Jan. 28, 1947. J. F. AICHINGER 2,414,846

REMOVABLE INSULATING CLOSURE MEMBER FOR ELECTRICAL DEVICES

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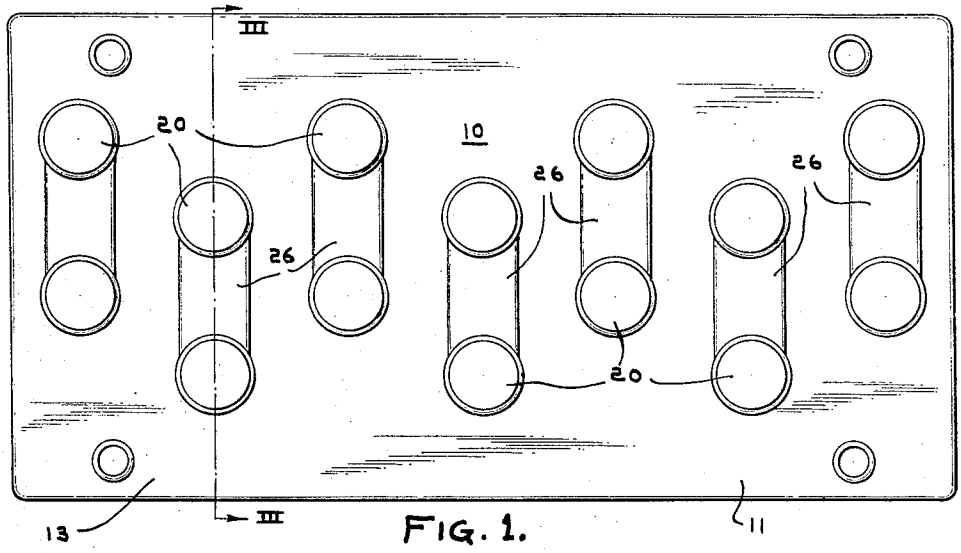


FIG. 1.

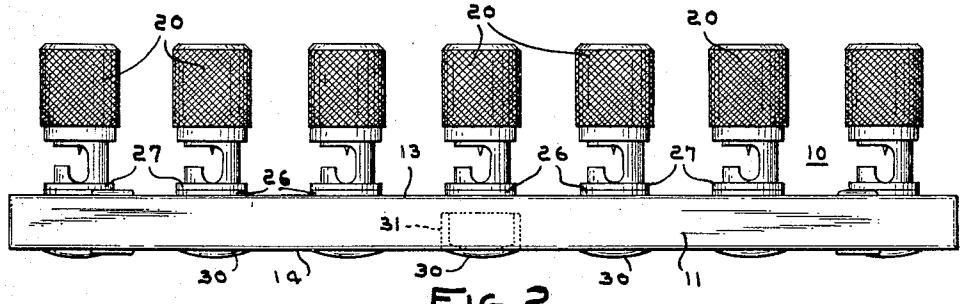


FIG. 2.

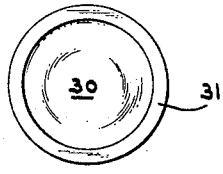


FIG. 4.

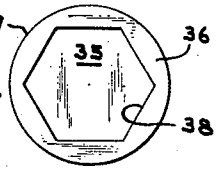


FIG. 5.

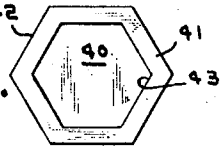


FIG. 6.

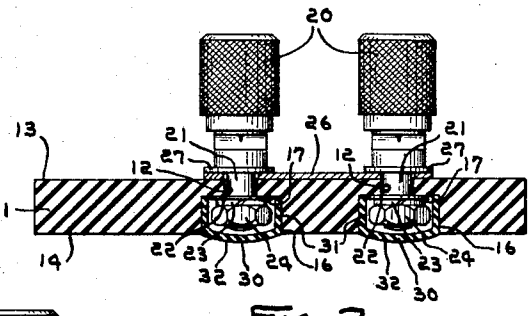


FIG. 3.

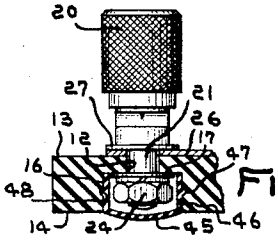


FIG. 7.

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REMOVABLE INSULATING CLOSURE MEMBER FOR ELECTRICAL DEVICES

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6 Claims. (Cl. 174—138)

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This invention relates to electrical devices, more particularly to sealing means therefor, and has for an object to provide novel sealing means of this character.

With most metallic devices which are adapted to receive an electric current, it is customary to insulate and/or seal the device from contact with other conductors of electricity, or from moisture or accumulations of dirt. A typical example of such a situation is the conventional mounting of binding posts on panels or supports of insulating material.

In such mountings the panel may be provided with an opening therethrough which is counterbored or otherwise enlarged at the rear of the panel. The binding post is mounted on the front of the panel and has an anchoring stem extending into the opening, the stem threadedly receiving a locking nut disposed in the counterbore at the rear of the panel and securing the binding post in position. To seal the anchoring post and its nut at the rear of the panel, it is customary to fill the counterbore space about the stem and nut with insulating material in the form of a wax compound.

One is never sure that this wax compound is properly anchored in the space about the nut, because the wax, which is inserted in liquid or plastic form, is chilled during the filling operation by contact with the nut, and frequently does not fill the cavity. This cannot be detected in normal inspection, and the wax may fall out in actual service. On the other hand, if the wax is properly anchored, which is usually accomplished by tamping while the wax is still plastic, it is very difficult to remove, incident to replacement or repair of a binding post, or for any reason.

To eliminate these and other difficulties incident to the use of a wax seal, the present invention provides for the use, in place of the wax, of cup-like closure members which, when pressed into place in the counterbored spaces, provide uniform closures, making perfect seals of neat appearance.

Inasmuch as these closure members are retained in place solely by frictional engagement with the walls of the openings, they may be easily removed to provide access to the securing nuts of the binding posts, when it is desired to repair or replace any of the latter.

Therefore, another object of the invention is to provide removable sealing means for electrical devices.

Yet another object of the invention is to provide removable sealing means for the securing nuts of electrical elements, which sealing means also prevent accidental unscrewing of the securing nuts.

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A further object of the invention is to provide removable sealing members of cup-like configuration for the anchoring means of electrical binding posts, or the like, which cup-like members have flexible side walls frictionally engaging the side walls of the openings in which they are disposed.

These and other objects are effected by the invention as will be apparent from the following description and claims, taken in accordance with the accompanying drawing forming a part of this application, in which:

Fig. 1 is a top plan view of an electrical binding post panel incorporating the present invention;

Fig. 2 is a front elevational view of the structure shown in Fig. 1;

Fig. 3 is a sectional view, taken along the line III—III of Fig. 1, looking in the direction indicated by the arrows;

Fig. 4 is a top plan view of one of the sealing members shown in Fig. 3;

Figs. 5 and 6 are views similar to Fig. 4, showing modified forms of sealing members; and

Fig. 7 is a vertical sectional view showing a modified form of securing means for sealing members.

Referring now to the drawing more in detail, the reference numeral 10 indicates, in its entirety, a terminal strip or panel comprising a body member or base 11, having a plurality of openings 12 therethrough (Fig. 3) from the front surface 13 to the rear surface 14. The openings 12 are provided with portions 16 of enlarged diameter extending inwardly from the rear surface 14 and terminating in radial shoulders 17.

The body member or base 11 may be of any suitable insulating material which is a non-conductor of electricity, and a plastic material which may be either thermo-setting or thermoplastic has been found highly satisfactory. Such material lends itself readily to formation of the member and its openings by molding.

As best shown by Figs. 1 and 3, the openings 12 are arranged in pairs, each opening having associated therewith a binding post 20 of conventional construction. Each binding post 20 includes a threaded anchoring stem 21 extending through the opening 12 into the enlarged portion 16 thereof, and receiving a flat washer 22,

a lock washer 23, and a nut 24, with the nut acting through the washer 23 to force the washer 22 against the radial shoulder 17.

At the front surface 13 of the body member 11, a connecting strip 26 of metal, or other material providing a conductor of electricity, is disposed beneath the shoulders 27 of each pair of binding posts and electrically joins the latter.

The structure described above may be considered conventional insofar as the present invention is concerned, the latter relating to the novel sealing members 30 for the washers 22 and 23 and the nuts 24, in the enlarged openings 16.

The closure member 30 is of cup-like configuration, having an annular side wall 31 and a bottom wall 32, the latter preferably being slightly domed for added strength. The closure is of insulating material, preferably a plastic such as mentioned in connection with the base or body member 11. The closure walls are of such thinness, considering the material, that the side walls 31 are somewhat flexible, with the result that they frictionally grip the side walls of the openings 16. Preferably, the height of the closure side walls 31 is substantially the same as the depth of the openings 16, so that the edges of the closure bottom walls 32 are substantially flush with the rear surface 14 of the body member 11.

When it is desired to remove a closure member 30, to obtain access to the nut 24, incident to repair or replacement of a binding post, the closure bottom wall 32 may be easily punctured by a sharp instrument, and the closure pried or pulled out.

In Fig. 5, there is illustrated a modified closure member 35, whose side walls 36 in cross section have a circular outer periphery 37 and a hexagonal inner periphery 38 adapted to closely receive the correspondingly-shaped nut 24, to prevent accidental unscrewing of the latter.

Fig. 6 shows a further modification wherein the closure member 40 has side walls 41 which, in cross section, have outer and inner peripheries 42 and 43, respectively, both of hexagonal shape for reception in a correspondingly-shaped space between a hexagonal nut and the walls of a hexagonal opening.

In Fig. 7, there is shown a modified construction of sealing or closure member 45 wherein the side wall 46 is provided with a rib 47 which may be continuous or broken, and is adapted to snap into a mating groove 48 formed in the side wall of the opening 16. This construction may be found desirable where manufacturing specifications require a positive securing means, other than frictional engagement of the parts.

Obviously, the closure members may have side walls whose cross sections are of other shapes than those shown and the bottom walls may be flat or concaved, instead of convexed, as shown.

The constructions disclosed provide closures which, when pressed into place, provide uniform and perfect seals of very neat appearance and readily removable.

While the invention has been shown in several forms, it will be apparent to those skilled in the art that it is not so limited, but is susceptible of various modifications and changes, as well as other applications, without departing from the spirit thereof, and it is desired, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What is claimed is:

1. Apparatus of the character described comprising a body member of insulating material having an opening therethrough which is counterbored at one end, an electrical element in the opening and extending beyond the other end thereof, means in said counterbore removably securing the electrical element in the opening, and a removable insulating closure member for said counterbore providing a seal for the electrical element and its securing means at the counterbored end of the opening, said closure member being in the form of a cup whose side walls are of the same configuration as the side walls of the counterbore, said cup side walls frictionally engaging the counterbore side walls, and said frictional engagement constituting the sole means for retaining the removable closure member in sealing position.

2. Apparatus of the character described comprising a body member of insulating material having opposed front and rear surfaces and having an opening extending therethrough from said front surface to said rear surface, said opening having a portion of enlarged diameter extending inwardly from the rear surface; an electrical element mounted on the front of the body member and having a threaded anchoring stem extending through the smaller portion of the opening into the enlarged portion thereof; a nut of greater diameter than the smaller portion of the opening disposed within the enlarged portion of the opening in threaded engagement with the anchoring stem for removably securing the electrical element to the body member; and a removable member of insulating material closing the enlarged portion of the opening and sealing the nut and threaded anchoring stem therein, said nut being spaced from the walls of the opening and the removable closure member being cup-shaped with its edge received in the space between the nut and the walls of the opening, the outer periphery of its sides being of a shape corresponding to the cross section of the opening and frictionally engaging the walls thereof, and the inner periphery of its sides being shaped to closely embrace the nut to prevent accidental unscrewing thereof.

3. Apparatus of the character described comprising a body member of insulating material having a recess of circular cross section in one face thereof; an electrical element removably secured to said body member; means disposed in said recess for removably securing said electrical element to the body member, said means being of materially lesser diameter than the recess in which it is disposed; and a cuplike member having a cylindrical side wall of a height corresponding substantially to the depth of the recess, said cuplike member being positioned in said recess with the open end of its cylindrical side wall contacting the bottom of the recess and surrounding the securing means and with its closed end wall capping the mouth of the recess.

4. Apparatus of the character described comprising a body member of insulating material having a circular recess in one surface thereof; an electrical element carried by said body member; means positioned in said recess for retaining said electrical element on the body member; and a hollow cylindrical member of insulating material, entirely open at one end and entirely closed at the other end, disposed in the recess with its cylindrical side wall frictionally engaging the corresponding side wall of the recess and with its closed end closing the mouth of the recess.

5. Apparatus of the character described com-

prising a body member of insulating material having an opening therethrough; an electrical element secured in said opening; and a removable closure member of insulating material, having a flexible annular side wall and a rigid domed end wall, positioned in one end of the opening and sealing the corresponding end of the electrical element, the flexible annular side wall frictionally engaging the side wall of said opening, thereby removably retaining the closure member in sealing position.

6. A body member having an opening therethrough which is counterbored at one end, a metallic element in the opening and extending beyond the other end thereof, means in said counterbore removably securing the metallic element in the opening, and a removable insulating closure member for said counterbore providing a seal for the metallic element and its securing means at the counterbored end of the opening, said closure member being in the form of a cup whose side walls are of the same configuration as the side walls of the counterbore, said cup side walls frictionally engaging the counterbore side walls, and said frictional engagement constituting the sole means for retaining the removable closure member in sealing position.

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