

[54] **RESILIENT OMNIDIRECTIONAL
PUSH-BUTTON FOR AN ELECTRICAL
SWITCH**

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[58] Field of Search 200/159 B

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[57] **ABSTRACT**

An omnidirectional push-button for a switch has a resilient inverted cup member with thin sides and a relatively thick base. The sides become thinner as they approach the top portion of the push-button. A cap is positioned across the recess of the cup member, while a base fixed to a substrate is connected on the bottom portion of the cup member adjacent an electrical circuit.

6 Claims, 2 Drawing Figures

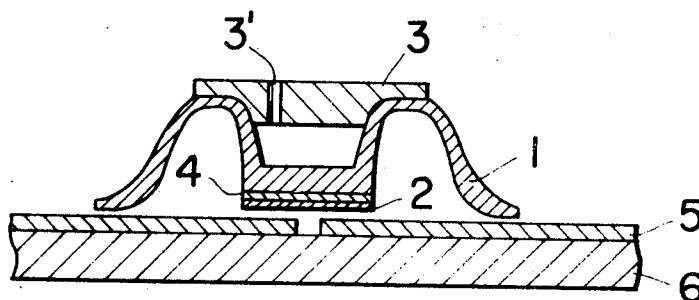


FIG. 1

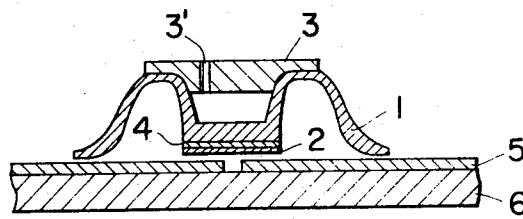
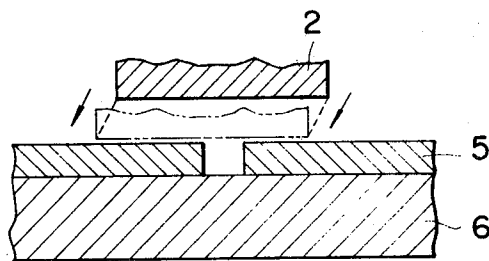


FIG. 2



RESILIENT OMNIDIRECTIONAL PUSH-BUTTON FOR AN ELECTRICAL SWITCH

BACKGROUND OF THE INVENTION

The present invention relates to an omnidirectional push-button for an electrical connection of various components of a circuit, and more particularly to the structure of the omnidirectional push-button used to open or close a printed wire circuit.

DESCRIPTION OF THE PRIOR ART

Generally, push-buttons associated with printed wire circuits have been generally rigid permitting movement only in a single direction and relatively complex and expensive. Even when resilient material has been utilized, the push-button is generally only operative in a single direction.

SUMMARY OF THE INVENTION

The present invention is designed to provide an omnidirectional movement to the push-button so that even if the push-button is depressed in an oblique fashion with respect to the contact, that it will still provide a positive opening or closing of an electrical circuit. The present invention is designed to provide an omnidirectional push-button connected to an electroconductive member capable of providing a positive contact with a printed wire circuit so as to either open or close the circuit even if the push-button is not depressed vertically with respect to the electroconductive member. According to the preferred form of the present invention, there is provided an omnidirectional push-button for a switch which comprises a resilient inverted cup member having a relatively thick base with gradually thinner sides that become thinner in the upper portion of the push-button. The push-button has a recess on the top with a cap disposed over the recess. The bottom portion of the cup carries an electroconductive member, while the base of the cup is fixed to the substrate of the switch.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become more apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a cross-sectional side view of the omnidirectional push-button of the present invention, and

FIG. 2 is a partial cross-sectional view of the electroconductive member and the printed wiring circuit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a resilient member formed from appropriate material having elastic characteristics such as rubber, has a cross-sectional shape approximating a sinusoidal or M-shaped form. The resilient member 1 can be considered an inverted cup shape having a central recess with the sides of the inverted cup being thinner as it extends away from the base portion. The base portion has a relatively bulbular cross-sectional shape and is adapted to be connected or attached by appropriate means to the substrate of the printed wiring circuit. The recess carries a central portion that has a rectangular cross-sectional shape. The recess in the

resilient member 1 is covered by a cap 3 having an opening 3' which provides a conduit to the atmosphere, thus permitting the cup-shaped resilient member to retain fully its resilient characteristics.

A holder 4 is attached to the bottom portion of the central recess and fixes an electroconductive member 2 to the resilient member 1. The resilient member 1 is fixed onto the printed circuit 5 formed on the printing substrate 6 by appropriate connection.

By virtue of the design of the resilient member 1 adequate connection can be made to the printed circuit 5 via the relatively thick bulbular portion of the resilient member 1. The upper thinner walls assure the resiliency to permit omnidirectional movement, while the relatively thicker central recess portion provides an adequate base with which to affix the electroconductive member 2.

As disclosed in FIG. 2, no matter what direction the force is applied to the cap 3, the resilient member 1 permits a relatively vertical movement of the electroconductive member 2 to provide the electrical contact on the printed circuit 5. By virtue of this design, a relatively inexpensive, but versatile, omnidirectional push-button switch is provided.

While the above description discloses the preferred embodiment, it is clear that craftsmen skilled in the art can make minor modifications of the present invention and accordingly, the scope of the present invention should be measured in light of the following claims.

What is claimed is:

1. An omnidirectional push-button for a switch comprising a resilient inverted cup member having an M-shaped cross section including a relatively thick, inner, central base portion, a relatively thick peripheral edge forming an annular outer base portion of bulbular shape and an annular inverted U-shaped wall joining the peripheral edge to said central base portion with the sides of said U-shaped wall being gradually thinner towards the top of the inverted cup, said central base portion and said wall forming a central recessed top portion, and a cap spanning said recess and connecting opposed sides of said annular wall; whereby regardless of where the top of said push-button is pressed and in which direction, the central, inner base portion moves toward a contact plane defined by said peripheral edge with its bottom surface maintained coplanar therewith.

2. An omnidirectional push-button as claimed in claim 1, wherein the cap has a conduit permitting equalization of pressure from the exterior to the interior of the recess.

3. An omnidirectional push-button as claimed in claim 1, wherein the cup is formed of rubber.

4. An omnidirectional push-button as claimed in claim 2 wherein the central base portion defining said recess has a bottom portion which is relatively thick compared to the wall and has a rectangular cross-sectional shape.

5. An omnidirectional push-button as claimed in claim 4 wherein an electrical conductive member spans the bottom portion of said central base portion.

6. An omnidirectional push-button as claimed in claim 5, wherein said switch includes a printed circuit board supporting and connected to the relatively thick peripheral edge of the resilient cup with said electrically conductive member overlying said printed circuit board and normally spaced therefrom.

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