

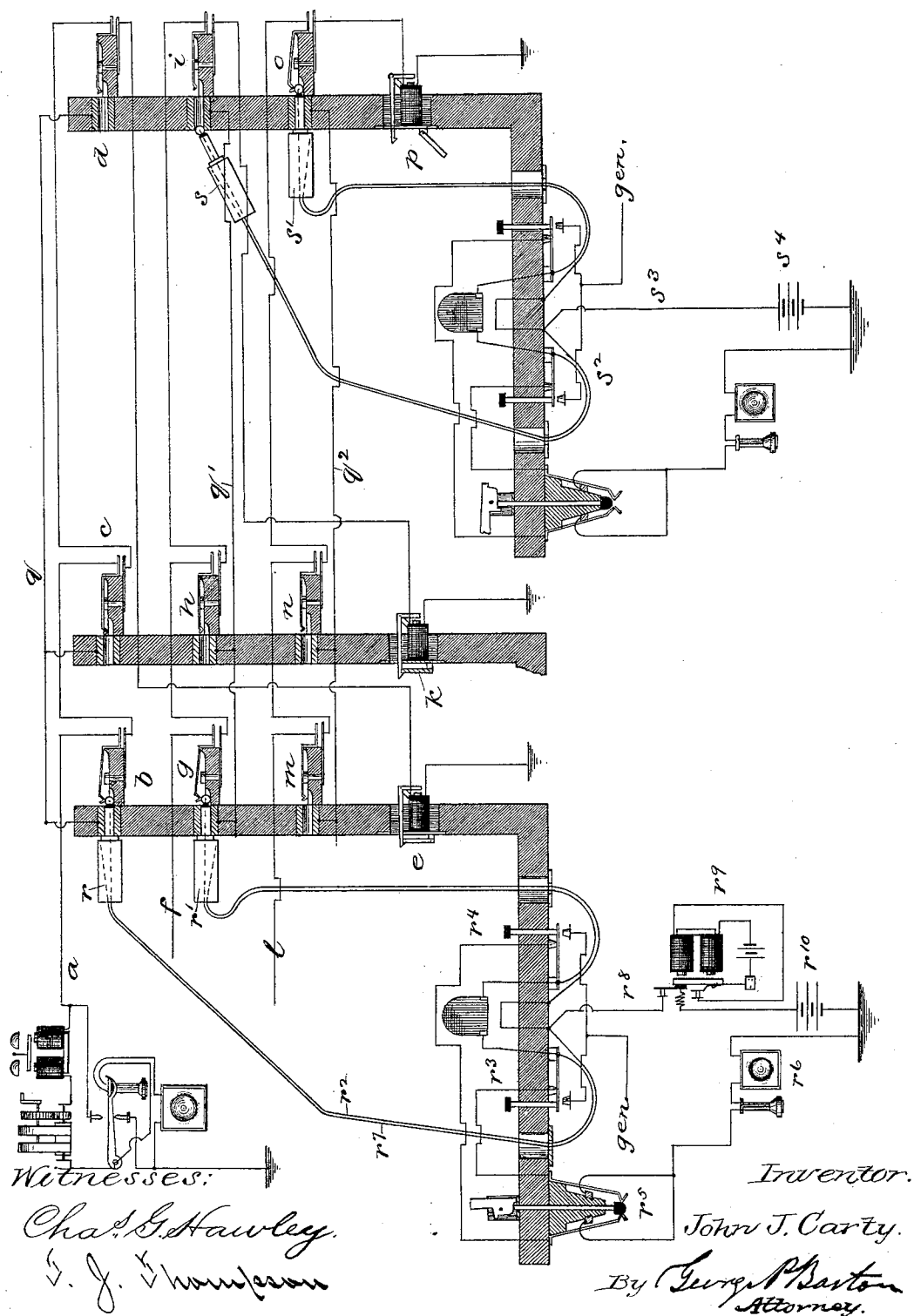
(No Model.)

J. J. CARTY.

MULTIPLE SWITCH BOARD TESTING APPARATUS.

No. 403,458.

Patented May 14, 1889.



Witnesses:

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MULTIPLE-SWITCH-BOARD-TESTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 403,458, dated May 14, 1889.

Application filed February 2, 1889. Serial No. 298,448. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CARTY, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented a certain new and useful Improvement in Multiple-Switch-Board-Testing Apparatus, (Case 5,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to multiple-switch-board apparatus of a telephone-exchange, and more particularly to the means of determining at one board whether a line called for is in use or connected at any other of the boards. The telephone-lines are connected from ground at the different subscribers' stations to a different switch on each of the switch-boards and through an annunciator to ground in the usual manner. The insulated frames or test-pieces of the switches of each of the different lines are connected together by a test-wire in the usual manner—that is to say, each line is provided with its special test-wire. I provide pairs of cords and plugs at the different boards, the strand of each pair which connects the tips of its plugs being connected, when desired, by means of a suitable switch through the operator's telephone to ground. The strand of each pair which connects the sleeves of the plugs is provided with a ground branch, in which is included a test-battery. At the different boards I provide different test-signals—for example, the sleeve-strands of the cords at one board may be connected through a battery only, at another of the boards the sleeve-strands may be connected through a rheotome and battery, the sleeve-strands of the cords at a third board may be provided with a branch connection to ground, in which is included a battery and a rheotome differently attuned. Thus I provide a characteristic tone or current which is always present upon the sleeve-cords of each board. It is sometimes desirable not only to know that a line is in use, but also where it is in use. It is of advantage to the exchange manager, in cases where operators fail to clear out promptly, to be able to tell by listening just

at what table the dilatory operator is located. The most approved way of operating long-distance lines in large exchanges in connection with local lines is to extend all of the local lines into the long-distance operating-room. This in a measure removes the local lines from the control of the local manager, who is responsible for the service over such lines. By the use of the tone-test any delay in clearing out on the part of the long-distance people can readily be discovered. In this manner I am not only enabled to determine the fact when a line is busy, but am enabled to determine at any board where the test is made at what particular other board the line tested is connected or in use.

My invention will be readily understood by reference to the accompanying drawing, in which the line *a* extends from its subscriber's station through spring-jack switch *b* on the first board, spring-jack switch *c* on the second board, spring-jack switch *d* on the last board, and thence through individual annunciator *e* on the first board and to ground. Line *f* is connected with spring-jack switches *g h i* on the different boards, and through individual annunciator *k* on the second board to ground. Line *l* is connected with spring-jack switches *m n o* on the different boards, and through annunciator *p* on the last board to ground. Line *a* is provided with a test-wire, *q*, connecting together the test-pieces of its spring-jack switches *b c d*. Line *f* is provided with the test-wire *q'*, connecting in like manner the test-pieces of its spring-jack switches *g h i*. Line *l* is provided with test-wire *q''*, connecting together the test-rings of its switches *m n o*.

At the first board I have shown a pair of loop-plugs, *r r'*. The tips of these plugs are connected by strand *r''*, this strand *r''* including the usual clearing-out annunciator. From the different sides of this clearing-out annunciator are provided the branch connections *r'''*, these branches passing through a switching apparatus, *r''''*, to the ground branch, including the operator's telephone *r''''''*. The sleeves of plugs *r r'* are connected by a strand, *r''*. From this strand *r''* branch *r'''* extends, through a rheotome, *r''''*, and the battery *r''''''*, to

ground. At the last board I have provided a corresponding pair of plugs, s s' . The strand s^2 , connecting the sleeves, I have shown connected with ground branch s^3 , in which is included test-battery s^4 . It will be understood that several such pairs of cords will be provided at each board.

Means for connecting the telephone with the strand which connects the tips of any cord may be as shown, or in any other well-known way. The ground branch r^8 or s^3 , at any board which connects with the sleeve-strands, should include a characteristic current-producing device.

The manner of sending in the calls and making the connections and disconnections is briefly as follows: Subscriber sends in current over line a and throws down shutter e . Operator at first board inserts plug r in spring-jack b and throws down cam-lever of switching device r^5 , bringing telephone r^6 into circuit. She having received the order, we will say, for line f , touches tip of plug r' to test-piece of spring-jack switch g , and line f being idle, she hears no tone in telephone r^6 , and thereupon inserts plug r' , as shown. The cam-lever of switching device r^5 is then thrown up to the position shown, and the operator is ready for the next work, first having called up the subscriber of line f by throwing current to line in the well-known way. It will be seen that when lines a and f are thus connected a tone from rheotome r^9 will be present upon both of their test-circuits—that is, upon test-circuits q q' —since the said rheotome r^9 is connected thereto through the sleeve-strand r^7 .

Suppose, now, subscriber of line l throws down shutter p , as shown at the last board. Operator at last board inserts plug s' in spring-jack switch o of line l , and connects her telephone with line l , as shown, and having received the order, we will say, for line f , pro-

ceeds to test said line f by touching tip of other plug—that is to say, tip of plug s —to test-piece of spring-jack switch i of line f upon the last board. When this test is made, the tone of rheotome r^9 will be heard in operator's telephone at last board, and she, hearing the tone, will not only know that the line is busy, but will also know that the connection has been made at board 1—that is to say, at the board having the characteristic tone of rheotome r^9 .

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

1. The combination, with telephone-lines connected each with a different switch on each of two or more switch-boards, of pairs of cords and plugs at each of said switch-boards, the tips of each pair being connected together and the sleeves of each pair being connected through a characteristic current-producing device, whereby it may be determined at one board whether any line wanted or called for is in use at any other of the boards, the particular board at which the connection is made being indicated by the characteristic tone, substantially as and for the purpose specified.

2. A pair of loop-plugs, the tips of said plugs being connected together by a strand of a pair of cords, the sleeves of said plugs being connected together by another strand which is connected through a rheotome, r^9 , to ground, in combination with an operator's telephone, telephone-lines, and switching apparatus, substantially as described.

In witness whereof I hereunto subscribe my name this 12th day of January, A. D. 1889.

JOHN J. CARTY.

Witnesses:

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