Aug. 11, 1953 J. B. LESTER 2,648,234

MOMENTARY ACTION ACTUATOR

Filed June 10, 1950

Fig. 1

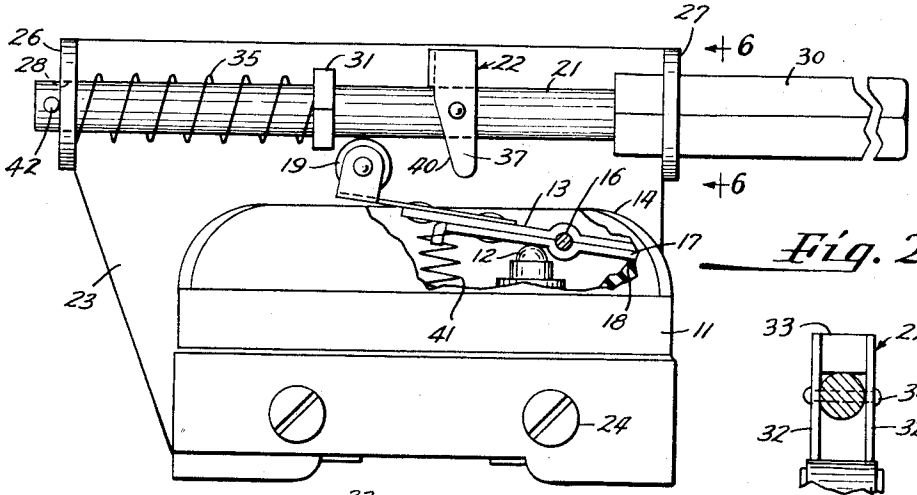


Fig. 2

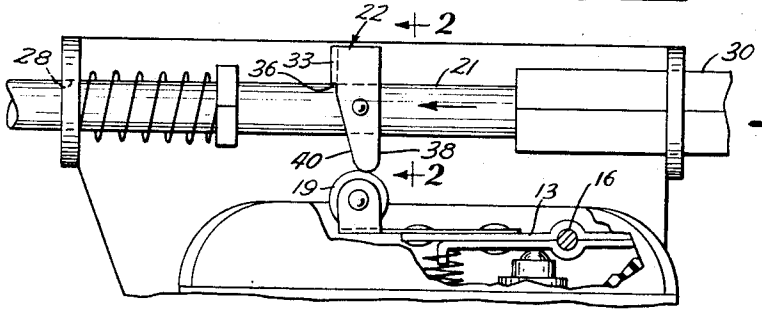


Fig. 3

Fig. 4

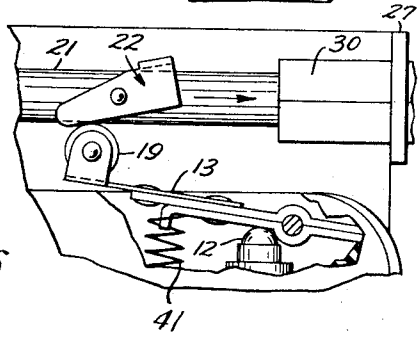


Fig. 5

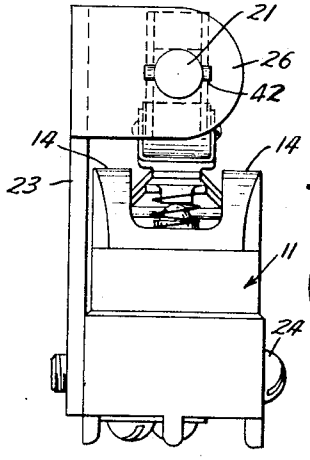
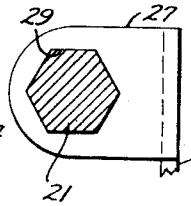


Fig. 6



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MOMENTARY ACTION ACTUATOR

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8 Claims. (Cl. 74—503)

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This invention relates to an actuating mechanism for an operator actuated device and more particularly to a detachable actuating mechanism for a plunger operated snap action switch.

An object of the invention is the provision of a novel actuating mechanism of the above character that provides for momentary actuation of the device at the same relative position of the actuating mechanism in one direction of movement thereof and permits relative movement between the mechanism and the operator of the device in the other direction of movement of the actuating mechanism.

Another object of the invention is the provision of a novel actuating mechanism of the above character that is simple to construct, that has a relatively low cost, and that can be readily attached to and detached from an operator actuated device.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which—

Figure 1 is an elevational view with cutaway portions of a precision snap action switch having an actuating mechanism embodying the present invention mounted thereon to actuate the switch;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 3;

Fig. 3 is a fragmentary view similar to Figure 1 showing the actuating mechanism in its operating position;

Fig. 4 is a fragmentary view similar to Fig. 3 showing the relation of the parts of the actuating mechanism on return movement of the movable member of the actuating mechanism;

Fig. 5 is an end view of the construction shown in Figure 1; and

Fig. 6 is a sectional view taken substantially along the line 6—6 of Figure 1.

The invention is shown embodied in an actuating mechanism for an operator actuated device such as a precision snap action switch 11. The switch may be of any of the well known types and for purposes of illustrating the invention is of the type operated by a reciprocable plunger 12. A lever 13 is pivotally mounted on spaced upstanding ribs 14 on top of the switch body by a pin 16 and is positioned to move between the non-operating position shown in Figure 1 and an operating position shown in Fig. 3 such that the lever 13 swings about the pivotal axis to depress the plunger 12 and actuate the switch. A compression spring 17 acts between the lever 13 and the switch to urge the lever to its non-operating

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position, which is determined by engagement of the end 41 of the lever with an upstanding abutment 18 formed on the switch. At its opposite end the lever is provided with an upwardly facing roller 19 mounted thereon in a conventional manner.

One phase of the invention is concerned with the provision of a readily attachable actuating mechanism for a device that provides for momentary actuation of the device at the same relative position of the actuating mechanism in one direction of movement thereof and permits relative movement between the mechanism and the device in the other direction of movement of the actuating mechanism. In this embodiment of the invention the actuating mechanism includes a reciprocable member 21 arranged to be secured on the switch 11 and a dog 22 mounted on the movable member and shaped so that when the member moves in one direction the dog 22 engages the roller 19 to move the lever 13 about its pivotal axis to depress the plunger 12 and when the member 21 moves in the opposite direction the dog 22 moves relative to the member and plunger so as not to effect actuation of the precision switch 11. As best seen in Figs. 1 and 2 the member 21 is mounted on a bracket 23 secured to the side of the switch 11 as by conventional mounting screws 24 and is formed at opposite ends with flanges 26 and 27 deformed out of the plane of the bracket to be spaced above the top of the switch 11. The flanges 26 and 27 are formed with apertures 28 and 29 shaped to slidably receive the movable member 21 and support the latter member in overlying relation to the lever 13 and switch. To prevent rotation of the reciprocable member 21 the latter is formed with an enlarged portion 30 at one end with a non-circular configuration, in this instance a hexagonal shape and the aperture 29 in the flange 27 has a complementary shaped configuration for receiving the enlarged portion of the member 21. The member 21 is normally urged to the position shown in Figure 1 by a spring 35 acting between a collar 31 on the member 21 and the flange 26 to normally urge the crosspin 42 extending through the member 21 into engagement with the outer face of the flange 26 and the enlarged portion 30 of the member 21 to the right as viewed in Figure 1.

The dog 22 is mounted on the member 21 between the collar 31 and the enlarged portion 30 of the member 21. As shown, the dog comprises a pair of spaced legs 32 disposed on opposite sides

of the member 21 and interconnected along one edge adjacent the top of the dog by a bridging portion 33. The dog 22 is secured to the member 21 as by a pin 34 extending through the legs 32 as best seen in Fig. 2. The legs 32 and bridging portion 33 are shaped so that when in the operation position shown in Fig. 3 the lower edge 36 of the bridging member 33 rests on the top of the member 21 and the lower portions 37 of the legs extended below the member 21 to engage the roller 19. Preferably the forward edges of the legs are inclined from the front to the rear of the dog as shown in Fig. 3 to define a cam surface 40. The bridging member 33 is arranged in an off center relationship with the legs 32 so that when a force is applied to the rear edges 38 of the legs 32 the dog 22 is rotated about the pin 34 to a position shown in Fig. 4 such that the longitudinal axis of the leg 32 and the plane of the bridging portion 33 are substantially in parallel relation with the longitudinal axis of the member 21.

The normal position of the actuating mechanism is shown in Figure 1. In this position the spring 41 urges the lever 13 to the position such that the roller 19 is spaced outwardly from the switch 11 and the dog 22 is to the right of the roller 19. Upon application of an axial pressure to the enlarged end 30 of the reciprocable member 21 the latter is moved bodily to the left so that the dog 22 is translated from the position shown in Figure 1 to the position shown in Fig. 3. When the forward edges 40 of the dog 22 initially engage the roller 19 the bottom edge 36 of the bridging member 33 is forced into rigid engagement with the member 21 so that the dog is rigidly supported thereon. Continued movement of the member 21 to the left causes the dog to move relative to the roller and deflect the latter and the lever downwardly to actuate the switch. As soon as the dog 22 clears the roller 19 the spring 41 acts to return the lever to the position shown in Figure 1. Upon release of pressure to the member 21 the latter is urged to the right as viewed in Fig. 3 by the spring 35. As the member 21 moves to the right the rear edges 38 of the dog 22 engage the roller 19 and cause the legs 32 to pivot about the pin 34 to the position shown in Fig. 4. Thus, as the member 21 returns to its normal position the dog 22 moves relative to the roller 19 and in turn the lever 13 without causing movement of the lever about the pivotal axis 16 to effect actuation of the switch 11. The hexagonal configuration of the enlarged portion 30 of the member 21 and the complementary shaped opening 29 in the flange 27 insures that the member 21 is maintained in alignment during its reciprocation. This construction provides for momentary actuation of a switch mechanism in one direction of movement only of the reciprocable member and at the same relative position of the reciprocable member upon successive reciprocations thereof. This actuating mechanism is simple to construct, has a minimum number of parts, may be readily assembled and can be readily attached to a conventional snap acting precision switch.

I claim:

1. In an actuating mechanism for an operator actuated device, the combination of a member movable between opposite positions, support means for mounting said member on said device to be spaced from the operator of said device, a U-shaped member comprising a bridging portion extending transversely of the longitudinal axis of the movable member and spaced legs disposed on opposite sides of said movable member, said U-shaped member being pivotally mounted on said movable member with said legs positioned to engage the operator of said operator actuated device in one position of said movable member relative to said operator and said bridging portion extending transversely of the movable member and positioned to engage the movable member to maintain said U-shaped member supported on said movable member to move as a rigid unit therewith when engaging the operator in one direction of movement of said movable member for actuating the device, said U-shaped member being supported on said movable member to pivot thereon and to ride over the operator without actuating the device when said movable member moves in the opposite direction.

2. In an actuating mechanism for a device, the combination of a lever having an end movable between an actuating and a non-actuating position, means for pivotally mounting the lever to have the latter move to its actuating position to engage a plunger to actuate the device when pressure is applied to one end of the lever, means normally biasing said lever to said non-actuating position, a bracket, means for mounting said bracket on said device, flanges attached to said bracket adjacent the lever, a movable member overlying said lever and supported by said flanges to be movable between opposed positions, means normally biasing said member to one of said positions, a dog engageable with said lever, means for pivotally mounting said dog on said member to move relative to the lever without moving the latter to actuate the device in one direction of movement of the member, and means acting between the dog and the member to cause the dog to form with said member a rigid assembly shaped to engage said first end of the lever to move the latter into engagement with the plunger and effect actuation of the device when the member moves in the opposite direction.

3. In an actuating mechanism for an operator actuated device, the combination of a member reciprocable between opposed positions, an operator mounted for movement substantially perpendicular to the path of reciprocation of said member, said operator being biased to extend adjacent the path of reciproction of said member, and means mounted on said reciprocable member operable upon movement thereof in one direction to engage the operator to move the same substantially perpendicular to the path of movement of the reciprocable member for actuating the device and operable upon continued movement of the reciprocable member in the same direction to be disengaged from the operator, said mounted means being free to move relative to the operator without operating the same upon return movement of the reciprocating member in the opposite direction.

4. In an actuating mechanism for an operator actuated electrical switch, in combination, a member movable in opposite directions, an operator mounted for movement substantially perpendicular to the path of movement of said member, said operator being biased to extend adjacent the path of movement of said member, and means pivotally mounted on said movable member and extending in a direction offset from the direction of movement thereof and positioned to engage the operator at one position of the movable member, said pivoted means being operable responsive to engagement with the operator in one direction of movement of the

movable member to be urged into rigid engagement with the movable member to move unitarily therewith to move the operator in a direction substantially perpendicular to the path of movement of said movable member for actuating the switch, said pivoted means being operable upon continued movement of the movable member in the same direction to move beyond the operator and disengage therefrom, said pivoted means being operable upon movement of the movable member in the opposite direction to move about its pivotal axis so as to ride freely over the operator upon engagement therewith without moving the same a distance sufficient to actuate the switch.

5. In an actuating mechanism for an operator actuated switch, the combination of an elongated operator mounted to be movable about a horizontal axis, a member movable in opposite directions transverse to said axis, a dog pivotally mounted on said movable member and provided with a portion depending from the movable member, said operator being biased to present a free end remote from said axis disposed in the path of movement of said depending portion on the dog as the movable member is moved, said dog being mounted on said movable member to move as a rigid unit therewith in one direction of movement of the movable member when said depending dog portion engages said free end of the operator for moving the operator about said axis to actuate the switch, and said dog being mounted on said movable member to pivot thereon and to ride freely over said free end of the operator without moving the latter a substantial amount about said axis when said depending dog portion engages said free end of the operator in the opposite direction of movement of the movable member.

6. In an actuating mechanism for an operator actuated switch, the combination of a plunger reciprocable in a horizontal direction, a dog pivotally mounted on said plunger and provided with a portion depending from the plunger, an elongated operator mounted below said plunger for movement about a horizontal axis transverse to the directions in which the plunger reciprocates, said operator extending from said axis in the same direction as said plunger and being biased to extend angularly upward toward the plunger and at its upper free end being interposed in the path of movement of said depending dog portion as the plunger is reciprocated, said dog being mounted on said plunger to move as a rigid unit therewith in one direction of movement of the plunger upon engagement by said depending dog portion of said free end of the operator for moving said free end of the operator downwardly to displace the operator angularly about said axis to actuate the switch, and said dog being mounted on said plunger to pivot thereon and to ride freely over said free end of the operator without moving the latter a substantial distance when said depending dog portion engages said free end of the operator in the opposite direction of movement of the plunger.

7. The mechanism of claim 6, wherein there is provided a roller at the free end of the operator, and the depending dog portion presents a cam surface for engaging said roller in the movement of the plunger in said one direction.

8. The mechanism of claim 6, wherein said dog comprises a U-shaped member having two depending legs pivotally connected to the plunger at opposite sides thereof and a cross piece interconnecting said legs and overlying the plunger at a location offset from the pivotal axis of the dog in a direction toward said one direction of movement of the plunger.

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