

Aug. 25, 1936.

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2,052,319

SWITCHING DEVICE

Filed Feb. 9, 1935

FIG. 1

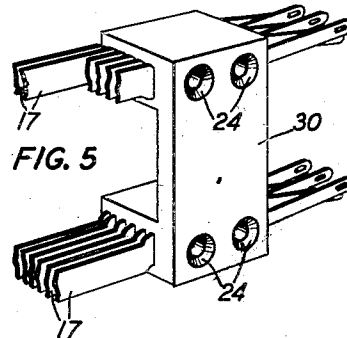
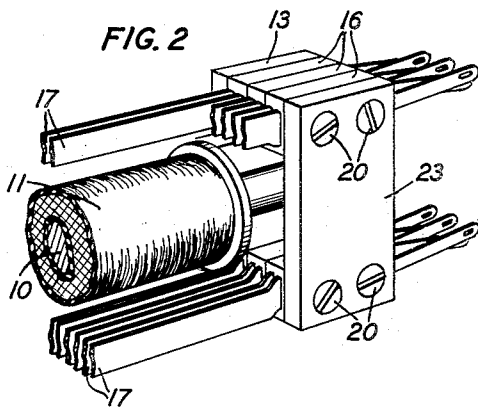
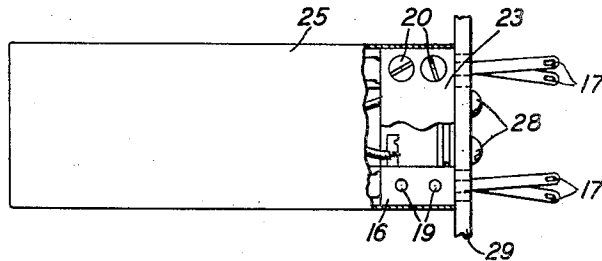


FIG. 3

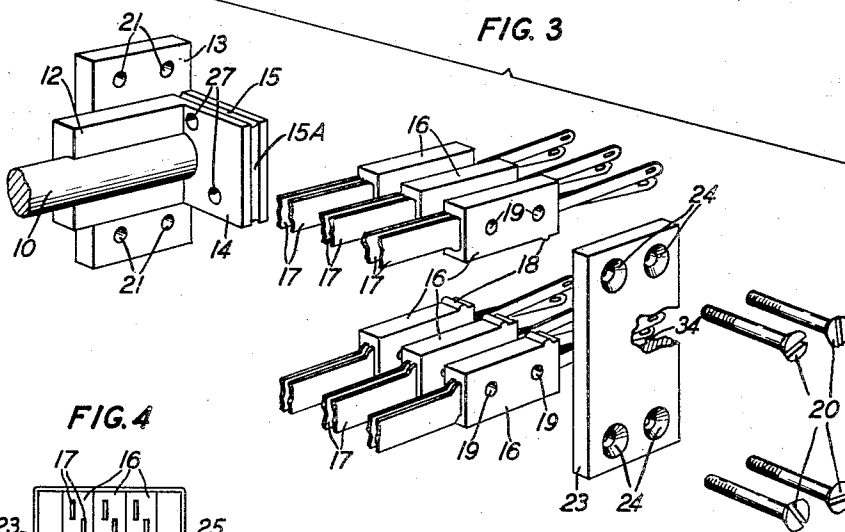
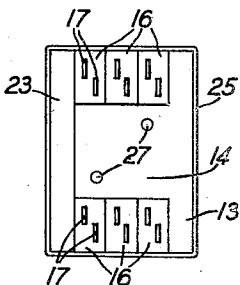


FIG. 4



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2,052,319

SWITCHING DEVICE

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Application February 9, 1935, Serial No. 5,692

3 Claims. (Cl. 200—168)

This invention relates to switching devices and particularly to electromagnetic relays of the type extensively employed in telephone systems.

One of the major difficulties encountered in the operation of electrical circuits and particularly telephone circuits is the occasional abnormally high resistance introduced at the contacts of the switching devices. In the case of noble metal contacts, this resistance is due principally to the presence of foreign particles, such as dust, between the contacting members. Relay bases are ordinarily provided with apertures through which the terminal ends of the contact springs and windings extend for the purpose of making connection with the circuits controlled by the relay. These apertures permit access to the structure of foreign matter which eventually may find its way to the relay contacts.

It is the object of this invention to provide a covered relay structure which precludes the possibility of admission of dust or other foreign matter into the relay from the terminal end thereof and thereby insure reliability of operation from a contact standpoint.

This object is attained in accordance with a feature of the invention by molding the relay contact springs into one or more molds which constitute a base-like support for the relay cover.

This and other features of the invention will be readily understood from the following detailed description made with reference to the accompanying drawing in which,

Fig. 1 is a side elevation of a relay structure embodying the features of this invention in which the relay cover is broken away at one end to disclose the terminal end of the relay;

Fig. 2 is a fragmentary perspective of the terminal end of the relay;

Fig. 3 is an exploded view of the cooperating elements which constitute the terminal end of the relay;

Fig. 4 is a rear elevation of the structure shown in Fig. 2; and

Fig. 5 is a perspective view of a modified form of the relay terminal end.

The relay core 10, upon which a form wound coil 11 may be supported, may be welded to a yoke-piece 12 which, in turn, is welded to the cross-piece or end member 13. The yoke-piece 12 as illustrated, is provided with an integral right angle projection 14, though the portion 14 may be an independent element secured to the back edge of the yoke 12 by welding in such a manner that its rear surface is in alignment with the back edge of cross-piece 13. Each of the

three exposed edges of portion 14 is provided with a groove, such as 15 and 15-A for a purpose to be hereinafter described.

The relay contact springs and winding terminals are molded in a mold of insulating material. As illustrated, the springs are molded together in pairs, though each spring may be molded separately without departing from the spirit of the present invention. As clearly shown in Figs. 2 and 3, each unit comprises a mold 16 with its respective springs 17 embedded therein, each mold being provided with a ridge 18 which fits into the groove 15 on element 14 to provide an effective seal between the molds 16 and the element 14. Each mold is furnished with two cylindrical holes 19 which extend the entire depth of the mold and are adapted to be placed in alignment with corresponding holes in adjacent molds and with the holes 21 in cross-piece 13 after assembly as will appear presently. The holes 18 accommodate screws 20.

In assembling the terminal end of the relay structure, the molded spring units are built up one after the other on the cross-piece 13 so that their respective ridges 18 fit into the grooves 15 in the upper and lower edges of element 14. A clamping piece or end member 23 is placed across the uppermost units and the screws 20 passed through the countersunk holes 24, the mold holes 19 and the holes 21 in cross-piece 13. The holes 21 may be threaded to receive the screws 20 or they may be countersunk on the outer surface of cross-piece 13 to accommodate nuts into which the screws 20 may be threaded. On its inner surface the piece 23 is furnished with a ridge 24 which fits into the groove 15-A to insure an effective seal between the elements 23 and 14. The structure after assembly, as illustrated in Fig. 2, provides a rigid rectangular cap-like support or seal over which a cover 25 is snugly fitted. As shown in Fig. 4, the rear of the relay is completely sealed and effectively shielded against dust or other foreign matter.

The holes 27 in the portion 14 accommodate screws 28 by virtue of which the relay may be secured to a mounting frame 29 as shown in Fig. 1.

In the modification shown in Fig. 5, all the relay spring members are molded together in a single U-shaped mold 30 which replaces the individual molds 16 and the clamping piece 23 of Figs. 2 and 3.

The relay armature has been omitted from the drawing in order not to complicate the disclosure. A cross-bar type armature, such as is disclosed in Patent 1,973,090, issued to D. D. Miller

on September 11, 1934, may be employed in the relay shown. Such an armature is mounted on the relay by means of the well-known reed type hinge and in the present invention a reed hinge
5 associated with each longitudinal leg of the armature would be interposed between the cross-piece 13 and the adjacent mold 16. In other words, the reed type hinge would constitute an
10 element in the assembly included between the elements 13 and 23 and would be located directly upon the surface of element 13.

What is claimed is:

1. In combination, a switching device, a cover
for said device having an opening by way of which
15 said device may be placed within said cover, and a seal for the opening in said cover, said seal comprising in part oppositely disposed rows of
molds into which the contact springs of said
switching device are embedded, and a pair of end
20 members between which said rows of molds are located.

2. In combination, an electromagnetic switching device, a cover for said device having an opening
by way of which said device may be placed
25 within said cover, and a seal for the opening in

said cover, said seal comprising oppositely disposed rows of molds into which the contact springs of said switching device are embedded, a pair of end members between which said rows of molds are located, and a member centrally
5 disposed with respect to said molds and said end members.

3. In combination, an electromagnetic switching device, a cover for said device having an opening by way of which said device may be
10 placed within said cover, and a seal for the opening in said cover, said seal comprising oppositely disposed rows of molds into which the contact springs of said switching device are embedded,
15 a pair of end members between which said rows of molds are clamped, and a member rigidly secured to one of said end members and centrally located with respect to said rows of molds and said
end members and provided with a peripheral
20 groove into which ridges on said molds and one of said end members fit to effect a dust-proof union of the several elements constituting said
seal.

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