

March 17, 1959

J. STOECKLIN

2,878,430

ELECTRICAL RELAY HAVING TESTING MEANS

Filed Feb. 26, 1957

Fig. 1.

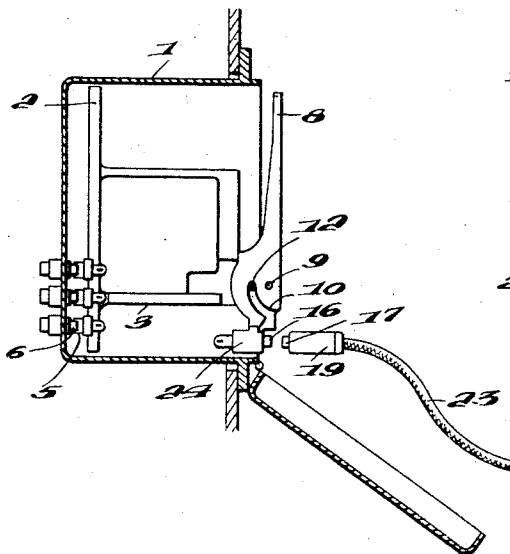


Fig. 3.

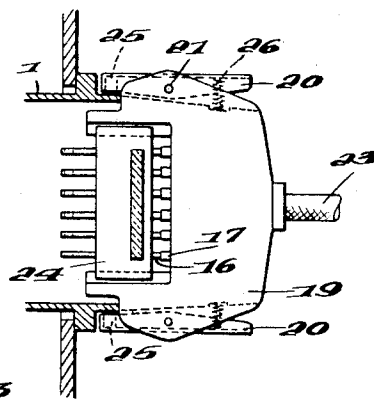
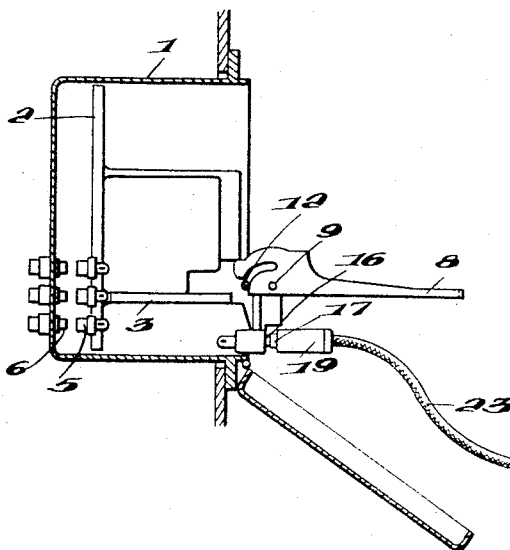


Fig. 2.



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ELECTRICAL RELAY HAVING TESTING MEANS

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Application February 26, 1957, Serial No. 642,587

Claims priority, application Switzerland March 23, 1956

2 Claims. (Cl. 317—113)

This invention relates to an improvement in disconnectable electrical relay apparatus of the type described in U. S. Patent 2,771,523 to Joseph Stoecklin and Mario Lura.

Said patent describes extraction means for an electrical apparatus, particularly, a relay, comprising a casing having a front opening and being provided on the inside of its rear wall with fixed contact means. A relay frame which is slidably inserted through the front opening of the casing, is provided with relay contact members, at the rear thereof, adapted for connection with and disconnection from the fixed contact means of said casing. On the front portion of the relay frame there is disposed a U-shaped lever which is pivotally mounted at the outer ends of the leg portions of the lever, on co-axially arranged pivot means on said frame for rotation about a horizontal axis. The apparatus includes, also, means responsive to pivotal movement of the U-shaped lever for forcibly moving the relay frame and therefore the relay contact means towards or away from the fixed contact means, this last-mentioned means comprising horizontal co-axially disposed pins at opposite sides of the casing and open-ended spiral slots at the outer leg portions of the lever, said slots being spirally arranged about the axis of rotation of the lever for cooperation with the pins. The open ends of the spiral slots are farther away from the axis of rotation of the lever than are its opposite closed ends, and the pins are engageable in these slots, through their open ends, upon horizontal insertion of the relay frame into the casing (the U-shaped lever being, for this purpose, in substantially horizontal position) and subsequent rotation of the lever about its axis into a substantially vertical position thereby moving the slots along the pins to effect a pulling movement, the relay contact means at the rear of the frame being guided into connection with the fixed contact means at the rear wall of the casing.

In this arrangement, therefore, the connecting contacts at the rear wall of the relay casing are moved in and out with great power transmission by reversing the U-shaped lever. With the lever in horizontal position, the relay—which runs in guide rails in the casing—can be pulled out.

This arrangement, particularly the power transmission between lever and relay, can also be used according to the invention, in order to activate strong contacts for testing the apparatus.

The improvement constituting the present invention consists in that at the front of the extensible apparatus there are additional test contacts arranged in a row in an insulating ledge, and that the corresponding counter-contacts are arranged in an attachable test connecting piece which is insertable into the casing by means of a holder device, for undertaking a test, in such a way that the counter-contacts stand opposite and spaced from the test contacts on the apparatus, so that in pivoting the U-shaped lever into horizontal position the operating

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connections lying at the back of the casing are opened first, and that shortly before the end of the path the test contacts in front of the apparatus come into connection with the counter-contacts of the test connecting piece.

The invention will now be described in more detail with reference to a representative embodiment thereof and to the appended drawings which illustrate the same:

In the drawings:

Figure 1 is a side view of the device, in the "in-contact" state;

Figure 2 is a side view showing the lever in horizontal position; and

Figure 3 is a plan view of the test connecting piece.

In Figure 1, 1 represents the casing into which a relay, comprising a built-up body 2 is inserted by means of a rail 3. The relay body 2 is shown in the "in-contact" state, whereby the U-shaped lever 8 stands in vertical position. At the back in the casing are the operating connections 5 and 6. These are connected with the installation to operate in the closed state of the relay. In front in the removable apparatus are found the test contacts 16 inserted into an insulating ledge 24. The corresponding counter-contacts 17 are resiliently mounted in the test connecting piece 19. This latter test connecting piece exhibits lateral levers 20, 20 which are rotatably mounted on pivots 21, 21 (Figure 3) and are under pressure of springs 26.

Laterally disposed in the casing are pegs 25, 25. The levers 20 are so formed at their rear ends that they can be snapped into locked position over the pegs 25 under the action of the springs 26. In this manner the test connecting piece 19 may be held fast to the casing. Corresponding counter-contacts 17 stand opposite the test contacts 16. With the lever 8 in vertical position according to Figure 1 there is a distance between the contacts, so that no contact takes place. From the test connecting piece 19 a connecting cable 23 leads to a testing instrument with which the working method of the relay can be tested.

By pivoting lever 8 into horizontal position (Figure 2), the relay part 24 is pushed forward through corresponding displacement of the spiral slot 10 along the pin 12 according to the description in the aforesaid patent. Thereby, the test contacts 16 come into contact closure with the counter-contacts 17 with great power transmission by means of the lever 8. The relay is detached from the working connection and switched to the testing instrument. The testing can be carried out directly and without taking out of the relay. After the test has been carried out the lever 8 is again pivoted into vertical position. Through this movement the connections to the testing instrument are detached again and re-connection with the installation brought about. The test connecting piece 19 can be detached from the instrument casing 1 by pressing the lateral levers 20 so as to pass the pins 25.

The principal advantage of this arrangement lies in that the relay can be instantaneously switched from operating connection to testing connection, and inversely, whereby the time during which the installation is without protection is reduced to the absolute minimum.

I claim:

1. In a disconnectable relay apparatus comprising a casing having a front opening, fixed main contact means disposed on the inside of the rear wall of said casing, a relay frame adapted to be slidably inserted in said casing through said front opening, said relay frame including relay main contact means at the rear thereof for connection with and disconnection from said fixed main contact means, lever means pivotally mounted on the front

portion of said frame, and means responsive to pivotal movement of said lever for forcibly moving said relay frame and hence the relay main contacts thereon horizontally towards or away from said fixed contact means to connect or disconnect said main contact means, respectively; the combination therewith of testing means for testing the relay operation comprising a test connecting member removably secured to the front portion of said casing, said test connecting member having at least one auxiliary test contact thereon, said relay frame having a corresponding test contact on the forward portion thereof opposite the test contact on the test connecting member, said test contacts being brought into electrical engagement when said lever means is actuated to move said relay frame forwardly in said casing to disconnect said relay main contact means and said test contacts being

electrically disengaged when said relay frame is moved rearwardly in said casing to cause engagement of said relay main contact means.

2. Relay apparatus as defined in claim 1 and further wherein said test connecting member extends across the front opening of the casing and includes spring-biased lateral levers pivotally connected thereto on each side thereof, said levers being arranged to engage pin means on said casing to removably secure said test connecting member to the casing.

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