June 27, 1950 W. E. BROWN ET AL 2,512,788

SWITCH

Filed July 27, 1946

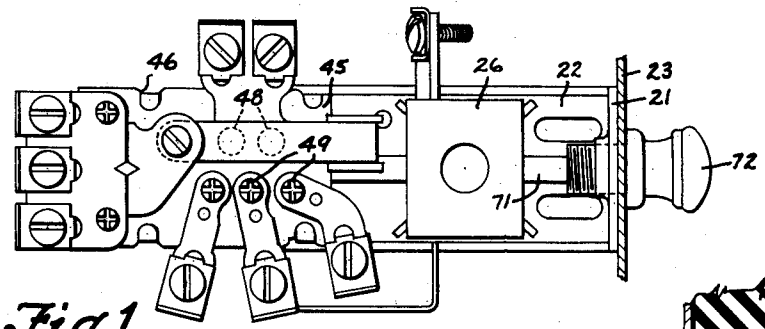


Fig. 1.

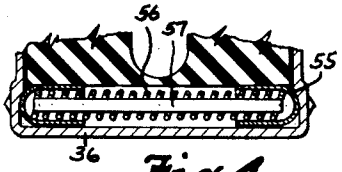


Fig. 4.

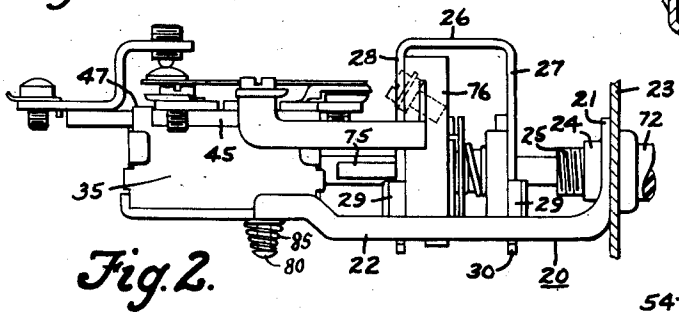


Fig. 2.

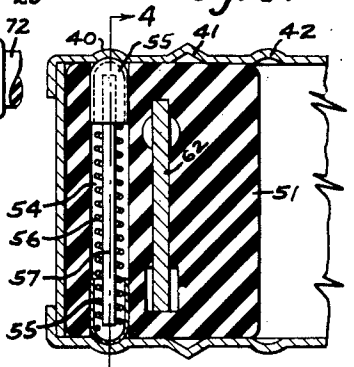


Fig. 5.

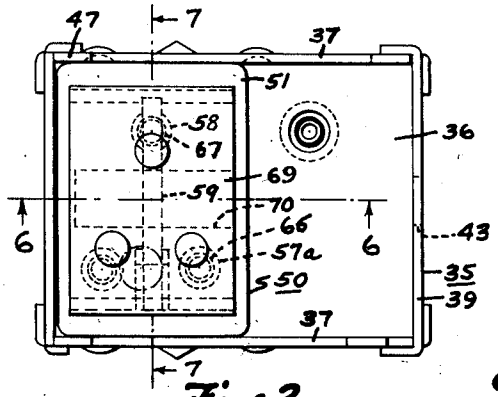


Fig. 3.

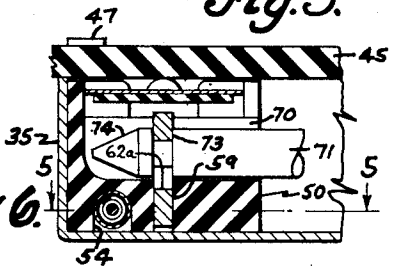


Fig. 6.

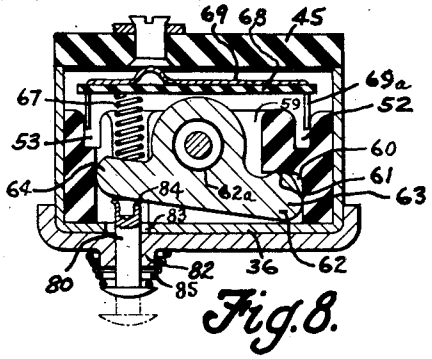


Fig. 8.

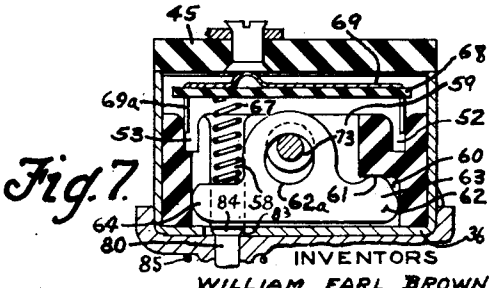


Fig. 7.

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Patented June 27, 1950 2,512,788

UNITED STATES PATENT OFFICE

2,512,788

SWITCH

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Application July 27, 1946, Serial No. 686,609

16 Claims. (Cl. 200—16)

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This invention relates to improvements in switches of the type which are mounted on the rear side of an instrument panel or dash board and is controlled by an actuator extending on the front side thereof and in which the actuating member is attached or detached from the switch mechanism after the switch is mounted in position to the panel.

An object of the present invention is to provide insulating contact carrier in association with novel means for interconnecting the inner end of the actuating member therefor after the latter has been installed in position.

Another object of the invention is to provide means whereby the connection between the movable contact carrier and the actuating member may be disconnected easily when the movable contact carrier is in a certain position.

Another object of the invention is the provision of yielding means in which a positive indication is provided when the switch mechanism is in various positions.

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:

Fig. 1 is a plan view of a combined switch and rheostat embodying the principles of the present invention.

Fig. 2 is a side view of the combined switch and rheostat.

Fig. 3 is an enlarged sectional view showing a movable contact assembly and its relation with a switch case.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 5.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 6.

Fig. 6 is a sectional view taken on line 6—6 of Fig. 3.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 3.

Fig. 8 is a sectional view similar to Fig. 7, but showing the switch assembly moved to another position so as to permit the actuator to be detached from the switch assembly.

Referring to the drawing, more particularly to Figs. 1 and 2 the reference numeral 20 indicates an L-shaped bracket having arms 21 and 22. The bracket 20 is adapted to be supported from a dash board or panel 23. The panel 23 and the arm 21 have aligned openings, the opening in the arm 21 is formed by forcing a portion of the arm out of

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its normal plane into a tubular portion 24 which is internally threaded to receive a threaded shank of a flanged bushing 25. The threaded shank of the bushing passes through the opening in the panel and is threaded into the tubular portion 24 to clamp the arm 21 of the bracket firmly against the rear face of the panel. The flange of the bushing limits the extent of entry into the panel.

The arm 22 of the bracket supports an inverted U-shaped member 26 having arms 27 and 28 each provided with angular wings 29 which rest on the upper face of the arm 22. The arms 27 and 28 are also provided with extensions 30 which project through openings provided by the arms 22 and then staked to fix securely the member 26 to the arm 22. Each arm is provided with aligned bearing openings the use of which will be described hereafter.

A switch casing 35 of rectangular formation having a bottom wall 36, side walls 37 and end walls 38 and 39 is secured to the arms 22 in any suitable manner. In this instance, the bottom wall of the casing is secured to the arm 22 by spot welding. The side walls 37 are both provided with spaced and opposed detents or depressions 40, 41, and 42 the detents 41 are deeper than 40 and 42, as will be referred to later. The end wall 39 is provided with a bearing opening 43. The upper portion of the casing is closed by a terminal block 45 of insulating material the side edges of which are notched as at 46, see Figs. 1 and 2, to receive ears 47 on the side walls 37 of the casing 35. The ears 47 are bent over to secure the terminal block 45 to the casing and also close same. The terminal block 45 carries a number of spaced stationary contacts 48 electrically connected with each other and a number of spaced stationary contacts 49 arranged in parallel relation with the contacts 48. The contacts 48 and 49 are adapted to be bridged by movable contacts. It is to be understood that any suitable arrangement and number of contacts 48 and 49 may be provided as required.

A movable contact carrier unit 50 is located within the casing 35 and comprises a carrier 51 of suitable electrical insulating material having longitudinal notches 52 and 53 extending downwardly from the upper face of the carrier, as viewed from Figs. 7 and 8. It is very desirable that the carrier shall move into respective positions by a pronounced snap action. This is accomplished by providing the carrier 50 with a transverse recess 54 extending upwardly from the bottom of the carrier for receiving a pair of metallic thimbles 55 urged in opposite directions by a

coil spring 56 surrounding a rod 57. The thimbles 55 are adapted to seat in oppositely arranged detents or depressions 40, 41 and 42 in the side walls 37. When the thimbles seat in the oppositely disposed detents or depressions the carrier 50 is yieldingly held in that position under the bias exerted by the spring 56. Thus the carrier 50 must be moved from one position to another against the action of the spring 56 and the spaces between the detents.

The carrier is also provided with spaced recesses 57*a*, a through bore 58, and a transverse slot 59, the slot 59 is enlarged as at 60 to provide a shoulder 61. The slot 59 receives a latch plate 62 including lateral lugs 63 and 64 and an opening 62*a*. When the latch plate 62 is assembled in the notch 59 the lug 63 cooperates with the shoulder 61 to act as a pivot for the latch while the lug 64 will extend across the bore 58. Each recess 57*a* receives a spring 66 while the bore 58 receives a spring 67. The lower ends of the springs 66 rest on the bottom of their respective recesses 57*a* while spring 67 rests upon the lug 64. The upper ends of the springs 66 and 67 bear against a contact supporting block 68 of insulating material the sides of which are notched to receive arms 69*a* of a contact plate 69, said arms 69*a* extending into the longitudinal notches 52 and 53 to prevent lateral shifting of the contact plate relative to the carrier 51. The springs 66 and 67 cooperate in one direction to force the block 68 upwardly to urge the contact plate 69 against the terminal block 45, but the spring 67 serves the dual purpose of urging the plate 69 against the terminal block 45 and also for forcing the latching plate 62 downwardly within the notch 59.

The carrier 50 is provided with a longitudinal passage 70 which extends from the front end of the carrier, as viewed in Fig. 3, and extending rearwardly beyond the transverse slot 59.

The means for shifting the carrier unit assembly from one position to another within the casing 35 comprises an operating rod 71. The outer end of the rod carries a knob 72 adapted to be disposed on the front of the panel 23. The inner end of the rod 71 is provided with an annular or perimetrical groove 73 and a conical or cam portion 74 spaced a short distance from the groove 73. The rod 71 is provided with a flat side 75 intermediate its ends to drive a movable contact of a resistance unit 76 supported on the arm 28.

After the bracket 20 has been attached on the back side of the panel 23 the actuator or rod 71 is inserted from the front of the panel 23 by passing the rod through the bushings 25, the resistance unit 76, bearing opening 43 of wall 39 and into the longitudinal passage 71 of the carrier 50. When the conical or cam portion projects through the opening 62*a* of latch plate 62 the cam portion cooperates with the opening to move the latch about the pivot 63 thereby moving the lug 64 against the tension of the spring 67. As soon as the groove is in the same vertical plane of the latch the spring will move the lug downwardly with a snap action which yieldingly interlocks the latch with the rod. This permits the rod 71 to rotate relative to the latch and longitudinal movement of the rod on the front side of the panel then serves to shift the carrier 50 within the casing 35 from one position to another.

When it is desired to disassemble the rod 71 from the carrier the rod is actuated to move the carrier 50 to a position so the latch 62 is located directly over a plunger 80. When the plunger 80 is actuated upwardly as viewed in Fig. 8 it will raise the latch out of the groove 73 and the rod 71 may then be removed. In this instance the plunger device 80 is hollow and slidably supported in a bearing opening 82 which aligns with a larger opening 83 provided in the bottom wall 36 of the switch casing 35. The upper end of the member 80 is flared as at 84, to limit the downward movement of the member 80. This flared portion is flush or below the top surface of the bottom wall 36 when in its normal position indicated by dot and dash lines so as not to interfere with the sliding movements of the carrier 50 within the casing 35. The member 80 is moved in a downward direction, as viewed in Figs. 2 and 8 by a spring 85 surrounding the member 80 and having one end resting on a head 86 and having the other end engaging the bottom side of the arm 22.

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, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A switch having a switch case, a longitudinally movable contact carrier having a transverse slot and a longitudinal recess communicating with the transverse slot; a latch member pivotally supported in the transverse slot and having an aperture capable of aligning with the recess, an operating rod having its inner end tapered and formed with an annular groove spaced from the tapered end so that when the rod is inserted into the recess the tapered portion will fit into the aperture of the latch to raise same to allow the latch to register with the groove; a spring means carried by the carrier for yieldingly holding the latch in the groove whereby the rod is capable of longitudinal movements to actuate the carrier.

2. A switch comprising a rectangular case having a plurality of depressions in opposite side walls thereof; an insulating block carried by the case opposite the bottom wall of the case; fixed contacts carried by the block; a movable carrier movable in the case; a movable contact carried by the carrier for bridging the fixed contacts; a latch pivotally mounted on and movable with the carrier, said latch having an opening; a rod adapted to be inserted through the opening of the latch and having an annular groove to receive the latch so as to interlock the latch with the rod whereby the rod will actuate the carrier, resilient means between the latch and the movable contact for yieldingly holding the latch within the groove and the movable contact against the block; a pair of thimbles loosely carried by the carrier; and spring means between the thimbles for urging same in opposite directions and into opposed depressions for yieldingly holding the carrier in position.

3. An electric switch comprising, a unit adapted to be mounted on the rear side of a support and including a bracket adapted to be mounted over an opening in the support and a switch case secured to the bracket spaced from the support, said case having an end wall provided with an opening; a movable contact carrier slidably supported within the case, said carrier having a through slot formed therein; a latch having a through opening received by said slot, said latch having a portion engaging a shoulder located within the slot

thereby providing a pivot for the latch; an operating rod adapted to be inserted through the openings of the support, the case and the latch from the front of the support; cooperating means provided by the latch and the inner end of the rod for interconnecting the latch with the rod to provide for operating the carrier upon movements of the rod; and spring means carried by the carrier and acting on the latch for yieldingly holding the latch in locking engagement with the rod.

4. An electric switch comprising a unit adapted to be mounted on the rear side of a support and including a bracket adapted to be mounted over an opening in the support and a switch case secured to the bracket spaced from the support, said case having an end wall provided with an opening; a movable contact carrier slidably supported within the case, said carrier having a through slot formed therein; a latch having a through opening received by said slot, said latch having a portion engaging a shoulder located within the slot thereby providing a pivot for the latch; an operating rod adapted to be inserted through the openings of the support, the case, and the latch from the front of the support; cooperating means provided by the latch and the inner end of the rod for interconnecting the latch with the rod to provide for operating the carrier upon movements of the rod; and spring means carried by the carrier and acting on the latch for yieldingly holding the latch in locking engagement with the rod; a biased plunger supported by and extending into the interior of the case, said plunger being operable only when the carrier is in a certain position to raise the latch against the biasing force of the spring to such a position that the rod can be removed.

5. A switch comprising, a switch case; a molded insulating body shiftably mounted within the case, said body formed with an elongated through slot and a bore to provide a pair of notches on opposite sides of the slot and intermediate the ends thereof; a latch having a through opening therein received by the slot; a removable rod adapted to be inserted through the opening of the latch; cooperating means provided by the latch and the rod for interconnecting the latch with the rod to provide for operating the body upon movements of the rod, said latch having one end engaging a shoulder provided by the body to form a fulcrum for the latch; and spring means located within the bore and engaging the other end of the latch to move the latch in a direction to hold yieldingly the latch in interengagement with the rod.

6. A switch comprising an open sided rectangular casing and having an opening in one of its end walls, a closure for the open side; fixed contacts insulatingly supported by the casing; a carrier shiftably mounted within the casing; a movable contact supported by the carrier for bridging the fixed contacts; and means for moving the carrier comprising a removable rod adapted to be inserted through the opening in the casing and connected with the carrier by a latch member pivotally supported in the carrier and having separable end interlocking connection with the rod allowing the detachment of the latch from the rod by transverse movement of the latch with respect to the rod; and means supported by the casing and operable when the carrier is in a predetermined position to impart the transverse movement to the latch to permit removal of the rod.

7. A switch comprising an open sided rectangular casing and having an opening in one of its end walls; a closure for the open side of the casing; fixed contacts insulatingly supported by the casing; a carrier shiftably mounted within the casing; a movable contact supported by the carrier bridging the fixed contacts; and means for moving the carrier comprising a removable rod adapted to be inserted through the opening in the end wall and connected thereto by a latch pivoted within the carrier and having separable and interlocking connections with the rod including an annular groove in the rod, an opening in the latch to receive the grooved end of the rod; a spring insulated from the movable contact for moving the movable contact in engagement with the fixed contacts and also to retain normally the latch and rod in interlocking relation and permitting the detachment of the latch from the rod by transverse movement of the latch with respect to the rod when the carrier is in a certain position within the casing.

8. A switch comprising a switch case; a molded insulating body having an elongated slot shiftably mounted within the case; an overhanging portion provided by the body at one end of the slot; a latch having a through opening received by the slot, said latch having a lug disposed on opposite sides of the opening, one of said lugs engaging the overhanging portion of the body thereby providing a pivot for the latch; a removable rod adapted for longitudinal movements, said rod being provided with a perimetrical groove at its inner end so that when the rod is inserted through the opening in the latch portions of the latch will lie between the shoulders formed by the groove to provide for operating the body by movements of the rod; and a compression spring having one end seated against the other lug of the latch and operating to hold yieldingly the latch within the groove; and means carried by the case and operable when the body is in a certain position to move the latch against the action of the spring to such a position that the rod can be removed.

9. A switch comprising, a switch casing having one of its end walls provided with an aperture; a body of insulating material shiftable within the casing and having a longitudinal recess on its upper face and a through opening traversing the recess; a closure for the casing; fixed contacts carried by the closure; a movable contact shiftable on the carrier for engaging the fixed contacts; an overhanging portion provided by the body at one end of the opening to provide a shoulder; a latch having a through opening received by opening of the body, said latch being provided with a lug so that it will underlie the shoulder thereby providing a pivot for the latch; a removable rod insertable through the openings and having its inner end formed with an annular groove so that when the rod is inserted through the opening of the latch the groove will receive portions of the latch to provide for operating the body upon movements of the rod; and a spring confined under compression between the movable contact and the latch and operable to maintain yieldingly the latch within the groove of the rod and to hold yieldingly the movable contact in engagement with the fixed contacts; and means for moving the latch about its pivot against the action of the spring to such a position that the latch is free of the groove to remove the rod.

10. An electric switch comprising, a casing;

fixed contacts insulatingly supported by the casing; bridge means; a carrier disposed within the casing supporting the bridge means for movement with respect to the contacts; a latch having an opening confined within the carrier; actuating means extending into the casing and through the aperture of the latch; spring means arranged in said carrier for urging the latch in one direction to interconnect the latch with the actuating means to provide for moving the carrier upon movements of the actuating means; and means to move the latch in the opposite direction against the action of the spring means to release the actuating means from the latch.

11. An electric switch comprising, a casing; fixed contacts insulatingly supported by the casing; bridge means; a carrier disposed within the casing supporting the bridge means for movement with respect to the contacts; a biased latch movably mounted within the confines of the carrier; a control member projecting through an opening provided by the casing and coupled with the latch to provide for moving the carrier upon movements of the control member; and means carried by the casing and operable on the latch to uncouple the latch from the control member.

12. An electric switch comprising, a casing; a closure carrying contacts mounted on the casing; a carrier movably mounted within the casing; bridging means slidably supported on the carrier; a latch member movably supported within the confines of the carrier; means for actuating the carrier projecting into the casing and detachably interlocked with the latch; resilient means carried by the carrier and operating to urge the bridging member against the closure and the latch into yielding interlocking relation with the actuating means; and means carried by the casing and operable upon the latch only when the carrier is in a predetermined position to move the latch out of interlocking relation with the actuating means to permit the latter to become disconnected from the latch.

13. An electric switch including a switch casing; a closure carrying fixed contacts supported by the casing, a carrier slidably guided within the casing; bridge means slidably supported on the carrier; actuating means for the carrier extending into the casing and detachably connected to a biased latch housed within the carrier whereby the actuating means is capable of moving the carrier to a plurality of positions; yieldable positioning means for the carrier, said means comprising members slidably supported within the carrier and parts provided on opposite walls of the casing; and resilient means biasing the members in opposite directions whereby the member will cooperate with the parts to hold yieldingly the carrier in the various actuated positions.

14. An electric switch including a casing having an end wall provided with an opening and having its opposite side walls provided with spaced opposed depressions; a closure carrying fixed contacts supported by the casing; a carrier slidably guided within the casing; bridge means slidably supported on the carrier; a latch movably supported within the confines of the carrier; actuating means for the carrier extending through the opening of the end wall and detachably connected with the latch; spring means carried by the carrier operating to urge the bridge means in a direction toward the closure and the latch against the actuating means for holding the latch connected with the actuating means to provide for moving the carrier upon movement of the actuating means; a pair of cup-shaped members slidably supported within a recess provided by the carrier and arranged so that their closed ends are oppositely arranged therein; and spring means for pressing the cup-shaped members in opposite direction and into opposed depressions to hold yieldingly the carrier in position.

15. An electric switch comprising, a casing, fixed contacts insulatingly supported by the casing; a carrier shiftably mounted in the casing; a movable contact member movably mounted on the carrier for movement therewith to bridge the fixed contacts; a latch movable within the confines of the carrier; actuating means extending into the casing and projecting beyond the latch; spring means arranged on the carrier for urging the movable contact in a direction to engage the fixed contacts and the latch in another direction to interconnect the latch with the actuating means to provide for moving the carrier upon movement of the actuating means; and means for moving the latch against the resiliency of the spring means to free the actuating means from the latch.

16. An electric switch comprising, a casing, fixed contacts insulatingly supported by the casing; a carrier shiftably mounted in the casing; a movable contact movably mounted on the carrier; a latch movable within the confines of the carrier; actuating means extending into the casing and projecting beyond the latch; cooperating means on the latch and the actuating means for interlocking the latch and the actuating means; spring means disposed between the movable contact and the latch for urging the movable contact toward the fixed contacts and the latch toward the actuating means so as to interlock yieldingly the latch with actuating means to provide for moving the carrier upon movement of the actuating means; a means for moving the latch against the resiliency of the spring means so as to free the actuating means from the latch.

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REFERENCES CITED

The following references are of record in the file of this patent:

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