Sept. 28, 1965 B. R. WANLASS ETAL 3,209,088

SLIDING CONTACT WINDOW SWITCH WITH RESILIENT SPRING MEANS FOR BIASING CONTACTS AND CENTERING ACTUATOR MEANS

Filed June 17, 1963 2 Sheets-Sheet 1

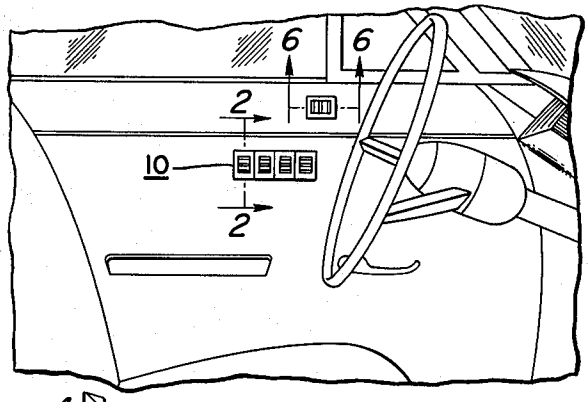

Fig. 1

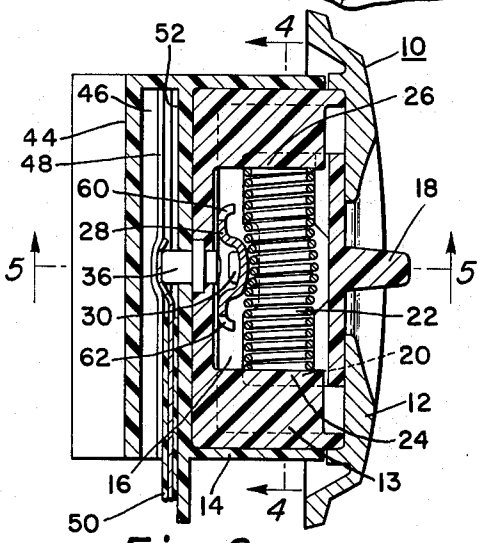

Fig. 2

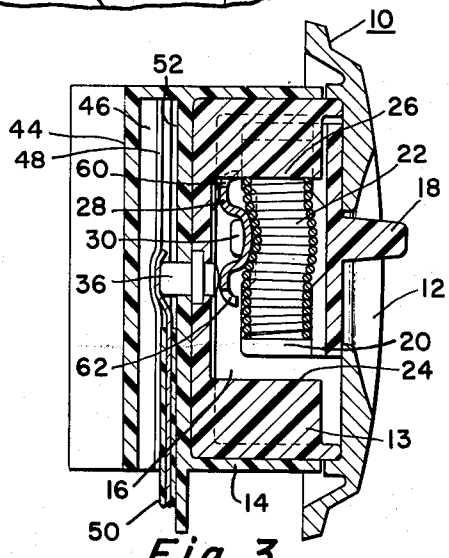

Fig. 3

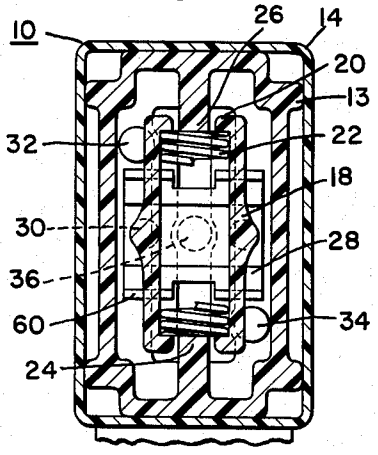

Fig. 4

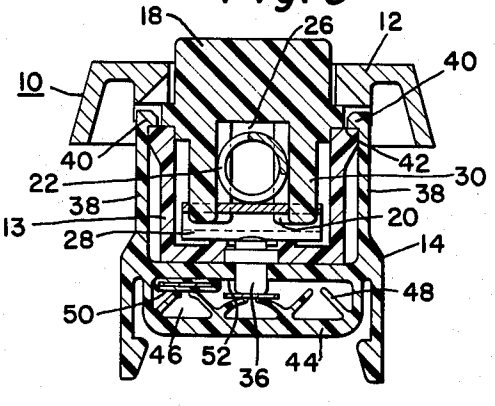

Fig. 5

INVENTORS
Bert R. Wanlass
Donald H. Suszko

BY C. R. Meland

Their Attorney

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Filed June 17, 1963 2 Sheets-Sheet 2

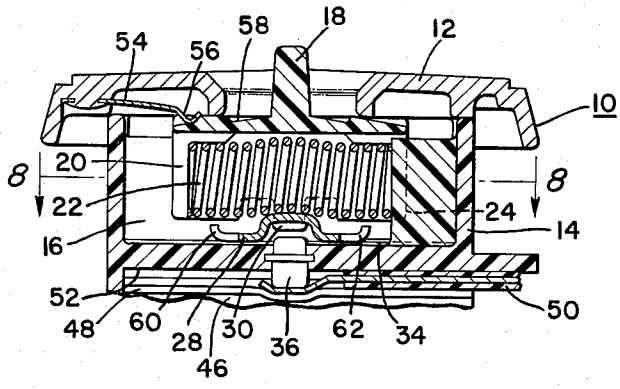

Fig. 6

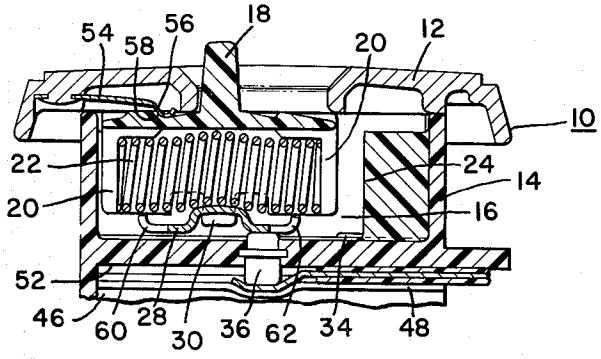

Fig. 7

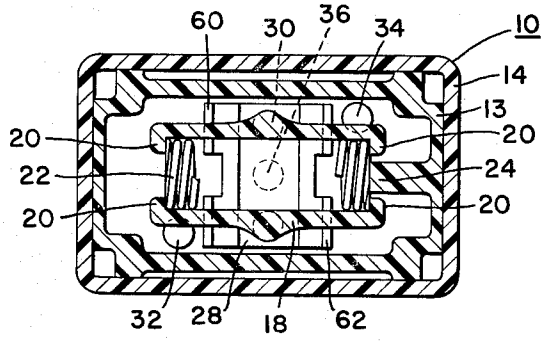

Fig. 8

INVENTORS
Bert R. Wanlass
Donald H. Suszko

BY C. R. Meland

Their Attorney

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SLIDING CONTACT WINDOW SWITCH WITH RESILIENT SPRING MEANS FOR BIASING CONTACTS AND CENTERING ACTUATOR MEANS

Bert R. Wanlass and Donald H. Suszko, Warren, Mich., assignors to General Motors Corporation, Detroit, Mich., a corporation of Delaware

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This invention relates to an electric switch and more particularly to an improved type of electric switch having a sliding contact that is constantly biased towards a neutral position.

It is an object of the present invention to provide an electrical switch having a minimum number of parts.

It is another object of the present invention to provide an electric switch with a biasing means that centers an actuator while maintaining a sliding contact in biased engagement with stationary contacts.

It is a further object of the present invention to provide an actuator for a three-position switch that can be mechanically held in one position of actuation which will automatically return to a neutral position when released.

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

In the drawings:

FIGURE 1 is a view of the interior of an automobile, with parts broken away, showing the switch in a typical operative environment;

FIGURE 2 is a sectional view taken along line 2—2 of FIGURE 1 illustrating the switch in the neutral position;

FIGURE 3 is a sectional view taken along line 2—2 of FIGURE 1 illustrating the switch in an actuated position;

FIGURE 4 is a sectional view of the switch taken along line 4—4 of FIGURE 2 with parts broken away;

FIGURE 5 is a sectional view taken along line 5—5 of FIGURE 2;

FIGURE 6 is a sectional view taken along line 6—6 of FIGURE 1;

FIGURE 7 is a sectional view taken along line 6—6 of FIGURE 1 illustrating the lock-out switch in an actuated position;

FIGURE 8 is a sectional view taken along line 8—8 of FIGURE 6.

Referring now to the drawings, in FIGURE 1 is seen a view of the sliding contact window switch, generally designated by numeral 10, in a typical application as a window lift switch controlling the upward and downward movement of automobile windows.

Referring now to FIGURE 2, the sliding contact window switch 10 has a cover portion 12 held in biased engagement with a contact carrying portion 13 by a series of tabs not shown, the contact carrying portion being in biased engagement with a base portion 14. Within the cover portion 12 is a switching area 16 in which an actuator 18, made of an insulator material, is disposed for translational movement.

Referring now to FIGURE 4, the actuator 18 has a plurality of hooked portions 20 adapted to engage alternatively the ends of spring 22.

Referring now to FIGURE 2, the spring 22 normally abuts a wall portion 24 and a wall portion 26 of the contact carrying portion 13. A slidable contact 28 is adapted to be engaged by downwardly projecting lugs 30 formed on the actuator 18 and therefore will be responsive for translational movement between contact pins 32 and 34

of the actuator 18. These contacts are best seen in FIGURE 4. Disposed in the center of the contact carrying portion 13 is a hot lead contact 36 which is engaged by one end of the slidable contact 28 during translational movement.

Referring now to FIGURE 5, the base portion 14 has upwardly extending flanges 38 with locking lugs 40 adapted to move around and engage a surface 42 of the contact carrying portion 13 during assembly. The base portion 14 has a wall 44 surrounding a lead strip area 46, the wall 44 having upwardly projecting fingers 48 adapted to resiliently hold a lead strip 50 against a surface 52 of the base portion 14 at a point where contacts 32 and 34 pass through said wall.

In operation, a typical cycle is started when the actuator 18 is moved in either direction from the neutral position along a portion of the surface 42 as seen in FIGURE 5. As best seen in FIGURE 3, the spring 22 abuts the wall portion 26 and, as the actuator 18 is moved towards wall portion 26, the hook portions 20 pick up one edge of the spring 22 and depress it against the wall portion 26. The slidable contact 28, being engaged with the actuator 18, is caused to move in the same direction until a portion 60 makes contact with the contact 32. The contacts are so disposed that this occurs when portion 62 of the slidable contact 28 makes electrical contact with the hot lead contact 36. As long as pressure is maintained on the actuator 18, a circuit energized between the hot lead contact 36 and the contact 32 will be maintained. As the spring 22 is depressed in the aforementioned manner, the compacting of this spring will cause the slidable contact 28 to be more firmly held in engagement with the hot lead contact 36 and the contact 32. The slidable contact 28 is more firmly urged toward the contact 36 and the contact 32 by the natural tendency of the spring 22 to deflect laterally as it is compressed when it is contained at its ends and on one side by the housing.

As pressure is released from one side of the actuator 18, the stored energy in the spring 22 bearing against the hook portions 20 will cause the actuator 18 to return to a neutral position.

The manner of operation of this switch will be duplicated in a reverse manner as the actuator 18 is moved in the opposite direction.

A second embodiment of this invention illustrates its utility when used as a lock-out switch for electrical circuits. Referring now to FIGURE 7, the actuator 18, when moved towards the left, has a groove 58 which will engage the depressed portion 56 of the spring strip 54, thus holding the actuator 18 in that position. When it is desired to place the actuator 18 back in its neutral position, sufficient pressure must be exerted on the actuator to push the actuator free of the depressed portion 56 of the spring strip 54.

As best seen in FIGURE 8, the abutment 26 is removed and the centering of the actuator is accomplished by finger pressure assisted by the resilient spring strip 54. When the actuator 18 is moved towards the right, the function is exactly the same as described in the generic embodiment.

The utility of this embodiment is seen in an application in which the embodiment is used as a lock-out switch for the operation of electrical windows of an automobile. In this environment, the operator of a vehicle is provided with a means of enabling and disabling the window switches elsewhere in the vehicle and to permit operation of the windows in an emergency situation where the ignition switch is locked and the car keys are unavailable.

In the centered or neutral position of the switch as shown in FIGURE 6, the circuits to the switch can be such that the window switches, other than the operator's, are disabled but the operator's panel of window buttons

are operable if the ignition is on. When the operator's button is moved to the left as the switch appears in FIGURE 7, the depressed portion 56 engages the groove 58 and maintains the actuator in this position. When so positioned, all window switches are operable if the ignition is on.

When the actuator is moved from the position shown in FIGURE 6 to the right wherein the spring is compressed by the hooked portions of the actuator against the far wall 24, the operator's panel is enabled even though the ignition switch is off. It should be noted that during this operation, the operator must continue finger pressure on the lock-out switch while operating the window switch inasmuch as the spring pressure is continuously urging the button to the neutral position.

The fact that pressure must be applied simultaneously to a pair of buttons to operate the windows when the ignition is off provides a safety feature in that a person, for example, a child attempting to operate the windows of an automobile, is not likely to discover that both buttons must be depressed simultaneously to operate the windows. Windows, other than the driver's window, are inoperative in this case because of the physical distance between the lock-out switch and the individual window switches.

While the embodiments of the present invention, as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. The combination of electric window lift circuits for an automobile and an electrical switch for the selective energization of one of a plurality of electrical circuits arranged to control the electric window lift circuits, said switch comprising a housing wherein an actuator means is held in biased centered disposition by a resilient means and being adaptable for translational movement, said actuator means having a slidable conductor disposed to make electrical contact with a plurality of conductors, said conductors being in conductive relationship to said plurality of circuits, said housing having a base portion wherein the plurality of conductors are disposed, said slidable conductor being biased toward said base by the resilient means and being responsive for translational movement to the actuator means whereby one of said plurality of electrical circuits is selected, said switch including means for holding said actuator means in one extreme of translational movement thereby maintaining the electric windows of an automobile in an operative condition.

2. An electrical switch comprising a housing having an opening therein and a base portion, an actuator means disposed for translational movement within said housing and having a portion protruding through the opening in said housing for manipulation, resilient means operatively associated with the actuator means for centering said actuator means in said housing, and a slidable contact disposed to make electrical contact with a plurality of electrical leads disposed in said base portion and being biased toward said base portion by said resilient means during translational movement of said actuator means thereby effecting a selection of one of the plurality of electrical leads, said actuator means including a detent portion arranged to cooperate with one of said resilient means to selectively hold the actuator means in one extreme of translational movement or to urge said actuator means to a centered position.

3. An electrical control comprising a housing, an actuator means disposed within said housing and adapted to be moved translationally to two extremes of movement, a plurality of resilient means for positioning said actuator, one of said resilient means being compressed by said actuator means and thereby storing a force, another resilient means arranged to center said actuator and to hold said actuator in an extreme position, and a plurality of electrical contacts, a first of said contacts being operatively associated with said actuator means, said second mentioned resilient means urging said first contact with an increasing force generated by its own deflection as it compresses during a translational movement of the actuator means toward one extreme of movement, and several of said contacts being disposed in a portion of said switch body and positioned so as to cooperate with said first contact to control a plurality of electrical circuits.

4. An electrical control comprising a housing having electrical circuits connected thereto and an opening therein, an actuator means disposed for translational movement between two extremes of movement in said housing including a portion protruding through said opening, a plurality of resilient means engaging said actuator means for positioning said actuator means in said housing, a first of said resilient means being adapted to center said actuator during one condition of operation and a second of said resilient means for biasing said actuator means toward an extreme position during a second operating condition, and a plurality of electrical contacts, a first of said contacts engaging said actuator means and adaptable for slidable movement and several of said contacts being leads to said electrical circuits and being carried by said housing to make contact with said slidable contact during translational movement thereof thereby effecting a switching action from one circuit to another, said second resilient means deflecting laterally during a compressing thereof to urge the first contact means toward the second contact means with an increasing force as the actuator means moves toward one extreme translational movement.

5. An electrical control comprising a housing having an opening in one side thereof and electrical circuits connected to leads disposed on another portion thereof, an actuator means adaptable for translational movement between two extremes in said housing and having a portion extending through the opening in said housing, a plurality of resilient means for positioning said actuator means, one of said resilient means engageable by said actuator means during translational movement toward one extreme of movement to center said actuator, another of said resilient means arranged to selectively hold said actuator means or to urge said actuator means to a centered position from another extreme of translational movement when manually pushed from the extreme of movement, and a slidable contact cooperating with said actuator means and being in biased engagement with the portion of said housing having electrical circuits connected thereto whereby translational movement of said actuator means is transmitted to said slidable contact thereby effecting a switching action of said electrical circuits.

6. An electrical switch comprising a housing, an actuator means adaptable for translational movement between two extremes in said housing, a centering resilient spring means for said actuator means carried between the housing and extending legs of said actuator means, and a slidable contact means engaging said actuator means, said slidable contact means being increasingly biased towards electrical leads by the contractive action of the centering resilient spring means as it is depressed during the translational movement of the actuator means thereby effecting a positive switching action.

7. An electrical control comprising a housing having an opening in one side thereof and electrical circuits connected to leads disposed on another portion thereof, an actuator means adaptable for translational movement between two extremes of movement within said housing and having a portion extending through the opening in said housing and another portion having a detent thereon, a resilient spring for centering said actuator after translational movement in one direction and a resilient metal strip having a depressed portion cooperating with said detent in the actuator means for holding said actuator means at the point of maximum travel after translational movement in another direction and effecting a centering action of the actuator in said switch housing when the

actuator is freed from its engagement with the depressed portion of said resilient metal strip, and a slidable contact cooperating with said actuator means and being in biased engagement with the portion of said housing having electrical circuits connected thereto whereby translational movement of said actuator means is transmitted to said slidable contact thereby effecting a switching action of said electrical circuits.

8. An electrical switch comprising a housing having an opening in one side and a compartment therein, an actuator means having downwardly projecting lug portions, an upwardly projecting portion extending through the opening in said housing, and a portion with a detent therein, said actuator adaptable for translational movement between two extremes of movement within said housing compartment, a resilient spring disposed to abut the ends of said compartment and adapted to be engaged by the downwardly projecting lugs for returning said actuator to a center position from one extreme of translational movement, a resilient metal strip extending from one wall of said housing and having a depressed portion

cooperating with the actuator detent to hold the actuator in another extreme of translational movement, said strip being adapted to center said actuator after said actuator is moved from said depressed portion of the resilient strip, and a slidable contact engaging said actuator and being biased toward the base of said housing compartment in which electrical leads are disposed by the resilient spring, said slidable contact being responsive to the actuator means during translational movement thereby effecting a switching in electrical circuits.

References Cited by the Examiner

UNITED STATES PATENTS

2,586,750	2/52	Wagner	200—16
2,710,317	6/55	Pearl	200—16
2,919,315	12/59	Woofter	200—16
2,977,432	3/61	Spicer	200— 16 X
3,106,619	10/63	Scheid	200—16

BERNARD A. GILHEANY, *Primary Examiner.*