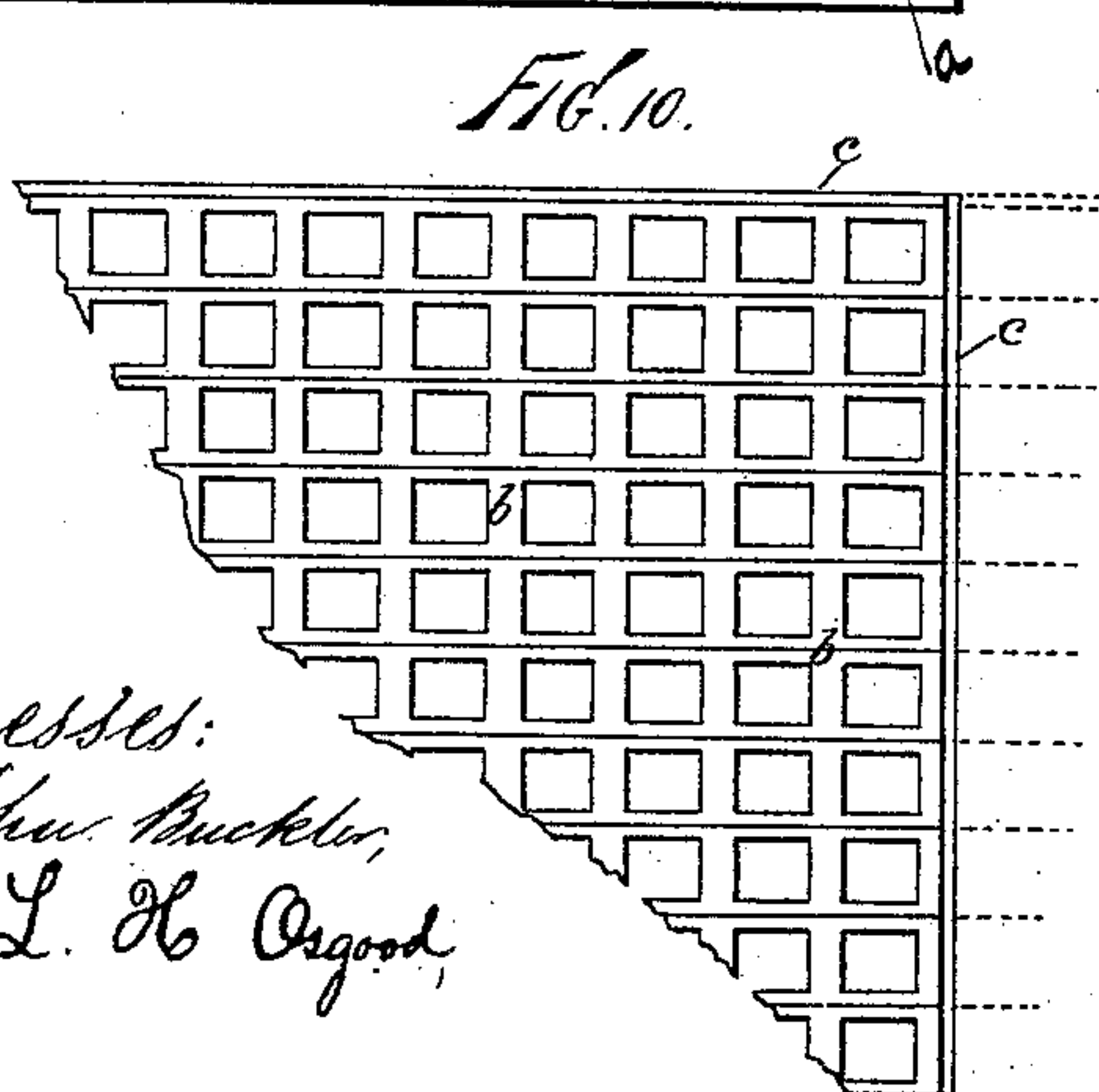
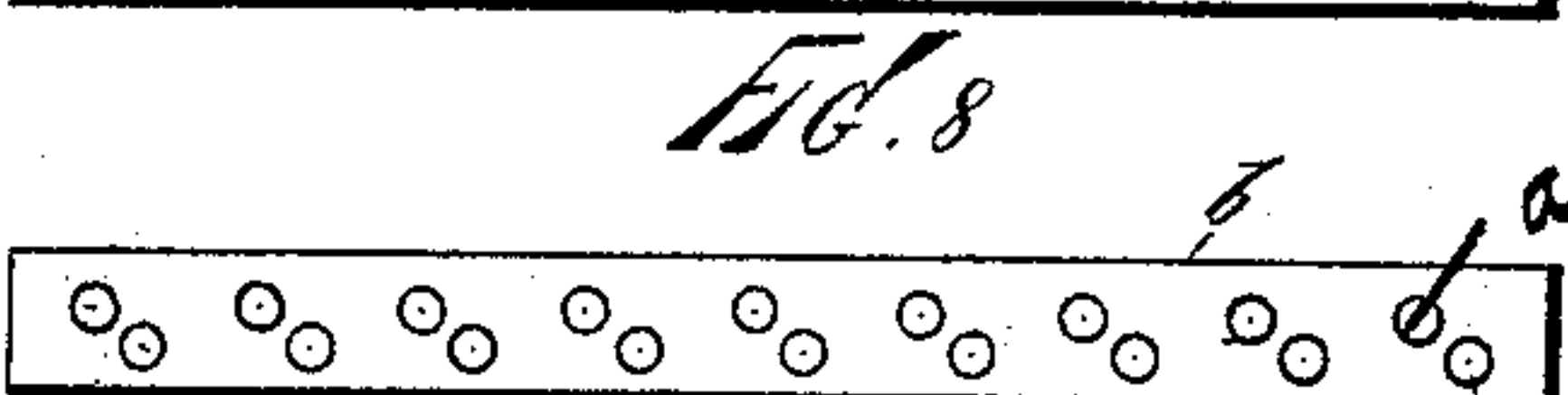
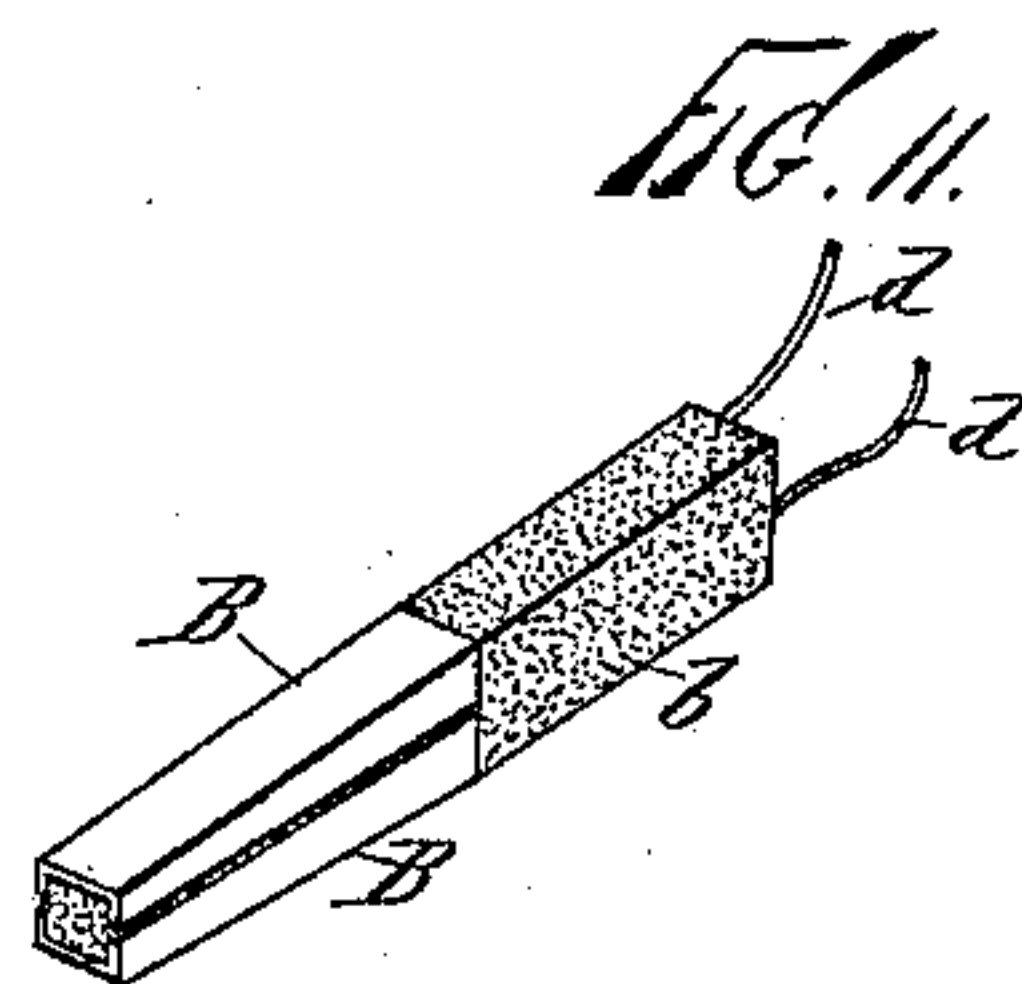
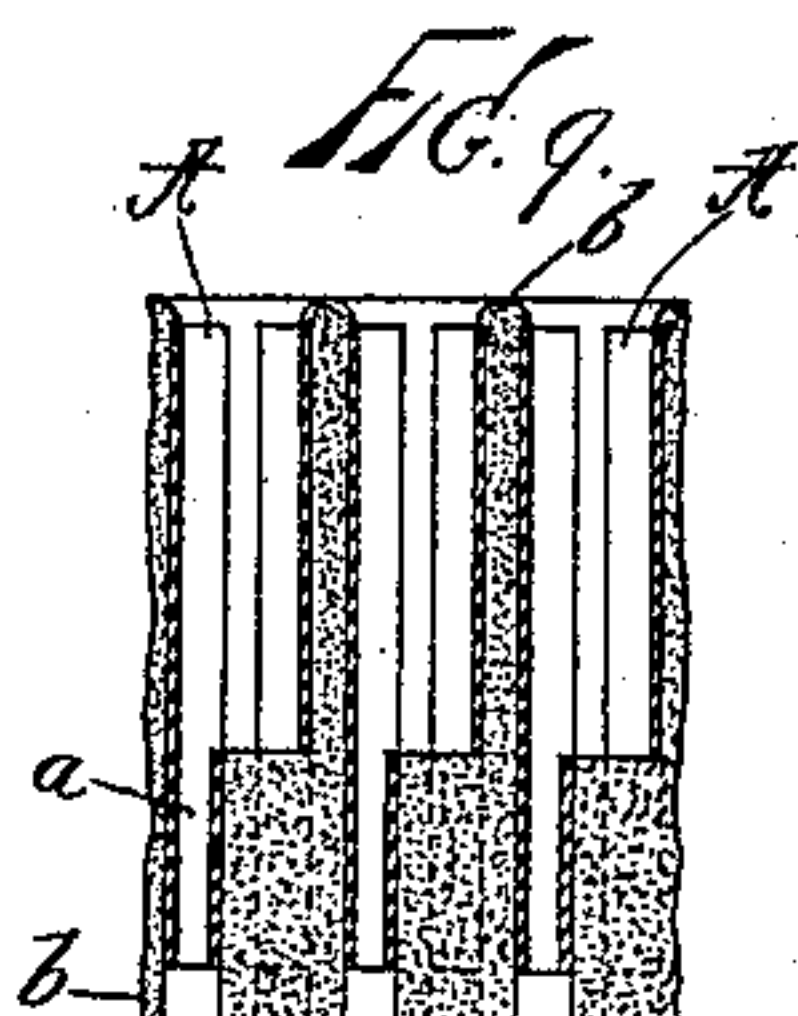
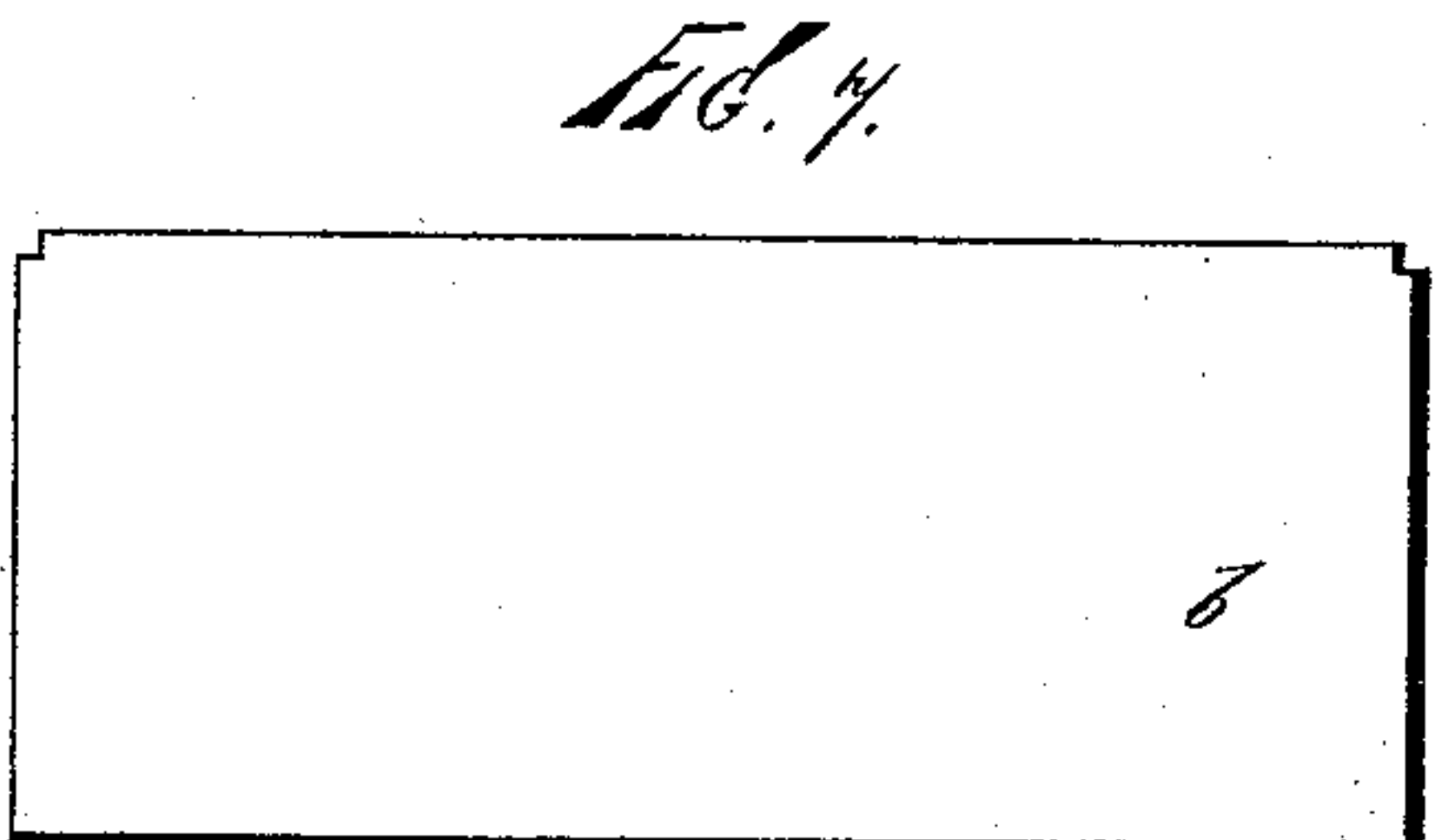
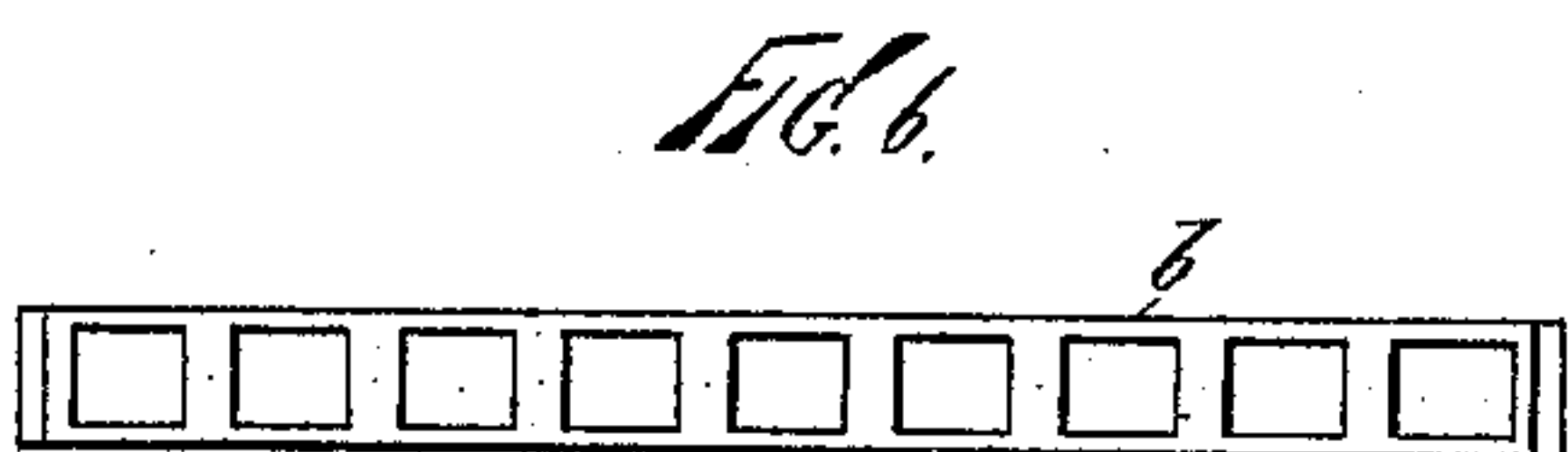
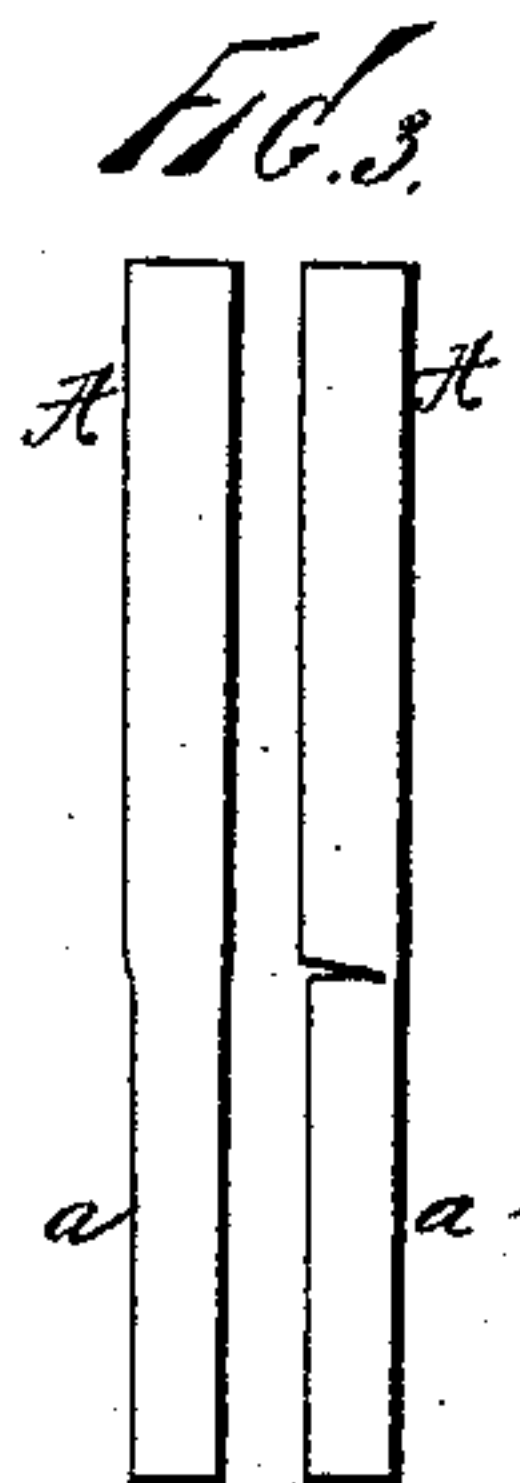
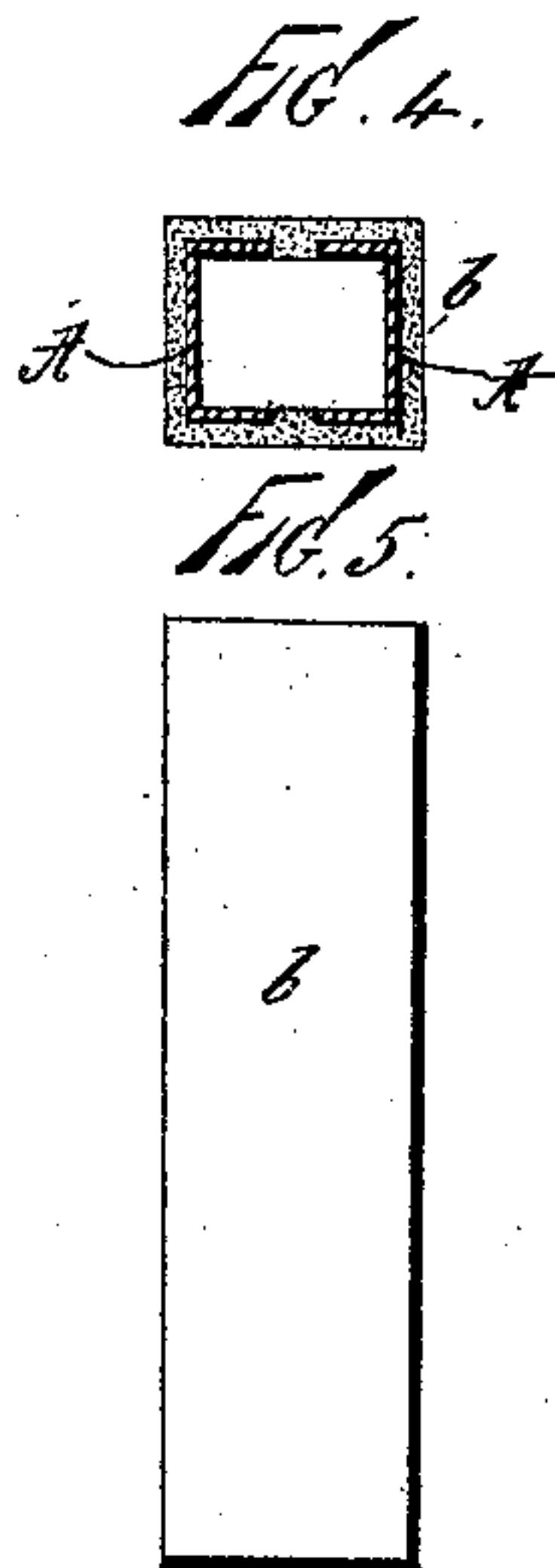
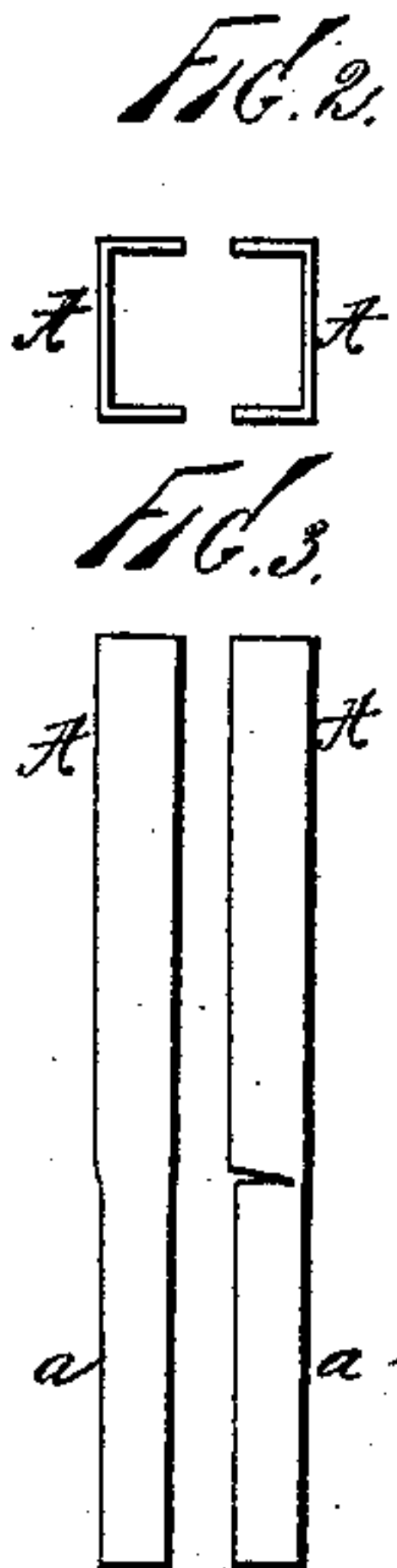
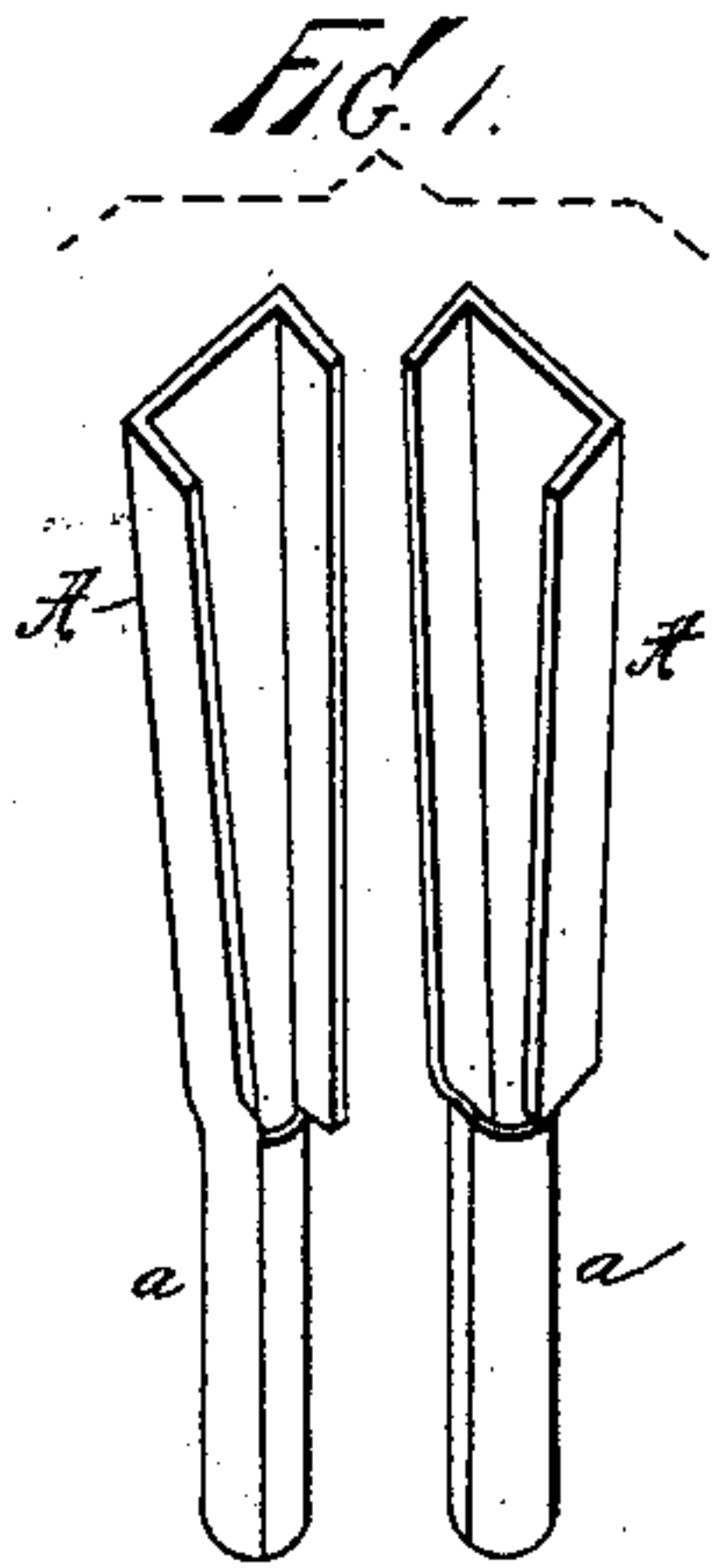


(No Model.)

J. W. LYON.
ELECTRICAL SWITCHBOARD.

No. 488,532.

Patented Dec. 20, 1892.



Witnesses:
John Buckler,
L. H. Osgood,

Inventor:
James W. Lyon,
By North Osgood,
Attorney

UNITED STATES PATENT OFFICE.

JAMES W. LYON, OF BROOKLYN, NEW YORK.

ELECTRICAL SWITCHBOARD.

SPECIFICATION forming part of Letters Patent No. 488,532, dated December 20, 1892.

Application filed June 11, 1889. Renewed February 7, 1891. Again renewed June 6, 1892. Serial No. 435,653. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. LYON, of Brooklyn, county of Kings, and State of New York, have invented certain new and useful

5 Improvements in Electrical Switchboards, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

10 My invention has relation to switch boards or switch tables such as are employed in connection with any number of electric conductors in telephone, telegraph or other electric stations, and has for its object the construction of the switch apparatus in such manner

15 that it shall be light but amply strong and durable, cheap and easy of manufacture, effective in operation, and so that the board or table may comprise any number of switches,

20 which will occupy the least possible space and between which or between the members of which perfect insulation is insured where required and this not liable to be affected by any atmospheric conditions or by ordinary

25 use of the table or board. To accomplish all of this and to secure other and further advantages in the matters of construction, operation and use, my improvements involve certain new and useful peculiarities of construction and details of manufacture as will be

30 herein first fully described and then pointed out in the claims.

Heretofore in the manufacture of switch boards of the general class to which my improvements relate and wherein keys or plugs are made to enter sockets to accomplish the desired electrical connections the metallic elements of the board constituting the sockets to receive the key or plug have been separately riveted upon strips of paper fiber, the spaces between them insulated by the interposition and riveting of other strips of fiber; and the strips so built up constituting sections or cards have been united in blocks and

35 the blocks assembled to make up the complete board or table. The parts of the keys or plugs have been likewise built up of separate pieces riveted together. The manufacture of such a board or table involves the

40 handling and riveting of a multitude of small parts, entailing great expense—and between the parts thus secured it is practically impos-

sible to secure perfect joints throughout or to avoid seams which impair the insulation—even if perfection of union could be secured 55 at the outset, the board or its sections are liable to warp and are always subject to damage by moisture, and the manner of construction as well as the nature of the material employed are such as to render it impracticable 60 to use walls thin enough to provide the desired number of cells or sockets within the limited area of the table.

In the accompanying drawings forming part of this specification I have illustrated so 65 much of a switch board and the various parts thereof as is essential to the purposes of the present description the principles of construction and operation being in accordance with my invention, in which drawings 70

Figure 1 is a view showing two metallic pieces or parts of one socket in perspective, the two parts being separated, and drawn to an exaggerated scale, Fig. 2 is a top or plan view of the same two parts in their proper 75 relative position, and Fig. 3 an elevation corresponding with Fig. 2. Fig. 4 is a horizontal section and Fig. 5 a side view showing the two pieces of previous figures secured together and insulated one from the other after 80 the manner of my invention. Fig. 6 is a top or plan view, Fig. 7 a side view and Fig. 8 a bottom view of a section or card of ten cells or sockets constructed in accordance with my invention and ready to be assembled with 85 others of like character to form a block of the table or board. Fig. 9 is a vertical section of a fragment of the card. Fig. 10 is a plan of a fragment of a board indicating how the blocks may be united. Fig. 11 is a view 90 in perspective of a key or plug involving my improved mode of manufacture.

In all the figures like letters of reference wherever they occur indicate corresponding 95 parts.

The walls of each socket or cell into which the key or plug is to be inserted are composed of separate metallic pieces as A A. These are by preference made alike as indicated in Fig. 1 and are conveniently stamped or otherwise formed of brass. Each piece has a neck *a* to receive the conducting wire or 100 wires and each is preferably formed so that the socket or cell shall have two opposite

walls slightly inclined toward each other from the upper part or mouth the better to insure a proper seating of the key. The necks are shown as located a little to one side of the axis of the socket and both pieces being alike, when the two are turned together to form a pair the necks will assume positions as indicated in Fig. 8, by reason of which the conductors may be separated by an ample wall of the insulating material. The socket pieces may be united in single pairs—or in any desired numbers of pairs. To unite a single pair I sustain them immovably in a mold of any suitable construction and at their proper relative distances from each other, the necks resting upon pins which close their lower ends and the space between the two parts being filled by a piece which fits closely same as the plug or key is required to fit. Around the pieces so mounted in the mold I mold rubber of acceptable quality and then vulcanize the rubber following the usual process of vulcanizing molded rubber. The material adheres closely and perfectly to the metal at all points with which it may come in contact and it enters between the edges of the two pieces thus insulating them from each other as is required. The vulcanized rubber is indicated at *b*. The socket thus formed is solid substantial and durable and the parts perfectly insulated with a minimum quality of surrounding material by which space is economized. These sockets may be placed together in any desired way to form the switch board.

Instead of molding each pair separately I prefer to mold a convenient number, say ten, at one and the same operation so as to increase the economy of construction. The ten pairs are placed in one mold and each element sustained in proper relative position to its mate same as in the case of the single pair above described and the pairs are properly spaced. Rubber is then molded or packed about them all and the vulcanizing proceeded with same as before. The result is a card of ten cells, rigid and durable, without unnecessary amount or thickness of insulating material. The cards thus made may be easily mounted in blocks of ten cards each constituting a square or section of the table, the block containing one hundred cells as partly indicated in Fig. 10. These blocks are united in any preferred numbers and may be added to at the top or bottom or either side as desired, suitable indicating strips as *c c* being placed between them.

The same method of manufacture might be pursued with the entire blocks, but the cards of ten are preferred as being easier to handle, to connect with the conductors and to locate in the table.

The insulating material by preference extends a little above and a little below the metallic pieces *A A*, above so that electric connection with the key will not be made until the key is seated, and below so that

when the conductors are inserted their insulation from each other will be insured. The conductors may be of any kind and inserted in the necks *a* and secured in any preferred way. The keys or plugs are made upon the same general principles and with similar advantages in the matters of perfection rigidity and security of insulation. They are of course made singly and the outer surface of their elements exposed instead of their inner surfaces as in the sockets.

B B are the metallic pieces of a key or plug—and these are by preference of steel though they might be of other metal. They are similar in size and shape, sustained in a mold at proper distance and the rubber molded or packed between them and around the ends which receive the conductors and then vulcanized so as to hold the parts very solidly in place. The conductors as *d d* may be attached and secured in any preferred manner. The keys thus made are light and strong and possess like advantages as the cards in matter of facility and accuracy of manufacture as well as effective insulation.

The parts made in the mode above described are in no way affected by water or moisture.

Of course any size of socket may be adopted but it is best to make them small as is consistent with the uses intended. With the cards about three and a half inches long and ten cells or sockets in each card, the blocks or squares would contain one hundred sockets, and with them a table of ten thousand switches could be made within the limits of a square yard. The mere use of rubber as an insulating material is not claimed as new, but

Having now fully described my invention what I do claim as new herein and desire to secure by Letters Patent, is:—

1. An electrical switch board composed of cards, each consisting of an insulating material molded about a series of contact plates forming a series of sockets.

2. An electric switch board, composed of cards, each consisting of an insulating material molded about a series of pairs of contact plates forming a series of sockets.

3. An electrical switch board, consisting of the rectangular metallic socket pieces having the necks and an insulating material surrounding and supporting said piece to produce a socket or sockets.

4. In an electrical switch board, the socket pieces having the necks, and the vulcanized rubber surrounding and insulating said pieces, substantially as described.

5. In an electrical switch board the combination of the rectangular key, with the board consisting of the rectangular sockets formed by the socket-pieces having the necks and the insulating material surrounding and supporting said pieces.

6. An electrical key socket, consisting of metallic pieces in juxtaposition, but not in con-

tact, with insulating material molded around them and between their adjacent edges, which material supports and retains them in place, substantially as set forth.

- 5 7. A switch board of insulating moldable material, having electrical key sockets therein, each consisting of metallic pieces in juxtaposition, but not in contact, with the insulating material of the switch board molded
10 around them and between their adjacent edges

to support and retain them in place, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

JAMES W. LYON.

Witnesses:

JOHN BUCKLER,
WORTH OSGOOD.