

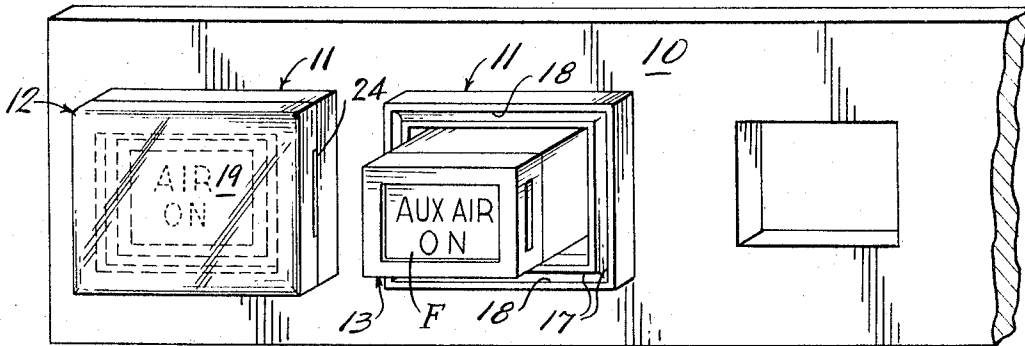
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PROTECTIVE INSTRUMENT COVER

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PROTECTIVE INSTRUMENT COVER

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1 Claim. (Cl. 200—168)

This invention relates to a protective cover to be used with panel mounted instruments which will not interfere with visual observation and operation of the instrument when in place. More specifically, this invention relates to a water and dust protective cover for use with panel mounted instruments of the push button type which, because of its unique design, permits visual observation and manipulation of the instrument while the cover is in place.

Panel mounted instruments of the push button type, which contain an illuminated warning device to indicate the function or malfunction of a particular component or circuit, are commonly used in control panels, particularly in aircraft, where the instantaneous indication of malfunction or abnormality in a system is required. One such instrument which contains a visual warning device in combination with a push button type switch for checking the lamps in the warning system or performing a circuit changing function is disclosed in United States Patent 3,090,949.

As explained in this patent, to maintain a high degree of reliability of the visual warning means, the lamps within the instrument must be capable of replacement easily and rapidly from the front of the panel. Relamping in this type of instrument is accomplished by removing the push button or indicator unit from the front of the panel or, in other types, by rotating the push button unit to expose the lamps to the front of the panel.

Because instruments of this type desirably feature maintenance or removal from the front of the panel, it is desirable that any water or dust protective cover be easily attached and removed from the front of the panel to facilitate servicing of the visual warning circuit. Furthermore, because such instruments have been found to be extremely reliable and convenient to service, they are extensively used in aircraft and shipboard control panel installations. Due to large variations in humidity and other environmental factors to which such control panels are exposed in these installations, it has become necessary to provide a waterproof and dust tight cover for such instruments.

Accordingly, it is an object of this invention to provide a protective instrument cover for panel mounted instruments which may be readily removed from the front of the panel to facilitate servicing of the instrument.

It is another object of this invention to provide a removable water and dust proof cover for push button type panel mounted instruments which may be easily removed to expose the instrument for servicing and which will not interfere with manipulation and visual observation of the instrument when the cover is in place.

It is still another object of this invention to provide an inexpensive, translucent, resilient water and dust proof cover for push button type panel mounted instruments which can be easily removed from the front of the panel for servicing of the instrument and which permits manipulation and visual observation of the instrument when in place.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawings in which:

FIG. 1 is a view in perspective of a small section of an instrument panel showing a protective instrument cover

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attached with an instrument of the type previously described and also showing an instrument in which a part of the protective cover has been removed to permit servicing;

FIG. 2 is a cross-sectional view in elevation illustrating the method of installing the instrument cover of this invention with a switch of the type previously described, on a panel;

FIG. 3 is a front view of an instrument cover of this invention installed over a switch of the type previously described, taken along the line 3—3 of FIG. 2; and

FIG. 4 is a side view in cross section taken along the line 4—4 of FIGURE 3, and shown on an enlarged scale.

Referring to FIGURE 1, a control panel 10 is shown with provision for three individual push button type illuminated warning devices, as disclosed for instance in United States Patent 3,090,949. At the right of this figure, an empty switch aperture is shown. The central illustration of FIGURE 1 shows an installed switch with a portion of the protective cover of this invention removed in order that the lamp capsule portion of the unit may be removed or serviced from the front of the panel. The left illustration of this figure shows the complete protective cover of this invention installed over a push button type switch unit.

Referring particularly to FIGURES 2 and 4, the protective cover of this invention consists of a base portion 11 and a cover member 12. In the illustrated preferred embodiment of this invention, both the base portion 11 and the cover member 12 are comprised of a resilient thermoplastic material such as polyethylene, polypropylene, nylon or other suitable, resilient thermoplastics. In installations such as that illustrated where the protective cover of this invention is used in association with an illuminated warning device, it is important that the material of the cover member 12 be transparent or translucent so that the warning device may be observed when the cover member 12 is in place, as shown in the left illustration of FIGURE 1.

The base portion 11, as best seen in FIGURES 1, 2 and 4, comprises a continuous closed frame having a central opening large enough to receive a movable switch unit 13 and its housing 14. In the switch illustrated in FIG. 2, the switch unit 13 contains lamps L which are visible through the usual lens F having an indicia bearing front surface. Manual depression of the switch unit 13 in its housing 14 causes a push rod R to operate a conventional spring biased switch S.

The rear surface 15 of the base portion 11 has an inwardly extending flange 16 which is continuous throughout the closed frame comprising the base portion 11. The forward surface 17 of the base portion 11 contains a continuous recess 18, which, as shown in FIGURES 2 and 4, is inwardly enlarged and is preferably of circular cross section with a constricted portion extending from the enlarged area to the forward surface 17.

The cover member 12 comprises a generally planar body 19 which extends completely across the major dimensions of the base portion 11 and which has an outwardly projecting, continuous bead 20 on its inner surface about its periphery. The bead 20 is preferably generally circular in cross section and is complementarily shaped to match the cross section of the recess 18 in the base portion 11.

FIGURE 2 illustrates an expanded assembly of the base portion 11 and the cover member 12 associated with a switch housing 14 and panel 10. The switch housing 14, which holds the switch unit 13, includes an outwardly extending continuous peripheral flange or projection 21 which overlies the flange 16 on the base portion 11. To install the base portion 11, it is slipped over the inward end of the switch housing 14 prior to

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inserting the switch housing 14 in the panel aperture. When the housing 14 is inserted in the panel aperture and pushed against the face of the panel 10, the projection 21 on the switch housing 14 seats upon the flange 16 of the base portion 11 and holds the rear surface 15 snugly adjacent the front surface of the panel 10, as shown in FIGURE 4. FIGURE 4 shows one means of securing the switch housing 14 against outward movement from the panel 10. A set screw 22 extends through a threaded boss 23 which is secured to or integral with the rear surface of the panel 10. When the switch housing 14 is pressed inwardly against the front surface of the panel 10, and the projection 21 pushes the rear surface 15 of the base portion 11 against the front surface of the panel 10, the set screw 22 is tightened. Only a slight amount of resiliency in the thermoplastic material comprising the base portion 11 is required to perfect an airtight and watertight seal between the projection 21, the flange 16 and the front surface of the panel 10. The flange 16 of the base portion 11 acts as a gasket between the front surface of the panel 10 and the projection 21 on the switch housing 14 and also holds the base portion 11 firmly in place on the panel 10. As shown in the center illustration of FIGURE 1 and in FIGURE 2, the switch unit 13 is next installed from the front of the panel by inserting it through the base portion 11 and into the switch housing 14. Installation is completed by pressing the cover member 12 against the forward surface 17 of the base portion 11, as illustrated in phantom in FIGURE 2. When the bead 20 on the cover member 12 is pressed against the constricted or narrowed slot of the enlarged recess 18, the resiliency of the thermoplastic material will permit the bead 20 to snap completely into the recess 18 and to be held securely therein, as shown in FIGURE 4. When so installed, the switch unit 13 is completely enclosed on the outer side of the panel 10 by the base portion 11 and cover member 12 which provide a water tight and dust proof seal.

As previously pointed out, the advantages of the protective instrument cover of this invention are many. Because, in the preferred embodiment of this invention, the cover member 12 is comprised of a translucent thermoplastic material, the illuminated warning device illustrated in this embodiment may be observed with the protective cover in place, as illustrated in FIGURES 1 and 3. Furthermore, when associated with push button switches of the type described, the switch may be manipulated with the protective cover installed due to the resiliency of the thermoplastic material comprising the cover member 12. FIGURE 4 shows in phantom the position of the cover body 19 and switch unit 13 when the switch unit 13 is depressed, as at 19a and 13a. Due to the resiliency of the material comprising the cover member 12 and the base portion 11, the water and dust tight seal provided by the protective cover of this invention is not broken when the switch is depressed as illustrated in FIGURE 4. Only the thin wall cover body 19 is substantially distorted and further resiliency is provided by a small amount of bending of the base portion 11 in an inward direction. This minor amount of bending or distortion does not disturb the gasket-like seal provided by the flange 16 which is firmly compressed between the projection 21 and the face of the panel 10. It is therefore unnecessary that the thermoplastic material comprising the base portion 11 and cover member 12 have an appreciable modulus of elasticity. Further depression of the cover body 19 is possible due to a slight amount of rotation of the circular bead 20 relative to the recess 18 which

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will not break the sealing engagement of these members.

As previously explained, a unique advantage of the protective cover of this invention is the fact that it provides for ready accessibility to the switch unit 13 from the front side of the panel. As illustrated in FIGURE 1, the cover member 12 may be provided with a fingernail recess 24 which facilitates easy removal of the cover member 12 from the base portion 11 by exerting force on one side of the cover member 12 in a direction away from the panel 10 to remove the bead 20 from the recess 18. When one side of the cover member 12 is pulled free, it may be peeled off and removed off, thereby exposing the switch unit 13 for servicing, as illustrated in the central part of FIGURE 1.

While in the above-described preferred embodiment of this invention, the cover member 12 is comprised of a transparent or translucent colorless thermoplastic material, it may be desirable in certain installations to use various colors of such thermoplastic materials to indicate various conditions or circuits, etc. Because the cover members 12 are interchangeable with the base portions 11, it is more economical to provide a number of color coated cover members 12 or even to print the legend upon the cover member 12 itself rather than upon the front surface or sign panel of the switch unit 13. Thus, in certain experimental installations, the cover member 12 not only will provide a water and airtight seal, but also will add to the variation of the applications for which the panel may be used, at very low cost.

Various modifications of the above-described preferred embodiment of the invention will be apparent to those skilled in the art to which this invention relates and it is to be understood that such modifications can be made without departing from the scope of the invention, if within the spirit and tenor of the accompanying claim.

What I claim is:

A protective cover for a panel mounted push button instrument having a portion displaceable inwardly in normal actuation comprising, in combination, a resilient base portion including a hollow frame surrounding said instrument, said frame having a rear surface with means for holding said rear surface against said panel to provide sealing engagement therewith, and a separable resilient cover member having a generally planar body extending over said base portion and said instrument, and means for effecting a seal between an exposed surface of said base portion and the inner adjacent surface of said resilient cover member, said cover member being flexible inwardly upon actuation of said instrument without impairing the seals between said cover member and said base portion or between said base portion and said panel, said cover member being removable from said base portion without impairing the seal between said base portion and said panel.

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