

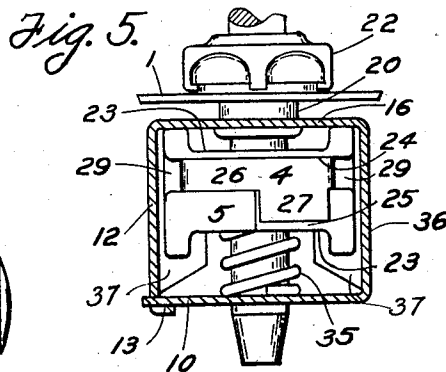
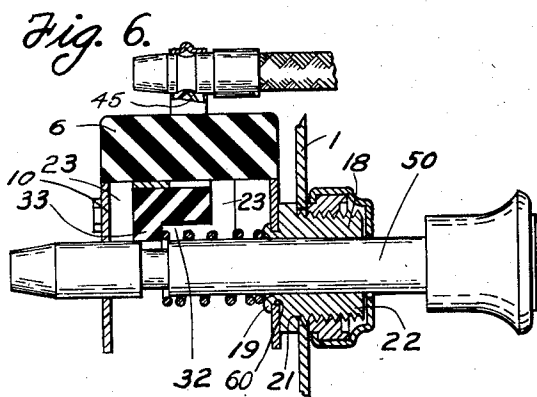
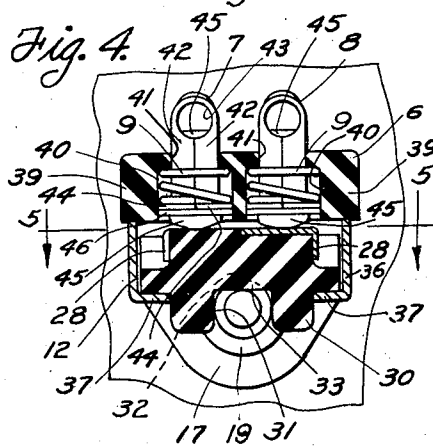
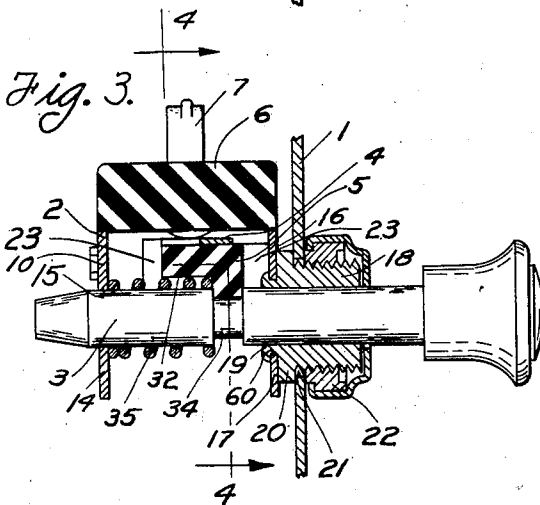
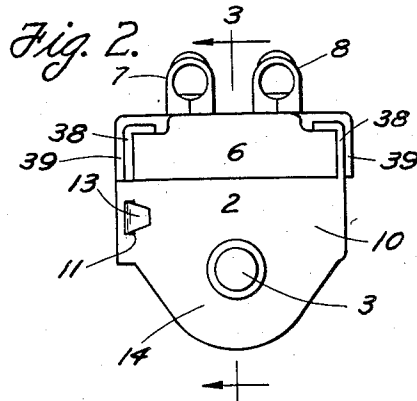
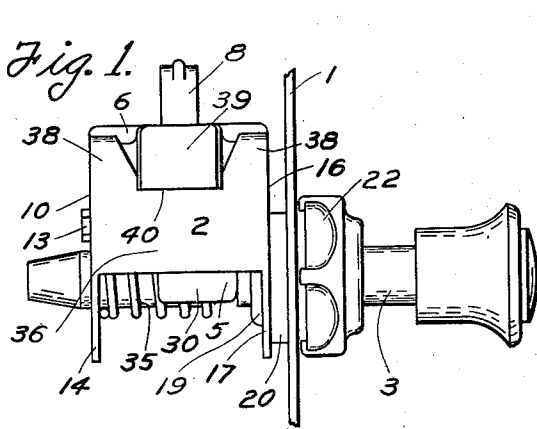
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ELECTRIC SWITCH

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ELECTRIC SWITCH

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19 Claims. (Cl. 200—163)

This invention relates generally to electrical switches, and particularly to that class of switches known as the reciprocating type, and which are preferably associated with the instrument panel of an automobile.

One principal object of the invention is to construct an electric switch including in combination a, casing, bridge member, reciprocable actuator member, carrier for the bridge member, switchback mounted on the housing, contact means mounted on said switchback, resilient means associated with the contact means adapted to assist in detachably holding the actuator and carrier in assembly, and resilient means carried by said actuator functioning to maintain said bridge in a predetermined relation with respect to said contact means.

Another important object of the invention is to design and construct a relatively small switch consisting of very few parts which can be economically manufactured and easily and quickly assembled on a commercial scale.

Another object is to provide a switch having parts that may be assembled in different positions whereby the said resilient means, carried by said actuator, in one position will effect the return of the bridge member to normally maintain the circuit open when the actuator is pulled out and released, and in another position will return the bridge to open the circuit after pushing in and releasing the actuator. Moreover, if so desired, the resilient means may be entirely omitted, in which case the bridge member is not returned by said means.

A further object of the invention is to take a single piece of strip sheet metal stock and fold the same into a band or loop, and interlock its ends whereby to provide a switch casing, and close but one side thereof by a switchback in order to leave the other side normally open whereby certain parts of the switching mechanism are accessible. Moreover, it is an object to provide extensions or continuations on two of the opposite walls of the casing through which the actuator extends for bearing and guidance.

Other objects and advantages of the invention will be apparent after considering the description hereinafter set forth in connection with the drawing annexed hereto.

Referring to the drawing wherein like parts of the switch are designated by the same numeral:

Figure 1 is a side view in elevation of the switch mounted on an instrument panel;

Figure 2 is an end view of the switch shown in Figure 1 with the panel omitted;

Figure 3 is a section in elevation taken substantially on line 3—3 of Figure 2, clearly showing details of construction;

Figure 4 is a section taken substantially on line 4—4 of Figure 3 illustrating more in detail the construction of the carrier, and the spaced apart contact means that are mounted on the switchback, but the contact means are not shown in section;

Figure 5 is a section taken substantially on line 5—5 of Figure 4 clearly illustrating the constructional details of the carrier and the manner in which the bridge member is mounted thereon; and

Figure 6 is a view corresponding substantially to that shown in Figure 3, except that the carrier and the resilient means above referred to, are arranged in reverse positions, and the actuator is preferably made longer. This view also shows the position of the carrier just before it snaps into assembly with the actuator, or the act of removing the latter.

Referring first to the switch disclosed in Figures 1 through 5, same is shown mounted adjacent the rear of the instrument panel 1. Generally, the switch includes in combination, a switch casing 2, an actuator 3, bridge member 4 mounted on a carrier 5, a switchback 6, and a pair of spaced apart contact means 7 and 8 mounted on the switchback, and having resilient means 9 in the form of springs associated therewith with function to force the contact means in a direction to engage the bridge, and hold the carrier 5 in assembly with the actuator 3, and also act to resiliently and detachably retain electric plug conductor terminals of the snap type in association with said contact means.

The switch casing of the improved switch is preferably constructed of a relatively thin piece of sheet metal stock which is preferably folded into a rectangular shape as shown in Figure 5. The free end of side wall 10 thereof is provided with a rectangular slot 11, and the free end of the end wall 12 with a finger 13 that is projected through said slot and bent over against the wall 10 as clearly shown in Figures 2 and 5, to provide an interlocking connection.

The wall 10 is preferably provided with a depending continuation 14, having an aperture 15 through which the actuator 3 extends for guidance. The wall 16 opposite and parallel to the side wall 10 is provided with a depending portion 17 corresponding to the depending portion 14,

and has an aperture 60 of a slightly greater diameter than aperture 15. A tubular bushing 18 is preferably permanently secured to the wall 16 of the casing, and is provided with a reduced extremity extending through the aperture 60, and is upset as indicated at 19. An annular shoulder 20 is formed on the bushing, and one side abuts the rear of the instrument panel and serves to maintain the switch in proper spaced relation to the panel. An exteriorly threaded extension formed on the bushing is adapted to be projected through a hole 21 in the panel, and a nut 22 cooperable with the extension clamps the panel between the shoulder 20 and the nut, as clearly shown. It is to be understood that if found desirable, the switch may be mounted in a different manner, and that means may be provided to positively prevent the switch proper from rotating with respect to the instrument panel. This may be accomplished by the customary method of providing a longitudinal slot on the exterior of the extension of the bushing, and a projection on the instrument panel cooperating with said slot. Thus far, it is evident that a very inexpensive switch casing is provided, and that one wall thereof serves as a bearing guide for the actuator, that the bushing 18 functions as a bearing, and that the switch may be easily and quickly connected to a mounting such as an instrument panel, the actuator being usually connected to the switch mechanism after the switch is mounted on said panel.

Considering now in detail the bridge member 4 and its carrier 5, the carrier is preferably substantially rectangular in shape, and the upper surface thereof is made flat. The sides of the carrier are preferably recessed as at 23 to provide sufficient clearance for the upset end of the bushing 18. The flat surface of the carrier is provided with a longitudinal recess 24, and a transverse recess 25 which intersects recess 24. Said recesses receive the bridge member 4, the portions 26 and 27 thereof, fitting within said recesses 24 and 25 respectively, whereby the upper face of the bridge is flush with the flat surface of the carrier. The bridge is substantially L in shape, and of a character to be dropped into assembly with the carrier, with the downturned ends 28 of the portion 26 projecting into notches 29 formed in the ends of the carrier.

A portion 30 of the lower extremity of the carrier is preferably reduced in size and provided with an aperture 31 substantially square in shape, which cooperates with a substantially circular recess 32, to provide a latch 33 adapted to register with the reduced portion 34 provided in the actuator 3. The diameter of this portion 34 is of substantially the same width as the aperture 31, and as clearly shown the spring 35 employed to return the bridge member to an open circuit position encircles a length of the actuator adjacent one side of the reduced extremity, and its ends are adapted to abut the wall 10 and the bottom of the recess 32, respectively.

As shown in Figure 4, each of the end walls 12 and 36 of the casing is provided with an inturned flange or way 37 on which the carrier 5 slides, and the portion 30 extends through and is guided by the opening formed between the ends of said flanges. In other words, the carrier is guided by the end walls 12 and 36, and the flanges 37, and has bearing on the latter.

Referring now to the construction of the switchback 6, same is preferably made of a moulded insulating material, such as a phenolic

condensate. As clearly shown in Figure 3, portions of the switchback rest upon the side walls 10 and 16 of the casing. The end walls 12 and 36 of the casing are each preferably provided with a pair of upstanding elongated spaced apart fingers 38 which are tapered on their inner marginal edges as shown in Figure 1. The switchback is formed with integral extensions 39 which project into the bifurcations or seats 40 formed by said fingers 38. Said seats 40 are in the same plane as the upper marginal edges of the side walls of the casing in order to provide a good foundation for the back. The fingers 38 also assist in piloting the switchback into place during assembly, and are then bent over into notches provided therefor in the switchback as indicated in Figure 2, to secure the switchback in a firm fixed position upon the casing.

Considering now in detail the spaced apart contact means 7 and 8, mounted on the switchback, and most clearly shown in Figure 4, said means are preferably arranged in spaced apart relation but in line with the longitudinal axis of the switchback, and with one on each side of the longitudinal axis of the switch proper. The switchback is provided with a circular well 40 and a rectangular aperture 41 cooperating with the well 40.

Since the contact means 7 and 8 are identical, a description of one will suffice. Each contact means is preferably constructed of sheet metal stock, formed into two like channel portions 42 which when brought together provide a tubular body substantially rectangular in cross-section that projects through the aperture 41, and since the shape of the latter corresponds to that of the body, rotation of the body with respect to the back is prevented. One end of the body extends outwardly and free from the confines of the switchback and is formed to provide a terminal receiving aperture 43 adapted to receive a plug conductor terminal of the snap type shown in Figure 6, and the inner end of the tubular body, or more specifically the inner end of each of the channel portions 42 is provided with a substantially semi-circular outwardly extending flange 44. An insert is movably arranged in the tubular body, and its outer extremity is provided with a detent portion 45 which intersects the terminal receiving aperture 43 to cooperate with a terminal, and the inner end is provided with an enlarged conical contact portion 45 having a substantially annular flange 46, set back from the conical portion 45, said flange normally abutting the flanges 44 on the tubular body as clearly shown in Figure 4. The well 40 is adapted to slidably receive and guide said flanges 44 and flange 46. A helical spring 9 surrounds the tubular body, and its ends engage the bottom of the well 40 and the flanges 44, respectively. Thus, the conical contact portion 45 of each contact means is normally urged in a direction to be engaged by the bridge member 4.

When a plug conductor terminal of the snap type, shown in Figure 6, is inserted into a terminal aperture 43, the relation between the contact portion 45 and the bridge member will not be disturbed, the groove in the terminal will cooperate with the detent portion 45 of the insert and resiliently retain the terminal in place. When a terminal is being inserted the flanges 44 and the flange 46 will separate to some extent and will substantially remain in this position while the terminal remains in the aperture 43. Thus, it will be evident that the contact means 7

and 8 are reciprocally mounted with respect to the switchback 6, that each contact means is provided with a contact adjacent its inner extremity adapted to cooperate with the bridge means, and that its outer extremity is adapted to resiliently retain a plug conductor terminal of the snap type.

As clearly shown in Figure 1 through 4, the bridge member 4 and its carrier 5 are assembled with the actuator member 3 in such a manner that the spring 35 urges the right side of the carrier against the wall 16 of the casing. In such position the switch is normally off for the reason that both of the contact means do not engage the bridge member 4, for as shown in Figure 4, the contact portion 45 of the contact means 7 bears against the flat portion of the carrier, whereas the contact portion of the contact means 8 is in engagement with the portion 27 of the bridge. It is desirable to construct the bridge member in the form shown, in order that at least one of the contact means normally engages a portion of the bridge member in order to force and hold the bridge member within the recesses 24 and 25. It is obvious that the portion 27 might be omitted entirely without effecting the operation of the switch, and that if desired the bridge may be so designed and placed on the carrier that the switch is normally in an on position.

As above recited, certain of the switch parts are so designed that their position may be reversed. This is illustrated in Figure 6, wherein the switch is arranged to be normally off as in Figure 3, but as herein shown, an outward pull on the actuator 50 is required to bridge the contact means 7 and 8, whereas in Figure 3 an inward push on the actuator 3 is required. Figure 6 also shows one position the carrier assumes when the actuator 50 is being connected or disconnected to the carrier, and if being connected, it will be evident that slight further inward movement of the actuator will cause the latch 33 of the carrier to snap into place through the action of the springs 9, and be received by the reduced portion 34 of the actuator. The actuator member 50 shown in Figure 6 is made slightly longer than the actuator member 3 shown in the other figures, and the reduced portion is placed in a different location in order that the inner extremity of the actuator will have sufficient bearing in the side wall 10. In order to promote easy entrance of the actuator, the inner end is provided with a tapered portion or nose, and same also serves to engage and cam against the latch 33 to force the carrier 5 upwardly, including the contact means 7 and 8, overcoming the resistance of the helical springs 9. If it were not for this provision, the actuator could not be inserted through the aperture 31 formed in the carrier, since said end would engage the latch means 33. In the event it is desired to remove an actuator, it is only necessary to place the fingers or a suitable tool against the portion 30 of the carrier and force the carrier upwardly as shown in Figure 6, whereupon the actuator may be withdrawn.

In view of the foregoing description it will be apparent that the switch is a decided improvement in the art and that among other things, the resilient means associated with the contact means perform the following functions: assist in resiliently retaining a plug conductor terminal with respect to contact means; urge the contact portions of the inserts of the contact means

inwardly in a direction whereby the portions may be engaged by the bridge; hold the bridge member in relation to its carrier; assist in holding the carrier in relation to the actuator; and prevent any possible rattling of the switch elements.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of the invention; and, therefore, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts, herein shown and described.

What I claim and desire to secure by Letters Patents is:

1. An electric switch including in combination, a casing having two open sides, a switchback closing one side of said casing, contact means carried by said switchback, a carrier supporting bridge means arranged in said casing, an actuator interlocked with said carrier, said carrier being accessible through the open side of said casing whereby said carrier may be lifted out of locking engagement with said actuator to permit withdrawal of the latter from said carrier.

2. An electric switch including in combination, a casing, a switchback closing one side thereof, a carrier reciprocally mounted on said casing, a bridge member mounted on said carrier adapted to engage contact means, cooperating means provided on said carrier, an actuator provided with cooperating means, and spring pressed contact means mounted on said switchback adapted to hold said bridge member to said carrier and maintain both of said cooperating means in assembly.

3. An electric switch including in combination, a casing, a switchback mounted on said casing, contact means mounted on said switchback, an actuator handle carried by said casing and projecting through same for longitudinal movement, a carrier mounted within said casing, a bridge member secured to said carrier, means provided on said actuator cooperating with said carrier, and means associated with said contact means for holding said carrier into engagement with said cooperating means, said handle being disconnectable from said carrier upon movement of the latter transversally with respect to the axis of said handle.

4. An electric switch including in combination, a casing provided with spaced apart depending portions, an actuator projecting through said depending portions for bearing and guidance, a carrier supporting a bridge member reciprocally mounted within said casing, a switchback secured to said casing, spaced apart contact means reciprocally mounted on said switchback, cooperative means provided on said actuator and cooperative means provided on said carrier, and means operatively associated with said contact means whereby to normally maintain both of said cooperative means in detachable interlocking relation and normally urge said contact means in a direction whereby to engage and hold said bridge member in assembly with said carrier.

5. An electric switch including in combination, a casing, a switchback carried by said casing, a plurality of spaced apart contact means mounted on said switchback, a pair of guideways having an opening therebetween provided on said housing, a carrier mounted in said casing and slidably engageable with said guideways and having a portion projecting through said opening for guidance, a bridge member mounted on said carrier arranged to engage said contact means, an

actuator, and means formed on said actuator and means formed on said carrier providing a detachable connection between said carrier and said actuator, the said projecting portion of said carrier being so arranged that it may be engaged to lift the carrier to separate said connection.

6. A device of the kind described including in combination, a casing, a contact carrier of insulating material mounted in said casing, a reciprocating actuator projecting through said casing and in direct locking engagement with said carrier, said carrier being manually movable transversely away from the axis of said actuator whereby to unlock said actuator from said carrier.

7. A switch including in combination, a casing in the form of a band and having open sides, a switchback closing one side of said casing, depending bearing portions provided on said casing including inturned flanges having an opening therebetween, contact means carried by said switchback and having means at one extremity for receiving a plug conductor terminal of the snap type and a contact provided at its other extremity, a carrier arranged in said casing and slidable on said inturned flanges and having a portion projecting through the opening between said flanges, a bridge member mounted on said carrier, latch means provided on the portion of said carrier projecting through said opening, an actuator projecting through said depending portions of said casing and provided with means interlocking with said latch means, and resilient means operatively related to the switch parts performing the functions of: resiliently retaining a terminal in said contact means, urging said contact of said contact means in a direction to be engaged by said bridge means and hold the latter in relation to said carrier, holding said carrier and actuator in interlocking relation yet permitting movement of said carrier in a direction whereby to break said interlocking relation to permit the withdrawal of said actuator as well as effect a reassembly thereof with said carrier.

8. A switch including in combination, a box like casing, a switchback mounted on said casing and provided with contact means, a carrier of insulating material mounted in said casing and having a portion extending exteriorly thereof, bridge means carried by said carrier, and an actuator extending through a pair of the side walls of the box detachably connected to said extending portion whereby the bridge member may be moved into engagement with said contact means, said portion being accessible from without the casing to release the actuator from said carrier.

9. A switch including in combination, a casing, a switchback mounted on said casing and provided with contact means, a carrier mounted in said casing and having a portion extending exteriorly thereof, a bridge carried by said carrier, an actuator detachably connected to said extending portion whereby the bridge may be moved into engagement with said contact means, and resilient means, said carrier, actuator, and other related parts being so constructed and arranged that said carrier and said resilient means may be disposed in either of two positions whereby in one position an inwardly directed force upon the actuator is required to overcome the resistance of said resilient means, and in the other position an outwardly directed force is required to overcome the resistance of said resilient means, the carrier in each instance returning to either of

said positions by the action of said resilient means.

10. An electric switch including in combination, a casing, a switchback secured thereto, spring pressed contact means mounted on said switchback, a carrier having bridge means carried thereby, said carrier being constructed and arranged whereby the same may be disposed in either of two positions within said casing to normally maintain one of said contact means out of engagement with said bridge means or both in engagement with said bridge means, an actuator adapted to be detachably connected to said carrier in either of said positions without removing said switchback, and resilient means adapted to be located with respect to said carrier in either of two positions whereby to normally maintain said carrier in either of said first-mentioned positions.

11. An electrical switch including in combination, a casing provided with spaced apart depending portions, an actuator projecting through said depending portions for bearing and guidance, a carrier supporting a bridge member movably mounted within said casing, spaced apart contact means reciprocally mounted on said casing, cooperative means provided on said actuator and cooperative means provided on said carrier arranged between said depending portions, and means operatively associated with said contact means whereby to normally maintain both of said cooperative means in detachable interlocking relation.

12. An electrical switch including in combination, a casing, a plurality of spaced apart contact means mounted on said casing, a pair of guideways having an opening therebetween provided on said housing, a carrier mounted in said casing and slidably engageable with said guideways and having a portion accessible from said opening, a bridge member mounted on said carrier arranged to engage said contact means, an actuator, and means formed on said actuator and means formed on said carrier providing a detachable connection between said carrier and said actuator, the said accessible portion of said carrier being so constructed and arranged that it may be engaged whereby to manually lift the carrier to separate said connection.

13. A switch casing including a plurality of walls, contact means carried by at least one of said walls, a pair of said walls being spaced apart to provide an opening, a carrier of insulating material slidably mounted on said pair of walls and having a portion accessible from said opening, bridge means mounted on said carrier, and an actuator detachably connected to said carrier for moving said bridge means with respect to said contact means, said actuator being detachable from said carrier by engaging and moving said portion relative to said opening and transverse to the axis of said actuator.

14. An electric switch including the usual housing, contacts, bridge member and carrier therefor, and actuator, means providing a detachable connection between said carrier and said actuator, and resilient means exerting a force transverse to the axis of said actuator holding said carrier and said actuator in connecting relation.

15. A carrier for a switch including, a large upper rectangular portion and a small lower rectangular portion offset from said large portion, the junction between said portions forming shoulders parallel to the face of said large por-

tion to provide bearing surfaces for said carrier, said large portion being of a character to support a bridge member, and means provided on said small portion whereby an actuator may be detachably connected thereto at a point below said large portion.

16. A switch casing including a plurality of wall portions, a pair of said wall portions being oppositely disposed and provided with depending portions having apertures therein adapted to accommodate an actuator for the switch, another pair of wall portions being provided with a pair of bearing surfaces for a bridge carrier and fingers for holding a switchback in relation to said casing, and one of said walls being provided with a mortise and another with a tenon for interlocking certain of said wall portions together.

17. An electric switch including in combination, a casing, a switchback mounted on said casing, contact means mounted on said switchback, a carrier supporting bridge means mounted on said casing, an actuator supported by said casing, means providing a connection between said actuator and said carrier, and resilient means carried by said switchback acting on said connection means for holding said actuator and said carrier in assembly, and said connection means being so exposed when the switch is assembled that said

carrier may be moved to compress said resilient means and release the said connection means whereby said actuator may be disconnected from said carrier.

18. An electric switch including in combination: a switch casing, a carrier carrying contacts mounted on the casing, a carrier supporting bridge means for the contacts arranged in the casing, an actuator detachably connected to the bridge carrier, an opening provided in the switch casing, said connection being accessible through said opening whereby the bridge carrier and actuator may be disconnected to permit withdrawal of the latter from the switch without first removing the contact carrier.

19. An electric switch including in combination: a switch casing, a carrier carrying contacts mounted on the casing, actuated means including a carrier supporting bridge means for the contacts arranged in the casing, an actuator detachably connected to the actuated means, an opening provided in the switch casing, said connection being accessible through said opening whereby the actuated means and actuator may be disconnected to permit withdrawal of the latter from the switch without first removing the contact carrier.

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