

C. W. DENNY.  
ELECTRIC SWITCH.  
APPLICATION FILED AUG. 3, 1908.

920,032.

Patented Apr. 27, 1909.

Fig. 1

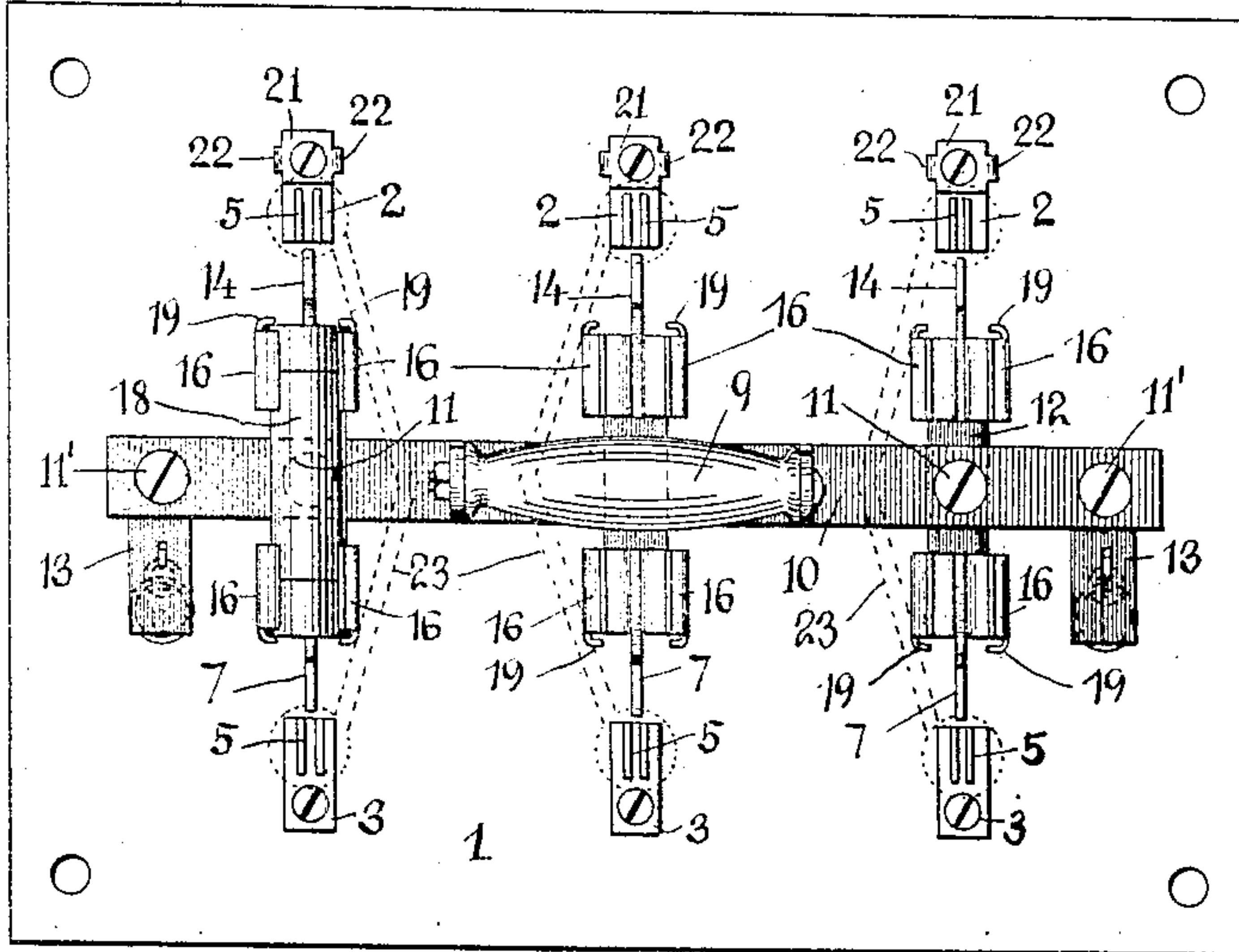


Fig. 2

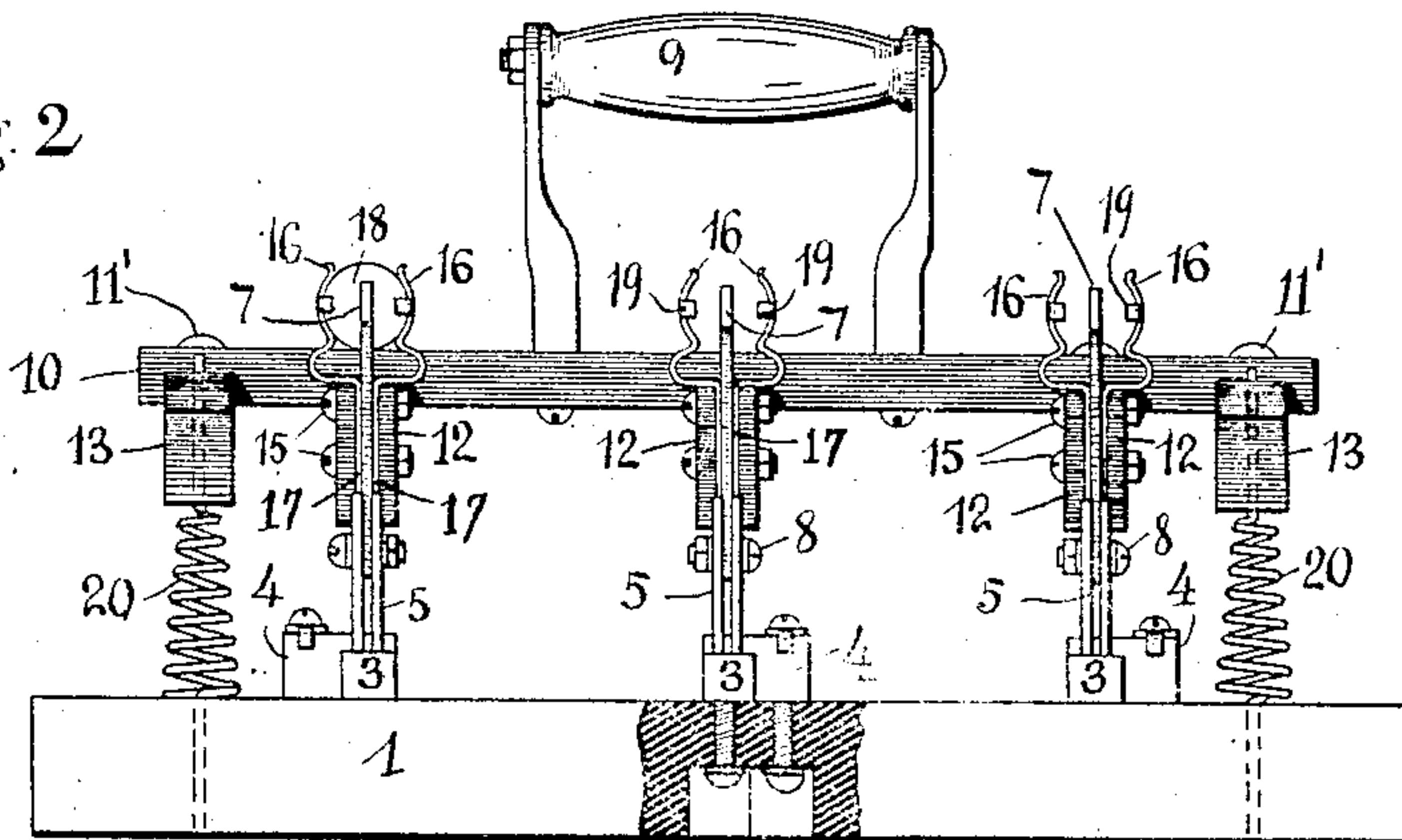
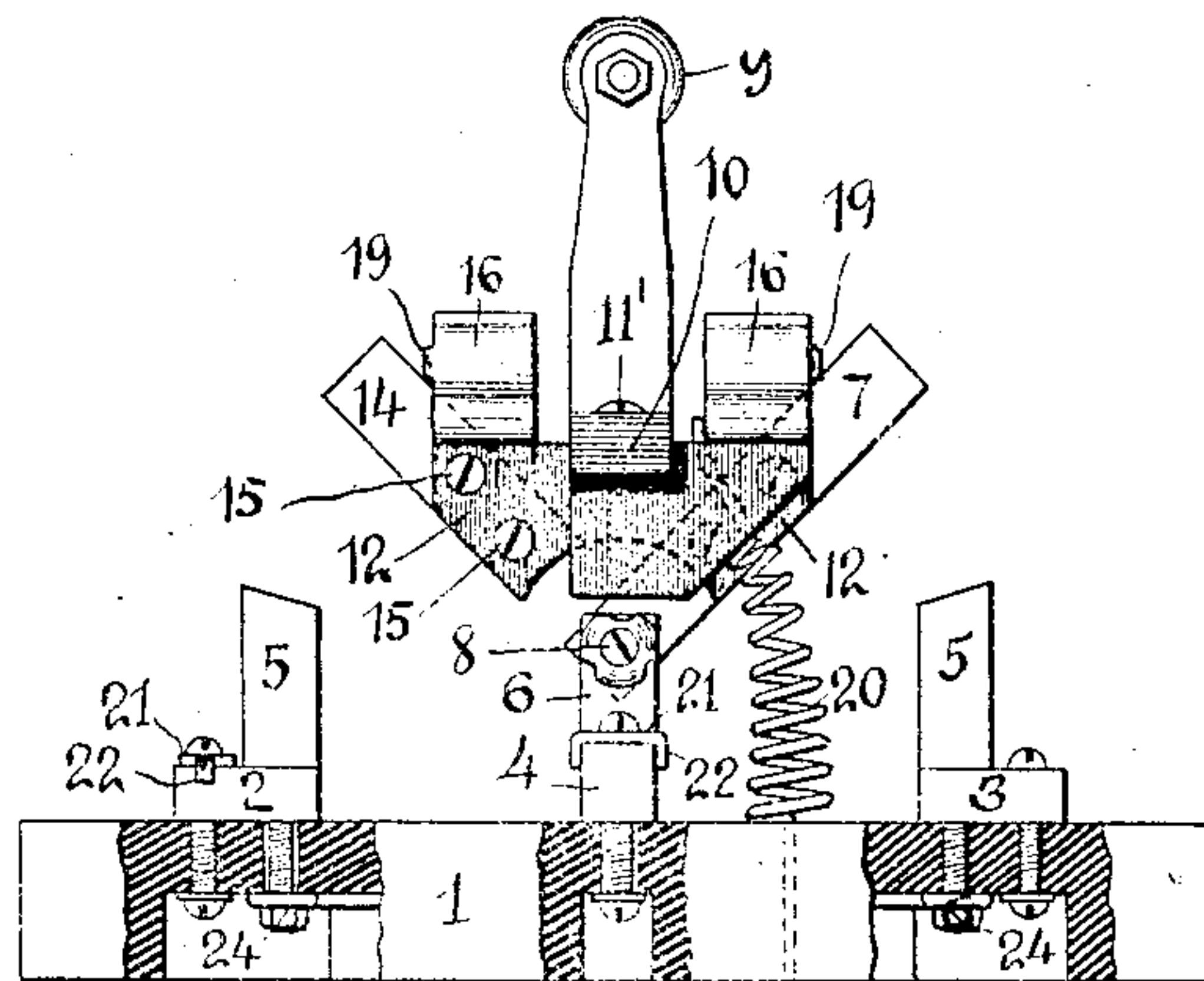


Fig. 3



Witnesses

*Charles W. Denny*  
*Edward Sager & Wooster*

By his Attorneys

*Charles W. Denny*  
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# UNITED STATES PATENT OFFICE.

CHARLES W. DENNY, OF MIDDLETOWN, OHIO, ASSIGNOR TO THE BARKELEW ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

## ELECTRIC SWITCH.

No. 920,032.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed August 3, 1908. Serial No. 446,527.

*To all whom it may concern:*

Be it known that I, CHARLES W. DENNY, a citizen of the United States, residing at Middletown, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Electric Switches, of which the following is a full, clear, and exact specification.

My invention relates to electric switches of a form particularly adapted for being placed in one position for starting motors and in another position for the running position.

Although particularly adapted for alternating current motors, my improved switch may be used with other forms of motors and may be used to control other forms of translating devices.

One object of my invention is to secure a form of controlling switch simple in construction, durable, compact and easily accessible to all its parts.

Another object is to provide a form of switch in which the circuit or circuits will be protected by protective devices in one position and not so protected in another position. For example, in operating motors it is desirable to insert protective overload devices in the circuit in running position which will open the circuit upon the occurrence of a predetermined overload current, whereas in the starting position such a current is permissible for a short length of time and if the protective devices were in circuit during starting they would interrupt the circuit unnecessarily. My improved switch is therefore adapted to insert suitable overload protective devices in the normal operating position but avoids such insertion in another position, such as the starting position.

Other objects and advantages of my construction will be understood from the following description and accompanying drawings.

Figure 1 is a plan view of one form of switch embodying my invention; Fig. 2 is a side view thereof, and Fig. 3 is an end view.

My improved switch in the form shown in the drawings is of the double throw type with the parts mounted upon a base 1 and comprises fixed contacts 2 for connection in circuit during normal position, also fixed contacts 3 for connection in circuit in the abnormal position, such as the starting position for a motor, and also a series of fixed contacts 4 to which the supply mains are con-

nected and which are located between the other two series of fixed contacts. The fixed contacts 2 and 3 are provided with spring clips 5 adapted to receive the switch blades of the movable element.

The movable part of the switch is pivotally mounted upon extensions 6 from the fixed contacts 4 by means of switch blades 7 pivotally connected to the extensions 6 by screws 8. The switch blades 7 are adapted to connect the fixed contacts 4 to fixed contacts 3 respectively when the switch is thrown to starting position, at which time the switch blades 7 engage the extensions 5 of the fixed contacts 3. The movable element is provided with an operating handle 9 connected to cross bar 10 of insulating material. Fixed to the cross bar 10 by screws 11 are cross pieces 12 also of insulating material, and at the two ends of the cross bar are fixed by screws 11' extensions 13. The cross pieces 12 are slotted at opposite ends for the reception of the switch blades 7 on one side and the switch blades 14 on the other side of the cross bar. The switch blades 7 and 14 are fixed to the cross pieces 12 by screws 15.

The movable element of the switch, supports fuse clips 16 on opposite sides of the cross bar which are stamped and formed from sheet metal and have lower extensions 17 embracing both sides of the switch blades 7 and 14 in the slotted portions of the cross pieces 12, and the screws 15 which serve to fix the switch blades in position also serve to clamp the extensions of the fuse clips firmly to the switch blades thus securing good electrical connection with the switch blades and also firmly supporting the fuse clips in place. The fuse clips fixed to each of the cross pieces 12 are so related to each other that they are adapted to receive the ends of an inclosed or other form of fuse 18, the fuse being shown in place at the left of Figs. 1 and 2 and not being shown in position in the other fuse clips in order to add clearness to the drawings. Each fuse clip is provided with projections 19 bent over at right angles in order to embrace the ends of the fuse 18 as shown in Figs. 1 and 2, and thus prevent the fuses from being improperly placed in position.

Between the projections 13 and the base plate are located coil springs 20, one end of the wire of each spring being inserted in a perforation in each extension 13 and the



other end of each spring being inserted in a perforation in the base plate. Thus, when the switch is thrown to the right, referring to Fig. 3, the springs 20 will be compressed and prevent the switch from remaining in this position unless held by the operator, and when released by the operator will cause the movable element to be forced quickly from such position over to the running position when the blades 14 will engage the fixed contacts 2, the lower ends of the springs 20 freely working in the perforations in the base plate in order to avoid any tension on the movable element of the switch when placed in running position. The switch will therefore remain in running position, but is prevented from remaining in starting position unless held by the operator. I provide at the fixed contacts where circuit connections are to be made, washers 21, having downwardly extending extensions 22 which embrace the sides of the fixed contacts. The ends of the circuit wires to be connected are placed under these washers around the screws and the projections 22 will prevent the washers from turning with the screws and also prevent the ends of the wires from being displaced while the screws are tightened.

The form of switch shown is adapted for starting an alternating current motor of the three-phase type and the leads from the supply wires are connected respectively to the fixed intermediate contacts 4, and the leads to the motor windings are connected to the fixed contacts 2 respectively. The contacts 3 are connected electrically to corresponding contacts 2, and in this particular form of switch these connections are made at the back of the base 1, the connecting wires 23 for this purpose being located in troughs cut in the back of the base plate and connected to screws 24 engaging the fixed contacts 2 and 3. The troughs and openings in the base at the screws 24 are afterward filled with sulfur or wax in order to insure permanent connection and protection.

It operating the switch, it will first be thrown by the operator so that the switch blades 7 engage the clips 5 of the fixed contacts 3, the operator holding the switch in this position against the pressure of the springs 20. The circuit connections will then be from the supply circuits to the fixed contacts 4, and extensions 6 and switch blades 7 to the clips 5 of the fixed contacts 3 and then by the connections 23 to the fixed contacts 2, and thence to the motor circuits. It will thus be seen that the fuses 18 are not connected in circuit during this starting position. When the switch is thrown to the running position the blades 14 will engage the clips 5 of the fixed contacts 2 and the circuit connections will be from the supply mains to the fixed contacts 4, then through

the extensions 6, through the switch blades 7 and clips 13 to the fuses 18, thence to the switch blades 14 and through the clips 5 of the fixed contacts 2 and thence to the motor circuits, the switch blades 14 being connected to the switch blades 7 only by means of the fuses. It will thus be seen that in running position, the circuits are protected by the overload fuses 18 and that these fuses are in circuit only when the switch is in normal running position.

It will be understood that my invention may be embodied in other forms than the particular form shown without departing from the scope of my invention.

Having thus described my invention, I declare that what I claim as new and desire to secure by Letters Patent, is,—

1. In an electric switch, the combination of a double-throw movable element, comprising a plurality of switch blades, a set of fixed contacts to which at least one of said switch blades is permanently connected, a second set of fixed contacts, and a protective device carried by said movable element and electrically connected in series with at least one of said switch blades.

2. In an electric switch, the combination of a double-throw movable element comprising a plurality of switch blades, a set of fixed contacts to which at least one of said switch blades is permanently connected, a second set of fixed contacts, and an overload protective device carried by said movable element and electrically connected in series with at least one of said switch blades.

3. In an electric switch, the combination of fixed contacts, a movable element for making circuit connections in a plurality of different positions, and an overload protective device carried by said element, and means for connecting said device in circuit in one of said positions but not in another of said positions.

4. An electric switch comprising in combination a double-throw movable element including at least two switch blades, a fixed contact to which one of said switch blades is permanently connected, a second fixed contact adapted to be engaged by one of said switch blades in one position of said movable element, a third fixed contact adapted to be engaged by another of said switch blades in another position of said movable element, and a protective device mounted on said movable element in series with at least one of said switch blades.

5. In an electric switch, the combination of fixed contacts, a double throw movable element, an overload protective device carried by said element, and means whereby said device is connected in circuit in one position of said element but not in the other position of said element.

6. In an electric switch, the combination



of a double throw movable element, a switch blade carried by said element pivotally connected to a fixed contact, a second fixed contact engaged by said switch blade in one position of said element, a second switch blade carried by said element, a third fixed contact engaged by said second switch blade in another position of said element, and an overload protective device electrically connecting said two blades.

7. In an electric switch, the combination of a movable element, a switch blade permanently connected to a fixed contact, a second fixed contact engaged by said blade in one position of said element, a second switch blade carried by said element, a third fixed contact engaged by said second switch blade in another position of said element, and an overload protective device connecting said two switch blades.

8. In an electric switch, the combination of fixed contacts, a movable element for making circuit connections in a plurality of different positions, and a protective device carried by said element, and means for connecting said device in circuit in one of said positions but not in another of said positions.

9. In an electric switch, the combination of fixed contacts, a double throw movable element, a protective device carried by said element and means whereby said device is

connected in circuit in one position of said element, but not in the other position of said element.

10. In an electric switch, the combination of a movable element, a switch blade permanently connected to a fixed contact, a second fixed contact engaged by said blade in one position of said element, a second switch blade carried by said element, a third fixed contact engaged by said second switch blade in another position of said element, and a protective device connecting said two switch blades.

11. In an electric switch, the combination of sets of fixed contacts, a double-throw element including a plurality of sets of switch blades and nonconducting elements maintaining the switch blades of said set in a desired relation, one set of said switch blades being permanently connected to one set of the said fixed contacts, and a protective device carried by said double-throw element and electrically connecting said sets of switch blades in series.

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

CHAS. W. DENNY.

Witnesses:

H. D. DELL,  
B. I. HARWITZ.