

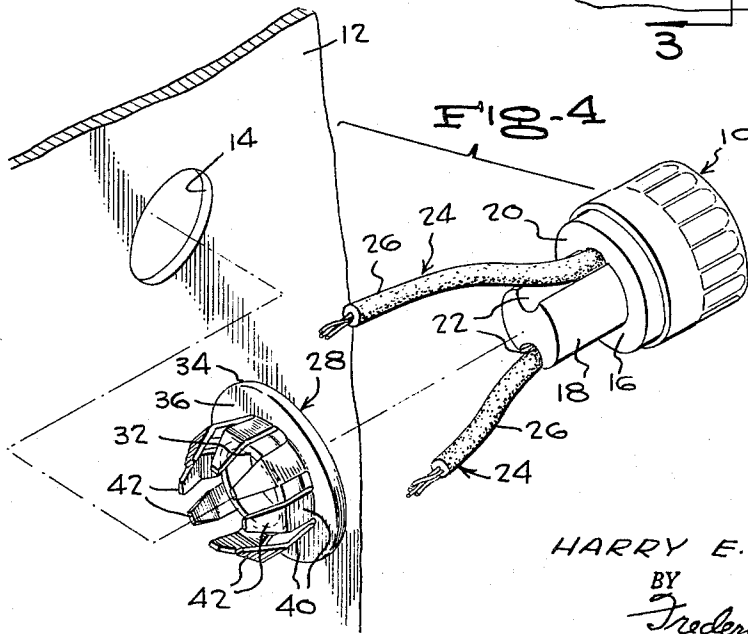
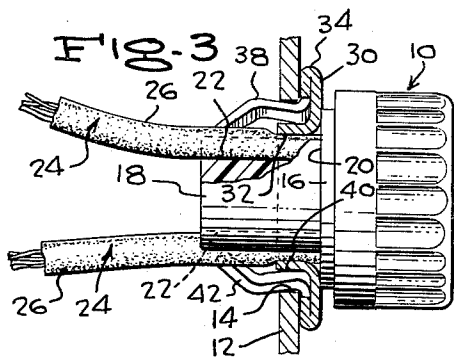
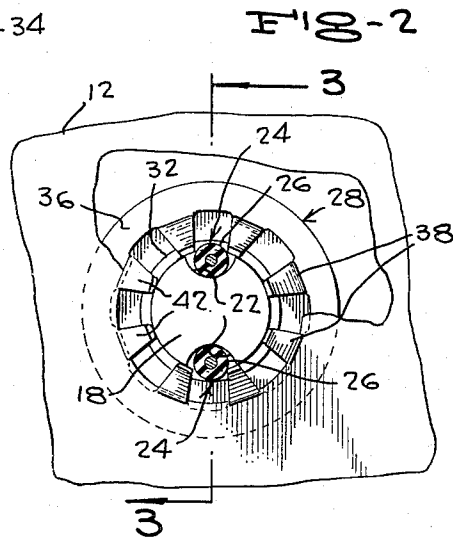
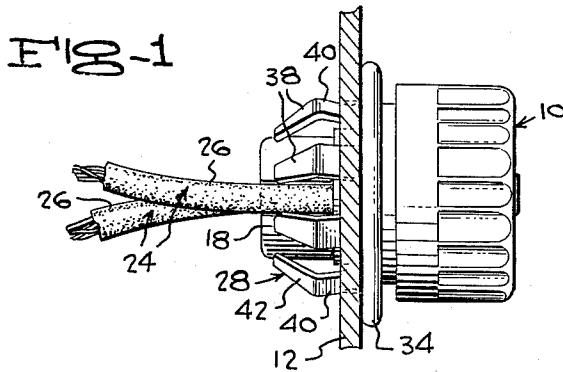
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H. E. RADACK

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ELECTRICAL WIRING DEVICE AND MOUNTING MEANS THEREFOR

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INVENTOR.

HARRY E. RADACK

BY

Frederick A. Zoda
ATTORNEY

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ELECTRICAL WIRING DEVICE AND MOUNTING MEANS THEREFOR

Harry E. Radack, Trenton, N.J., assignor to Circle F Mfg. Co., Trenton, N.J., a corporation of New Jersey
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This invention relates to electrical wiring devices having mounts of the type designed for snap-in engagement in supporting panels.

The invention has particular adaptability for use with rotary canopy switches, but is not necessarily restricted to said use.

Most usually, switches of this type are mounted on a panel by insertion of a threaded nipple of the switch through an aperture of said panel. Thereafter, a clamping nut is applied to the nipple.

This arrangement has certain disadvantages, in view of the relatively tedious process involved in mounting the switch. Further, the arrangement is comparatively expensive.

It has been heretofore proposed to provide a mount which includes an annular series of spring fingers, insertable through the aperture of the supporting panel in such a way as to detachably connect the switch to the panel responsive to axial movement of the switch through the aperture.

However, in many instances, the construction of the snap-in mount has been relatively complicated, particularly as regards its assembly with the body of the switch. Often the switch housing must be specially formed, in a comparatively expensive manner, and in other instances, the mount has had to be specially constructed. Then too, the assembly of the mount with the switch body has often been complicated, involving undesirably high labor costs.

The broad object of the present invention is to provide an improved snap-in mount characterized by its inexpensive design, and by a particular cooperation of the same with the switch proper, to hold the mount and switch body assembled without special fasteners, and without any connecting operation other than the relative axial movement of the body and mount.

To this end, I provide a lip on the finger support ring of the mount, while on the wiring device I provide a cylindrical portion having diametrically opposed, longitudinal channels. The leads of the device are sheathed with insulation, as is usual, and seat in the channels. Normally, the leads would project outwardly from the channels beyond the diameter of the lip.

In accordance with the invention, the movement of the ring onto the cylindrical, longitudinally channeled portion effects a compression of the sheaths or coatings of the leads. This in turn causes the sheaths to exert a continual outward pressure against the finger support ring, at diametrically opposed locations on said ring, when the ring is assembled with the cylindrical portion.

In this way, I hold the snap-in mount assembled with the switch proper, entirely by a coactive relationship between the mount and the resiliently sheathed leads. This dispenses with connecting fasteners, attaching flanges, and equivalent expedients necessarily employed in snap-in mounts for electrical wiring devices as heretofore designed.

A further object is to provide a snap-in mount capable of formation from a single piece of inexpensive material, readily made to the desired shape.

Still another object is to provide a snap-in mount which will involve minimum modification of the switch proper.

Another object is to provide a mount which, though

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inexpensively formed, will be possessed of a high degree of efficiency as regards the gripping action asserted thereby against the supporting panel.

Still another object of importance is to provide a mount which will be visible to a minimum extent, when the switch is in its final, fully installed position, thus to detract to a minimum degree from the attractive appearance of the installed switch.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

FIGURE 1 is a side elevational view of a rotary canopy switch and snap-in mount in accordance with the present invention, a supporting panel being shown in section;

FIGURE 2 is a view of the installed switch as seen from the rear, that is, from the left of FIGURE 1, a portion of the panel being broken away;

FIGURE 3 is a sectional view substantially on line 3-3 of FIGURE 2; and

FIGURE 4 is an exploded perspective view.

Referring to the drawing in detail, I have illustrated a rotary switch generally designated 10. The invention can be embodied in any of various wiring devices, the switch being shown purely as one example. Since the interior construction of the wiring device is relatively unimportant as far as the present invention is concerned, said interior construction need not be described. It is sufficient to note that the switch 10 would be mounted upon a supporting panel 12, which could be the instrument panel of an automobile, a wall of a housing of an electrical appliance, etc. The panel has a circular opening 14 to accommodate the switch body.

In the illustrated example, the switch 10 has a body or housing 16, of any suitable material, as for example a plastic having the desired electrically insulative qualities. The body 16 is formed with a rearwardly projecting, cylindrical portion 18 the diameter of which is reduced relative to the main diameter of the body, whereby to define a rearwardly facing, flat, circumferential shoulder 20 at the juncture of the body 16 and the cylindrical portion 18. Formed in the cylindrical portion 18, over the full length thereof, are diametrically opposed, longitudinally extending channels 22, receiving conductor wires or leads 24. The leads extend into body 16 through apertures formed in the shoulder 20.

The leads are provided with the usual sheaths or coatings 26 of electrically insulative material. The outer diameters of the sheaths are such as to cause the same to normally project radially outwardly of the portion 18, beyond the channels 22. The coatings are of a slightly resilient, compressible material, this being a characteristic of the coatings which plays an important part in the present invention.

Generally designated at 28 is a mount, formed from a single piece of inexpensive sheet metal material readily blanked out and formed to the desired end shape thereof illustrated in FIGURE 4. Quite possibly, I may employ a material other than sheet metal for the switch mount, such as a molded plastic.

The mount 28 is provided with a planiform base ring 30, defining a flat abutment surface adapted to bear against the correspondingly planar surface of the rearwardly facing shoulder 20 (see FIGURE 3). The inner periphery of the base ring 30 is of a diameter less than the diameter of body 16, and is integral with a rearwardly projecting, cylindrically shaped skirt or lip 32 formed to a diameter slightly greater than the diameter of the cylindrical portion 18. The inner diameter of lip 32, however, is less than the distance measured diametrically

of the switch between the outermost points of projection of the uncompressed coatings or sheaths 26.

The mount 28, at the outer periphery of the base ring 30, is folded on itself as at 34, providing a finger support ring 36 in face-to-face contact with the base ring 30. The finger support ring 36 in turn merges into an annular series of rearwardly projecting spring fingers 38. The fingers 38 are uniformly, angularly spaced about the circumference of the finger support ring, extending from the inner periphery of said ring so that the finger support ring will bear directly against the front surface of the supporting panel 12.

The fingers 38 are formed with rearwardly diverging proximal portions 40, merging at their divergent, rear extremities into rearwardly convergent distal portions 42.

Normally, the rear, divergent extremities of the proximal portions 40 would lie upon a circle the diameter of which is greater than the diameter of the aperture 14. Accordingly, when the mount 28 is being shifted rearwardly through the aperture 14, the divergent ends of the proximal portions 40 would engage the edge of the opening, and would be cammingly biased radially inwardly, so as to pass through the aperture 14. When the divergent extremities of the proximal portions 40 have passed through the aperture 14, they are again free to spring outwardly to their normal positions, thus holding the mount assembled with the supporting panel 12. In the final position, the finger support ring is in direct contact with the front surface of the panel 12, as shown in FIGURE 3.

In assembling the mount 28 with the switch 10, one merely extends the leads through the central opening of the mount, after which the mount and the switch body are relatively moved in an axial direction, toward each other. As the mount moves onto the cylindrical portion 18, the lip 32 presses against the outwardly projecting portions of the insulating sheaths or coatings 26, and said coatings are thus caused to be compressed. Continued movement of the mount onto the cylindrical portion 18 of the switch body causes the lip 32 to press the coatings inwardly, with the coatings being held in their compressed conditions in the finally assembled positions of the switch and mount. This is shown in FIGURE 3, and as will be observed, the snap-in mount, by compressing the coatings 26, is thus assembled with the wiring device. The compressed coatings exert a pressure radially outwardly of the electrical wiring device, at diametrically opposed locations, against the lip 32. A strong frictional engagement between the lip 32 and the resiliently coated leads 24 is thus produced, whereby the mount 28 and the wiring device are caused to be fully connected, through the medium of the compressed leads interposed between lip 32 and cylindrical portion 18.

It will be noted in this regard that rearwardly of lip 32, the sheaths remain uncompressed, bulging outwardly to define an abutment means behind the rear edge of the lip. Any tendency of the mount 28 to shift rearwardly from its use position is thus effectively resisted, since the back edge of lip 32 would hang up on the uncompressed sheath portions as readily seen from FIGURE 3. The shoulder and the uncompressed portions of the sheaths respectively lie directly in front of and rearwardly of the lip to define abutments. These limit the mount against both forward and backward movement in respect to the switch body 16, in the event that a force tending to create such movement occurs. This is desirable since such force might otherwise overcome the resistance inherent in the frictional interengagement of the sheaths with the mount and body respectively.

With the mount and the wiring device so assembled, one merely moves the device and its associated mount forwardly, to snap the mount into the aperture 14, thus installing the switch upon the panel.

In this way, at minimum cost, I provide for inexpensive swift, easy installation of wiring devices, utilizing a

low cost mount in association with a wiring device having a minimum number of redesigned components. The mount and the wiring device are at the same time characterized by the low cost of assembly with one another, in view of the use of the leads as friction grip means interposed between the mount and the wiring device to hold the same connected.

It is also very important to note that the construction permits mounting of electrical wiring devices on supports that are so designed as to prevent access to the back of the device, which access would be needed in the type using mounting nuts. Such an instance would occur when the support is a tube of relatively small diameter. Another instance would arise when the support, though flat, is so located as to prevent ready access to the back thereof.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any changes in construction that may be permitted within the scope of the appended claims.

I claim:

1. In an electrical wiring device and mounting means of the snap-in type intended for engagement in an aperture of a supporting panel, a wiring device body; a cylindrical portion extending rearwardly therefrom; a finger support ring extending about said cylindrical portion; an annular series of resiliently bowed fingers projecting rearwardly from the ring about said cylindrical portion for snap fastener engagement with the edge of the aperture of a panel on which the wiring device is to be installed; and at least one conductor wire extending from the body and including an electrically insulative sheath compressed between and frictionally bound against the ring and said cylindrical portion, to hold the finger support ring assembled with said cylindrical portion, said body and sheath abutting against the ring at locations spaced axially of the ring, said ring being engaged by the body against movement axially of said portion in one direction, the ring being engaged by the sheath against movement axially of said portion in the opposite direction.

2. In an electrical wiring device and mounting means of the snap-in type intended for engagement in an aperture of a supporting panel, a wiring device body; a cylindrical portion extending rearwardly therefrom and reduced in diameter in respect to the body, whereby to define a rearwardly facing shoulder on the body at the juncture of the cylindrical portion therewith; a finger support ring extending about said cylindrical portion adjacent said shoulder, the shoulder defining an abutment for locating the ring at the forward end of the cylindrical portion; an annular series of resilient, bowed fingers angularly spaced about the cylindrical portion and projecting rearwardly from the ring along said portion for snap fastener engagement with the edge of a panel aperture through which the cylindrical portion is extended; and at least one conductor wire extending from the body and including an electrically insulative sheath compressed between and frictionally bound against the ring and the said cylindrical portion to hold the finger support ring assembled with the cylindrical portion, said sheath comprising the sole means holding the ring and cylindrical portion assembled with each other, said shoulder and sheath being disposed as abutments in front and to the rear, respectively, of the ring, in positions limiting the ring against movement axially of said cylindrical portion in opposite directions.

3. In an electrical wiring device and mounting means of the snap-in type intended for engagement in an aper-

ture of a support, a wiring device body; a rear portion thereon; rearwardly facing abutment means on the body at the juncture of the same with said rear portion; a finger support ring extending about the rear portion, said abutment means limiting the ring against forward movement in respect to the body and rear portion; a plurality of spring fingers projecting from the ring rearwardly of said shoulder and resiliently bowed for snap fastener engagement with the edge of the aperture of a support upon which the wiring device is to be installed; and at least one conductor wire extending from the body along the length of said rear portion and including an electrically insulative, resiliently compressible sheath, having a front part compressed between and frictionally bound against the ring and said rear portion, said sheath having a back part expanded in a direction radially outwardly from said rear portion and lying as an abutment limiting the ring against rearward movement in respect to said body and rear portion.

4. In an electrical wiring device and mounting means of the snap-in type intended for engagement in an aperture of a support, a wiring device body having a back end formed with a rearwardly facing circumferential shoulder; a rear portion rigid with the body and extending rearwardly from said shoulder, said rear portion having angularly spaced longitudinal channels extending from end to end of the rear portion, the body having correspondingly angularly spaced apertures opening through said shoulder into communication with the respective channels; a finger support ring extending about the rear portion in concentric relation therewith, said ring lying in face-to-face contact with the shoulder, the shoulder limiting the ring against forward movement in respect to the body and rear portion; an annular series of spring fingers concentric with the body and projecting from the ring rearwardly of said shoulder, said fingers being resiliently bowed outwardly for snap fastener engagement with the edge of the aperture of a support on which the device is to be installed; and a pair of conductor wires extending through the respective apertures of the body, said wires having electrically insulative, resiliently compressible sheaths engaged in the respective channels, said sheaths having front parts compressed within the channels and frictionally interengaged with the ring and said rear portion, the sheaths having back parts expanded in a direction radially outwardly from the rear portion and projecting out of the channels as abutments in the path of axial movement of the ring, said abutments limiting the ring against rearward movement in respect to said body and rear portion.

5. In an electrical wiring device and mounting means of the snap-in type intended for engagement in an aperture of a support, a wiring device body having a back end formed with a rearwardly facing, circularly shaped, circumferential shoulder; a cylindrical rear portion of circular cross-section integral with and projecting rearwardly from said shoulder in concentric relation therewith, the rear portion having a pair of diametrically opposed longitudinal channels of part-circular cross-section extending from end to end of the rear portion, the body having correspondingly diametrically opposed apertures opening through said shoulder into communication with the respective channels; a mount including a finger support ring extending about the rear portion in concentric relation therewith and with the shoulder, said ring having a flat abutment surface lying in face-to-face contact with the shoulder to limit the ring against forward movement in respect to the body and rear portion, an annular lip integral with the ring and projecting rearwardly therefrom, said lip extending about the rear portion in close proximity thereto and terminating forwardly of the back end of the rear portion to expose a part of the length of the rear portion, and an annular series of spring fingers also integral with the base ring and projecting rearwardly therefrom, said series being concentric with and extending about the lip with the fingers of the series bowed resiliently outwardly for snap fastener engagement with the edge of the aperture of a support on which the device is to be installed; and a pair of conductor wires extending through the respective apertures of the body, said wires having electrically insulative, resiliently compressible sheaths of circular cross-section engaged in and projecting outwardly from the respective channels, the sheaths having front parts compressed within the channels and frictionally interengaged with the ring and said rear portion, the sheaths having back parts expanded in a direction radially outwardly from the exposed part of the rear portion in position lying as abutments effective to limit the ring against rearward movement in respect to the body and rear portion.

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