

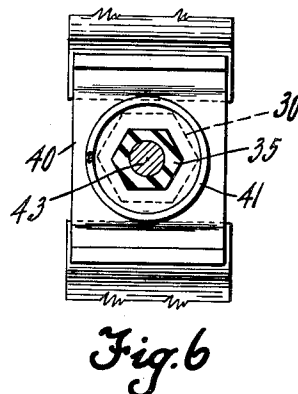
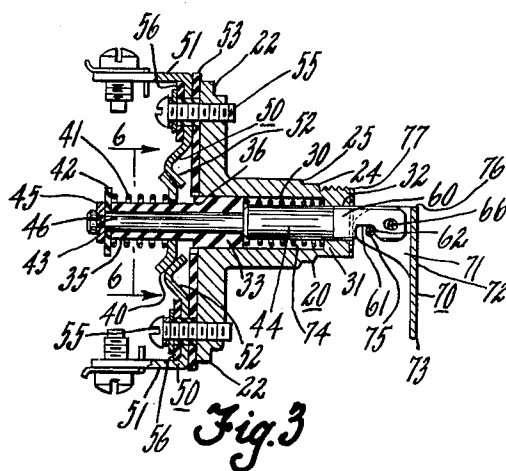
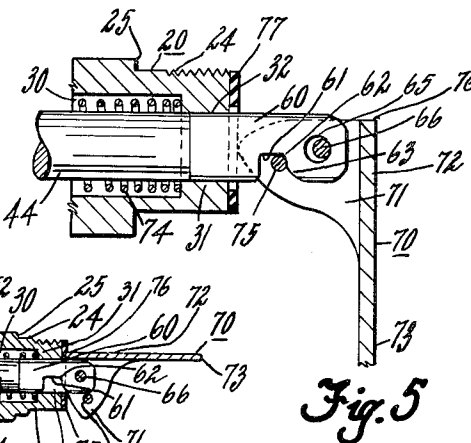
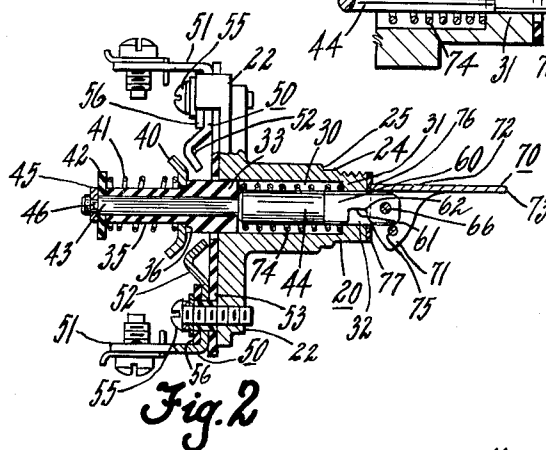
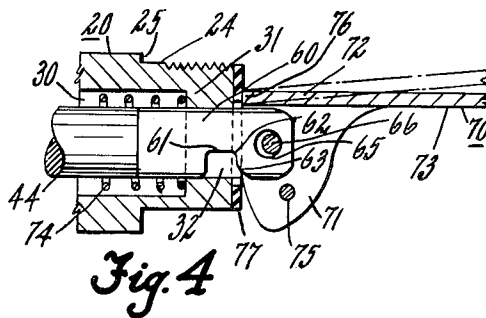
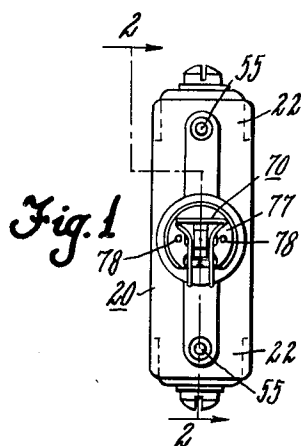
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SWITCH

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SWITCH

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2 Claims. (Cl. 200—153)

This invention relates to improvements in electric switches and particularly to relatively small switches of the trigger or saddle lever type.

An object of the present invention is to provide a lever operated switch which is actuated to one circuit controlling position by a spring and which is moved to another circuit controlling position by the lever loosely pivoted to an actuator for the switch which, on being moved manually in one direction, cooperates with the switch housing so as to shift the actuator in one direction against the force of the spring.

Another object of the present invention is to provide a lever operated switch which is moved to one circuit controlling position by a spring and is moved to another circuit controlling position by a lever loosely pivoted to the actuator for the switch which, on being moved in one direction of rotation cooperates with the switch housing to shift the actuator in one direction and when the lever is rotated a certain angular movement the lever is latched to the actuator so as to prevent movement of the actuator in the opposite direction by the spring when the lever is released. This object is accomplished by having the actuator provided with a transverse notch and having the lever pivotally attached to the actuator, said lever having cam actuable when the lever is rotated to cooperate with the housing to shift the actuator relative to the housing and having the cam means provided with means for engagement with the notch to hold the crest of the cam in engagement with the housing to maintain the switch in a selected circuit controlling position.

Another object of the invention is to design and construct the actuator and lever of the switch whereby the lever is limited to one direction of rotation to shift the actuator to a circuit controlling position.

Another object of the present invention is to provide in connection with non-latching and latching type levers for switches means of identification improved arrangement of same and their operating connections so that one may determine by the position of the lever as to whether or not a circuit is closed or opened.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is a top plan view of the switch embodying the present invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1 and showing the switch in the open position.

Fig. 3 is a sectional view similar to Fig. 2 but showing the switch in a closed position.

Fig. 4 is a fragmentary sectional view, on an enlarged scale, showing the lever operating mechanism in its normal position.

Fig. 5 is a view similar to Fig. 4, but showing the lever operating mechanism in its operative position.

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Fig. 6 is a sectional view, on an enlarged scale, taken on line 6—6 of Fig. 3.

Referring to the drawing 20 designates a switch housing or body having oppositely disposed side wings 22. The body 20 in this instance has an external reduced portion 24 to provide a shoulder 25. The reduced portion may be externally threaded to receive a clamping nut which secures the switch housing to an instrument panel, not shown. In this instance reduced threaded portion 24 is adapted to pass through a suitable aperture in the panel until the shoulder engages the rear side of the panel and the nut being then screwed on the reduced threaded portion 24.

The housing 20 is formed with a non-rounded cavity 30 closed at the upper end by a wall 31 having an elongated opening 32. The cavity 30 receives a hollow insulating member or sleeve 33 of molded insulating material. The member 33 has a non-rounded portion which has the same contour as the cavity so as to prevent relative rotary movement of the member 33 with respect to the housing 20. The sleeve is formed with a reduced non-rounded portion 35 to form a shoulder 36. The reduced portion 35 slidably supports a movable contact element or bridging member 40 having its ends bent from the normal plane of contact 40. The contact 40 is urged against the shoulder 36 by a compression spring 41 disposed between the contact 40 and an insulating washer 42 mounted on a reduced end 43 of an actuator or rod 44 which extends through the sleeve 33. The washer 42, in this instance, engages the end of the reduced portion and is held in assembled relation with the rod 44 by a C-washer 45 fitting in a perimetrical groove 46 formed in the shaft. The contact 40 has a central opening slightly larger in diameter than the reduced portion 35 of sleeve 33. Therefore, there is play between the contact 40 and the reduced portion 35 so that force of the spring will be distributed and contact 40 will engage a pair of spaced stationary contacts or terminals 50 with substantially equal pressure.

As shown each stationary contact 50 is supported by but insulated from a wing 22 so that both contacts are operatively related to the bridging contact 40. The contacts 50 are substantially L-shaped to provide arms 51 and 52 with the arm 52 deformed at their ends to provide inclined portions to be engaged by the inclined portions of the movable contact 40. The arms 52 are insulated from the support by a fiber insulating plate 53 having a central opening therein through which the sleeve 33 passes. The opposite ends of the plate are notched to extend between spaced depending lugs or side portions 22 provided by the wing. One of these lugs is shown in elevation in Fig. 2. Each stationary contact 50 is fixed to the support by a screw 55 which is insulated from the arm 52 by an insulating tube which fits in apertures provided by the plate 53, arm 52 and an insulating washer 56. A plane washer and a lock washer cooperate with the screws 55 to maintain the parts 56, 50 and 53 in assembled relation with the respective wings 22. Each washer is disposed between the depending lugs of portions 22 to prevent same from turning relative to the wings. Each washer 56 is provided with a notch to receive the arm 51 which prevents the contact from turning relative to the washer 56.

The reduced portion 43 of rod or actuator 44 has a sliding fit within the sleeve but has its upper end provided with flats 60 cooperating with the flat sides of the elongated opening 32 in the wall 31 so as to prevent relative rotary movement of the rod. The upper end of the rod which has the flats 60 is provided with a transverse notch 61 the upper wall of which is provided with a concave seat 62. A rounded cam portion 63 is provided adjacent the outer end of the notch. The flattened por-

tion of the rod is also provided with an aperture 65 adapted to receive a pivot pin 66 of smaller diameter than the openings. Therefore, there is play between the aperture 65 and the pivot pin 66 which will allow the rod to move in a straight line when actuated.

A lever 70 is mounted on the pivot pin 66. This lever is formed to provide a saddle portion at one end. This saddle portion is U-shaped in transverse vertical cross section and comprises parallel depending side or cam portions 71 interconnected by a yoke or stop portion 72. The yoke 72 is extended to provide a finger grip 73. The lever is mounted in a straddling relation to the flats 60 of the rod 44 and is afforded a pivotal support by the pivot pin 66 which extends through aligned openings formed in the cam or side portions 71 of the lever and through the opening 65 in the rod. The pin has a head at one end and bears against the outer surface of one side portion and the opposite end is upset over the outer face of the other side portion thereby being secured against axial movement.

In the illustration shown in the drawing the side or cam portions are provided with additional aligned openings for receiving a pin 75 and which is secured to the side portions in a manner similar to that described for pin 66.

As shown in Fig. 2, the switch is in its "off" position. The rod 44 is moved to the left position due to the bias of compression spring 74 which acts on the rod through the sleeve 33. The rod is limited in its movement to the left by an end or edge 76 of the yoke 72 engaging an insulating washer 77 attached to the other surface of the wall 31 by rivets 73. The washer is made of nylon in this instance for its lubricating qualities. As will be appreciated the lever 70 can not be moved in a counterclockwise direction from the position shown in Fig. 2 to actuate the rod. Should the attempt be made to move the lever in a clockwise direction the yoke 72 will engage the rod 44, therefore the yoke 72 acts as a stop to limit the counterclockwise direction of the lever 70.

When the lever is moved in a clockwise direction from the position shown in Fig. 2 to that shown in Fig. 3 against the bias of compression spring 74 the cam portions 71 will engage the nylon disc 77. This initial movement of the lever will cause the pin to take up the play thereof within the opening 65 and then to engage the opposite wall of the opening and move the rod to the right. When the lever is moved in a clockwise direction the cams slide on the nylon disc. After the lever moves a certain angular distance the cross pin 75 will first engage the cam portion 63 on the rod and then move into the transverse notch until the pin engages the back wall of the notch to limit the clockwise movement of the lever. In this position the cam portions 71 have reached their crests and cause the pin to enter the seat. Before the cams reach their crests the movable contact 40 will bridge the stationary contacts 50 to complete a circuit. This causes the sleeve 35 to move relative to the movable contact 40 to compress the spring 41 in order to protect the movable contact from injurious effects in case the operator exerts

an exceedingly strong force to actuate the lever. It is also pointed out that by compressing the spring 41 a good contact engagement is assured between the contacts.

Upon release of the force which actuates the lever 70 the spring 74 tends to move the rod to the left but the cross pin 75 prevents the rod 44 from moving to the left due to the fact the pin rests in the seat. As a result the movable contact 40 is maintained in contact engagement with the stationary contacts 50.

In order to release the actuator for movement by the spring 74 to open the switch, the lever 70 must be actuated in a counterclockwise direction to remove the pin 75 from the seat and the spring 74 effects return of the switch to the circuit open position as shown in Fig. 2.

If it is desired the movable contact and the stationary contacts could be rearranged to provide a switch arrangement whereby the switch is closed by the spring and is opened by actuating the lever.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An electric switch comprising, a housing; an actuator slidable in the housing, said actuator having a transverse notch adjacent one end; stationary contacts supported by the housing; a movable contact on the actuator engageable with the stationary contacts; a lever pivotally attached to the actuator, said lever having cam means actuatable when the lever is rotated to cooperate with the housing to move the actuator within the housing; and means carried by the cam means for engagement with the notch to hold the cam crest in engagement with the housing to maintain the switch in selected circuit controlling position.

2. An electric switch comprising, a housing; an actuator slidable in the housing; stationary contacts carried by the housing; a bridging element on the actuator engageable with the stationary contacts; a lever pivotally attached to the actuator, said lever having a normal position with respect to the actuator and said lever having a portion adapted to engage the actuator, when it is attempted to move the lever in one direction from its normal position, to prevent movement of the lever in such direction, and said lever having a cam actuatable, when the lever rotates in the opposite direction from its normal position, to cooperate with the housing to move the actuator within the housing from its normal position and means effective to hold the actuator in the position to which it is moved including a notch in the actuator and a latch member on said operating lever engageable with said notch.

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