Feb. 16, 1965 J. H. MULLEN 3,169,406

CONTROL SWITCH OPERATOR

Filed May 31, 1961 2 Sheets-Sheet 1

Fig. 1.

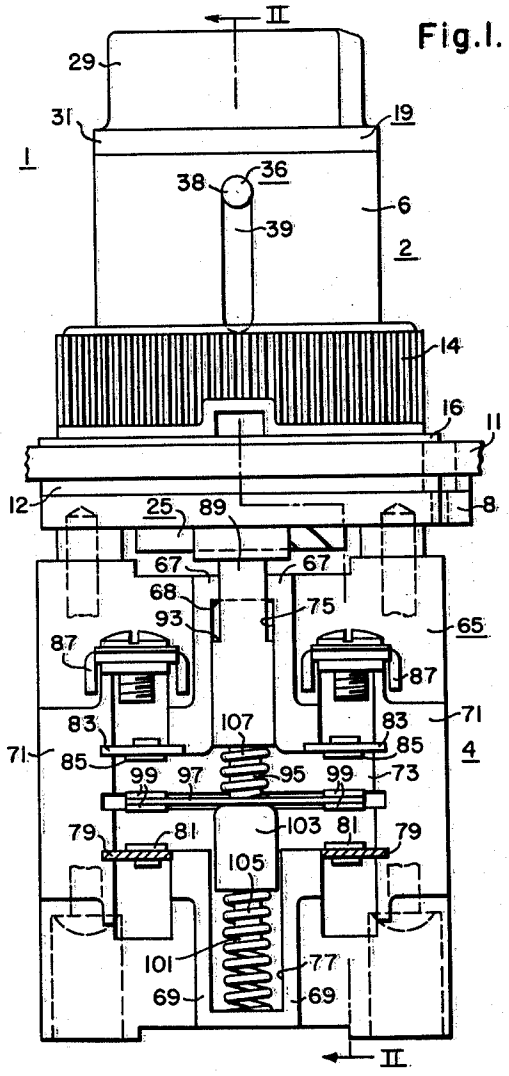


Fig. 2.

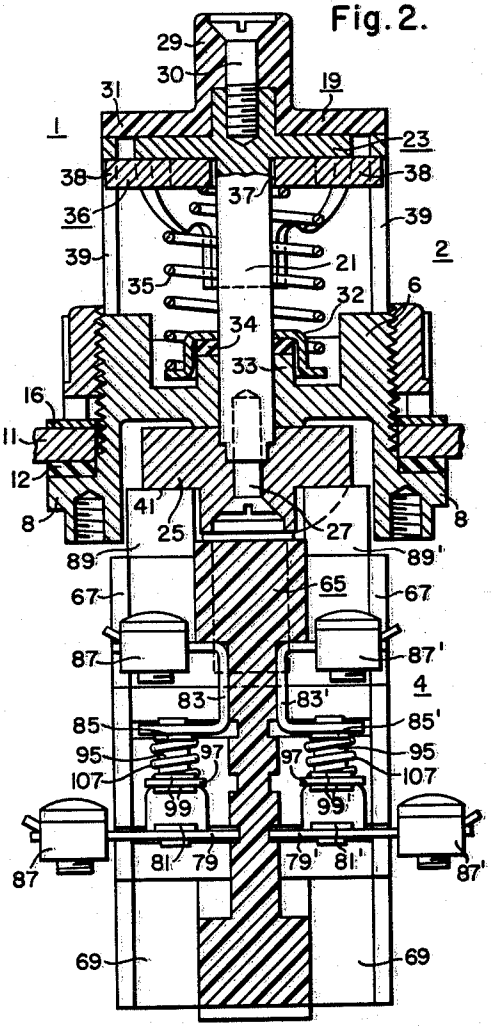


Fig. 5.

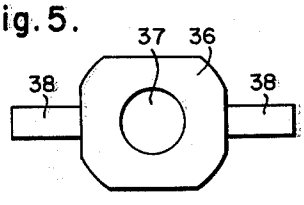


Fig. 6.

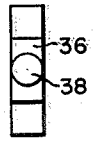
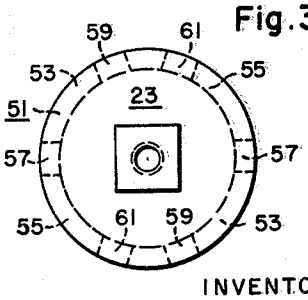


Fig. 3.



WITNESSES

Edwin E. Bassler

William W. Elchik

INVENTOR

John H. Mullen

BY

ATTORNEY

Feb. 16, 1965 J. H. MULLEN 3,169,406

CONTROL SWITCH OPERATOR

Filed May 31, 1961 2 Sheets-Sheet 2

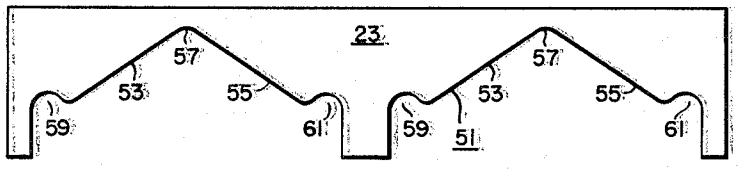


Fig. 4.

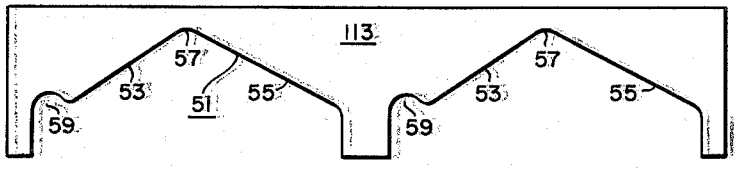


Fig. 8.

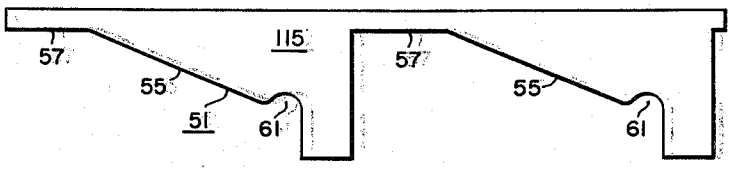


Fig. 9.

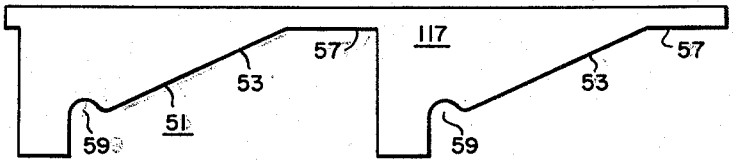


Fig. 10.

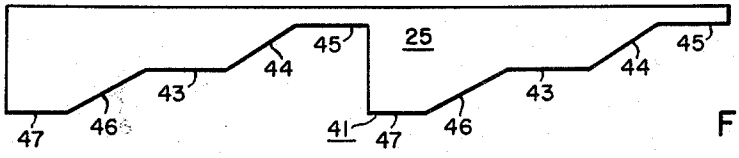


Fig. 7.

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CONTROL SWITCH OPERATOR

John H. Mullen, Brighton Township, Beaver County, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Filed May 31, 1961, Ser. No. 113,714
9 Claims. (Cl. 74—99)

This invention relates generally to electric control switches, more particularly to electric control switches of the type having a reciprocating operating member and even more particularly to actuating units for such control switches.

It is old in the art to provide a control switch having an actuating structure that is manually rotatable from a first to a second position to cam a reciprocal spring-biased switch operating member from a first to a second operating position. During this movement a movable spring support is cammed to a position charging a spring so that upon release of the actuating structure the charged spring discharges to automatically effect movement of the actuating structure back to the first position, whereupon the spring-biased operating member is automatically moved back to its first position. In this prior art type of switch only the first or original position is automatically maintained.

An object of this invention is to provide a control switch of the type hereinbefore described, which switch has two and, in some instances, three positions that are automatically maintained.

A more general object of this invention is to provide a control switch having improved operation and utility.

Another object of this invention is to provide a control switch that comprises an improved actuating unit.

Other objects of this invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of the invention, there is provided an electric control switch comprising a switch unit that includes a spring-biased operating member that is reciprocable to open and close a circuit. An actuating unit is provided comprising a tubular support member having two elongated vertically extending slots therein. An actuating structure is rotatably supported on the support member and it includes a manually operated member having two cams attached thereto. One of the cams engages the reciprocable operating member to cam this member to various operating positions upon rotation of the actuating structure. An operating spring is supported within the subular support member between a stationary spring support and a movable spring support. The movable spring support has two projections thereon engaging in the two slots in the support member to prevent rotation and to permit reciprocation of the movable spring support. The other cam on the manually operated member engages the movable spring support so that upon rotation of the actuating structure the movable spring support is cammed and, being guided by the slots in the tubular support member, it moves in a direction to charge the operating spring. Notches are provided in the cam that engages the movable spring support, and when the actuating structure reaches a predetermined operating position, parts of the movable spring support engage in the notches to maintain the actuating structure and operating member in the predetermined position after the actuating structure is released. When it is desired to effect movement of the operating member and actuating structure back to the starting position, the actuating structure is manually rotated a sufficient distance to disengage the movable spring support from the notches in the cam whereupon the charged spring discharges to move the actuating structure back to the starting position, and the spring-biased operating member is automatically returned to its starting position.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, in conjunction with the accompanying drawings, in which:

FIGURE 1 is a view partly in section illustrating a control switch that embodies principles of the invention;

FIG. 2 is a sectional view taken substantially along the line II—II of FIG. 1;

FIG. 3 is a top view of one of the cam members seen in FIG. 2;

FIG. 4 is a linear development of the cam member hown in FIG. 3;

FIGS. 5 and 6 are top and end views, respectively, of the movable spring support seen in FIG. 2;

FIG. 7 is a linear development of another cam that is seen in FIG. 2;

FIGS. 8, 9 and 10 are linear developments of other cams that can be used in place of the cam seen in FIGS. 3 and 4 when certain desired operational characteristics are required.

Referring to the drawings, and particularly to FIGS. 1 and 2, an electric control switch indicated generally at 1 comprises an actuating unit indicated generally at 2 and a switch unit indicated generally at 4. The actuating unit includes a tubular supporting sleeve 6 having a flanged portion 8 on the inner end thereof which flange portion is disposed at the inner side of a supporting panel 11. A sealing disc 12 composed of any desirable sealing material, such as rubber, may be interposed between the flange portion 8 and the inner surface of the panel 11. A portion of the tubular support member 6 is threaded for receiving a clamping ring 14 that is adapted to secure the support member 6 to the panel 11 when the clamping ring 14 is drawn down tightly. A name plate 16 having an extended portion at one side is supported between the clamping ring 14 and the panel 11. The name plate 16 may carry suitable indicia for a proper identification of the switch and for indicating the various operating positions of the switch.

An actuating structure, indicated generally at 19, comprises an elongated member 21 having a cam portion or member 23 at its upper end; a cam member 25 secured to its lower end by means of a screw 27, and an operating handle 29 secured to its upper end by means of a screw 30. The actuating structure 19 is rotatably supported on the tubular support member 6 by means of a flange portion 31 on the handle 29 which flange portion engages the upper edge of the support member 6.

A stationary spring support 32 having an opening therein through which the member 21 passes, is supported on a cylindrical portion 33 of the support member 6. A gasket 34 is provided between the stationary spring support 32 and the portion 33 of the support member 6. An operating spring 35 is supported between the stationary spring support 32 and a movable spring support 36, which movable spring support has an opening 37 through which the member 21 extends. Two projections 38 extending from opposite sides of the movable spring support 36 engage in two elongated vertical slots 39 in the tubular support member 6.

The cam member 25, a development of which is shown in FIG. 7, has a cam surface 41 that comprises two oppositely disposed intermediate generally horizontal portions 43, two oppositely disposed slanting portions 44 that lead to two upper oppositely disposed generally horizontal portions 45, and two oppositely disposed slanting portions 46 that lead to two lower oppositely disposed generally horizontal portions 47.

The cam portion or member 23, a development of which is shown in FIG. 4, has a cam surface 51 com-

prising two oppositely disposed slanting surfaces 53 and two oppositely disposed slanting surfaces 55. The slanting surfaces 53, 55 form two inverted U-shaped surfaces each having an apex 57. Two notches 59 are disposed at the ends of the cam surfaces 53, and two notches 61 are disposed at the ends of the cam surfaces 55.

The switch unit 4 is of the type specifically described in the patent to S. L. Frank, Patent No. 2,669,616. The switch unit 4 comprises a base 65, which is preferably of a molded insulating material. The base 65 is provided with opposed projections 67 and 69 on two sides thereof, and it has, on the same sides, another pair of opposed projections 71. All of the projections 67, 69 and 71 are spaced apart so as to provide a recessed space 73 between the inner ends thereof.

The projections 67 have a recess 75 extending throughout the length of the projections. An internal shoulder 68 is formed near the upper ends of the projections 67. The projections 69 have a recess 77 therebetween, the lower end of which is closed.

Two straight contact strips 79 and two similar contact strips 79' are disposed in suitable slots which are provided at the inner sides of each projection 71 for receiving one edge of each of the contact strips, the opposite edge of each strip being received in a slot provided in one of the projections 69. Each of the contact strips 79 and 79' is provided with a contact 81 or 81'.

Two generally U-shaped contact strips 83 and two similar contact strips 83' are supported in suitable slots in the base 65. Each of the U-shaped contact strips 83 and 83' has one leg supporting a stationary contact 85 or 85', and the leg of each strip which does not hold the stationary contact 85 or 85', supports a terminal 87 or 87' for the purpose of securing a conductor thereto. Terminals 87 and 87' are also supported at the outer ends of the contact strips 79 and 79', respectively.

The switch unit includes two operating members 89 and 89' (FIG. 2) which are preferably molded from an insulating material, and which are disposed in the recesses 75, 73, 77 in the base 65. As can be seen in FIGS. 1 and 2, the switch unit 4 includes two identical parts operated by the operating members 89 and 89', respectively. The part operated by the operating member 89 is specifically shown in FIG. 1 and will hereinafter be specifically described. It is to be understood, however, that unless otherwise described, the same general description can be applied to both parts of the switch unit 4.

Referring to FIG. 1, the operating member 89 has a shoulder portion 93 which is engageable with the shoulder 68 adjacent the outer end of the recess 75 to limit the extent of outer movement of the operating member. The operating member 89 has a contact supporting portion 95 thereon. A bridging contact member 97 is slidably mounted on the supporting strip 95. The bridging contact member 97 is provided with contacts 99 on opposite sides thereof and at each end of the bridging member for cooperation with the contacts 81 of the contact strips 79 and the contacts 85 of the U-shaped contact strips 83. The contact supporting portion or strip 95 has an extension 101 on which is slipped a spring supporting sleeve 103, also preferably composed of an insulating material. A coil compression spring 105 is disposed in the recess 77 to react between the closed end of the recess and the sleeve 103 to normally bias the operating member 89 upwardly to the intermediate position shown in FIGS. 1 and 2. Upward movement of the operating member 89 is stopped in the position shown in FIGS. 1 and 2 by engagement of the operating member 89 with one of the cam surfaces 43 (FIG. 7) of the cam member 25. A coil compression spring 107, which is weak relative to the spring 105, is provided on the contact supporting strip 95, and it reacts between the operating member 89 and the bridging contact member 97 in a manner to be hereinafter specifically described.

As seen in FIG. 1, the bridging contact member 97 is in an intermediate position. When the operating member 89 is depressed, it moves the bridging contact member 97 and the contacts 99 down against the bias of the spring 105, into engagement with the lower contacts 81. When the lower contacts 99 of the bridging contact member 97 engage the contacts 81, the spring 107 will compress allowing for overtravel of the operating member 89. When the force against the operating member 89 is released, the spring 105 operates to return the operating member 89 and the bridging contact member 97 back to the intermediate position shown. The operating member 89 is stopped in this intermediate position in a manner to be hereinafter specifically described. When the operating member 89 is further released, the spring 105 operates to move the operating member and the bridging contact operating member 97 up to a position in which the upper contacts 99 engage the contacts 85. A force can then be applied to return the operating member 89 and bridging contact member 97 back to the position shown in FIGS. 1 and 2.

As was previously mentioned, the description and operation of the operating member 89' (FIG. 2) and its associated parts which are identified with primed reference characters, is identical to the description and operation of the operating member 89 and its associated parts.

The operation of the switch 1 is as follows: As shown in FIGS. 1 and 2, the switch is at an initial position in which the bridging contact member 97 is disposed intermediate the contacts 81 and 85 and the bridging contact member 97' is disposed intermediate the contacts 81' and 85'. In this position, the switch operating members 89 and 89' engage the horizontal portions 43 (FIG. 7) of the cam member 25. The projections 38 (FIGS. 1, 2, 5 and 6) of the movable spring support 36, are disposed in the upper ends of the elongated vertical slots 39 (FIGS. 1 and 2) in the support member 6. The projections 38 of the movable spring support 36 also engage in the vertices 57 (FIG. 4) of the cam member 23 when the parts are in the positions seen in FIGS. 1 and 2.

When it is desired to operate the switch 1, the handle 29 of the actuating structure 19 is rotated in one direction whereupon the two cam surfaces 53 (FIG. 4) of the cam member 23 engage the projections 38 (FIGS. 1, 2, 5 and 6) of the movable spring support 36 and, since the support member 6 is stationarily supported, these cam surfaces 53 cam the movable spring support 36 down to charge the spring 35 (FIG. 2). During this movement, the cam surfaces 46 (FIG. 7) of the cam member 25 engage the operating members 89 and 89' to cam these members down to a position in which the contacts 99 and 99' engage the contacts 81 and 81'. When the parts have reached this operating position, the operating members 89 and 89' engage the horizontal portions 47 (FIG. 7) of the cam member 25. When the parts have reached this operating position, the projections 38 of the movable spring support 36 engage in notches 59 (FIG. 4) in the cam member 23, so that upon release of the handle 29 the parts remain in this maintained position.

When it is desired to operate the switch back to the position shown in FIGS. 1 and 2, the handle 29 is manually rotated just enough to disengage the projections 38 of the movable spring support 36 from the notches 59 (FIG. 4), thus defeating the maintaining means, whereupon the stored energy of the charged spring 35 takes over to effect movement of the spring support back up to the position shown in FIGS. 1 and 2 in which position the projections 38 engage in the vertices 57 (FIG. 4) of the cam member 23.

As the movable spring support 36 moves upward, the projections 38 thereon engage the cam surfaces 53 (FIG. 4) on the cam member 23 to effect rotation of the actu-

ating structure 19 back to the position seen in FIGS. 1 and 2. During this movement, the cam 25 (FIG. 7) is rotated so that the operating members 89 and 89' are permitted to return to the position shown in FIGS. 1 and 2 under the bias of the spring 105 (FIG. 1) in which position the operating members again engage the oppositely disposed horizontal portions 43 (FIG. 7) of the cam member 25.

When it is desired to close the contacts 99 and 99' with the upper contacts 85 and 85' respectively, the operating handle 29 is rotated in the opposite direction from the first described contact closing operation whereupon the two cam surfaces 55 (FIG. 4) of the cam member 23 engage the projections 38 of the movable spring support 36 and cam the movable spring support down charging the spring 35. At the end of this movement, the projections 38 engage in the notches 61 (FIG. 4) of the cam member 23 to maintain the parts in this position. During this movement, the cam member 25 (FIG. 7) rotates so that the horizontally disposed portions 43 (FIG. 7) move off of the operating members 89 and 89' and these operating members move upward under the bias of the spring 105 (FIG. 1) to a position where they engage the oppositely disposed horizontal portions 45 (FIG. 7) of the cam member 25. During this upward movement of the operating members 89 and 89', the bridging contact members 97 and 97' are moved up to engage the contacts 99 and 99' with the contacts 85 and 85', respectively.

The parts are maintained in this position until the operator again desires to effect return of the parts to the initial intermediate position shown in FIGS. 1 and 2 whereupon the handle 29 is rotated just enough to disengage the projections 38 of the movable spring support 36 from the notches 61 (FIG. 4) whereupon the charged spring 35 discharges to effect upward movement of the movable spring support 36.

During this upward movement of the movable spring support 36, the projections 38 thereon engage the cam surfaces 55 (FIG. 4) of the cam member 23 effecting rotation of the actuating structure 19 back to the position seen in FIGS. 1 and 2 in which position the projections 38 again engage in the vertices 57 (FIG. 4) of the cam member 23. During this rotating movement of the actuating structure 19, the cam surfaces 44 (FIG. 7) of the cam member 25 engage the operating members 89 and 89' (FIGS. 1 and 2) to cam these operating members back down against the bias of the spring 105 to the position in which the operating members again engage the oppositely disposed horizontal portions 43 (FIG. 7) of the cam member 25. When the parts reach this position, the bridging contact members 99 and 99' are again disposed in the intermediate non-contacting positions seen in FIGS. 1 and 2.

In FIGS. 8, 9 and 10, there are illustrated three cam members 113, 115 and 117, respectively, that can be used in different embodiments of the invention in place of the cam member 23 (FIG. 4). The parts of the cam members 113, 115 and 117 that function in substantially the same manner as similar parts of the cam member 23 (FIG. 4) are designated by the same reference characters as the similar parts of the cam member 23.

Referring to FIG. 8, it will be seen that the cam member 113 has a notch 59 at one end of each of the cam surfaces 53; but there are no notches at the corresponding ends of the cam surfaces 55. When this cam member is used as part of the actuating structure 19 (FIGS. 1 and 2), and when the actuating structure is rotated in the direction to cam the projections 38 of the movable spring support 36 against the cam surfaces 53 (FIG. 8), the actuating structure will be maintained in position when the projections 38 engage in the notches 59. When the actuating structure 19 is rotated in the other direction, however, in which direction the cam surfaces 55 (FIG. 8) engage the projections 38 to cam the movable spring support 36 down, the final position will be merely a momentary position so that, upon release of the actuating handle 29, the spring 35 will operate to effect movement of the parts back to the positions in which they appear in FIGS. 1 and 2. It can be understood that the cam member 113 (FIG. 8) can be constructed with retaining notches adjacent the cam surfaces 55 and without the retaining notches 59 adjacent the cam surfaces 53 thus providing for a maintained final position when the actuating structure is rotated to cam the cam surfaces 55 against the projections 38 and a momentary final position when the actuating structure is rotated to cam the cam surfaces 53 against the projections 38.

Each of the cam members 115 and 117 (FIGS. 9 and 10 respectively) is constructed to be used in place of the cam 23 (FIG. 4) in a switch having only two operating positions. In each case, an initial operating position is effected when the projections 38 of the movable spring support 36 engage the oppositely disposed horizontal portions 57. If the cam 115 is used, the switch will be maintained in the second operating position when the projections 38 engage in the notches 61. If the cam 117 is used, the switch will be maintained in the second operating position when the projections 38 engage in the notches 59. Otherwise, the operation of the actuating unit 2 portion of the switch 1 is generally the same as hereinbefore described.

When either the cam 113 or the cam 115 is used, the switch unit portion 2 of the switch 1 can be changed slightly. These changes would comprise merely changing the cam member 25 and the position of the contacts so that when the switch is in the first maintained position the contacts 99 and 99' of the bridging contact members 97 and 97' will engage upper contacts 85 and 85', respectively. Upon movement of the actuating structure to the second maintained position the contacts 99 and 99' will be moved down to engage the lower contacts 81 and 81', respectively. This construction of the switch unit 4 permits control of various motor circuits in a variety of ways well known to those skilled in the art.

It is to be understood that in all of the above-described structures, for certain desired operations, a switch unit 4 could be used comprising only one operating member 89 or 89' for operating only one bridging contact member 97 or 97', respectively.

From the foregoing, it is apparent that there is provided an improved control switch comprising a spring-return actuating structure that is rotatable to reciprocably move one or more switch operating members to various operating positions. Improved means are provided for maintaining the actuating structure in a plurality of positions.

Since numerous changes may be made in the above-described construction and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a switch actuating unit for reciprocally moving a switch operating member, a cam member, an actuating structure rotatable in a first direction from a first position to a second position to rotate said cam member to effect movement of said switch operating member from a first operating position to a second operating position, a first retaining means for retaining said actuating structure in said second position, resilient means operating to automatically return said first actuating structure to said first operating position when said retaining means is released to thereby effect movement of said switch operating member from said second operating position to said first operating position, said actuating structure being rotatable in a second direction from said first position to a third position to rotate said cam member to effect movement of said switch operating member from said first operat-

ing position to a third operating position, a second retaining means for retaining said actuating structure in said third position, and said resilient means operating to automatically return said actuating structure to said first operating position when said second retaining means is released to thereby effect movement of said switch operating member from said third operating position to said first operating position.

2. A switch actuating unit for reciprocally moving a switch operating member which switch operating member is spring biased to a first position, said switch actuating unit comprising, in combination, a rotatable actuating structure comprising a first cam member, a rotatable actuating member rotatable from a first position to a second position to rotate said first cam member to effect movement of said switch operating member from said first position to a second position, a spring, means comprising a second cam member charging said spring when said actuating structure is rotated from said first position to said second position, manually defeatable maintaining means operating automatically to maintain said actuating structure in said second position when said actuating structure is rotated to said second position, and said spring discharging sufficiently to automatically return said actuating structure to said first position when said maintaining means is defeated.

3. A switch actuating unit for reciprocating a switch operating member, said switch actuating unit comprising, in combination, a rotatable actuating structure comprising an actuating member and a first cam member attached to said actuating member, said actuating structure being rotatable from a first position to a second position to move said operating member from a first position to a second position, resilient means, means comprising a second cam member attached to said actuating member and charging said resilient means when said actuating structure is rotated from said first to said second position, manually defeatable maintaining means operating automatically to maintain said actuating structure in said second position when said actuating structure is rotated to said second position, and upon defeat of said maintaining means said charged resilient means operating to effect rotation of said actuating structure from said second position to said first position.

4. In a switch actuating unit for reciprocally moving a switch operating member, a rotatable actuating structure comprising an actuating member, a first cam member movable with said actuating member, a second cam member movable with said actuating member, a stationary spring support, a movable spring support having a projection thereon, a spring supported between said stationary and movable spring supports, said actuating structure being rotatable from a first position to a second position during which movement said first cam member cams said movable spring support to charge said spring member and said second cam member cams said operating member to move said operating member from a first position to a second position, said first cam member having a notch therein that receives said projection on said first spring support to maintain said actuating structure in said second position, and when said actuating structure is rotated to a position that clears said projection from said notch said charged spring operating to effect rotation of said actuating structure from said second position to said first position.

5. A switch actuating unit for reciprocally operating a switch operating member, said switch actuating unit comprising, in combination, a stationary tubular support member having two elongated slots therein, a rotatable actuating structure comprising an actuating member, a first cam member secured to said actuating member and having a cam surface thereon, a second cam member secured to said actuating member and having a cam surface thereon, a stationary spring support, a movable spring support having two projections thereon, each of said projections being disposed in one of said slots, a spring supported between said stationary and movable spring supports, upon rotation of said actuating structure from a first to a second position said cam surface of said first cam member operating to move said movable spring support to effect charging of said spring, said cam surface of said first cam member having two notches therein, said projections engaging in said notches to retain said actuating structure in said second position, when said actuating structure is rotated back towards said first position an amount sufficient to clear said projections from said notches said charged spring discharging sufficiently to effect rotation of said actuating structure back to said first position.

6. An electric switch comprising, in combination, a switch structure comprising a switch operating member reciprocable to open and close an electric circuit, means biasing said switch operating member to a first position, a rotatable actuating structure comprising a first cam member and being rotatable from a first position to a second position whereupon said first cam member is operated to move said operating member from said first position to a second position, resilient means, a second cam member operable to charge said resilient means when said actuating structure is rotated from said first to said second position, manually defeatable maintaining means operating automatically to maintain said actuating structure in said second position when said actuating structure is rotated to said second position, means for maintaining said operating member in said second position when said actuating structure is in said second position, upon defeat of said maintaining means said resilient means operating to automatically effect return of said actuating structure to said first position, and said biasing means operating to move said switch operating member back to its first position when said actuating structure is moved to its first position.

7. A switch actuating unit for reciprocally moving a switch operating member and comprising, in combination, a first cam member, a second cam member, resilient means, an actuating member rotatable in a first direction from a first position to a second position during which movement said first cam member is operated to effect movement of said switch operating member from a first operating position to a second operating position and said second cam member is operated to charge said resilient means, a first retaining means for retaining said actuating structure in said second position, upon defeat of said first retaining means said charged resilient means operating to automatically return said actuating structure to said first operating position to thereby effect movement of said switch operating member from said second operating position to said first operating position, said actuating structure being rotatable in a second direction from said first position to a third position during which operation said first cam member is operated to effect movement of said switch operating member from said first operating position to a third operating position and said second cam member is operated to charge said resilient means, a second retaining means for retaining said actuating structure in said third position, upon defeat of said second retaining means said charged resilient means operating to automatically return said actuating structure to said first operating position to thereby effect movement of said switch operating member from said third operating position to said first operating position.

8. An electric switch comprising, in combination, a switch structure comprising a switch operating member reciprocal rectilinearly to open and close an electric circuit, a first cam member, a second cam member, resilient means, an actuating structure rotatable in a first direction from a first position to a second position during which movement said first cam member is rotated to effect movement of said switch operating member from a first operating position to a second operating position and said second cam member is rotated to effect charging of said re-

silient means, a first retaining means for retaining said actuating structure in said second position, upon defeat of said first retaining means said charged resilient means operating to automatically return said actuating structure to said first position to thereby effect movement of said switch operating member from said second operating position to said first operating position, said actuating structure being rotatable in a second direction opposite from said first direction and from said first position to a third position during which movement said first cam member is rotated to effect movement of said switch operating member from said first operating position to a third operating position and said second cam member is operated to charge said resilient means, a second retaining means for retaining said actuating structure in said third position, and upon defeat of said second retaining means said charged resilient means operating to automatically return said actuating structure to said first operating position to thereby effect movement of said switch operating member from said third operating position to said first operating position.

9. An electric switch comprising, in combination, a switch structure comprising a switch operating member reciprocal to open and close an electric circuit, means biasing said swith operating member to a first position, a rotatable actuating structure rotatable in a first direction from a first position to a second position to effect movement of said operating member from a first position to a second position, resilient means, means charging said resilient means when said actuating structure is rotated from

said first position to said second position, a first maintaining means for maintaining said actuating structure in said second position, upon defeat of said first maintaining means said charged resilient means discharging sufficiently to automatically effect return of said actuating structure to said first position, said biasing means operating to return said operating member from its second to its first position when said actauting structure is returned from its second to its first position, said actuating structure being rotatable from said first position in another direction opposite from said first direction to a third position to effect movement of said operating member from said first position to a third position, means charging said resilient means when said actuating structure is rotated from said first position to said third position, a second maintaining means for maintaining said actuating structure in said third position, upon defeat of said second maintaining means said charged resilient means discharging sufficiently to automatically effect return of said actuating structure to said first position, and means on said actuating structure operating to move said operating member from its third position to its first position when said actuating structure is returned from its third position to its first position.

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