

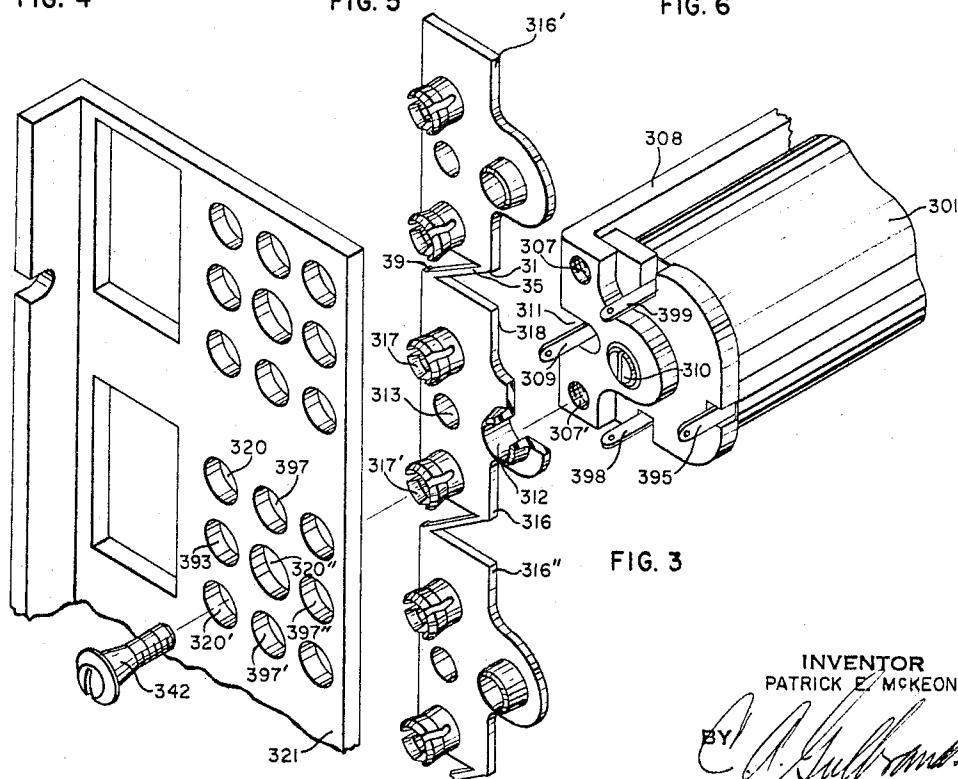
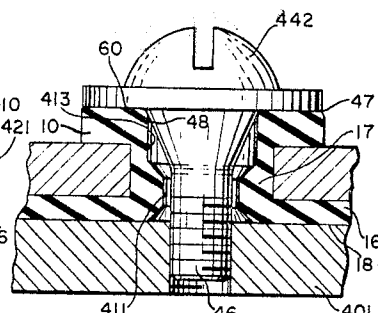
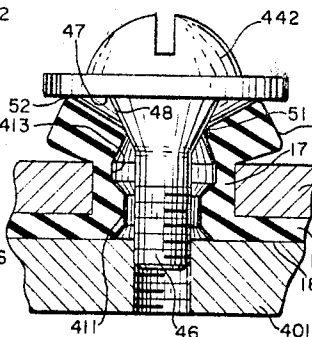
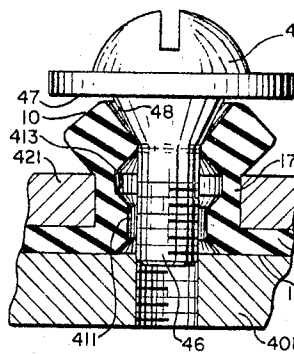
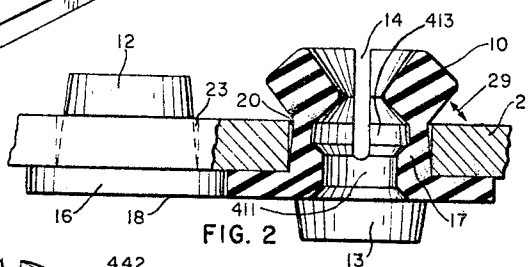
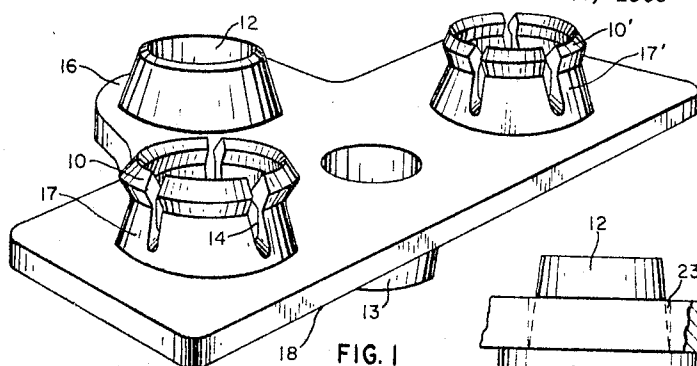
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MOUNTING ARRANGEMENT FOR AN ELECTRICAL COMPONENT

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MOUNTING ARRANGEMENT FOR AN ELECTRICAL COMPONENT

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5 Claims. (Cl. 200-168)

This invention relates to insulators and in particular to insulating devices for insulating electrical components which are mounted by means of a screw. More specifically, the invention relates to insulating devices and arrangement for insulating telephone relays which are mounted by means of fastening screws.

Known techniques for insulating electrical components, such as telephone relays, and their fastening screws from the plate to which they are mounted require a plurality of insulators. An insulating spacer is used to separate the component and the mounting plate, and individual insulator bushings are used to separate the heads of the fastening screws and the mounting plate. At present, no insulation is provided for the shank portion of the screws used for fastening the component to the plate, and in the case of relays, no insulation is provided for the head of the screw which fastens the core of the relay to the heel piece and which protrudes through an aperture in the mounting plate. Thus, if the component is jarred while in position, the shank portion of the fastening screws, and in the case of the relay, the core screw head, may make contact with the mounting plate.

Because of this lack of insulation and because of the need for a plurality of insulators, installation may be difficult and time consuming, thus increasing cost.

Accordingly, it is a primary object of this invention to provide an insulating arrangement for electrical components, such as relays for example, which avoids the aforementioned drawbacks.

A feature of this invention is the provision of a one-piece insulating device or insert with integral collar portions each having a flange and each surrounding one of the fastening screw holes which pass through the device. Because of their resiliency, these collar portions with their flanges, enable the device to be snapped into place on a mounting plate, and are caused to bend over when pressure is applied by the tightening of the fastening screws and thus supply an insulating layer for the screws.

Other objects and features of the invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings of which:

FIG. 1 is a perspective view of an embodiment of an insulating device or insert according to the invention specifically designed for use in mounting relays.

FIG. 2 is a cross-sectional view of the insert in FIG. 1 shown snapped into position on a mounting plate.

FIG. 3 is an exploded perspective view of a strip of devices such as shown in FIG. 1 and of a multi-relay mounting plate with which this strip is used; and also of one of the relays which may be mounted on this mounting plate through the medium of the associated section of the above mentioned strip.

FIGS. 4-6 are cross-sectional views of a portion of an insulating device or insert according to the invention drawn to illustrate the deformation of the device as the mounting screws are tightened into position.

FIG. 1 shows a one-piece molded insulating device or insert 16 according to the invention, designed for use in mounting telephone type relays. Insert 16 is formed from a flexible dielectric material such as plastic, and comprises a base portion 18, and molded integrally with base portion 18, collar portions 17 and 17', each with a flange 10

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and 10', which are vertically split by slots, such as 14. These slots may be of any number and spaced at any desirable angle, but preferably three slots are provided per collar portion which are mutually spaced by 120 degrees. Other projections 12 and 13 are molded into device 16 for insulating certain component parts of the relays as explained in detail below.

FIG. 2 is a cross-sectional view of device or insert 16 shown in FIG. 1, as it appears snapped into position on mounting plate 21. Flanges 10 and 10' are larger in diameter at their widest point than the corresponding apertures such as 20 in mounting plate 21 through which collar portions 17 and 17' extend. The above-mentioned vertical slots, such as 14, in collar portions 17 and 17' run from the top of flanges 10 and 10' almost to base portion 18. Because of these vertical slots 14, and because device 16 is molded from a flexible material, collar portions 17 and 17' are sufficiently resilient to enable flanges 10 and 10' to pass through apertures, such as 20, and be snapped into place. Once flanges 10 and 10' are in place, they are at an angle 29 less than 90 degrees with the axis of the collar portions 17 and 17' and can thereby hold device 16 in position on mounting plate 21. One of the other projections 12 is received by an aperture 23 in mounting plate 21, but is smaller in diameter than aperture 23 and therefore does not snap in as the aforementioned collar portions 17 and 17'.

This "snapping in" feature of the device allows an installer of relays or other electrical components to devote his full attention to the relay or component after he has snapped the device into position on the mounting plate. The installer no longer has to manually keep the insulation positioned and at the same time hold the relay or component and position it. Thus, the insulating device or insert according to the invention facilitates a faster, more reliable installation at a reduced cost.

FIG. 3 illustrates an optional way of molding the insulating devices shown in FIG. 1. Shown, are three devices 316, 316' and 316'' molded together by means of connecting links such as 35 which are formed in such a manner as to be manually severable at either end such as 31 or 39. Using this technique, any number of devices may be molded together to form a strip of any desired length which may be used in its entirety or severed according to need. Also, the links such as 35, are diagonally formed so that if the spacings between mounting positions on the mounting plate to be used are not equal or if there are minor differences in spacing due to manufacturer's tolerances, the links such as 35 can be compressed or stretched in an accordion like fashion to meet the occasion.

FIG. 3 also illustrates how insulating devices or inserts of the type shown in FIG. 1 are used to insulate the relays and their fastening screws, from the plate or plates to which the relays are to be mounted.

Insulating device 316 will first be snapped into position on mounting plate 321 through apertures 320 and 320' as described above and shown in FIG. 2. Relay 301 will then be positioned against base portion 318 of insulating device 316 and fastening screws, such as 342 will be inserted into collar portions 317 and 317' which have already been inserted into their respective aligned apertures 320 and 320' in mounting plate 321. Screws, such as 342 will then be received by threaded apertures 307 and 307' in heel piece 308 of relay 301.

One of the projections 312, which is inserted into its aligned aperture 320'' in mounting plate 321 will receive and insulate the head 310 of the screw which fastens the core of relay 301 to heel piece 308. The other projection 313 will be inserted into slot 311 in heel piece 308 for aligning relay 301 and also for insulating one of the coil

terminals 309 if, as shown in FIG. 3, there is a second winding used on relay 301.

The remaining terminals 395, 398 and 399 of relay 301, pass alongside the device 316 and through aperture 397", 397' and 397, respectively, in mounting plate 321. These apertures 397", 397', and 397, through which terminals 395, 398 and 399 pass, respectively and aperture 393 through which terminal 309 passes, are of a sufficiently large size so that no contact will be made between the terminals 309, 395, 398, 399 and mounting plate 321. After fastening screws, such as 342 are fully tightened, relay 301 and its fastening screws, such as 342 are securely insulated from mounting plate 321. The procedure by which the insulation of the fastening screws and the component takes place will be described in detail below.

FIGS. 4-6 present a series of steps to show in detail how the device or insert 16 will insulate both fastening screw 442 and relay or other electrical component 401 from mounting plate 421 when screw 442 is fully tightened into component 401. Screw 442 is of the well known "washer head" type. This screw 442 also has, a shank 46, and immediately beneath head portion 47, a substantially conical portion 48, which, together with elongated head portion 47, acts as a cam driver to bend flange 10, acting as a cam follower, eventually into the position shown in FIG. 6, so that it will insulate head portion 47 of screw 42 from mounting plate 421. This conical portion 48 may be added to the "washer head" screw by a cold rolled process or other techniques, or the screws can be originally made with this conical portion 48 integrally formed with shank 46. Conical portion 48 provides a smoother path for the bending flange 10 as the screw is being tightened.

As shown in FIGS. 4-6, the device is molded in such a manner as to have a ribbed section 411 formed on the inside of collar portion 17. This ribbed section 411 provides weak section 413 immediately beneath flange 10 and acts as a hinge so flange 10 can bend more easily as screw 442 is tightened.

Referring to FIG. 5, which illustrates an intermediate step in the deformation of flange 10, the cam action mentioned above can be seen at points 51 and 52 as screw 442 is inserted into component 401. Finally in FIG. 6, when screw 442 is tightened down as far as it can be, flange 10 is bent under head portion 47 so that flange 10 now rests flat on mounting plate 421 and provides secure insulation for head portion 47.

When fastening screw 442 has been fully tightened there is an area 60 of flange 10 which will be in a compressed state. This area 60, being under pressure, provides a locking effect and tends to keep the screw 442 securely in place.

Also when this device is used, the shank 46 of screw 442 is insulated from mounting plate 421. This is accomplished by means of collar portion 17. This particular insulation provided here for shank 46 is not used in present techniques. In the present techniques, if the component would shift after it was positioned, it would be possible for the shank and the mounting plate to make contact and upset the functioning of the component.

In summation, with reference to FIGS. 4-6, as screw 442 is tightened, inclined portion 48, directly beneath head portion 47 of screw 442, and head portion 47, which is elongated, act as a cam driver on flange 10, which acts as a cam follower, so as to bend flange 10 so that it will eventually, when screw 442 is fully tightened, rest on mounting plate 421 and insulate head portion 47 of screw 442. Flange 10 bends over more easily as screw 442 is tightened because of the ribbed section 411 formed on the inside of collar portion 17 of device 16. When the tightening is completed and screw 442 is in place, head portion 47 is insulated from mounting plate 421 by the bent flange 10, FIG. 6, shank 46 of screw 442 is insulated by collar portion 17, and component 401 is insulated from mounting plate 421 by base portion 18 of

device 16. Thus an electrical component and its fastening screws can be insulated by using this single, one-piece device.

It will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broadest aspects and therefore the aim in the appended claims is to cover all such changes and modifications as in the true spirit and scope of this invention.

What is claimed is:

1. An arrangement for mounting an electrical component in insulated fashion comprising, in combination:

- (1) a mounting plate having an aperture of predetermined diameter therethrough,
- (2) a screw having a washer-type head portion with a diameter larger than that of said aperture, a shank and therebetween a portion tapering in the direction from said head towards said shank,
- (3) and an insert of insulating material comprising:

a base portion and extending therefrom and integrally formed therewith a resilient collar portion having a flange at its free end, a hole being formed through said insert, which is surrounded by said collar portion, said flange having an outside diameter slightly larger than that of said aperture,

said collar portion with its flange being inserted into said aperture from said component side of said mounting plate, said flange emerging from the other side of said mounting plate and overlapping the edges of said aperture so as to retain said insert on said mounting plate,

said flanged end of said collar portion receiving said shank which in turn passes through said collar portion into said component, said flange, upon the tightening of said screw, being engaged and deformed by said tapered screw portion and said head portion, thereby forming an insulating layer between said head and said plate,

and said base portion being interposed between said plate and said component to provide an insulating layer therebetween.

2. An arrangement for mounting an electrical component in insulated fashion as claimed in claim 1, wherein said flange includes circumferentially spaced slots extending from the free end of said flange to the base end of said collar portion, whereby said collar portion is made sufficiently resilient to permit insertion of said collar portion with its flange through said aperture.

3. An arrangement for mounting an electrical component in insulated fashion as claimed in claim 1, wherein said collar portion includes an inner rib to insulate said shank from said plate, and to create a weak section immediately beneath said flange to provide a hinge-like section and whereupon the tightening of said screw said tapered portion and said head portion engage said flange, causing said flange to be bent down until it comes to rest on said plate, thereby forming an insulating layer between said head and plate.

4. In combination:

a relay comprising a core having a heelpiece attached thereto by means of a screw and a head projecting therefrom, said heelpiece having a plurality of threaded bores therein,

a mounting plate having a plurality of apertures therethrough, certain ones of said apertures being of a predetermined diameter,

a plurality of fastening screws each having a head, shank and therebetween a portion tapering in the direction from said head towards said shank, and an insert of insulating material for insulating said heelpiece, the head of said core screw and said fastening screws from said mounting plate,

said insert comprising:

a base portion and extending therefrom and integrally formed therewith, resilient collar portions,

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each having a flange at its free end, each said flange having a diameter slightly larger than that of said apertures of predetermined diameter, said insert having holes therethrough, certain ones of said holes each being surrounded by one of said collar portions, respectively, 5

a first projection extending in the same direction as said collar portions and integrally formed with said base portion, said first projection surrounding one of the remaining holes, 10

said collar portions with their flanges and said first projection being inserted into said apertures of predetermined diameter and one of the other of said apertures, respectively, from the relay side of said mounting plate, said flanges and the free end of said first projection extending outwardly beyond the other side of said mounting plate, said flanges retaining said insert on said mounting plate, 15

each of said fastening screws being received by one of said collar portions from the flanged end thereof, said shanks extending through said collar portions and into said threaded bores in said heelpiece, respectively, 20

said flanges, upon the tightening of said fastening screws, respectively, being engaged and deformed by said tapered screw portion thereby forming insulating layers between the heads of said fastening screws and said mounting plate, 25

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said first projection receiving the head of said core screw, thereby insulating said head from said mounting plate,

and said base portion interposed between said heelpiece and said mounting plate to provide an insulating layer therebetween.

5. The combination as claimed in claim 4, wherein said relay includes at least one winding with at least one terminal extending therefrom and wherein said insert includes a second projection extending in the opposite direction from said collar portions and integrally formed with said base portion, said second projection surrounding one of said remaining holes and receiving and insulating said one winding terminal.

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