

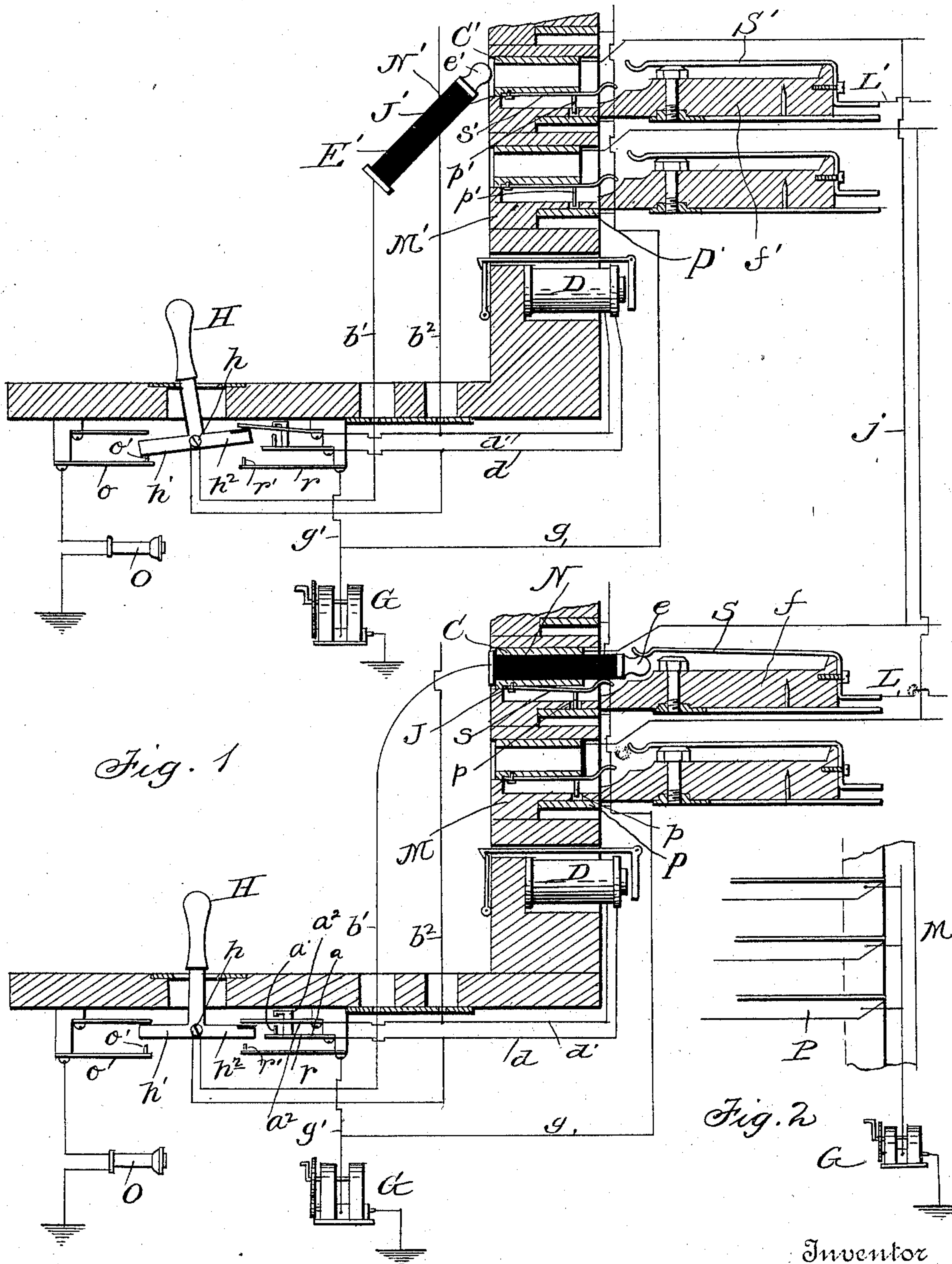
(No Model.)

W. S. NASH.

MULTIPLE SWITCHBOARD FOR TELEPHONE EXCHANGES.

No. 591,192.

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MULTIPLE SWITCHBOARD FOR TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 591,192, dated October 5, 1897.

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To all whom it may concern:

Be it known that I, WALTER S. NASH, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Multiple Switchboards for Telephone-Exchanges; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in multiple switchboards for telephone-exchanges.

It consists in the combination of a generator of the well-known type properly grounded and adapted, when energized, to transmit vibratory currents through test-circuits comprising a series of contact-plates in electrical connection with said generator and with each other, improved spring-jack switches in electrical connection with correspondingly numbered and constructed spring-jacks on the other multiple boards of the exchange, each having two contact-arms extending from the front and back of the spring-jack frame and parallel to, but not connected with, each other, the arm thereof projecting to the front being in electrical connection with a subscriber's line and the one projecting to the rear being in similar connection with the eye or metallic rim of the spring-jack switch and adapted, when depressed by the insertion of a switch-plug, to electrically engage a contact-plate in circuit with said generator, and test-plugs insulated along their cylindrical peripheries, each provided with a conducting-core exposed at one end and electrically connected at the other end with a pivoted hand-switch adapted, when drawn backward, to close the test-circuit through the operator's head-phone and when pushed forward to break such circuit, and by tapping directly on another connection with said generator to ring up both subscribers, a more detailed description of the construction and operation of my device being as hereinafter set forth.

In the drawings forming a part of this specification, Figure 1 is a side elevation of

sections of two multiple switchboards to which the same lines are connected, together with a diagram showing circuit connections and apparatus embodied in my invention. Fig. 2 is a front elevation of a section of the frame of a multiple switchboard, showing the contact-plates, which are features of my device, and the connection of each with the feed-wire from the generator.

In the drawings, L L' are subscribers' lines.

M M' are sections of multiple switchboards provided with the contact-plates P P', insulated from, but secured to, said switchboards M M' in any well-known manner.

J J' are spring-jacks connected with the spring-jack of the other switchboard through the wire *j*, said spring-jacks being connected to the test-thimbles C C'. Line-switches S S' are provided and are connected in the usual manner with the subscribers' wires L L'.

The switch-plugs E E' are composed of cylinders of non-conducting material N N', through each of which projects a metallic core, terminating at one end in the point *e e'* and at the other in a flexible insulated conducting-cord *b' b²*, and are in electrical connection with the hand-switch H, which is pivoted at *h* to a non-conducting surface and is provided with the arms *h'* and *h²*.

O is the operator's head-phone in electrical connection with the projections *o'* on the contact-arm *o* and properly grounded.

G is the generator, grounded in the usual manner, which is provided with the feed-wire *g* therefrom to the contact-plates P P', and also provided with the annunciator connection *g'*, adapted, when the arm *h²* of the hand-lever H is brought into contact with the projection *r'* on the contact-arm *r*, to establish an annunciating-circuit from generator G along the annunciator connection *g'*, the contact-arm *r*, the projection *r'* on the contact-arm *r*, the horizontal arm *h²* of the hand-switch H to *h*, thence along the conducting-cord *b* to and through the switch-plug E, line-switch S, line L to the subscriber's telephone, ringing his bell, and simultaneously closes the annunciator-circuit through the other subscriber's telephone through the drop connection *d*, which is in electrical engagement with the switch-lever H at *h*, the contact-arm *a*, the projection *a'* on the contact-arm *a*, the spring-switch

a^2 , the switch connection a^3 , the plug-cord b^2 , and thence through the switch-plug in electrical connection with the subscriber's line-switch and line in the usual manner.

5 The operation of my device is as follows: When the switch-plug E is inserted through the test-thimble C of the spring-jack J, the point e of the switch-plug E electrically engages the spring S, thereby establishing the
10 line-circuit L, and at the same time the insulated cylinder N depresses the test-switch s , so that the projection p thereon is brought into electrical connection with the contact-plate P, when the test connection is completed through
15 the generator G, the feed-wire g , the contact-plate P, the test-thimble C, the wire j in electrical connection with the spring-jacks J J', and the test-thimble C' of the spring-jack J', so that if the point e' of the switch-plug E' is
20 brought into contact with the test-thimble C' of the spring-jack switch J' the test-circuit is established thence through the metallic core of the switch-plug E', the conducting-cord b' , the horizontal arm h' of the hand-
25 switch H, the projection o' of the contact-arm o to the operator's head-phone O, in which the alternation of the generator-current indicates that the line thus tested is in use. It is obvious that if the point of the switch-plug
30 be applied to the test-thimble of a spring-jack whose multiple terminals are not in electrical connection with the generator—that is to say, when lines operated through correspondingly-numbered spring-jacks on other
35 multiple boards of the exchange and in electrical connection with the spring-jacks to be tested are not in use—the test-circuit is not established, and the operator knows by the absence of vibrations in the head-phone that
40 the tested line is not busy. If the line tested is not busy, the operator makes the connection with the desired line in the usual manner, and by reversing the switch-lever H and bringing the arm h^2 thereof into electrical en-
45 gagement with the point r' on the contact-arm r establishes the calling-circuit through the connected lines, as hereinbefore set forth.

In my device it is apparent that wires in electrical connection with the wire g may be
50 substituted for the contact-plates P P', and that the switch (described as switch-lever H) may be adapted to be operated by a pivoted pedal or equivalent mechanism.

By the foregoing it will be noted that my
55 switching-test apparatus is simple and effective, dispensing, as it does, with intricate con-

nections and at the same time affording a more distinct and unmistakable test than by other devices of this character heretofore operated, and at the same time affords a satisfactory and convenient apparatus for making and breaking the calling-circuit. 60

Having described my invention and its operation, what I claim, and desire to secure by Letters Patent of the United States, is— 65

In multiple switchboards for telephone-exchanges, the combination of the subscriber's telephone in electrical connection with corresponding line-switches on several multiple boards of the exchange, each attached in a
70 suitable manner to the frame of a corresponding spring-jack, a test-thimble to each of the spring-jacks, spring-switches, one end of each being in electrical engagement with the test-thimble of a corresponding spring-jack, and
75 adapted to be operated by the insertion of a suitable switch-plug through the thimble of the spring-jack, means for electrically connecting the thimbles of corresponding spring-jacks on the several multiple boards of the
80 exchange, contact-points in electrical connection with a suitable generator and adapted to electrically engage said spring-switches when same are depressed, switch-plugs insulated
85 save at their extremities one of said switch-plugs being inserted through the test-thimble of a spring-jack in electrical connection with a corresponding spring-switch, from
90 which it is insulated, into electrical engagement with one of said contact-points, a similar switch-plug on a different multiple board of the exchange, a switch-lever in electrical connection therewith, an arm on said switch-lever, adapted when the switch-lever is op-
95 erated in one direction to engage a contact-point in electrical engagement with the operator's head-phone, and another arm on said switch-lever which when said switch-lever is operated in another direction breaks its con-
100 nection with the operator's telephone, to engage a contact-point in the calling-circuit, actuated by said generator and adapted when established to ring up both subscribers whose lines are connected, substantially
105 as described.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER S. NASH.

Witnesses:

W. A. GAGE,
W. C. LAWSON.