(No Model.)

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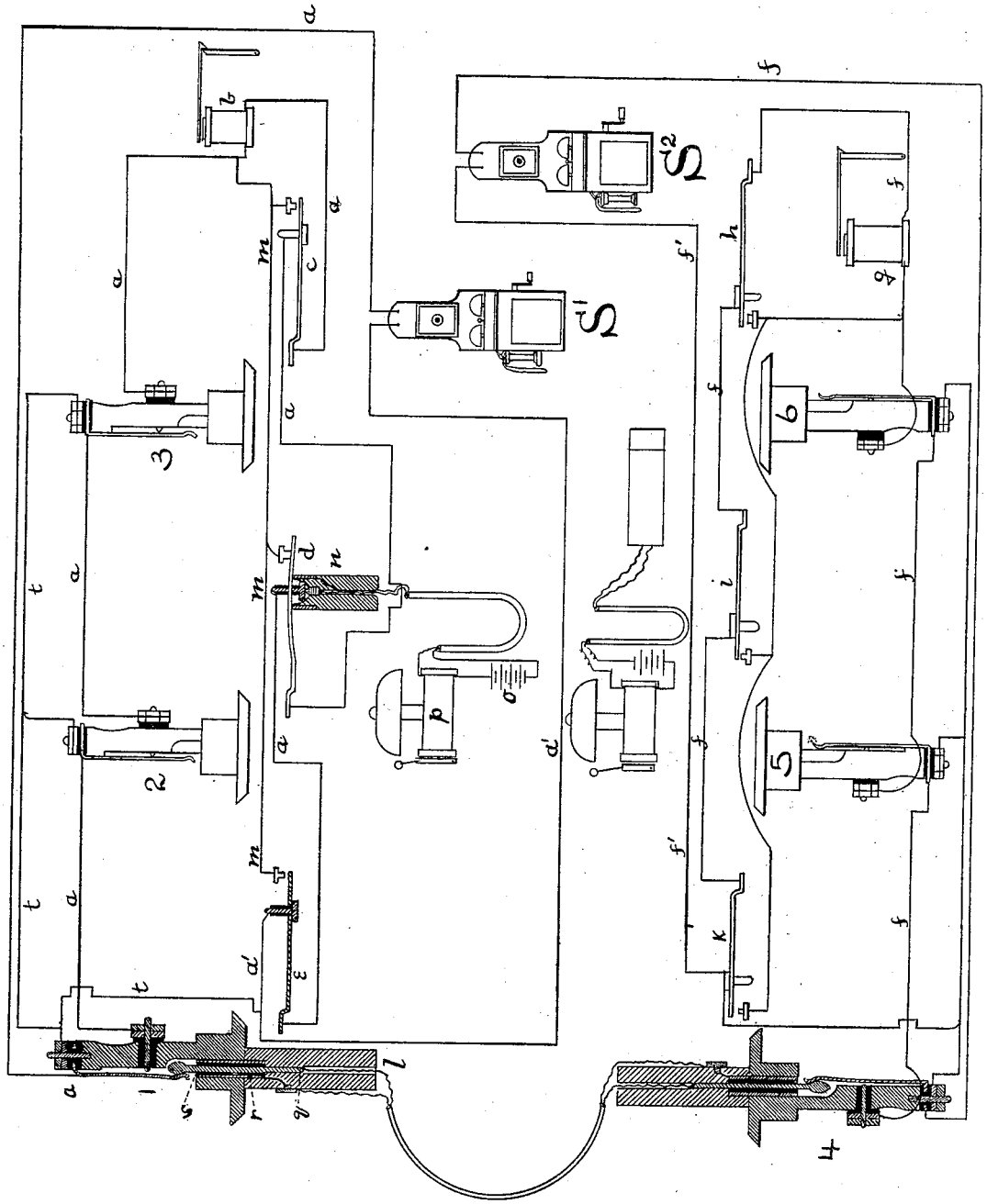
CIRCUITS FOR MULTIPLE SWITCH BOARDS OF TELEPHONE EXCHANGES.

No. 262,701. Patented Aug. 15, 1882.



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CIRCUITS FOR MULTIPLE SWITCH-BOARDS OF TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 262,701, dated August 15, 1882.

Application filed February 1, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, of Chicago, Illinois, have invented certain new and useful Improvements in Metallic Circuits for Multiple Switch-Boards of Telephone-Exchanges, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part thereof.

Prior to my invention the telephone-lines were connected with multiple switch-boards at the central office, so that any two lines might be connected together for conversation upon either of the boards. Different systems of try-circuits have been used with this multiple switch-board system for determining whether the lines wanted at one board are in use at either of the other boards. By one system each line, after passing to a single switch or bolt on each of the boards, is run back through test-keys, one test-key being provided near each switch on each board, and to ground, and the switches are so constructed that when two lines are connected together they are cut off from the ground at their respective switches. There are various modifications of the try-circuits that are too well known to require description.

My invention, as hereinafter described, may be used where complete metallic circuits are connected with the multiple switch-boards; and it consists in the combinations herein described and claimed.

In the drawing I have shown two subscribers' stations, S′ and S², each provided with the usual telephone-outfit, and each connected with a switch of each of the multiple boards at the central office. The normal circuit—that is, the circuit when not connected for conversation—of each of the subscribers may be traced as follows: From S′ by line *a* through spring or lever and contact-point of switch 1 of the first board, and thence to the spring of switch 2 of the second board and to the spring of switch 3 of the third board, and thence through the calling-annunciator *b* and through test-keys *c d e*, and thence by the return-wire *a′* to S′. In like manner the circuit of S² may be traced over the same switch-boards—that is to say, by line *f* through switches 4, 5, and 6 of said first, second, and third boards, respectively, to annunciator *g*, and thence through test-keys *h i k* and by return-wire *f′* to S². The circuits through the central office, as thus described, are the same as heretofore used, except that I have provided return-circuits *a′* and *f′* instead of grounding the lines.

Let us suppose plug *l* removed from switch 1 and that an operator at one of the boards—for example, the second board—desires to call up S′. It should be observed that the branch or shunt line *m* is connected with the line *a* between the annunciator *b* and the switch 3, and provided with contact-points, one contact-point being near the lever of each test-key of the line. The operator at the second board, by pressing the plug *n* against the test-key, as shown, loops in the calling battery *o* and bell *p*, thus sending a current through the electro-magnet of the bell at the subscriber's station S′. The ringing of the bell *p* notifies the operator that the line is not in use at either of the other boards, while at the same time the subscriber's bell at S′ announces the call. In case line *a* should be connected, as shown, at switch 1, the portion of the circuit of line *a* including the test-keys will be open at said switch, so that the circuit of the calling battery would remain open though the plug *n* were connected with the test-key *d*, as shown. Under these conditions the bell *p* would not ring and the operator would thus know that the line of S′ was in use or connected at one of the other boards. The springs or levers of switches 1 2, &c., are insulated from the frames by hard rubber, and the plugs at the ends of the double conducting-cords have double points. Thus in section of plug *l* the central portion, *q*, is insulated from the portion *r* (which comes in contact with the frame of the switch) by means of the rubber sleeve *s*. When the plug is inserted, as shown, the lever of the switch is lifted from the contact-point, so that the line *a* is cut off from the test-keys *c d e* and directed through the central point of the plug, and thence through a strand of the conducting-cord to the central point of the other terminal plug. The line *t* connects the frames of

the switches 1, 2, and 3 directly with the return-circuit *a'*. Thus any two of the metallic circuits may be formed into one for conversation by inserting the double pointed terminal plugs of a double flexible conducting-cord in the switches, respectively, of said circuits upon either of the multiple boards, while the portions of said circuits containing the test-keys will be cut out. At the test-keys the circuit is normally closed by contact between the levers and screw-heads of said test-keys. The plug *n* is provided with two contact-points, so arranged that when the plug is pressed against the test-key the lever of the key is carried away from contact with the screw and brought into contact with wire *m*, thus shunting the electro-magnet of annunciator *b*. The metallic collar of the plug first forms contact with the lever of the test-key, and as the lever is brought into contact with line *m* the circuit of battery *o* is completed through line *m* as the central contact-point of the plug touches the screw-head of the test-key. The annunciator-magnet is thus shunted when the battery is looped into the the line for calling, so that the annunciator cannot be thrown down by the calling battery.

I claim—

1. The combination of a metallic circuit with a series of switches and test-keys, one switch and one test-key upon each of the multiple boards, and a branch line or connection from the switches to the return-wire of said metallic circuit, whereby the circuit is completed as the test-keys are cut out when said metallic circuit is united, as described, with any other metallic circuit upon either of the boards.

2. Three or more multiple switch-boards, to which the same complete metallic telephone-circuit lines are connected, and test-keys, one test-key for each line on each board, and the connection to the return-wire from the switches of each line, whereby any two circuits may be united upon either of the boards, while the test-keys are cut out, as and for the purpose specified.

3. The shunt-wire *m*, provided with contact-points, in combination with the test-keys and circuit-wires, whereby the annunciator *b* is shunted when the calling battery is looped into the circuit at either of the test-keys.

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