

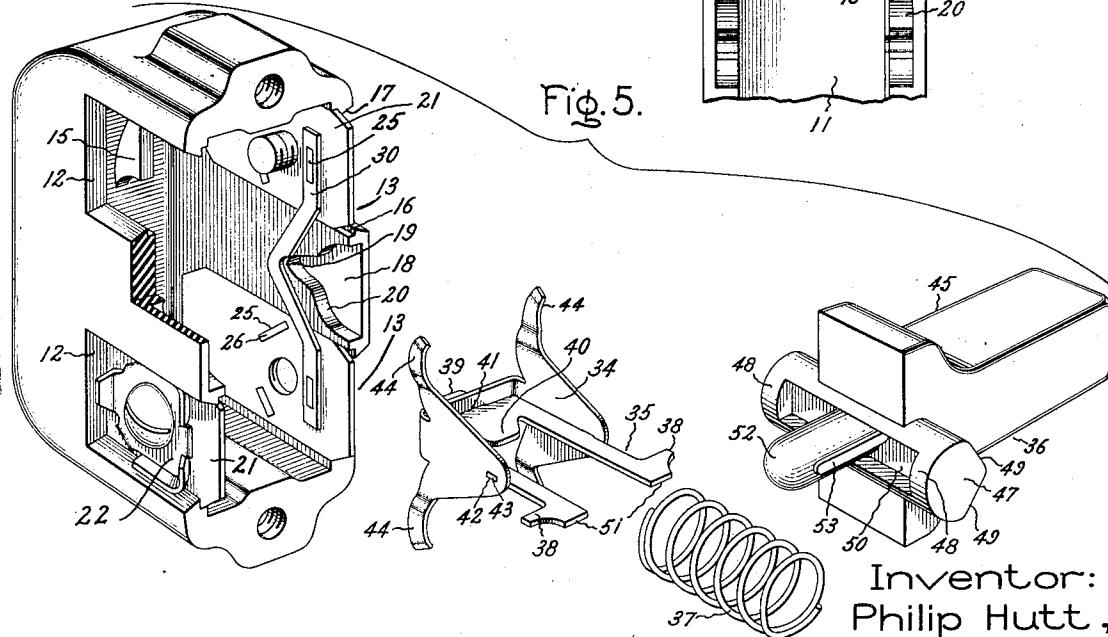
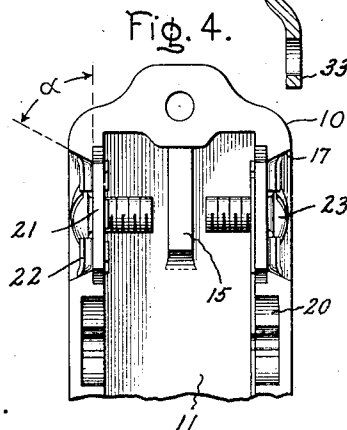
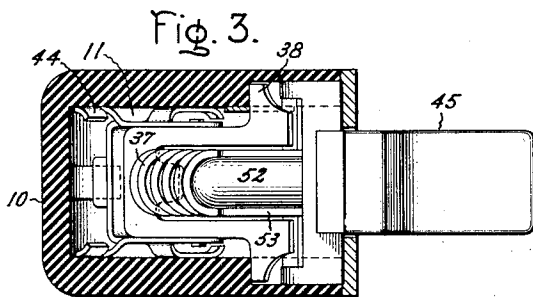
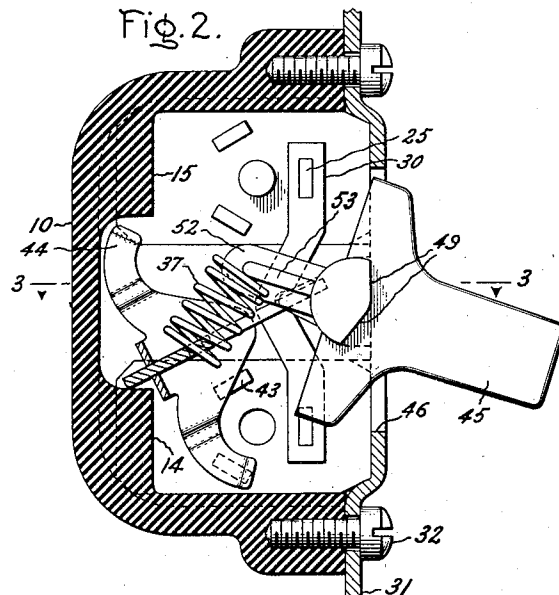
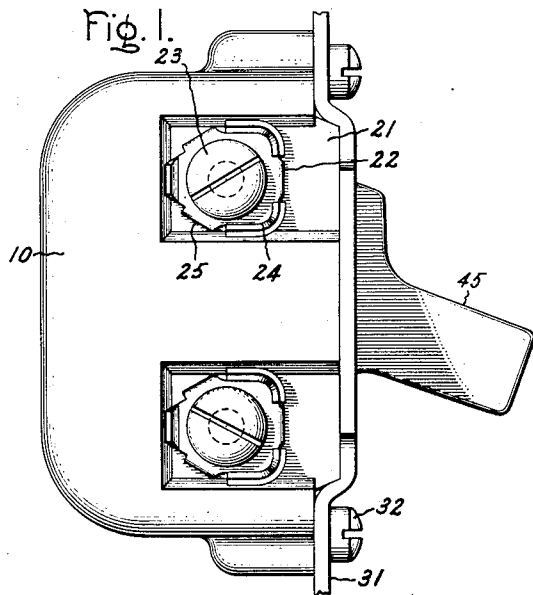
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ELECTRIC SWITCH

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2,334,007

ELECTRIC SWITCH

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9 Claims. (Cl. 200—67)

The present invention relates to electric switches and like devices, particularly of the toggle-operated or tumbler type, although it is not necessarily limited thereto.

The object of my invention is to provide an improved switch and like device which has relatively few parts and may be economically manufactured and assembled.

For a better understanding of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto in connection with the accompanying drawing.

In the drawing Fig. 1 illustrates a side view of a switch embodying my invention; Fig. 2 is a sectional view of the switch; Fig. 3 is a section along line 3—3 of Fig. 2; Fig. 4 is a top view of the switch housing and contacts secured thereto; and Fig. 5 is an exploded perspective view of the switch.

The switch illustrated in the drawing comprises a cup-shaped insulating housing or base 10 forming a chamber 11 open at the top and with two parallel side walls each having two openings 12 and 13 respectively extending to the upper edges of the walls. Centrally located, aligned reinforcing ribs 14 and 15 are formed on the bottom of the chamber to act as stops or abutments for the movable switch mechanism described hereinafter. Each of the openings 12 and 13 which in the present example are rectangular in shape forms an inner shoulder 16 and has a tapered side wall or outer surface 17. Each of the side walls has an inner recess 18 located symmetrically between the respective openings 12, 13. The inner end of the recess is essentially V-shaped, constituting a knife edge bearing 19, and the outer opposite wall portions of the recess have a cylindrical shape to form a cylindrical bearing 20.

A stationary contact assembly is positioned in each of the openings 12 and 13. Each contact assembly comprises an insulating plate 21 and a contact or terminal plate 22 with a wire binding screw 23 threaded into the contact plate and projecting through an opening in the insulating plate 21. The contact plate 22 has a plurality of edge portions alternately extending forward and rearward of the plate. In the present example the plate 22 has three spaced edge portions or upturned flanges 24 bent forward and three like edge portions or lugs 25 each located between adjacent portions 24 and bent backward. The portions 25 project through openings in the insulating plate 21 and are riveted or otherwise

secured thereto. The backward bent portions 25, while thus acting as a means to secure the contact plate 22 to the insulating plate 21, also form contact surfaces for direct electric engagement with a movable switch mechanism. Each of the backward bent lugs 25 forms a contact surface 26 substantially flush with the rear surfaces of the insulating plates through which current may be conducted. As will be explained hereinafter, the contact surface 26 of only one of the three projections 25 on each insulating plate is utilized for cooperation with a movable switch member.

The outer or forward bent edge portions or flanges 24 are inclined towards the plane of the contact plate 22 and the insulating plate 21. More specifically, the flanges 24 taper away from the contact plate 22 to form together with the plane of the insulating plate 21 an acute angle alpha (Fig. 4) which is equal to the angle formed between the tapered side wall 17 and the shoulders 16. The contact plate 21 thus may be slid into an opening 12 with the insulating plate 21 engaging shoulders 16 and the tapered lugs 24 engaging the tapered walls 17. The contact assembly is firmly held and accurately positioned on the casing without the provision of special locking and positioning means. Broadly, the casing and contact assembly are held together by tongue and groove connections between them. The casing forms several tapered projections or tongues (formed between shoulders 16 and corresponding tapered surfaces 17) which cooperate with or fit into tapered recesses or grooves formed by each contact assembly between the insulating plate 21 and the corresponding tapered flanges 24 of the contact plate 22. Broadly, a contact assembly mounted in an opening of the casing or base according to my invention comprises an insulating plate which engages the rear surface of the casing wall adjacent the opening and a terminal plate which is secured to the insulating plate and has forward bent portions which form flanges engaging the front of the casing wall.

In the present example the switch is adapted for use as a 3-way switch. To this end the contact plates 22 in the openings 13 of one side wall are electrically connected by a connecting strip 30 which has end portions with openings for receiving the respective lugs 25 of the two contact plates. The central part of the strip 30 is V-shaped and located adjacent the knife-edge bearing 19 in the side wall. During assembly the two contact assemblies with the strip connector 30 are inserted together into the rectangular open-

ings 13. Without the connecting strip 30 the switch may be used as a single pole switch. In this case two contact assemblies at one end of the base may be omitted and the openings in the base closed by grooved insulating plates.

The base is closed by a supporting strap 31 fastened to the base by screws 32 and having ears 33 for attachment to corresponding ears of an outlet box, not shown.

The movable switch mechanism or switch movement comprises a blade assembly including a contact blade 34 held on a lever or carrier 35 actuated by a trigger 36 and over-center spring 37. The lever 35 is U-shaped. Lateral projections 38 near the end of the legs of the U-shaped lever are supported on the knife-edge bearings 19. The base of the U-shaped lever has a depending portion or lug 39 for cooperation with the stops or abutments formed by the ribs 14, 15 to fix the end positions of the switch movements. An inward projection 40 formed on the base of the U-shaped lever projects into and forms a support for one end of the over-center spring 37.

The movable contact blade 34 is also essentially U-shaped. The base of the U has an opening 41 through which the lug 39 of the lever projects. The legs of the contact blade 34 have openings or slots 42 for receiving lateral projections or lugs 43 formed on the legs of the lever. During assembly the contact blade is forced open slightly to permit insertion or straddling of the lever 35 and then it is permitted to spring back to its original shape to engage the projections 43. Each leg of the blade 34 has two extensions forming contact surfaces 44 for engaging corresponding contact surfaces 26 of the lugs 25. As pointed out above, the contact surface 26 of one lug only of each contact assembly is adapted to engage a corresponding contact surface 44 of the contact blade 34 (Fig. 2).

The molded operating trigger comprises a handle 45 projecting through a slot 46 of the yoke 31. A shaft 47 is integrally formed with and extends across one end of the handle 45. The shaft 47 has stubs or trunnions 48 which on one side are cylindrical for engaging the bearings 20 on the base. On the other side the trunnions have two oppositely inclined flat surfaces 49 for cooperation with the inner surfaces of the supporting strap 31 (Fig. 2) to limit movement of the trigger. The cylindrical bearings 20 in the base together with the strap cooperate with the cylindrical and flat surfaces 49 of the trunnions 48 to fix the end positions of the trigger. The cylindrical portion of the shaft 47 has a slot 50 for receiving the ends 51 of the lever 35, to constitute a means for positively starting movement of the contact blade by direct engagement between the lever and the trigger. A cylindrical pin 52 forming a bearing for the outer end of the spring 37 is integrally formed with the trigger. Diametrically opposite portions of the pin 52 have ridges 53 forming abutments for engaging the end of the spring 37.

The switch may be easily assembled by first sliding the contact assemblies into the openings of the housing and then placing the lever with the contact blade into the housing. Two of the wire binding screws are preferably removed to facilitate insertion of the contact blade assembly. Thereupon the spring 37 is placed on the end of the pin 52 of the trigger and brought into engagement with the projection 40 of the lever. Finally, the supporting strap is assembled on the housing and secured thereto by the screws 32.

Thus, with my invention I have accomplished an improved switch construction which is simple in design and economical to manufacture.

Having described the method and operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Electric switch comprising a molded base having spaced parallel side walls with tapered openings therein each extending through an edge of a side wall, and a plurality of contact assemblies each including an insulating plate and a contact plate secured to the insulating plate and having edge portions forming together with the insulating plate recesses for receiving wall portions forming one of said tapered openings.

2. Electric switch comprising a molded base having a wall with a tapered opening, a contact assembly comprising an insulating plate, a terminal plate with a wire binding screw having a plurality of edge portions alternately bent forward and backward, the backward bent portions constituting lugs for holding the terminal plate on the insulating plate, the forward bent portions forming flanges inclined to the insulating plate and defining with the latter grooves for receiving wall portions forming said openings.

3. Electric device comprising an insulating wall having an opening, a contact assembly for mounting in the opening comprising an insulating plate engaging the rear surface of the wall adjacent the opening, a terminal plate mounted on the insulating plate and having forward bent portions forming flanges for engaging the front of the wall.

4. Electric device including an insulating wall forming an opening, and a contact assembly including an insulating plate and a terminal plate mounted thereon, said terminal plate having oppositely located bent edge portions each defining a groove with the insulating plate and constituting part of a tongue and groove connection between the wall and the contact assembly.

5. Electric switch comprising an insulating base, terminal contacts secured to the base, the base having opposite side walls each with an inner recess having a lower portion forming a knife edge bearing and an upper portion forming cylindrical bearing surfaces, and a switch movement comprising a blade assembly having a lever movably held on the knife edge bearings and a trigger with trunnions having cylindrical surfaces engaging the cylindrical bearings and a recess for receiving the end of the lever.

6. Electric switch comprising an insulating base, terminal contacts secured to the base, the base having opposite side walls each with an inner recess having a lower portion forming a knife edge bearing and an upper portion forming a cylindrical bearing, and a switch movement comprising a blade assembly having a lever movably held on the knife edge bearings, a trigger having trunnions with cylindrical surfaces engaging the cylindrical bearing and a recess for receiving the end of the lever, an over-center spring, and means formed on the lever and a pin secured to the trigger for supporting the spring.

7. Electric switch comprising an insulating base having opposite side walls with a pair of spaced substantially rectangular openings in each, a contact assembly for each opening having an

insulating plate and a contact terminal secured thereto, the contact assembly and the opening of the base forming a tongue and groove connection between them, each side wall between its openings having an inner recess with a lower portion forming a knife edge bearing and an upper portion forming a cylindrical bearing symmetrically located between the openings, a switch movement comprising a blade assembly including a lever with lateral projections supported on the knife edge bearing, a molded trigger having a handle, trunnions on the handle having cylindrical portions engaging said cylindrical bearings, a pin secured to the trigger, and an over-center spring held between the pin and a portion of the lever, said trigger having a recess for receiving an end portion of the lever for positively starting the switch movement by direct engagement between the lever and the trigger.

8. Contact assembly comprising an insulating plate having a plurality of spaced openings, a

terminal plate having a plurality of edge portions alternately bent forward to form flanges inclined toward the terminal plate and other edge portions located between the flanges and bent backward fitting into the openings for securing the terminal plate to one side of the insulating plate and to constitute a contact surface on and substantially flush with the other side of the insulating plate.

9. Contact assembly comprising an insulating plate with openings, a terminal plate with a wire binding screw mounted on the insulating plate, said terminal plate having three spaced edge portions bent forward to form inclined flanges and three like edge portions each located between adjacent flanges and bent backward to constitute a lug projecting through an opening for securing the terminal plate to one side of the insulating plate and to form a contact surface on the other side of the insulating plate.

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