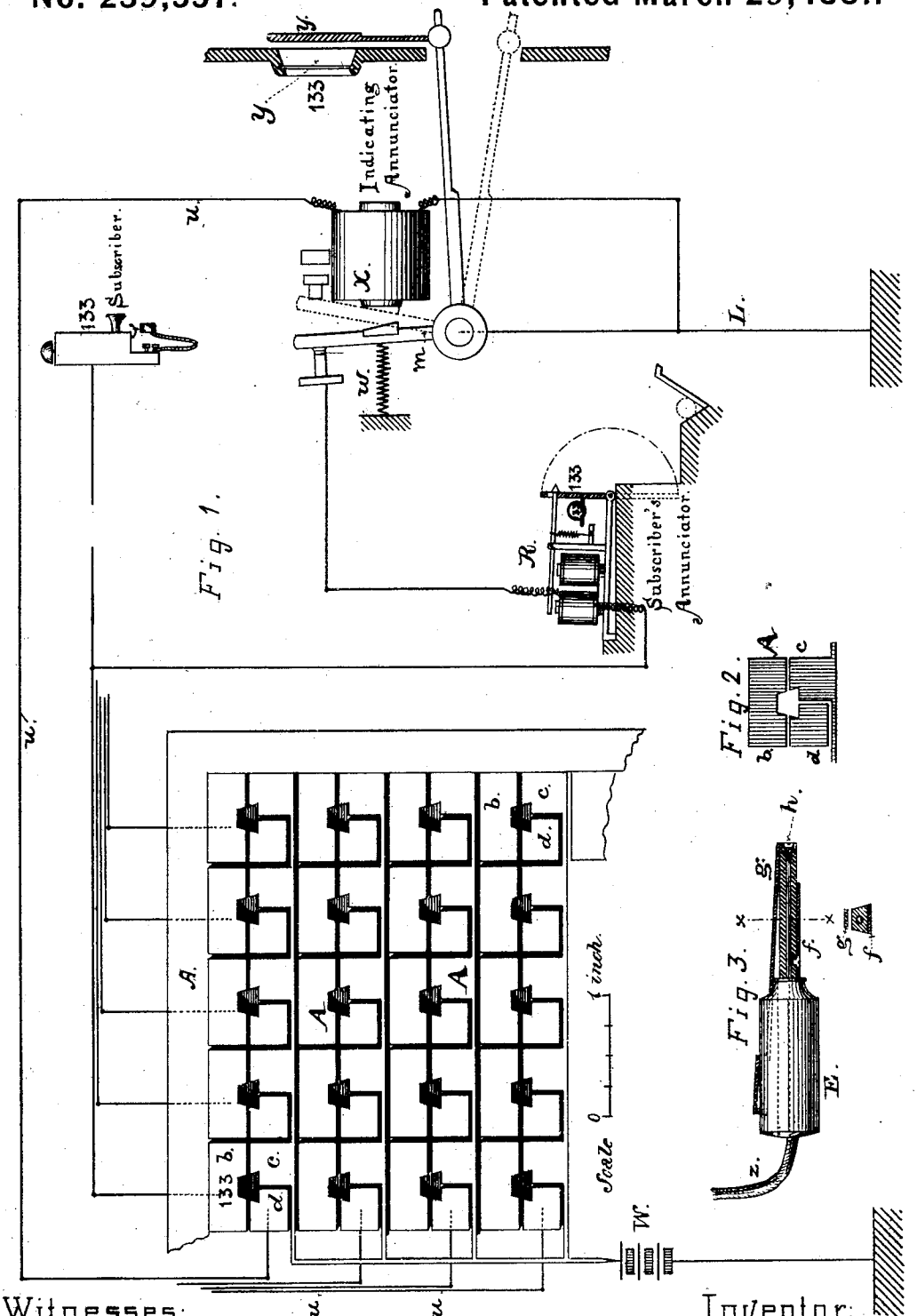
(No Model.) 2 Sheets—Sheet 1.

J. I. SABIN.

Electrical Switch Board.

No. 239,557. **Patented March 29, 1881.**



Witnesses:

Wm. Clark

W. Voit.

Inventor:

John D. Sabin

By his Attys. Boone & Osborn

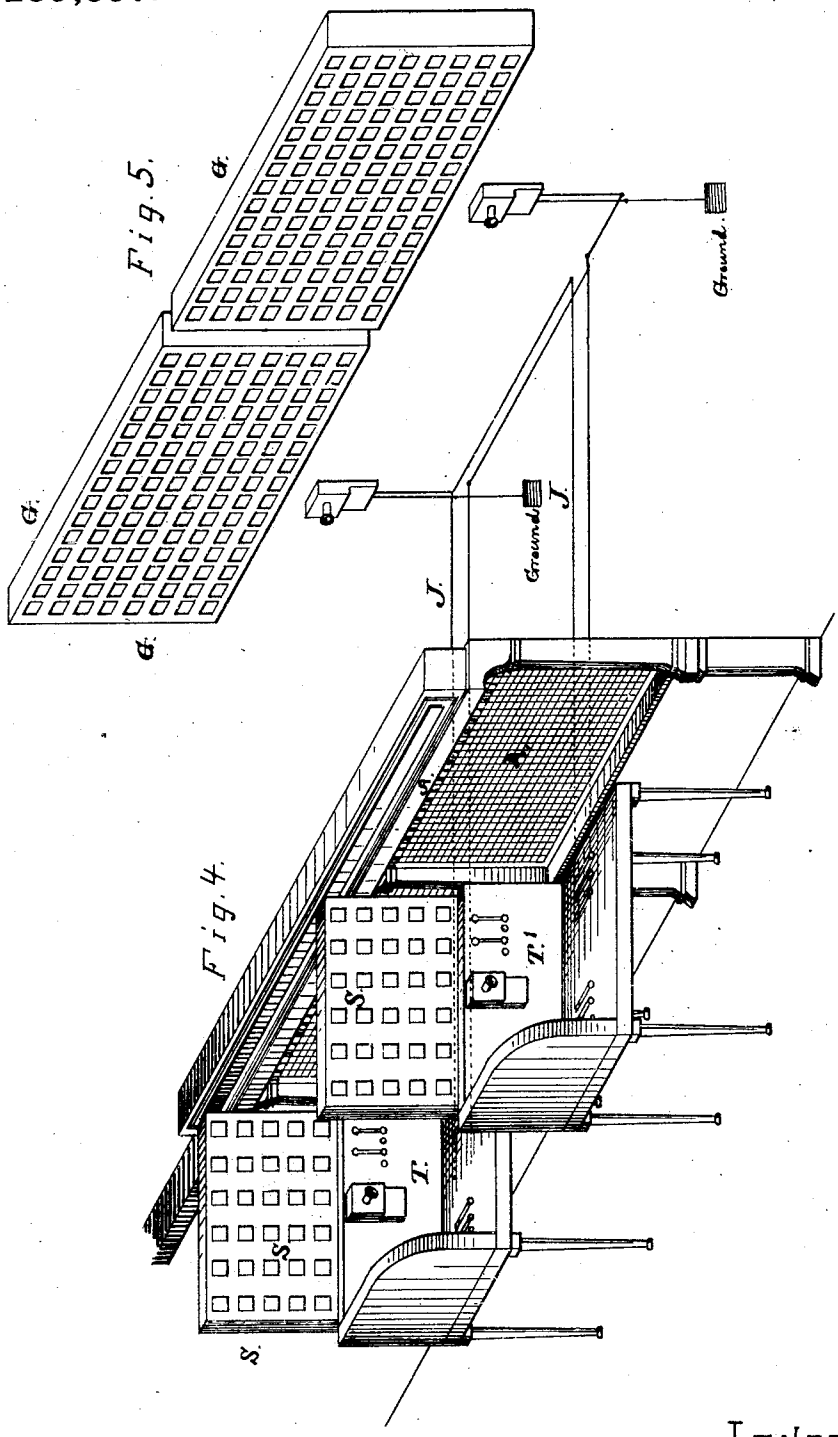
N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

J. I. SABIN.

Electrical Switch Board.

No. 239,557. **Patented March 29, 1881.**



Witnesses;

W. Hart

Chas. F. Clark.

Inventor:

John I. Sabin.

By his Attys, Dame & Adams

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN I. SABIN, OF SAN FRANCISCO, CALIFORNIA.

ELECTRICAL SWITCH-BOARD.

SPECIFICATION forming part of Letters Patent No. 239,557, dated March 29, 1881.

Application filed December 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN I. SABIN, of the city and county of San Francisco, in the State of California, have made and invented certain new and useful Improvements in Electrical Switch-Boards and System of Operating Telephone-Exchanges; and I do hereby declare that the following specification fully, clearly, and exactly sets forth and describes my invention, and the manner in which the same is applied and operated, reference being had to the accompanying drawings.

My invention relates to a new construction of switch-board for interconnecting the lines or members in a telephone-exchange system; also to a mode of arranging, applying, and operating the same in connection with other means and apparatus to produce an improved telephone-exchange system, as hereinafter described and claimed.

In the accompanying drawings here referred to, Figure 1 shows the arrangement and application of my improvements to form an exchange system of any desired number of lines. It illustrates the relation of the subscriber's switch, local circuit, local indicator, and subscriber's or regular annunciator. Fig. 2 shows the construction of a subscriber's switch or switch-board section. Fig. 3 is the double-acting switch-plug. These two views are full size. Fig. 4 illustrates the arrangement of two operators' tables, each with a complete switch-board to which all the wires entering the exchange may be attached. Fig. 5 shows the arrangement of the local indicating-annunciator with which all the operators' tables are in communication through a local signaling apparatus, battery, and circuit.

I provide each subscriber with a local indicating annunciator or apparatus in addition to the regular annunciator of his line, and I operate it in the following manner by means of a local circuit and a connection provided at the subscriber's plate or section on the switch-board, so that the same plug used in connecting the subscriber's line through the exchange system is caused to operate this auxiliary annunciator.

Each switch A is constructed of three parts or sections, *b c d*, each part normally disconnected from the others. To one of these parts, as at *b*, I connect the subscriber's incoming line. To one, as at *c*, I connect the battery W, and to the third one I bring the local line *u* from a relay, X, that operates to cover and uncover a local indicator, Y. This battery W, the two parts *c d*, and the line *u*, therefore make the local circuit, and there is one such switch to each subscriber's line. To each operator's table I provide a complete switch-board, composed of these sections, A, to which are connected all the subscribers' wires and "trunk lines" entering the office; and for convenience and economy of space I place these tables T T one behind another, as many as may be required, so that the switch-boards can be run in a continuous line alongside of the tables. To each operator is given, also, as many subscribers' annunciators S as he can attend and make connections for, and these I place in front of the table, as at *s*, Fig. 4, so that with each set of annunciators S, I give the operator a complete switch-board.

I run separate local wires *u* for each subscriber from his switch-section *d* to the operating apparatus of his auxiliary or local indicating annunciator along the upper part of the line of switch-boards. The switch-plug E for this switch-board is a double-acting one. It has two circuit-closing plates or tongues— one, *f*, on the under side to connect the sections *c d* and complete the local circuit, and the upper one, *g*, for making connection between the end of the switch-cord *z* and the section *b* of the line-wire. The construction of the plug is shown in Fig. 3 of the drawings.

I do not in this application lay any claim to the indicating annunciator, nor to the arrangement herein described, whereby all the subscribers' wires and trunk lines are connected to each switch-board.

The lower metallic plate, *f*, is simply screwed onto the bottom face of the end portion; but the upper plate, *g*, is made in the form of a spring, that works at the front end of the plug in a groove, and is fixed at the rear end by the screw *h*, where it connects with the end of the switch-cord wire Z. By the single movement of inserting this plug in the aperture of the switch the double result is effected of putting the switch-cord on the line-wire, and of throwing the battery upon the relay X, by which

the local indicator is operated. The spring *g* insures the retention of the plug E in place, and it is readily pressed down by the operator to release the plug and permit it to draw out easily.

The arrangement of the relays that work the local indicating apparatus is shown in the diagram, Fig. 1. When the circuit of the local line *u* is closed by the switch-plug E, the relay X acts to uncover and keep exposed the number or indicating character of this local indicator Y, and this condition continues until the plug is withdrawn and the circuit broken. At such time, the relay being thrown out of action, the indicator is covered by the operation of a spring, *w*, as shown, or by any other suitable means. This local indicator therefore shows to each operator at all times the condition of any line in the system, whether it is in use or not.

To facilitate work in large systems, where a number of operating-tables are employed, and to avoid noise and confusion, I prefer to arrange the local indicating-annunciators in a separate room. In such case I place the indicators in sections or detachments of a convenient number, and at each section I put an attendant, with whom each and every table-operator can communicate through the medium of a local signaling-line and apparatus—such as a telephone. Each section of local indicators is thus provided with an operator or attendant, who, by means of his local line and telephone, receives and responds to inquiries as to the condition of any line in his section from any operator in the main room. This is illustrated in diagram, Fig. 5, where G are the sections of local indicators, and J the local lines running to each table. I also make the relay X to automatically take off and put on the subscriber's annunciator at the required times. This I accomplish by making the ground-connection of the subscriber's annunciator through the arm or lever *m* of the relay-armature, in such manner that when the relay acts to uncover the number of the local indicator Y, it will take the "ground" from the subscriber's annunciator, R, and when the relay covers up the indicating number, the return of the parts to their normal position will put the subscriber's annunciator in working condition again by closing the circuit of its line. This arrangement will be readily understood by reference to Fig. 1 of the drawings.

My improvements, as hereinabove described, will operate substantially as follows: Upon the signal from a subscriber—say No. 133—his individual annunciator at one of the operators' tables will drop and expose 133. The table-operator, by inserting one of a pair of switch-cord plugs into hole 133 on his switch-board, then connects his telephone with line 133 to receive the order after the usual manner. As the switch-plug E is pressed in, it also brings into action the local circuit to operate the relay and expose the number 133 on the local indicator. This informs all the other operators that line 133 is in use. When the subscriber's order is received, the table-operator first refers to the local indicating-annunciator to ascertain whether or not the number required is uncovered, and if it be not in use the operator then inserts into the proper number on his switch-board the switch-plug of the second cord of the pair, and connection is then made in the usual manner between the two subscribers' lines. The second switch-plug operates, like the first one, to uncover at the local indicator the second number, and thus all the operators learn that these two lines are engaged. As long as these plugs remain in the subscriber's switch-board sections the two numbers of the local annunciators will remain exposed, and no operator will plug into such numbers on his switch-board as long as they are in use. At such time, also, these two subscribers will have the ground taken off their individual annunciators automatically and simultaneously with the uncovering of the local indicators *y*; and when the plugs are withdrawn the ground will be restored on the subscriber's annunciator simultaneously with the covering of the local indicating number.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The three-part section or switch A, composed of the detached sections *b c d*, to which are connected, respectively, the line-wire, the battery, and the local line *u*, to operate the relay X, constructed and applied to operate substantially as and for the purpose hereinbefore set forth.

2. The double-acting plug E, having the connections *f g*, substantially as hereinbefore described, for making connections between the switch-cord and the line-wire and completing the circuit between the battery and local line.

3. The combination, with the subscriber's annunciator R, of the relay X, the local circuit *u*, for operating the relay, and the ground-connection L to the subscriber's annunciator R, whereby the said annunciator is thrown into and out of action by the operation of the relay, substantially as hereinbefore described.

Witness my hand and seal.

JNO. I. SABIN. [L. S.]

In presence of—
CHAS. D. WHEAT,
EDWARD E. OSBORN.