Jan. 14, 1936. J. F. MERKEL 2,027,743

DETACHABLE RELAY

Filed Feb. 11, 1932

FIG. 1.

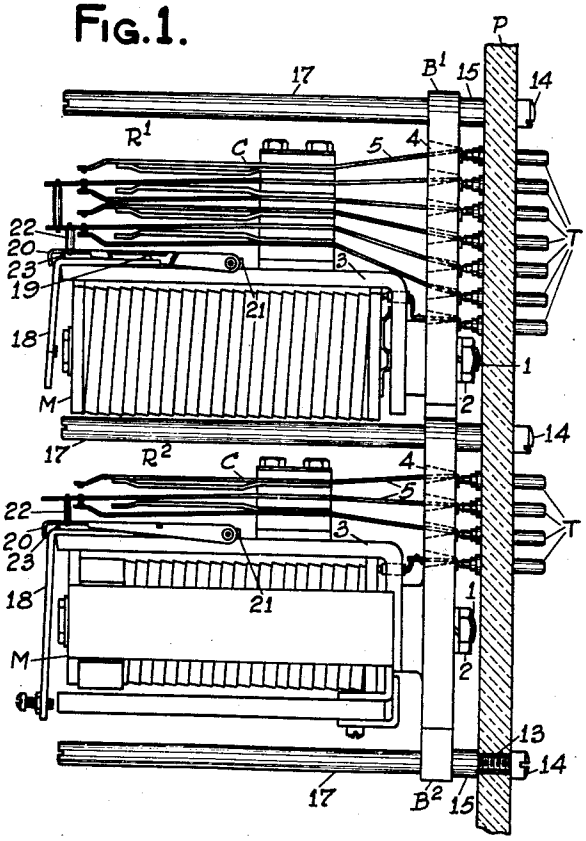


FIG. 2.

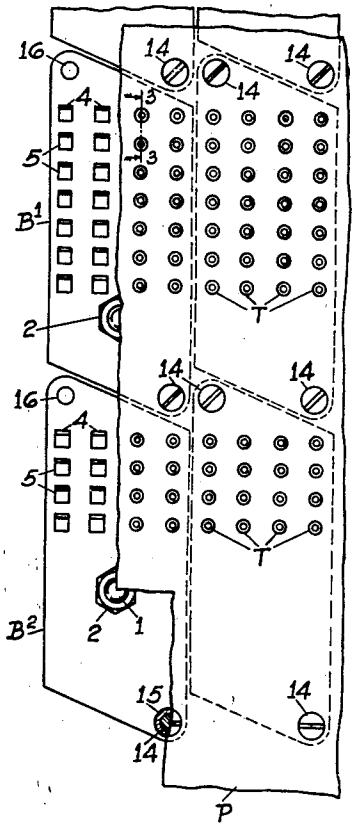
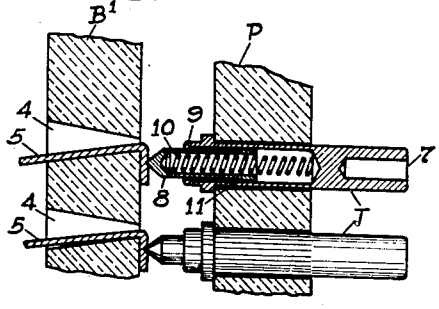


FIG. 3.



INVENTOR
J. F. Merkel,
BY Neil A. Preston,
his ATTORNEY

Patented Jan. 14, 1936 2,027,743

UNITED STATES PATENT OFFICE

2,027,743

DETACHABLE RELAY

Joseph F. Merkel, Rochester, N. Y., assignor to General Railway Signal Company, Rochester, N. Y.

Application February 11, 1932, Serial No. 592,261

5 Claims. (Cl. 175—298)

This invention relates in general to relays and more particularly refers to a relay of the telephone type which has means permitting quick detachment of the relay proper from its external wire connections.

Railway centralized traffic controlling systems, such as described for example in the application of N. D. Preston et al., Ser. No. 455,304, filed May 24, 1930, employ a number of relays of the telephone type to effect the selection and the control of various apparatus along the trackway and consequently these relays must be of a compact and simple design in order to be housed in the small space available. The present relay of this type employs flat spring contacts to which external circuit connections are made by soldering wires directly to the extending ends of these spring contacts. Inasmuch as these relays must be removed from time to time for maintenance or for replacement, considerable difficulty is experienced in removing such wires and making the necessary new soldered connections.

In view of these facts, it is proposed in accordance with the present invention to provide a relay which may be easily removed from service without disturbing the external circuit connections to such relay, thereby eliminating these inconveniences now experienced.

Other objects, purposes and characteristic features of the invention will appear as the description thereof progresses, during which references will be made to the accompanying drawing which shows the invention in a manner to make it easily understood rather than with the view of showing the particular construction preferably employed in practice, and in which:—

Fig. 1 is an elevational side view of two relays according to the present invention mounted on a single supporting panel with a part thereof shown in section;

Fig. 2 is an elevational end view of Fig. 1 with parts shown in section; and,

Fig. 3 is a sectional detail view of a means proposed in accordance with this invention for connecting the relay contacts and their external circuit connections, and is taken on line 3—3 of Fig. 2.

Referring to Fig. 1 and Fig. 2 a conventional neutral telephone type relay R^1 is shown mounted on an insulating supporting panel P along with a magnetic stick type of relay R^2 such as disclosed in the application of W. D. Hailes et al, Ser. No. 508,659, filed January 14, 1931. These relays may be mounted in horizontal and vertical banks on a panel P as shown in Fig. 2 and of course may be thus assembled in banks of units to form the number required for the particular applicatio..

These relays R^1, R^2, etc. have individual insulating boards B^1, B^2, of acute angled parallelogram form, etc. attached to their extending cores 1 by nuts 2. These extending cores 1 pass through bosses on the board B which bosses are counterbored to receive nuts (not shown) which hold the top magnetic members 3 and contact arrangements C to the electro-magnet assemblies M. In these boards B are cut spaced rectangular holes 4 which taper toward the back thereof, there being one of such holes for each contact spring. Extensions of these contact springs 5 then pass through these holes 4 and are bent downwardly as shown in Fig. 3 to lie parallel to the surface of the boards B.

The panel P carries a plurality of terminals T which are pressed into holes therein and arranged to register with the downturned ends of the extending contact springs 5 and these terminals may be provided with a means for soldering external wire connections such as the hole 7 in the extending end. In the other end of this terminal T is placed a pointed contact member 8 which is telescoped in a hole 9 therein, and is outwardly biased by a spring 10. The end of the pointed contact member 8, which slides within the terminal T, has a raised shoulder 11 which limits the outward biased motion thereof by engaging the end of the terminal T which is spun in assembly to a diameter smaller than that of the shoulder 11.

The panel P has holes 13 therein which receive screws 14 upon which are threaded bushings 15 with the screw 14 of sufficient length to extend through holes 16 in the insulating board B there being one in each acute angled corner of each board B. The insulating board B carrying its relay is then arranged to fit over these screws 14 and may be clamped in place by elongated tap bolts 17. With this arrangement, the staggered boards B interlock and aid in preventing displacement, and due to their acute angled forms, less space is taken up by the two bolts 16, for each board, than would be the case with rectangular shaped boards.

It is then obvious that a relay thus assembled on the panel P engages the downturned ends of the contact springs 5 with the pointed contact member 8, and inasmuch as the space between the insulating board B and the panel P is made short enough to force the pointed con-

tact member 8 into the terminal T against the spring 10, a good electrical connection is thus assured between these terminals T and the contact springs 5.

A suitable housing, not shown, may then be placed over the relays to keep out foreign matter such as dust and dirt and to protect the relays against damage. The relay operating mechanism as shown in Fig. 1 comprises an armature 18 operated by the electro-magnet arrangement M which armature pivots about an oblique corner at the end of the magnetic member 3 and operates through a round head rivet 19 to move an operating arm 20 which pivots on round extending ends of a rectangular rod 21 riveted to the magnetic member 3. The ends of the arm 20 may be spread sufficiently to be placed over these extending bearings of the pivot 21 and the front of this arm 20 is bridged across the top to which insulated contact operating rods 22 are secured.

The free end of this arm 20 has downturned ends which hold the armature 18 in place when assuming a de-energized position and a pin 23 secured to the magnetic member 3 projects through a slot in the armature 18 to prevent lateral movement thereof. This contact operating mechanism is considered necessary in the present arrangement to enable a more compact design of the relay inasmuch as it permits the contact springs to be mounted farther toward the armature end of the relay than is possible by operating the contacts directly from the armature 18.

It will now be seen that a simple and compact relay has been provided which permits convenient and quick removal from its support and its external wire connections by simple tools and without the inconvenience of making the various soldering connections necessary in the present type of relays, and has the further advantage of permitting the connecting of lead wires to the terminal panel P before assembling the relays thereon.

The above rather specific description of one form of the present invention is given solely by the way of example, and is not intended in any manner whatsoever in a limiting sense. It is also to be understood that various modifications, adaptations and alterations may be applied to meet the requirements of practice without in any manner departing from the spirit or scope of the present invention except as limited by the appended claims.

Having thus shown and described my invention, what I claim is:—

1. In a relay, an electro-magnet, an armature operated by said electro-magnet, an arm operated by said armature, spring contact means operated by said arm, and an insulating board carried by said relay having spaced slots therein each receiving an extension of said spring contact means, said extensions being shaped to present a flat surface parallel to, and bearing against, the face of said board.

2. In a relay, an electro-magnet, an armature operated by said electro-magnet, an arm operated by said armature, spring contact means operated by said arm, an insulating board carried by said relay and having spaced slots therein each receiving an extension of said spring contact means, said extensions being shaped to present a flat surface parallel to, and in contact with the base of said board, a supporting panel for said relay, and insulated spaced connecting means in said panel arranged in register with the flat surfaces of said contact spring extensions.

3. In a relay, an electro-magnet, an armature operated by said electro-magnet, an arm operated by said armature, spring contact means operated by said arm, an insulating board carried by said relay having spaced slots therein each receiving an extension of said spring contact means, said extensions being shaped to present a flat surface parallel to the face of said board, a supporting panel for said relay, insulated spaced connecting means in said panel arranged in register with the flat surfaces of said contact spring extensions, each connecting means including; a hollow sleeve, means insulating the sleeve from the panel, a plunger within the sleeve and biased outwardly therefrom, and cooperating shoulders on the sleeve and plunger to limit the outward movement of the plunger mounting means arranged to clamp said relay to said supporting panel, the biasing means biasing said plunger against the flat surfaces of said contact spring extensions.

4. In combination with a relay having flat spring contacts of an insulating board secured to said relay having spaced rectangular slots therein receiving extending ends of said flat spring contacts, flat contact surfaces on said board formed by bending the ends of said spring contact extensions to lie parallel to the surface of said board, a panel for supporting said relay, insulated spring biased contact points on said panel arranged to register with said flat contact surfaces, shoulders on the panel and contact points to limit the biased movement of the points, and mounting means arranged to clamp said board to said panel whereby said flat contact surfaces are forced against the spring biased contact points.

5. In a relay assembly, a plurality of relays, each relay having flat spring contacts extending through an individual insulating board, a supporting panel common to all the relays, and having spaced insulated terminals with contact points biased to engage the ends of said spring contacts, and means permitting convenient attachment and removal of said relays to and from, said supporting panel, with the individual insulating boards each having the form of an acute angled parallelogram, and arranged in contacting parallel rows, and the boards of each row in close contact with each other with the edges of the boards of each row in staggered relation with respect to the edges of the boards of immediately adjacent rows, and each having a fastening means passing through each acute angled corner, whereby to conserve space and prevent accidental displacement of the boards when assembled.

JOSEPH F. MERKEL.