May 5, 1942. G. SMILEY 2,281,808

SWITCH

Filed Feb. 4, 1941

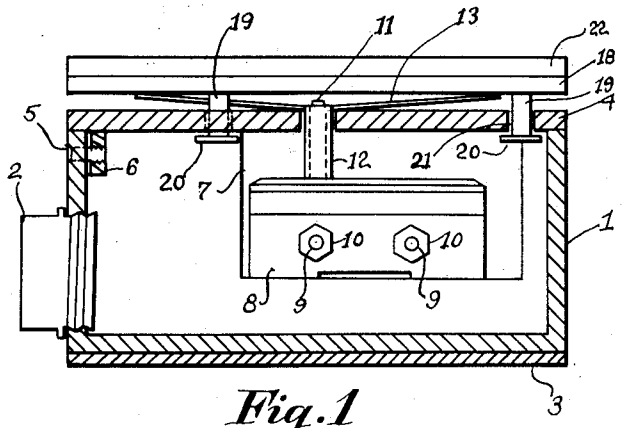


Fig. 1

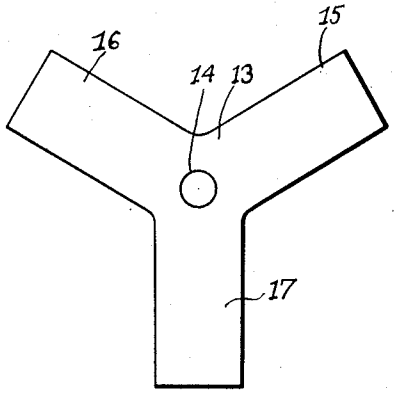


Fig. 2

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SWITCH

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3 Claims. (Cl. 200—153)

The present invention relates to an electric switch and more particularly to a switch that may be operated by the elbow, knee, foot, or by bodily contact or the like. The invention more particularly is preferably applied to the operation of electric switches in which the motion of the contact elements are extremely small, of the order of several thousandths of an inch and in which the mechanism operated by the foot, elbow or the like is also comparatively small.

The advantage of the present invention resides in the constructional features of the article whereby small switches which are often called microswitches may be operated simply, positively and by means which if directly applied to the switch unit itself may be of such a nature that these units would not stand up.

The present invention will be more fully understood from the description in the specification below when taken in connection with the drawing, in which:

Figure 1 shows a sectional elevation of the device, and,

Figure 2 shows a plan view of a detail shown in Figure 1.

In Figure 1, 1 represents a casing which may be of metal or durable fiber material of rugged construction and comparatively substantial weight. 2 is an inlet for the electric cables, and 3 represents a friction plate so that the casing may remain fixed even though it is not screwed down to the base member. 4 is a top plate which may be held down to the sides of the casing 1 by means of one or more screws 5 which pass through the sides of the casing into a dependent flange 6 from the top cover 4. A bracket or wall support 7 also projects downward from the cover 4 and this support 7 holds the microswitch 8 by means of the studs and bolts 9 and 10 respectively. The operating pin 11 of the microswitch projects through a shell or tube 12 from the unit 8 which shell or tube extends upward slightly beyond the top surface of the cover 4. A spring 13 shown in plan in Figure 2 is symmetrically centered about the shell 12 which projects through a hole 14 in the center of the spring which is a flat leaf spring with three projecting leaves 15, 16 and 17. These projecting leaves are bent upwards and come in contact with the bottom of the operating plate 18, which plate the spring 18 freely supports. The plate 18 is held in position so that it cannot be removed from the cover 4 by means of the studs 19 which have large heads 20 abutting the inside of the cover 4. The studs 19 are preferably symmetrically placed with respect to the center tube 12. These studs 19 work up and down in holes 21 which are sufficiently larger than the studs 19 to permit free motion of the studs, at the same time maintaining the motion of the plate up and down, but not parallel particularly to the cover 4. The plate 18 may have a cover surface 22 of rubber or other suitable material to provide easy contact and insure against friction in the operation of the switch.

The drawing shown in Figure 1 may be considered approximately full size, the spacing between the operating plate 18 and the cover plate 4 being approximately one eighth of an inch.

The switch as above described may be operated by pressure at any point on the top of the operating plate on the member 22. The motion of the cover plate under these conditions is such that even when the plate is forced down at the edge, the center of the plate over the pin 11 will force the pin downward the necessary distance for operation.

It will be noticed in the construction, the shell 12 projects beyond the surface of the cover 4 of the casing approximately no more than the thickness of the spring 13, and that the pin 11 within the shell projects a short distance beyond the shell so that the distance between the top of the pin and the operating cover or plate is considerably less than the distance between the cover plate 4 and the plate 18.

Further it should be noted that the pin 11 can be driven down flush with the top of the shell or spring because of an overtravel mechanism contained within these microswitches so that the pressure or weight on the plate 18 will be borne by the shell 12.

As indicated in Figure 1 these distances are in the ratio of approximately 2 to 1. The pin 11 is operated by a very slight motion and this motion is obtainable by pressing the top cover at any point on its surface in the same amount.

Having now described my invention, I claim:

1. In combination a comparatively heavy casing, a switch having an operating pin operative by a longitudinal travel in the direction of the pin of the order of a small fraction of an inch, means suspending said switch within said casing in a position with the operating pin projecting from the top of the casing, a protective collar surrounding the operating pin, a leaf spring having more than two branches extending from the center hub, said center hub having a perforation through which said projecting collar extends, said spring at its hub resting against said casing, a

plate positioned in parallel relationship over the top of the casing in juxtaposition with said operating pin and supported by the free ends of said spring and means directing travel of said plate within limits to and from the direction of the top of the casing.

2. In combination a comparatively heavy casing, a switch having an operating pin operative by a longitudinal travel in the direction of the pin of the order of a small fraction of an inch, means suspending said switch within said casing in a position with the operating pin projecting from the top of the casing, a protective collar surrounding the operating pin, a leaf spring having more than two branches extending from the center hub, said center hub having a perforation through which said projecting collar extends, said spring at its hub resting against said casing, a plate positioned in parallel relationship over the top of the casing in juxtaposition with said operating pin and supported by the free ends of said spring and a plurality of studs extending from the plate through perforations in the top of the casing, said perforations being larger than said studs to permit comparatively free motion of the studs through said perforations, said studs having enlarged heads at the inside of said casing.

3. In combination a comparatively heavy casing, a switch having an operating pin operative by a longitudinal travel in the direction of the pin of the order of a small fraction of an inch, means suspending said switch within said casing in a position with the operating pin projecting through the top of the casing, a leaf spring having more than two branches and having a central hub with a perforation located therein, means centering said spring with the perforation located over said pin, said spring at its hub resting against said casing, a plate positioned in parallel relationship over the top of the casing in juxtaposition with said operating pin and supported by the free ends of the spring and means directing the travel of said plate within limits to and from the direction of the top of the casing.

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