

(No Model.)

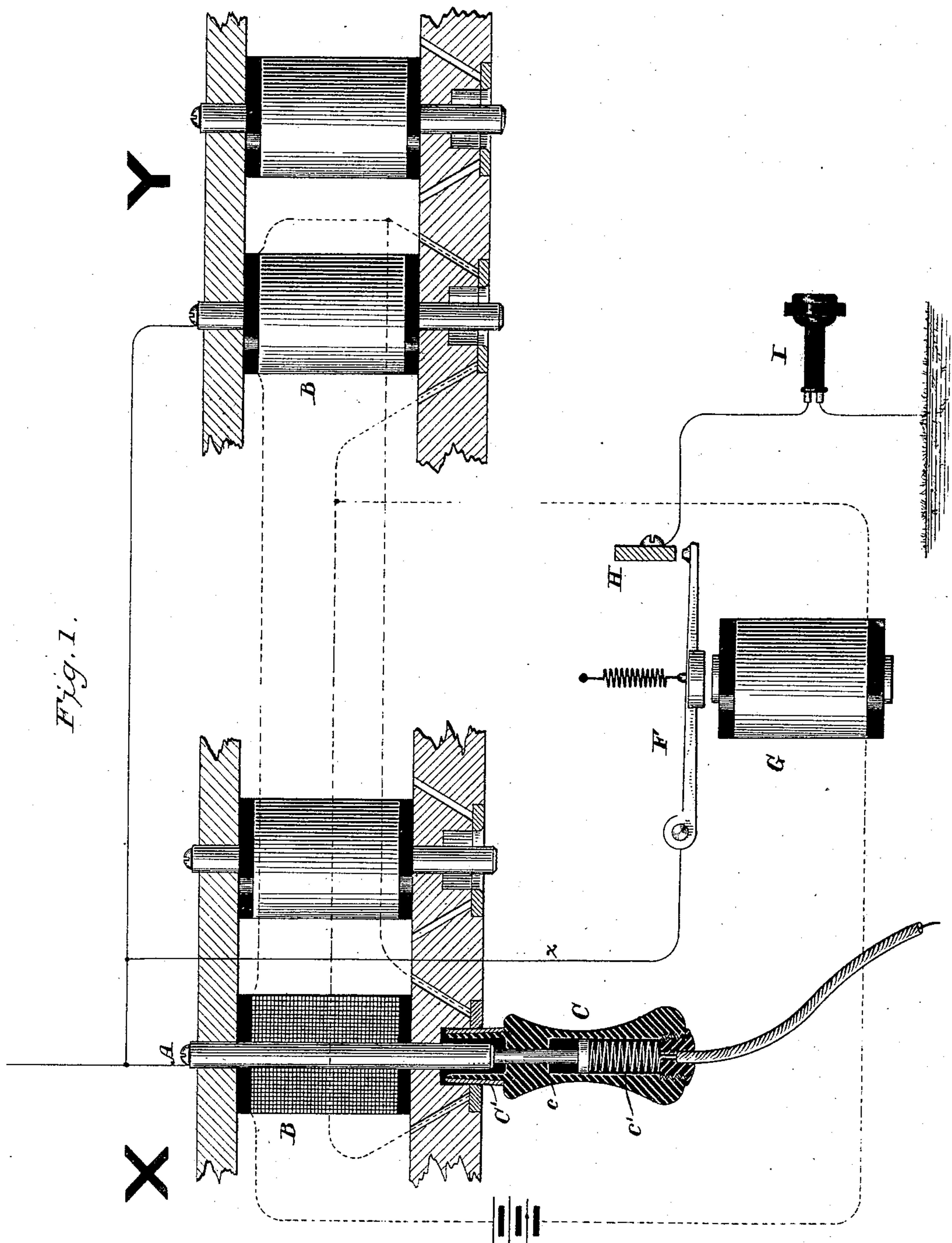
3 Sheets—Sheet 1.

T. J. PERRIN.

MULTIPLE SWITCH BOARD.

No. 316,395.

Patented Apr. 21, 1885.



WITNESSES

Wm A. Shinkle
Geo W Young

INVENTOR

Thomas J. Perrin.

By *his* Attorneys.

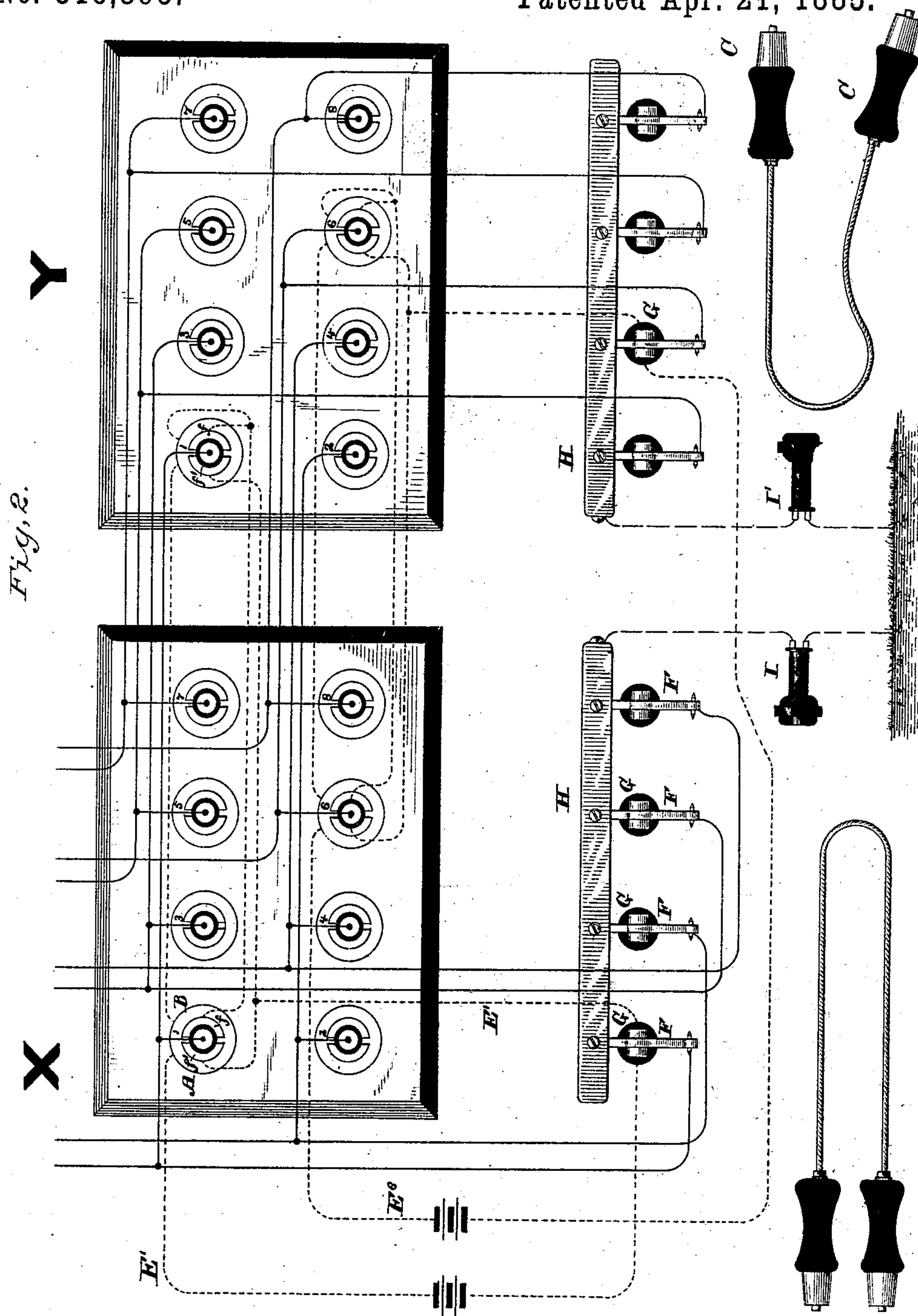
Baldwin, Hopkin & Ketchum

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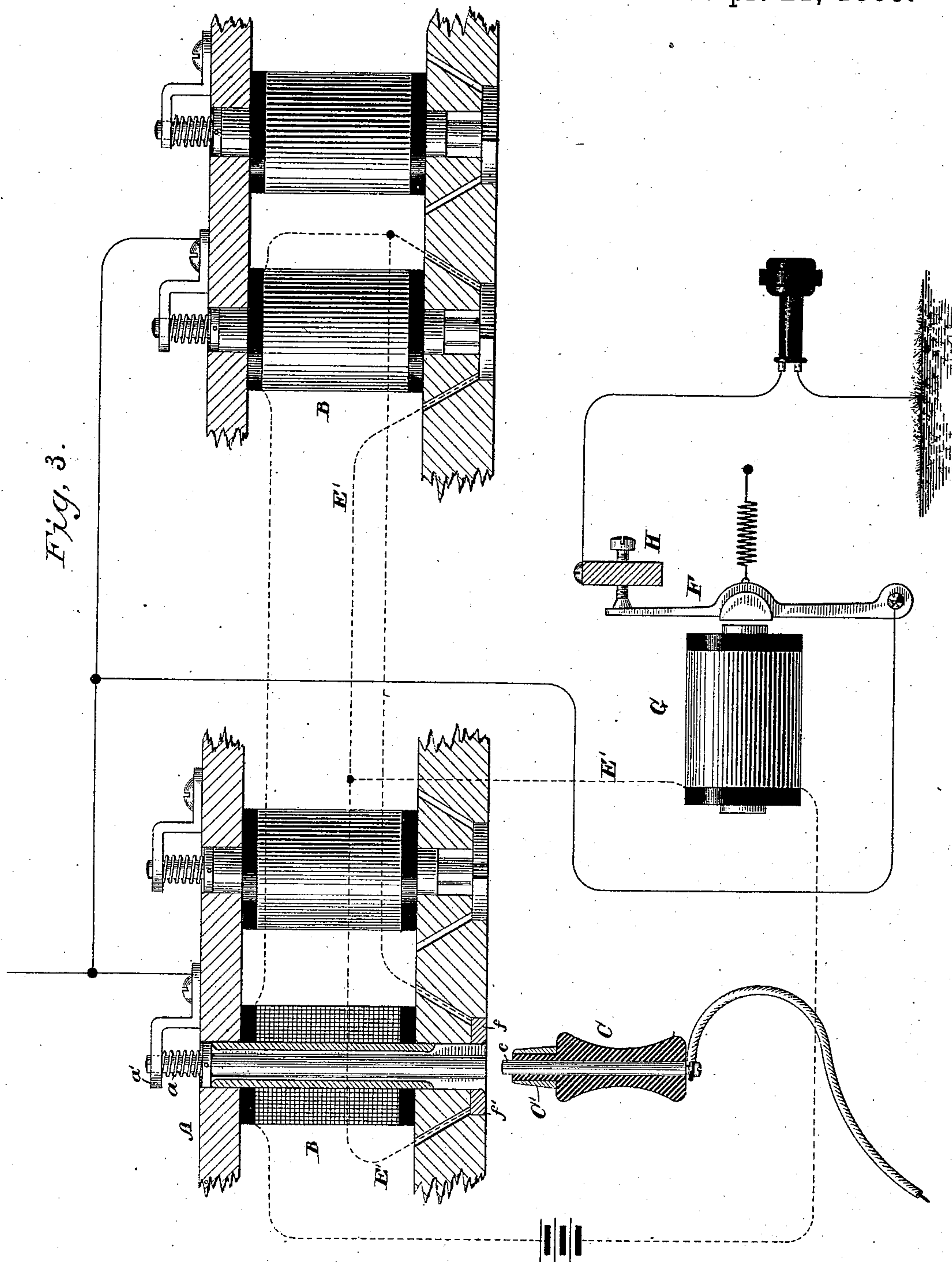
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Fig. 3.



WITNESSES

Wm A. Sinkler
Geo W. Young

INVENTOR

Thomas J. Perrin.

By his Attorneys

Baldwin, Hopkins & Peckham.

UNITED STATES PATENT OFFICE

THOMAS J. PERRIN, OF BROOKLYN, ASSIGNOR TO CHARLES P. HUNTINGTON,
OF NEW YORK, N. Y.

MULTIPLE SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 316,395, dated April 21, 1885.

Application filed October 6, 1884. (No model.)

To all whom it may concern:

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

The object of my invention is to provide a switch-board of a simple and economical construction which may be worked with rapidity and facility to meet the demands of the subscribers.

In the accompanying drawings, Figure 1 is a detail view of sections of two boards of a multiple series, each section showing two line-terminals. Fig. 2 is a diagram view showing a portion of the faces of two boards in a multiple series and the apparatus connected therewith; and Fig. 3 is a similar view to Fig. 1, showing a slightly-modified construction.

Referring to Figs. 1 and 2, it will be perceived that the main lines enter the boards, and are directly connected with the cores A of the magnets B at each of their terminals on the several boards. For instance, in Fig. 1 line No. 1 is connected directly with the core of its terminal magnet on the board X, and from thence to the core of its terminal magnet on the board Y. The line is also connected by a wire, *x*, with the armature F of the electro-magnet G. This armature is normally in contact with a bar, H, with which the operator's telephone-instrument I is normally connected. We will suppose that the operator at X will answer calls from 1 to 4, inclusive, and the operator at Y will answer calls from 5 to 8, inclusive. Lines 2, 3, and 4 at X are connected in the same manner through the armatures F of the several electro-magnets G with the operator's telephone I, as clearly shown in Fig. 2. Lines 5, 6, 7, 8 are similarly connected on board Y through said armatures and strip H through the operator's instrument I'. A local circuit is provided for the terminals of each line. For instance, take the line 1. Its local circuit is marked E', and runs from one pole of the battery, through the coil B of terminal *l* on board X, and through coil B of terminal *l* on board Y, thence to its contact-plate *f* at the aperture of each of said line-terminals. The opposite pole of the battery, as is clearly

shown, is connected through the coil of the electro-magnet G with the opposite contact *f'* at each terminal. The local circuit E' of line 6 is similarly connected through its electro-magnet G at station X.

The cores A of the several magnets B are arranged in the frame of the boards, as clearly shown in Fig. 1. The front end of each core is shown as projecting slightly beyond the face of the board, being surrounded by a well or socket in the board for the reception of the plugs, which will presently be described. The contacts *f f'* of the local circuits are arranged on opposite sides of the opening around the end of the core, so that they may be connected when the terminal is plugged to, so as to complete the local, as is presently described.

The plugs which I prefer to employ are clearly shown in Fig. 1. They are preferably composed of a hollow ebonite or vulcanite handle, C, within which a contact-rod, *c*, which is normally thrust outwardly toward the end of the plug by a spiral spring, *c'*, is arranged. The plugs are in pairs, as shown in Fig. 2, and the contact-pin *c* in one plug is connected to that in the other through the spiral spring and ordinary flexible conducting-cord. The nose of the plug C' is hollowed out, as clearly shown in the drawings, so as to pass over the end of the magnet A. The outside of this portion of the plug is surrounded with an annular conducting-collar, which, when the plug is inserted into the board, as shown in Fig. 1, makes contact between the plates *f f'*, and completes the local circuit of that particular line.

The operation of the board is as follows: Suppose, for instance, that subscriber No. 1 desires to communicate with subscriber No. 6. He signals the operator at X through the telephone I, and the operator at that board tests the terminal of line No. 6 to ascertain if the line is in use—that is, he touches the end of the iron plug *c* to the core A of the magnet at terminal 6. If the magnet is magnetized, he then knows that the local circuit E' of line 6 has been completed by being plugged to at some other board, and that that line is therefore in use, because the completion of the local circuit E', as before described, will magnetize all the cores belonging to line 6 on the several boards. If, however, he finds that

the line is not in use—that is, that the core is not magnetic—he proceeds to call up subscriber No. 6 by sending a signaling-current into his line. Then by taking a pair of connecting-plugs, C, and connecting the terminals of the lines 1 and 6, the subscribers will be in connection for communication. At the same time the plugging to the terminal of line No. 1 at Fig. 1 completes the local circuit E' through the coil of its electro-magnet G. This energizes the magnet, which attracts its armature F and breaks the connection with the contact-plate H, so that the instrument I is cut out of circuit. The operator, by lifting the armature F into contact with the bar H, may at any time throw his telephone into circuit to ascertain when the subscribers have finished conversation.

A description of any of the other lines is unnecessary, as they are all similarly connected. If No. 6 were to call and desired to communicate with No. 1, the operator at station Y would make connections as already described.

Instead of employing such a plug as illustrated in Figs. 1 and 2, the cores A of the magnets may be made to yield inwardly against the pressure of a coil-spring, α , the end of the core moving in a bracket, α' , as clearly shown in Fig. 3. Under this arrangement the contact-pin c in the handle C is rigid, and extends entirely through the handle, as clearly illustrated. The operation is of course identical with that already described.

I have shown my invention as organized for practical operation in the way deemed by me best. I do not, however, limit myself to specific details.

In an application for Letters Patent of the United States filed by me June 25, 1884, No. 135,996, I have shown a switch-board having the same arrangement of local batteries and local-battery terminals. In that application, however, the main line was broken at the terminal plugged to, so that all the other of said line-terminals on the other boards were entirely cut out of circuit. In the present case it will be perceived that the main-line connections with the several terminals are never interrupted.

The operators at the several boards are, as in the application just referred to, notified of the use of any of the lines by the magnetic condition of the cores at the several terminals.

No claim is herein made to any subject-matter claimed in said application.

I am aware of the patent of Sabin, No. 249,262, November 8, 1881, in which a multiple switch-board is shown having two electro-magnets for each main line at its particular board. In that arrangement the main line is connected with the armature of a magnet included in a local circuit. This armature is normally drawn toward a contact or stop connected with the operator's instruments, and is permitted to be drawn against said contact to throw the operator's instruments into the

circuit when a signal-current is received over the main line by the attraction of the armature of a main-line magnet, which serves as a catch or detent for the armature first mentioned. I make no claim to such a structure.

I claim as my invention—

1. The combination, substantially as set forth, in a multiple switch-board, of a main line permanently connected with its terminals on the several boards, a magnet at each of said terminals, a local circuit in which the coils of all of said magnets are included, and plugs or line-connecting devices which complete said local whenever one of the main-line terminals is plugged to.

2. The combination, substantially as set forth, in a multiple switch-board, of a main line permanently connected with its terminals on the several boards, and normally directly connected with operator's instruments on its particular board, plugging or line-connecting devices, and an electro-magnet which automatically cuts the operator's instruments out of the line when the terminal of said line is plugged.

3. The combination, substantially as set forth, in a multiple switch-board, of a main line, the several connections of said line on the several boards, operator's instruments with which the main line is normally connected at its particular board, a local circuit, contacts at each of said connections or terminals for completing the local circuit whenever the terminal of said line is plugged to, an electro-magnet for said line included in said local circuit, and devices, actuated by the said magnet whenever the local circuit is completed, to cut the operator's instruments out of the main line.

4. The combination, substantially as set forth, of a main line, its several connections or terminals on the several boards, an electro-magnet at each of said terminals, a local circuit which includes the coils of all of said electro-magnets, contacts for completing said local circuit at each terminal, plugging or line-connecting devices which complete said local circuit whenever the terminal of said line is plugged, an electro-magnet for said line, also included in said local circuit, operator's instruments normally connected with the main line at its particular board, and devices, actuated by the latter magnet when the local circuit is completed, which throw the operator's instrument out of the main line.

5. The combination, substantially as set forth, in a multiple switch-board, of a main line, its several connections or terminals on the several boards, an electro-magnet at each terminal, the core of which is connected directly with the main line, a local circuit which includes the coils of said magnets, the contacts of said local circuit at each terminal, and plugging or line-connecting devices, substantially such as described.

6. The combination, substantially as set forth, in a multiple switch-board, of a permanently unbroken main line, its several connec-

tions or terminals on the several boards, an electro-magnet at each of said terminals, a local circuit in which the coils of said magnets are included, the contacts of said local circuit at the several terminals, a contact with which the main line is permanently connected at each terminal, and plugging or line-connecting devices which complete the local circuit and make contact with said line contacts whenever the terminals of said line are plugged.

7. The switch-board plug herein described, constructed of a hollow handle of insulating

material, an annular collar or circuit-completer rigidly secured around the nose or plugging end of the handle, a yielding contact-pin, and its spring carried within the handle, and the conducting-cord.

In testimony whereof I have hereunto subscribed my name.

THOMAS J. PERRIN.

Witnesses:

L. C. YOUNG,
NELLIE L. HOLMES.