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PROTECTIVE SWITCH ASSEMBLY

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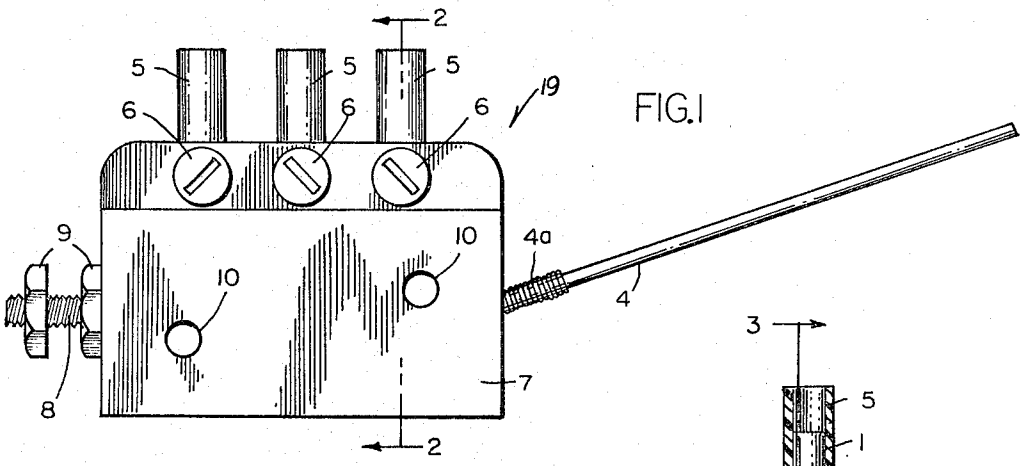


FIG. 1

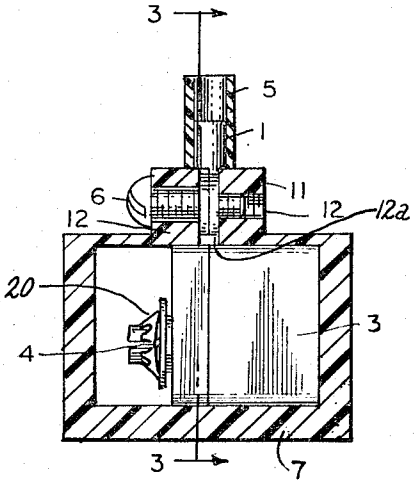


FIG. 2

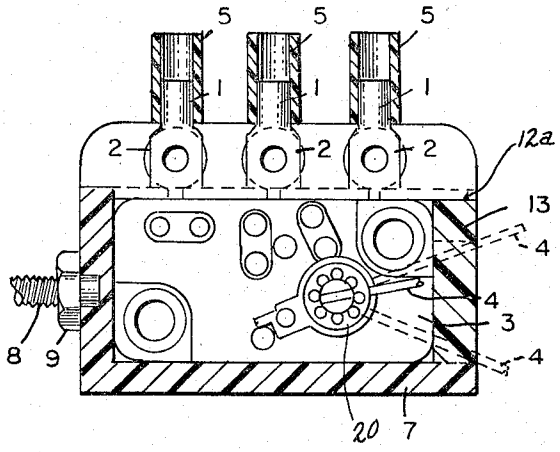


FIG. 3

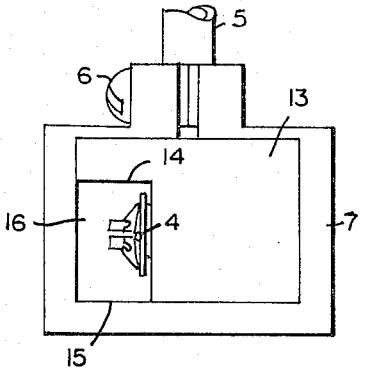


FIG. 4

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PROTECTIVE SWITCH ASSEMBLY

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The present invention relates to switch housings and more particularly to novel protective casings for miniature electric switches and the like which housings substantially prevent accidental damage or breakage in normal use.

As is well known in the art, miniature switches such as microswitches are employed in a variety of electrical systems for making or breaking contact or altering the connections of circuits. These tiny switches are quite delicate. They normally comprise an actuating lever which is pivoted to the switch for movement along an arcuate path. Such levers are easily prone to breakage particularly at their pivot point with the switch when excessive pressure is inadvertently applied. In addition to the problem of breakage, the relatively small size and fragile nature of miniature switches sometimes makes securing of these switches to chassis, boards, motors or other objects awkward which in turn requires that these objects have some special mounting means for securing each particular configuration switch employed.

An important object of this invention is to provide a protective casing for miniature switches and the like which acts to prevent accidental damage or breakage of the switches.

Another object of this invention is to provide a protective casing in accordance with the preceding object which is relatively inexpensive and facilitates mounting and support of the miniature switches on objects with which they are to be associated.

According to the invention a switch assembly comprises a miniature switch and a protective casing thereover. The casing defines a space or chamber within which the miniature switch is mounted with at least one opening to the switch from the outside for attachment of an electrical lead. The miniature switch carries an elongated actuating handle or lever for movement over an arcuate path to operate the switch from outside of the casing. The handle passes from the space through an opening defined by the casing with the opening defining casing edges positioned along the arcuate path and preventing overtravel of the handle at extremes of movement thereof. Thus, even if excessive pressure is exerted on the handle, a stop is provided by the edges to prevent overstressing of the miniature switch.

These and other objects, features and advantages of the invention will be better understood with reference to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a side elevation of a preferred embodiment of the novel protective casing of this invention;

FIG. 2 is a partial sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a partial longitudinal view through the body of the switch casing taken along line 3—3 of FIG. 2; and

FIG. 4 is an end view showing an opening for an extending actuator lever with its limiting stops.

With reference now to the drawings, a switch assembly is shown at **19** comprising a conventional miniature switch such as a microswitch **3** and a casing **7**. In the preferred embodiment the miniature switch **3** has a generally rectangular configuration with a lever mounting means such as ring **20** which is pivotable, along with its attached switch shaft, in its plane over an arcuate path with an upper position and a lower position as shown in FIG. 3 to actuate and deactuate portions of the switch.

The ring **20** can have two or more actuating positions between the dotted outlines shown in FIG. 3. The particular configuration of the switch may vary as is conventional and the casing can be suitably modified in configuration to conform generally to the outer shape of the switch.

The switch of the preferred embodiment has three contacts **2** extending upwardly therefrom to which are mounted conventional contacting lugs **1**. In the preferred embodiment the lugs **1** have a lower circular portion which is joined to switch contacts **2** by means of a screw such as **6** as will be further described.

The casing or housing **7** is preferably composed of tough, resilient plastic such as polyethylene or other insulating material and provides shock and abrasion resistance to the switch. Preferably the casing or housing **7** has a generally rectangular configuration defining a space or chamber within which the switch **3** is snugly received on at least three sides thereof.

Preferably the top wall of the casing **7** defines an elongated slot **12***a* on either side of which extend integral upwardly extending flanges **12**. The flanges **12** provide means for mounting the lugs **1** to the contacts **2** and additionally act to prevent unwanted movement of the switch with respect to the casing. Screws **6** are threadably received in bores provided in the flanges and lock the lugs **1** to the contacts **2**. The lugs **1** are surrounded by plastic sleeves **5** which provide additional insulation. The particular lugs or means used for providing connection to electrical leads may vary considerably. In the preferred embodiment shown, the screws **6** additionally function, along with the flanges **12** which preferably snugly receive the lugs and contacts, to prevent movement of the switch **3** within the space provided by the walls of the casing **7**.

Preferably the casing **7** is molded as an integral substantially rigid unit with one end as shown in FIG. 4 opened to allow for sliding of the switch within the casing. This opening is closed by a cover piece **13** which is preferably adhered to the casing **7** after assembly of the switch within the casing by suitable adhesives. Alternately, the cover **13** can be snapped fit to the casing **7** or otherwise secured by conventional means to allow for withdrawal of the switch when desired.

The cover **13** is preferably generally rectangular having one corner thereof cut away as at **16**. The opening **16** is in registration with an actuating means of the switch comprising the ring **20** permitting the lever or actuating handle **4** to be fixed to the ring **20** and extend outwardly of the casing **7** as best shown in FIGS. 1 and 3. Edge **14** of the cover **13** and edge portion **15** of the bottom wall of the casing **7** provide stops preventing overtravel of the lever **4** in normal usage. Thus, as best shown in FIG. 3, the lever **4** is preventing from upward movement beyond a preselected point and downward movement beyond a second preselected point by the edges **14** and **15** respectively. Preferably the lever **4** is a flexible arm which may be composed of a plastic rod and has an encircling tightly coiled spring **4***a* extending from a portion just outside the casing into the ring **20**. The coiled spring **4***a* stiffens the lever at the point where the arm contacts the stops permitting overtravel of the flexible portion of the lever **4** when excessive forces are applied, yet limiting flexing of the lever towards the ring **20** from its point of attachment to a point just outside the casing.

The provision of stops such as **14** and **15** is an important feature of this invention. It should be understood that these stops can be provided by casings of other configurations so long as they are positioned to prevent unwanted overtravel of the lever.

Preferably holes are provided for attachment of a mounting means to the switch assembly **19** of this inven-

tion. In the preferred embodiment a mounting means is employed on a side wall as shown in FIG. 3 and comprises a threaded spindle 8 force fit within a bore provided in the casing wall. A base nut 9 is threaded onto the spindle 8 and a second nut 9 is then threaded on the spindle. Mounting of the assembly can be performed merely by removing one of the nuts 9 passing the spindle 8 through a suitable aperture in a chassis or mounting board and locking the removed nut 9 with the board between the two nuts as is known in the art. Such mounting means can be provided on any of the walls of the casing as desired.

Bores 10 can be provided and extend through the casing in registration with similar holes in switch 3. Thus in some cases mounting rods can be used passing entirely through the switch assembly 19 and mounted on a suitable support.

While one specific embodiment of this invention has been shown and described, it should be understood that many variations thereof are possible. Therefore this invention is to be limited only by the spirit and scope of the appended claims.

What is claimed is:

1. A switch assembly comprising a miniature switch and a protective casing thereover,

said casing defining a space within which said miniature switch is mounted,

said casing further defining at least one opening through which an electric lead may pass for attachment to said switch,

said switch having an actuating means and an elongated actuating handle connected thereto for movement over an arcuate path for pivoting about a point to operate said switch actuating means from outside of said casing,

said handle passing from said space through an opening defined by said casing and having a flexible portion outside of said casing, said handle opening defining stop means positioned along said handle path to prevent overtravel of the handle at said point and over travel of said actuating means at extremes of movement of said flexible portion.

2. A switch assembly in accordance with claim 1 wherein said handle is stiffened at a portion thereof which passes through said handle opening.

3. A protective device including a miniature switch having a plurality of contacts and an actuator lever mounted for movement along an arcuate path and extending from the body of said miniature switch, said protective device comprising a hollow casing for enclosing the body of said miniature switch,

the inner dimensions of said casing confining tightly and thereby substantially excluding movement of said miniature switch when positioned therewithin,

said casing defining an opening through which said actuator lever extends and defining edges for limiting travel of said arm along said arcuate path,

a plurality of lead wire connecting lugs extending into said casing for securing a lead wire in electrical contact with at least one of said contacts of said miniature switch.

4. In a switch assembly comprising a miniature switch and a protective casing thereover, the improvement comprising said casing defining a space within which said miniature switch is snugly mounted, and further defining at least one slot opening to said space for attachment of an electrical lead to said switch,

said switch carrying an elongated actuating handle for movement over an arcuate path to operate said switch from outside of said casing,

said handle passing from said space through a handle opening defined by said space with said opening defining casing edges positioned along said path to prevent overtravel of said handle at extremes of movement thereof.

5. The improvement of claim 4 wherein said casing comprises a cover means covering said space.

6. The improvement of claim 5 wherein said cover means defines one of said edges.

7. In a switch assembly comprising a miniature switch and a protective casing thereover, the improvement comprising said casing defining a space within which said miniature switch is snugly mounted,

and further having upstanding flanges defining a slot therebetween opening to said space for attachment of an electrical lead to said switch,

said switch having contact means positioned in said slot between said flanges,

said switch carrying an elongated actuating handle for movement over an arcuate path to operate said switch from outside of said casing,

said handle passing from said space through a handle opening defined by said space, and means positioned along said path to prevent overtravel of said handle at extremes of movement thereof.

8. The improvement of claim 7 wherein said casing carries means for mounting said switch assembly.

9. A switch assembly in accordance with claim 1 wherein said casing provides upstanding flanges defining a slot therebetween,

and contact means for said switch lying between said flanges.

References Cited by the Examiner

UNITED STATES PATENTS

2,717,941	9/1955	Steiner	200—168
3,098,905	7/1963	Anderson	200—168

References Cited by the Applicant

UNITED STATES PATENTS

2,814,704	11/1957	Bald.
2,817,736	12/1957	Bastian.
2,931,878	4/1960	Eisenberg.
3,060,296	10/1962	Ryab.
3,085,140	4/1963	Roe.
3,154,659	10/1964	Flanagan.

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