

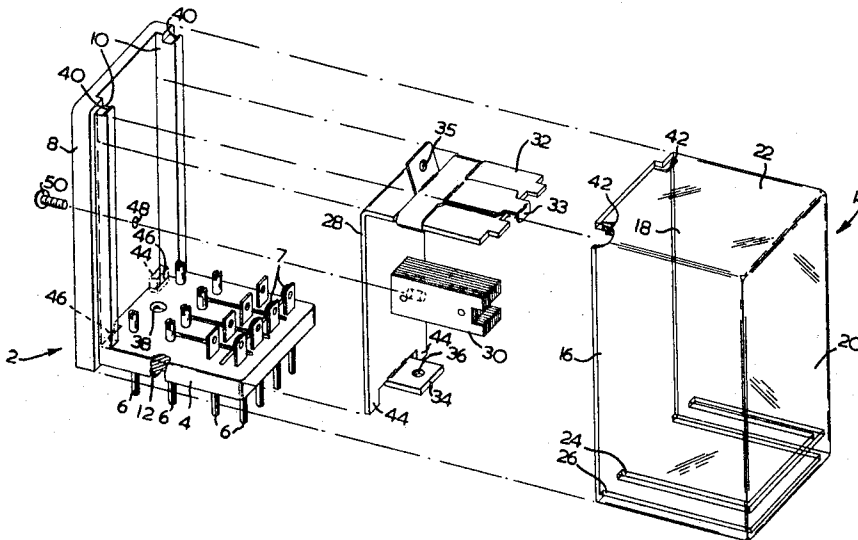
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 [33] **Canada**
 [31] **41,795**

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[54] **ENCLOSURE FOR PLUG IN RELAY**
13 Claims, 4 Drawing Figs.

[52] **U.S. Cl.**..... **335/278,**
174/50, 174/52, 317/120, 339/198
 [51] **Int. Cl.**..... **H01f 7/00**
 [50] **Field of Search**..... **174/52, 50,**
50.5, 66, 59; 317/117, 120, 113; 335/278;
336/90; 339/198.2, 36

ABSTRACT: An enclosure for electrical components is provided having an L-shaped base and integral sidewall and a preferably transparent cover; connecting pins are moulded through the base in a conventional manner and the cover has lips so that it can be slid onto the base in a direction at right angles to the axis of the pins; thus the cover cannot become detached during engagement or extraction of the pins in their socket components, such as relays may be mounted on the integral sidewall; a snap action lock remote from the base indicates closure positively.



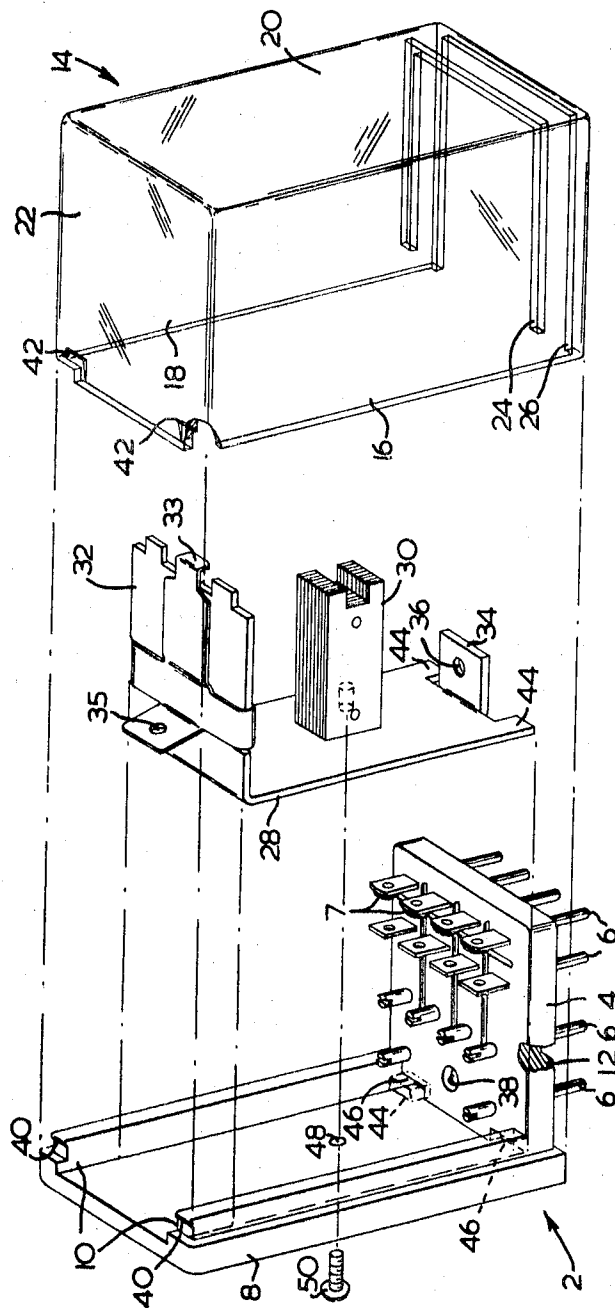


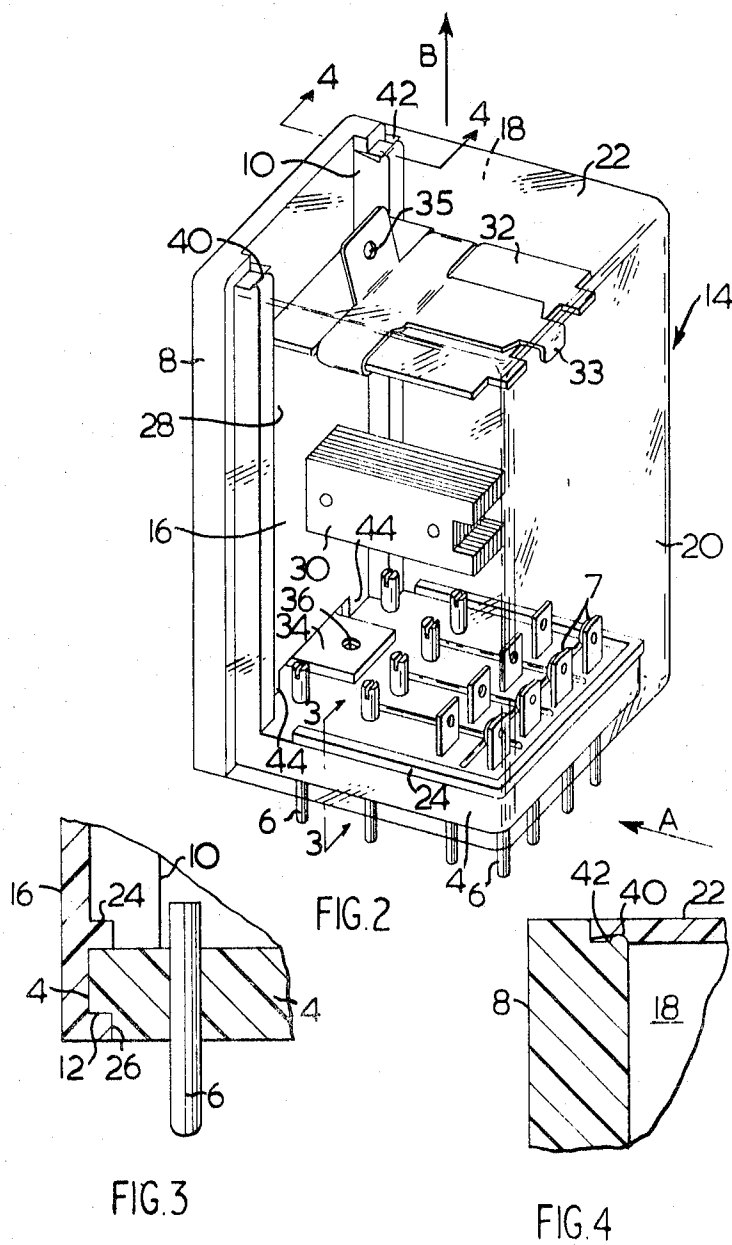
FIG. 1

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ENCLOSURE FOR PLUG IN RELAY

This invention relates to a plug-in enclosure which can be used to protect electromechanical devices or such components as photoelectric memory units.

Such enclosures comprise a terminal board or generally planar base with the required number of spade connectors or pins for connection to the component, passing through the base; in the prior art a cover having the shape generally of an open box was usually removable to permit inspection or adjustment in situ of the device. The cover is attached to the base by means of screws, wire clips or catches integral with the cover.

The cover thus becomes part of the structural assembly and is used to insert and extract the plug-in device. Unfortunately, if the cover is secured to the base by screws it cannot be slipped off easily for inspection and adjustment; and if it is attached by catches it is difficult to remove the unit integrally as the cover comes off if the spade or pin connectors stick. This disadvantage is becoming more pronounced as the trend to miniaturization proceeds, together with multifunctional requirements which increases the number of the pins. What usually happens in practice is that the extracting force is next applied to the component which, in the case of such electromechanical devices as relays is sufficient to destroy the element by deformation of the soft iron frame.

It is an object of this invention to avoid the disadvantages of the prior art and to obtain the advantages of alternative mounting for the apparatus to be enclosed by building an enclosure with the base and one side integral and providing a cover to surround the remainder of the base and to engage the sidewall so as to complete the enclosure, the cover being provided with a groove around that part of the periphery which engages the base so that the cover may be slid on in a direction at right angles to that in which force is exerted to insert or remove the plug-in enclosure from its socket. Usually the base is rectangular so that the cover has three sidewalls and a top wall but other base configurations are also possible. Other advantages such as wide face to face seals can be incorporated and a preferred location for providing a snap action closure lock is also given.

This method for construction of the enclosure is particularly useful for relays because the magnetic frame can be accurately located upon, and firmly secured to the sidewall. Thus, any force on the coil will be transmitted to the base with much less likelihood of bending the soft iron frame than in the present designs where there is only a limited space on the base available for attachment; any significant force on the coil usually destroys the relay characteristics in prior art relay enclosures. In the drawings which illustrate an example of an embodiment of the invention:

FIG. 1 is an exploded perspective view of a plug-in type relay;

FIG. 2 illustrated the relay of FIG. 1 fully assembled again in perspective view;

FIG. 3 is an enlarged scrap section along the plane 3-3 in FIG. 2 showing how the base of the enclosure is gripped by the cover;

FIG. 4 is an enlarged scrap section along the plane 4-4 in FIG. 2 showing how the cover snaps into engagement with the sidewall when it is home.

In FIG. 1, 2 is generally a plug-in component comprising a base 4 with connection pins 6 therethrough and an integral sidewall 8. The base and sidewall are preferably white or light colored to facilitate inspection, and the inner end of the pins 6 carry the fixed relay contacts 7, directly. The base sidewall 8 has two integral raised ribs 10 having outer and inner register functions. The base 4 also has a register 12 for reasons which are explained below.

A plastic cover 14 which is preferably transparent has two parallel sidewalls 16, 18, a sidewall 20 parallel to the sidewall 8 integral with the base, and a top wall 22. The walls of the cover are smooth on the outside but a pair of lugs 24, 26 on the inside, by providing a base gripping recess between them,

enable the cover to slide on to the base along a plane parallel to the base; the lug 26 is accommodated in register 12 so as to give the assembly a planar base; lug 24 registers on the top surface of the base 4 within the enclosure and does not, therefore, need a register. The lugs 24, 26 gripping the base (26 being accommodated in register 12) may be understood more easily by reference to FIG. 3 and the direction of sliding assembly and disassembly of base sidewall (4, 8) with the four faced transparent cover 14 is indicated by the arrow A in FIG. 2.

From FIG. 2 it can be seen that the outer register function of ribs 10 on base integral sidewall 8 is to provide support for the transparent cover 14 at the free edge of sides 16 and 18. The inner register function of the integral base ribs 10 locate magnet yoke 28 in a lateral sense on sidewall 8; the soft iron core laminations 30 for the coil and the soft iron armature support 32 project from this magnet yoke; a small tag 34 integral with the magnet yoke is provided parallel to the core on the top of the base 4. A tapped hole 36 in this tag and a clearance hole 38 in the base enables a screw to fasten the magnet frame to the base. The coil and armature are conventional and have, therefore, been omitted for the sake of clarity, although armature retaining clip 33 and its tension bias spring anchor hole 35 are shown.

Alternatively, the magnet yoke may be secured to the mount sidewall 8 by means of a screw or screws. This allows complete dissociation of the separate base functions; i.e., the terminal board contact and plug function remains in the base 4 and the entire support for the main structure of the relay or other device is provided by the integral sidewall 8. Such a magnet yoke may be additionally braced against the sidewall by the provision of tags 44 in slots 46.

The cover is retained in position by two small projections 40 on the top end of the register ribs 10. These projections engage recesses, 42, in the top wall 22, transparent cover 14 and are of such a height that the edges of the recesses will slide over them without breaking the cover; but yet they retain the cover when accommodated in the recesses against any vibration that the remainder of the assembly will withstand. This snap action retaining of the transparent cover 14 is best seen in the enlarged scrap section illustrated in FIG. 4.

While other retaining means may be sued to maintain the cover and L-shaped base and wall assembly engaged, I much prefer to use these retaining pips 40 as the snap action gives an audible indication that the enclosure is properly shut at the top.

The operation of the enclosure will be easily understood. To remove (or insert) the assembly, it is grasped between finger and thumb on sidewalls 16 and 18 (or perhaps 20 and 8). The holding pressure increases the engagement of lugs 24 and 26 with the base 4, so that the force which the lugs can exert to extract the assembly is at right angles to and incomparably greater than that required to slide the cover and base together; this is in contrast to most prior covers, which are mounted on the base by a motion in the same direction as that necessary to remove or insert the assembly. This right angle between the base-and-cover-assembly motion indicated by arrow A and the removal-or-insertion motion indicated by arrow B is clearly illustrated by the arrows in FIG. 2.

It will be understood that another feature of this invention is that the enclosure may be directly mounted on either a horizontal chassis or even a vertical wall by means of the screw 50 passing through hole 48 in the sidewall into a tapped hole in the core laminations 30. Thus, although for easy understanding it is called plug-in unit, it is adaptable for use as a fixed-plug unit with which a movable socket may be engaged.

While there has been shown and described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention as defined by the appended claims.

I claim:

1. A plug-in type component comprising:

an insulating base having a plurality of rigid electrical conductors fixedly mounted therein and extending therethrough;

a wall integral with and projecting away from said base; and
a separate cover cooperating with the base and the wall and enclosing a volume therewith, the cover having means gripping the base upon the upper and lower surfaces thereof upon assembly with the base by movement relative thereto in a direction substantially at right angles to the direction of force for engagement for disengagement of the rigid electrical conductors from a plurality of connectors in a socket.

2. A plug-in type component as defined in claim 1 wherein the cover means gripping the base comprises a pair of inwardly projecting lugs spaced apart so as to accommodate the base thickness therebetween.

3. A plug-in type component as defined by claim 2 in which the base has two free parallel sides.

4. A plug-in type component as claimed in claim 3 in which the base is generally rectangular and the inwardly projecting lugs extend the length of the three free sides of the rectangle.

5. A plug-in type component as claimed in claim 2 wherein the base is provided with a recessed register to accommodate the lug of the cover so as to present a substantially planar surface to the socket.

6. A plug-in type component as claimed in claim 1 wherein the wall has two ribs with outward facing registers adjacent the sides of the wall, the cover engaging the rib registers to provide a face to face seal.

7. A plug-in type component as claimed in claim 6 in which the ribs each have an undercut extension to provide a small projection at the end distant from the base, and the cover has recesses cooperating with said projections to provide a snap-action assembly at the cover with the base and sidewall.

8. A plug-in type component as claimed in claim 1, in which the base and sidewall are light colored and the cover is trans-

parent to facilitate inspection of the component without removal.

9. A plug-in type electric relay comprising:

a rectangular generally flat insulating base having a plurality of rigid electrical conductors fixedly mounted therein and extending therethrough;

a rectangular generally flat wall integral with said base at one side thereof and at right angles to the plane of said base, said wall having two ribs providing two external locating registers and two internal locating registers, adjacent the sides of the wall;

a cover cooperating with said base and wall and enclosing a volume therewith, the cover having means gripping the base at the upper and lower surfaces thereof so as to prevent relative movement at right angles to the plane of the base while allowing relative movement in the plane thereof for assembly; and

a flat magnet yoke supported by said wall and located by said internal locating register.

10. A relay as claimed in claim 9 in which the base and sidewall are light colored and the cover is transparent to facilitate on side examination of the contacts and inspection of relay action.

11. A relay as claimed in claim 9, having a tapped hole in the core laminations through and perpendicular to the plane of the yoke and a clearance hole in the flat sidewall, so as to permit the assembly to be mounted by the sidewall.

12. A plug-in type electric relay as claimed in claim 9 in which the base adjacent the wall has a recess, the width of the magnet yoke material thickness and a portion of flat magnet yoke continues into the recess so that the recess will grip the yoke portion and tend to prevent distortion.

13. A plug-in type relay as claimed in claim 12 in which the magnet yoke has a portion at right angles to the flat plane and adjacent the base, said portion being fixed to said base.

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