Jan. 28, 1941. L. B. BUTTERFIELD 2,229,956

ELECTRICAL SWITCH

Filed Jan. 8, 1938

FIG. 1.

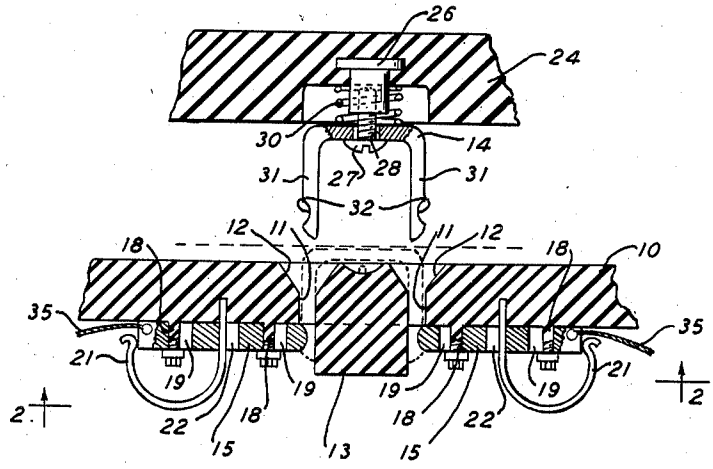


FIG. 2.

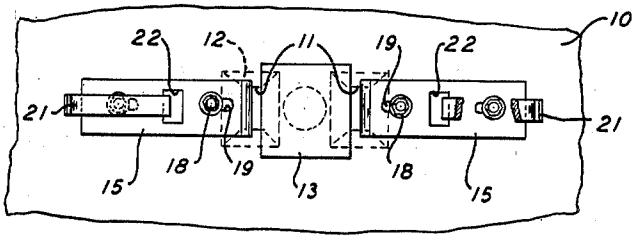
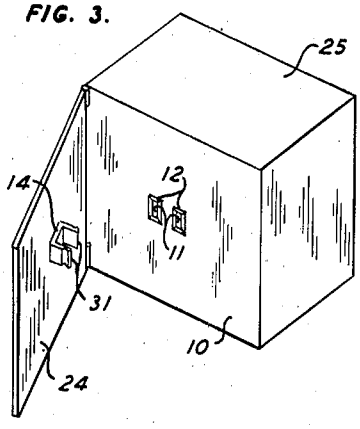


FIG. 3.



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ELECTRICAL SWITCH

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7 Claims. (Cl. 200—162)

This invention relates to an electrical switch and more particularly to a safety switch of the type associated with a cover or the like.

The primary purpose of safety switches of this type is to open a circuit or circuits in which the switch is electrically connected whenever a cover or like member, carrying a contact engaging element, is removed from a housing for the remaining portion of the switch, but it is important that the contacts be conditioned against possible electrical association when the cover is removed and that accurate and positive engagement and disengagement of the engaging element with the contacts be assured.

The object of the invention is to provide an efficient and accurate electrical switch.

With this and other objects in view, one embodiment of the invention comprises a substantially U-shaped element movably carried by a cover member and positioned to have its arms project through apertures in a panel to engage contacts normally urged toward each other but limited in their movement to avoid closing the apertures and separated from each other by an insulating means.

These and other objects will be apparent from the following detailed description when taken in conjunction with the accompanying drawing, wherein

Fig. 1 is a fragmentary vertical sectional view of a safety switch illustrating the invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1; and

Fig. 3 is one form of housing and cover therefor illustrating the invention.

Referring now to the drawing, numeral 10 designates a member formed of insulating material with apertures 11 disposed therein at spaced positions and having their upper portions bevelled or flared outwardly as at 12. Integral with the member 10 and having side walls in alignment with the innermost walls of the aperture 11 is a projection 13 serving as a guide and support for a U-shaped switch member 14 and to separate contact members 15.

The contact members 15 are rectangular in general contour, their upper flat walls in the present instance being slidably disposed adjacent the under surface of the insulating member 10 where they are supported by lugs 18 disposed in elongated apertures 19 of the contact members.

In the present embodiment of the invention the lugs 18 are shown integral with the insulating member 10 but if desired these lugs may be separate elements secured to the member in any desired manner. The contact members 15 are urged toward each other to position their engaging ends adjacent the apertures 11, as shown in Fig. 1, by springs 21, each having one of its ends embedded in or secured in any suitable manner to the insulating member 10 extending downwardly through an aperture 22 in its respective contact member and bent arcuately so that its upper end forcibly engages the outer end of its contact member.

An element 24, which may be a cover for a housing 25 (Fig. 3) in which the previously described switch structure is disposed, is provided with a suitable means for movably supporting the switch member 14 so that the latter may automatically align itself with the apertures 11 when moved into or out of registration therewith during movement of the cover element. In the present instance the supporting means for the switch member 14 comprises an internally threaded element 26 embedded in or fixed to the cover element to receive a screw 27 projecting through an aperture 28 in the switch member. A compression spring 30 disposed concentrically with the threaded element 26 between the cover element 24 and the switch member 14 normally holds the switch member so that its projecting arms 31 are perpendicular to the cover element. If desired, the switch member 14 may be resiliently supported by the spring, this being accomplished by fixing one end of the spring to the switch member, the other to the cover element 25. The arms 31 are notched at 32 to receive the arcuate ends of the contact members 15 tending to form a locking relation between the contact members and their respective arms when the cover element 24 is closed.

The contact members 15 are electrically connected to conductors 35 of any suitable circuit or circuits (not shown) which are desired to be opened when the cover element 24 is moved into open position.

When the cover element 24 is closed, that is, disposed adjacent the member 10, the switch member 14 is in the dotted line position, Fig. 1, completing an electrical connection between the contact members 15 to complete the circuit or circuits including the conductors 35. When in this position the springs 21 constantly urge the contact members toward each other to assure a positive electrical connection with the switch member 14 and tend to hold the switch member against movement. The force of each of springs 21 is carried through to the projection 13 of the member 10 which supports the arms 31 against

movement toward each other. Movement of the cover element 24 away from the member 10 will move the switch member 14 to free its arms 31 from their respective contacts, thus opening the circuit. The cover element 24 may be pivotally mounted, in which case it would not be moved in a truly vertical path but in an arcuate path. However, during such movement of the cover member 11 the switch member 14 may move in a plane perpendicular to the member 10, by the aid of its connecting means with the cover element, until the arms 31 are moved free of the apertures 11. The universal supporting of such member 14 upon the cover element 24 is also important in allowing the arms 31 to move in a plane perpendicular to the member 10 as they enter the apertures 11, although the movement of the element 24 may be arcuate or irregular, so that there will be no wedging of the arms in the apertures to cause wear and other damage to the associated parts and so that they will engage the contact members simultaneously.

The embodiment of the invention herein disclosed is illustrative only and may be widely modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. In an electrical switch, an insulating member having spaced apertures therein, a pair of contacts movable endwise toward the apertures, means for limiting the movement of the contacts, and a switch element having projections movable through the apertures into electrical engagement with the contacts.

2. In an electrical switch, an insulating member having spaced apertures therein, a pair of contacts movable endwise toward the apertures, means for limiting the movement of the contacts to normally position an end of each contact adjacent its aperture, and a switch element having projections movable through the apertures into electrical engagement with the ends of the contacts.

3. In an electrical switch, an insulating member having spaced apertures and a projection between the apertures, electrical contacts separated by and movable in a common plane toward the projection, means to urge the contacts toward each other, and a switch member having projecting arms movable through the apertures to engage and electrically connect the contacts, the walls of the projection serving to guide the arms into and out of engaging position and support the arms in the said plane of the contacts against movement toward each other by the force of the urging means.

4. In an electrical switch, an insulating member having apertures therein and a spacing portion disposed therebetween, rigid electrical contacts movably disposed in a common plane adjacent the apertures, a switch member having projections movable through the apertures to electrically connect the contacts, and means to urge the contacts to engage the projections and to cause the contacts to normally hold the projections against movement and in engagement with the spacing portion in the said plane.

5. In an electric switch, an insulating member having spaced walls, electrical contacts separated by the member and movable endwise toward the respective said walls thereof, means to move the contacts, and a switch member having projections slidable on the said walls to positions in engagement with the adjacent ends of the contacts and held against bending by the walls.

6. In an electric switch, an insulating member having spaced walls, electrical contacts separated by the member disposed in a plane at right angles to and movable endwise toward the respective said walls thereof, means to move the contacts, and a switch member having projections with recesses therein slidable relative to the said walls to positions to receive in the recesses the adjacent ends of the contacts to electrically interconnect the contacts.

7. In an electric switch, an insulating member having spaced walls, electrical contacts separated by the member and movable endwise toward the respective said walls thereof, means to move the contacts, and a switch member having projections with recesses therein slidable relative to the said walls to positions to receive in the recesses the adjacent ends of the contacts to interlock therewith and electrically interconnect the contacts.

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