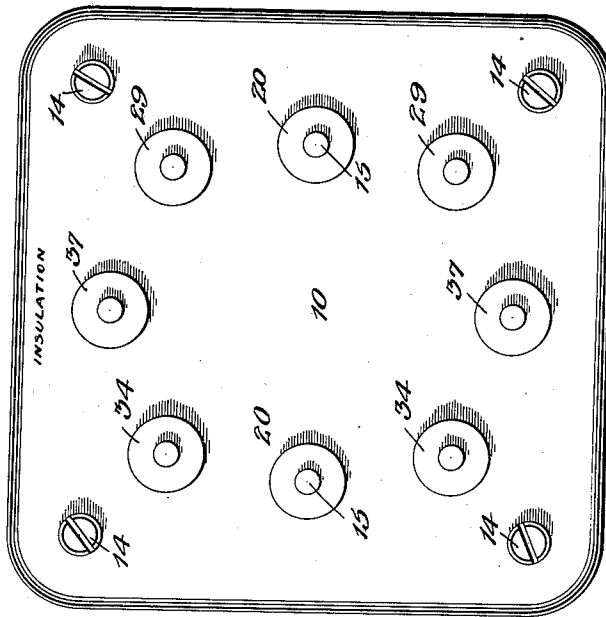
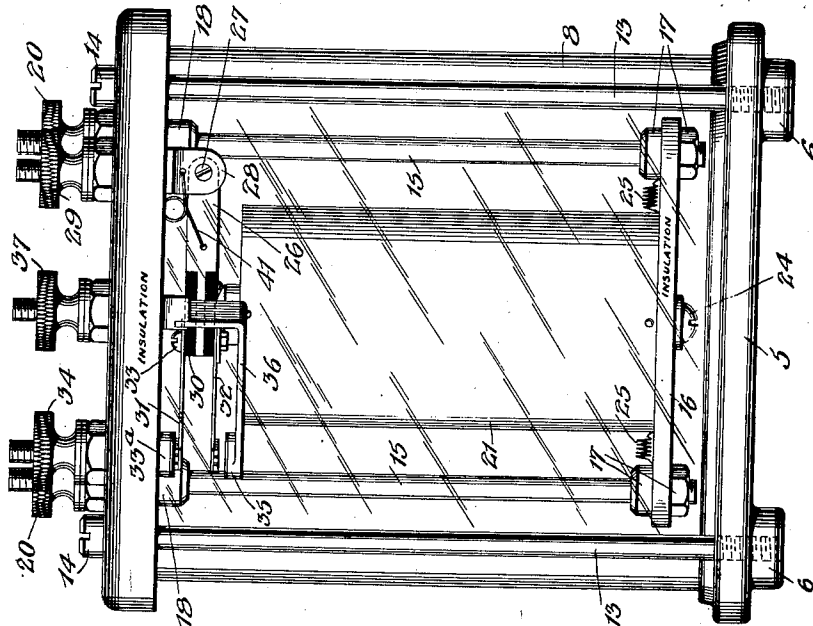


1,201,491.

2 SHEETS—SHEET 1.



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ELECTROMAGNETIC DEVICE.
APPLICATION FILED MAY 22, 1915.

Patented Oct. 17, 1916.
2 SHEETS—SHEET 2.

Fig. 4.

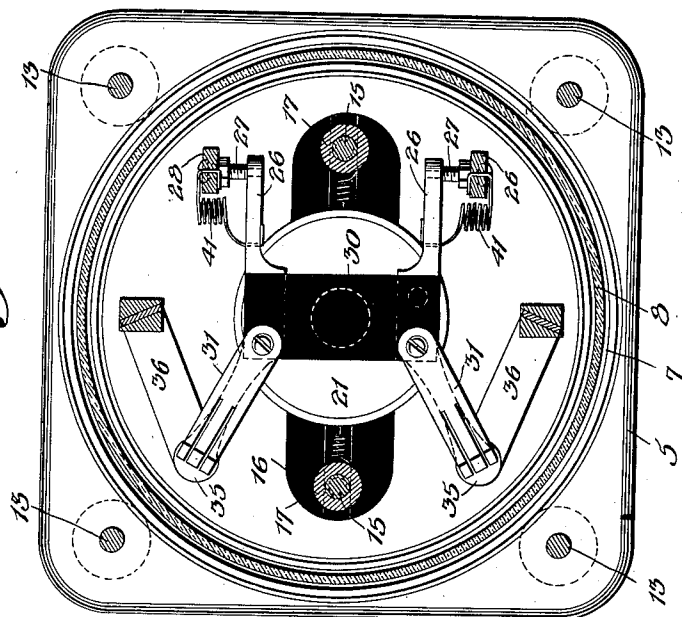
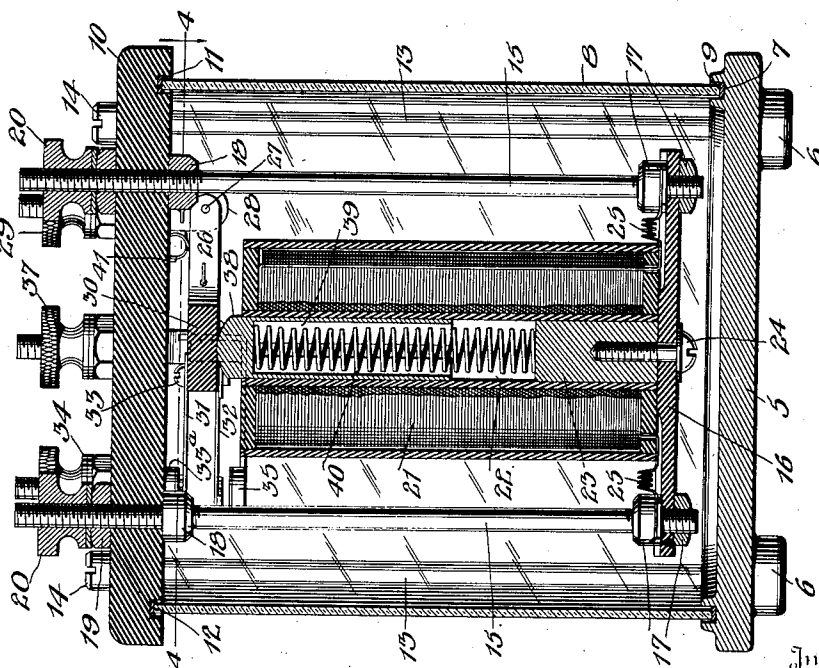


Fig. 5.



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ELECTROMAGNETIC DEVICE.

1,201,491.

Specification of Letters Patent.

Patented Oct. 17, 1916.

Application filed May 22, 1915. Serial No. 29,751.

To all whom it may concern:

Be it known that I, WILL C. NEAHR, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in Electromagnetic Devices, of which the following is a specification.

The present invention relates more particularly to electromagnetic switches or relays, and in a restricted sense to those intended for operation by alternating currents.

The primary object is to provide a practical structure of a relatively simple character, which is compact, and in which the parts can be readily assembled and are easily accessible.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view of the same. Fig. 3 is a vertical sectional view, and Fig. 4 is a horizontal sectional view taken substantially on the line 4—4 of Fig. 3.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment disclosed a supporting structure is employed which is in the form of a casing or housing for the mechanism. This includes a base 5, preferably of metal, having suitable bosses 6 constituting feet, and having an annular groove 7 in its upper surface, which groove receives the lower edge of a cylindrical wall 8 of glass or other transparent material. A packing washer 9 is preferably located in the groove 7 and constitutes a yielding bed for the lower end of the wall 8, while forming a tight joint. A cap disk 10 of insulating material closes the upper end of the cylindrical wall 8, and has a groove 11 that receives said wall. A similar packing washer 12 is located in the said groove 11 and rests on the upper edge of said wall. The above described parts of the casing are held together by tie screws 13 having heads 14 at their upper ends that bear upon the cap 10 and having their lower ends threaded into the bosses or feet 6 that thus constitute extended bearings for the said screws.

Suspended from the cap 10 is a yoke comprising a pair of spaced side rods 15 of electric conducting material, the lower ends of

these side rods being connected by a cross bar 16 of insulating material, the cross rod having openings through which the lower ends of the rods 15 pass, and said cross bar being held against displacement by nuts 17 threaded on the rods and arranged on opposite sides of said bar. The upper ends of the rods 15 pass through the cap 10. Said end portions have adjusting collars 18 threaded thereon and bearing against the lower face of the cap, while clamping nuts 19, screwed upon the upper projecting ends of the rods, bear against the upper face of the cap. The rods are thus effectively held in position, but may be adjusted. Binding nuts 20 are threaded on the upper ends of the said rods 15, and thus binding posts are provided upon the cap 10.

Supported on the cross bar 16 of the yoke is an electro-magnet 21, which may be of any well known or desired character, and is provided with a central bore 22. In the lower end of this bore is a fixed core section 23 of soft iron, and a holding screw 24, extending centrally through the cross bar 16, is threaded into the core element 23, thereby serving to secure the electro-magnet in place within and upon the yoke. The said electro-magnet has its terminals 25 electrically connected to the side rods 15, so that the binding posts 20 constitute the means whereby the lead wires from the source of the electric current supply for the electro-magnet can be connected to said electro-magnet.

Located between the electro-magnet 21 and the cap 10 is a swinging switch member which is shown more particularly in Fig. 4, and consists of a pair of side arms 26 of conducting material pivoted as shown at 27 to the depending terminals 28 of binding posts 29 mounted on the cap. These arms are connected by a tie block 30 of insulating material that is disposed over the electro-magnet, and mounted on the said tie block are upper spring contact members 31 and lower spring contact members 32 electrically connected to the arms 26 by the screws 33 which secure the members 31 and 32 to the tie block 30. The upper members 31 are arranged to engage contact or terminal elements 33^a located beneath the cap 10, and electrically connected to binding posts 34 on said cap while the contact members 32 engage contact elements or terminals 35 lo-

cated beneath the same and carried by angular arms 36 suspended from the lower ends of binding posts 37. It will be noted by reference to Figs. 1 and 2 that the various binding posts are disposed in substantially a circle upon the cap 10.

For the purpose of actuating the above described switch member, a movable core element 38 is slidably mounted in the upper portion of the bore 22 of the electro-magnet 21, said core element being relatively long and its lower portion being in the form of a longitudinally slitted casing providing a socket 39. This element acts in the nature of a plunger, its upper end bearing against the under side of the tie 30 of the switch element. It is yieldingly supported by a coiled spring 40 interposed between the core element 23 and said sliding element. This coiled spring enters the socket or casing portion, as clearly shown in Fig. 3. The spring is of sufficient strength to hold the core element 38 and the switch element in elevated position with the contact members 31 of said switch element against the contact elements 33. But when the electro-magnet is energized, the core element 33 is drawn downwardly against the action of the spring, so that the switch element can drop until its contact members 32 engage the contact elements 35. This movement is assisted by a pair of light springs 41, the central portions of which are coiled and their terminal portions being respectively engaged with the terminals 28 and the arms 26. These springs, however, are much lighter than the spring 40, so that said spring 40 can overcome them when the magnet is deenergized. The springs 41 moreover constitute electrical connections between the terminals 28 of the binding posts 29 and the side arms 26, insuring a good connection between the parts that is not dependent on the pivots 27.

It is believed that the operation of the apparatus will be clear to those skilled in the art. As long as the electro-magnet 21 is deenergized, the parts will be in the position shown in Figs. 1 and 2, in which case the binding posts 29 will be electrically connected with the binding posts 34, through the switch arm, but when the electro-magnet is energized, the switch element will drop, thus breaking the electric connection between the binding posts 29 and 34, and establishing an electrical connection between the binding posts 29 and the binding posts 37.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without de-

parting from the spirit or sacrificing any of the advantages of the invention.

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

1. In a device of the character set forth, a transparent casing of insulating material and a cover of insulating material therefor, a yoke suspended within the casing from the cover and comprising side rods of conducting material that project through and above said cover, binding nuts on the projecting ends and a cross bar of insulating material connecting the lower ends of the side rods, an electro-magnet supported by and secured to the cross rods, and means actuated by the electro-magnet interposed between the same and the cover.

2. In a device of the character set forth, the combination with a cap, of spaced supporting rods of conducting material passing through the cap and projecting above and below the same, binding posts formed on the upwardly projecting ends of the rods, and an electro-magnet supported by the downwardly projecting portions of the rods and electrically connected thereto.

3. In a device of the character set forth, the combination with a support including a yoke, of an electro-magnet arranged within the yoke and having a bore, a stationary core element fixed in one end of the bore, a fastener for the electro-magnet extending through the yoke and engaging the stationary core element, a movable core element slidably mounted in the bore, and means actuated by the electro-magnet and cooperating with the movable core element.

4. In a device of the character set forth, the combination with a casing including a detachable cap, of an electro-magnet suspended from the cap in spaced relation thereto, a movable contact member operated by the electro-magnet and interposed between the same and the cap, and contact elements also supported by the cap and located above and below the contact member in positions to be alternately engaged by the latter as the same is moved in opposite directions.

5. In a device of the character set forth, the combination with a casing including a detachable cap, of an electro-magnet suspended from the cap, a swinging contact member pivotally suspended at one end from the cap and operated by the electro-magnet, and contact elements also supported by the cap and located above and below the free end portions of the contact member in positions to be alternately engaged by the latter as the same is moved in opposite directions.

6. In a device of the character set forth, an electro-magnet, a movable switch element operated thereby and comprising spaced

sets of contact members and a tie of insulating material connecting the same, spaced sets of contact elements located on opposite sides of the contact members of the switch element, and a core actuated by the electro-magnet and bearing against the insulating tie to operate the switch element.

7. In a device of the character set forth, the combination with a transparent casing having a cap of insulating material, a yoke suspended from the cap element within the casing and comprising spaced side rods of conducting material having their upper ends formed into binding posts and a cross bar of insulating material connecting the lower ends of the rods, an electro-magnet supported on the cross bar, a movable core element slidably mounted in the upper end of the electro-magnet, spaced binding posts mounted

on the cap, spaced switch arms pivoted to said binding posts and including sets of contact members, a tie of insulating material connecting the arms and borne against by the core element, a spring in the electro-magnet bearing against the core element, other binding posts mounted on the cap, and contact elements connected to the latter binding posts and located on opposite sides of the contact members of the switch element.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILL C. NEAHR.

Witnesses:

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JAS. R. ELMENDORF.