponding contact-point, of a test-plug having a yielding contact and a fixed contact, the yielding contact connecting with the point of the switch at the same time the lever of the switch is lifted from its said opposing contact-point and connected to the fixed contact-point of the plug upon the insertion of the plug, and contact plates or pieces upon the handle of the plug connected, respectively, with said points of the plug, whereby the points of the switch are made accessible for testing, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 26th day of March, A. D. 1886.

CHARLES E. SCRIBNER.

Witnesses:
GEORGE P. BARTON,
F. H. MCCULLOCH.