

(No Model.)

J. B. LYON.

MOLD FOR THE MANUFACTURE OF ELECTRICAL SWITCHBOARDS.

No. 479,891.

Patented Aug. 2, 1892.

Fig. 2.

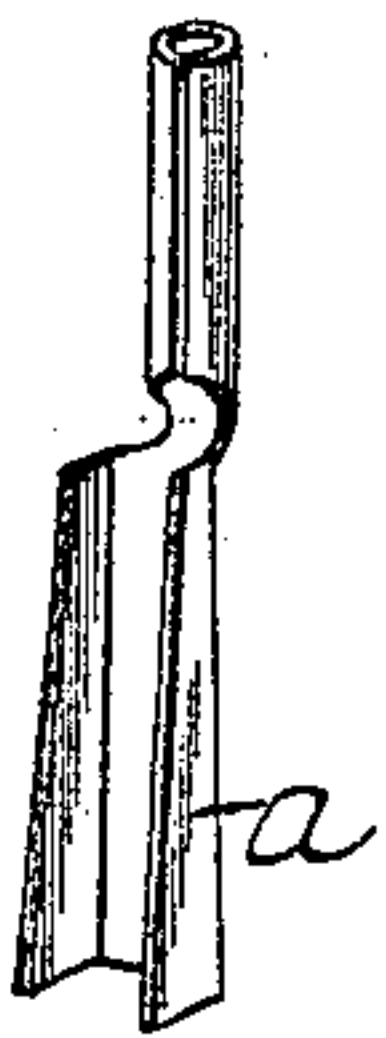


Fig. 1.

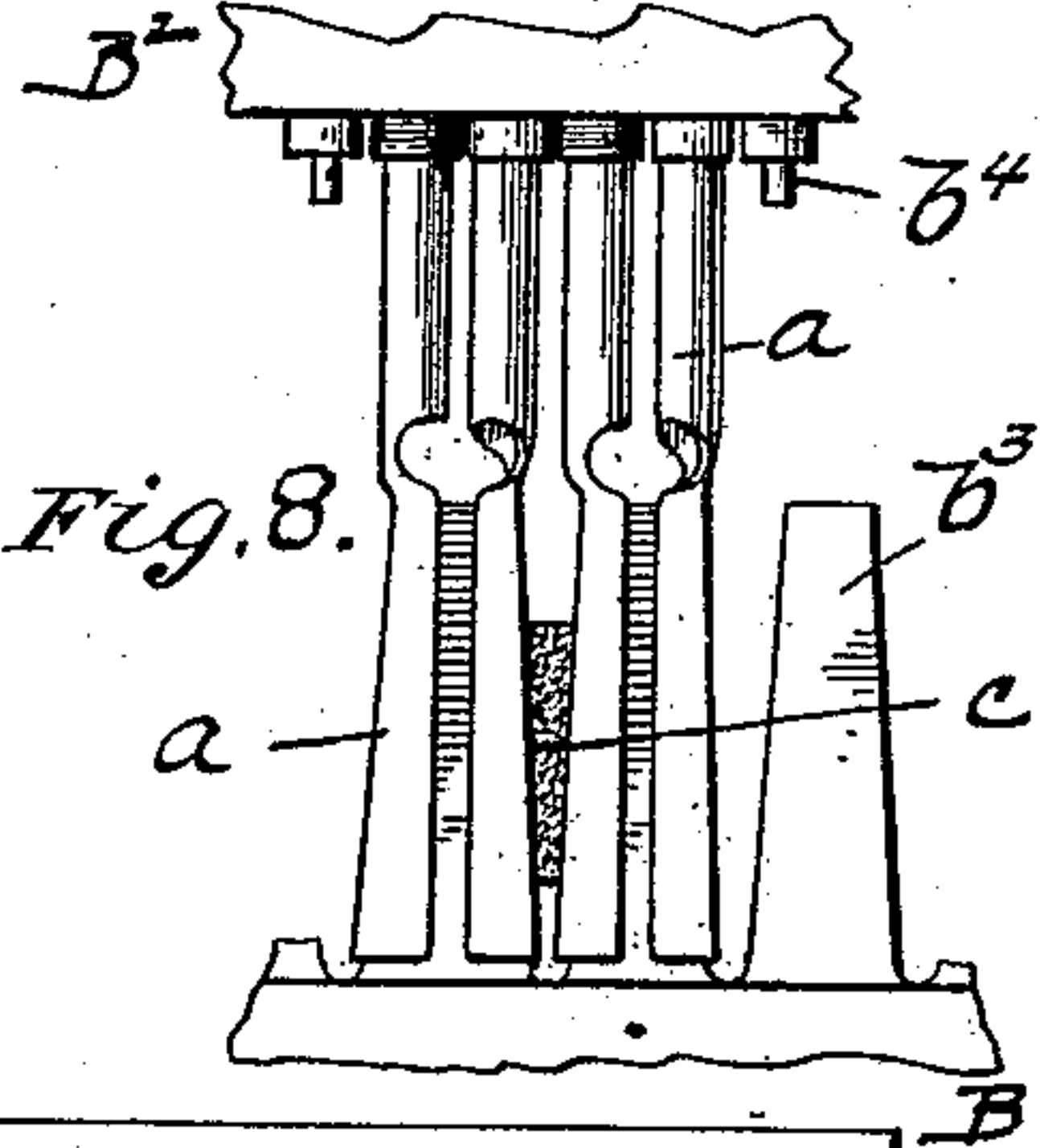
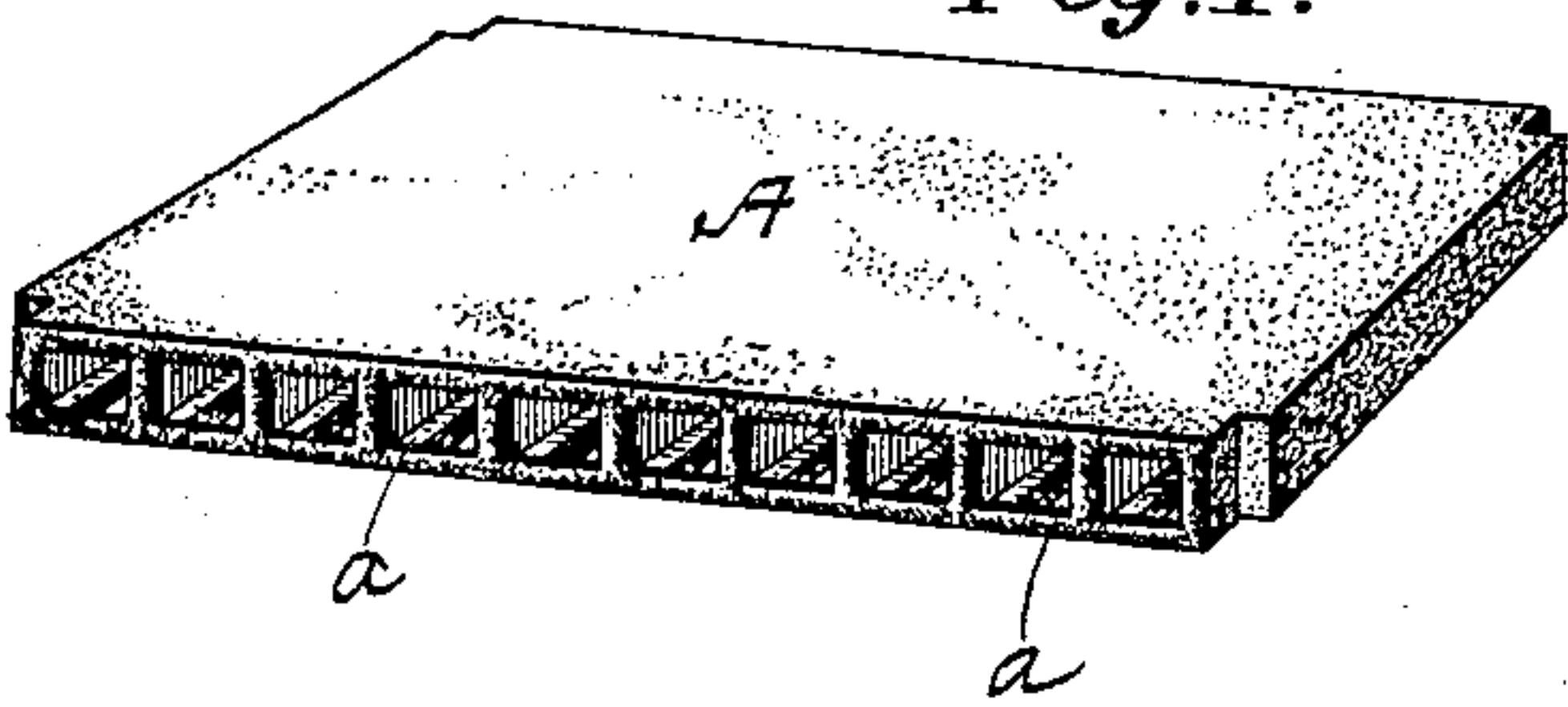


Fig. 8.

Fig. 3.

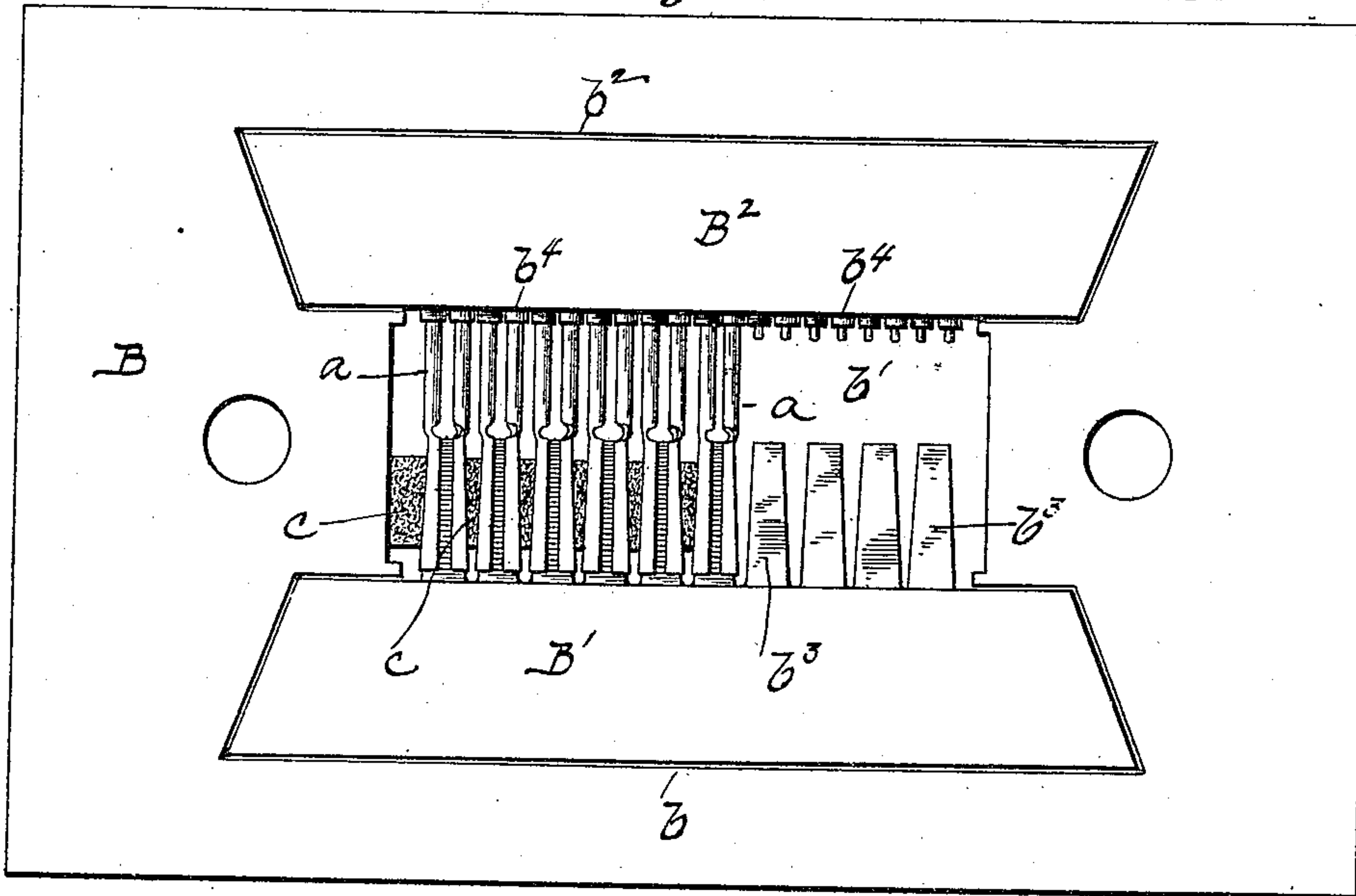


Fig. 4.

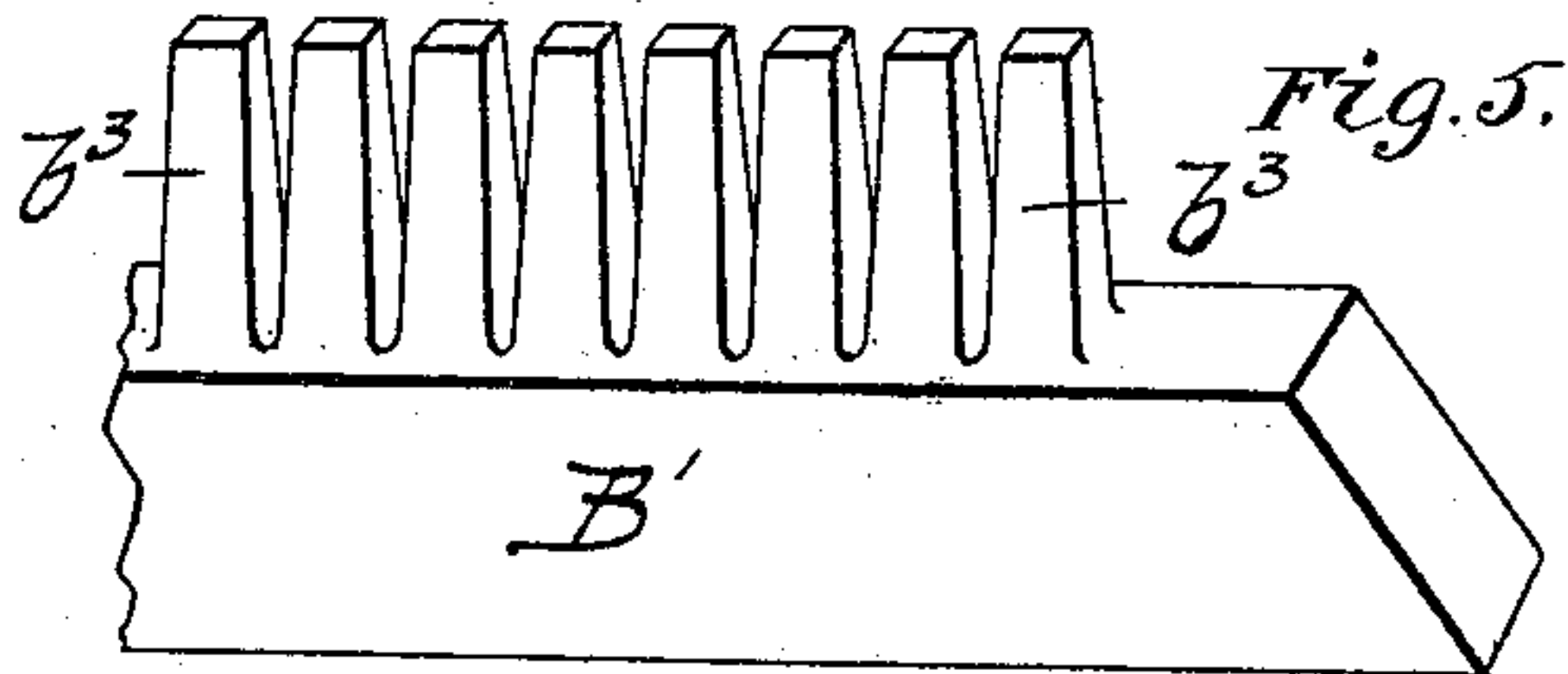
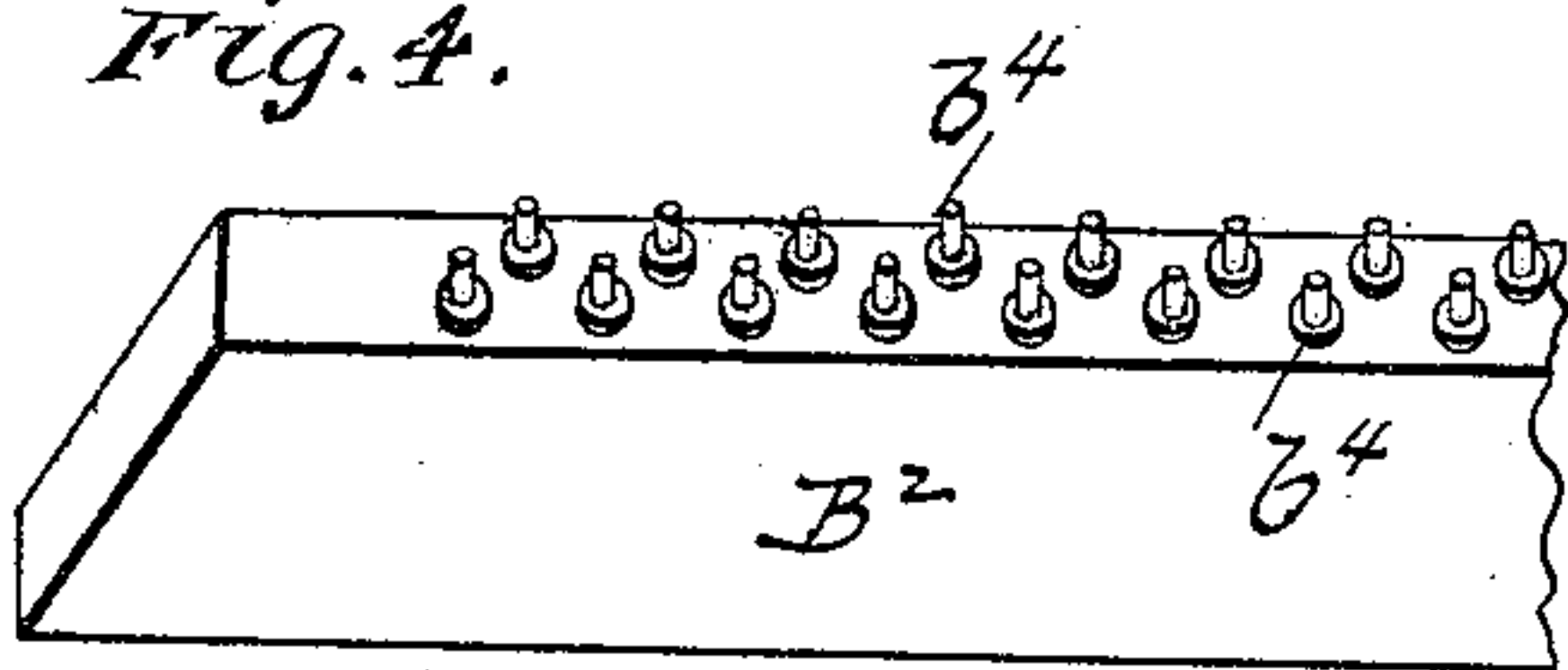


Fig. 5.

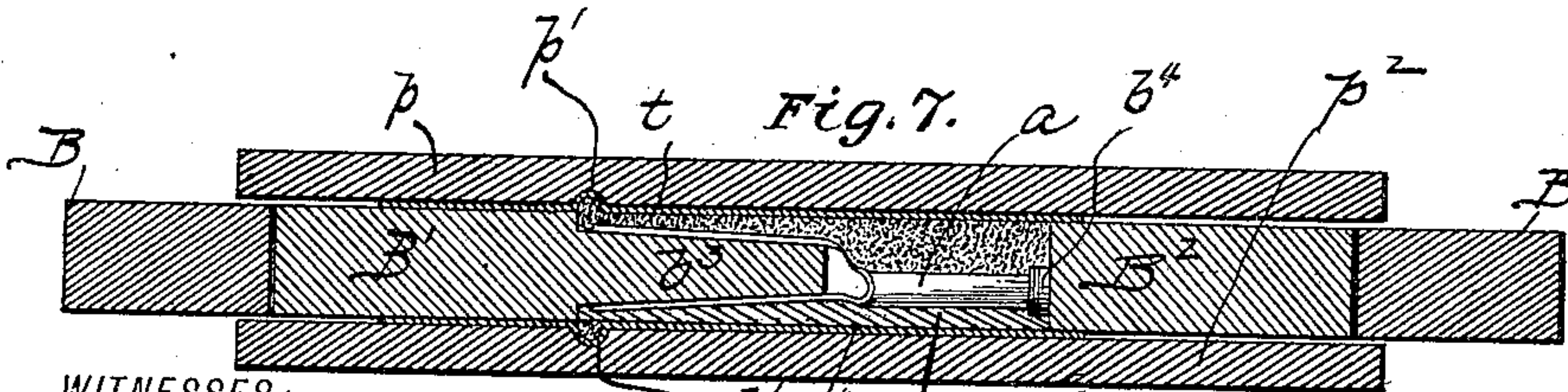


Fig. 7.

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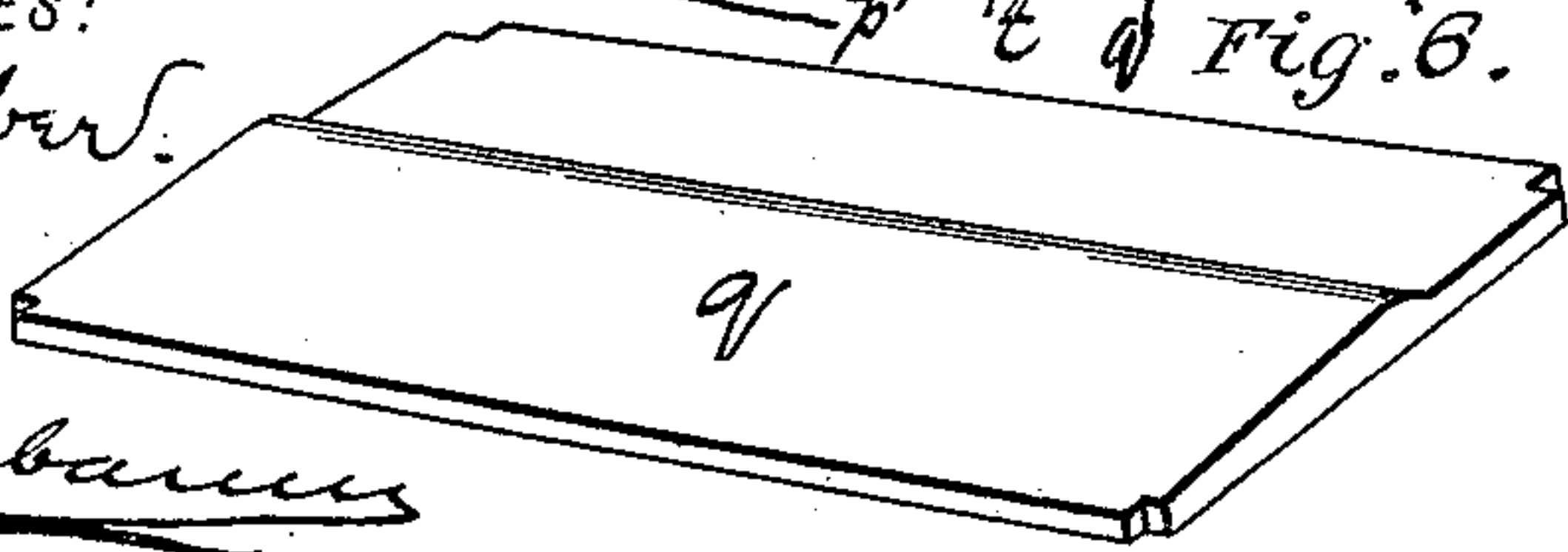


Fig. 6.

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## MOLD FOR THE MANUFACTURE OF ELECTRICAL SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 479,891, dated August 2, 1892.

Application filed January 19, 1891. Renewed June 16, 1892. Serial No. 436,993. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN B. LYON, a citizen of the United States, residing in Brooklyn, county of Kings, and State of New York, have  
5 invented certain new and useful Improvements in Molds for the Manufacture of Electrical Switchboards, of which the following is a specification.

This invention has reference to electrical  
10 switchboards, and relates particularly to the switchboards used in telephonic and telegraphic systems.

The object of the invention is to simplify and cheapen the manufacture of switch-  
15 boards; and it consists in the apparatus hereinafter described for manufacturing the cards or sections containing the sockets of the switchboards.

The invention consists of the details of construction, which will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a perspective view of a single card or section of which the switchboard is built  
25 up. Fig. 2 is a view of one of the contact-pieces or electrodes. Fig. 3 is a plan of the mold containing the contact-pieces and showing their appearance and location before the rubber is applied. Figs. 4, 5, and 6 are perspective views of sections of the mold. Fig.  
30 7 is a transverse section of the mold when all the parts are adjusted and at work; and Fig. 8 is an enlarged detail of the mold, illustrating the manner of setting or securing the contacts before the rubber is applied.

The finished card shown in Fig. 1 consists of a hard-rubber rectangular strip containing a plurality (usually ten) of sockets or cavities extending from one edge of the card  
40 through and past the middle of the same. The sockets have four sides converging toward the interior and are extended through the card to the rear edge by two tubular passages. In each socket there are secured two  
45 metallic contact-pieces or electrodes *a*. These are placed opposite each other and consist of a rectangular portion and a tubular portion, the former being located in the socket proper and the latter extending through the respective tubular passages of the socket. It has  
50 been found exceedingly difficult to manufacture this article, the difficulty arising mainly

in the supporting of the electrodes while the rubber is being applied and in the application of the rubber, so that shrinkage will not  
55 take place at particular locations. In order to explain my improved method for overcoming these difficulties, I refer now to Figs. 3, 4, 5, 6, and 7, in which B represents a metallic frame or plate of a little greater thickness  
60 than the finished card and made of solid tin or an alloy of tin or other metal covered with tin or an alloy of tin. It has a central opening, constituting three compartments *b*, *b'*, and *b<sup>2</sup>*. The central opening *b'* is of general  
65 rectangular shape and is the place where the card is formed. The openings *b* and *b<sup>2</sup>* receive two removable sections *B'* *B<sup>2</sup>*, respectively. The ends of the sections *B'* *B<sup>2</sup>* are beveled or inclined to fit the ends of the openings *b* *b<sup>2</sup>*,  
70 respectively. They are of the same thickness and material as the plate B. The section *B'* is provided along its shorter side with ten wedge-shaped pegs or mandrels *b<sup>3</sup>*, which correspond in size and shape with the ten  
75 sockets in the cards. These mandrels, when the section *B'* is in place in the plate B, project into the rectangular space *b'*. The section *B<sup>2</sup>* is provided on its shorter side with a series of short pins or mandrels *b<sup>4</sup>*, arranged  
80 in pairs, one pair for each socket in the card A. When the section *B<sup>2</sup>* is in place in the plate B, the pins *b<sup>4</sup>* project into the opening *b'*, and each pair of them stands opposite one of the mandrels *b<sup>3</sup>* of the section *B'*.  
85

The mold having now been described, I will proceed to explain the manner of handling it in the manufacture of these cards. The section *B'*, detached, is first taken and each mandrel *b<sup>3</sup>* fitted with two of the electrodes *a*. They are adjusted to the opposite  
90 sides of the mandrels in the manner shown in Fig. 8, and between every two mandrels, after the electrodes have been adjusted, a wedge *c* is driven in to force the electrodes tightly  
95 upon the mandrels and to hold them temporarily pending the final binding of hard rubber. When all of the mandrels on the section *B'* have been fitted with the electrodes, as shown in Fig. 7, the section *B<sup>2</sup>* is then connected  
100 with the electrodes by inserting the pins *b<sup>4</sup>* into the open ends of the tubular portions of the electrodes, respectively. The two sections *B'* and *B<sup>2</sup>* are then inserted into their



proper places in the plate B, thereby rigidly supporting and holding the electrodes in proper relation to one another. To hold and force the terminal electrodes tightly upon the mandrels, a wedge is then driven in between each one and the frame B. The next step in the method is to apply the rubber. It is to be understood that the plates and all the parts of the mold are kept in a heated condition. A sheet of soft rubber is placed upon one side of the electrodes, entirely filling one side of the opening  $b'$ . Then a sheet of tin-foil (represented by  $t$  in Fig. 7,) is placed over the rubber. After this a metal plate  $p$ , provided with a longitudinal groove  $p'$ , is placed over the foil, so that the groove will extend along the edge of the rubber sheet or of the opening  $b'$  adjacent to the base of the mandrels. Then a plate  $q$  of peculiar shape is placed against the opposite side of the electrodes to sustain them and pressure is put upon the plate  $p$ . The cross-section of this plate  $q$  is of the same shape as the rubber shown in the lower half of the mold in Fig. 7, and the plate when in position occupies the space filled by this rubber. The rubber being soft is forced into and through the interstices between the electrodes and into the groove  $p'$ . The function of the groove  $p'$  is to form a reservoir of rubber, which, when the rubber shrinks in the vulcanizing process, as it invariably does, will supply a sufficiency and insure about and around the base of the mandrels a complete filling of the mold and a perfect card. When the rubber has been applied to one side, the plate  $q$  is removed and a sheet of rubber and another of foil are applied to the other side. Then, after the adjustment of the plate  $p^2$ , pressure is again applied and the molding is complete. The next operation is that of vulcanizing, which is done while the card is yet in the mold. The function of the foil is to seal the sides of the mold while it is undergoing the vulcanizing process. While cooling after vulcanizing the rubber shrinks and tends to cause malformation of the card at the base of the mandrels, (which is the exposed portion in the switchboard.) This is prevented, however, by the bead of rubber formed in the groove  $p'$ , which is drawn down

into the body of the card and supplies the deficiency in its neighborhood caused by shrinkage. The foil being flexible, the rubber in the bead which sticks to it draws it in when the shrinking takes place. After vulcanizing the card is taken from the mold and trued up by cutting and grinding.

Great difficulty has been encountered in the manufacture of these cards, principally occurring in temporarily supporting the electrodes before the rubber was applied and in the shrinking of the rubber while vulcanizing. The use of the wedges entirely overcomes the former difficulty and the groove  $p'$  in the plate overcomes the latter. The mold itself has been a great source of trouble and expense.

The separable feature of the mold is a good one, in that it facilitates the adjustment of the electrodes.

Having thus described my invention, I claim—

1. In a mold for forming cards or sections of electrical switchboards, the combination of a frame, parts of which are removable, with devices for supporting the contact-pieces of the section, said devices being attached to or carried by the removable parts of the frame, substantially as described.

2. The combination, with the frame B, B', and B<sup>2</sup>, of the plates  $p$   $p^2$ , provided with the groove  $p'$ , for the purpose set forth.

3. The combination, with a mold provided with removable sections, such as the plates  $p$   $p^2$ , of a removable plate or plug shaped to fit a portion of the mold, for the purpose set forth.

4. A mold for forming cards or sections of electrical switchboards, consisting of a plate provided with a plurality of mandrels arranged in a row, a second plate provided with a plurality of supporting-pins, and a frame adapted to hold the two plates and itself, forming part of the mold, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN B. LYON.

Witnesses:

FRANK S. OBER,  
WM. A. ROSENBAUM.