July 18, 1933. A. H. NERO 1,919,119

TUMBLER SWITCH

Filed July 2, 1929

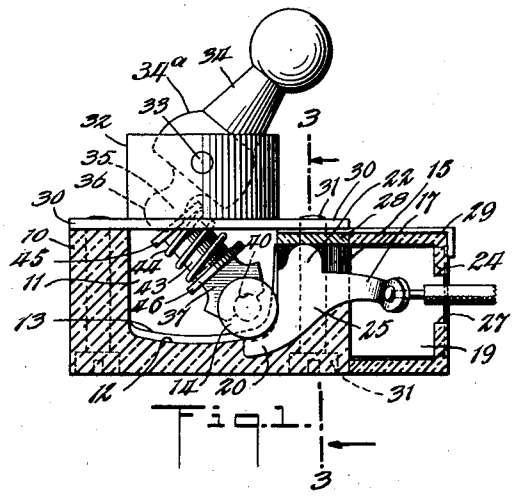


Fig. 1.

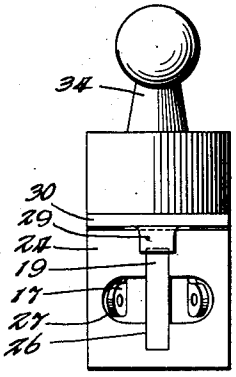


Fig. 2.

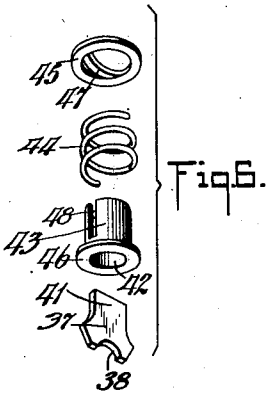


Fig. 6.

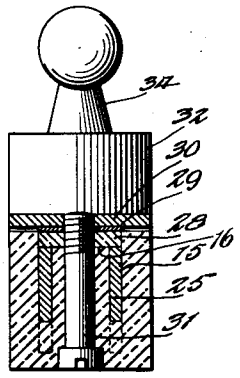


Fig. 3.

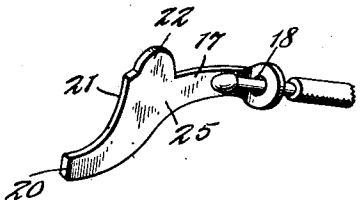
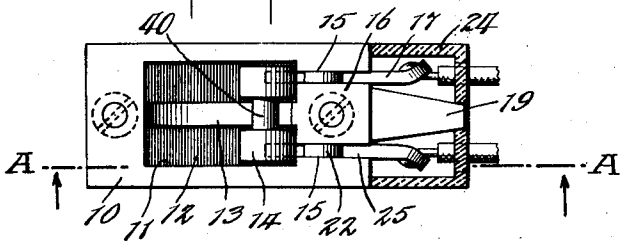


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE

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TUMBLER SWITCH

Application filed July 2, 1929. Serial No. 375,394.

This invention has to do with electric switches of the tumbler type and its object is to provide a switch with few parts, easily made and assembled.

In the drawing—

Figure 1 is a sectional view of the assembled switch, taken on the line A—A of Figure 4, to show the interior of the base.

Figure 2 is a view in elevation of the end of the switch which is at the right hand side of Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 1.

Figure 4 is a top plan view of the base with the top plate and switch actuating mechanism removed.

Figure 5 is a view in perspective of a combined wire terminal and contact piece used in this switch.

Figure 6 is an exploded view in perspective of the resilient part of the toggle mechanism by which the rocking motion of the hand lever is transmitted to the roller to cause it to travel along the floor of the switch well.

The base 10 of the switch is molded from insulating material and has a switch well 11 with a concave floor 12. A bead 13 extends the length of this floor at its mid area, serving as a guide for a roller 14 which is the circuit closing element.

One end wall of the base has two narrow recesses 15 from the top surface extending through the wall and to a considerable depth therein, terminating in surfaces which are inclined from the outside of the base downwardly to a level slightly below that of the floor at the juncture of the floor and the inner surface of that wall of the base. At that level they merge into short shallow recesses in the floor of the well on opposite sides of the bead 13. There is also a shallow recess 16 in the upper surface of the base joining the upper ends of the two deeper recesses. These are all formed by the molding operation.

In the two deep recesses 15 are placed combined switch contacts and wire terminals 25, each formed as an integral piece having a rearwardly extending portion 17 bent laterally at its end and provided with a hole 18 to receive the bared end of a lead wire. The latter may be soldered or otherwise secured to the said portion. The two rear portions thus form the terminals of the switch. They extend outside of the base on opposite sides of a wing 19 that is integral with the base and so serves as an insulator between the two terminals.

The forward part of each piece 25 is curved on its under surface to conform to the curvature of the bottom of the recesses 15 and has a toe 20 extending into one of the shallow recesses in the flow of the switch well. The toe portions 20 are of the same depth as these recesses so that their top surfaces are substantially flush with the floor and thus are contacted by the roller 14. The forward surface 21 of each piece 25 is substantially at right angles to the toe portion and hence lies flush with the inner surface of the end wall. On the top is a head 22 that reaches to the bottom of the shallow recess 16. A flat piece of insulating material 28 fitting in this recess engages the heads 22 of the two pieces 25 and, in cooperation with the holding action of the recesses in the floor of the well, maintains the two pieces 25 in position.

Resting against the end of the base and shielding the terminals is a box like cover 24 which has an opening 26 in the mid part of its end wall to rest over the end of the wing 19, and two lateral slots 27 leading off from this opening to permit the lead wires to pass through to the terminals 17. A spring clip 29 holds the cover in position.

The insert or flat insulating piece 28 and the clip 29 are held in place by the cover plate 30 which is held on the top surface of the base by screws 31 extending from the bottom. The cover plate has a central opening at the rim of which is an upstanding, cylindrical collar 32 which may be threaded on its outer surface. A pin 33 extending across this collar and fixed therein serves as a fulcrum for a rocking finger piece 34 by which the switch is actuated. This finger piece has a semi-spherical skirt portion 34ª fitting freely within the collar 32 so as to close the opening in the cover plate 30 in all positions.

The skirt has openings through which the pin 33 extends, thus providing the pivotal mounting. Inside the skirt portion is fixed a flat leg, likewise having an opening for the pin 33, and having a portion 35 extending below the skirt. This portion of the leg has a curved end surface 36 and is arranged so that its flat sides are at right angles to the pin 33. Therefore as the finger piece 34 is rocked, these sides move in a plane parallel to the long axis of the base or, in other words, in the direction in which the roller 14 moves.

The rocking motion of the finger piece is transmitted to the roller 14, to move it with a snap action back and forth on the floor of the switch well, by a resilient lever forming a toggle with the leg portion 35. This resilient lever consists of a flat piece of insulating material 37 which has a curved slot 38 to rest on the central shank 40 of the roller 14 and a neck 41 which extends into the open end 42 of a tubular element 43. A coil spring 44 surrounds this element and rests on the flange 46 at its lower end, the spring being of such length when not compressed that it extends to the upper end of the element 43.

There is a ring member 45 at the upper end of the tubular element and of a size to just clear the outside of the latter. This ring has a diametral cross-rib 47 that is bowed outwardly from the plane of the ring. This rib 47 provides a seat for the curved end surface 36 of the rocking leg 35 while the ring portion abuts the end of the spring 44. The tubular element 43 is slotted (as at 48) to permit the ring member to slide with respect to it, the cross rib sliding in the slots and the ring portion sliding on the outer surface.

By reason of this combination, the rocking of the finger piece 34 causes the leg 32 to compress the spring through its pressure on the ring member 45. The leg and the cross rib 47 telescope with the tubular element due to the slot in the latter and thus the necessary yielding is obtained to permit the leg to swing. When the spring is sufficiently stressed and with the leg 32 exerting a force at the proper angle, the roller is moved from its position at either end of the floor 12 and is moved with a snap action to the opposite end. In this way, the switch is opened or closed as the roller moves respectively away from and onto the toe portions 20 of the combined contact and terminal pieces 25.

I claim—

1. An electric switch comprising a base of molded insulating material having a well for the switch movement, a wing of insulating material extending from one wall of the said base, conductive pieces extending through the said wall and having lead-wire terminals on opposite sides of the said wing, together with a cap member having an opening conforming to the end of the said wing and lead wire openings at opposite sides thereof, said cap being removably secured to the said wall with the said opening receiving the end of the wing and the lead wire openings in register with the said terminals.

2. An electric switch comprising a base of molded insulating material having a well for the switch movement, a wing of insulating material extending from one wall of the said base, conductive pieces extending through the said wall and having lead-wire terminals on opposite sides of the said wing, together with a cap member apertured for lead wires, and enclosing the wire terminals, and a cover member holding said conductive pieces in said base and said cap in position at the end of said base.

3. An electric switch comprising a base of molded insulating material having a well for the switch movement, a wing of insulating material extending from one wall of the said base, conductive pieces extending through the said wall and having lead-wire terminals on opposite sides of the said wing, together with a cap member apertured for lead wires and enclosing the wire terminals, means engaging said cap to hold it in position at the end of said base, and a cover member holding said conductive pieces in said base and holding said means upon said base.

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