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ELECTRIC SWITCH

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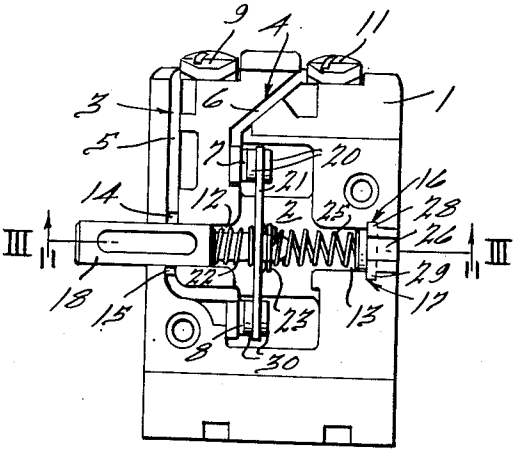


FIG. 1.

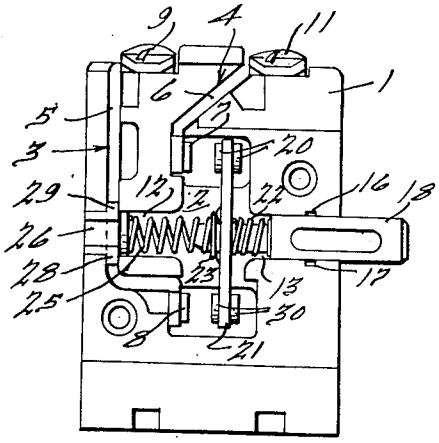


FIG. 2.

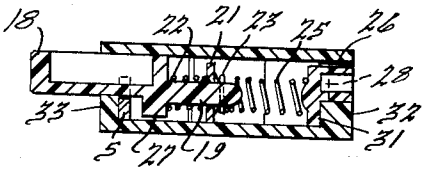


FIG. 3.

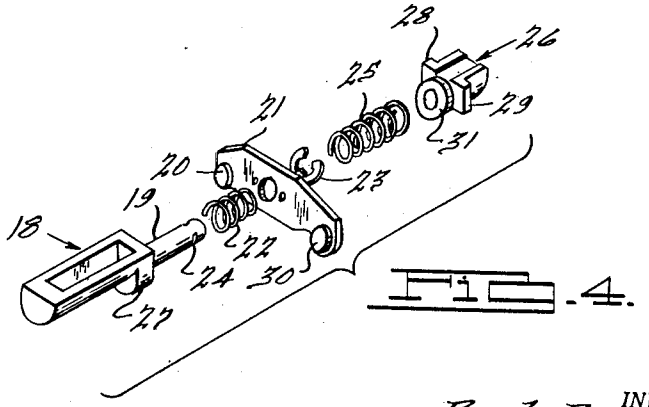


FIG. 4.

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ELECTRIC SWITCH

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5 Claims. (Cl. 200—166)

This invention relates to an electrical switching device and more particularly to a switch of the interlock type.

The object of the invention is to provide an interlock type switch of simple and inexpensive construction which may be either a normally open or normally closed type and which may be readily converted from a switch of the one type to a switch of the other type.

A further object in accordance with the preceding object is to provide an interlock type switch in which the external operator and internal movable mechanism may be physically reversed from one side of the switch casing to the other while retaining the position of the internal contacts to effect a conversion of the switch from a normally open to a normally closed type switch or vice versa.

Further objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawing illustrating certain preferred embodiments in which:

Figure 1 is a top plan view of the switch with the side cover removed and showing the switch as a normally closed type.

Figure 2 is a top plan view with side cover removed and showing the switch as a normally open type.

Figure 3 is a sectional view taken along the lines III—III of Figure 1.

Figure 4 is an exploded perspective view of the external operator and internal mechanism of the switch.

The present invention constitutes a switch useable as an interlock type switch and comprising an insulating base 1 having a central recessed portion at 2 and slots at 3 and 4 extending from the recessed portion 2 to the exterior of the base in which are positioned conducting straps 5 and 6 carrying stationary contacts 7 and 8 at one end within the recess 2 and terminals 9 and 11 at the other end and outside of the base 1.

The insulating base 1 is further provided with coaxial lateral grooves 12 and 13 opening at one end to the exterior of the base 1 and at the other end to the central recessed portion 2 containing the stationary contacts 7 and 8. Conducting strap 5 passes transverse of the groove 12 and is cut out to conform to the dimensions of the groove and to provide side slots at 14 and 15 along the groove 12. Groove 13 is likewise provided with side slots 16 and 17 to provide side slots in exact compliment with those designated 14 and 15 for a purpose to be explained hereinafter.

Referring now to Figure 1 and the exploded view of Figure 4, the switch operating mechanism is constituted by an operator 18 of suitable insulating material having an extending spring guide probe 19. A movable contact member 21 is supported on the probe portion 19 and is spring pressed toward the end of the probe by a helical spring 22 pressing at one end against the body portion of the operator 18 and at the other end against the contact member 21. The movable contact member 21 carries at its opposite ends movable contacts 20 and 30 which are maintained in operative alignment with the stationary contacts 7 and 8 in the recess 2. A spring clip retainer

23 cooperates with a groove 24 on the probe 19 to retain the contact member 21 in mounted position on the operator 18 and the contact member 21 is spring pressed into a normal position either open or closed, as will be seen, by helical spring 25 pressing at one end against the contact member 21 and the other end against spring seat 26 which is retained in the base 1.

The operator 18 and the spring seat 26 are provided with means cooperating with the base 1 to maintain them in position and alignment as will be seen by reference to Figures 3 and 4. The operator 18 is provided with a semi-circular guide and barrier 27 on its under side acting as a guide during the travel of the operator in switch operation and as a stop for travel of the operator in open position as will be seen hereinafter. Spring seat 26 is provided with radial extensions 28 and 29 which cooperate with the grooves 14 and 15 or 16 and 17, depending upon the location of the spring seat, and with an end barrier 31 extending generally below the axis the spring seat as shown in Figure 3. It should be noted that the dimensions of the base at 32 with which the barrier cooperates in the device, as shown in Figure 3, is the same as the total dimension of the corresponding portion 33 of the base on the opposite side plus the thickness of the strap 5 which, as has been previously described, is cut out to conform with groove 12 in the base and to provide slots 14 and 15 so that all operator parts may be positioned at either side of the base 1.

Referring now to Figures 1 and 2 illustrating the assembled switch in its two conditions, it may be seen that the switch provides the adjustability of being either a normally open or a normally closed type of switch. The switch provides for ready reversal from one type to the other by merely reversing the operating mechanism thereof as by lifting the entire mechanism out and reversing it in the base. The parts which constitute the operating mechanism are readily positionable in either side of the base and, as has been shown, the base is provided with complimentary grooves on each side to accommodate the operators at either side. For instance, the portion 32 of the base corresponds in dimension with the dimension of portion 33 and the conducting strap 5 so that end post 26 will fit in the base and be flushed with its exterior regardless of on which side it is mounted. Likewise, the grooves established by slots 16 and 17 are complimentary with the slots 14 and 15 established by the cutout in the strap 5 in its position in slot 3.

With the operating mechanism in its position as illustrated in Figure 1, the switch constitutes a normally closed switch with contacts 7—20 and 8—30 in engagement. Movement of the operator opens the contacts and breaks its associated circuit. In Figure 2 the contacts are in a normally open position with movement of the operator closing the contacts. With the switch in this adjusted construction, the barrier 27 on the operator 18 cooperates with portion 32 of the base to establish an end stop for the barrier.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

What is claimed is:

1. In an electrical switch having an insulating base, sidewalls on said base defining a central recess therein, a removable cover for said base and recess, a pair of coaxially disposed grooves of equal and complementary cross section extending from said central recess through opposed sidewalls to the exterior of said base, stationary contacts supported in said base and recess, an external operator, a seat means, said operator and seat means

being cooperative individually with said grooves at either side of said base and positionable in either of said grooves at opposite sides of said base, a movable contact member carried on said operator in cooperative alignment with said stationary contacts, said operator contact member and seat means being reversible as a unit with respect to said base and stationary contact to cooperate with either of the grooves in opposite sidewalls whereby said switch is convertible from a normally open to a normally closed switch, or vice versa.

2. In an electrical switch having an insulating base, side and end walls on said base defining a central recess therein, stationary contacts positioned in said central recess, electrically conducting members connected to said stationary contacts and terminating at the exterior of said base at one end thereof, a pair of coaxial grooves of equal and complementary cross section extending through opposed sidewalls of the base into said recess, one of said electrically conducting members being notched to conform with the groove in one of said sidewalls, an external operator slidably supported in one of said pair of grooves and having a portion thereof extending into said central recess, a movable contact carrier supported on said external operator within said central recess, a spring seat supported in the other of said pair of grooves, spring means operating at one end against said spring seat and at the other end against said external operator to bias said operator and contact carrier in one direction in said central recess, said external operator, movable contact carrier, spring and spring seat being reversible as a unit with respect to said insulating base and said pair of grooves, whereby said external operator is slideably supported in either of said grooves, means on said spring seat for locking said spring seat in either of the grooves to permit positioning of said spring seat in either of said grooves, and permit said reversal of parts to convert said switch from a normally open to a normally closed switch, or vice versa.

3. In an electric switch, the combination comprising; an insulating base having spaced parallel walls defining a recess, a cover for the base and recess, a pair of grooves in opposed parallel walls of the recess, said grooves being coaxially aligned and of equal and complementary cross-section and extending through the walls from the exterior of the base into the recess, fixed contacts supported in the recess, a movable member having a portion thereof in sliding engagement in one of the grooves, a fixed member having a portion thereof positioned in the other of the pair of grooves, said portions of the movable member and fixed member being of substantially equal cross-section and having a shape complementary to the shape of the grooves, means in both grooves for limiting the movement of the fixed member therein, fixed contacts in said recess, a contact member carried by the movable member for engagement with the fixed contacts, spring means positioned by the fixed and movable member and operative on the contact member for biasing the contact member in one direction in the recess, said movable member, fixed member, contact member and spring means being reversible with respect to the base and grooves whereby said reversal is effective to convert the switch from a normally open to a normally closed switch and vice versa.

4. In an electric switch, the combination comprising; an insulating base having spaced parallel walls defining a recess, a cover for the base and recess, a pair of grooves in opposed parallel walls of the recess, said grooves being coaxially aligned and equal and complementary in cross-section and extending through the walls from the exterior of the base into the recess, fixed contacts supported in the recess, a movable member having a portion thereof in sliding engagement in one of the grooves, a fixed member having a portion thereof positioned in the other of the pair of grooves, said portions of the movable member and fixed member being of substantially equal cross-section and having a shape complementary to the grooves, means in both grooves for limiting the movement of the fixed member therein, fixed contacts in said recess, a substantially flat contact member carried by the movable member in cooperative alignment with the fixed contacts, spring means positioned by the fixed and movable member and operative on the contact member for biasing the contact member in one direction in the recess, said movable member, fixed member, contact member and spring means being reversible with respect to the base and grooves whereby said reversal is effective to convert the switch from a normally open to a normally closed switch and vice versa.

5. In an electric switch, the combination comprising; an insulating base having spaced parallel walls defining a recess, a cover for the base and recess, a pair of grooves in opposed parallel walls of the recess, said grooves being coaxially aligned and equal and complementary in cross-section and extending through the walls from the exterior of the base into the recess, fixed contacts supported by the base in the recess, a movable actuating member having a portion thereof slideable in one of the grooves, a fixed member having a portion thereof positioned in the other of the pair of grooves, said portions of the movable member and said fixed member being of substantially equal cross-section and having a shape complementary to the grooves, means in both grooves for limiting the movement of the fixed member therein, a pair of stationary contacts carried by the base in said recess, a substantially flat contact member carried by the movable member arranged for engagement with the stationary contacts, a first spring means carried by the actuating member for urging said contact member in one direction in the recess, a second spring means positioned by the fixed and movable member and operative on the contact member for biasing the contact member in the other direction in the recess, said movable member, fixed member, contact member and both spring means being reversible with respect to the base and grooves whereby said reversal is effective to convert the switch from a normally open to a normally closed switch and vice versa.

References Cited in the file of this patent

UNITED STATES PATENTS

2,419,072 Hall ---------- Apr. 15, 1947