United States Patent

[11] 3,586,811

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[21] Appl. No. **826,963**
[22] Filed **May 22, 1969**
[45] Patented **June 22, 1971**

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[54] **MOISTURE SEAL FOR PUSHBUTTON CAPPED ELECTRICAL CARTRIDGES WHICH ARE CLAMPED TO A PANEL**
5 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **200/168**
[51] **Int. Cl.** **H01h 9/04**
[50] **Field of Search** ..... 200/168 G

[56] **References Cited**

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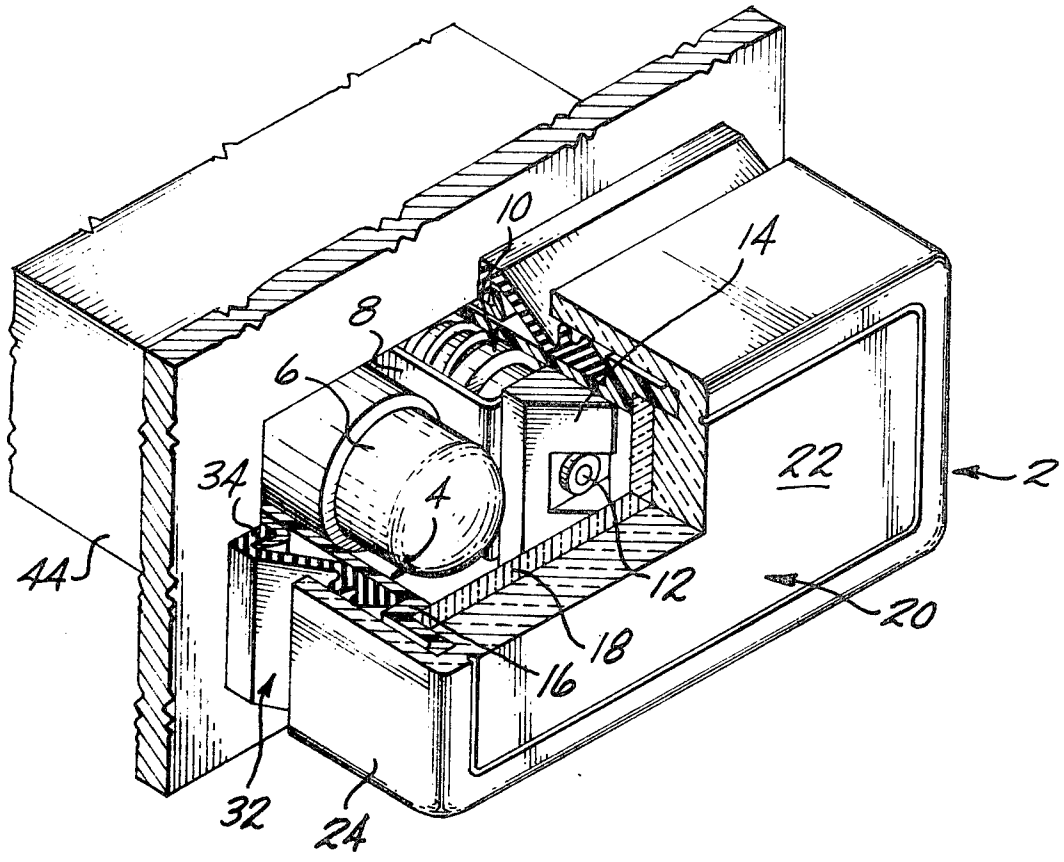
ABSTRACT: A resiliently flexible moisture seal is disclosed for a pushbutton capped electrical cartridge which is clamped to a panel. The seal comprises an elastomeric sleeve which has an inside diameter in one cross-sectional plane thereof that is greater than the width of the end opening in the cartridge; and axially inclined body portions thereof on the opposite sides of the plane, one of which is clamped onto the panel with the cartridge, about the open end thereof, and the other of which enables the seal to flex with respect to the panel, when the cap is peripherally engaged with the seal and reciprocably inserted in the cartridge, through the opening in the sleeve.



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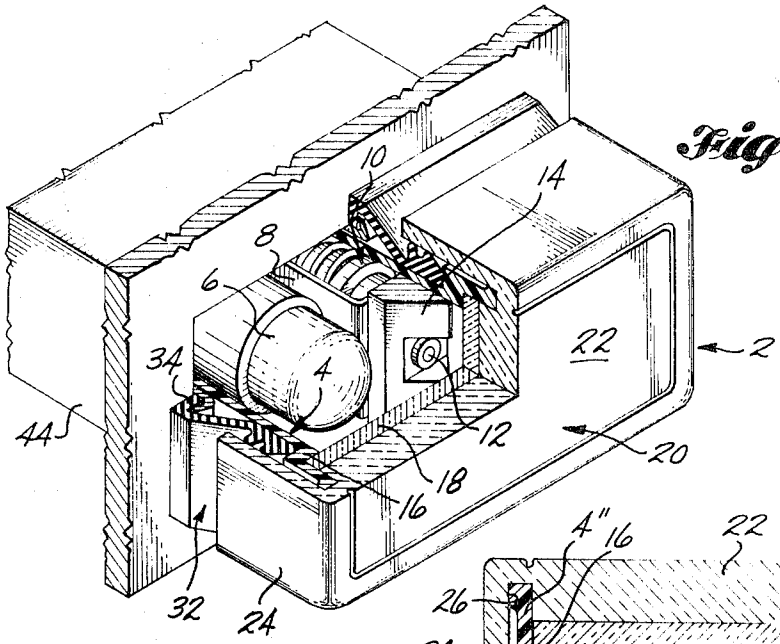


Fig. 1.

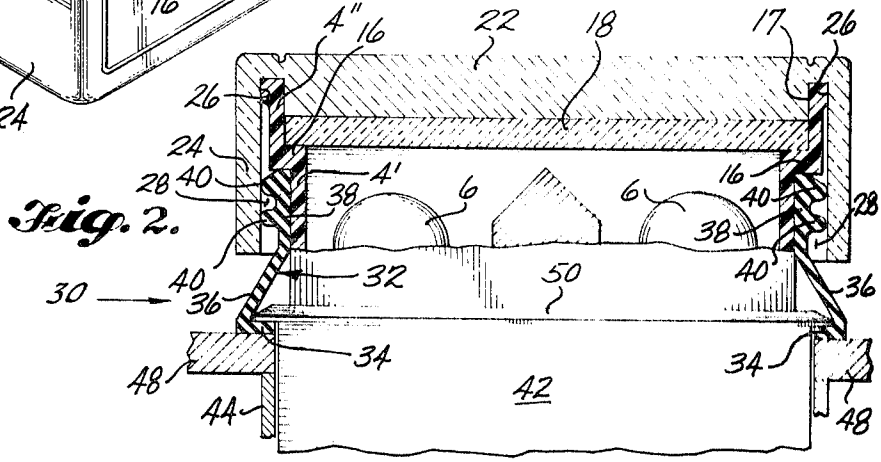


Fig. 2.

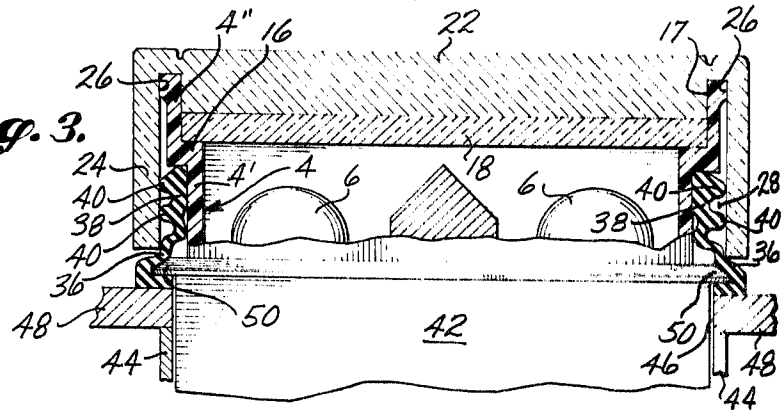
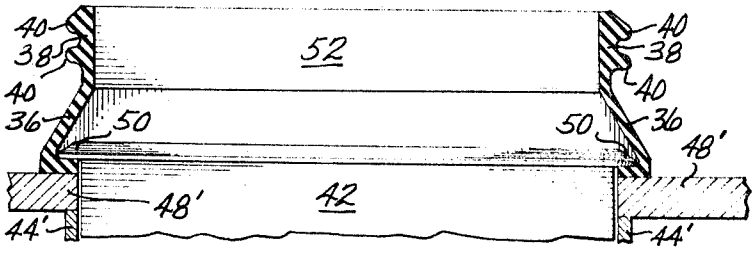


Fig. 3.

Fig. 4.



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MOISTURE SEAL FOR PUSHBUTTON CAPPED ELECTRICAL CARTRIDGES WHICH ARE CLAMPED TO A PANEL

FIELD OF THE INVENTION

This invention relates to sealing devices for electrical cartridges which are mounted in openings on panels; and in particular, to a moisture seal for a pushbutton capped electrical cartridge which is installed in an opening in a panel and clamped to the edge thereof.

BACKGROUND OF THE INVENTION INCLUDING CERTAIN OBJECTS THEREOF

Electrical assemblies such as pushbutton switches are often mounted in small tubelike cartridges on a panel. The cartridges are installed in openings in the panel, and if possible, secured to the panel by clamping them to the edges of the openings. One such cartridge is disclosed in our copending application Ser. No. 826,964 which was filed on even date herewith. As is seen therein, the cartridge has peripheral means such as an out-turned flange on the open end portion thereof for clamping the cartridge to the panel. Moreover, in use the cartridge has a pushbutton cap reciprocably inserted and latched therein, such as is described in another copending application Ser. No. 826,962 which we also filed on even date herewith.

One object of the present invention is to provide a moisture seal for a pushbutton capped electrical cartridge which is clamped to a panel, as in the case of the cartridge described in our above copending applications. Another object is to provide a moisture seal of this nature which is annular in shape and can be clamped onto the panel with the cartridge, about the open end thereof, to peripherally interengage with the cap when it is reciprocably inserted on the cartridge, through the opening in the seal. A further object is to provide an annular seal of this nature which is resiliently flexible so as to follow the pushbutton movement of the cap, when it is employed to operate the electrical assembly in the cartridge. Other objects include the provision of a seal of this nature which is cheap to manufacture and readily assembled with the cartridge and the cap. Still further objects will become apparent from the description of the invention which follows hereafter.

SUMMARY OF THE INVENTION

These objects and advantages are realized by a resiliently flexible moisture seal of our invention which comprises an elastomeric sleeve having an inside diameter in one cross-sectional plane thereof that is greater than the width of the end opening in the cartridge; and axially inclined body portions thereof on the opposite sides of the plane, one of which is clamped onto the panel with the cartridge, about the open end thereof, and the other of which enables the seal to flex with respect to the panel, when the cap is peripherally engaged with the seal and reciprocably inserted in the cartridge through the opening in the sleeve. The first-mentioned body portion of the sleeve takes the form of a relatively inturned flange thereon which can be clamped to the front face of the panel, as for example, by the out-turned flange of the inner sleeve in the telescopically assembled cartridge described in our above application Ser. No. 826,964. The other body portion takes the form of a trapezoidal web which has the flange portion interconnected about the larger diameter end thereof, and an axially extending collar on the smaller diameter end thereof. The collar interengages with the cap, in an axially extending groove disposed about the periphery of the cap; and preferably, there are spaced circumferential beads on the outer peripheral wall of the collar which undergo compression when the sleeve is interengaged in the groove, to effect a moisture tight seal with the cap.

BRIEF DESCRIPTION OF THE DRAWING

These and other features of the invention will be better understood by reference to the accompanying drawing wherein such a sleevelike construction is employed to seal the joint around an illuminated pushbutton cap which is reciprocably inserted in a telescopically assembled cartridge of the type described in our above application Ser. No. 826,964.

In the drawing:

FIG. 1 is a part perspective view of the cap, seal, and cartridge assembly;

FIG. 2 is a part cross-sectional view of the assembly;

FIG. 3 is another part cross-sectional view of the seal assembly, illustrating the flexural capability of the seal when the cap is depressed in use; and

FIG. 4 is a part cross-sectional view of the seal when the cap has been removed from the cartridge.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, it will be seen that the cap 2 comprises a rectangular molded plastic tube section 4 which has an insulative ceramic mounting base (not shown) clamped on the forward or concealed inner end portion thereof. Though the base and the inner end portion of the tube 4 are concealed, a pair of light bulbs 6 can be seen projecting into the hollow rear end portion 4' of the tube from the base. The bulbs 6 are electrically interconnected through the medium of a U-shaped bus bar 8 which is carried on a spring biased latch mechanism 10 employed in releasably latching the cap in the cartridge, as described in our above application Ser. No. 826,962. The latch mechanism is mounted on an elongated cylindrical rod, one end portion 12 of which is "riveted" to a thick crossbeam 14 molded widthwise into the body of the tube within the hollow rear end portion 4' thereof. See FIG. 1.

In addition, the extreme rear end portion of the tube is laterally expanded or flared to form a deeply recessed peripheral shoulder 16 on the inner wall of the tube. The recess 17 of the flared portion 4'' is occupied by a color filter plate 18 which is clamped against the shoulder by a molded plastic cover 20 having a broad, flat rectangularly shaped legend plate 22 at the center thereof, the base of which is sized to frictionally engage in the recess 17. Extending about the plate, and depending therefrom, is a peripheral skirt 24 which is outwardly spaced from the base of the plate so that the flared portion 4'' of the tube can be frictionally engaged in a circumferential groove 26 formed therebetween. The skirt depends to a point well below the shoulder 16 of the tube so that in addition, an axially extending peripheral groove 28 is formed about the waist 4' of the tube. This latter groove 28 enables the cap to interengage with the seal 30 when it is reciprocably inserted in the cartridge. The seal 30 is also rectangular in outline and comprises an elastomeric sleeve 32 which has an inturned flange 34 on the forward or inner end portion thereof. The web 36 of the sleeve is trapezoidal in cross section and is interconnected at its larger diameter end with the flange portion 34. The smaller diameter end has an axially extending rectangular collar 38 thereon which in turn has spaced circumferential beads 40 on the outer peripheral wall thereof.

As mentioned, the seal 30 is employed with a cartridge of the type illustrated in our above copending application Ser. No. 826,964. Such a cartridge includes a pair of telescoping inner and outer metal sleeves 42 and 44, respectively, the inner 42 of which is received in an opening 46 in the panel 48 and has an out-turned flange 50 on the projecting forward end thereof. The edge of the opening is clamped between the flange and the adjacent forward end 44' of the outer sleeve. Thereafter, the cap is slidably inserted in the inner sleeve 42, through the opening 52 in the elastomeric sleeve 32, and latched to the cartridge in such a way that it can be operated in conventional pushbutton fashion.

In order that the seal **30** can be clamped to the face 48' of the panel the elastomeric sleeve **32** has an inside diameter in the plane of the flange **34**, which is greater than the outside diameter of the flange **50** of the outer sleeve **44**. On the other hand, the collar **38** of the seal is sized to slidably interfit with the groove **28** formed within the skirt **24** of the cap, although the beads **40** have sufficient body to undergo compression when the collar works its way into the groove. The trapezoidal web **36** is axially inwardly inclined toward the collar from the flange, and as seen by comparing FIGS. **2** and **3** the inclination of the web enables the seal to collapse or flex when the cap is depressed into the cartridge in operation. Otherwise, due to the resiliency of the sleeve, the seal stands erect in an outwardly projecting disposition on the face of the panel, as seen in FIG. **4** wherein the cap has been removed.

What we claim is:

1. An electrical assembly comprising a panel having an opening therein, a tubelike electrical cartridge installed in the opening of the panel and having an out-turned flange thereon which is disposed opposite the edge of the opening on the front side of the panel, a pushbutton cap inserted in the cartridge from the front side of the panel, to reciprocate on the axis of the cartridge, and having an axially extending groove about the periphery thereof and an axially extending skirt around the groove which is disposed opposite the edge of the opening, and an elastomeric sleeve interposed between the panel and the cap to form a moisture seal for the cap and cartridge assembly, the body of which sleeve has an inturned flange on one end thereof which is clamped between the flange of the cartridge and the front face of the panel, and an axially extending collar on the other end thereof which is compressibly interengaged in the groove of the cap, within the skirt, and a trapezoidal web extending between the ends thereof which is resiliently collapsible along the axis of the cartridge to enable the sleeve to accommodate to the reciprocable motion of the cap.

2. The electrical assembly according to claim 1 wherein there are spaced circumferential beads on the outer peripheral wall of the collar which undergo compression when the sleeve is interengaged in the groove of the cap.

3. The electrical assembly according to claim 1 wherein the aforesaid one end of the sleeve has a greater diameter than the other.

4. The electrical assembly according to claim 1 wherein the outer periphery of the groove in the cap is defined by the skirt.

5. The electrical assembly according to claim 1 wherein the web fits snugly about the flange on the cartridge.