

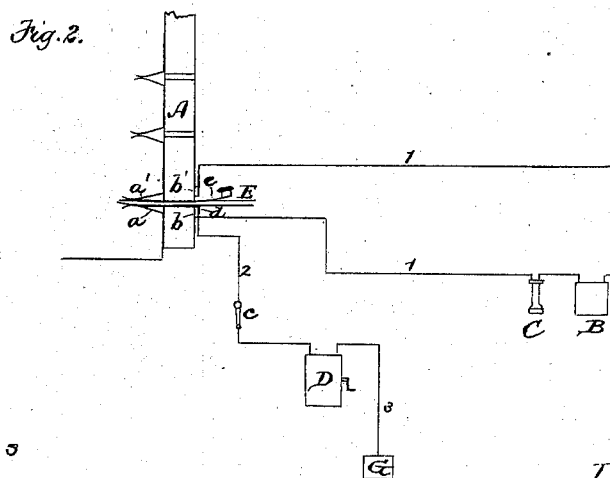
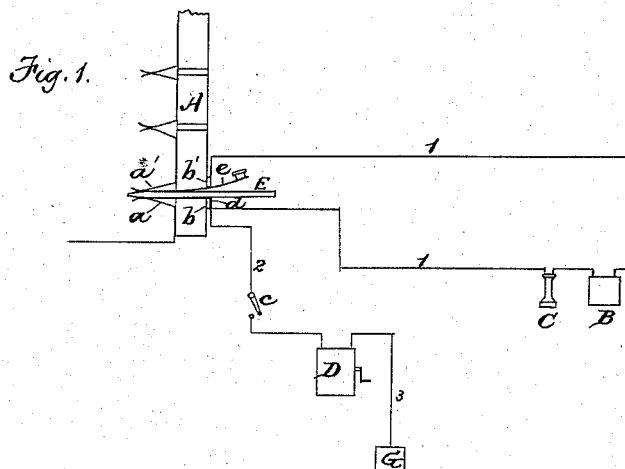
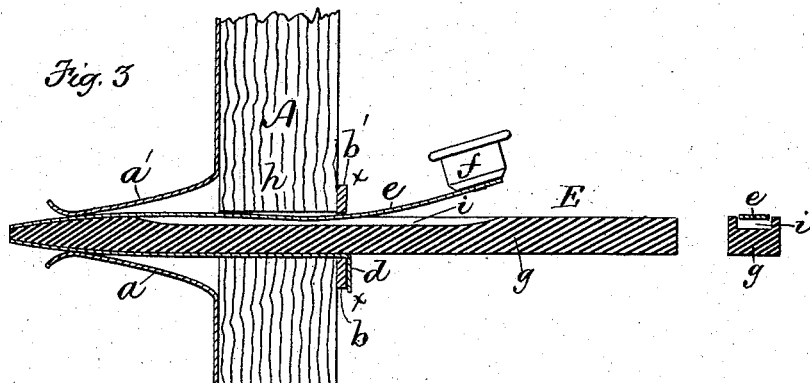
(No Model.)

T. W. LANE & F. W. HARRINGTON.

## ELECTRICAL SWITCH BOARD AND SIGNALING APPARATUS.

No. 262,059.

Patented Aug. 1, 1882.



Witnesses

C. P. Judd.  
A. L. White

*Inventors*

J. W. Lane  
F. W. Harrington  
by Myself & B. Brown  
Attys.

# UNITED STATES PATENT OFFICE.

THOMAS W. LANE AND FRANK W. HARRINGTON, OF BOSTON, ASSIGNORS  
TO CHARLES WILLIAMS, JR., OF SOMERVILLE, MASSACHUSETTS.

## ELECTRICAL SWITCH-BOARD AND SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 262,059, dated August 1, 1882.

Application filed June 9, 1882. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS W. LANE and FRANK W. HARRINGTON, both of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Electrical Switch-Boards and Signaling Apparatus, of which the following is a specification.

This invention relates to telephonic switch-boards used in central offices and employing line-circuit strips adapted to be connected by plugs through connecting-strips.

The invention has for its object to provide means whereby the necessary operations of calling and arranging circuits for intercommunication between subscribers can be performed with the utmost directness, simplicity, and economy of apparatus.

The invention relates directly to the improvement forming the subject-matter of Patent No. 250,081, granted to Thomas W. Lane November 29, 1881, in which a listening-circuit is shown and described composed of two horizontal metallic strips arranged at the lower edge of a switch-board and separated by a space from one another, with orifices extending through the board opposite each line-strip upon the rear of the board, so that by the insertion of a special plug through any such orifice connection may be made between said line-strips and the horizontal metallic strips, and thus complete a listening-circuit, the line-strip being capable of separation at points opposite said orifice, and the separating-plug being similar to that described in said patent.

Our present invention consists in the arrangement of circuits and apparatus whereby when said plug is inserted into the line-strip the operator's local circuit may be cut out and a signal sent to line, or when two line-strips are connected together through the switch-board they may be temporarily separated from each other and a signal sent to either one of the two without disturbance or annoyance to the other, as we will now proceed to describe.

In our present invention the line enters the line-strip, and passes through the annunciator to ground in the usual manner. We attach a wire to the upper one of the pair of horizontal strips, which, after passing through the oper-

ator's transmitter and telephone, is in like manner secured to the lower one of said strips, so that when the plug is inserted into the separable line-strip the said instruments are in the line-circuit. We attach another wire to the lower strip of the pair, which is connected to ground through a generator of electricity, which may be either a battery or a magneto-electric machine. For most circuits we prefer the latter. In the course of this wire we insert a one-point switch, by means of which all connection to the ground or generator may be cut off.

In the operation of our invention we employ a plug composed of two metallic springs supported and insulated from each other by a stock of insulating material, one of the springs being bent at right angles at its free end to form a stop to rest against one of the horizontal strips when inserted between them. The other spring is made longer, and has a button or knob of some insulating material secured to its free end.

Of the accompanying drawings, forming a part of this specification, Figure 1 is a diagram and sectional view, showing our invention with the plug inserted, forming a completed listening-circuit. Fig. 2 represents a similar view, showing the said circuit broken. Fig. 3 represents an enlarged view of the spring-plug.

The same letters of reference indicate the same parts in all the figures.

In the drawings, A is the body of the switch-board, upon the rear side of which are secured the spring line-strips *a* and *a'*, which normally rest against each other firmly by their own resiliency. Upon the face of the board A are two horizontal metallic rods or strips, *b* *b'*, directly opposite the separable springs *a* *a'*. Between the strips *b* *b'* are orifices *h* through the board for the insertion of the plugs, hereinafter described. To upper rod, *b'*, is connected a wire, 1, which, after passing through transmitter B and hand-telephone C, is attached to the lower rod, *b*. From the lower rod or strip, *b*, a wire, 2, runs to a one-point switch, *c*, through magneto or other generator D to earth G by wire 3.

E is a connecting-plug, formed of a stock, *g*, of insulating material, upon one face or side of

which is a flat metal spring, *d*, permanently fixed at one end of the plug, and so arranged as to normally spring away from the stock *g* at its free end. The free end is bent over at right angles to form a stop to limit its insertion into the switch-board, and to rest upon one of the rods *b b'*. Upon the opposite side of the stock *g* another spring, *e*, is arranged in a similar manner. Upon the free end of the spring *e* is a button or knob, *f*, of insulating material. A portion of the surface of the stock *g* is cut away under the spring *e*, forming a recess, *i*, to allow the spring to be depressed from contact with rod *b'* when inserted between said rods *b' b*, as hereinafter described.

The operation is as follows: A call being received at the central office, the annunciator of the line-circuit on which the call is sent drops, the operator inserts a plug, *E*, as shown, into the line-strip, with the spring *e* uppermost, presses the knob *f*, causing the spring *e* to separate from the strip *b'*, thus cutting off the normal-line ground, and, turning the switch *c* to its button, sends a signal to the calling party by means of the generator *D*, a circuit being thus made from ground through generator *D*, wire 2, rod *b*, spring *d*, spring *a* to line. By releasing the knob *f* the listening-circuit is made complete and the wants of the calling party ascertained. The desired line-strip having been plugged or connected with that of the calling party through a connecting-strip of the switch-board, the plug *E* is withdrawn from the calling-line and inserted into the desired line-circuit. By pressing down the knob *f* of the plug *E* connection between the two lines is temporarily broken, and a calling-signal can then be sent by means of the generator *D* to the desired party without ringing into the ear of the party first called. By releasing the knob and turning the switch *c* from its button the two lines are placed in circuit again, with the listening telephones *O B* looped in.

It will be seen that by the use of our improved plug it is possible to automatically com-

plete a listening-circuit which is susceptible of being temporarily opened, thus breaking the normal line to ground and making a new ground and signaling circuit with any line-circuit on the switch-board.

We claim—

1. The combination of a switch-board having a series of line-circuit strips, each adapted to be separated into two distinct parts at a given point, a circuit comprising two strips, *b b'*, arranged, as described, with relation to the points where the line-circuit strips are separable, a magneto-generator or its equivalent connected with the strip *b*, a switch adapted to cut the generator into and out of the circuit, and a plug, substantially such as herein described, adapted to separate one of the line-circuit strips into two parts and connect the strips *b b'*, respectively, with the separated parts of said line-circuit strip, or to connect one strip and disconnect the other, as described, whereby when said plug is inserted into the line-strip the operator's local circuit can be cut out and a signal can be sent to line, or when two line-strips are connected through the switch-board they may be temporarily separated from each other and a signal may be sent to either independently, as set forth.

2. The improved plug for an electrical switch-board, composed of the outwardly-projecting springs *d e* and a stock or body, *g*, supporting and insulating said springs, and provided with a recess, *i*, adapted to receive one of said springs, substantially as and for the purpose specified.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 7th day of June, A. D. 1882.

THOMAS W. LANE.  
FRANK W. HARRINGTON.

Witnesses:

O. F. BROWN,  
A. L. WHITE.