Jan. 29, 1957 W. E. BROWN ET AL 2,779,827

CONTROL DEVICE

Filed Sept. 22, 1954 2 Sheets-Sheet 1

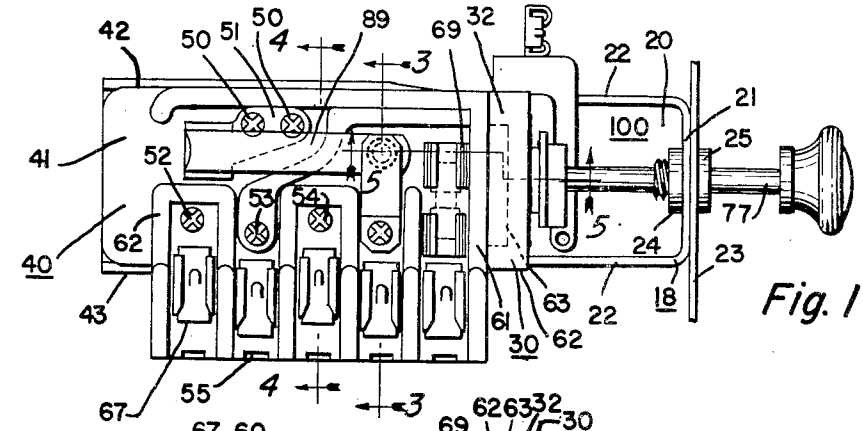


Fig. 1

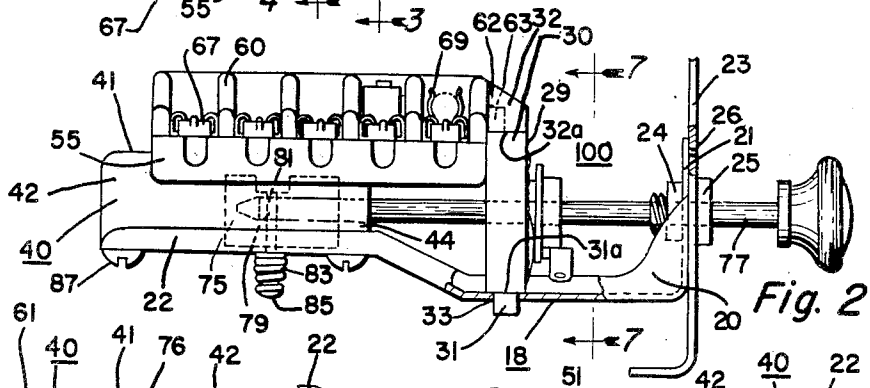


Fig. 2

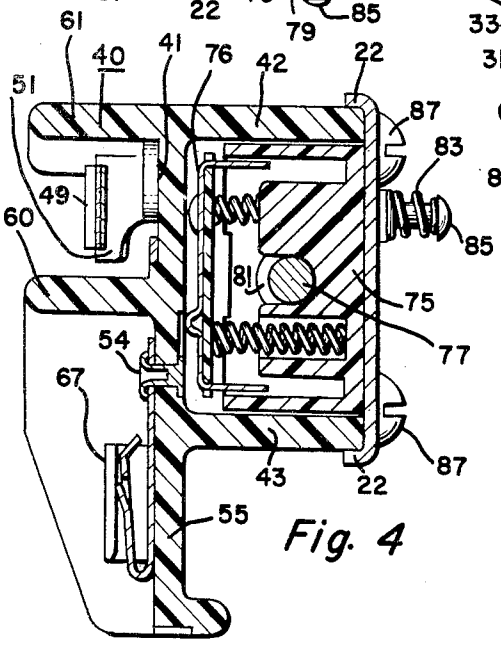


Fig. 4

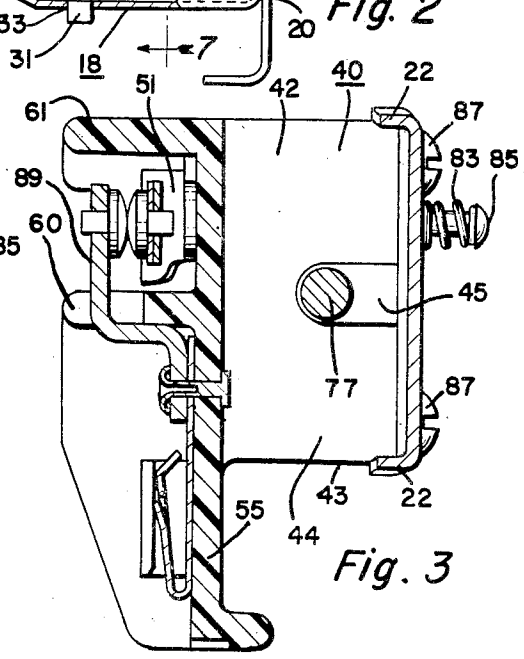


Fig. 3

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CONTROL DEVICE

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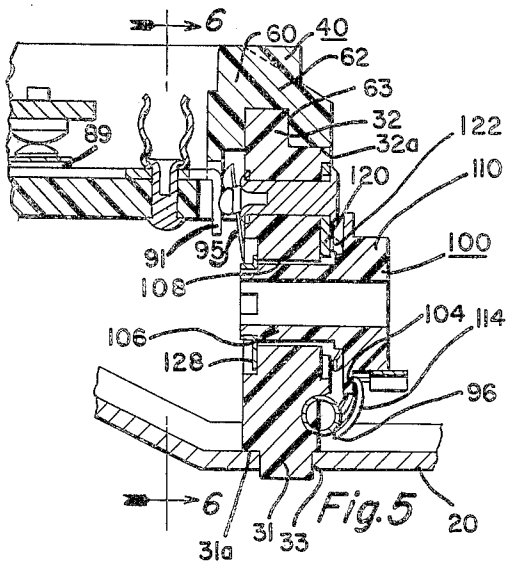


Fig. 5

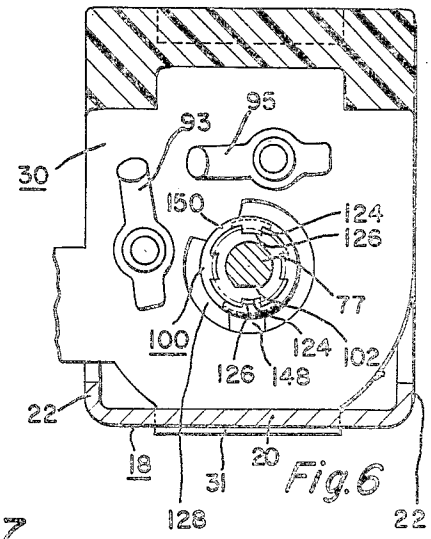


Fig. 6

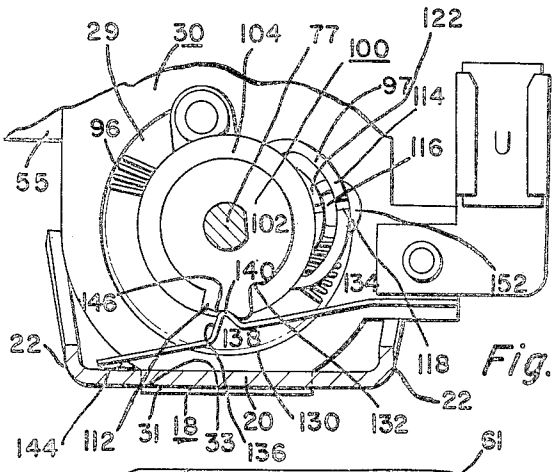


Fig. 7

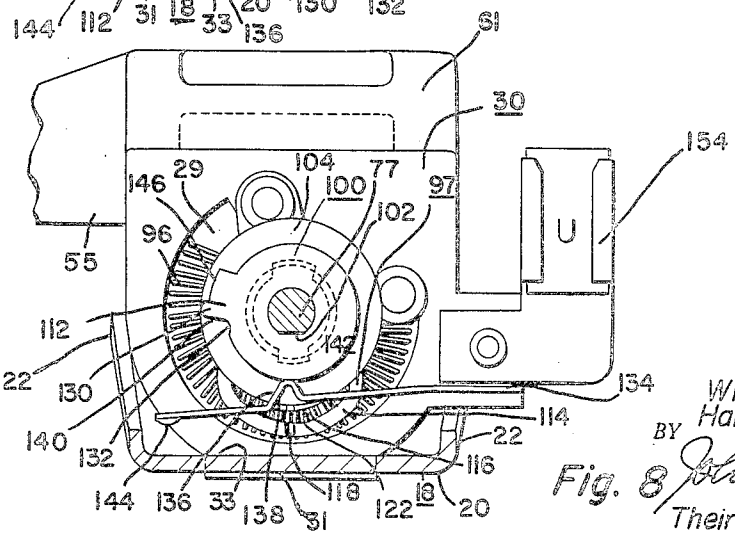


Fig. 8

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CONTROL DEVICE

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Application September 22, 1954, Serial No. 457,740

3 Claims. (Cl. 200—4)

This invention relates to control devices and is particularly directed to a combination switch for use on automotive vehicles and the like.

It is an object of the present invention to provide a switch with a reciprocal and longitudinally movable rod that is adapted to control at least one switch means during its longitudinal movement and two individual switch means during its rotary movement irrespective of the longitudinal position of said rod.

It is a further object of the present invention to provide a switch with a rod that when moved longitudinally will actuate one switch means and which when rotated will actuate another switch means throughout its range of rotation irrespective of the longitudinal position of the rod. Said rod being adapted when rotated to a predetermined angular position to actuate a third switch means which yieldably maintains and indicates the angular position of the rod.

It is a still further object of the present invention to provide a cam surface in a switch that is actuated by a rotatable longitudinally movable rod that is adapted to control a plurality of different circuits as when said rod is moved longitudinally for actuating one switch means and rotatably moved, irrespective of the longitudinal position of the rod, for actuating two other switch means, one of which is actuated only when the cam surface on said rod is turned to a predetermined position and the other of which is actuated when the rod is rotated to any position.

A more specific object of the present invention is to slidably and nonrotatably mount an insulating carrier on a rotatable rod that is adapted to be longitudinally moved for actuating one switch means, said carrier being adapted when rotated by said rod for moving a movable contact across the stationary contact portions of a rheostatic switch means and having a camming surface on its periphery that is adapted to move another switch means that yieldably holds the rod against rotation when the rod is rotated to a predetermined angular position.

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

In the drawings:

Figure 1 is a plan view of the combined switch embodying the features of the present invention.

Figure 2 is a side view of the switch shown in Figure 1, partly in elevation and partly in horizontal section.

Figure 3 is a sectional view on an enlarged scale, taken along line 3—3 of Figure 1.

Figure 4 is a sectional view on an enlarged scale, taken along line 4—4 of Figure 1.

Figure 5 is a fragmentary view in section along line 5—5 in Figure 1.

Figure 6 is a fragmentary view in section taken along line 6—6 in Figure 5.

Figure 7 is a fragmentary view partly in section taken along line 7—7 in Figure 2 showing one of the switch means in a closed circuit position.

Figure 8 is a fragmentary view partly in section along line 7—7 in Figure 2, showing one of the switch means in an open circuit position.

Referring to Figure 2 of the drawings, the numeral 18 designates a channeled generally L-shape bracket having two leg portions 20 and 21 wherein a channel is formed by a pair of upturned sides 22 of the leg portion 20 thereof. The bracket 18 is adapted to be attached to a support or dashboard 23. The support 23 and the leg 21 have aligned openings, the opening in the leg 21 has a tubular portion or collar 24 which is generally threaded to receive an external shank of a flange bushing 25. The leg 21 is formed with an outwardly extending tang 26 which fits into a recess in aperture support 23. The tang 26 prevents the bracket 18 from turning relative to the support when the shank of the bushing 25 is threaded into collar 24 to clamp the leg 21 of bracket 18 firmly against the face of the support 23.

The leg 20 of the bracket supports a rheostat support body 30 of the insulating material having reduced portions 31 and 32 which form shoulders 31A and 32A. The portion 31 is adapted to project through an opening 33 in leg 20 so that shoulder 31A rests thereon. The body 30 has an opening 108 wherein a flanged bushing 100 is supported which in turn supports elements to be hereinafter described. The body 30 includes a groove 29 formed concentrically in the body member 30 that is concentrically arranged with bushing 100.

The leg 20 also forms a closure for a switch casing 40. In this instance, the casing 40 is generally rectangular in form having a top wall 41, side walls 42 and 43 and end wall 44. The end wall 44 is formed with a slot 45 arranged in alignment with the bushings 25 and 100 when all parts of the switch are assembled on the bracket 18. The casing 40 includes a pair of contacts 50 which are electrically connected with one another by a bracket 51 and a number of spaced, stationary contacts 52, 53, and 54, in parallel relation with the stationary contacts 50. The contacts 50, 52, 53 and 54 are all flush with the inner surfaces of the wall 41. The wall 41 is extended beyond the side wall 43 and the end wall 44 to form a platform 55. The wall 41 and platform 55 have a plurality of upright walls or barriers 60 and an end wall 61 extending outwardly thereupon. The wall 61 is formed with a laterally extending boss 62 having a recess or cavity 63 therein adapted to receive and cooperate with the reduced portion 32 of the body member 30 which is clamped to the bracket 18 thereby when the various parts are assembled.

The upright walls 60 form a plurality of individual compartments, four of which contain metallic receptacles 67 which are adapted to receive the well-known spade type terminals and one of which includes a fuse receptacle 69. The terminals and receptacles are electrically connected with the various contacts 52, 53 and 54, for example, by riveting. The walls 60 are provided to prevent short circuits caused by tools or wires being laid over the platform 55. These walls 60 also improve the insulating qualities of the structure.

Within the switch casing 40 is a slidable contact or switch member 75 carrying a spring pressed contact member 76 which selectively contacts the contacts 50, 52, 53 and 54. The slidable member 75 is controlled by a rod 77 which passes through and drivingly engages the bushing 100 and which then passes through the slot 45 in end wall 44 of the casing and finally engages the slidable switch member 75. The end of the rod 77 includes an annular groove 79 into which snaps a hook member 81 which is normally held in engaging position with rod

77 and may be released when a plunger 85 is compressed against the external spring 83 which is positioned between the plunger member 85 and a portion of the casing 40. Thus when it is desired to remove the rod 77, the plunger 85 is pressed inwardly against spring 83 so that the hook-like member 81 is pivoted in switch member 75 and the hook member 81 is then released from engagement with the groove 79 whereby the rod 77 may be pulled outwardly from disengagement with the slidable contact part 75.

Thus it will be noted rod 77 has a dual control function. By moving the rod longitudinally outwardly and inwardly, it is possible to move the sliding switch member 75 into various contacting positions so that its sliding contact 76 engages the several switch contacts in the casing 40 whereby the headlights, parking lights, etc. may be selectively controlled. Simultaneously it is possible to rotate the rod 77 without regard to its longitudinal position whereby other switch means that will be hereinafter described may be controlled without changing the position of switch member 75 since the rod may be rotated in the hook member 81.

It will be noted that when bracket 18 is assembled to casing 40 by means of screws 87, the sliding switch member 75 is yieldably held in position and that simultaneously, the rheostatic body 30 is clamped between the bracket 18 and the cavity or recess 63. Simultaneously the cavity switch casing 40 which includes a slidable member 75 is closed. Thus this assembly of the switch through the assembly of the bracket holds the various parts in a predetermined aligned position while simultaneously closing the open cavity portions thereof.

The switch mechanism may also include a terminal circuit breaker noted as 89 which makes or breaks the circuit according to the load whereby when an overload is placed on any of the circuits passing through the switch, the bimetallic element of the circuit breaker heats and breaks the circuit, reestablishing the same upon cooling.

The electrical connections between the rheostat body 30 and the switch body 40 are particularly shown in Figure 6. In this instance, a contact member extending through the switch casing 40 and molded therein is noted as 91. A second similar member is also included which is positioned so as to not be shown in Figure 6. These contacts are bent downwardly as depicted and present a pair of contacting surfaces. The rheostat 30, see Figure 6, includes two spring ears 93 and 95, riveted or otherwise suitably connected to one end of the rheostat coil 96 fitted within the groove in the rheostat body 30 and a rotor or contacting element 97. The spring ears 93 and 95 preferably include rounded portions at the free ends thereof so that when the portion 32 of the rheostat 30 is slipped within the cavity 63 in the switch casing 40, the contacts 93 and 95 resiliently wipe and make contact with the fixed members 91. When the bracket 18 is fixed in secured position with the body member 40 and with the extending portion 31 of the rheostat in the aperture 33, the electrical connection is complete. It is apparent that when the rheostat body is to be replaced or repaired, it is a simple matter to remove the bracket, slip the rheostat from its position, make the necessary repairs or adjustments and then slip the rheostat body back into place whereby all the electrical connections are reestablished without the necessity of the use of binding posts or other conventional connecting means.

Referring specifically to Figures 6–8 the switch means as controlled when shaft 77 is rotated are shown. These switch means are dependent in their motivation upon rotation of the shaft 77 without regard to the longitudinal position thereof and are actuated by a rotor or bushing 100, preferaby formed of insulating material, which is keyed to rod 77 by a flat portion 102 so as to be relatively non-rotatable and slidable thereon.

The bushing or carrier 100 has an annular flange 104 formed on its mid portion. One end 106 of bushing 100 is sized to be received in an extended through an opening 108 in rheostat body 30. The other end 110 of the bushing 100 has a cam 112 formed on its outer periphery, the purpose, shape and function of which will be hereinafter described.

The rotor 97 of the rheostat is of spring metal and has a crescent shaped slot 116 therein and a depressed central portion 118 on the outer rim. This depressed portion 118 rides on the wire coil 96 as the rotor 97 is turned through bushing 100 by shaft 77.

Surrounding opening 108 is an annulus 120 of conducting material which is electrically connected with the spring ear 95. The side 122 of the rotor 97 opposite from the depressed portion 118 is also slightly depressed so that when the rotor 97 is in position on bushing 100 and nonrotatably held thereon by ears 124 which extend into notches 126 as formed in bushing 100, see Figure 6, flange 104 will press depresesd portions 118 and side portions 122 of the rotor 97 into contact with coil spring 96 and the metal annulus 126 respectively so as to form a contact therebetween and as the depressed portion 118 rides over coil spring 96 and forms a switch means wherein more or less electrical resistance will be included in the circuit with which the rheostat is associated depending upon the direction of rotation of the rod 77. The end 106 of bushing 100 is serrated and circumferentially grooved so that a holding washer 128 may be snapped into the groove to hold the bushing 100 reasonably tight against end play. Any end play which may exist after the washer 128 is applied is taken up by the springy rotor 97.

The raised cam 122, which is formed on the periphery of end 110 of bushing 100, is provided with a raised pimple 130 and a dimple 132 adjacent the root of the raised cam surface 112 where it is joined to the periphery of the end 110 of the bushing.

The dimple 132 will permit the contact arm 134, which is spring biased upwardly toward the bushing 100 to first raise slightly and then be downwardly moved as the inclined surface 136 of the V-shaped identation 13 of arm 134 is engaged by the surface 140 of cam 112 when the bushing 100 is rotated counterclockwise from the position shown in Figure 8 to the position shown in Figure 7. When the apex 142 of the V-portion 138 passes over the pimple 130, the contact 144 on the end of arm 134 will be pressed into grounding contact with the leg portion 20 of support bracket 18. A further rotation of bushing 100 will cause the apex 142 to seat on the flat surface 146 of cam 112 adjacent the pimple 130.

This represents the furthest point to which bushing 100 may be rotated for at this point a stop 148, formed on C-spring 128 engages a surface of a stop 150, as formed in the rheostat body 30. When the bushing 100 has reached this position the detent 118 will be in contact with the contact 152, as associated with spring ear 93, and the bushing will be yieldably prevented from rattling and moving in a counterclockwise direction by the pimple 130 which is held by the apex 142 of the spring arm 134.

The spring arm 134 is secured to the rheostat body 30 and is connected to a terminal 154 which may be of the bayonet type if desired.

From the foregoing, it is apparent that we have provided a combination switch which is easy to assemble and which will control a plurality of circuits to a signal actuating rod and wherein the assembly of the pocket member closes a cavity including the switch means and simultaneously clamps the rheostat between the bracket and within the locating cavity of the switch body. During this procedure, the electric circuit between the rheostat and the switch is established due to the springy nature of the contacts therebetween which are pressed into circuit forming position by proper positioning of the rheostat by the bracket. This structure presents a compact, neat appearing device, that is easy to install and

simple to service when the occasion demands. It further provides a combination control device wherein a multiple switch position is achieved when the rod is moved longitudinally and wherein a rheostat is controlled which may connect it with the panel lights of the vehicle when the control rod is rotated to any number of positions and further, wherein the control rod when rotated to a predetermined position will cause a grounding of one of the switch means which may be associated with the dome light of the vehicle while simultaneously minimizing the resistance in the panel light circuit so that the great amount of illumination will be present in the vehicle wherein the switch is installed. It is apparent that the switch means wherein the dome light is controlled may be modified so that rather than grounding the circuit to the frame of the switch, a separate insulated contact may be provided for controlling the circuit if so desired.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A switch for controlling a plurality of circuits, comprising; a rotatable rod longitudinally movable for moving a first switch means for controlling at least one circuit, a second switch means controlled when said rod is rotated within predetermined limits independently of the longitudinal position thereof, a reciprocating third switch means transversely spaced from said rod and controlled when said rod is rotated to a predetermined position independent of its longitudinal position, a stop means associated with said second switch for preventing rotation in one direction of said rod beyond said predetermined position, and yieldable means associated with said third switch means for yieldably preventing relation in the other direction when said rod is rotated to said predetermined position.

2. A switch for controlling a plurality of circuits, comprising; a rotatable longitudinally movable rod, a first switch means adapted to be actuated when said rod is longitudinally moved, a second switch means adapted to be actuated when said rod is rotated within predetermined limits irrespective of the longitudinal position thereof, a reciprocating third switch means transversely spaced from said rod and adapted to be actuated irrespective of the longitudinal position of said rod when said rod is rotated to a predetermined position, a stop means associated with said second switch for preventing rotation in one direction of said rod beyond said predetermined position, and a yieldable means on said third switch means for yieldably preventing rotation of said rod in the opposite direction when the rod is in said predetermined position.

3. A switch for controlling a plurality of circuits, comprising; a rotatable longitudinally movable rod, a first switch means adapted to be actuated by the longitudinal movement of said rod, a second switch means adapted to be actuated by the rotary movement of said rod irrespective of the longitudinal position thereof, a reciprocating third switch means transversely spaced from said rod adapted to be actuated by said rod irrespective of its longitudinal position when said rod is rotated to a predetermined position, a stop means associated with said second switch for preventing rotation in one direction of said rod beyond said predetermined position, and means on the third switch for yieldably holding said rod against rotation and permitting longitudinal movement thereof when said rod is rotated to said predetermined position.

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