

No. 702,149.

Patented June 10, 1902.

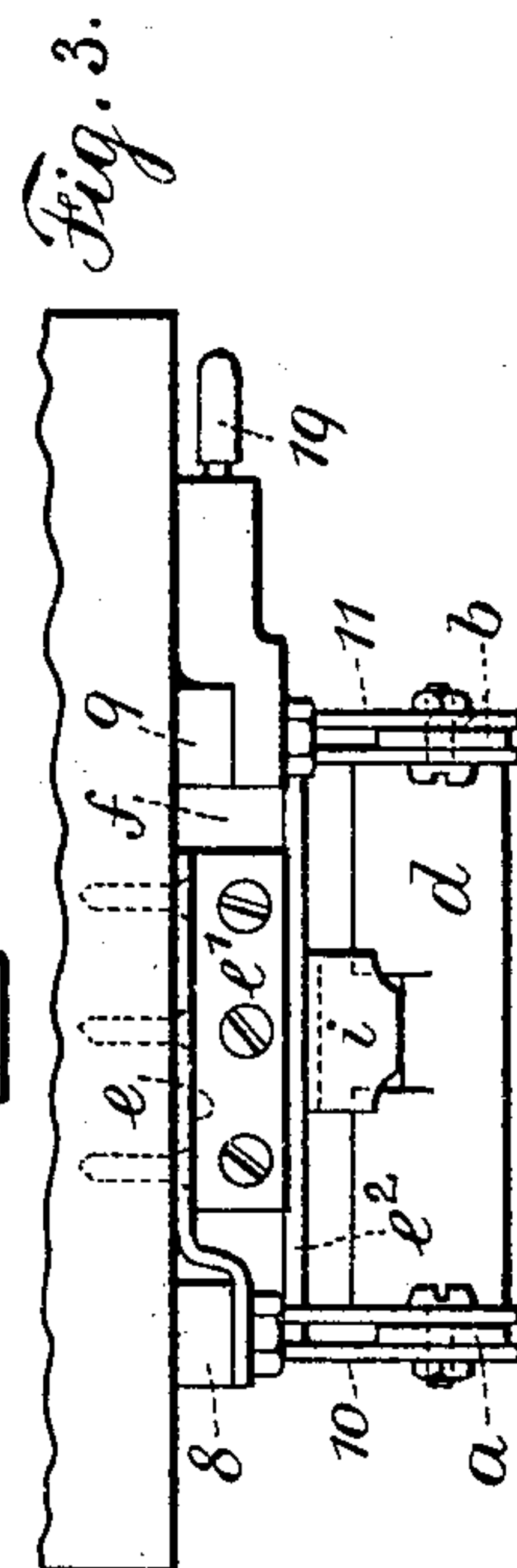
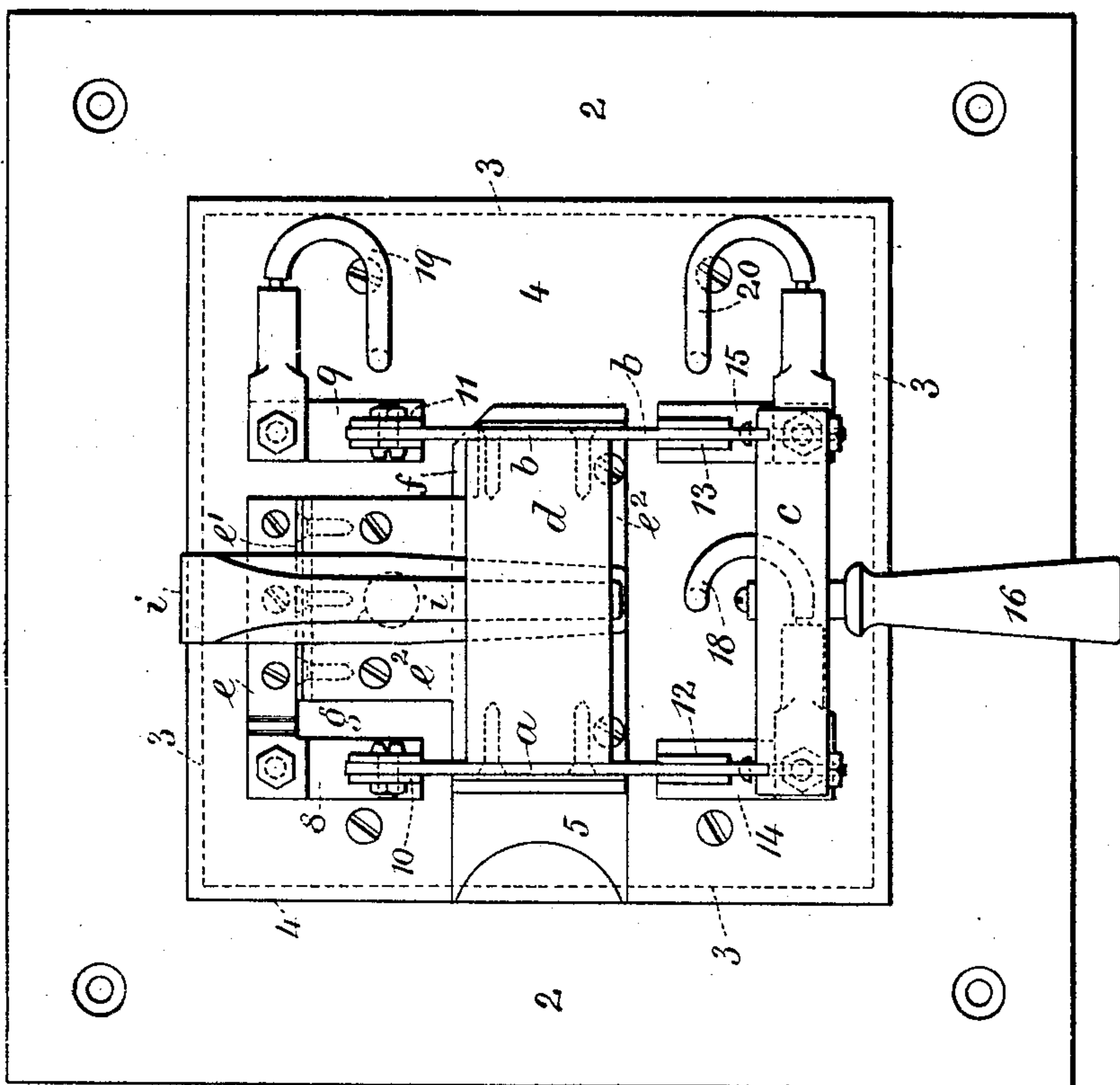
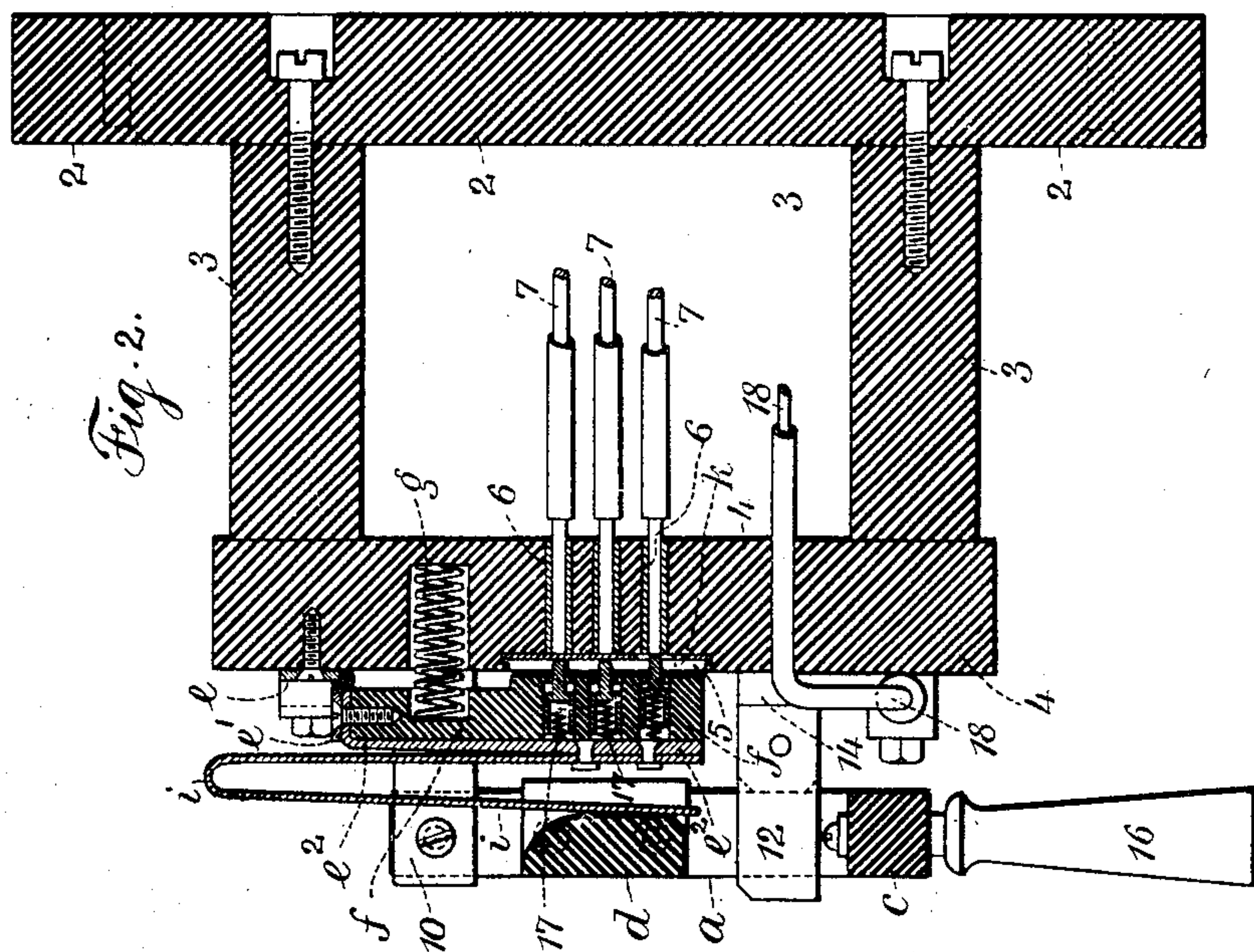
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SWITCHBOARD FOR ILLUMINATING ELECTRIC LAMP SIGNS.

(Application filed Mar. 19, 1902.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 7.

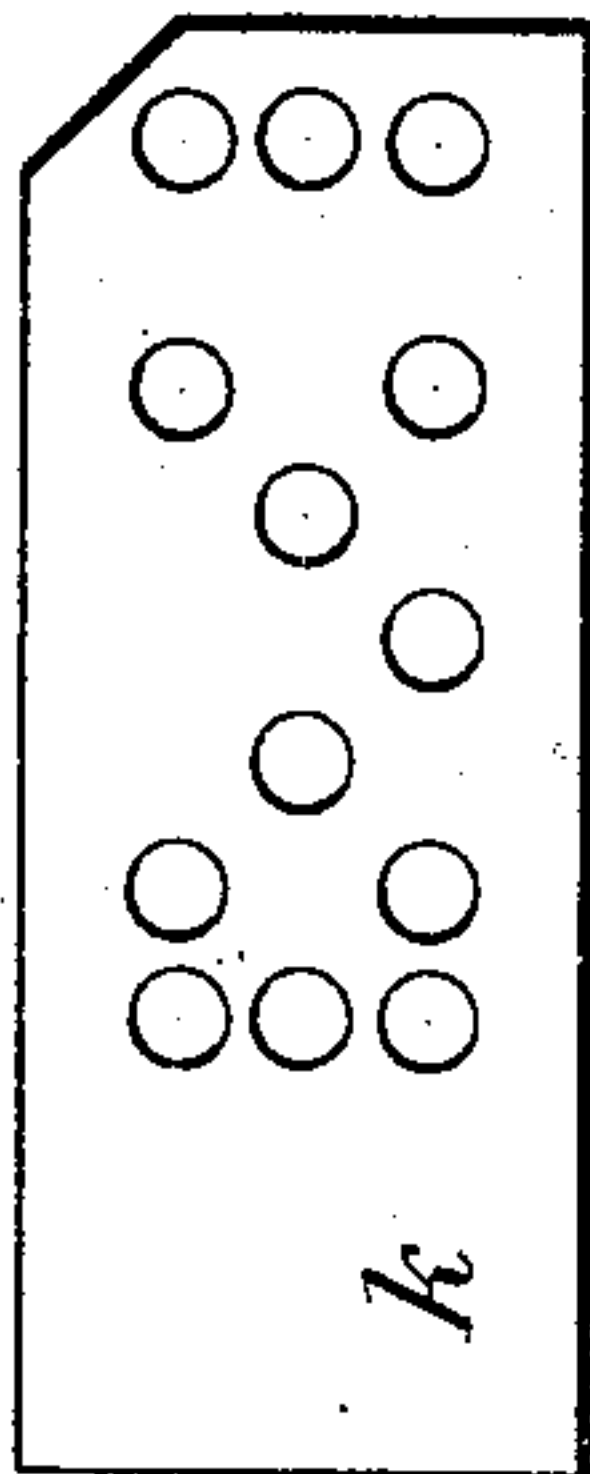
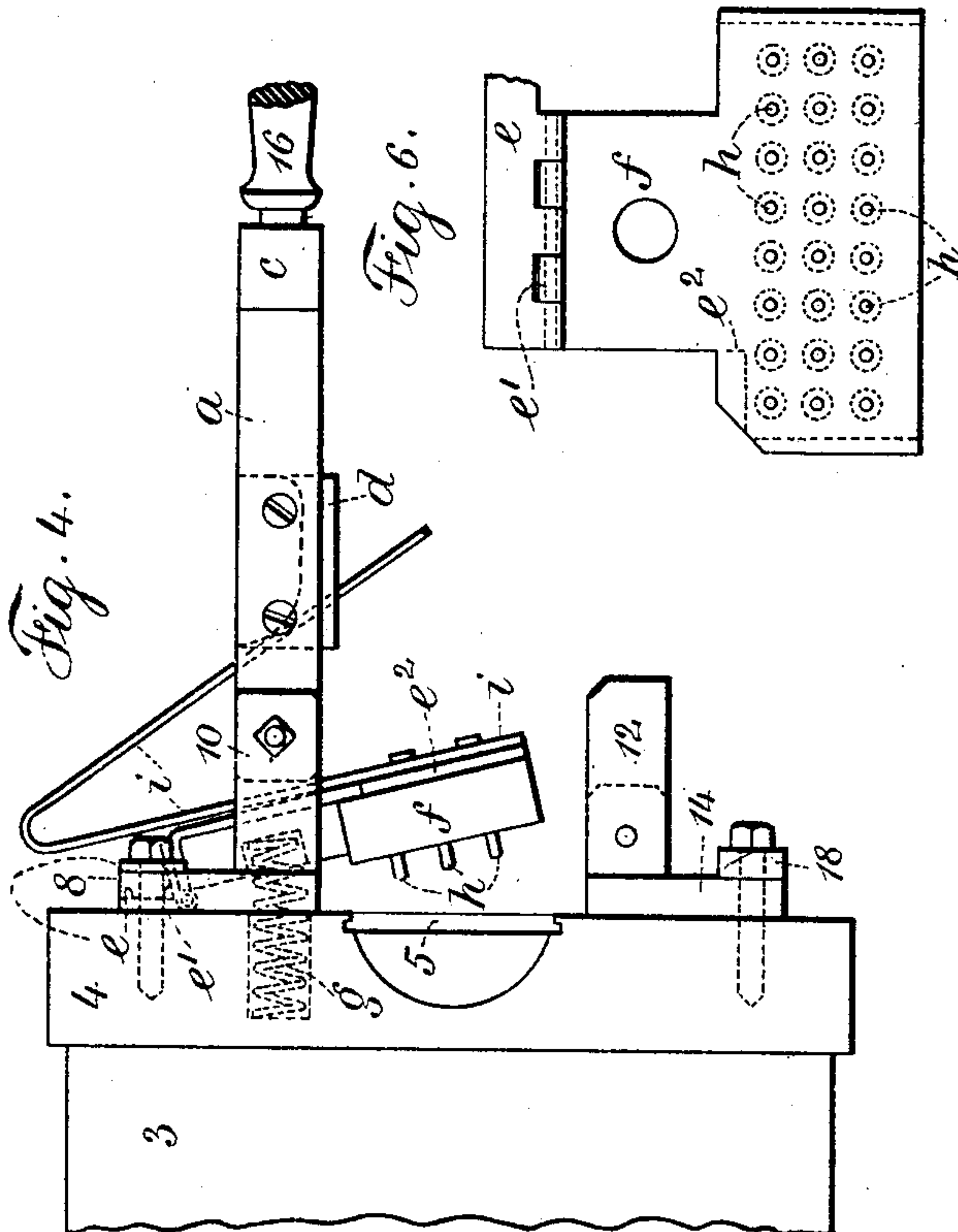
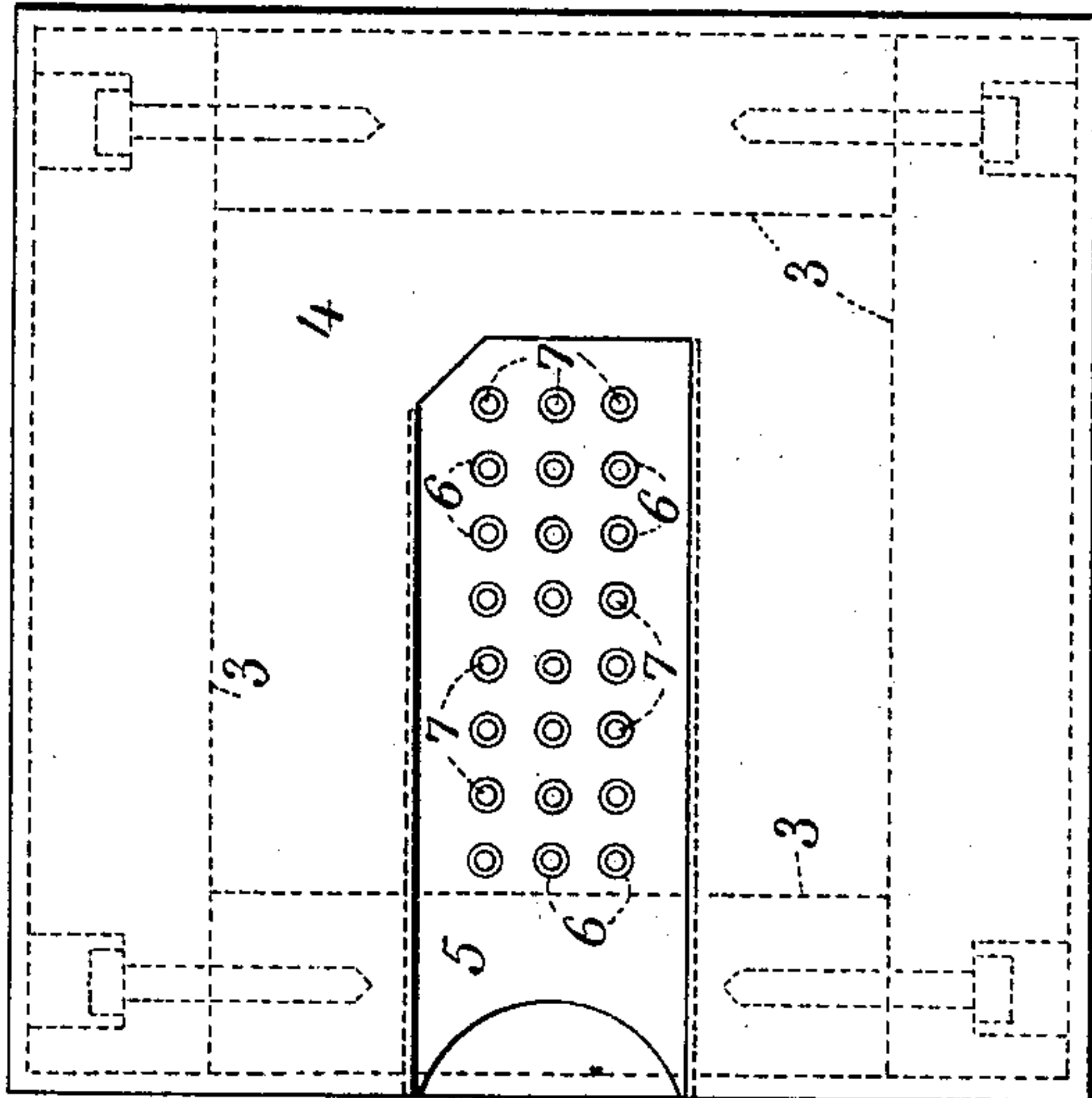


Fig. 5.



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UNITED STATES PATENT OFFICE.

MORTIMER NORDEN, OF NEW YORK, AND LUCIEN S. CRANDALL, OF
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SWITCHBOARD FOR ILLUMINATING ELECTRIC-LAMP SIGNS.

SPECIFICATION forming part of Letters Patent No. 702,149, dated June 10, 1902.

Application filed March 19, 1902. Serial No. 98,888. (No model.)

To all whom it may concern:

Be it known that we, MORTIMER NORDEN, residing at the borough of Manhattan, and LUCIEN S. CRANDALL, residing at the borough of Brooklyn, in the city and State of New York, citizens of the United States, have invented an Improvement in Switchboards for Illuminating Electric-Lamp Signs, of which the following is a specification.

Our invention relates to devices for simultaneously displaying at a predetermined spot several electric-lamp signs of numerals or letters, the numerals constituting a number or the letters a word. These electric-lamp signs are such as are shown in design patents, dated July 23, 1901, Nos. 34,848 and 34,849.

In our present invention several monograms of lamps are simultaneously operated by a device consisting of parallel series of spring-actuated circuit-selectors arranged to contact with correspondingly-arranged circuit-wires, the coacting groups thereof being determined by perforated cards acting similarly to the cards of the Jacquard loom. The cards are received one at a time in a receptacle embracing the groups of circuit-wires. A card covers all of the circuit-wires except those predetermined according to the letters or numerals to be displayed, and these are exposed by the openings of the card and permit the passage of the spring-actuated circuit-selectors to electric contact therewith when said circuit-selectors are swung to place and at which time the various electric contacts are made and the circuit established. The circuit is broken with the return movement of the parts.

In the operation of the device the parts are so arranged and timed in their movements that the circuit-selectors are brought to place before the electric contact is made and the circuit established, and said contact is broken and the current shut off before the separation of the circuit-selectors from the contact-wires is effected. Therefore there is in the operation of the devices no sparking which would have a tendency to injure the parts.

In the drawings, Figure 1 is an elevation representing our improvement. Fig. 2 is a vertical cross-section of the same. Fig. 3 is

a partial plan of the parts shown Fig. 1. Fig. 4 is a side elevation showing the parts as separated in contradistinction to the closed position shown in Figs. 1, 2, and 3. Fig. 5 is an elevation of the face-plate, showing the groups of circuit-wires and the receptacle for the perforated cards. Fig. 6 is an elevation of the back or inner face of the device carrying the spring-actuated circuit-selectors, and Fig. 7 is an elevation of a perforated card.

We prefer to employ a case of insulating material for the group of circuit-wires comprising a back plate 2, side plates 3, and a face-plate 4. In this face-plate 4 from one side—that is, from the left hand, Fig. 5, toward the right hand—is a receptacle 5, with opposite grooved edges adapted to receive the perforated card. The circuit-wires which extend to the monogram of lamps are shown at 7, and where they pass through this plate 4 they are preferably surrounded by tube-sections 6. These circuit-wires are arranged in parallel, horizontal, and vertical rows at predetermined spaced-apart intervals. As shown in Fig. 5, there are three parallel horizontal rows and eight parallel vertical rows.

The switch is preferably composed of the base-plates 8 9, to which are connected pivot-posts 10 11, and the blade-bars *a b* are pivoted to the posts 10 11. The spring-clips 12 13, with which the opposite ends of the blade-bars come into electrical connection, are secured to base-plates 14 and 15, and the several base-plates 8, 9, 14, and 15 are secured to the face of the plate 4.

Between the blade-bars *a b* there are insulating-material cross-bars *c d*, a handle 16 being securely connected to the cross-bar *c* and the cross-bar *d* on its rear face being recessed and curved for a bow-spring *i*, hereinafter described. A hinge formed of plates *e e'* is employed, the plate *e* being secured to the face-plate 4 by screws, with one end of the plate *e* bolted to the base-plate 8. A block *f* of insulating material is provided with parallel, horizontal, and vertical rows of offset apertures spaced apart between the centers to agree with the circuit-wires 7, and the plate *e²* covers or overlies the outer surface of this block *f* and is secured thereto, the plate *e'* of the hinge being secured to the plate *e²* and

the block *f* and hinging the block to the face-plate 4.

We employ a helical spring *g*, received in a recess in the face-plate 4 at one end and at the other end in a shallow recess in the block *f*, the said spring being located centrally and in proximity to the pivot of the hinge-plates and the bow-spring *i*, secured by rivets at one end of the plate *e*² of the block and at the other end received in the recess of the cross-bar *d*, the spring *g* having the function of moving the block *f* away from the face-plate 4 and the spring *i* of moving the switch device on its pivots at the posts 10 11 away from contact with the clips 12 13, and we would remark that the bow-spring *i* is of greater tension and strength than the helical spring *g*—so much so that it is adapted to maintain the block *f* in the position shown in Figs. 1 and 2 until after the bars *a b* of the switch are removed from contact with the clips 12 13 and the parts are brought toward the position Fig. 4, when the spring *g* acts to move the block *f* into the position shown in Fig. 4.

We employ circuit-selectors *h*, received and moving in the offset apertures of the block *f*. These circuit-selectors are each in the form of cup and stem portions, the cup portions being in the larger portions of the apertures and the stem portions in the smaller apertures, that pass through the back face. Helical springs 17 are placed within the cup portions of the circuit-selectors. At one end they bear against the bases of the cup portions and at the other end against the inner surface of the plate *e*² of the block, and their action is to force the stem portions of the circuit-selectors to project from the surface of the block *f*. A conductor-wire 18 extends from the source of electrical energy to contact with the base-plate 14, a conductor 19 extends from the base-plate 9 from the monogram of lamps, and a conductor 20 extends from the base-plate 15 and returns to the source of electric energy, the various circuit wires or conductors 7 extending to the monogram of lamps, so that the electric circuit is complete from the source of energy by the conductor 18, base-plate 14, spring-clip 12, bar *a*, post 10, base-plate 8, hinge-plates *e e*², plate *e*¹, springs 17, circuit-selectors *h*, circuit-wires 7, to the monogram of lamps, from the monogram of lamps by the conductor 19 to the base-plate 9, post 11, bar *b*, clip 13, base-plate 15, and conductor 20, back to the source of electric energy.

In Fig. 7 we have illustrated a sample card or ticket *k* with perforations. These perforations are of larger diameter than the stems of the circuit-selectors or the ends of the circuit-wires 7; but it will be noticed that the distance between centers of these perforations in all directions agrees exactly with the distance between centers of the circuit-wires 7 or the stems of the circuit-selectors, and one corner of the card *k* is preferably cut off at an angle, and the receptacle for the card in the

face-plate 4 is also cut off at an angle, so that it is impossible to insert the ticket except in the one way, which is the correct way, for if the ticket were turned over it would not fit, and when in position, as indicated, the apertures therein expose predetermined groups of the circuit-wires 7, so that the stems of the circuit-selectors pass through the apertures to electric contact with said circuit-wires, and where there are no apertures in the card or ticket the stems of the circuit-selectors rest against the face of the card or ticket, which forms an insulating medium or septum between the circuit-selectors and the conductors.

The parts are in their normal position in Fig. 4, and in the operation of the device a ticket is inserted in the groove 5 or receptacle of the face-plate 4, and the handle is turned downward toward the position shown in Fig. 2. By this action and for the reasons hereinbefore described with reference to the springs *g* and *i* the circuit-selectors are brought into contact with the face of the ticket, and where there are apertures they pass through the apertures and form electric contact with the circuit-wires 7, and after this relation is established the handle reaches such a downward position that the bars *a b* pass between the spring-clips 12 13 and the electric contact is made and the circuit established, the current passing, as hereinbefore described, through the predetermined circuit-selectors to the monogram of lamps illuminating the numerals or letters predetermined by the ticket or card *k*. The illumination of the numerals or letters is maintained so long as the hand of the operator upon the handle 16 keeps the parts in the position shown in Fig. 2. With the return movement the handle and switch are swung upwardly toward the position Fig. 4, and because of the greater power of the spring *i* the circuit-selectors are kept in electric contact with the wires 7 until the contact between the bars *a b* and the spring-clips 12 13 is broken and the electric current shut off, and with the further upward movement of the handle and bars the spring *g* acts to throw the block *f* outward into the position Fig. 4, in which the card or ticket *k* is removed and another one having different perforations inserted to produce with the repetition of the operations a different illuminated number. These movements may be repeated as frequently as desired or necessary, and with the employment of tickets or cards having varying perforations different combinations or groups of circuit-selectors are brought into play to carry out the functions of the device.

We claim as our invention—

1. In a switchboard device for illuminating electric-lamp signs, the combination with groups of circuit-wires in a fixed position, of groups of circuit-selectors, a movable support therefor, means for effecting a predetermined contact of the circuit-selectors and circuit-wires, a switch for making and breaking the

electric circuit, means for changing the position of the movable support of the circuit-selectors, means of greater force than the former means connected to the said movable support of the circuit-selectors and bearing against the switch device whereby a contact of the circuit-selectors and circuit-wires is made before the completion of the electric circuit, and contra, the circuit is broken before the separation of the circuit-selectors from the circuit-wires, substantially as set forth.

2. In a switchboard device for illuminating electric-lamp signs, the combination with groups of circuit-wires in a fixed position, of groups of circuit-selectors, a movable support therefor, means for effecting a predetermined contact of the circuit-selectors and circuit-wires, a switch for making and breaking the electric circuit, a spring for changing the position of the movable support of the circuit-selectors, a second spring of greater strength than the former spring connected to the said movable support of the circuit-selectors and bearing against the switch device whereby a contact of the circuit-selectors and circuit-wires is made before the completion of the electric circuit, and contra, the circuit is broken before the separation of the circuit-selectors from the circuit-wires, substantially as set forth.

3. In a switchboard device for illuminating electric-lamp signs, the combination with groups of circuit-wires having their ends in the same plane and a suitable support therefor, of groups of spring-actuated circuit-selectors, a hinged support therefor, a metal plate upon the surface of the support forming electric contact with the circuit-selectors, means for effecting a predetermined contact of the circuit-selectors and circuit-wires, a switch for making and breaking the electric circuit, and springs of varying tension acting between the fixed support of the circuit-wires and the switch upon opposite sides of the movable support for the circuit-selectors, substantially as and for the purposes set forth.

4. In a switchboard device for illuminating electric-lamp signs, the combination with groups of circuit-wires in a fixed position and a suitable support therefor, of groups of spring-actuated circuit-selectors, a hinged support therefor, a metal plate upon the surface of the support forming electric contact with the circuit-selectors, means for effecting a predetermined contact of the circuit-selectors and circuit-wires, a switch for making and breaking the electric circuit, and springs of varying tension acting between the fixed support of the circuit-wires and the switch upon opposite sides of the movable support for the circuit-selectors, and conductors from a source of electricity to part of the switch device, from the monogram of lamps to another part of the switch device and from the switch device back to the source, whereby a

complete circuit is formed through the switch device, the circuit-selectors and circuit-wires and the monogram of lamps, substantially as set forth.

5. In a switchboard for illuminating electric-lamp signs, the combination with groups of circuit-wires, a support to which the same are connected in a fixed position, a perforated card or ticket, a receptacle for the same in the support of the circuit-wires, whereby predetermined circuit-wires are exposed in the apertures of the ticket, of groups of circuit-selectors, a movable support therefor, a switch for making and breaking the electric circuit, a spring for actuating the support of the circuit-selectors to move the same away from the circuit-wires and a spring of greater tension for supporting the switch in its disconnected position and which acts to make contact of the circuit-selectors and circuit-wires before the completion of the electric circuit by the switch, substantially as set forth.

6. In a switchboard for illuminating electric-lamp signs, the combination with groups of circuit-wires, a support to which the same are connected in a fixed position, a perforated card or ticket, a receptacle for the same in the support of the circuit-wires, whereby predetermined circuit-wires are exposed in apertures of the ticket, of a block of insulating material, groups of circuit-selectors supported thereby, a plate of metal upon the outer surface of the block of insulating material, a hinge connected therewith, a switch device comprising parallel blade-bars, base-plates and pivot-supports therefor and spring-clips and base-plates engaged thereby, a plate forming the other part of the hinge electrically connected to one of the switch-supports, cross-bars of insulating material connecting the switch-bars and circuit connections from a source of electricity to the switch through the hinge to the circuit-selectors, from the circuit-wires to the monogram of lamps, from the monogram of lamps back to the other side of the switch and from the switch returning to the source of electric energy, substantially as set forth.

7. In a switchboard device for illuminating electric-lamp signs, the combination with a suitable support and groups of circuit-wires arranged in parallel, horizontal and vertical rows at predetermined spaced-apart intervals and connected thereto in a fixed position, and a block of insulating material having parallel, horizontal and vertical rows of offset apertures spaced apart between centers to agree with the centers of the circuit-wires, a plate overlying the outer surface of said block and secured thereto, and a plate connected to the plates e' and e^2 by a hinged joint and secured to the support of the circuit-wires, circuit-selectors h comprising cup and stem portions received in the offset apertures in the block of insulating material, springs within the cup portions of the circuit-selectors

with one end bearing against the inner surface of the plate e^2 , means for effecting a predetermined contact of the circuit-selectors and circuit-wires, a switch for making and
 5 breaking the electric circuit, springs of varying tension acting against the support of the circuit-wires and the switch and upon opposite sides of the hinged device supporting the circuit-selectors, substantially as and for the
 10 purposes set forth.

8. In a switchboard device for illuminating electric-lamp signs, the combination with a suitable support and groups of circuit-wires arranged in parallel, horizontal and vertical
 15 rows at predetermined spaced-apart intervals and connected thereto in a fixed position, of a block of insulating material having parallel, horizontal and vertical rows of offset apertures spaced apart between centers to agree
 20 with the centers of the circuit-wires, a plate e^2 overlying the outer surface of said block and secured thereto, and a plate e connected to the plates e' and e^2 by a hinged joint and secured to the support of the circuit-wires,
 25 circuit-selectors h comprising cup and stem portions received in the offset apertures in

the block of insulating material, springs within the cup portions of the circuit-selectors with one end bearing against the inner surface of the plate e^2 , means for effecting a pre- 30
 determined contact of the circuit-selectors and circuit-wires, a helical spring g received in sockets provided therefor in the face of the support of the circuit-wires and in the under surface of the hinged part carrying the 35
 circuit-selectors and acting to separate the block of insulating material from the base or support, a bow-spring i secured at one end to the plates e' and e^2 of the hinge, a switch 40
 having blade-bars, pivots and spring-clips, a cross-bar of insulating material against which the free end of the bow-spring i bears, and an insulating-material handle secured to the switch for actuating the same, substantially 45
 as and for the purposes set forth.

Signed by us this 8th day of March, 1902.

MORTIMER NORDEN.
 LUCIEN S. CRANDALL.

Witnesses:

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 S. T. HAVILAND.