Sept. 5, 1939. W. V. JOHNSON ET AL 2,172,203

OPERATION INDICATOR RESET

Filed Dec. 30, 1937

Fig. 1.

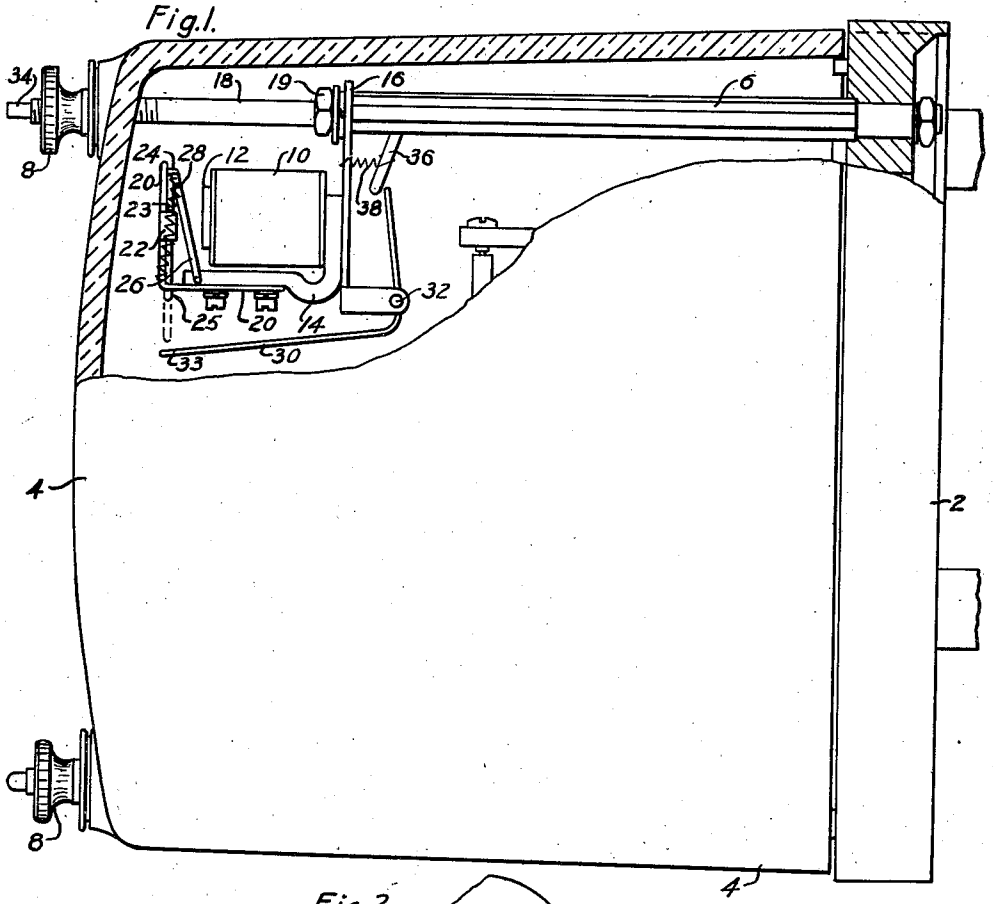


Fig. 2.

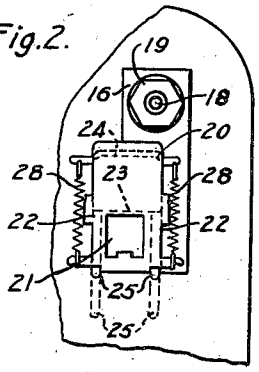
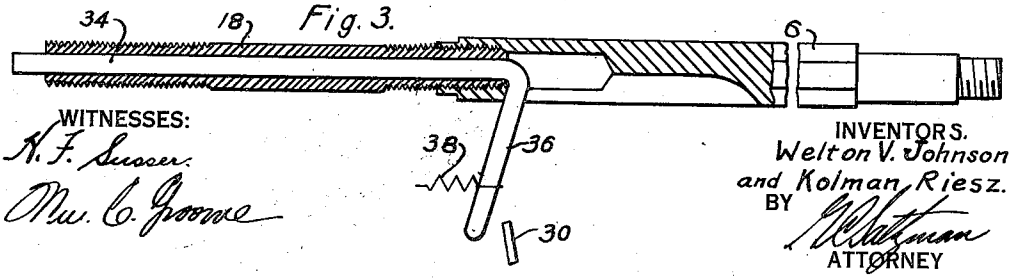


Fig. 3.



WITNESSES:

N. F. Susser.

Mw. C. Greene

INVENTORS.
Welton V. Johnson
and Kolman Riesz.
BY

ATTORNEY

Patented Sept. 5, 1939 2,172,203

UNITED STATES PATENT OFFICE

2,172,203

OPERATION INDICATOR RESET

Welton V. Johnson, East Orange, and Kolman Riesz, Gillette, N. J., assignors to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application December 30, 1937, Serial No. 182,632

4 Claims. (Cl. 177—311)

The present invention relates to operation indicators for electro-responsive devices, such as electrical protective relays, and more particularly to improved mountings and resetting mechanisms for such indicators.

It is common practice to provide indicators for electrical relays to indicate when a relay has operated, in response to a fault or other predetermined condition, so that the relay responding to the fault, and hence the type of fault, may be identified.

In view of the wide variety of relays now required for transmission-line protection, and control purposes generally, it has been difficult to obtain a standardized mounting for operation indicators to take care of all or a substantial number of different types of relays. Inherently, the relays themselves differ widely in design and proportions and this has resulted in almost as many types of operation indicators and mountings therefor as there are relays. As a consequence, the relay manufacturer must have available a substantial number of indicator reset designs with the accompanying difficulty in handling and tooling them, and he has not been able to standardize the mountings of such indicators.

Operation indicators are usually of the annunciator type which when once actuated must be manually reset. In view of the different locations of these indicators in the casings of various types of relay, it has been almost impossible to obtain a standardized resetting mechanism. The resetting mechanism should be readily accessible from the front of the relay and since present practice dictates that the front shall be of glass, a further difficulty is encountered. In United States Letters Patent such as 1,726,653 and 1,664,326, the resetting operation is accomplished through the hole in the glass cover through which projects the stud used to secure the cover to the base of the relay. As shown in these two patents, however, the resetting mechanism is complicated and it is impossible to remove the cover without disturbing such mechanism.

It is an object of the present invention to provide an operation indicator for an electro-responsive device, such as a protective relay, which may be mounted upon the stud which secures the cover of the relay in position, and which may be reset by means cooperating with said stud in such manner that it is independent of the relay cover and does not interfere with the removal of the cover from the stud.

It is a further object of the invention to provide an operation indicator which may be adjusted and tested in its operative position prior to placing the cover of the electro-responsive device in position.

Other objects will appear from the following description read in conjunction with the accompanying drawing wherein:

Figure 1 is a view in side elevation, with parts broken away, of an encased relay mechanism having an operation indicator in accordance with the present invention;

Fig. 2 is a view in front elevation of the operation indicator illustrated in Fig. 1; and

Fig. 3 is an enlarged view partly in section of a cover stud of the mechanism shown in Fig. 1 illustrating the details of the resetting mechanism.

Referring to the drawing, Fig. 1 illustrates a relay having a base 2, to be mounted upon a support, and a glass cover 4 which is secured to the base by means of a plurality of studs 6 secured at one end to the base and projecting through holes in the face of the cover 4 to receive knurled nuts 8. The electro-responsive device or relay, which is to be mounted upon the base 2 within the cover, is not shown in detail because the specific character of it is not of importance with reference to the invention. It is contemplated that any type of relay or other mechanism, the operation of which is to be indicated, may be disposed within the cover 4 within the scope of the invention.

The operation indicator is of the drop-annunciator type and comprises an electromagnet 10 having a core 12 mounted upon an arm 14 constituting part of the magnetic circuit. One end of the arm 14 is secured to a sheet metal strap 16 which is carried by and removably secured to one of the cover-securing studs 6. Preferably, as indicated in Fig. 3, the forward portion of such stud 6 is removed and a threaded tubular member 18 is threaded therein for a purpose to be hereinafter described. The strap 16 may rest against a shoulder on the stud 6 and be clamped thereto as with a nut 19.

An angle plate 20 of sheet material is secured adjacent the other end of the arm 14 in such manner that the free end thereof extends vertically across the core 12 of magnet 10. Such vertically extending portion of the plate 20 is provided with a rectangular aperture 21 (Fig. 2) and rearwardly bent arms 22 to embrace and guide the indicating member 23 which constitutes the "drop" of the annunciator.

The indicating member 23 comprises a member of sheet material having an angularly bent portion 24 at the upper edge thereof and two depending legs 25 which extend through suitable apertures in the horizontal portion of the plate 20. By this means the drop may move freely in a vertical direction guided by the portions 22 and the legs 25. Preferably, the indicating member 23 is of such size that when the annunciator is in its non-actuated position, as shown in the drawing, it is entirely concealed behind the face of plate 20 above the rectangular aperture or window 21. When the annunciator is actuated, as described below, the member 23 will drop to be visible

through the window 21, and the depending legs 25 will assume the position shown in dotted lines in Figs. 1 and 2. Preferably, the faces of the plate 20 and the member 23 are of different or contrasting colors so that the latter is clearly visible through the window 21 when the annunciator is actuated.

The electromagnet 10 is provided with an armature 26 pivotally mounted at its lower end, on the end of the arm 14, and having its upper end extended to underlie the in-turned edge 24 of the indicating member 23 to maintain the member clear of the window 21 when the electromagnet is not energized. A pair of springs 28 secured to the sides of the armature bias it toward this position.

It is contemplated that the electromagnet 10 will be energized when the electro-responsive device operates or performs a predetermined operation. A circuit for accomplishing this is not shown, but may readily be devised depending upon the character of the electro-responsive device and the function thereof to be indicated. Upon the occurrence of such energization, the armature 26 will be drawn toward the pole face of the magnet core 12 so that member 23 may fall to obstruct the rectangular aperture 21.

When it is desired to reset the device, when the electromagnet is deenergized, it is necessary to manually raise the indicator 23 to its latched position. This may be accomplished by a lever 30, pivoted at 32 to a bracket extending from the lower end of the strap 16. One arm 33 of the lever extends beneath the legs 25 of the indicator in its dropped position, and the other end extends upwarly toward the cover mounting stud 6. A rod 34 extending through the tubular part 18 of the stud 6 is provided with a downwardly bent portion 36 extending through a slot cut in the stud (Fig. 3), and terminating adjacent to the upwardly extending arm of the lever 30. The other end of rod 34 projects beyond the end of the tubular stud portion 18, as shown in Figs. 1 and 3, and when manually pressed to move the rod axially of the stud causes the rod portion 36 to rock the lever 30 to an extent necessary to raise the indicator 23 to its latched position with respect to the armature 26. Any desired means may be provided to return to the rod 34 to its normal position. Usually, when lever 30 returns to its normal position, by gravity, the upwardly extending arm thereof will kick the rod to the left, as viewed in the drawing, but if this is not effective in some instances, a suitable bias may be provided as by connecting the portion 36 of the rod 34 to the supporting strap 16 with a small tension spring 38.

By the construction disclosed, the operation indicator as well as its resetting means is carried by the cover-securing stud 6 independently of the cover and base, as well as of the electro-responsive device itself. The indicator, accordingly, will always be in the same position within the casing without regard to the type of electro-responsive device to which it is applied. The cover 4 may be removed at any time to facilitate inspection of the electro-responsive device without disturbing the operation indicator or its resetting mechanism, and the indicator and its resetting mechanism may be removed as a unit with the stud 6 for replacement or repair without disturbing the electro-responsive device. As a result, a wide variety of types of relay may be provided with a standard or single design of operation indicator having a standard mounting.

Quite apparently the construction disclosed is capable of considerable modification, and it is contemplated that no limitations shall be placed upon the invention except as imposed by the appended claims.

We claim as our invention:

1. In an electro-responsive device, a casing including a base and a cover therefor having a transparent portion, means for clamping said cover to said base including a portion disposed within said casing, an indicator of the annunciator type requiring a manual resetting operation after being actuated, means for mounting said indicator upon said portion of said clamping means disposed within said casing to be visible through said transparent portion, and means carried by said portion of the clamping means accessible from outside the casing for resetting the indicator.

2. In an electro-responsive device, a casing including a base, a cover having a transparent portion, a stud projecting from said base and through said cover to receive means for clamping the cover to the base, an indicator of the annunciator type requiring a resetting operation after an actuation, means for supporting said indicator upon said stud within said casing to be visible through said transparent portion, and means carried by said stud independently of said cover for resetting said indicator, said resetting means including an operating member extending through said clamping means and axially through a portion of said stud into said casing.

3. In an electro-responsive device, a casing including a base and a transparent cover, a stud secured at one end to said base and extending through said cover, and a clamping device surrounding the free end of the stud for securing the cover to the base, an opening extending axially of the stud from the free end thereof to a point within the casing and then laterally of the stud to communicate with the interior of the casing, an indicator to be responsive to an operation of said electro-responsive device and means for mounting it within the casing upon said stud, resetting means for said indicator, and means extending through the opening in said stud for operating said resetting means.

4. In an electro-responsive device, a casing including a base and a transparent cover, a stud secured at one end to said base and extending through said cover, and a clamping device surrounding the free end of the stud for securing the cover to the base, an opening extending axially of the stud from the free end thereof to a point within the casing and then laterally of the stud to communicate with the interior of the casing, an indicator to be responsive to an operation of said electro-responsive device and means for mounting it within the casing upon said stud, resetting means for said indicator, means extending through the opening in said stud for operating said resetting means, and means for biasing said last-named means to a normal ineffective position.

WELTON V. JOHNSON.
KOLMAN RIESZ.