March 30, 1926. 1,578,707

W. O. BECK

ELECTROMAGNETIC DEVICE

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Fig. 1

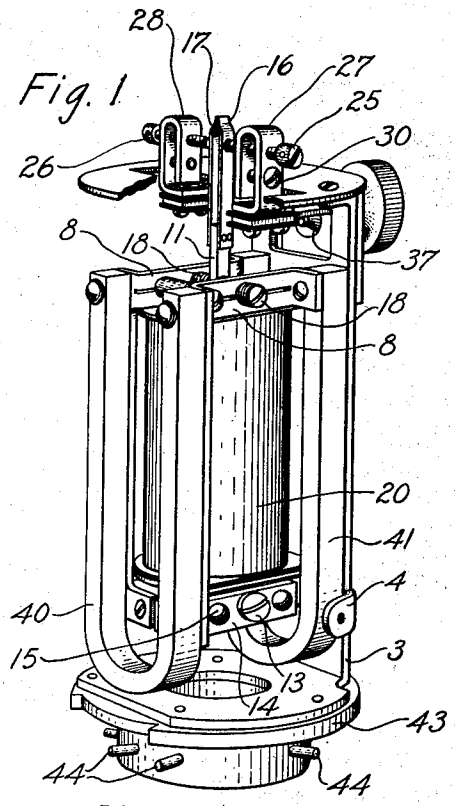
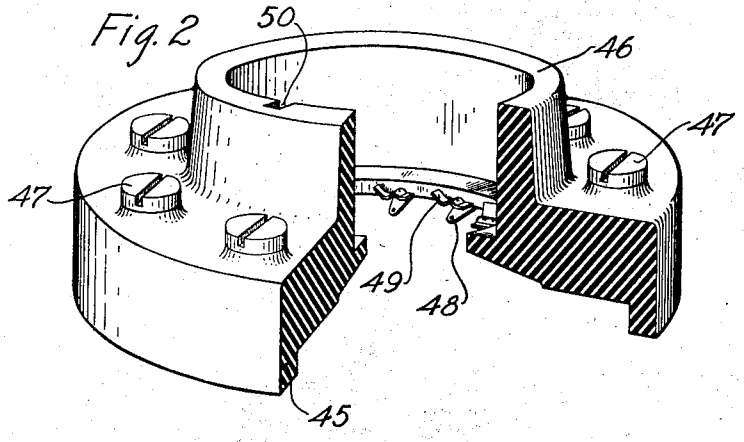


Fig. 2



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Fig. 3

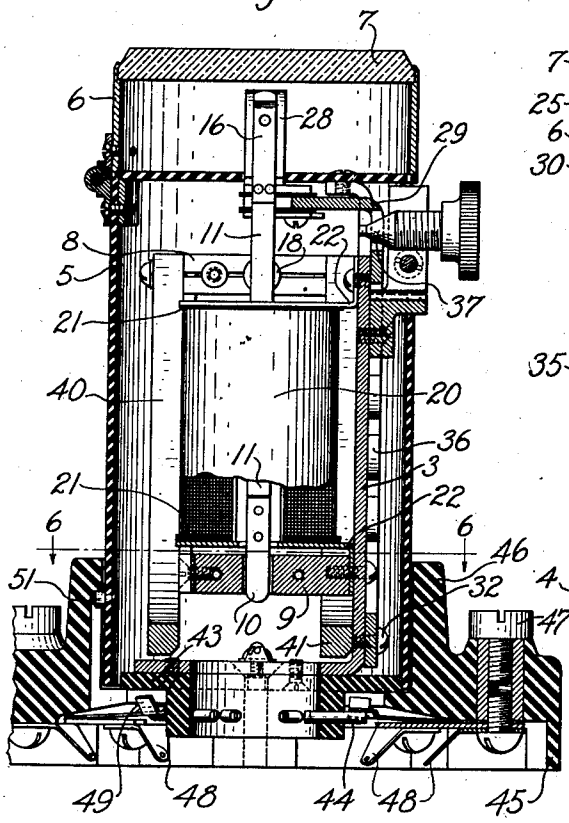


Fig. 4

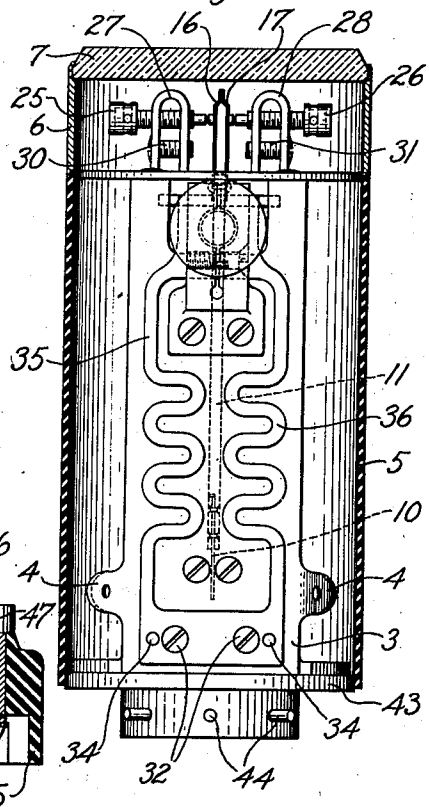


Fig. 5

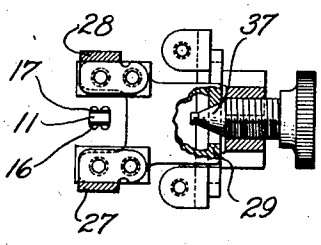
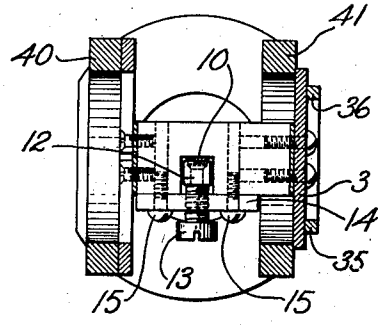


Fig. 6



Inventor:
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Patented Mar. 30, 1926. 1,578,707

UNITED STATES PATENT OFFICE.

WILLIAM O. BECK, OF RIDGEFIELD, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTROMAGNETIC DEVICE.

Application filed November 20, 1922. Serial No. 602,072.

To all whom it may concern:

Be it known that I, WILLIAM O. BECK, a citizen of the United States, residing at Ridgefield, in the county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Electromagnetic Devices, of which the following is a full, clear, concise, and exact description.

This invention relates to electromagnetic devices and particularly to polarized telegraph relays.

The object of the invention is a sensitive polarized relay which is adaptable to commercial systems and which may be operated without requiring frequent readjustment.

The invention in its preferred form provides an operating element or balanced magnetic circuit which is capable of being detached from its associated base and which is arranged with means for adjusting the position of the contact posts, thereby giving an accurate biasing arrangement for the relay.

The invention will be readily understood from the following description, taken in conjunction with the accompanying drawings in which one embodiment of it is shown.

In the drawings, Fig. 1 is a perspective of a relay embodying this invention. Fig. 2 is a perspective of the base of the relay shown in Fig. 1 with a portion thereof broken away. Fig. 3 is an elevation of the relay shown in Fig. 1 attached to the base shown in Fig. 2. Fig. 4 is an elevation of the relay shown in Fig. 1 showing details of the relay structure. Fig. 5 is a detail of the relay shown in Fig. 1. Fig. 6 is a sectional view taken along the broken line 6—6 of Fig. 3.

Referring now to the drawings in which there is illustrated a relay embodying this invention. There is shown a frame 3 of brass or other non-magnetic material, the frame being provided with projections or bosses 4—4 having threaded apertures. The threaded apertures in the projections or bosses 4—4 serve to receive screws for holding an enclosing case 5 to the frame 3. The enclosing case 5, preferably of non-conducting material, is provided with a hinged portion 6 in the upper end of which there is mounted a glass plate 7 for permitting the observance of the operation of the armature with its cooperating contacts. Supported at one end of the frame 3, and secured thereto by means of suitable screws are pole pieces 8—8 of magnetic iron. Also secured to the frame 3 is a block 9 having an aperture, as shown in Figs. 3 and 6, extending through the central portion thereof. In this aperture there is arranged to be positioned a steel reed 10 which is carried by the armature 11 and which is held in position by means of a horizontally movable block 12. This block 12 is secured to one end of a screw 13 which passes through a threaded aperture in a member 14 secured to the block 9 by means of screws 15—15. It is thus seen that when the block 12 with the spring 10 in engagement with a wall of the aperture in the block 9, is in its furthermost inner position, the armature will be securely held in position. Also by simply loosening the screw 13 the armature can be readily removed and replaced without disturbing the other parts of the relay. Such an arrangement also permits of the accurate alignment of the contacts carried by the armature with their cooperating contacts. Secured to the free end of the armature 11 is a pair of feather springs 16 and 17 which are tensioned so that their free ends are normally in engagement with each other. The arrangement of the springs 16 and 17, so that their ends normally touch, a substantially non-chattering relay is provided as each of the springs upon being brought into engagement with their cooperating contact are prevented from vibrating at their natural periodicity. Arranged on opposite sides of the armature 11 and threaded in apertures in the pole pieces 8—8 are screws 18—18 which may be adjusted for varying the length of travel of the armature.

The relay operating coil 20 is provided with spool heads 21—21, which are provided with angle members 22—22 secured to the frame 3 by means of screws. The hollow core of this coil is so dimensioned as to allow clearance for the operation of the armature 11. In alignment with and on opposite sides of the armature 11 are contact screws 25 and 26, which, in turn, pass through apertures in U-shaped members 27 and 28 respectively. The U-shaped members 27 and 28 are carried by member 29 and insulated therefrom, which will be described as being arranged with means for accurately biasing the relay. Each of the U-shaped

members 27 and 28 is also provided with apertures parallel to the operative thread to receive the contact screw and near their free ends through which pass screws 30 and 31 respectively. These screws, upon being tightened, draw the free end of their associated U-shaped member inwardly and thus produce a clamping action between the threads of the U-shaped member and the contact screw passing therethrough and permit of locking the contact screw in position.

As shown in Fig. 4, the member 29, upon which the U-shaped members 27 and 28 are mounted, extends downwardly along the side of the relay and is secured to the frame 3 at the lower end thereof by means of screws 32—32. For insuring the accurate positioning of the member 29, dowels 34—34 are also provided. The branches 35 and 36 of the member 29 are formed in a plurality of reoccurring S-shaped portions which makes the effective length of such member greater than if these branches were straight. It is thus seen that should the free ends of the member 29 be moved laterally the contacts which are carried thereby will, for a short distance, be moved in an approximately straight line rather than the arc of a circle which would be the case if the branches 35 and 36 of the member 29 were made straight. For moving the member 29 together with the U-shaped contact carrying members 27 and 28 laterally, a cone shaped screw 37 having a knurled head of insulating material is provided. This member 37, upon being moved by the rotation of the knurled head engages the walls of an aperture formed in the member 29, as shown in Fig. 5 for moving the U-shaped members 27 and 28 laterally in an approximately straight line.

The means for polarizing this relay consists of a pair of U-shaped permanent magnets 40 and 41 which are secured to the pole pieces 8—8 and the frame 3 by means of screws or other fastening devices.

Secured to the frame 3 is a base 43 of insulating material which carries a plurality of radially extending pins 44 of conducting material. These pins have their inner ends connected with the various parts of the magnetic circuit comprising the relay, while their outer ends are in engagement with contact springs to which the external circuit is connected.

The operating element shown in Fig. 1 is arranged to be positioned in a circular base 45 of insulating material having an aperture with an upwardly extending tubular shaped portion 46. Secured in the base 45 are a plurality of terminal posts 47 to which the circuit connections may be connected and which have radially extending portions 48, as shown in Figs. 2 and 3 for the purpose of providing a relay in which the connections are internal. Also arranged in the base 45 and projecting radially are a plurality of spring members 49 having a depressed portion in which the radially extending pins 44 of the operating element are arranged to rest. The spring members 49 are connected to corresponding terminals 47. In order that the operating element when inserted in the base 45 will be positioned such that the proper pins 44 engage their corresponding contact members 49, a slot 50 is formed in the tubular shaped member 46. Arranged in the casing 5 is a pin 51 which engages the slot 50 for aligning the operating element properly when attached to the base 45 thereby bringing into engagement the proper contact pins 44 with their associated contact terminals. When the operating element is positioned in the base, the contact springs 49 exert a pressure on the pins 44 in engagement therewith for maintaining it in place.

Although the invention has been described and disclosed in connection with a particular type of relay, it is, of course obvious that the embodiments may be applied to other types of electromagnetic devices without departing from the spirit and scope of the present invention.

The invention claimed is:

1. A polarized telegraph relay comprising an operating coil, an armature surrounded by said coil and acted upon by flux produced due to a current passing through said coil, a weak extension spring secured to one end of said armature, a support for said armature consisting of a member having an aperture arranged to receive said extension spring, means fitted in said aperture for securely holding said spring, a pair of spring members carried by the other end of said armature, and a pair of adjustable contact points arranged opposite each other and in contactual relation to said spring members, said spring members being normally tensioned to bring their free ends into engagement to prevent chattering therebetween when said armature is operated toward either of said contact points.

2. A polarized telegraph relay comprising an operating coil, an armature surrounded by said coil and acted upon by flux produced due to a current passing through said coil, a reed spring secured to one end of said armature, a permanent magnet, a support carried by said permanent magnet having an aperature arranged to receive said spring; means for securely holding said spring against the walls of said aperture, a pair of spring members carried by the other end of said armature, and a pair of adjustable contact points arranged opposite each other in engageable relation with said spring mem-

bers, said spring members being normally tensioned to bring their free ends into engagement to prevent chattering therebetween when said armature is operated towards either of said contact points.

3. A polarized telegraph relay comprising an operating coil, an armature surrounded by said coil and acted upon by flux produced due to a current passing through said coil, a reed spring secured to one end of said armature, a pair of spring members carried by the other end of said armature, said spring members being normally tensioned to bring their free ends into engagement to prevent their vibration at their natural periodicity, a contact point secured to each of said spring members, stationary contacts cooperating with said contact points, a permanent magnet, a support secured to said permanent magnet having an aperture arranged to receive said spring, and means fitted in said aperture engaging said spring and arranged to permit the free adjustment of the armature to enable the alignment of said contact points with respect to the stationary contacts.

4. In an electromagnetic device, an operating coil, an armature surrounded by said coil and acted upon by flux produced by the passage of a current through said coil, a pair of stationary contacts engaged by said armature, contact carrying members, a support for said contact carrying members having a plurality of flexible branches, and means for causing the lateral movement of said branches and accordingly the movement of said contact carrying members.

5. In an electromagnetic device, an operating coil, an armature surrounded by said coil and acted upon by flux produced by the passage of a current through said coil, a pair of stationary contacts engaged by said armature, contact carrying members, a support for said contact carrying members having a plurality of irregular shaped flexible branches, and means for causing the lateral movement of said branches and accordingly the movement of said contact carrying members.

6. In an electromagnetic device, a support having a pair of branches formed in a plurality of reoccurring S shaped portions, a contact carrying member carried by each of said branches, and means for moving said contact carrying members laterally through the movement of said branches.

7. In an electromagnetic device, a support having a pair of branches formed in a plurality of reoccurring S shaped portions, a contact carrying member mounted on each of said branches, and a horizontally movable cone-shaped member for causing said contact carrying members to be moved laterally through the instrumentality of said branches.

8. In an electromagnetic device, a pair of contact carrying members, a support for said contact carrying members having a pair of pivoted branches, a cam acting on said branches, and means for moving said cam to effect equal lateral movement of said branches and accordingly the movement of the contact carrying members.

In witness whereof, I hereunto subscribe my name this 14th day of November A. D., 1922.

WILLIAM O. BECK.