(No Model.) 2 Sheets—Sheet 1.

T. J. PERRIN.

MULTIPLE SWITCH BOARD.

No. 348,578. Patented Sept. 7, 1886.

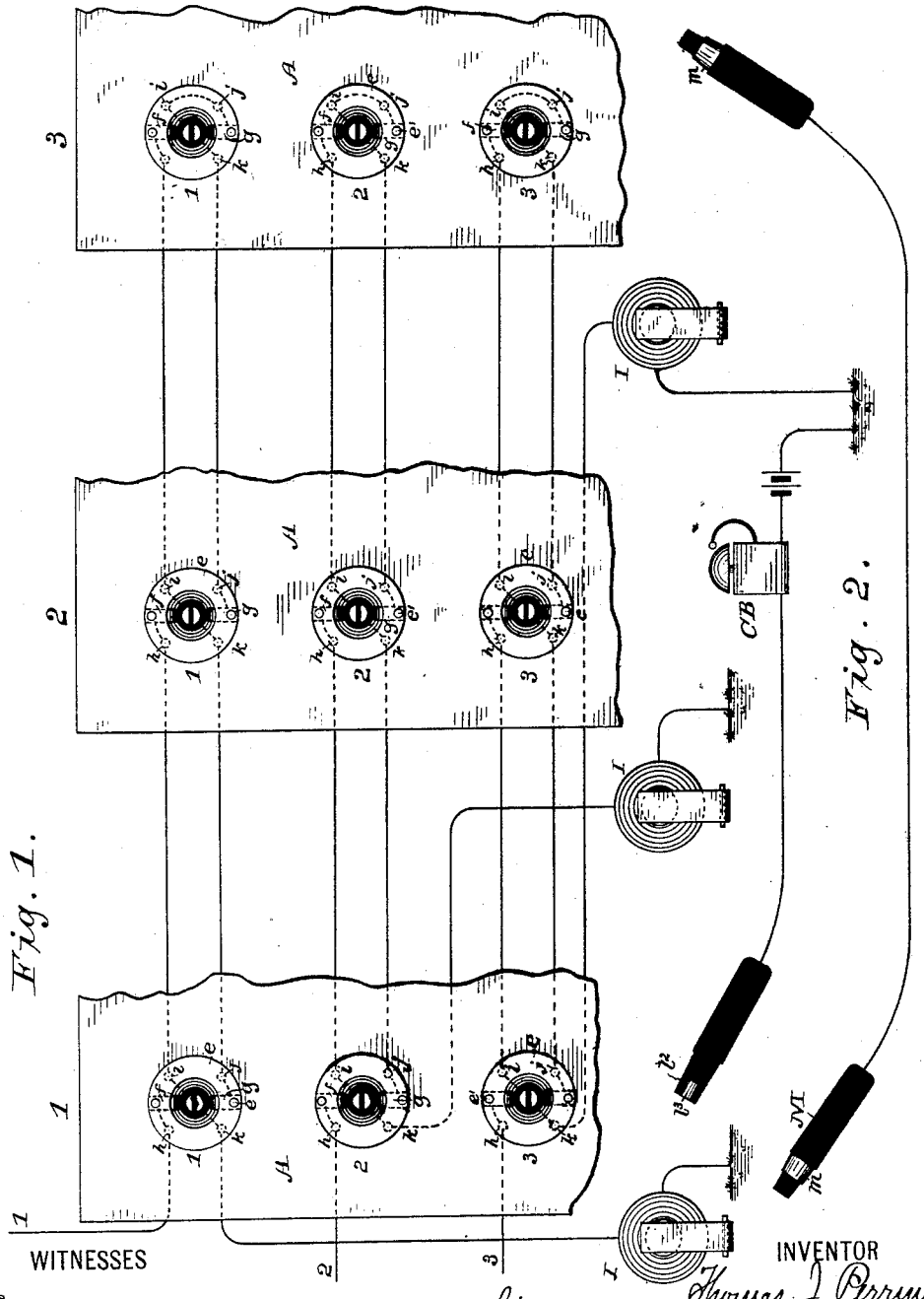

Fig. 1.

Fig. 2.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

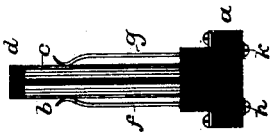


Fig. 8.

Fig. 10.

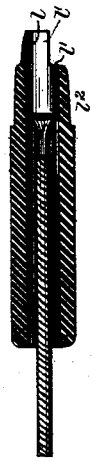


Fig. 5.

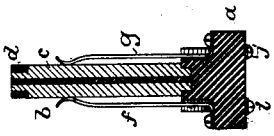


Fig. 7.

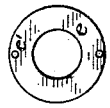


Fig. 3.

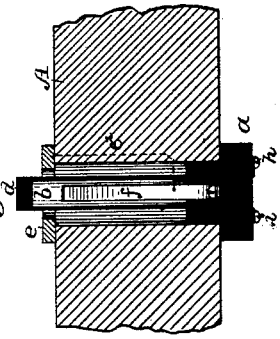


Fig. 6.

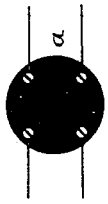
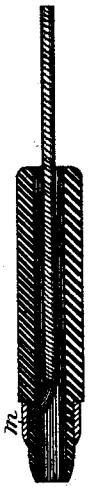


Fig. 9.



WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

THOMAS J. PERRIN, OF BROOKLYN, NEW YORK, ASSIGNOR TO CHARLES P. HUNTINGTON, OF GREENVILLE, MISSISSIPPI.

MULTIPLE SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 348,578, dated September 7, 1886.

Application filed October 6, 1885. Serial No. 179,141. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. PERRIN, of Brooklyn, Kings county, State of New York, have invented certain Improvements in Multiple Switch-Boards, of which the following is a specification.

The object of my invention is to simplify and cheapen the construction of such boards. The details are fully set forth below.

In the accompanying drawings, Figure 1 is a diagram view illustrating three portions of three sections of a multiple switch-board and three main lines connected thereto. Fig. 2 is a view showing the connecting-plugs. Figs. 3, 4, 5, 6, 7, and 8 are detail views illustrating the construction of the line terminals in the board, and Figs. 9 and 10 are detail sectional views showing the construction of the connecting-plug and the test-plug.

The frame of the board A is bored for each terminal, and the line terminal devices fitted therein, as clearly shown in Fig. 3. A plug of insulating material, *a*, is inserted in the aperture from the rear side of the board. This plug carries two forwardly-projecting metallic spindle-sections, *b c*, which are insulated from each other by an intervening layer of some insulating material, and are bound together at the end which projects slightly from the front face of the switch-board by a collar, *d*, of insulating material. Contact-springs secured on the plug or block A, of insulating material, project forward through the aperture in the board, and bear upon the upper and lower spindle-sections, *b c*, as clearly shown in Figs. 3, 4, and 5. Each spring *f g* and each spindle-section *b c*, is independently electrically connected with a binding-screw on the rear face of the plug *a*. Each opening in the board is preferably faced with a metallic ring, *e*, which is secured in place by pins or screws *e'* at the top and bottom, and each ring is electrically connected with the upper finger, *f*, at each terminal, as indicated by the line e^2, Fig. 3. The plug *a* and the parts carried thereby are so inserted in the board that the spindle-sections, spring-fingers, and screws *e'* will all be in a vertical line. In the arrangement shown all the main lines are brought in at section 1 of the board, and, after running to their terminals on the several sections, pass to their annunciators at their particular boards, and from thence to earth. Three sections of board and three main lines are shown, and they are numbered 1 2 3. The terminals of each line on each section are numbered to correspond with the lines.

Referring specially to line 1 of section No. 1 of the board: This line runs to a binding-screw, *h*, on the rear of the plug of insulating material *a*, which screw is connected with the upper spring-finger, *f*, which bears on the spindle-section *b*, which is connected with the binding-screw *i*. From thence the line runs to screw *h*, finger *f*, spindle-section and screw *i* on board No. 2, thence through the corresponding parts on board No. 3. On the latter board the screw *i* is electrically connected with a screw, *j*, connected with the lower spring-finger, *g*, bearing on the lower spindle-section, *c*, which is connected with the binding-screw *k*. From section 3 the line returns to section 2 of the board and passes through the corresponding parts *j*, *g*, *c*, and *k*, and from thence through the corresponding parts on board No. 1, and through the annunciator-coil I to earth. All the other lines are similarly connected, each line being finally carried to its annunciator at its particular board and grounded. The circuits shown are similar to those generally used in all switch-boards.

The test-plug (there being one at each section of the board) is illustrated in the lower half of Fig. 1 and in Fig. 10. This plug is composed of a handle of insulating material, in the front end of which is secured a brass sleeve, *l*. The interior of the sleeve is lined with insulating material *l'*. The exterior is also covered with insulating material l^2, except at the point l^3, where the insulating material is cut away so as to leave the brass sleeve exposed. On the side of the plug opposite the exposed portion of the sleeve l^3 a section of the sleeve and of the insulating material is cut out so as to form an opening in the side of the plug, as clearly shown at l^3, Fig. 10. The metal sleeve *l* is connected through an ordinary call bell and battery to earth.

If the operator at any one of the switch-boards wishes to ascertain whether any one of the lines is in use, he inserts the test-plug just described in the terminal of that line. When

this is done the upper spring, *f*, will remain undisturbed, because of the test-plug being cut, as described; but the lower spring, *g*, will be lifted from its contact with the lower spindle-section, *c*, and will bear upon the exposed portion *l*³ of the conducting-sleeve *l* in the test-plug. If a line is not in use, the operator's bell will sound, and the subscriber's bell will also be rung, thus calling him. For instance, assume that the test-plug has been inserted in the terminal of line 1 on switch-board No. 2, the circuit of the main line No. 1 will run through the upper-connections, *h f i*, of its terminal on its particular board No. 1, thence to its terminal on board 2. The test-plug having been inserted at board 2 the circuit will there be] as follows: from the lower spring-finger, *g*, through the metallic sleeeve *l*, call-bell C B, and battery, to earth. This gives a ground at the subscriber's station and at the central office, and rings the bells, as before mentioned. There will be no circuit to the annunciator of this line, because the insulating material *l'* on the interior of the sleeve *l* breaks connection between the lower spring-finger, *g*, and the lower spindle-section, *c*. The operation with all the other circuits is precisely the same.

If the subscriber's line is not in use, the operator proceeds to make the desired connection with each of the connected plugs M. These plugs are of ordinary construction, being provided with annular conducting-rings *m*, surrounding a tube of insulating material, which passes over the spindle-sections. The end of the tube of insulating material separates the fingers *f* and *g* and upper and lower spindle-sections, while the conducting-ring makes contact with the face or terminal ring *e*. When these plugs are inserted, the main line circuit of each subscriber will be completed through the upper spring-finger, *f*, ring *e*, conducting-sleeve *m* on the plug, thence to the other subscriber's line. The circuit will be opened by the separation of the spring-fingers from the spindle-sections, so that the earth and annunciator of each subscriber will be disconnected. If therefore the line is in use, an operator at any of the boards upon testing that line would get no signal. For instance, suppose that line No. 1 is in use and has been connected on its particular board No. 1, and that the operator at No. 3 inserts the test-plug at the terminal of that line on board No. 3. The test-circuit would then be from the earth, battery, and call-bell to the conducting-sleeve *l*, lower spring-finger, *g*, and screw *j*, through the upper terminal on boards 2 and 3 to screw *i*, and upper spindle-section at the terminal on board 1, where the circuit would be open, because the connecting-plug M had been thrust between the spindle-section and upper-finger, *f*. There would therefore be no circuit for the operator's call-bell. As before remarked, there would be no circuit from the lower spindle-section at terminal 1 on No. 3, where the test-plug had been inserted, because the insulating lining *l'* of the sleeve *l* would break the circuit from the spring *g* to the lower spindle-section, and there would therefore be no ground through the annunciator in line No. 1 at board No. 1. By placing the screws *e'*, which secure the face-place in position, and the spring-fingers and spindle-connections at each terminal in a vertical line, the screw *e'* serves as a guide for the proper insertion of the test-plug.

It is thought that the complete operation of the board will now be understood without further description.

Any ordinary suitable arrangement of clearing-out relay and operative telephone may be employed. As such matters are, however, common and well understood, their description and illustration is thought to be unnecessary. The spindles of the spring-jacks may be of any cross-section other than round, and the apertures in the plugs be correspondingly shaped. Thus flat upper and lower spindle-sections may be used, if desired.

It will be observed that the spring-jacks are attached to the board by a single aperture, and that the test and line connecting-plugs are plugged to the same aperture. This gives a cheap and simple structure.

I claim as my invention—

1. The combination of the several sections of a multiple switch-board, the main lines, the terminal devices for each main line on each section of the board, said devices consisting of the upper and lower insulated spindle sections or contacts and the upper and lower insulated contact-springs which bear, respectively, on the spindle-sections and the circuit-connections.

2. The combination of the several sections of a multiple switch-board, the main lines, the terminal devices for each line on each section of the board, consisting of the upper and lower spindle sections or contacts, and the spring-fingers, circuit-connections, substantially such as described, and the test-plug with its bell or indicator and battery.

3. The main-line terminal devices, consisting of the combination of the plug of insulating material, the insulated spindle sections or contacts separated by insulating material, and the insulated spring contact-fingers mounted on the plug and bearing on the spindle-sections.

4. The combination, substantially as set forth, of the several sections of a multiple switch-board, a main line, a terminal device or compound spring-jack for said line on each board, said spring-jack having two pairs of insulated contacts, through which the line-circuit normally passes, a circuit-connecting plug which, when inserted in said spring-jack, separates said pairs of contacts, thus disconnecting the earth and annunciator of the subscriber from the spring-jack, and connecting the line with the circuit-connecting cord, and a test-plug and test-indicating devices electrically connected therewith, said test-plug being

constructed, substantially as set forth, so as to separate only the pair of contacts nearest the subscriber's annunciator, at the same time connecting the line-contact *g* of said pair with the test devices, and leaving the contact with which the annunciator is connected disconnected from the line and test devices, all for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

THOS. J. PERRIN.

Witnesses:
ANNA E. PERRIN,
E. H. QUANTIN.