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OVERTRAVEL SWITCH ACTUATOR

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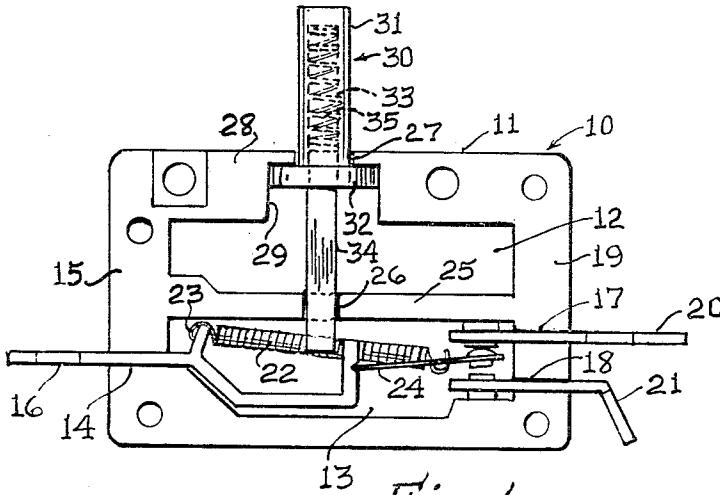


Fig. 1.

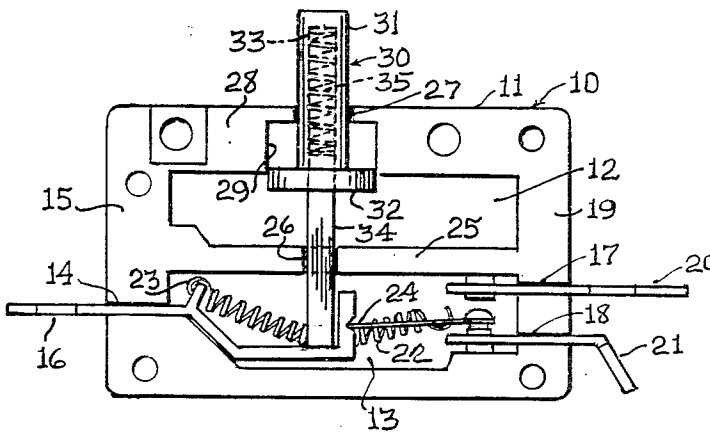


Fig. 2.

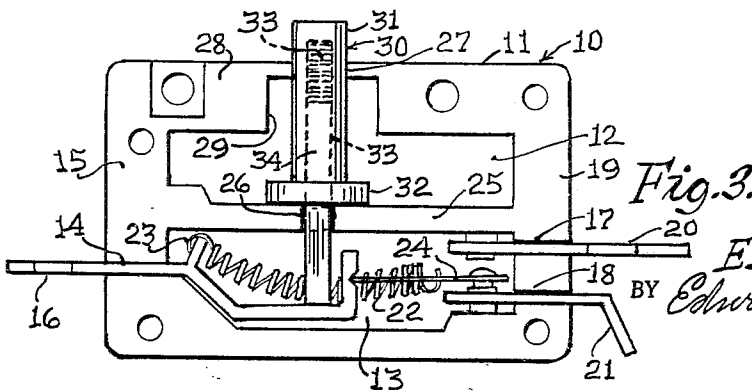


Fig. 3.

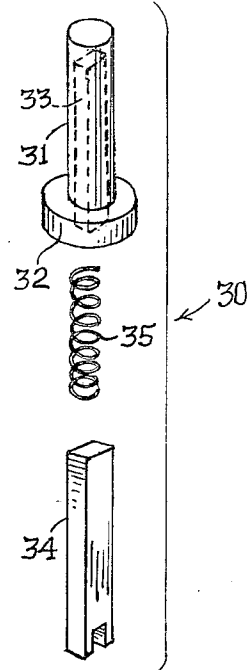


Fig. 4.

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OVERTRAVEL SWITCH ACTUATOR

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2 Claims

ABSTRACT OF THE DISCLOSURE

A snap-action switch actuator constructed of telescoping sections yieldably separated by an internal spring having a compression resistance equal to the tension of a switch blade overcentering coil spring, which coil spring is deformed out of its normal longitudinal plane by one of the actuator sections, as such section is moved through its pretravel, and before the second section of the actuator continues its overtravel telescopic movement.

SUMMARY OF THE INVENTION

The two-piece telescopic switch actuator has an internal spring yieldably maintaining the parts in an extended relation with each other. One part of the actuator has a prescribed pretravel, which is the distance it moves to effect actuation of the switch, and with the remaining part of the actuator having a continued telescopic overtravel, which is a distance of movement beyond that necessary to effect actuation of the switch. The internal spring between the two parts of the actuator has a compression resistance at least equal to the tension of the switch blade actuating spring such that the switch blade actuating spring is deformed by the pretravel movement of one part of the actuator before there is a telescopic movement between the parts of the actuator as the second part continues in its overtravel.

The invention will be best understood by reference to the accompanying drawings in which:

FIG. 1 is a side elevational view of the switch with the overtravel switch actuator in its normal or rest position.

FIG. 2 is a side elevational view similar to FIG. 1 but showing the switch actuator in its pretravel position and with the switch components in their actuated position.

FIG. 3 is a side elevational view similar to FIG. 2 but showing the actuator in its full telescopic overtravel position, and

FIG. 4 is a perspective exploded view of the telescopic switch actuator.

The overtravel switch actuator is associated with a snap-action switch containing in a switch housing 10 which includes a case 11 and a complementary side cover, not shown. The case 11 is divided into upper and lower compartments 12 and 13. A slot 14 is formed in one side wall 15 of the lower compartment 13 in which is positioned a combination terminal and pivot post plate 16. A pair of parallel extending slots 17 and 18 are formed in the opposite side wall 19 of the compartment 13 and have positioned therein spaced apart fixed terminals 20 and 21. A coil spring 22 has one end connected as at 23 to the plate 16 and the other end connected to a movable switch blade 24. The switch blade 24 has one end pivotally connected to the pivot posts of the plate 16 and is held under compression thereagainst through the tension of the coil spring 22. The upper and lower compartments 12 and 13 are separated by a wall 25 which has an opening 26 formed therein providing open communication between the compartments 12 and 13. The opening 26 formed in the wall 25 is in alignment with an opening 27 formed in the top

wall 28 of the case 11. The opening 27 provides an internal counterbore 29, the purpose and function of which will hereinafter be made apparent.

A two-piece actuator 30 is provided and includes a circular top section 31 which provides an enlarged head 32 having a diameter equal to the width of the counterbore 29 so that the enlarged head 32 will be received therein and guided thereby when moved therethrough. The top section 31 is provided with an internal square cut bore 33 which extends upwardly through the enlarged head 32.

The actuator 30 includes a second section 34 which is substantially square in cross section, and of a length slightly longer than the section 31 of the actuator 30. The arrangement is such that one end of the second section 34 of the actuator 30 will be disposed in the square bore 33 of the first section 31. Between the end wall of the square bore 33 formed in section 31 and the inserted end of the second section 34 there is disposed an expansion spring 35. This spring normally maintains the sections of the actuator 30 in the positions shown in FIG. 1.

When an actuating force is applied to the switch actuator 30, sections 31 and 34 thereof, by reason of the expansion spring 35 therebetween, will move as a single unit, and as the expansion spring 35 is of a slightly greater tension than the coil spring 22, the movement of the actuator 30 will deform the coil spring 22 below the point of pivotal connection between the blade 24 and the pivot posts of the plate 16 to cause the blade 24 to pivot in a downward direction with a snap action out of contact with terminal 17 and into contact with terminal 18. At this point the exposed end of the second section 34 of the actuator 30 will have moved through its pretravel and be bottomed on the plate 16 where further movement will be arrested.

Continued movement of the actuator 30 is achieved when the section 31 is caused to continue in an overtravel movement, compressing spring 35, permitting section 34 to be telescoped into the bore 33 of the section 31 as seen in FIG. 3.

It should be noted that during the initial movement of the actuator 30 or the pretravel movement of the second section 34 such section is guided by the walls defining the opening 26 formed in the wall 25, and by the fact that the enlarged head 32 of section 31 of the actuator is being guided by the side walls of the counterbore 29. Thus during the critical pretravel movement of the actuator which results in the actuation of the switch, the sections of the actuator are positively guided and restrained in their directional movement. The section 31 is guided during its overtravel movement by the fact that its circular wall is passing through and guided by the opening 27 formed in the top wall 28 of the housing as well as the fact that a greater length of the second section 34 is being projected into the square bore 33 of section 31 to prevent any lateral deflection thereof as it moves into the position shown in FIG. 3.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. An overtravel actuator for a switch having a housing for the switch components which includes an overcentering mechanism having a coil spring for pivotally moving a switch blade between fixed terminals and to yieldably

maintain a switch actuator in position relative thereto, wherein the improvement comprises:

- (a) a two-piece actuator carried by the housing and disposed substantially perpendicular to the longitudinal plane of a coil spring,
- (b) an opening formed in a top wall of the housing, and having communication with an enlarged internal counter bore formed in the under surface of such top wall,
- (c) said two-piece actuator having a substantially hollow first part of a size equal to said opening and journaled therethrough with said first part having at one end a circumferentially extending enlarged head of a size equal to said counter bore so as to be guidingly movable therethrough,
- (d) a second part of said actuator positioned within the housing and having one end projected into said first part of said two-piece actuator and its opposite end in contact with the coil spring,
- (e) a second opening provided within the housing in alignment with said opening formed in the top wall and through which said second part of said actuator is guidingly moved within the housing and perpendicular to the coil spring,
- (f) a compression spring disposed in said hollow first part of said actuator telescopically connecting said first and second parts of said actuator with said spring having a compression resistance equal to the tension of the coil spring so that initial movement of both parts of said actuator through their respective guide openings effects movement of the coil spring out of its longitudinal plane before telescopic movement between said first and second parts of said actuator, and

(g) fixed means in the path of movement of said second part of said actuator for arresting further movement thereof after the coil spring of the switch is deformed out of its normal longitudinal plane and for effecting telescopic movement of said second part within said first part of said actuator against said compression spring.

2. The overtravel actuator of claim 1 further defined by having said first and second parts of said actuator formed into different shapes with the shape of said first part conforming to the opening formed in the top wall of the housing, and the shape of the second part conforming to the configuration of said second opening provided within the housing with said openings cooperating to guide their respective actuator parts and to prevent lateral deflection and axial rotation therebetween as they are moved through the housing, and with said enlarged head adapted to bear against the end surface of said counter bore to resist separation of said first and second parts of said actuator in one direction under expansion of said compression spring positioned therebetween.

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