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SWITCH ACTUATOR MECHANISM

Filed Sept. 3, 1959

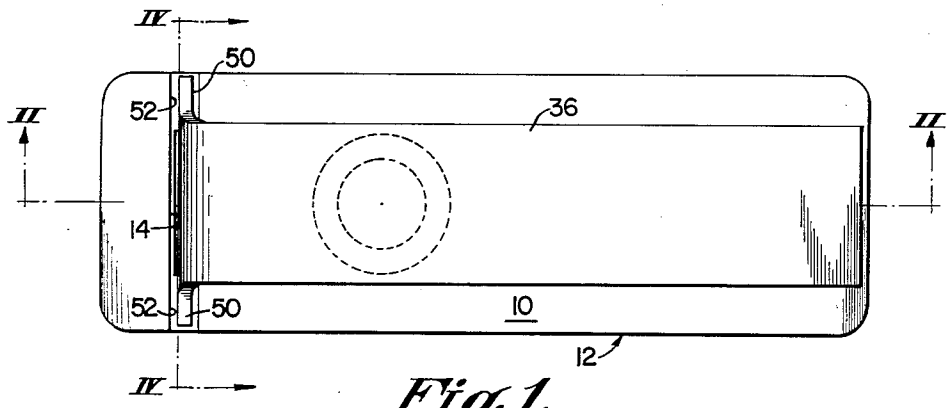


Fig. 1.

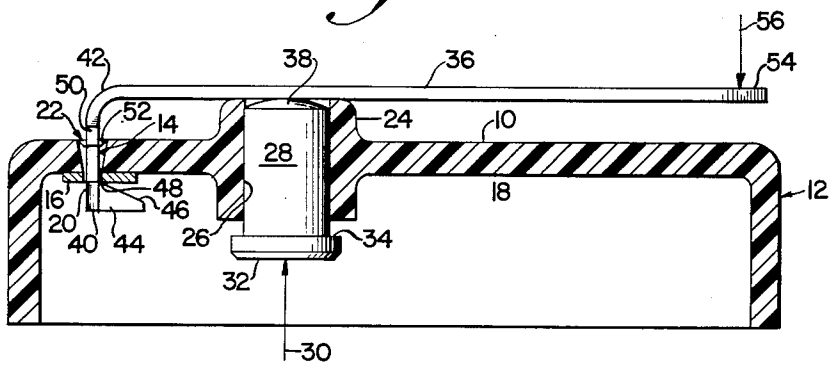


Fig. 2.

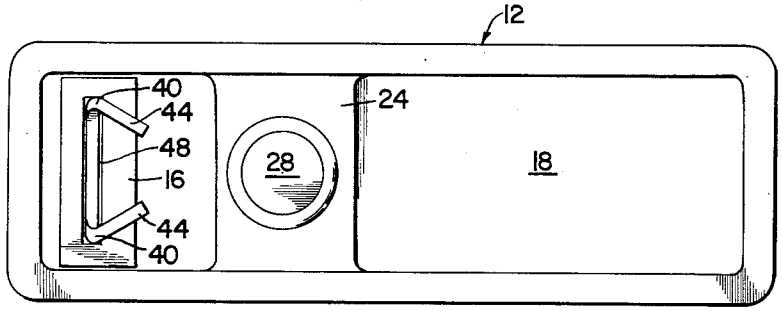


Fig. 3.

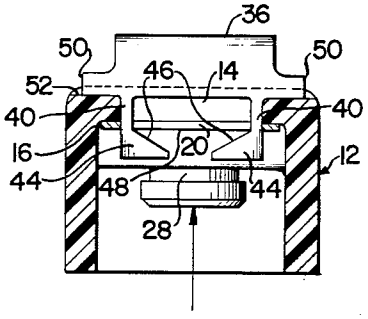


Fig. 4.

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SWITCH ACTUATOR MECHANISM

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This invention relates generally to switch actuator mechanisms and more particularly to mounting means for switch actuator levers.

In the past, switch actuator levers have been mounted on the switch casing by a pivotal construction or by mounting a bent end of the lever in a groove in the casing to form a resilient hinge. The pivotal mounting is unsatisfactory in that it requires an excessive number of parts. In the construction using the resilient hinge mounting, the actuating force on the lever must be of sufficient magnitude to overcome the bias of the resilient hinge and hence this construction would be undesirable in switches wherein it is important to use a very small actuating force.

It is an object of this invention to reduce the magnitude of the switch actuating force.

Another object of this invention is to minimize wear on the switch actuator lever and thereby prolong the life of the switch actuating mechanism.

Another object of this invention is to construct a switch actuator mechanism with a minimum number of parts which will render it economical to manufacture and facilitate installation and repair.

In a preferred embodiment of the invention, the actuator lever is mounted on the exterior of the switch casing by means extending from one end of the lever through a slot in the switch casing into the interior thereof. A portion of the switch means is engageable with a fulcrum means within the casing when the other lever end is actuated relative to the casing whereby the lever rocks about the fulcrum means.

The above and other objects and features of this invention will appear more fully from a consideration of the following description taken in connection with the accompanying drawing wherein:

FIG. 1 is a plan view of a preferred embodiment of the invention;

FIG. 2 is a sectional view taken on line II—II of FIG. 1;

FIG. 3 is a bottom plan view of the embodiment shown in FIG. 1; and

FIG. 4 is a sectional view taken on line IV—IV of FIG. 1.

Referring now more particularly to the drawing, the top wall **10** of a switch casing **12** is provided adjacent one end with a transverse slot **14**. A metallic reinforcement plate **16** is positioned adjacent the inner side **18** of top wall **10** and has a transverse slot **20** corresponding to slot **14**. Slots **14** and **20** cooperate to define a slot **22** extending through switch casing **12** to the interior thereof.

Top wall **10** also has a hollow boss **24** intermediate its ends defining a cylindrical bore **26** extending through switch casing **12**. The wall of bore **26** slidably receives a cylindrical switch button **28** which is biased axially outwardly of switch casing **12** as is indicated at **30**. The inner end **32** of switch button **28** has an annular flange portion **34** which engages the underside of boss **24** and limits the outward movement of button **28**, the latter being of sufficient length to project slightly above the upper surface of boss **24**. When switch casing **12** is completely assembled, the inner end **32** of switch button **28** is designed to be operatively engageable with the switch operating mechanism (not shown) contained in casing **12**.

Means are provided for actuating switch button **28** axially within bore **26**. To this end, a metallic switch actuator lever **36** is mounted on the exterior of top wall **10** so that a medial portion thereof is engageable by the projecting end **38** of switch button **28**. Actuator lever **36** may thus oppose the bias of switch button **28** to position the same.

A pair of fingers **40** extend from one end **42** of actuator lever **36** and at right angles thereto through slot **22** into the interior of switch casing **12**. Fingers **40** have inner end portions **44** extending transversely of slot **22** to restrict the removal of fingers **40** therefrom. Each inner end portion **44** presents an arcuate edge **46** which faces a portion of the inner edge **48** of slot **20**. In assembling the switch actuator mechanism, inner end portions **44** are bent into position after they have been inserted into slot **14** in switch casing **12** and slot **20** in reinforcement plate **16**. Fingers **40** thus retain reinforcement plate **16** in its assembled position adjacent inner side **18**.

The end **42** of actuator lever **36** also has a pair of ears **50** extending laterally thereof. Ears **50** overlie top wall **10** and are engageable therewith to restrict inward movement of fingers **40** and thereby serve to position the same. A pair of recesses **52** are formed in top wall **10** and are adapted to receive ears **50**.

The other end **54** of actuator lever **36** is adapted to receive the application of an actuator force thereto as is indicated by the arrow **56** in FIG. 2. In its normal relaxed position wherein no actuator force is applied to end **54**, actuator lever **36** rests on the outer end **38** of switch button **28** which projects from top wall **10** because of its outward bias. When an actuating force is applied to end **54** to move the same toward top wall **10**, actuator lever **36** at first tends to pivot on switch button **28** and pulls the arcuate edges **46** of end portions **44** tightly against inner edge **48**. Continued inward movement of end **54** will cause the actuator lever **36** to rock about inner edge **48** which acts as a fulcrum. As actuator lever **36** rocks inwardly about inner edge **48**, switch button **28** is moved inwardly against the bias thereof.

It will thus be apparent that as a result of the rocking mounting for actuator lever **36**, the only opposition to the actuator force **56** is the bias **30** of switch button **28** and there is no opposing force provided by actuator lever **36**. Thus, as end **54** of actuator lever **36** is reciprocated, the switch button will be actuated into and out of switch casing **12** with a minimum actuating force. Also, the rocking action practically eliminates wear at the metal-to-metal contact point between fingers **40** and plate **16** as there is no friction whereby the actuator mechanism will have a long life.

Although only one embodiment of this invention has been shown and described for purposes of illustration, the invention may be variously embodied and changes may be made in the construction and arrangement of parts without departing from the scope of the invention as defined by the appended claims.

I claim:

1. A switch actuator for a switch mechanism having an insulating casing provided with a substantially rectangular slot having an elongated end wall and a pair of opposite side walls, a switch operating plunger projecting from the casing adjacent the end wall of the slot, comprising a generally rectangular rigid lever adapted for overlying the plunger with a free end remote from the slot, said lever having the opposite end thereof extending substantially at a right angle to the plane of said lever, said opposite end having a pair of finger elements depending from the outer edges thereof and being reversely bent intermediate the ends, said reversely bent portions having arcuate surfaces forming bearing edges

thereon, a reinforcement member positioned on the interior of said casing and having an aperture adapted for registry with the slot and providing an elongated end wall having an inner edge portion for operative engagement with said bearing edges, said engagement providing a fulcrum means for rocking movement of said lever relative to said end wall and thereby operation of the plunger upon application of a force to said free end, said opposite end of said lever having a pair of oppositely disposed ears extending outwardly therefrom and adapted for operative engagement with the exterior of the casing for restricting movement of said fingers into the slot to thereby position said bearing edges in said operative engagement.

2. For use in combination with a switch mechanism having a casing and a switch operating plunger operatively mounted in said projecting outwardly through one wall of said casing; an actuator assembly comprising a one piece lever member of sheet material having an elongate flat lever arm portion, a pair of spaced parallel fingers on said lever member projecting downwardly from the forward end of said arm portion, means defining an elongate slot through said one wall of said casing adapted to receive said fingers with said fingers slideably engaged with the respective transverse end walls of said slot, said slot being located in spaced relationship to said plunger to locate said arm portion of said lever in overlying

relationship with said plunger when said fingers are received within said slot, a lateral projection at the lower end of each finger inclined rearwardly and inwardly of said lever member into spaced underlying relationship with said arm portion, said projections extending transversely of said slot into underlying engagement with the inner surface of said one wall of said casing when said fingers are received in said slot, a pair of ears integral with and projecting outwardly from said lever member at the upper ends of said fingers, and means defining an ear receiving recess in the outer surface of said one wall of said casing at each end of said slot.

3. A switch actuator assembly as defined in claim 2 further comprising a reinforcement plate having an elongate slot therein adapted to receive said fingers, said plate being retained upon said fingers in engagement with the inner wall of said casing by said lateral projections.

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