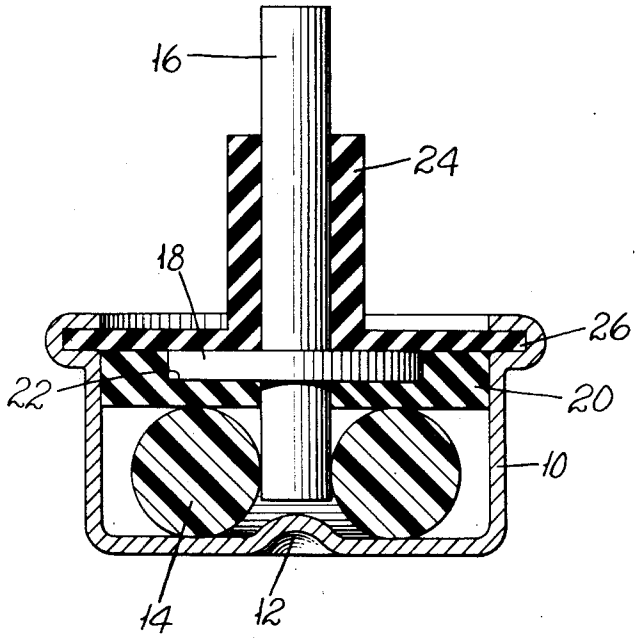
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CONTROLLED LOADING ELECTRIC SWITCH

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CONTROLLED LOADING ELECTRIC SWITCH

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5 Claims. (Cl. 200—86)

This invention relates to an electric switch, and more particularly, to an electric switch which will close when loaded with a predetermined weight.

A need exists for a simply designed electric switch which can be made miniature in size, is relatively waterproof, has good insulating characteristics, and which will close when loaded with a predetermined weight.

Accordingly, the principal object of the invention is to provide an electric switch which has such desirable characteristics.

Broadly stated the switch of the invention comprises a cupped container having a dimple in its bottom and a flanged metallic plunger centrally positioned above the dimple and spaced a predetermined distance therefrom. The plunger is supported above the dimple by a quantity of an electrically non-conductive resilient material which is uniformly disposed around the dimple. When a predetermined weight is applied to the plunger the resilient material will be depressed, the plunger will contact the dimple and the switch will be closed.

The invention will be best understood by reference to the accompanying drawing wherein the single figure is a sectioned front elevational view of the preferred embodiment of the switch of the invention.

Referring to the drawing, a cupped metallic container **10**, having a dimple **12** in its bottom, is provided with an O ring **14**, which resides on the bottom of the container **10**, surrounding the dimple **12**. The O ring **14** is made from a resilient electrically non-conductive material. Centrally positioned above the dimple **12** and spaced therefrom is a flanged metallic plunger **16**. The flange **18** of the plunger **16** resides on a bottom insulating gasket **20**, preferably set in a recess **22**, and the gasket **20** in turn rests on top of the resilient O ring **14**. The switch is sealed at the top by an insulating gasket **24**, preferably by crimping the top of the container **10** over onto a flange **26** provided on the top gasket **24**. The gasket **24** also provides a moisture barrier seal along the cylindrical portion of the plunger **16** and the adjoining portion of the metal container **10**, as well as preventing the metal plunger **16** and flange **18** from shifting from side to side and possibly causing a short circuit between the flange **18** and the can **10**.

The function of the resilient O ring is to provide the physical resistance which must be overcome to close the switch of the invention. Several types of resilient materials are satisfactory for the O ring and the particular selection depends upon the environment in which the switch is to operate. The clearance between the plunger and the container determines the loading required to close the switch when using any given material for the O ring.

For any given clearance and temperature, the pressure required to close the switch varies with the O ring material used. While an O ring is preferred in actual practice, it is not necessary to have the resilient material in the shape of an O ring and any suitably placed mass of a resilient plastic or rubber material is satisfactory.

In the preferred embodiment of the invention, the container and plunger are made of gold-plated stainless steel, the top and bottom insulating gaskets are made of a plastic consisting of a tetrafluoroethylene polymer commercially available under the trademark "Teflon," and the O ring is made of a silicone elastomer.

The advantages of the controlled loading electric switch of the invention may be summarized as follows:

(1) The pressure required to close the switch may be accurately predetermined to any suitable range. The pressure necessary to close the switch is directly related to the particular resilient material employed and to the clearance between the plunger and the metal container.

(2) The loading pressure required to close the switch may be changed anytime after assembly without taking the switch apart. If it is desired to lessen the necessary pressure required, the distance between the dimple and the plunger may be reduced by tapping the dimple with a rounded tool while holding the switch in a jig. If it is desired to increase the necessary pressure, the switch is put into a jig and the plunger is tapped so as to flatten the dimple slightly.

(3) The switch is capable of operating over wide temperature ranges; the resilient material determining the maximum-minimum value, for example —40° F. to 160° F. when a silicone elastomer is used.

(4) The switch is suitable for use in circuits which require abnormally high resistances when the contacts are open. Resistance values of the order of 1×10^{12} ohms may be maintained in normal environmental conditions when the top and bottom insulating gaskets are made of "Teflon." Open circuit resistance value is maintained at 1×10^{10} ohms under high temperature-high humidity conditions, for example, 160° F. and 95 percent relative humidity.

(5) The entire switch together with lead wires may be completely encapsulated in an elastomeric compound, thus enabling it to function even though completely submerged in water.

We claim:

1. An electric switch which closes when loaded with a predetermined weight and which comprises a cupped container having a dimple in its bottom, a flanged metallic plunger centrally positioned above said dimple and spaced a predetermined distance therefrom, said flange of said plunger residing on an electrically insulating bottom gasket, a quantity of an electrically non-conductive resilient material interposed between said bottom insulating gasket and the bottom of said container and uniformly disposed around said dimple on which said bottom insulating gasket resides, and an electrically insulating top gasket residing on top of said flanged plunger which seals the top of said cupped container.

2. An electric switch which closes when loaded with a predetermined weight and which comprises a cupped container having a dimple in its bottom, a flanged metallic plunger centrally positioned above said dimple and spaced a predetermined distance therefrom, said flange of said plunger residing in a recess in an electrically insulating

bottom gasket, a quantity of an electrically non-conductive resilient material interposed between said bottom insulating gasket and the bottom of said container and uniformly disposed around said dimple on which said bottom insulating gasket resides, and a flanged electrically insulating top gasket residing on top of said flanged plunger onto which the top of said container is crimped.

3. The electric switch of claim 2 wherein said resilient material is in the form of an O ring which surrounds said dimple.

4. The electric switch of claim 3 wherein said container and said plunger are made of gold plated stainless steel, said top and bottom insulating gaskets are made of a plastic consisting of a tetrafluorethylene polymer and said O ring is made of a silicone elastomer.

5. The electric switch of claim 2 wherein said switch is completely encapsulated in an elastomeric compound.

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