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E. S. LESLIE  
SWITCHING DEVICE

2,807,692

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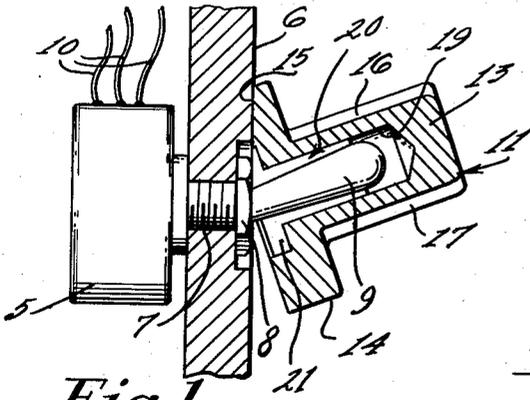


Fig. 1.

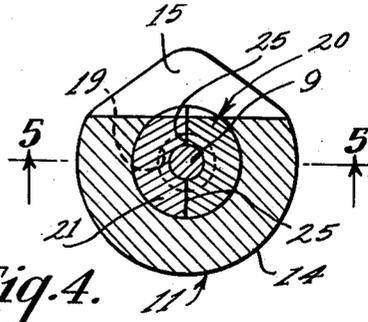


Fig. 4.

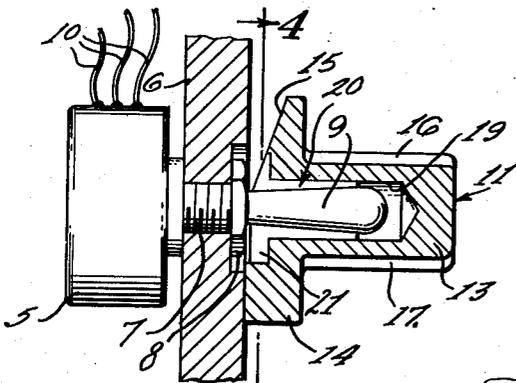


Fig. 2.

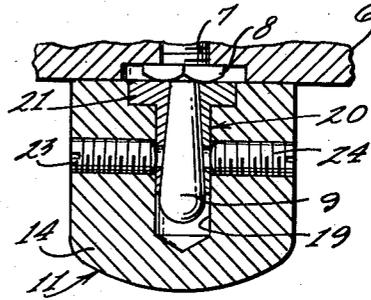


Fig. 5.

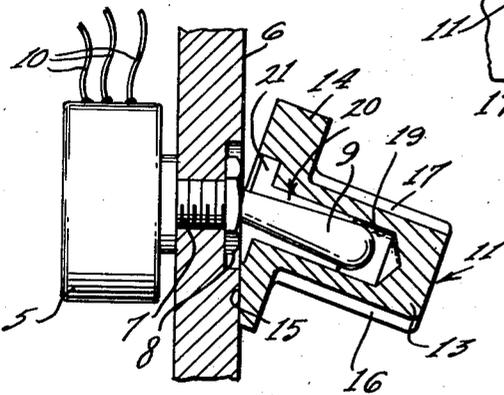


Fig. 3.

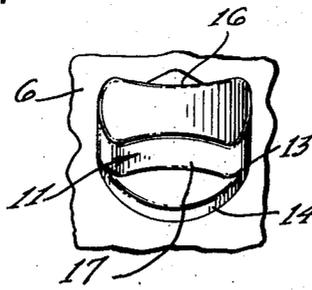


Fig. 6.

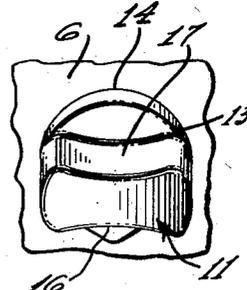


Fig. 7.

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2,807,692

## SWITCHING DEVICE

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5 Claims. (Cl. 200—172)

This invention relates to switching devices, and particularly to a three-position switch having a positive "off," or neutral, position intermediate its two "on" positions.

In electrical circuits, particularly those which control the energization of motors for driving a load in forward and reverse directions, switches, such as the toggle type, are frequently used. In these motor systems, sudden reverse energizations of the driving motor can cause damage to the load driven thereby. This is particularly true when the motors drive film transport mechanisms in recorders, reproducers, and similar apparatus.

The present invention may be an integral part of, or an adjunct to, a standard toggle switch which prevents a sudden change in a circuit, such as a motor energization circuit. The switch is suitable in places where space is limited. With the switch in one energization position, it cannot be thrown to its second energizing position without rotation of the switch handle 180 degrees. This prevents the sudden or rapid reversing of the circuits by providing a safety delay action between the two energizing positions.

The principal object of the invention, therefore, is to provide an improved switching device which prevents a sudden or rapid reversal of electrical circuits.

Another object of the invention is to provide an improved three-position switch which prevents the rapid actuation thereof between two energizing positions.

A further object of the invention is to provide a switch knob or control element for a toggle switch which prevents the toggle switch from being rapidly actuated between its two energizing positions.

The novel features which are believed to be characteristic of this invention, both as to the manner of its organization and the mode of its operation, will be better understood from the following description when read in conjunction with the accompanying drawings, in which:

Fig. 1 is a side view, partially in cross-section, of a switching device embodying the invention, the device being shown in one "on" position;

Fig. 2 is a view similar to Fig. 1 showing the switch in its "off," or neutral, position;

Fig. 3 is a view similar to Figs. 1 and 2 showing the switch in a second "on" position;

Fig. 4 is a cross-sectional end view taken along the line 4—4 of Fig. 2;

Fig. 5 is a cross-sectional view taken along the line 5—5 of Fig. 4; and

Figs. 6 and 7 are end views of the switch knob when the switch is in its two "on" positions.

Referring, now, to the drawings in which the same reference numerals identify like elements, a standard type of toggle switch 5 is shown mounted on a panel 6 by a threaded stud 7 and a nut 8. The switch has the usual type of tapered actuating lever 9 which will reverse the electrical circuits connected to the switch 5 over conductors 10.

On the lever 9 is mounted a T-shaped knob, shown

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generally at 11, and having a substantially cylindrical body portion 13 and a larger diameter cylindrical portion 14. The portion 14 has a 180 degree face portion 15 thereof at an angle to the axis of the body portion 13. The body portion has flattened sides 16 and 17 diametrically opposite one another to facilitate the hand actuation of the knob.

The body portion 13 has a cylindrical recess 19 therein within which is a split sleeve 20 internally tapered to accommodate the lever 9. The sleeve 20 has a cross end portion 21 with a tapered face to correspond with the face 15. The sleeve 20 is held in position on the lever 9 by a pair of set screws 23 and 24, as shown in Fig. 5. The sleeve 20 is split at 25, as shown in Fig. 4, to permit the assembling thereof on the lever 9. There is sufficient friction between the sleeve 20 and the lever 9 to prevent the accidental rotation of the knob on the lever, but which permits the rotation of the knob when turned manually.

With the above construction, it is necessary that the switch be rotated 180 degrees before it can be actuated between the position shown in Fig. 1 and the position shown in Fig. 3. For instance, when the lever 9 is thrown from its "on" position in Fig. 1 to its "off" position, such as shown in Fig. 2, the side of the portion 14 perpendicular to the axis of the knob comes in contact with the adjacent surface of the panel 6, preventing further movement of the lever 9. Now, to throw the lever 9 to its other "on" position, the knob 11 must be rotated 180 degrees, as shown in Fig. 3, which permits the lever 9 to be moved to its other "on" position. Thus, a standard toggle switch is provided with a safety knob which prevents the sudden actuation thereof between its two "on" positions, the delay required preventing damage to reversible equipment. The safety knob occupies very little additional space to that required by the standard switch so that it may be used on panels where minimum space is available.

I claim:

1. A switching device comprising a panel, a switch mechanism on said panel and adapted to be thrown to two different "on" positions and to an intermediate "off" position, said mechanism including an actuating lever, said lever having its axis perpendicular to said panel when in said "off" position and at an angle to said panel when in said "on" positions, a knob mounted on said lever and having a portion of one end surface of said knob perpendicular to the axis of said lever and knob, and another portion of said end surface of said hub diametrically opposite said perpendicular surface at an angle less than 90 degrees to said axis, and means for attaching said knob to and for rotation on said lever.

2. A switching device in accordance with claim 1 in which said last-mentioned means includes a split sleeve adapted to surround said lever and occupy a recess in said knob.

3. A switching device comprising a panel, a switch mechanism on said panel and adapted to be thrown to two different "on" positions and to an intermediate "off" position, said mechanism including an actuating lever, said lever having its axis perpendicular to said panel when in said "off" position and at an angle to said panel when in said "on" positions, a knob mounted on said lever and having a portion of one end surface thereof perpendicular to the axis of said lever, and another portion of said end surface diametrically opposite said perpendicular surface at an angle less than 90 degrees to said axis, means for attaching said knob to and for rotation on said lever, said last-mentioned means including a split sleeve adapted to surround said lever and occupy a recess in said knob, said sleeve has an end surface at the same angle having the

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angle surface of said knob, said angle permitting said lever to be actuated to either of its "on" positions when said angle surfaces are in certain positions.

4. A switch actuating knob unit for a switch lever comprising an elongated body portion of a certain size and an end portion extending at right angles away from said body portion, said portions having a cylindrical opening extending from one end thereof, said opening being adapted to accommodate said lever, said end portion having a portion of its end surface perpendicular to the axis of said knob unit and said lever and another portion

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of said end surface at an angle less than 90 degrees to said axis.

5. A switch actuating knob unit in accordance with claim 4 in which a sleeve is provided between said lever and the inner surface of said opening to hold said knob unit on said lever and permit rotation of said knob unit on said lever.

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