Feb. 6, 1934. H. E. NORVIEL 1,945,562

LOCK SWITCH

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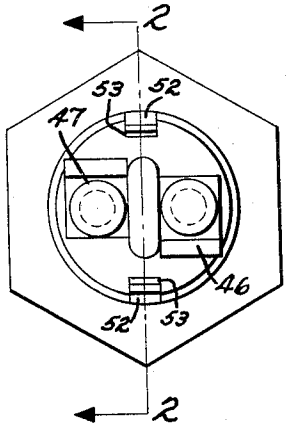


Fig. 1

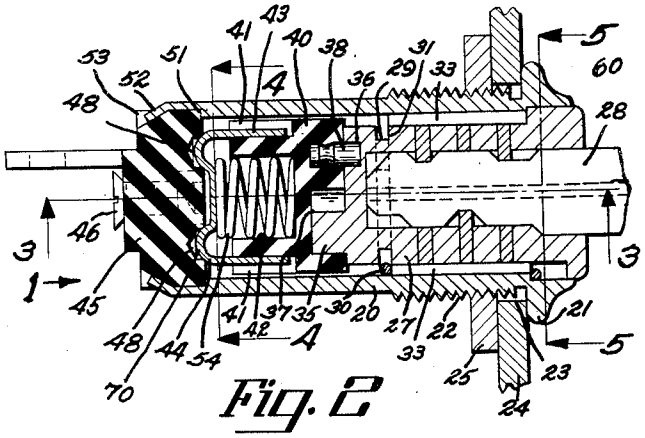


Fig. 2

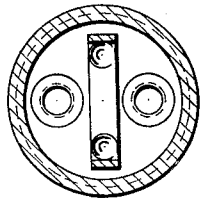


Fig. 4.

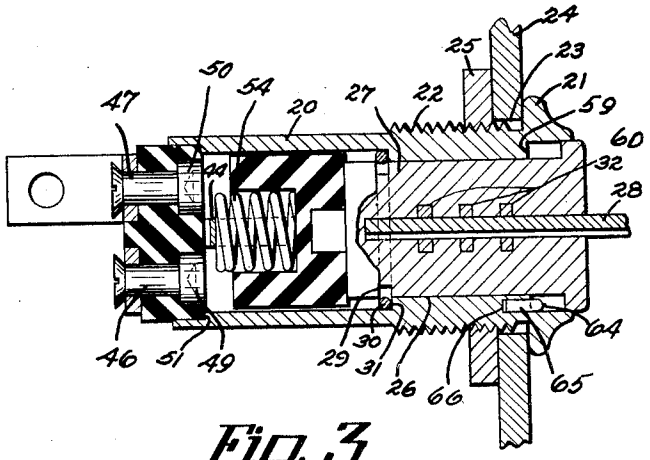


Fig. 3

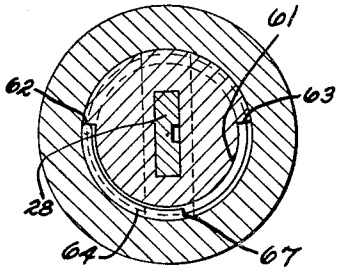


Fig. 5

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LOCK SWITCH

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8 Claims. (Cl. 200—44)

This invention relates to electric switches, and more particularly to switches that are controlled by a key in which the circuit closing means is maintained against unauthorized actuation.

An object of the present invention is to provide a switch that is simple in construction, efficient in operation, manufactured at a low cost, and is normally insured against unauthorized actuation.

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

In the drawing:

Fig. 1 is a rear end view of the present invention looking in the direction of arrow 1 of Fig. 2.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 2.

Figs. 3, 4 and 5 are sectional views taken on the lines 3—3, 4—4 and 5—5 respectively of Fig. 2.

A cylindrical member in the form of a frame or casing 20 is provided with a bead or ferrule 21 at its front end and a threaded portion 22 behind the bead. The frame may be passed through an aperture 23 in an instrument board or other mounting device 24, a nut 25 being received by the threaded portion 22 and serving to clamp the bead against the board, the frame projecting to the rear of the board. The casing 20 has an axial bore 26 of stepped formation and supports a key cylinder or other contact actuator mechanism 27 that may be operated by a convenient and proper key 28 as illustrated in Figs. 2 and 3. The key cylinder 27 has a groove 29 to receive a C-washer 30 or other suitable means within the groove to engage a shoulder 31 preventing axial movement in one direction of the cylinder 27 with respect to the casing 20. The cylinder 21 contains tumblers 32 that are moved transversely thereof into and out of diametrically opposite slots or grooves 33 formed in the casing 20. The key is formed to engage suitable apertures in the tumblers to adjust the tumbler in alignment with and out of a locking position. The key 28 acts as a handle to actuate the switch closing mechanism.

The key cylinder 27 is provided with a plug 35 and a socket or recess 36. The plug 35 engages recess 37 and the socket 36 receives a plug or pin 38 of an insulating contact actuator or support 40 whereby the support is driven when the key cylinder is operated by the key 28.

The actuator or support 40 is provided with notches or guides 41 and a recess 42. The notches 41 receive extensions or arms 43 of a U-shaped bridging contact member 44. The length of the notches are such as to permit considerable freedom of axial movement of the arms in the notches with respect to the actuator but preventing rotary movement thereof. The bridging contact member is formed to provide spherical portions or other suitable deformations 70 adapted to ride over a switch back or terminal head 45.

For closing the end of the lock frame 20, the switch back or terminal head 45 of insulating material carries a pair of terminal members 46 and 47. The inner face of the terminal head provides detents or recesses 48 that are arranged in a concentric row with respect to the inner ends of the terminal members 46 and 47 forming fixed contacts 49 and 50 respectively.

The end of the frame 20 is counter-bored to form a shoulder 51 and the terminating end thereof is provided with tangs or tongues 52. The frame is sufficiently bored to telescope the switch back so that the back rests on the shoulder 51 and the tangs 52 are bent inwardly, as illustrated in Fig. 2, to fit into the notches 53 of the base 45 and secure the base to the frame 20 and maintain the arms 43 of the bridging member 44 within the notches 41 to be driven by the actuator 40. The assembly of the back to the frame is such as to permit the arms 43 considerable freedom of axial movement in the notches with respect to the actuator 40, while confining the arms against such movement as would enable the arms to become free of the notches 41. Since the frame 20 is of hardened material, the tongues 52 are not easily bent out of engagement from their cooperating notches 53, thus preventing unauthorized access to the interior of the switch structure.

Referring to Figs. 2 and 3, a spring 54 is interposed between the bridging member 44 and the support 35. The spring 54 is seated in the recess 42, the recess being centrally located in the support to guide the spring, thus providing a uniform pressure upon bridging contact 44 and urging same against the base 45 and at the same time urging the support 35 in driving engagement with the cylinder 27 through the plugs 35 and 38 engaging recesses 37 and 36 respectively.

It will be observed that a structure of smooth cylindrical contour is formed when the frame 20 is fitted with the back 45. This operates to retain the back within the frame and renders access to the interior of the switch mechanism relatively inconvenient.

The bead 21 is counter-bored to form a shoulder 59 and adapted to receive a flange or head

portion 60 of the key cylinder 27 preventing axial movement to the left as viewed in Fig. 1. The inner surface of the flange portion 60 is notched as at 61 forming stops 62 and 63 for the key cylinder, and at the same time incloses a wire 64, adjacent the shoulder 59. The wire 64 has one end bent at an angle to form a projection 65 which is anchored into a recess 66 provided in the shoulder 59. Referring to Fig. 5, the stop surfaces 62 engage a portion of the projection 65 to limit the movement of the cylinder in a counter-clockwise direction and indicates a circuit open position of the switch structure. When it is desired to close the circuit, the key 28 is actuated causing the cylinder to be rotated in a clockwise direction until the stop 63 engages an end 67 which limits the clockwise movement of the cylinder 27. When this occurs the switch will be in a circuit closed position.

It is obvious from the description that has preceded that manipulation of the key 28 will rotate the cylinder 27 within the frame, and at the same time will rotate the plug and socket connection of each the cylinder and the support 40, and the arms 43 of the bridging member 44 engaging the notches 43 of the support 35, so that the bridging contact spherical portions 70 engaging the detents 48 will be caused to move over the switch back 45 from the detent position to the fixed contact surfaces, and vice versa, at whatever the option of the operator. The connection of the bridging contact 44 and the support 40 are such as to allow the bridging contact to have axial movement relative to the support 40 from the lowest point of detent position 48 to the highest position on the contact surfaces 49 and 50 and yet maintain the driving engagement with the support 35 when the support is actuated by the key cylinder 27.

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; a terminal base telescopically attached to said frame and cooperating with said frame to form an inclosure for an actuating mechanism; said actuating mechanism comprisng a rotary lock member journalled in said frame; an insulating member drivingly connected with said lock member and provided with peripheral notches and a recess interposed between said notches; a bridging member having arms extending into said notches permitting axial movement therewith but preventing rotary movement with respect to said insulating member; and a single coiled spring disposed in said recess and engaging said bridging member for yieldably urging said bridging member toward the terminal base and maintaining the driving connection of said lock member and insulating member.

2. A switch comprising in combination, a stationary contact; a block of insulating material supporting the stationary contact; a controller frame attached to said block; a rotary controller journalled in said frame, a contact carrier; driving connections between the controller and contact carrier; a movable contact supported for rotary movement by the carrier means including arms at each end of the contact and peripheral notches in the carrier to permit relative axial movement between the movable contact and carrier; a single coiled spring between the carrier and the contact, and means including the spring for urging the carrier into driving engagement with the controller and the movable contact toward the stationary contact.

3. A switch comprising in combination, a controller, a contact carrier having peripheral guides; plug and socket means upon said carrier and controller and cooperating with each other to effect one way mating of controller and carrier, and to produce rotation of said carrier by the controller; a movable contact having a plurality of arms slidable within said guides to provide for rotary movement by said carrier, means including said arms and guides permitting relative axial movement between the movable contact and carrier; and a single coiled spring abutting said carrier and movable contact to constantly retain the plug and socket engagement of said controller and carrier, and to urge said movable contact toward the stationary contact.

4. A switch comprising, in combination, a stationary contact; a block insulatingly supporting said stationary contact; a movable contact; a non-conducting carrier for the movable contact provided with guides and a central recess, said movable contact having arms disposed within said guides so as to permit relatively axial movement between said movable contact and carrier; driving connections between the controller and carrier; and a single helical coil spring having one end seated in said recess and the other end engaging said movable contact to maintain the driving connection between said controller and carrier and to urge the movable contact toward said stationary contact.

5. A lock switch comprising in combination, a key actuated rotatable controller, a controller frame supporting the controller and extending beyond the enclosed end thereof to provide a switch housing, a dielectric driving member and contact carrier seated directly on the end of the controller, said dielectric member having a pair of diametrically arranged guideways at its periphery and an interpositioned spring socket, a movable contact having parallel forwarding guide tongs received by the guideways in said dielectric member, a terminal member disposed within the end of said controller frame, and spring means substantially confined in the spring socket of the dielectric member and guided thereby to separate the contact and dielectric member and to maintain the dielectric member in driving engagement with the controller.

6. A lock switch comprising in combination, a key actuated controller, a dielectric member providing a one way mating relation with said controller, a movable contact supported by said dielectric member, a terminal member for cooperation with the movable contact, a controller frame enclosing the controller and extending beyond the end thereof with a substantially uniform bore to enclose the switch mechanism and surround the terminal member, and spring means interposed between and substantially enclosed by the dielectric member to guide the contact member tending to separate it from the dielectric member.

7. A lock switch comprising in combination, a key actuated controller, a dielectric driving member having one way mating relation therewith, a controller frame, a terminal member supporting a plurality of fixed contacts, a bridging contact carrier by the dielectric member, said controller frame extending beyond the controller to enclose

and surround the movable contact and the terminal member, a contact urging spring, and means for supporting and guiding the said spring including a deep well in one phase of the dielectric member.

8. A lock switch comprising in combination, a casing, a key actuated controller in one end of the casing, a terminal support enclosing the other end of the casing, a movable contact for cooperation with the fixed contacts thereof, the dielectric driving member and contact carrier seated on the inner end of the controller, and having a pair of diametrically arranged guideways axially spaced at its periphery, and an interposed spring socket, a contact urging spring disposed within said socket and tending to separate the movable contact and dielectric member, said spring socket being of sufficient depth to substantially enclose a spring and guide it in its movement.

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