

Oct. 3, 1967

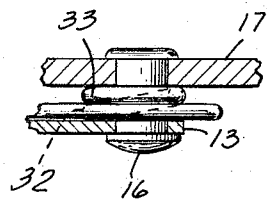
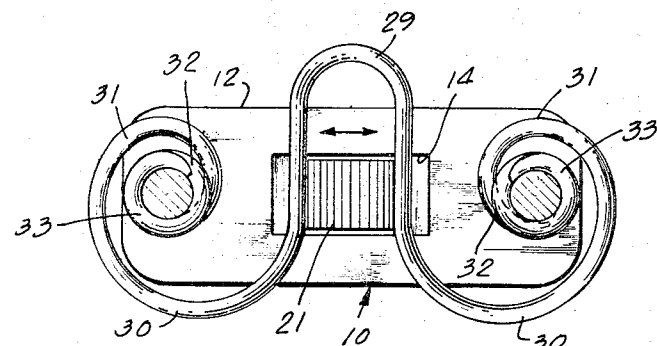
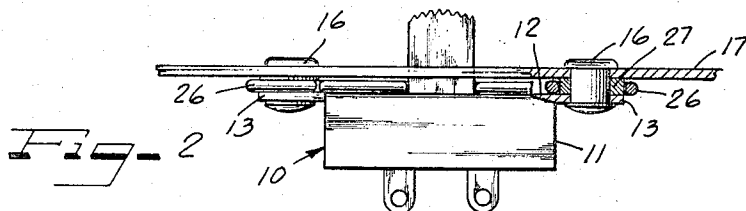
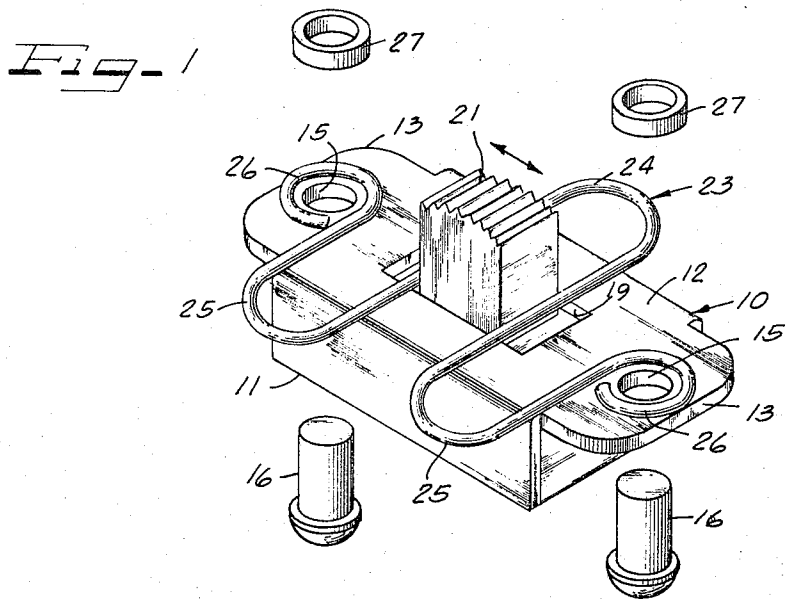
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3,345,488

CENTER BIAS MOMENTARY SWITCH

Filed Nov. 4, 1966

2 Sheets-Sheet 1



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Fig-5

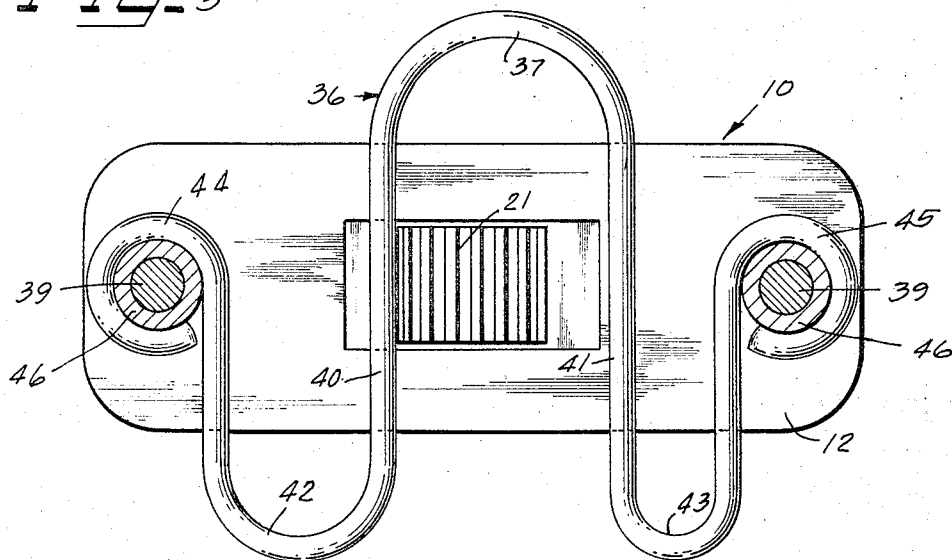
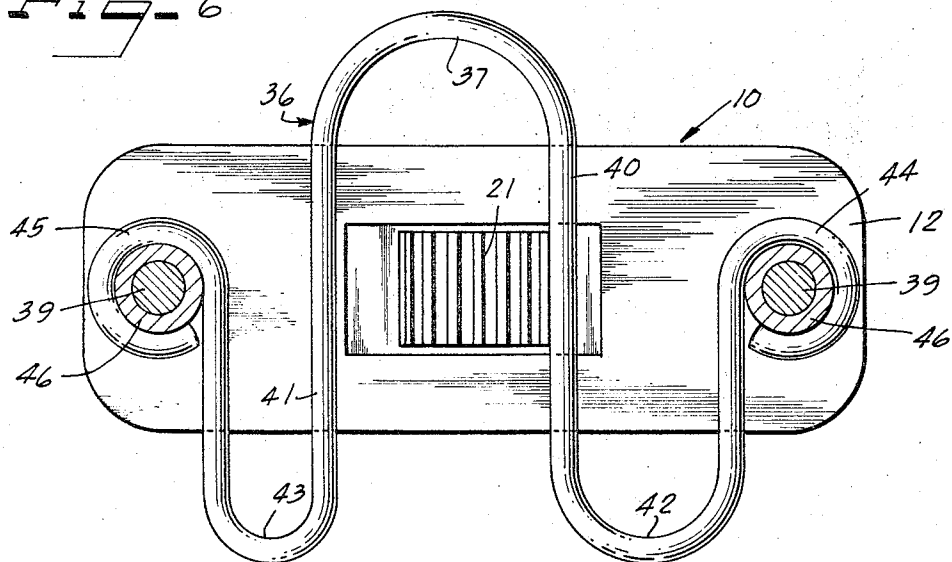


Fig-6



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3,345,488

CENTER BIAS MOMENTARY SWITCH

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11 Claims. (Cl. 200—153)

This invention relates to improvements in switches and more particularly relates to an improved form of three position switch, momentarily in two positions of the switch.

In carrying out my invention I provide an improved form of three position switch and a simplified biasing means therefor, biasing the switch in one position and momentarily remaining in its other two positions upon manual release of the trigger for the switch and also provide an alternate form of biasing means which may accommodate the positioning of the switch into two positions and into a momentary position on one side of the "off" position of the switch.

A principal object of the invention is to provide a simple and improved form of momentary switch, having two momentary energizing positions and having biasing means for the switch biasing the switch out of its energizing positions and arranged with a view toward utmost simplicity and economy in construction and operation.

Still another object of the invention is to provide a biasing means for a three position switch biasing the switch into a neutral position, in which a formed wire spring is anchored from movement in the direction of movement of the trigger for the switch at its free ends and extends along opposite sides of the trigger of the switch trigger to a neutral position as manual pressure is relieved therefrom.

A further object of the invention is to provide a spring adapter for the trigger of a three position switch, converting a standard three position switch into a switch having two momentary positions.

A still further object of the invention is to provide a spring adapter for the trigger of a three position switch, which may convert a standard three position switch into a switch having a momentary position on either side of its off position.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a conventional form of switch with biasing means constructed in accordance with the principles of the present invention connected with the switch trigger and showing the anchoring means for the biasing means in exploded form;

FIGURE 2 is a view in side elevation of the switch shown in FIGURE 1, showing the switch mounted on its mounting plate;

FIGURE 3 is a plan view of a switch similar to that shown in FIGURE 1 but showing a modified form in which the biasing means for the switch may be constructed;

FIGURE 4 is a fragmentary sectional view taken vertically through an anchoring connection for the biasing means for the switch;

FIGURE 5 is a plan view of a switch similar to that shown in FIGURES 1 and 2 but showing a modified form of the invention in which the biasing means may convert the switch to a momentary switch in one direction; and

FIGURE 6 is a plan view similar to FIGURE 5 but showing the biasing means turned over to convert the switch to a momentary switch in an opposite direction.

In the embodiment of the invention illustrated in FIG-

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URES 1 and 2 of the drawings, I have shown a conventional form of three position electrical switch 10, including a switch casing 11 forming a housing for stationary and movable contacts of the switch (not shown), arranged to provide a central neutral deenergizing position and energizing positions on opposite sides of the neutral deenergizing position.

The switch 10 may be of a type used to energize a reversible motor, such as may be used for raising and lowering flexible windows, screens, shades and the like, in which it is desirable to have the operator hold the switch in the required "on" position until the window or other device being raised or lowered is at a required location, at which time the switch should instantaneously move to a neutral position, as pressure is relieved from the actuator member for the switch, to effect instantaneous deenergization of the drive motor for the window or other device being raised or lowered.

The switch casing 11 has a cover plate 12 extending beyond opposite ends of the casing and providing integral attachment flanges 13, 13 extending beyond opposite ends of the casing 11. The attachment flanges 13, 13 have apertured portions 15, 15 spaced equal distances from the transverse center of the switch, the apertures of which form an attachment means for rivets 16, 16 or other suitable securing means for attaching the switch casing to a mounting plate 17.

The cover plate 12 has a slot 19 extending therealong within the margins of the switch casing 11 and terminating at its opposite ends equal distances from the centers of the apertured portions 15, 15 and the rivets 16, 16 extending therethrough. A conventional manually operable trigger 21 is slidably mounted within the switch casing 11 in a suitable manner, to move the movable contacts of the switch from a neutral deenergized position, which in the present instance is the center of the slot 19, into individual energizing positions on either side of the neutral position. The trigger 21 and its slidable mounting within the switch casing 11 and the switch contacts and operable connections to said contacts are well known to those skilled in the art so need not herein be shown or described further.

Referring now in particular to the means for biasing the trigger 21 and switch contacts into a neutral position and accommodating movement of the trigger to either side of neutral to selected energizing positions, and returning the trigger and switch contacts to a neutral position as soon as manual pressure is relieved from the trigger 21, a generally flat spring 23, is shown as engaging the trigger 21 intermediate its ends, and as being anchored at its opposite ends to anchoring devices, shown as being the rivets 16.

The flat spring 23 may be made from spring steel wire, Phosphor bronze wire or any other spring material having the resiliency to return the trigger 21 to a neutral position, as manual pressure holding the trigger in one of the energizing positions of the switch is relieved from the trigger.

The spring wire 23 is shown as formed to have a central bight portion 24 extending along opposite sides of the trigger 21 and opening to one side of the switch casing to accommodate the spring to be readily assembled to the trigger. The central bight portion 24 terminates at its open end into oppositely facing bight portions 25, 25 formed from the free ends of the bight portion 24. The bight portions 25 terminate at their free ends into integrally formed anchoring eyes 26, 26 anchored to the rivets 16, 16.

As shown in FIGURES 1 and 2, spacers 27, 27 in the form of collars are mounted on the rivets 16, 16 and extend within the anchoring eyes 26, 26. The collars 27,

27 are thicker than the wire and engage the underside of the mounting plate 17, to space side mounting plate from the spring 23, and thereby accommodate free movement of the eyes 26, 26 about said collars and free flexing of the spring, to assure return of the trigger 21 to its neutral position, as manual pressure is relieved therefrom.

The spring 23, therefore, is in effect an adapter and may adapt various forms of switches into momentary switches having two momentary energizing positions.

In the form of the invention illustrated in FIGURE 3 I have shown a switch 10 like that shown in FIGURES 1 and 2. Like part numbers will, therefore, be applied to like parts of the switch. In this form of the invention, a central bight portion 29 of the biasing spring of the switch terminates into oppositely facing bight portions 30, 30. The bight portions 30, 30 are curved inwardly at their outer ends along uniform lines of curvature to form radially expansible loops 31, 31. The radially expansible loops 31, 31 are formed to continue their inward curvature and form anchoring eyes 32, 32 within the radial loops 31, 31. The anchoring eyes 32, 32 are bent to a spiral form into the lower eyes 32, 32 abutting the tops of the flanges 13, and upper eyes 33, extending about said lower eyes and abutting the underside of the mounting plate 17, and spacing the radially expansible loops 31 therefrom. The radially expansible loops 31, 31 thus have sufficient resiliency to enable the anchoring eyes 32, 32 to be clamped in position against the mounting plate 17 and form spacers to accommodate the radially expansible loops 31 to freely flex about the anchoring rivets for the eyes 32, 32, as in the form of the invention illustrated in FIGURES 1 and 2. The adapter or biasing spring otherwise operates on the same principles as in the form of the invention illustrated in FIGURES 1 and 2.

In the form of the invention illustrated in FIGURES 4 and 5 I have shown a switch 10 like that shown in FIGURES 1, 2 and 3. Like part numbers will, therefore, be applied to like part numbers of the switch, and a description of the switch need not be repeated.

In this form of the invention, a biasing spring 36 is provided having a central bight portion 37 unequally spaced between rivets 39, 39, forming anchoring means for the biasing spring. The central bight portion 37 has parallel legs 40 and 41 terminating into bight portions 42 and 43 respectively. The bight portions 42 and 43 are of unequal widths and terminate at their free ends into integrally formed anchoring eyes 44 and 45 on the outer sides of said bight portions, as in the form of the invention illustrated in FIGURE 1. The anchoring eyes 44 and 45 extend about spacer collars 46, 46 on the rivets 39, 39 and thicker than the wire, to prevent binding of the spring.

It may be seen from FIGURE 5, that when the biasing spring 36 is in the position shown in FIGURE 6 the leg 40 of the bight portion 37 will engage a side of the trigger 21. The opposite leg 41 will be free from the trigger. The switch 10, therefore, will only be a momentary switch when the trigger is moved in a direction, which in FIGURE 6 is shown as being to the left.

In FIGURE 6 the spring 36 has been turned over so the leg 40 engages the opposite side of the trigger 21 from the side shown in FIGURE 5. The switch now is a momentary switch when the trigger 21 is moved to the right to move the switch contacts to engaged positions to the right of center. The switch, therefore, may have one momentary position to either side of the off position of the switch by merely turning the biasing spring 36 over.

While I have herein shown and described one form in which the invention may be embodied, it may readily be understood that various modifications and variations in the invention will be attained without departing from the spirit and scope of the novel concepts thereof.

I claim as my invention:

1. In a three position switch having a neutral position and positions to each side of neutral, a switch casing, a manually operable switch trigger mounted in said switch casing, to move the contacts of the switch from a neutral position to operative positions to either side of neutral, and means biasing said trigger to normally maintain said trigger in a neutral position and to instantaneously return said trigger from either of its positions to each side of neutral to its neutral position, as manual pressure is relieved from the trigger, comprising a flat spring engaging said trigger intermediate its ends and anchored at its opposite ends from movement in the direction of movement of the trigger.
2. The structure of claim 1, wherein the flat spring is a wire spring having a central bight portion extending along opposite sides of the trigger and terminating into bight portions on opposite sides of said central bight portion, facing oppositely from said central bight portion and anchored at the outer ends of said bight portions from movement in the direction of movement of the trigger.
3. The structure of claim 2, wherein the outer bight portions terminate into anchoring eyes, anchored equal distances from opposite sides of the neutral position of said trigger, and free to move about the centers of said anchoring eyes.
4. The structure of claim 3, wherein fixed anchoring members extend within the anchoring eyes and spacers are interposed between the anchoring members and anchoring eyes to accommodate free movement of the anchoring eyes about the anchoring members.
5. The structure of claim 1, wherein the switch comprises a switch casing having attachment flanges extending from opposite sides thereof and having apertured portions spaced equal distances from the neutral position of the switch trigger, wherein a mounting plate forms a mounting for said switch casing, wherein the flat spring is a wire spring mounted between the switch casing and mounting plate and having a central bight portion extending along opposite sides of said trigger and terminating at its free ends into bight portions facing oppositely from said central bight portion, wherein the free ends of said oppositely facing bight portions are bent outwardly to form anchoring eyes disposed outwardly of said outwardly facing bight portions and anchored to said switch casing by said anchoring means, wherein fastening means extend through the apertures of said apertured portions and said anchoring eyes, and fasten the switch casing to said mounting plate, and wherein spacers extend about said fastening means and within said anchoring eyes and are thicker than said flat spring, to accommodate the mounting of said switch casing on said mounting plate and to space said mounting plate from said spring and thereby accommodate free flexing of said spring and assure positive return of said trigger from either of its momentary positions to its neutral position.
6. The structure of claim 2, wherein the bight portions on opposite sides of the central bight portion have inwardly curved relatively large diameter radially expansible portions terminating into anchoring eyes.
7. The structure of claim 6, wherein the anchoring eyes are within the limits of the inwardly curved relatively large diameter radially

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expansible portions, to accommodate free movement of said radially expansible portions upon the anchoring of said anchoring eyes in position and are turned about fixed axes at the centers thereof for at least two turns to form spacers, and accommodate free expansible movement of said radially expansible portions.

8. The structure of claim 2,

wherein the switch comprises a switch casing having attachment flanges extending from opposite sides thereof and having apertured portions spaced equal distances from the neutral position of the switch trigger,

wherein a mounting plate extends parallel to said flanges,

wherein the biasing spring is mounted between said switch casing and mounting plate,

wherein the bight portions on opposite sides of said central bight portion have inwardly curved relatively large diameter radially expansible portions terminating into anchoring eyes within the limits of said radially expansible portions and said bight portions,

and wherein fastening means extend through the apertures of said apertured portions and through said anchoring eyes, and form anchoring means therefor and clamp said anchoring eyes to the underside of said mounting plate.

9. The structure of claim 8,

wherein the anchoring eyes are spirally curved into more than one coaxial superimposed loop, spacing said spring from said mounting plate and accommodating free radial expansion of said radially expansible portion of said spring.

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10. The structure of claim 1,

wherein the flat spring is a wire spring having spaced anchoring eyes at its opposite ends and a bight portion between said anchoring eyes and spaced closer to one anchoring eye than the other,

and wherein the anchoring eyes are adapted to be anchored to said switch casing to position said trigger within said bight portion closer to one side of said bight portion than the other, whereby said spring is effective to return said switch trigger from one energizing position only, and may be turned over to return said switch trigger from an opposite energizing position.

11. The structure of claim 10,

wherein the bight portion has spaced leg portions, one of which engages one side of said switch trigger when moved in one direction only,

and wherein said leg portions are so spaced with respect to said anchoring eyes that one leg portion is always free from said switch trigger and the other leg portion may engage one side or the other of said switch trigger depending upon the position of said spring on said switch casing.

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