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DOUBLE ACTING SWITCH

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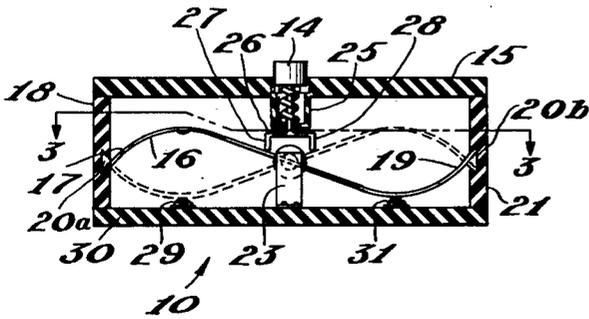


Fig 2

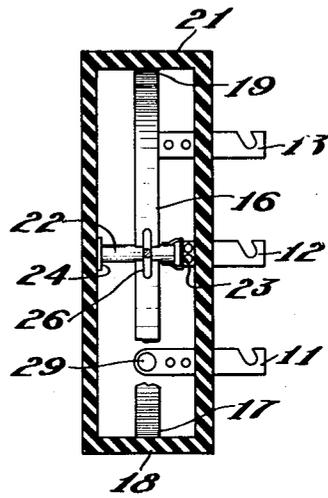


Fig 3

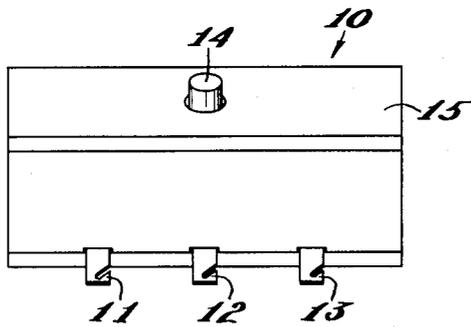


Fig 1

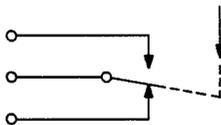


Fig 4

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DOUBLE ACTING SWITCH

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3 Claims. (Cl. 200—67)

This invention relates in general to switches, and in particular to a double-acting switch.

It is an object of this invention to provide a double-acting single pole double-throw switch.

Another object of this invention is to provide an improved switch which successively moves from a first to a second position and returns upon successive motion of an actuating button.

A feature of this invention is found in the provision for a container wherein a generally S-shaped spring is mounted with the center pivoted and an actuating Y-shaped push button movable transversely of said spring.

Further features, objects and advantages of the invention will become apparent from the following description and claims, when read in view of the drawings, in which:

Figure 1 is an isometric view of this invention,

Figure 2 is a sectional view of the invention,

Figure 3 is a sectional view taken on line 3—3 of Figure 2, and

Figure 4 illustrates the electrical equivalent of the switch.

Figure 1 illustrates a container member, designated generally as 10, which has three contacts 11, 12 and 13, respectively, extending therefrom and a push button 14 extending through the top cover 15.

As best shown in the sectional view of Figure 2, mounted within the container member 10, is an S-shaped spring member 16 which has its ends 17 and 19 mounted in slots 20a and 20b formed in the end walls 18 and 21. A pivot pin 22 is mounted in the center of the container 10 and is attached to the flexible member 16 at its center.

A pair of brackets 23 and 24 support the pivot pin 22.

A downwardly extending guide 25 is attached to the top 15 of the container 10 and the push button 14 is received therein. A generally bifurcated yoke 26 is attached to the push button 14 and extends into the confines of the container 10. The legs 27 and 28, respectively, of the yoke 26 are alternately engageable with the spring 16.

A button contact 29 is mounted in the end wall 30 of the container member and is engageable with one side of the spring 16. A second button contact 31 is mounted in the end wall 30 and is engageable with the other side of the spring member 16.

In operation when the push button 14 is depressed, the leg 27 or 28 which is in contact with the spring 16 pushes the particular side down so that it goes from a first to a second stable position. The first stable position is shown in solid line in Figure 2 and the other stable condition is shown in dotted line.

Let it be assumed that the switch is initially in the position shown in solid lines in Figure 2 and that it is required to reposition spring member 16 to the reverse S-shaped position shown in dotted lines.

In the first instance, S-shaped member 16 is formed

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with a high curved portion on the left side in Figure 2 and a low curved portion on the right side.

If yoke 26 is momentarily depressed, finger 27 engages the high side of spring member 16 and depresses it until the high portion adjacent the center is bent oppositely from the remainder of the high portion.

After the high portion is indented sufficiently and before the low portion on the right is engaged by the other finger 28, a wave action occurs along the length of spring member 16 to reverse its position to that shown in dotted lines in Figure 2.

The reversal of member 16 is accompanied by a change of position of its ends. End 17, which was previously at the lower edge of notch 20a, is now at the upper edge; while end 19, which was previously at the upper edge of notch 20b, is now at the lower edge. Hence, when spring 16 was activated, its ends 17 and 19 slide to the opposite edges of their notches.

When considered in an over-all manner, yoke 26 is actuated perpendicularly to spring 16. But this is not the case when considered during an instant of operation. For example, in the solid representation of member 16 in Figure 2, a straight line drawn from end 17 to end 19 will not be perpendicular to the direction of movement of yoke 26 but will be slightly oblique. Similarly, in the dotted representation of member 16 in Figure 2, a line drawn between the ends of spring 16 will not be perpendicular to the movement of yoke 26 but will be disposed obliquely and oppositely from the first drawn line. As indicated above, it is only the over-all average position of the lines which will be perpendicular to the movement of yoke 26.

Consequently, the movement of ends 17 and 19 in notches 20a and 20b shifts the point of unbalance for spring member 16 so that it lends itself to a condition of instability after a short amount of downward movement by the equal length fingers of yoke 26. The condition of instability is favorable to the yoke finger which engages the high side of member 16. In one sense, yoke fingers 27 and 28 do not appear with equal length to spring member 16 because before actuation the line between the yoke ends is not perpendicular to the movement of the fingers 27 and 28. Hence, each finger is more effective than the other, depending on the initial position of spring member 16.

Once the button 14 is depressed, the switch remains in that position until the button is released and pressed again. When this occurs the side opposite the first side will be engaged by the yoke 26 and the switch will move to the second stable condition.

It is a trigger switch similar in some respects to an electronic trigger circuit.

Figure 4 illustrates the electrical equivalent of the switch.

It is seen that this switch provides a single pole double-throw switch.

Although the invention has been described with respect to a particular embodiment thereof, it is not to be so limited as changes and modifications may be made therein which are within the full intended scope of the invention as defined by the appended claims.

I claim:

1. A double-acting switch comprising a container member, a pivoting bracket mounted within said container member, a flexible conducting member of spring material having a length greater than said container and mounted within said container and pivotally and slidably supported near its center by said bracket, said flexible conducting member formed in a reversible S-shape with an upward side and a downward side while in a steady-state position, slots formed in the ends of said container and receiving the ends of said flexible member,

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at least one of said slots formed with a smooth surface substantially longer than the thickness of said flexible member for relative sliding movement, a bifurcated yoke slideably supported by said container member wherein its sliding direction is generally transverse to said flexible member, said yoke having a pair of legs extending symmetrically on opposite sides of said bracket, said yoke being spring biased away from said flexible conducting member, one of said yoke legs capable of engaging the upward side of said flexible member when said yoke is momentarily depressed, and electrical contacts mounted on opposite sides of said container and engageable with opposite sides of said flexible member.

2. A double-acting switch comprising a container member, opposite sides of said container member formed internally with rectangular notches, a spring member formed of flat material and having opposite ends received in said rectangular notches, the ends of said spring member slideable in said notches in a direction generally transverse to the mean plane of said spring member, said spring member longer than the distance between said notches and formed generally in an S-shape, means for slideably and pivotally supporting the center portion of said spring member, a bifurcated member supported by said container and slideable in a direction transverse to the mean plane of said spring member, the ends of said bifurcated member extended respectively toward opposite sides of said spring member, said bifurcated member spring biased with its ends normally out of engagement with said spring member, a respective end of said bifurcated member engaging one side of said spring member when said bifurcated member is depressed, the sides of said spring member reversed in position after actuation by a respective end of said bifurcated member,

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and electrical contacts disposed on opposite sides of said spring member and container for successive engagement when said bifurcated member is actuated.

3. An actuating member for a switch having a container comprising a spring member formed of flat and resilient material, said container formed internally on one side with a rectangular notch greater than the width of said spring member and several times thicker, the opposite internal wall of said container formed with a second notch, opposite ends of the spring member received respectively in said notches, said spring member being longer than the distance between said notches and held generally in an S-shape with upward and downward sides, means secured to said container supporting the center portion of said spring member in a slideable and pivotal manner, a bifurcated member having oppositely extending legs and slideably supported by said container transverse to the mean plane of said spring member, one leg of said bifurcated member engageable with the upward side of said spring member when said bifurcated member is momentarily depressed, whereby the S-shaped spring member reverses its upward and downward sides after the momentary engagement with said bifurcated member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,113,227	Bokeeno	Apr. 5, 1938
2,374,435	Jordan	Apr. 24, 1945
2,395,698	Tiffany	Feb. 26, 1946

FOREIGN PATENTS

956,154	France	July 18, 1949
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