April 12, 1932. H. E. NORVIEL 1,853,075

SWITCH

Filed April 28, 1930

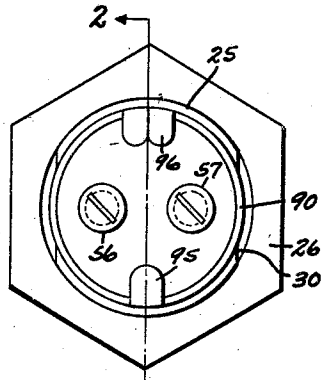

Fig. 1

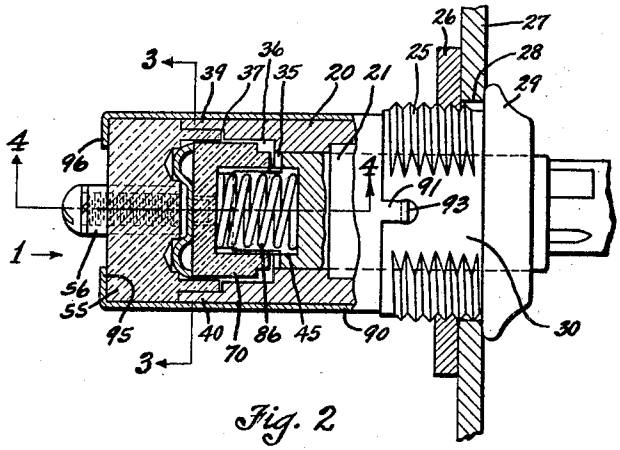

Fig. 2

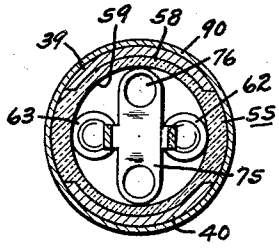

Fig. 3

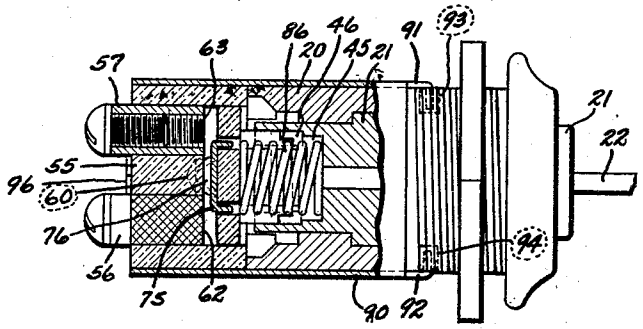

Fig. 4

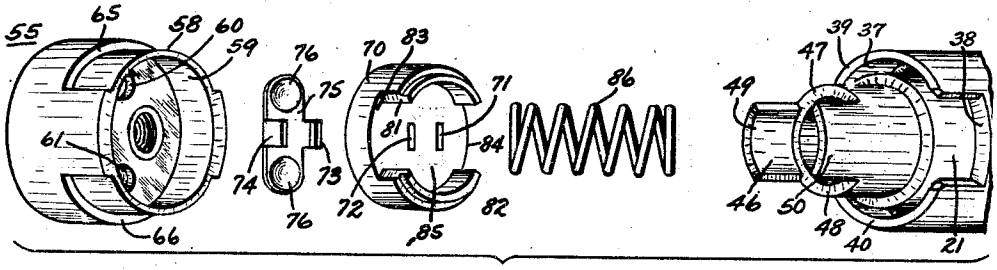

Fig. 5

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SWITCH

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This invention relates to electric switches and has particular reference to the key controlled type in which the circuit closing means is maintained against unauthorized actuation.

One of the objects of the invention is to provide a switch of efficient and simple construction.

Another object of the invention is to provide a switch structure normally insured against unauthorized actuation.

A further object of the invention is to provide a switch wherein the circuit completing members are entirely surrounded by dielectric material.

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 one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a rear end elevation of the improved switch, substantially as indicated by the arrow 1 of Fig. 2.

Fig. 2 is a side elevation of the switch device, a part thereof being in section substantially as indicated by the line and arrows 2—2 of Fig. 1.

Fig. 3 is a transverse section of the switch device substantially as indicated by the line and arrows 3—3 of Fig. 2.

Fig. 4 is a sectional view along the line and in this direction of the arrows 4—4 of Fig. 2.

Fig. 5 is an expanded view in perspective of the circuit closing means, illustrating the cooperative relation of the several parts contributing to the invention.

With particular reference to the drawings, 20 indicates a lock or key controlled frame supporting a key cylinder or other contact actuator mechanism 21, that may be operated by a convenient and proper key 22, as illustrated in Figs. 2 and 4. The frame 20 is generally cylindrical in formation and has a threaded portion 25 to cooperate with a clamping nut 26 so that the switch device may be secured to an instrument panel, dash or other convenient portion 27 of vehicle structure. The lock switch is retained in place by seating it within an aperture 28 of the dash against a ferrule 29 of the frame 20, and running on the clamping nut 26. At one or more points the frame 20 is provided with flats 30 which cooperate to provide a nonrotating relation with the dash member or support 27.

It will be observed that the key cylinder 21 is kept in an axial bore 35 of the lock frame, and is retained therein in any convenient or desirable manner well known to those skilled in the art. Since the instant invention does not reside in maintaining the key cylinder 21 within the frame 20, further description thereof is not herein supplied. The axial bore 35 of the frame is of stepped form or is enlarged at 36 to provide a cup-like recess for a purpose later to be described, and bore at the inner terminating end of the frame 20 is further enlarged at 37 to provide mating engagement with a dielectric member later to be described. At preferred points about the frame 20 the inner end thereof is notched as at 38, which notches extend substantially the depth of the enlargement 37. This notching provides a terminating end of the frame 20 with circumferentially spaced arc like tongues 39 and 40, that operate to maintain nonrotative engagement with a switch back, the description of which will soon follow.

The inner end of the key cylinder 21, in many respects, is much like the corresponding end of the frame 20, in that it is centrally recessed at 45, which recess is enlarged at 46, and the terminating end thereof is notched at 47 and 48 throughout the depth of the enlargement 46 to provide the arc like tongues 49 and 50. When the parts 20 and 21 are properly assembled, as illustrated in Figs. 2 and 4, an annular or ring like chamber is then formed by the enlargement 36 about the dove-tailed end of the key cylinder 21, and makes provision for reception of a driving mechanism that has interfitting engagement with the tongues 49 and 50 of the key cylinder 21.

For closing the end of the frame 20, there is provided a dielectric member 55 or switch back, as it may be termed, that carries a pair of terminal members 56 and 57. The mem-

ber 55 is cup-like in form, in that it has an axially extending flange or rim 58 on the inner face thereof, providing a contact enclosure or chamber 59. The inner face of the switch back provides detent recesses 60 and 61 that are arranged in a concentric row with respect to the inner ends of the terminal members 56 and 57, forming fixed contacts 62 and 63 respectively. At preferred regions about the rim 58 of the member 55, arc-like notches 65 and 66 are provided to receive the tongues or tenons 39 and 40 of the frame 20. This forms a rim to rim interfitting engagement therewith and maintains the switch back in nonrotative relation with respect to the frame 20.

Nicely fitting within the recess 59 formed by the flange 58 of the switch back, a dielectric contact supporting member 70 is provided, that has recesses 71 and 72 for driving reception of axially extending tongues 73 and 74 of a bridging contact member 75. The contact 75 is formed to provide spherical portions 76 adapted to ride over the switch back and optionally engage the detent recesses 60 and 61 or the fixed contacts 62 and 63. The contact supporting member 70 is of a size nicely fitting within the bore 59 of the switch back and when disposed therein with its contact member in place, operates with the switch back to form a closure for the chamber 59, within which are housed the circuit completing elements. Thus, the contact making-and-breaking members are wholly surrounded by dielectric members, since the fixed contacts 62 and 63 with a bridging contact member 75 are the only metallic or conducting elements exposed within the said chamber.

The opposite side of the contact supporting member 70 provides arc-like flanges 81 and 82 circumferentially spaced by notches 83 and 84 as illustrated in Fig. 5. This makes provision for a dove-tail like engagement with the driving tongues 49 and 50 of the key cylinder 21. It will be observed from the illustration in Fig. 5, that the contact support 70 is substantially cupped in form, with portions of the side walls removed affording the notches 83 and 84, and that the bottom 85 thereof provides a seat against which a contact urging spring 86 may be placed. When assembled, the other end of the spring seats against the key cylinder 21 at the bottom of the bore 45.

It will be observed from the description that has gone before, that the frame 20 and switch back 55 afford a mortise and tenon like engagement due to the tongues 39 and 40 having interfitting relation with the notches 65 and 66. Thus, a structure of smooth cylindrical and continuous contour is formed when the frame 20 is fitted with the switch back 55. A protective shell 90 that nicely fits about the structure is provided and has a plurality of tangs or bendable tongues at either end thereof. At one end of the shell 90, tangs 91 and 92 are struck radially inward into recesses 93 and 94 that may have a convenient location in the flats 30. This operates to retain the shell 90 about the frame 20, and renders access to the interior of the switch mechanism relatively inconvenient, since the tongues 91 and 92 cannot be easily removed or pried out from the said recesses. The shell 90 is sufficiently extensive to embrace the whole of the rear portion of the frame 20 and the switch back 55, and has the tangs 95 and 96 bent against the rear face of the switch back 55 to aid in maintaining it in assembled relation with the frame 20. Since the frame 90 is of hardened material the tongues 91, 92, 95 and 96 are not easily bent out of engagement from their cooperating position, thus precluding unauthorized access to the interior of the switch structure.

In assembling the switch it will be found convenient to first provide the frame and the protective shell in their assembled form with the tangs 95 and 96 bent outwardly. The switch back 55 carrying the contact support 70 with its bridging contact 75 interposed therebetween, is then arranged to receive the spring 86 against the head 85 of the member 70. Note at this point that the switch back 55 with its assembled contact actuating member 70 substantially encloses the circuit interrupting means within a chamber of dielectric material, and that manipulation of the contacting elements may be had by rotating the member 70 within the flange 58.

By means of the key 22, the key cylinder is manipulated so that the several tongues of the frame and key cylinder will be oriented to a position in mating engagement with the respective notches of the switch back and contact support, and the frame 20 with its protective shell 90 is then passed over the switch back and assembled contact actuator, until the tongues 39 and 40 are seated within the notches 65 and 66, whereupon the retaining tongues 95 and 96 are bent against the switch back. The structure thus assembled is represented by the sectional views Figs. 2 and 4, where it will be observed that the contact support 70 is disposed within the annular chamber 36 hereinbefore referred to and is engaged by the spring 86 which urges the contact support with its bridging member 75 into engagement with the switch back.

It is obvious from the description that has preceded that manipulation of the key 22 will rotate the cylinder 21 within the frame 20, and that the dove-tail like connection of the key cylinder 21 with the contact support 70, due to the tongues 49 and 50 mating with the notches 83 and 84, will thereby drive the contact actuator 70, and that through the tongues 73 and 74 of the contact 75 mating

with the recesses 71 and 72 of the block 70, that the contact 75 will be caused to move over the switch back from the detent provisions to the fixed contact members, and vice versa, at whatever the option of the person. The dove-tail provisions of the key cylinder and switch back are such that lineal motion of the back relative to the key cylinder is permissible so as to allow the contact 75 to ride over irregularities of surface of the switch back, or to move axially with respect to the mechanism, from the lowest point of the detent provisions 60 and 61 to the highest point of the contacts 62 and 63, and yet maintain the driving engagement between the key cylinder and the contact supporting member.

While the form of 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 lock switch comprising in combination, a lock frame in cylindrical formation providing tenons at one end thereof, a switch back having a concentric skirt providing mortises for the reception of said tenons, and a protective shell embracing said lock frame and switch back and provided with means for retaining the frame and switch back in assembled relation.

2. A switch of the class described comprising in combination, a frame providing axially extending tongues and a central recess for reception of circuit closing means, a switch back of cup form having engagement with said frame tongues and completing the enclosure of said recess, and means maintaining the frame and back in assembled relation against unauthorized access thereto.

3. A switch of the class described, comprising in combination, a lock frame, a switch back having interfitting engagement with one end of said lock frame, said frame and back being recessed to enclose spring urged circuit completing means, and a protective shell secured to the frame and maintaining the back in engagement therewith so as to form a relatively inaccessible enclosure.

4. The combination set forth in claim 3, in which said switch back is of cup form and provides a plurality of contact members, a contact carrier movably guided in said cup portion and providing a connector adapted to engage said contacts, and driving for actuation of said contact carrier.

5. A switch of the class described comprising in combination, a lock frame, a switch back having interfitting engagement with one end of said lock frame, said switch back being axially recessed and providing a plurality of fixed contact members, contact actuating means disposed within said axial recess and guided thereby and providing a connector optionally engageable with said fixed contacts.

6. A switch of the class described comprising in combination, a lock frame, a switch back having interfitting engagement with one end of said lock frame, and cooperating to provide an enclosure for contact actuating mechanism, said actuating mechanism comprising a contact carrier journalled concentric with said switch back, a lock plug carried by said frame, said contact carrier and plug having circumferential tongue and groove engagement and each axially recessed, and means disposed in said axial recess maintaining the contact carrier in engagement with the switch back.

7. A switch comprising in combination, a lock frame, a cup member having mating engagement therewith, preventing rotation of one relative to the other, said cup member having a pair of fixed contacts and detent positions, a contact carrier of cup-like form substantially filling said cup and supporting a bridging member for engagement with said contacts, and means provided by the said frame for actuating said contact carrier and maintaining the same in disposition against said cup member.

8. A switch of the class described, comprising in combination, a frame, a terminal support mating with the frame, said terminal support having a concentric skirt peripherally notched to receive complemental portions of said frame, a contact carrier disposed within said skirt and guided thereby, means driving the support, and means yieldingly urging the contact support toward the terminal support.

9. A switch of the class described, comprising in combination, a switch back of cupped form providing contacts, and off-contact detents, a movable contact support fitted within the cup and guided thereby, said support providing a contact movable into engagement with said fixed contacts, said detents, and means for actuating the contact support, and means for yieldingly urging the contact support toward the switch back.

10. The combination comprising, a lock frame having a key cylinder axially disposed therein, a switch back in nonrotative engagement with the frame, a contact support in the chamber and maintained in engagement with the switch back, said support having interfitting tongue engagement with the key cylinder, and means engaging the switch back and frame maintaining the same in interfitting engagement, and the support in driving relation with respect to the key cylinder.

11. A switch of the class described comprising in combination, a frame, a terminal support having an axially extending flange, a contact support device disposed within the flange, and guided in movement thereby, said device having peripheral arc-like

tongues, actuating mechanism carried by said frame providing tongues engageable between the tongues of said contact support, and means for actuating the contact support.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.