May 2, 1950 H. J. HAMMERLY 2,506,148

SAFETY SWITCH

Original Filed Sept. 25, 1946 2 Sheets-Sheet 1

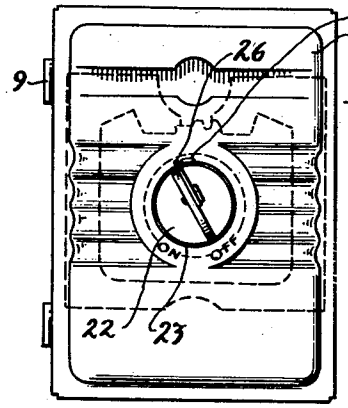
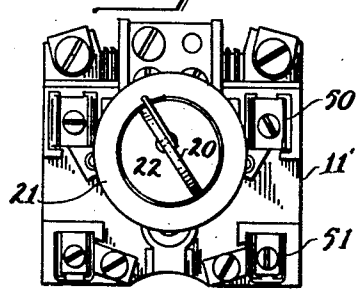


Fig. 1

Fig. 3



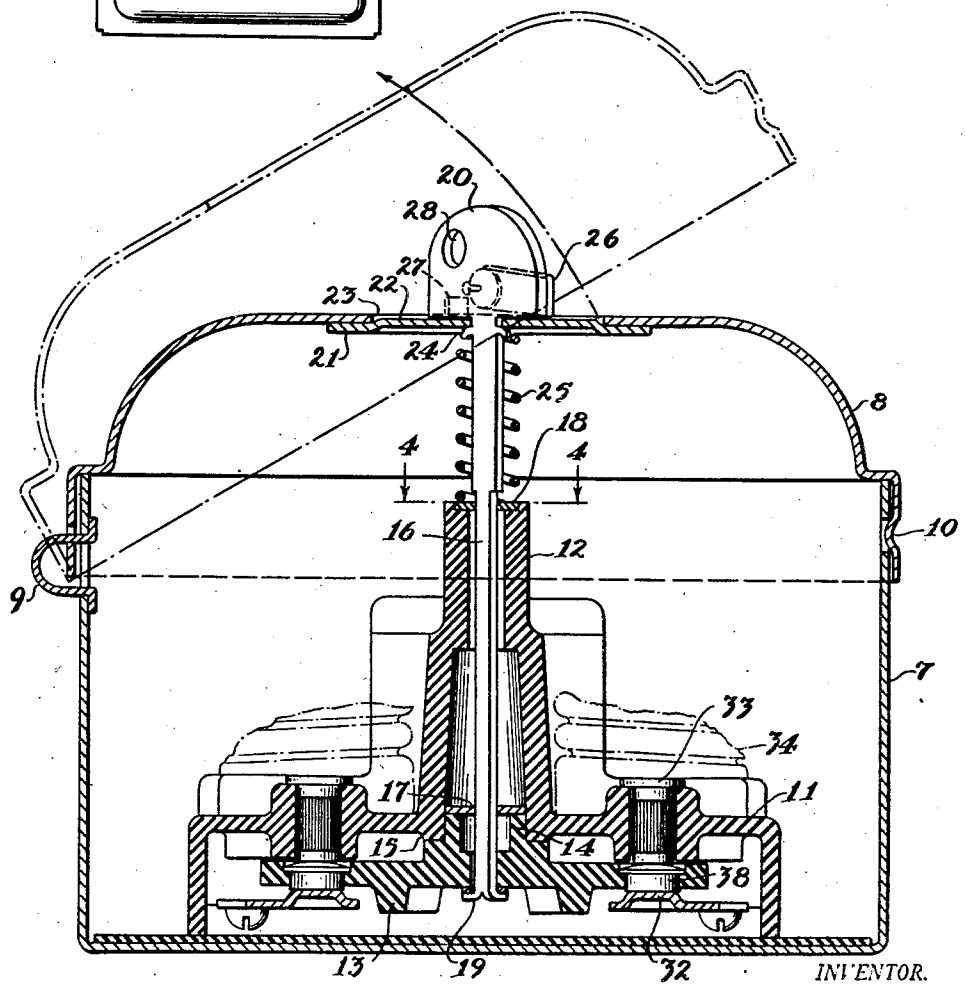


Fig. 2

INVENTOR.
Herman J. Hammerly
BY
ATTORNEY

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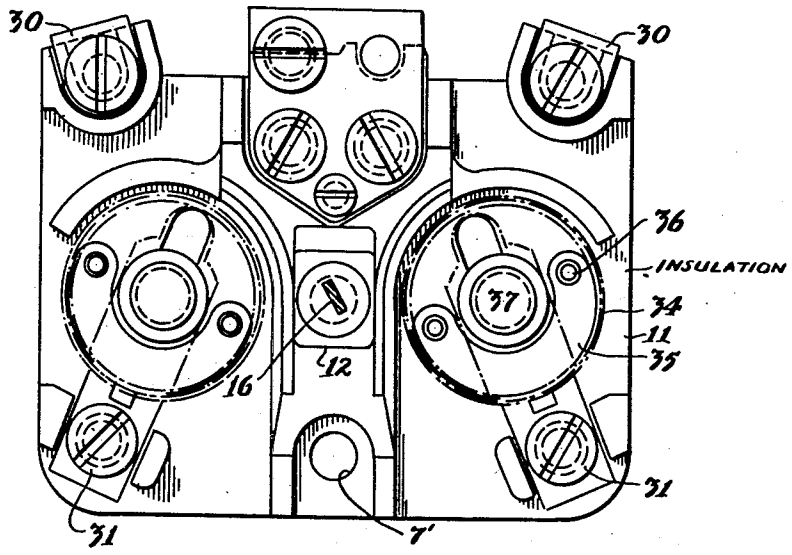


Fig. 4

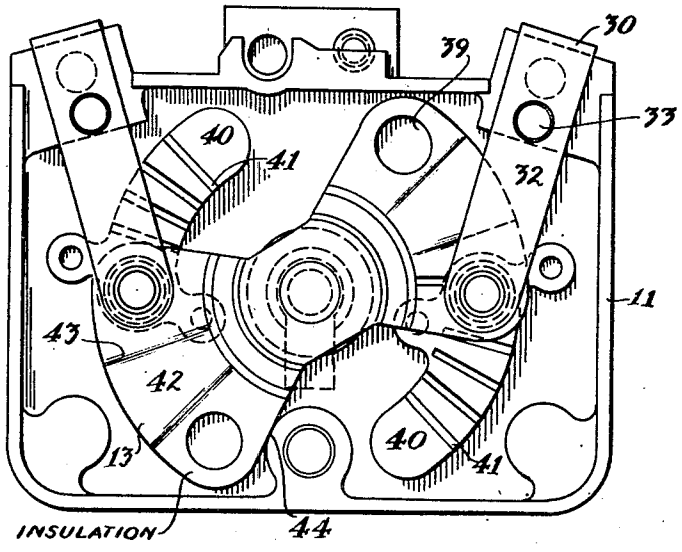


Fig. 5

INVENTOR.
Herman J. Hammerly
BY
ATTORNEY

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SAFETY SWITCH

Herman J. Hammerly, Plainville, Conn., assignor to The Trumbull Electric Manufacturing Company, Plainville, Conn., a corporation of Connecticut

Original application September 25, 1946, Serial No. 699,150. Divided and this application August 24, 1948, Serial No. 45,909

3 Claims. (Cl. 200—50)

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My invention relates to electric switches of the enclosed or safety type in which the switching mechanism is mounted in a box and provided with an actuating member outside of the box. This application is a division of my copending application Serial No. 699,150 filed Sept. 25, 1946.

The main object is to provide a simple and compact and yet efficient switch of the low price field.

With that in mind, I have provided a box with a hinged cover in which is mounted an insulating base which carries the circuit terminals, the protective devices, the switch contacts and a contact making-and-breaking rotor. The cover has an opening and the outer end of the switch actuating member which is carried by the insulating base projects through the opening in the cover and is provided with means for sealing the joint between the cover and the actuator and for locking the switch.

The proposed form of the invention is shown in the accompanying drawings and will be described in the following specification.

Fig. 1 is a front view on a small scale of an enclosed switch embodying one form of my invention and indicating in dotted lines the outline of the interior switch base.

Fig. 2 is a transverse sectional view of the entire switch showing the box and its cover and with the cover also shown in dotted lines in the open position.

Fig. 3 is a plan view showing a modification of a switch base and parts for cartridge type fuse protection.

Fig. 4 is a plan view of the base of Fig. 1 with attached parts on a scale larger than that of Fig. 1.

Fig. 5 is a bottom plan view of the base of Fig. 1 with the attached line terminals and the switch rotor in the closed circuit position.

The box body 7 may be of any suitable form and is provided with a cover 8 which is preferably hinged at 9 to one side and may have a catch 10 at the opposite side.

The switching mechanism mounted within the box is all carried by an insulating base 11 which is adapted to be secured to the bottom of the box in any suitable manner as for instance by a screw (not shown) through the passage 7' in the base.

The base 11 has a hollow post 12 which projects toward the cover of the box. In the form shown in Fig. 1, the switch member 13 has a hub 14 rotatably mounted in the lower end of the post and abutting against the bearing 15 in the

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base. The actuating shaft 16 is positioned in bearing washers 17 and 18 which are rotatable in the post. This shaft is formed of heavy sheet metal and is upset or flanged at its lower end at 19 and provided with an integral knob or handle 20 at its upper end.

On the shaft immediately below the knob is loosely mounted a closure member 21 in the form of a disc which is preferably bossed at 22 to loosely fit the opening 23 in the cover 8. This closure member may be retained on the shaft by projections 24 on the shaft which are spread slightly after assembly of the parts. On the shaft 16 is mounted a spring 25 which is compressed between the washer 18 on the end of the post 12 and the closure disc 21. The outer edge of the disc 21 underlies the edge of the cover around the opening 23 so as to ensure a tight closure when the cover of the box is closed.

The switch is actuated by the turning of the knob 20 from "on" to "off" and vice versa. To lock the switch in the "off" position, I provide a latch 26 which is hinged to the knob eccentric to the shaft axis.

The cover of the box has an upstanding lug 27 at the edge of the opening 23. By swinging the latch from the position of Fig. 2 to that of Fig. 1, the latch is brought back of the lug 27 so that by inserting a lock or sealing wire in the opening 28 in the knob 20, the latch is held in position to prevent turning the switch actuating shaft from the "off" to the "on" position.

The knob 20 is rounded off to ensure clearance of the edge of the opening 23 when opening and closing the cover.

Line terminals 30, 30 are secured to opposite corners of the base at the upper edge and load terminals 31, 31 are secured to the base at opposite corners of the lower edge of the base. Each line terminal has a spring contact arm extension 32 at the rear held in place for instance by a screw or stud 33. The form of device shown in Figs. 2 and 4 is intended to carry protective devices in the form of conventional fuse plugs (not shown) and for this purpose a screw-threaded fuse socket 34 is mounted on each side of the base and secured to an extension 35 of a load terminal by means of screws or studs 36. The center contact 37 for each fuse plug is preferably in the form of a serrated stud forced through the base so that its lower end constitutes one of the switch contacts. When a fuse plug is screwed into its socket it prevents the center stud from working loose.

The switch rotor 13 carries a contact button

38 in each arm. Each button is dropped into a hole in the rotor and prevented from falling out by engagement of adjacent parts. The rotor is also provided with two shallow recesses 39. The underside of the base 11 is provided with arcuate tracks 40 for guiding the contact buttons. Each track is provided with transverse grooves 41 so as to interrupt the surface of the track and avoid the possibility of metal particles forming a conductor along the track. The free end of each of the spring arm contacts 32 is provided with the adjacent contact stud 37. The rotor is provided with an inclined cam surface 42 at each end which extends between a recess 39 and the adjacent contact button. Each cam surface terminates in an abrupt shoulder 43 adjacent the contact button so that as the rotor is turned between the base and the bosses 32, 32 of the contact arms, the contact arms will be placed under tension and then snapped onto the contact buttons thus indicating clearly to the operator that the circuit has been closed. In breaking the circuit, the bosses 32, 32 drop into the recesses 39 and thus indicate that the switch has been turned to the fully "off" position.

The rotor is preferably provided with flanges which are interposed between the contacts and the operating shaft. The turning of the rotor 13 is limited by the opposite sides of an abutment 44 (Fig. 5).

From the foregoing, it will be seen that the spring 25 serves to ensure a tight fit of the closure disc 21 and that the spring arms 32 press the switch buttons 38 against the fuse plug center studs 37.

The form of construction shown in Fig. 3 is designed to accommodate cartridge type fuses instead of the fuse plugs previously mentioned. For this purpose, fuse clips 50 and 51 are provided on the base 11' in place of the screw-threaded sockets previously mentioned. Otherwise the mechanism and operation is essentially the same as that previously described.

The constructions thus shown and described provide a contact switch in which cable or wire connections may be made without interference with the switch operating mechanism. It leaves a clear wall space for cable entrance holes or knockouts in all four side walls of the box.

The spring construction on the handle shaft eliminates any loose feeling of the parts although they are slidably connected. The spring also pushes the flange on the handle washer 22 into a snug seal with the inside of the cover when the cover is closed. The loose mounting of washer 22 allows it to seat snugly even though the handle is not perfectly positioned. This prevents any accidental flash or fire through the handle hole in the cover should there be an explosion within the box.

The sliding connection of the handle shaft also allows for manufacturing variations in the dimensions of the box and the switch mechanism. The movable contacts float or slide in the rotor and the handle shaft floats or slides in the rotor so that if the handle is depressed during cover closing or by accident, strain upon the resilient switch contacts will be minimized and connection of the circuit through the switch will not be interrupted.

Although I have shown the invention as applied to a 2-pole switch, it should be understood that various features are applicable to 3-pole and 4-pole switches.

I claim:

1. An enclosed switch comprising a receptacle body having a cover with an opening, switch mechanism in the body and having a rotatable actuating shaft having a limited longitudinal movement toward and from the closure cover, a handle on said shaft projecting through said opening, a washer carried by said shaft and having an outer edge underlying the edge of said opening, a spring pressing said washer against the inner face of the cover around the edge of said opening, a stop lug projecting from the edge of said opening and an eccentric latch carried by said handle and movable toward and from said stop lug for locking said shaft.

2. An enclosed switch comprising a receptacle body having a cover with an opening, switch mechanism mounted in the body and having a rotatable actuating shaft, a handle on said shaft projecting through said opening, a washer carried by said shaft and having an outer edge underlying the edge of said opening, a stop lug projecting from the edge of said opening and an eccentric latch carried by said handle and movable toward and from said stop lug for locking said shaft.

3. A safety switch comprising a box body having a cover hinged to one edge thereof, said cover having an opening, switch mechanism having a base secured to the floor of the box body and having a centrally disposed operating member extending outwardly beyond the confines of the box body and having a knob passable through the opening in said cover when the cover is closed, a disc member loosely supported by said operating member beneath said knob, said disc member being adapted to seal said opening when the cover is closed, and a spring surrounding said operating member, abutting against a part of said base and pressing said disc member against the cover to accommodate the disc member to the inner surface of the cover and to seal the opening when the cover is in closed position, said knob and said cover having manually operable coacting means for preventing rotation of the knob and operating member.

HERMAN J. HAMMERLY.

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The following references are of record in the file of this patent:

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