March 13, 1934. A. A. HANSEN 1,950,552

RELAY COVER

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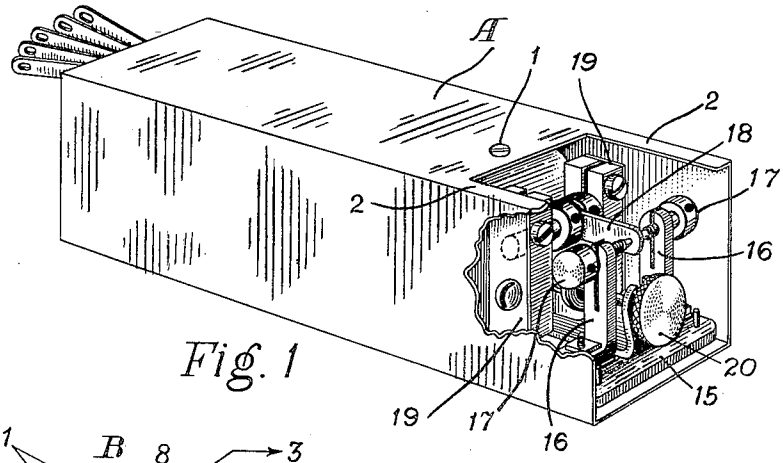


Fig. 1

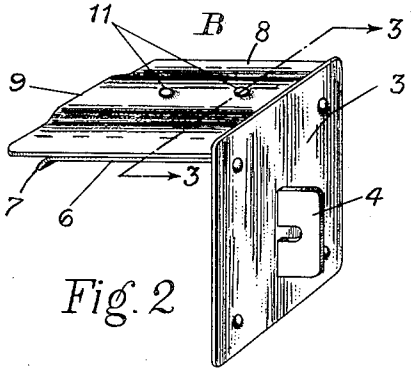


Fig. 2

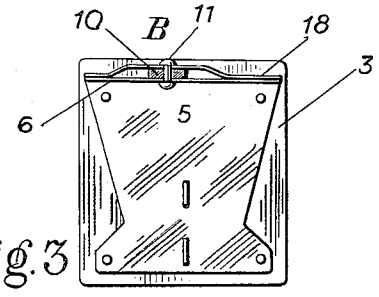


Fig. 3

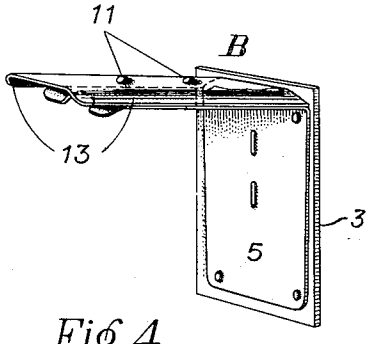


Fig. 4

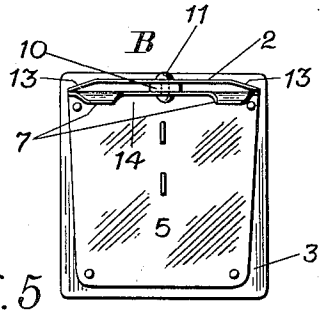


Fig. 5

INVENTOR
A. A. Hansen
BY
ATTORNEY

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RELAY COVER

Arnold A. Hansen, Maplewood, N. J., assignor to American Telephone and Telegraph Company, a corporation of New York

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3 Claims. (Cl. 220—24)

This invention relates to improved relay covers, and more particularly to covers for polarized relays.

Polarized relays of the type in which the cover forms a portion of the magnetic circuit have employed cover shells of permalloy or similar materials which act as a magnetic shield and also form a part of the magnetic and electrical circuit of the relay. In order to provide access to the adjustable parts, an aperture is provided in this shell at the front end of the relay. This front opening connects with an aperture which extends back into the top surface of the shell, and in order to exclude dust and dirt from the relay mechanism, a cap is provided to cover the opening and aperture. The cover cap heretofore employed has had certain disadvantageous features. These former types of caps have not satisfactorily excluded dust and dirt from the relay mechanism due to the difficulty of maintaining a perfect fit between the casing and the cap. It has also been found that a relatively large amount of dust and dirt collects upon the upper surface of the cover cap flange and when the cap is being removed from the relay, a portion of the accumulated dirt tends to drop from the cover cap into the relay.

Further, the method of securing former caps in place tended to produce relative displacement of the relay structure and the relay cover shell. Since the cover shell forms a part of the magnetic circuit, such displacement tends to disturb or destroy the equilibrium established in the magnetic circuit of the relay by previous adjustment. Force applied in a manner required to replace or remove a securely fitting cover cap of the previously known types also may be sufficient to cause a change in the relative positions of the relay armature and armature contacts, or between the relay armature and the pole pieces, thereby altering the established electrical characteristics of the relay.

It is an object of this invention to provide an improved enclosure including a cover cap for the relays of the type previously mentioned, which obviates the difficulties above outlined.

In accordance with the features of this invention an improved dust seal is provided by an improved cap which fits into place both above and below the upper surface of the cover shell adjacent to an aperture formed therein. The normal process of removal of the cover cap does not tend to cause accumulated dirt from the top of the cover cap to be dropped into the relay structure. The cover cap is secured in place by pressure it exerts on the outer and inner surfaces of the top of the cover shell, which is held in clamped relation between elements of the cap. This method of securing the cover cap does not tend to produce relative displacement between the permalloy shell of the relay and the relay structure, or between the armature and other parts of the relay, either by the nature of the force applied or by stresses imposed on the relay parts by the cover after it has been fixed in place; hence, it does not tend to alter the magnetic circuit or the mechanical adjustment of the relay and thereby alter established operating characteristics.

This invention may be now more clearly understood from the following description when considered in connection with the accompanying drawing in which certain forms of the invention are illustrated.

In the drawing, Figure 1 is a perspective view showing a relay of the general type to which the improved enclosure herein described is adapted to be applied.

Fig. 2 is a perspective view of one form of improved cover cap.

Fig. 3 is a view taken on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of a modification of the cover cap shown in Figs. 2 and 3, and

Fig. 5 is an elevation as seen from the interior side of the cover cap illustrated in Fig. 4.

A rectangular cover or casing A, which is made of suitable metal, forms an enclosure for the relay structure of the character previously pointed out. The cover may be secured to the relay structure by screws suitably positioned throughout, which may be of the character designated by the reference 1. The cover has an open front connected with an aperture which extends back into the top of the cover between the side flanges 2. A cap B is adapted to engage and register with the opening in the front and the aperture in the top of the cover and form therewith a seal to prevent entrance of dust or dirt. The cap B, as shown in Figs. 2 and 3, includes a substantially rectangular face plate 3, which is preferably provided with rounded corners. The dimension of the face plate is such that when applied to the open front of the cover member A it will closely abut its edges. A finger-piece or handle 4 is suitably attached to the face plate for the purpose of facilitating the removal or replacement of the cap. An inner plate 5 of non-magnetic material is applied to the rear of the face plate 3 by means of rivets or the like. The plate 5 is bent into an inverted L-shape formation and the top horizontal portion 6 thereof extends at right angles from the upper portion of the face plate 3. The inner edge 7 of

the horizontal portion is bent downwardly to form a lip, the function of which will be presently described. A top plate 8 is carried on the horizontal member 6 and is provided with a raised portion 9. The outer edge of the top plate abuts the inner surface of the face plate 3 and is of sufficient area to entirely cover the aperture in the top surface of the casing A. A spacer 10 is positioned between the plate 6 and the raised portion 9 and rivets 11 extend through this spacer and through the plates 6 and 8 to retain these elements in fixed relation to each other. The spacer 10 is of sufficient thickness to maintain a slight clearance between the plates 6 and 8. This clearance may be provided in order that the top plate 8 will pass over screw 1 when the cover cap B is being put in place on the casing A. These plates are of a flexible character to permit them to be temporarily spread apart while being applied to the casing A and to rigidly grip the flanges 2 of the casing when in position. The plate 6 is slightly shorter than the plate 8 and when in position the latter plate extends over the rear edge of the cover A, while the lip 7 of the plate 6 slides beneath this edge which is gripped between the inner ends of the members 6 and 8. The cap B thus clampingly engages with the casing 8 to provide a seal between these elements.

In the modification of the cap shown in Figs. 4 and 5 the construction is somewhat similar to the cap shown in Figs. 2 and 3. The cap illustrated in Figs. 4 and 5 has its outer edges 13 bent at an angle, as shown. The lip 7 in the latter figures differs from the lip 7 of Figs. 2 and 3 by having a cut-away portion 14, which separates the lip into two parts. This construction is provided to allow space for the cap B to clear the screw 1 through the casing A, when the cap is applied thereto. The cap illustrated in Figs. 4 and 5 functions similarly to that described in connection with the cap illustrated in Figs. 2 and 3.

The elements of the relay structure are mounted on a base 15 and may include contact screw supports 16, which carry a contact screw 17. The outer end of an armature 18 vibrates between these screws. Adjustable pole-piece supports 19, and a biasing spring adjusting screw 20, are also mounted on base 15. These elements are sensitive and require fine adjustment in order that they may function properly and any dirt or dust which may enter the casing or any distortion of the casing A caused by the removal or replacement of the cap B would tend to defeat this purpose.

It will be noted that the improved cover caps B, herein illustrated and described, are arranged to be fitted into place by sliding them directly on to the cover shell A with the flanges 2, 2 of the cover shell adjacent the aperture clamped between the edges of the plates 6 and 8 of the cover caps B, these edges being tensioned against each other. Thus, the fitting of these caps into place requires that a force be applied thereto only in such manner as to be transmitted to the flanges of the cover shell adjacent the aperture in a direction perpendicular to the front surface of the relay. When these caps are entirely in place the clamping force so holds them that they retain the front surface of the caps closely abutting the front edges of the cover shell A without any tendency to distort the shape of the cover shell or to change the position of its parts with relation to the position of the relay structure or parts which are shown in Fig. 1.

What is claimed is:

1. An enclosure for a relay including a casing having an open front and an aperture in the top surface of the casing and connecting with said open front, an edge portion formed in the top surface on two sides of the aperture and a removable cap having a front plate and a top plate having co-operating flexible flanges on two sides thereof, said front plate registering with the edges of the casing to cover said open front and said flexible flanges tensionally registering with the top and bottom surfaces of the top edges about the aperture to clamp the cap to the casing and provide a seal for the relay.

2. An enclosure for a relay including a rectangular casing having an open front and an aperture in the top surface of the casing and connecting with said open front, edge portions extending longitudinally on the top surface and at either side of the aperture and a removable cap of angular formation having one portion abutting the open front and another portion tensionally and slidingly engaging with the edges on the top surface of the casing to clamp said cap in position and cover said aperture.

3. An enclosure for a relay including a rectangular casing having a front opening and a connecting aperture in the top surface of the casing through which access may be had to adjust the relay, edge portions extending longitudinally of the top of the casing and at either side of the aperture and a removable cap of inverted L-shape formation having one arm of the L abutting the front opening and the other arm of the L covering said aperture and slidingly engaging with the top and bottom surfaces of the edges about the aperture to clamp the cap in position and form with the casing a dust proof seal for said relay.

ARNOLD A. HANSEN.