

W. A. CHILDS.  
SWITCHBOARD.

No. 512,805.

Patented Jan. 16, 1894.

Fig. 1

a	a	a
b	b	b
a	a	a

Fig. 2.

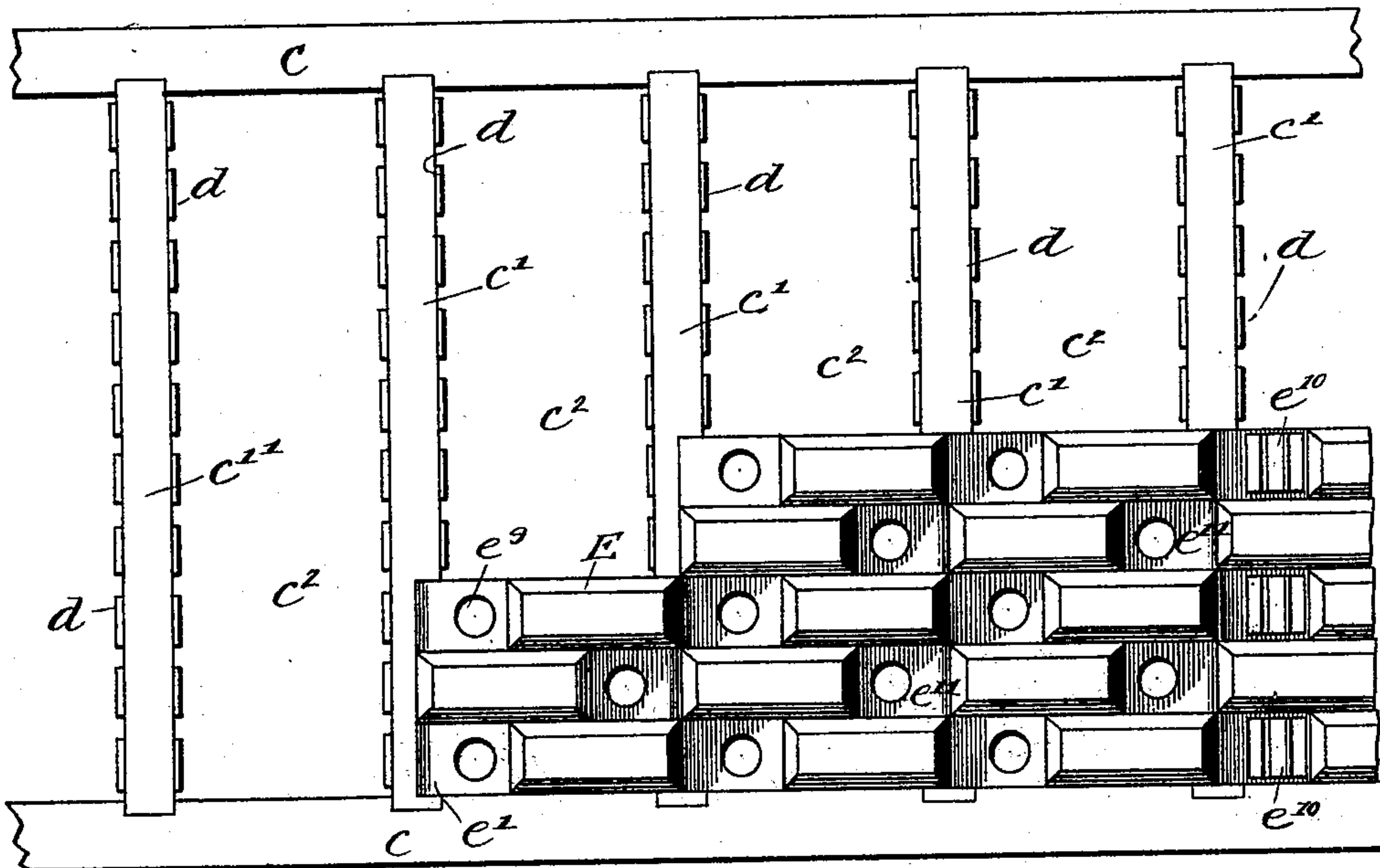
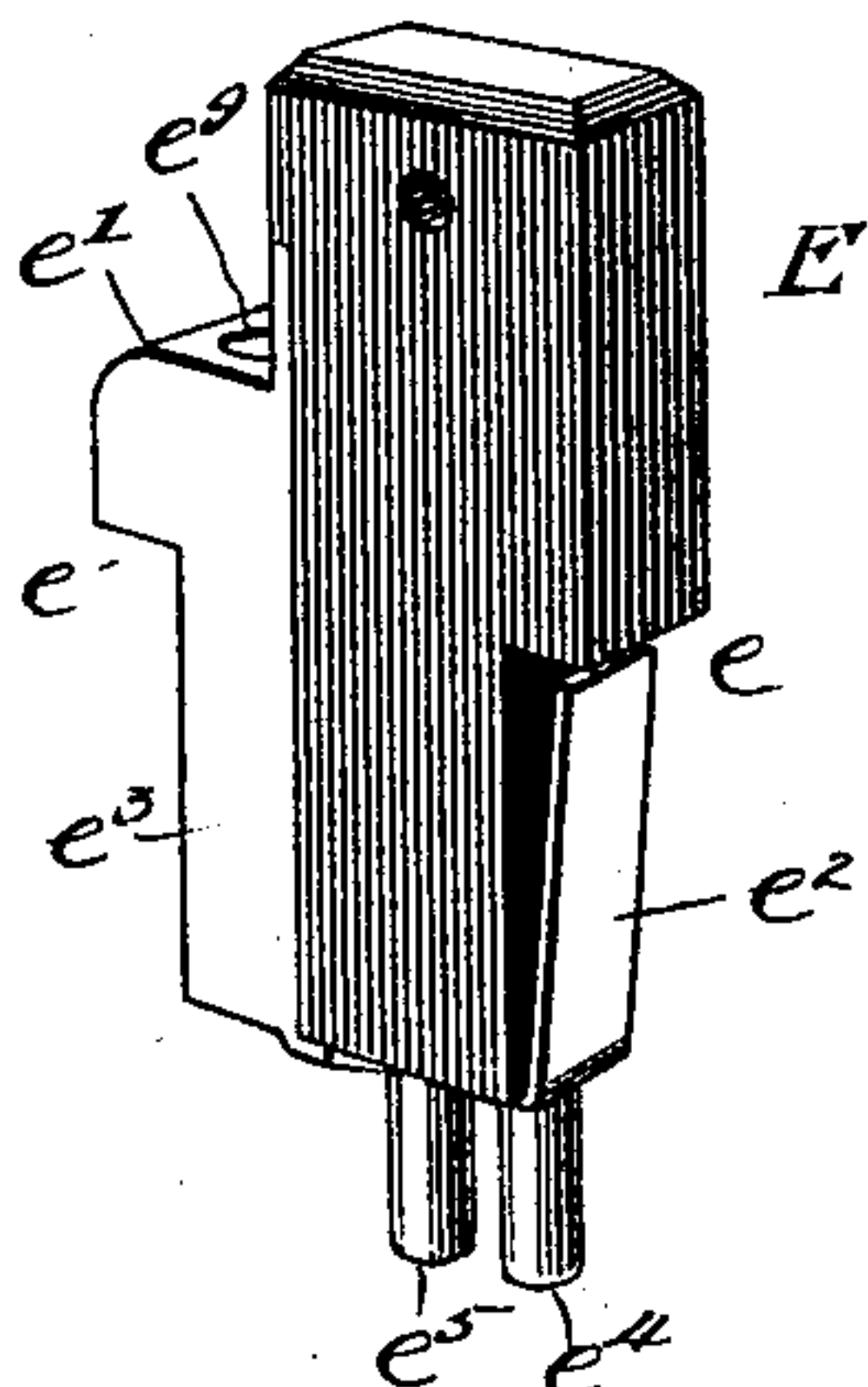


Fig. 5.



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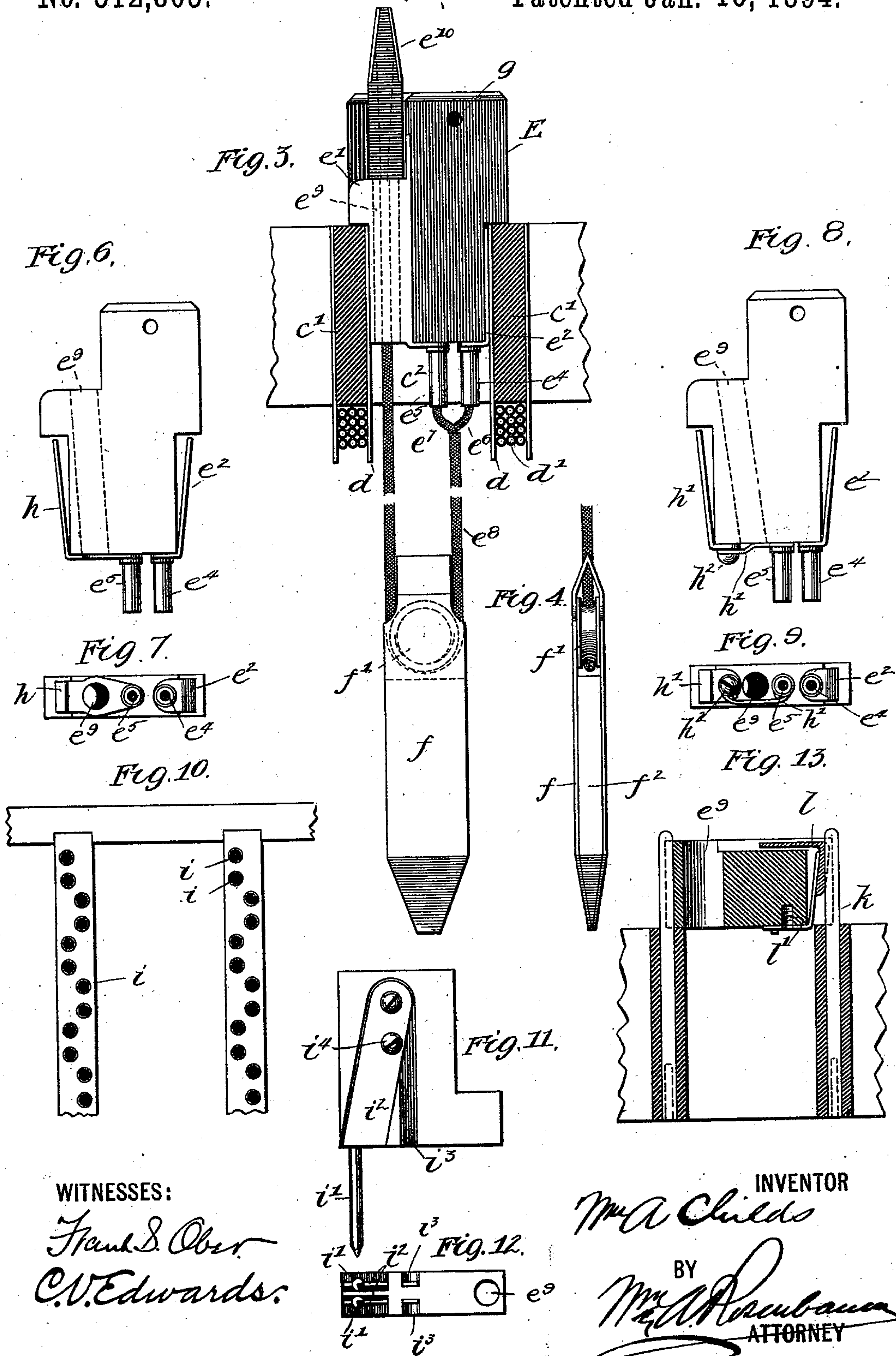
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# UNITED STATES PATENT OFFICE.

WILLIAM A. CHILDS, OF ENGLEWOOD, NEW JERSEY.

## SWITCHBOARD.

SPECIFICATION forming part of Letters Patent No. 512,805, dated January 16, 1894.

Application filed October 25, 1893. Serial No. 489,074. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM A. CHILDS, a citizen of the United States, residing at Englewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Electrical Switchboards; of which the following is a full, clear, and exact description.

This invention relates to electrical switchboards and it is intended to be used chiefly in telephone and telegraph exchange offices.

The invention has special reference to switch boards equipped with and operated by means of flexible conductors or cords fixed at one end and carrying a movable connecting plug at the other end, with a weight and pulley over which the cord passes for returning the cord and plug to their normal or inoperative position by gravity after the connection has been broken by the removal of the plug from a socket.

The primary object of the invention is to provide a construction for these parts which will admit of the ready removal of the entire cord, plug and weight from the switch-board whenever the same is found to be faulty and the insertion of a perfect cord, plug, weight, &c., in its place. Heretofore in switch-boards wherein these flexible cords have been used the fixed end of the cord has been connected by means of binding screws or solder or other substantially permanent means at a part of the board somewhat removed from the point where the plug at the free end of the cord is accessible to the operator, and thus when it was desired to remove a faulty cord it became necessary for a workman to first detach its fixed end, and to do this it was often necessary to go behind or underneath the board or remove a portion of the frame or case in order to reach the fixed end. This required time and meanwhile left the board disabled. By my invention neither end of the cord is permanently fixed and both ends are accessible to the operator close to each other and directly upon the face of the board. The cord is attached to a removable block forming a part of the face of the board and held in place in the frame thereof by friction. By lifting or withdrawing this block the entire cord, plug and weight comes with it.

The special construction of the block and

weight above referred to also forms a part of my invention, all of which will be hereinafter fully described and pointed out in the claims. 55

In the accompanying drawings: Figure 1 represents a plan of the face of the horizontal switch-board showing merely the spaces occupied by the sockets and plugs. Fig. 2 is a plan on an enlarged scale of a part of the central portion of the board, showing the frame with its contacts and the cord carrying blocks of which the face of the board is composed. Fig. 3 is a vertical section through a portion of the face of the board, showing one of the cord carrying blocks with its attachments in place. Fig. 4 is an edge view of the weight and pulley. Fig. 5 is a perspective view of the preferred form of cord carrying block. Figs. 6, 7, 8 and 9 are side and end views of modifications of this block. Fig. 10 is a plan of a portion of the frame work of the face of the board, showing a modified arrangement of the contacts carried by it. Figs. 11 and 12 are side and end views of a form of cord carrying block adapted for the frame shown in Fig. 10, and Fig. 13 is a sectional view of a block and portion of the frame adapted for ground circuit switchboards. 80

The switch-board to which this invention is best applicable has a horizontal face and each section of the multiple board or each single board, is divided into three parts *a a* and *b*. The part *b* contains the terminals of all those subscribers, wires whose calls are answered by the operator at a particular board or section, and underneath this part of the board the flexible cords and weights referred to are located, the plugs attached to them projecting through the face of the board in position to be grasped by the operator. The parts *a a* of the section or board contain the sockets of all the subscribers in the system and by raising one of the plugs in the part *b* and placing it into one of the sockets in the parts *a a*, any two subscribers in the system are connected together. The flexible cord permits a plug to be carried from the central portion *b* to any point in the outside portions *a a* and when the subscribers are disconnected the weight and pulley connected with the cord beneath the face of the board draw the plug back to its normal and inoperative position 100



and carry the cord down beneath the face of the board where it will not be in the way of the operator.

My invention has nothing to do with the sockets contained in the parts *a a* of the board. It is sufficient to state that each of these sockets contains two metallic contacts which make connection respectively with two similar contacts on the plug which is inserted into them, two contacts of course being necessary in any metallic circuit system.

*c* represents parts of the frame of the face of the board, between which are arranged transverse partitions *c'* forming preferably in each section of the board twenty spaces *c<sup>2</sup>*. These partitions are about two inches deep and are provided on each side with vertical metallic contact strips *d* which project somewhat below their lower edges, as shown in Fig. 3, to form a gutter for the reception of circuit wires *d'*. In each space *c<sup>2</sup>* the strips *d* are arranged directly opposite each other in pairs, and there are preferably ten of these pairs in each space *c<sup>2</sup>*, representing the terminals of ten subscribers. The outgoing and return conductors of the subscribers are positively connected respectively with these pairs of strips, one on each side.

*E* is a block of insulating material having its lower portion formed to fit across the space *c<sup>2</sup>* and provided with two shoulders *e* which rest upon the top of the partitions *c'* when the block is in place. From the upper portion of this block one corner is cut out to form a shoulder *e'*. The edges of the lower portion of the block which stand against the partitions *c'* are provided with metallic faces which make contact respectively with the strips *d*. As shown in Fig. 5 these metallic faces consist on one side of a spring plate *e<sup>2</sup>* and on the other side of a solid piece of metal *e<sup>3</sup>* forming a part of the body of the block which itself is of insulating material. Other forms of these metallic faces may be made, as will be described hereinafter. When the block is in the frame in the manner described, the spring *e<sup>2</sup>* establishes sufficient friction between the parts to hold the block firmly in place, but the connection is such that by using a little force the block may be pulled out of its seat. The spring *e<sup>2</sup>* bends under and slightly across the lower end of the block and is provided with a nipple *e<sup>4</sup>*; the block *e<sup>3</sup>* also has a tail piece which extends slightly across the lower end of the block and is also provided with a nipple *e<sup>5</sup>*. To these nipples are secured electrical conductors *e<sup>6</sup>* and *e<sup>7</sup>* which unite into a single flexible cord *e<sup>8</sup>*. The cord extends downward below the face of the table a certain distance and then around a pulley *f'* carried by a weight *f*; thence the cord leads upward through a vertical perforation *e<sup>9</sup>* in the block and then connects with a double plug *e<sup>10</sup>*, the two wires of the cord connecting respectively with the two contact pieces of the plug. The base of the plug is larger than the passage *e<sup>9</sup>* so that the weight

will not pull it through, but will be held in a vertical position projecting above the block. When the blocks with their cords and weights are adjusted to the frame they are placed side by side in contact with each other, but alternately reversed right and left in order to bring the upper cut out corner of the block first on one side and then on the other. The dimensions of the parts are such that the edges of each row of the adjacent rows of blocks will abut against each other directly over the partitions *c'* and the blocks are so placed that the straight upper portion of one will close the open side or corner of the other and thus form a rectangular well *e<sup>11</sup>* for the plug *e<sup>10</sup>*.

The weight *f* consists of two metallic plates clamping between them a piece of lead *f<sup>2</sup>*. The space between the upper portions of the plates is left free for a grooved pulley *f'* which is mounted to turn therein. The lower end of the weight is double wedge shaped. The upper end is also wedge shaped to facilitate its movement up and down between the other weights adjacent to it. The thickness of the weight is about the same or slightly less than that of the block *E*; each weight will therefore have a free space to move in from top to bottom. The electrical circuits are not shown complete, but, as before stated, the two sides of the circuit from a given subscriber enter the switch board with the wires *d'* and are attached respectively to the plates *d*. From one of these plates the circuit leads through the spring *e<sup>2</sup>* to the cord *e<sup>6</sup>* to one of the contacts on the plug *e<sup>10</sup>*, thence through one of the contacts of the socket in the part *a* of the switch board out to the subscriber called for, thence back to the socket, through the plug, flexible cord *e<sup>7</sup>*, metallic block *e<sup>3</sup>*, strip *d* and through the wire back to the subscriber. Whenever it is discovered that the insulation of a flexible cord is impaired or the weight or plug disarranged, or when in any other manner it is found to be faulty, the block *E* may be lifted vertically and it will carry with it the weight, cord and plug; another one may then be quickly and as easily inserted in its place, the two operations requiring very little time. To facilitate the removal of the block in case it cannot be grasped between the fingers, a small cavity *g* is made in the side of the block near its upper end into which a hook may be placed to pull the block out of its seat.

Figs. 6 and 7 show two views of a modified form of block. In the place of the solid metallic portion *e<sup>3</sup>* another spring *h*, similar to the spring *e<sup>2</sup>*, is provided. With such a construction, however, the passage *e<sup>9</sup>* must be through the insulating material itself and in an inclined direction, as shown, to avoid weakening the block. Figs. 8 and 9 show a similar construction except in the method of connecting the nipple *e<sup>5</sup>* with the spring *h*. In Figs. 8 and 9 the connection is by a wire *h'* and not by a portion of the spring itself, as shown in Figs.



6 and 7. This latter form necessitates that the passage  $e^9$  should be at a still greater angle in order to leave stock to receive the screw  $h^2$ . In Fig. 10 is shown a construction in which the strips  $d$  are dispensed with and in their places two metallic lined holes  $i$  are provided, which form both terminals of the circuit from a subscriber. This avoids the necessity of separating the wires and running one under each of the partitions  $c'$ . To correspond with these two holes the block which is shown in Figs. 11 and 12 is provided with two pins  $i'$  attached respectively to two plates  $i^2$ , the plates in turn being fastened to the opposite sides or faces. The two wires of the flexible cord pass respectively along the grooves  $i^3$  and are attached to the plates  $i^2$  by means of screws  $i^4$ .

A block adapted for a ground circuit switch-board is shown in Fig. 13. The single wire from the subscriber connects with post  $k$  and a spring contact  $l$  carried by the block makes contact with this post, which projects above the face of the frame. These posts are placed opposite each other in the partitions, but on one side of the block contact is with the non-conducting surface and is merely for the purpose of holding the block in place. A single flexible cord connects with the spring  $l$  in the hole by means of a screw placed in the hole  $l'$  and the cord, after passing over the pulley weight, runs through the passage  $e^9$ .

It is to be understood that any construction in which both ends of the cord terminate in the face of the board is within my invention, whether the ends be carried by a stationary or movable block and regardless of the manner of connecting the stationary end of the cord with the circuit.

Having thus described my invention, I claim—

1. In an electrical switch board, a flexible cord conductor, both ends of which terminate in a block forming a part of but removable from the face of the board, in combination with a pulley weight carried by the cord, for the purpose set forth.

2. In an electrical switch board, a block forming a part of, but removable from, the face of the board, in combination with a flexible conducting cord, a plug attached to the cord and a weight arranged to hold the cord in its normal position.

3. In an electrical switch board, a plug forming a part of, but removable from, the face of the board, in combination with a flexible conducting cord attached thereto and normally located behind or beneath the face of the board, but extensible to be above or in front of the face of the board, substantially as described.

4. An electric switch board having a face

made up of removable blocks placed side by side, each block carrying a flexible conducting cord, a plug attached to the cord and a weight arranged to hold the cord in its normal position.

5. In an electric switch board, a block forming a part of the face of the board, said block provided with a passage extending through it, in combination with a flexible conducting cord fixed at one end to the block, and the other end passing through the said perforation, for the purpose set forth.

6. In an electric switch board, a flexible cord conductor, both ends of which terminate in a block forming a part of the face of the board, said block being held in place by friction.

7. In an electric switch board having a face made up of blocks placed side by side, each block having one of its upper corners removed or cut away to form a well or cavity when surrounded by the adjacent blocks, and each block carrying a flexible cord and plug, the plug normally occupying the cavity, substantially as described.

8. In an electric switch board, a flexible cord conductor both ends of which terminate in a removable block forming a part of the face of the board, in combination with corresponding contact pieces located respectively on the block and frame of the switch board, for the purpose set forth.

9. In an electrical switch board, the combination of a plurality of cords and a plurality of pulley weights respectively therefor, all massed in close proximity, the weights having substantially rectangular bodies and wedge shaped ends.

10. In an electrical switch board, the combination of a plurality of cords and a plurality of pulley weights respectively therefor, all massed in close proximity, each weight having a double wedge shaped end, for the purpose set forth.

11. In an electrical switch board, the combination of a plurality of cords and a plurality of pulley weights respectively therefor, all massed in close proximity, the weights having pointed ends, for the purpose set forth.

12. An electrical switchboard having a face made up of removable blocks placed side by side, each block carrying a flexible conducting cord, a plug attached to the cord and a weight provided with pointed ends and adapted to hold the cord in its normal position.

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

WILLIAM A. CHILDS.

Witnesses:

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