May 26, 1925. 1,538,950

O. I. PRICE

CIRCUIT CONTROLLING DEVICE

Filed May 24, 1924

Fig. 1.

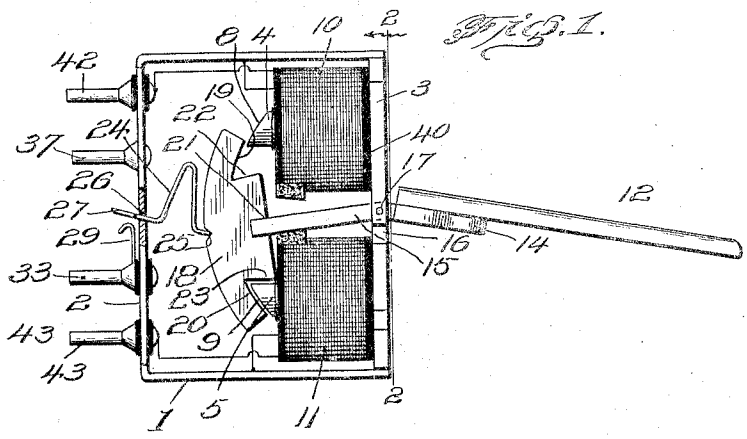


Fig. 2.

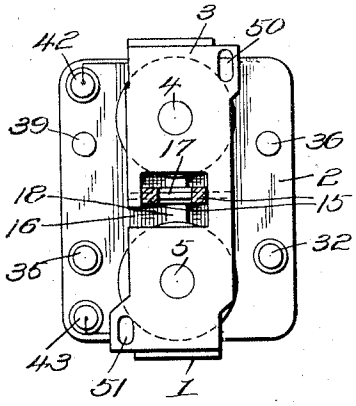


Fig. 4.

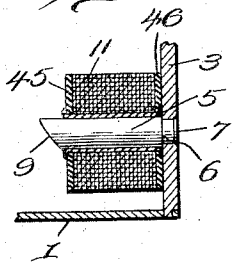


Fig. 3

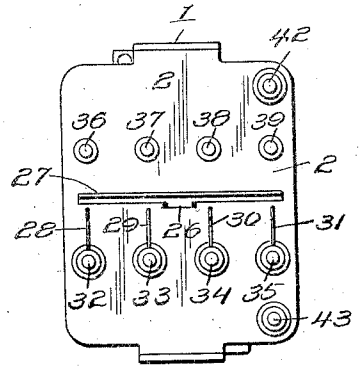


Fig. 5.

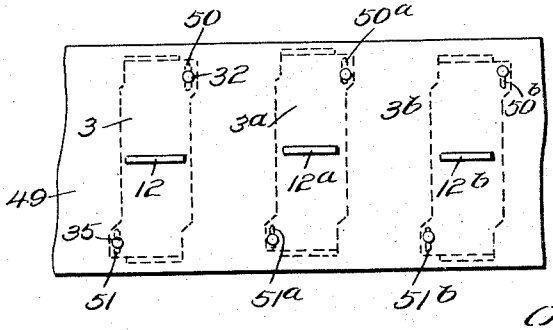
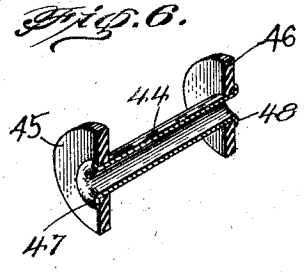


Fig. 6.



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Patented May 26, 1925. 1,538,950

UNITED STATES PATENT OFFICE.

OSBORNE I. PRICE, OF FREDERICK, MARYLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE W. H. REISNER MFG. CO., OF HAGERSTOWN, MARYLAND, A CORPORATION OF MARYLAND.

CIRCUIT-CONTROLLING DEVICE.

Application filed May 24, 1924. Serial No. 715,741.

To all whom it may concern:

Be it known that I, OSBORNE I. PRICE, a citizen of the United States, residing at Frederick, in the county of Frederick and State of Maryland, have invented a certain new and useful Improvement in a Circuit-Controlling Device, of which the following is a specification.

My invention relates broadly to electrical circuit controlling devices, and more particularly to a combined manual and automatic quick action make and break device for electrical circuits.

One of the objects of my invention is to provide an electric circuit controlling device of small overall size capable of inexpensive manufacture on a quantity production basis with electromagnetic operating means disposed therein and a moving armature arranged to be operated thereby.

Another object of my invention is to provide a combined indicator and an electromagnetic circuit closing device, the moving parts of which are arranged to operate silently in opening and closing an electrical circuit.

Still another object of my invention is to provide an electromagnetic circuit closing mechanism having means to manually actuate the mechanism whereby a plurality of electrical circuits may be simultaneously opened or closed.

Still another object of my invention is to provide a combined mechanical indicator and electromagnetic operating mechanism connected therewith wherein a plurality of electromagnets are employed with an arcuate armature member disposed adjacent the electromagnets and balanced under spring tension in such manner that impulses imparted to the armature tend to move the armature in either of two directions whereby the spring means becomes effective to carry the armature to a predetermined position for opening or closing an electrical circuit.

Still another object of the invention is to provide electromagnetic circuit closing devices carried within framelike structures in such manner that the individual structures may be adjusted and aligned in parallel relationship with respect to each other in bank formation for controlling a multiple number of electrical circuits.

A further object of the invention is to provide a simple construction and inexpensive construction of electromagnets wherein the magnet winding is disposed upon an insulated hollow core member upset upon itself at each end thereof to confine insulated end members upon the supporting tube, between which members the magnet winding is disposed substantially holding the end members apart against the upset ends of the tube.

Other objects of my invention will be understood from the following specification by reference to the accompanying drawings, in which:

Figure 1 is a side elevation partially in section of the electrical circuit closing device of my invention; Fig. 2 is a front view partially in section on line 2—2 of Fig. 1 of the electrical circuit closing device shown in Fig. 1; Fig. 3 is a rear view of the electrical circuit closing device shown in Fig. 1; Fig. 4 is a cross-sectional view of one of the electromagnets employed in the electrical circuit closing device; Fig. 5 represents a plurality of the electric circuit closing devices of my invention mounted in parallel relationship and adapted to be aligned with the indicators positioned in the same horizontal plane; and Fig. 6 is a perspective view showing the construction of the core for the electromagnets used in the system with upset ends for holding the end members upon the core.

Referring to the drawings in detail, the electric circuit closing device is disposed within a U-shaped frame member 1 having a rear wall portion 2 upon which is located the terminal posts of the device. The forward ends of the U-shaped strip device 1 are connected by magnetic member 3 forming the front plate of the device. The member 3 carries pole pieces 4 and 5 each having an annular shoulder 6 abutting against the face of member 3 with the end of the pole pieces riveted in the counter-sunk apertures in the member 3 as represented at 7. The tips of the pole pieces 4 and 5 are arcuate in shape as shown at 8 and 9 respectively, being curved on a radius from a center disposed between the electromagnets 10 and 11. The indicator which is directly connected with the moving parts of the electromagnetic mechanism is represented at 12.

This indicator may take the form of a manually operated key connected with an extended end 14 of the pivoted magnetic member 15. The magnetic front member 3 is apertured as represented at 16 to receive the pivoted magnetic member 15 operative on axis 17. The magnetic member 15 carries an arcuate armature member 18 having arcuate faces 19 and 20 on opposite ends thereof shaped to correspond with the shape of the pole tips 4 and 5 respectively and to move in extremely close relation to the pole tips whereby the magnetic circuit through magnetic members 3 and 15, armature 18, and a pole piece may become extremely small and be a minimum in length where the armature 18 is moved to a position where the end thereof lies directly adjacent a pole tip, and a maximum when the armature 18 moves in an opposite direction. The armature 18 is secured to the end of the movable magnetic member 15 and at right angles thereto as represented at 21, the ends of the armature 18 being abruptly cut away substantially at right angles to the side 21 of the armature as represented at 22 and 23. The armature 18 is spring pressed in the direction of its pivot 17 by means of a V-shaped spring member 24 having one end disposed in a socket 25 in armature 18 and its other end arranged to rock in a slot 26 in the rear face 2 of the frame 1. The member 24 carries an extension 27 at its end on the outside of the rear face 2 which may be moved to contact with spring members 28, 29, 30 and 31. These spring members connect to terminal posts 32, 33, 34 and 35 respectively, well insulated from the frame 1. The other side of each of these circuits is completed through terminal posts 36, 37, 38 and 39 grounded to the frame so that the several circuits may be simultaneously closed or broken by movement of the end 27 in contact with each of the several resilient members 28, 29, 30 and 31. The V-shaped spring member 24 is proportioned in such manner that its sides are moved together by an initial impulse imparted to move the armature in either of two directions, which movement results in making effective potential energy stored in the spring for moving the armature to the end of its path in the direction of the initial impulse. On the reverse movement the same operation occurs, that is, the initial impulse renders effective potential energy in the spring 24 for carrying the armature over its center. I provide silencing pads 40 and 41 on either side of the movable magnetic member 15 adjacent electromagnets 10 and 11 respectively, muffling the movement of the armature in either direction whereby the operation is entirely silent. This is an important feature of the electric circuit closing device when it is employed as an organ control mechanism where it is desirable for mechanical noises emanating from the device to cause any interference with the acoustics of the organ.

The electrical circuit through the electromagnets 10 and 11 are completed through binding post 42, a ground on the frame 1 such as binding post 39 and binding post 43, and a ground on the frame 1 such as binding post 35. By this arrangement either of the electromagnets may be independently energized from a local source from a push button, key or other circuit closing device for effecting the movement of armature 18 with opening or closing of the electrical circuits to be controlled.

The electromagnet structure is shown more clearly in Figs. 4 and 6 wherein an insulated tube 44 and end disks 45 and 46 are assembled by upsetting the ends 47 and 48 of the tube against which the disks 45 and 46 are pressed by the winding 11. The tube 44 may be of the well known soda straw variety which I have found well adapted for this purpose.

Where the electric circuit closing devices are employed as organ controls it is desirable that they be accurately aligned upon a panel 49 as represented in Fig. 5. That is to say, the key manuals or indicators 12, 12^a and 12^b of a plurality of electric circuit closing devices should be arranged in the same horizontal plane. To accomplish this I provide elongated slots 50 and 51 in opposite ends of the front plate 3 enabling securing means 52 and 53 to be passed through the slots in fastening the front plate 3 to the panel 49. The front plate 3^a may be likewise adjusted by means of slots 50^a and 51^a to bring indicator 12^a in horizontal alignment with indicator 12. Correspondingly the front plate 3^b of the next adjacent circuit closing device may be vertically adjusted with respect to panel 49 by means of slots 50^b and 51^b enabling key manual 12^b to be brought into horizontal alignment with keys 12 and 12^a.

While I have described my invention in certain particular embodiments I desire that it be understood that modifications may be made and that I intend no limitations upon the invention other than are imposed by the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is as follows:

1. An electric circuit controlling device, comprising in combination a U-shaped frame, a magnetic member closing one end of said frame, a pair of electromagnets carried by said member, said magnets having arcuate pole tips disposed in the same curved line, an arcuate armature pivotally mounted between said electromagnets and having arcuate faces at each end thereof corre-

sponding to the shapes of the pole tips, an indicator connected with said armature, and spring means for controlling the movement of said armature and said indicator to either of two positions whereby an electric circuit may be opened or closed and visible indication of the condition of the said circuit secured.

2. An electric circuit controlling device, comprising in combination a strip-like frame, a magnetic member closing the end of said frame, a pair of electromagnets carried by said magnetic member in positions spaced one from the other, arcuate pole tips on said electromagnets one curved opposite to the other, a second magnetic member pivotally mounted in said first mentioned magnetic member between said electromagnets, an arcuate shaped armature carried by said second mentioned member, said armature having arcuate faces at each end thereof corresponding to the shape of the arcuate pole tips, silencing devices secured on either side of said second magnetic member in a position to contact therewith in either of two positions, and spring means connected with said armature whereby said armature may be moved to either of said positions for silently opening or closing an electrical circuit.

3. An electrical circuit closing device, comprising a two position stop key for opening or closing an electric circuit, said key adapted to be moved manually from its normal position to its actuated position and vice versa, a pair of electromagnets spaced one from the other, a magnetic member pivotally mounted between said electromagnets and connected to said stop key, an arcuate armature carried on the extremity of said member and adapted to directly move said stop key from its actuated to its normal position when one of said electromagnets is energized, and to move said key from its normal to its actuated position when the other of said electromagnets is energized.

4. An electric circuit closing device, comprising in combination a magnetic frame, a casing connected to said frame, a pair of electromagnets mounted upon said magnetic frame in spaced relation one from the other, said magnets having pole tips curved upon a radius having its center at a point on said magnetic frame between said electromagnets, a magnetic member pivotally mounted upon said center and carrying an indicator on one end and an arcuate armature on its other end, arcuate faces on opposite ends of said armature curved upon a radius corresponding to the radius of curvature of said pole tips, and spring means disposed between said armature and said casing and operative upon movement of said armature in either of two positions for opening or closing an electrical circuit.

5. An electric circuit closing device, comprising in combinaton a magnetc frame, a casing connected to said frame, a pair of electromagnets mounted upon said magnetic frame in spaced relation one from the other, said magnets having pole tips curved upon a radius having its center at a point on said magnetic frame between said electromagnets, a magnetic member pivotally mounted upon said center and carrying an indicator on one end and an arcuate armature on its other end, arcuate faces on opposite ends of said armature curved upon a radius corresponding to the radius of curvature of said pole tips, a socket in the end of said armature, a V-shaped spring disposed between said socket and said casing and arranged to become potentially effective for moving said armature to either of two positions upon an initial impulse imparted thereto for opening or closing an electrical circuit.

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