Dec. 30, 1952 E. K. HAYDON 2,623,960

ELECTRIC SWITCH

Filed Dec. 15, 1949 2 SHEETS—SHEET 1

FIG. 1.

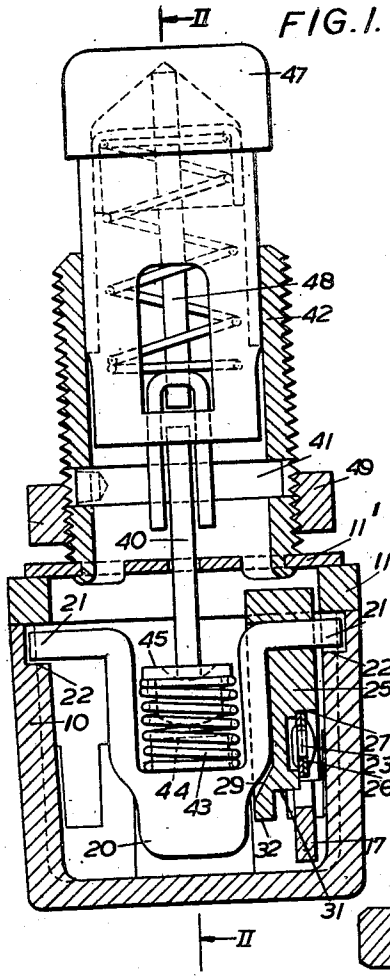
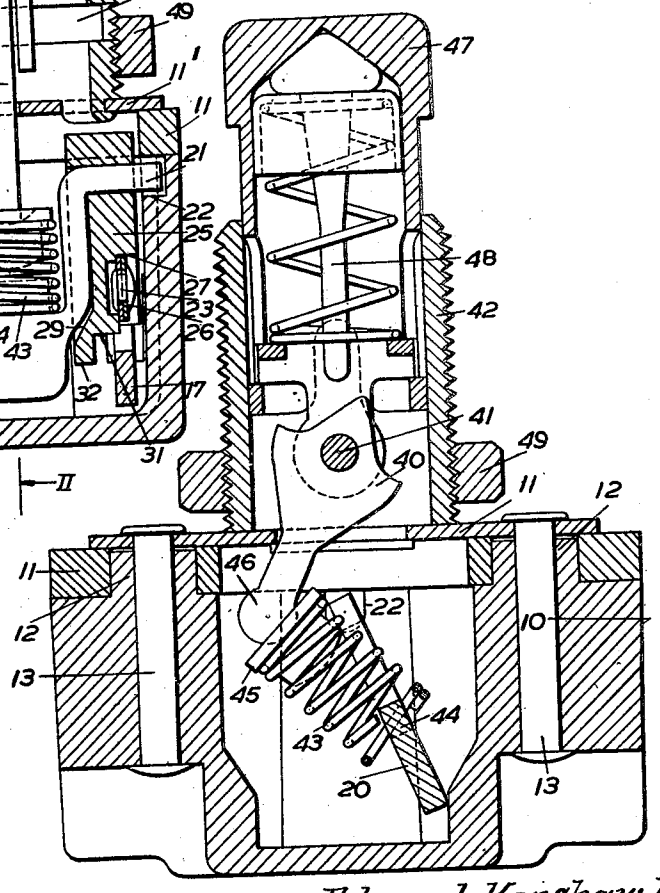


FIG. 2.



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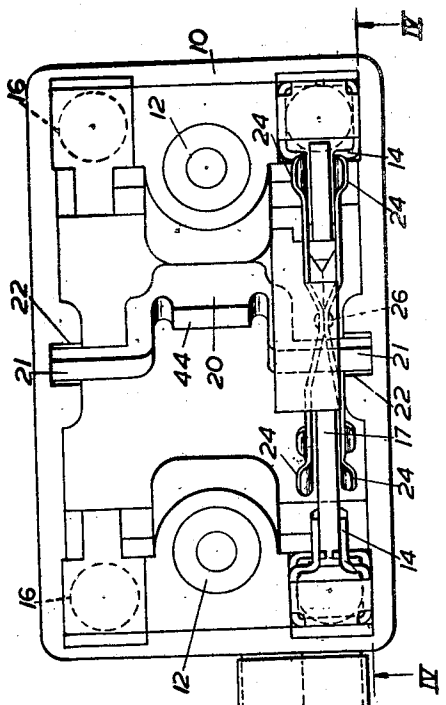


FIG. 3

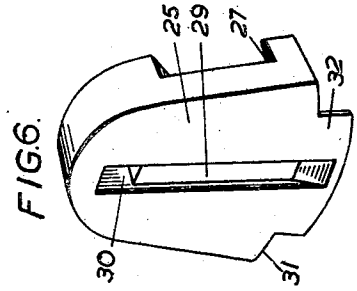


FIG. 6

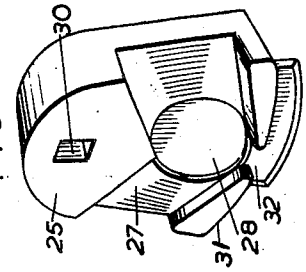


FIG. 5

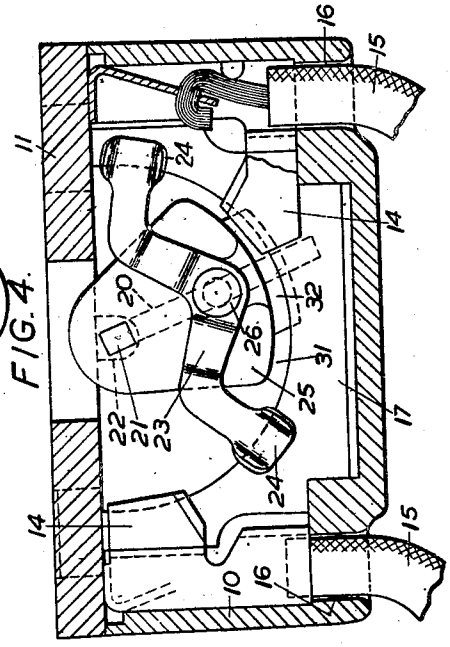


FIG. 4

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ELECTRIC SWITCH

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5 Claims. (Cl. 200—67)

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This invention relates to electric switches and is concerned with a particular type of switch including a box-like base or casing of insulating material containing fixed contacts in at least two corners of it, while the moving contacts are carried by a rocking U-shaped bail having trunnions projecting from its ends into seatings in the upper edges of opposite sides of the casing, the bail being operated by a dolly carried by the cover of the casing through a spring strut extending from the end of the dolly to the base of the bail.

The present invention is concerned with a detail of construction for securing a moving contact to the bail, and its object is to provide an improved arrangement which will be simple to manufacture in mass production and will also provide improved insulation as compared with what has been employed in the past.

According to the present invention in a switch of the type specified the moving contact is mechanically connected to the bail by a moulded block of insulating material having grooves in its opposite faces in one of which the moving contact rests while at least a part of the side of the bail rests in the other. Preferably the groove for the moving contact is of V-form in face view and receives a corresponding portion of the moving contact which is thereby held against longitudinal movement.

In one known prior construction two separate contact blades have been employed secured to opposite sides of a segment of thin insulating material by tongues which project from one of the contact blades through holes in the insulation and are bent over opposite sides of the other contact blade. At its top corner or centre the segment has an opening for the passage of a trunnion by which it is supported whilst at its bottom or periphery it is formed with a similar recess for the passage of a projection to ensure that rocking movement of the bail will be communicated to the moving contact. In order to prevent contact between the side limb of the bail and the adjacent contact blade a further small piece of very thin insulating material, of rectangular form with notches at the top and bottom for the passage of the trunnion and projection respectively, is interposed between the bail and the moving contact assembly. This arrangement for insulating the bail from the moving contact provides certain gaps over which the tracking path is very short.

In the arrangement according to the present invention, however, the moving contact is

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carried wholly on one side of the insulating block, and no part of it need project through the block to the other side. In this way a substantial thickness of insulating material lies between the bail and the moving contact.

In one construction the groove for the bail terminates in a hole passing through the block through which one trunnion of the bail extends. The block may be of generally triangular or sector shape, tapering towards the end adjacent the trunnion, so as to be wider and give added support to the moving contact at its opposite end.

The moving contact may comprise a pair of identical parallel metal strips or blades secured together at their centre as by riveting, the extremities of which serve to embrace the fixed contacts in one position of the moving contact. These blades may be of inverted W-shape.

The invention may be carried into practice in various ways, but one specific embodiment will now be described by way of example, with reference to the accompanying drawings, in which

Figure 1 is a sectional end elevation of a switch embodying the invention,

Figure 2 is a section on the line II—II of Figure 1,

Figure 3 is a plan of the switch of Figure 1 with the cover and certain other parts removed,

Figure 4 is a section on the line IV—IV of Figure 3, and

Figures 5 and 6 are perspective views on an enlarged scale of two sides of a moving contact carrier forming part of the mechanism of the switch of Figure 1.

In this embodiment the invention is applied to a switch of the push-push type, whose general arrangement and many of whose parts are similar to those of known construction. Thus the switch is contained in a body or casing 10 of box-like form comprising a single moulding of synthetic resin the length of which is somewhat greater than its width, and whose upper face is provided with a cover 11. In the middle of each end of the casing 10 is a boss 12 which serves to accommodate a rivet 13 for securing the cover 11 to the casing. The body of the boss 12 serves to locate fixed contacts 14 situated in the corners of the casing 10. In the embodiment shown in the drawings the switch has only two fixed contacts 14 for use as a single pole one-way switch, but might equally well be provided with four fixed contacts in the four corners of the casing for use as a double-pole or two-way switch. Each contact 14 is formed

from a sheet metal pressing to which is soldered a conducting lead 15 which passes through a hole 16 in the wall of the casing 10. A sheet 17 of insulating material extends parallel to one or each side of the casing to steady the fixed contacts 14 and to provide a guide or track for the moving contact. The insulating track 17 is rectangular in shape with a large semicircle of material removed. The portions of each fixed contact 14 which the moving contact engages embrace opposite sides of this track, those of one contact 14 near the top of the casing 10 and those of the other contact 14 near the bottom of the casing, as shown in Figure 4.

The moving contact is carried by a rocking U-shaped bail 20 from the ends of the limbs of which trunnions 21 project. These trunnions are received by seatings 22 each moulded at the middle of the upper edge of one side wall of the casing 10.

The moving contact 23, of which only one is provided in the single-way embodiment being described, consists of a pair of blades, the ends 24 of which embrace the track 17 and can rock to and fro so as either to bridge the fixed contacts 14 or, as shown in Figure 4, to engage another part of the track without bridging the fixed contacts.

The two blades of the moving contact 23 are both mounted on the same side of an insulating carrier 25. The blades are of inverted open-W-form and are riveted together at their centre by a rivet 26. The carrier 25, as shown most clearly in Figures 5 and 6, consists of a moulding of synthetic resin of generally sector shape one face of which is formed with an open-V-shaped groove 27, to receive the moving contact. The groove 27 has a circular recess 28 in its inner face to accommodate the head of the rivet 26, and extends across the face of the carrier 25 in the manner shown in Figure 5. Within this groove 27 lies the central portion of the inverted-W-shaped moving contact 23 as shown in Figure 4. No securing of the moving contact is necessary since it cannot move longitudinally due to the V-shape of the groove 27 and cannot leave the groove due to the fact that it straddles the track 17.

In its opposite side, as shown in Figure 6, the carrier 25 is formed with a straight groove 29 to receive the side of the bail 20, and at its upper end this groove extends completely through the carrier at 30, so that the carrier is threaded on the trunnion 21 of the bail. The side of the bail enters the groove 29 and thus ensures that movement of the bail will be imparted to the moving contact 23 through the carrier 25. The circumferential edge 31 of the carrier 25 is just clear of the track 17, and is provided with a projecting lug 32 which extends to one side of the track 17 to afford additional insulation between the fixed contacts 14 and the bail 20.

As in known constructions a snap-action movement of the bail is brought about by a dolly 40 carried by the cover 11 of the casing 10. The dolly 40 is pivoted on a pin 41 within a tubular cylinder 42 extending upwards from a metal plate 11' forming part of the cover 11, and is connected to the bail 20 by a spring strut 43 the lower end of which seats over a tongue 44 in the base of the bail. The upper end of the spring strut 43 carries a cap 45 within which the tip 46 of the dolly seats. The dolly is operated in this construction by a push button 47, successive downward movements of which shift the dolly alternately in opposite directions by means of a strut 48 carried by the push button 47 in known manner. Alternatively if desired the dolly may be directly operated where the invention is applied to a tumbler switch.

The switch is provided with nuts threaded on to the upwardly extending screw-threaded cylinder 42, one such nut being shown at 49 in the drawings. These nuts serve to mount the switch in a hole in a panel, or other required position.

It will be clear that if the switch is to be used as a two-way or double-pole switch, it will merely be necessary to provide fixed contacts 14 in all four corners of the casing 10, and to provide a second moving contact 23, carrier 25 and track 17, the two carriers and moving contacts being carried on opposite sides of the bail 20.

What I claim as my invention and desire to secure by Letters Patent is:

1. An electric switch including in combination a box-like casing of moulded insulating material, fixed contacts secured in at least two corners of said casing, a cover for the top of the casing, a rocking U-shaped bail having trunnions projecting from its ends into seatings formed in the upper edges of the casing, a substantially W-shaped moving contact carried by the bail for engagement with the fixed contact and comprising a pair of parallel metal blades secured together at their centers, a dolly carried by the cover for rocking the bail, a spring strut extending from the dolly to the base of the bail, and a moulded block of insulating material which mechanically connects the moving contact to the bail, said block having a V-shaped groove in one face thereof adapted to carry the center portion of the moving contact, a straight groove extending in the block through which one trunnion of the bail extends, a guide track of thin insulating sheet material whose upper edge is of arcuate form and extends between the fixed contacts and beyond one of them, so as to be embraced by and guide the extremities of the moving contact blades when these are not engaging the fixed contact, and an extension moulded integrally with the block and projecting from its edge remote from the trunnion so as to overlap the guide track to provide an additional mask of insulating material between the bail and fixed contacts.

2. An electric switch including in combination a box-like casing of insulating material, fixed contacts in opposed corners of said casing, a cover for said casing, a rocking U-shaped bail having trunnions projecting from its ends journaled in recesses in the opposite walls of said casing intermediate said fixed contacts, an arcuate wall of insulation material spaced to one side of said bail and extending between said fixed contacts, a moving contact movable between a closed position bridging said fixed contacts and an open position spaced from said fixed contacts and formed to interfit with the edge of said arcuate wall so as to be guided into and out of bridging position with said fixed contacts, and a block of insulating material for securing said moving contact to said bail, said block having non-circular recesses confined to the opposite sides thereof, the recesses in one side being shaped to interlock with one side of said bail and the recesses in the other side being shaped to interlock with said moving contact, said bail, said block, said moving contact, and said arcuate wall being so disposed that these elements are held in assembled position by one another when in place in said casing whereby these elements are held in assembled position without the use of rivets, screws and

the like and are readily separable from one another merely by lifting said bail from said casing.

3. An electric switch as defined in claim 2 wherein said recesses in the opposite sides of said insulating block extend generally crosswise to one another and are separated by the insulating material of said block.

4. An electric switch as defined in claim 2 wherein the recess in one side of said insulating block merges with said opening through said block formed to receive one of said trunnions on said U-shaped bail.

5. An electric switch as defined in claim 2 wherein the ends of said moving contact are bifurcated so as to straddle the arcuate edge portion of said arcuate wall, the mid-portion of said moving contact having a non-circular contour adapted to be received by and to interlock with said non-circular recesses in one side of said insulating block.

EDWARD KERSHAW HAYDON.

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