May 10, 1932. J. J. DANTE 1,857,711

SAFETY SWITCH

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Fig. 1.

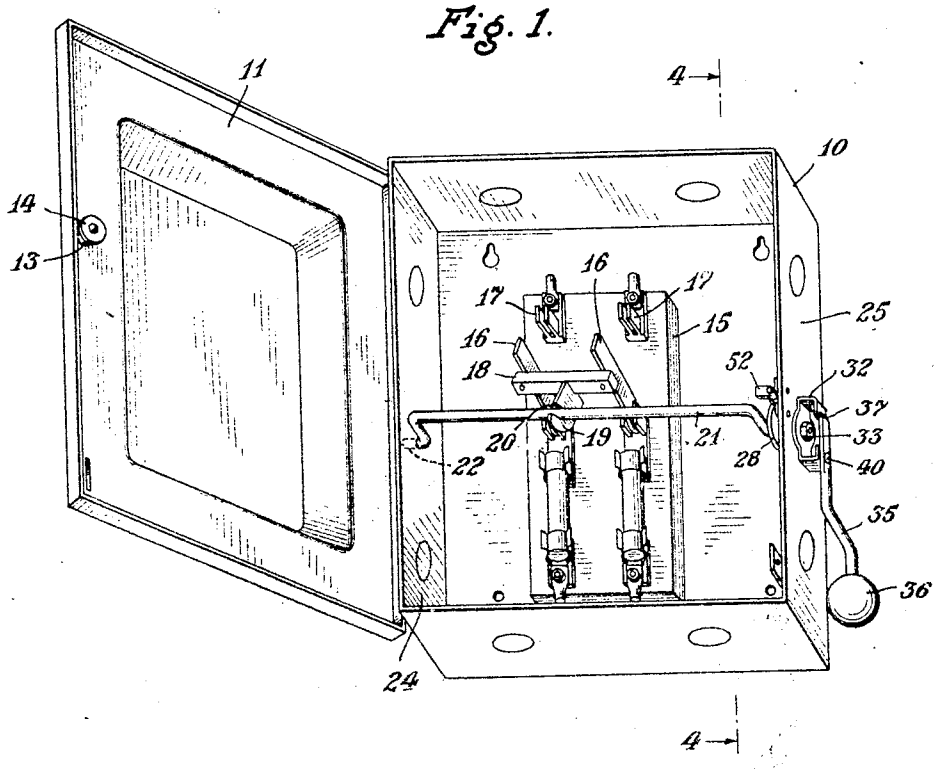


Fig. 2.

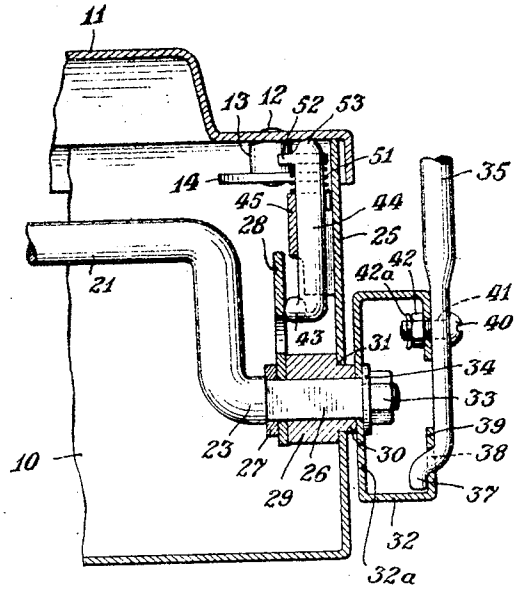
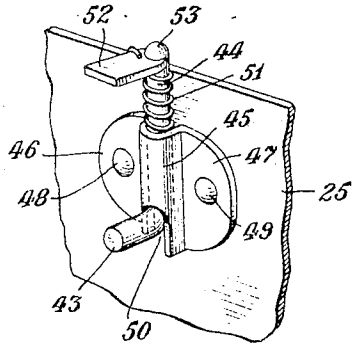


Fig. 3.



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Fig. 4.

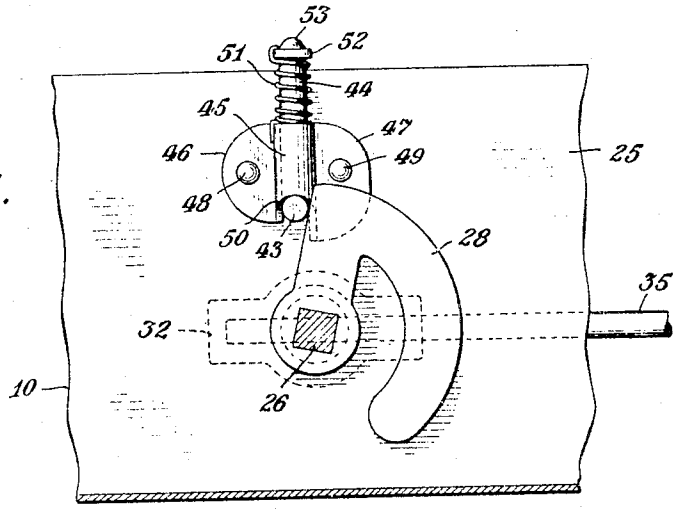
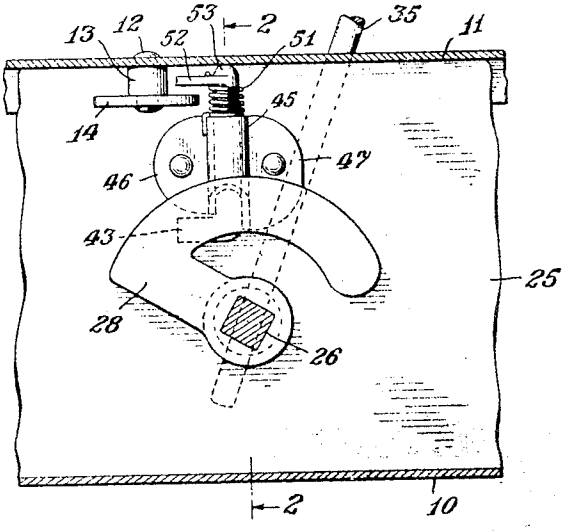


Fig. 5.



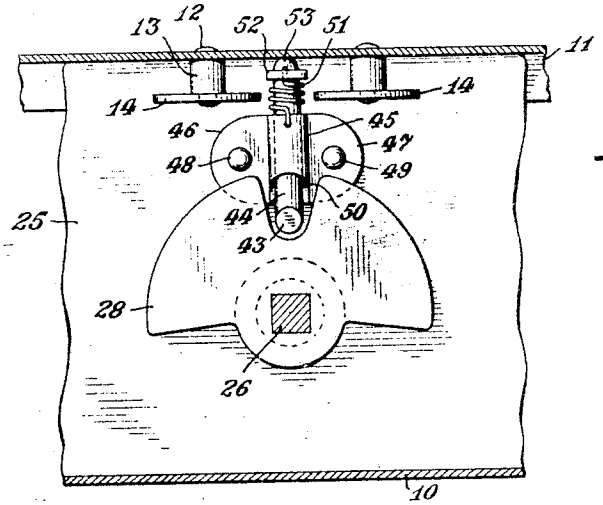


Fig. 6.

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UNITED STATES PATENT OFFICE

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SAFETY SWITCH

Application filed May 25, 1929. Serial No. 365,957.

This invention relates to safety switches, and more particularly to a safety switch enclosed within a casing, the cover of which is adapted to be locked in closed position as long as the switch remains closed.

One object of this invention is to provide an enclosed safety switch of the above nature having means for preventing closing of the switch when the cover is open, said means being released by the closing of the cover to permit the switch to be closed.

A further object of the invention is to provide a device having a plunger mounted on the side of the casing, said plunger having a latch member adapted to be rotated into locking engagement with a catch on the cover when the switch is moved to closed position.

A further object is to provide a device of the above nature provided with a rotary switch-operating member, said member being normally prevented from rotation by a lug projecting from said plunger, said lug being slidably located in a locking slot in the bottom edge of a surrounding bracket member.

A further object is to provide a device of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, and very efficient and durable in use.

With these and other objects in view there have been disclosed on the accompanying drawings two forms in which the invention may be conveniently embodied in practice.

Fig. 1 represents a perspective view of the safety switch showing the cover and switch in open position.

Fig. 2 is a fragmentary sectional view of the same taken on the line 2—2 of Fig. 5, looking in the direction of the arrows.

Fig. 3 is a perspective detail view of the sliding plunger member for retaining the cover in closed position while the switch is closed and preventing the closing of the switch while the cover is open.

Fig. 4 is a fragmentary sectional view showing the locking plunger and cam plate in locked position, said view being taken along the line 4—4 of Fig. 1, looking in the direction of the arrows.

Fig. 5 is a fragmentary sectional view similar to Fig. 4 with the cover shown in closed position.

Fig. 6 is a fragmentary sectional view, similar to Fig. 5, of a modified form of the invention for use upon a switch of the double-throw type.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a casing having a cover 11 hinged thereto at one side thereof. The cover 11 is provided at one side of its center with an inwardly extending rivet member 12, on which is mounted a collar 13 and a locking disc 14 forming a catch. Mounted in the base of the casing 10 is an insulating switch block 15 of usual construction, upon which is mounted a standard switch of the single-throw type.

The switch as herein disclosed comprises a pair of pivoted switch blades 16 adapted to be swung down into engagement with a corresponding pair of stationary clip contact members 17. The blades 16 are connected together adjacent their upper ends by a rectangular insulating cross-bar 18 having a vertical hook member 19 connected therewith, said member 19 having an inclined slot 20 in its upper edge for slidably fitting about the base 21 of a U-shaped switch operating rod, said rod having off-set horizontal ends 22 and 23 adapted to be journaled in the sides 24 and 25 respectively of the casing.

The front off-set end 23 of the rod 21 is reduced in diameter and squared, as shown by the numeral 26, said squared end having non-rotatively mounted thereon a washer 27, a cam plate 28, and a tubular collar member 29, said tubular collar having a cylindrical reduced front end 30 fitting within an aperture 31 in the side 25 of the casing 10. The squared section 26 extends slightly beyond the end of the reduced section 30 for non-rotatively receiving a U-shaped handle-attaching clip member 32, the latter having a square aperture in its base 32*a* for fitting over the squared end 26 of said shaft. The off-set portion 23 of the operating rod is threaded at its extremity, beyond the squared section 26, to receive a nut 33 and a washer

34, as clearly shown in Fig. 2 of the drawings.

In order to rotate the operating rod 21 for opening and closing the switch, provision is made of a handle member 35 having a manipulating knob 36 on its outer end, said handle member having a flattened off-set inner extremity 37 for fitting within an aperture 38 in one of the inturned ends 39 of the clip 32. Provision is also made of a bolt 40 passing through an aperture 41 in the handle 35 at a point spaced from the off-set extremity 37, said bolt being locked in position by a nut 42 and cotter pin 42*a*. By means of this construction, the turning of the handle 35 by reason of its non-rotative engagement with the squared end 26 of the operating rod 21 will rotate said operating rod for closing the switch.

When the cover 11 of the casing is open, the cam plate 28, which is non-rotatively mounted on the shaft 26, lies in engagement with a lug 43 on the lower end of a plunger 44, said plunger being slidably supported by a tubular bracket 45 having side plates 46 and 47 secured to the front side 25 of the casing as by rivets 48 and 49. The bottom of the tubular bracket 45 is cut away to provide a locking slot 50 within which the lug 43 will be held against rotation, so long as the cover remains open, by a helical compression spring 51 surrounding the upper part of said plunger 44. The lower part of the spring 51 engages the top of the tubular bracket 45 while the top of said spring is connected to a horizontal laterally-extending flat tail member 52 adapted to interlock with the circular disc 14 on the cover member and prevent the latter from being opened when the switch is closed.

The plunger 44 has a spherical upper extremity 53 adapted to be engaged by the top of the cover 11 for forcing the plunger downwardly against the influence of the spring 51 when the cover is forced to closed position and causing said tail member 52 to tightly press against said cover 11. The lug 43 of the plunger 44 will then lie below the locking slot 50 and will no longer obstruct the movement of the cam plate 28. The switch may then be readily closed by swinging the handle 35 in a clockwise direction, as viewed in Fig. 1.

To open the switch the handle will be swung in the opposite direction, the rotative action of the spring 51 causing the lug 43 to rotate into alinement with the locking slot 50 in the tubular bracket 45 so that, when the cover is raised, the lug 43 will move upwardly into said slot for locking the switch in open position.

One advantage of the present invention is that the switch may be operated when the cover is open by manually pressing down the plunger, without the use of injurious tools. This is sometimes required for inspection purposes.

While there have been disclosed in this specification two forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a safety switch, a casing, a cover hinged to one side of said casing and having a catch depending from the inner surface thereof, a pivoted switch within said casing, a rotatable operating member for moving said switch to open and to closed positions, a bracket secured within said casing and forming a bearing parallel to one side wall of the latter, a plunger having a cylindrical body portion slidable and rotatable within said bearing, said plunger having a lateral projection at its upper end for interlocking with said catch when said operating member is moved to close said switch.

2. In a safety switch, a casing, a cover hinged to one side of said casing and having a catch, a pivoted switch within said casing, a rotatable operating member for moving said switch to open and to closed positions, a bracket secured within said casing and having a tubular portion arranged parallel to one side wall of the latter, a plunger having a cylindrical portion movable within the tubular portion of said bracket, said plunger having a lateral projection at its upper end for interlocking with said catch when said operating member is moved to close said switch.

3. In a safety switch, a casing, a cover hinged to one side of said casing and having a catch, a pivoted switch within said casing, a rotatable operating member for moving said switch to open and to closed positions, a slidable plunger on the edge of said casing, a cam plate on said operating member, a lug on said plunger adapted to lie in alinement with said cam plate when the cover is open for preventing the rotation of said operating member, and means actuated by the closing of said cover for retracting said lug for permitting said rotation for closing the switch.

4. In a safety switch, a casing a cover hinged to one side of said casing and having a catch, a pivoted switch within said casing, a rotatable operating member for moving said switch to open and to closed positions, a spring-pressed slidable plunger on the edge of said casing, a cam plate on said operat-

ing member, a lug on said plunger adapted to lie in alinement with said cam plate when the cover is open for preventing the rotation of said operating member, and means actuated by the closing of said cover for retracting said lug for permitting said rotation for closing the switch.

5. In a safety switch, a casing having an opening, a cover for closing said opening and having a catch, a movable switch within said casing, a rotatable operating rod for moving said switch to open and closed positions, a handle outside of said casing rigidly connected with said rod, a tubular bracket secured to the side of said casing and having a locking slot in its lower edge, a rotatable plunger slidable in said tubular bracket and having a lug adapted to fit within said slot, said plunger having a latch on its upper end to interlock with said catch, and means on said operating rod located in alinement with said lug to prevent rotation of said rod, and means actuated by the closing of said cover for depressing said plunger to bring said lug out of said locking slot, permitting said operating rod to be rotated to close said switch and interlock said catch and latch.

6. In a safety switch, a casing having an opening, a cover for closing said opening, said cover having a catch secured to but spaced from the inner surface thereof, a movable switch within said casing, a bracket secured within said casing and having a tubular portion arranged parallel to one side wall of the latter, a plunger slidably mounted within said tubular portion and having a lateral projection at its upper end normally located adjacent to but out of alinement with said catch, means actuated by the closing of said switch for rotating said plunger to bring said lateral projection into alinement with said catch, and means on said plunger for preventing the closing of said switch while said cover is open.

7. In a safety switch, a casing having an opening, a cover for closing said opening, a switch in said casing, a switch-operating member, a bracket secured to a side wall of said casing and adapted to provide a tubular bearing, a plunger having a cylindrical portion slidable within said bearing, said bearing having a slot extending upwardly from the lower end thereof, a lateral projection at the lower end of said plunger, and spring means interposed between said plunger and said bracket to bias said projection into interlocking engagement with the walls of said slot to restrain said plunger from rotary movement, said projection also normally having interlocking engagement with a movable part of the switch, said cover when closed being adapted to depress said plunger against the bias of said spring means, whereby said projection is disengaged from the walls of said slot to permit closing movement of said switch.

8. In a safety switch, a casing having an opening, a cover for closing said opening, a switch within said casing, means for closing said switch, a one-piece metal bracket secured to the inner surface of one side wall of said casing, said bracket having an intermediate offset portion to form with said side wall a substantially tubular bearing, a plunger having an intermediate cylindrical portion slidable and rotatable within said bearing, said plunger having a lateral projection at the upper end thereof for locking said cover in closed position when said plunger is rotated, said plunger also having a lateral projection at the lower end thereof and lying in the path of said switch-closing means, and means including an integral part of said bracket for normally locking said plunger in a given angular position, said cover when closed acting directly upon said plunger to unlock the same to thereby permit manual actuation of switch closing means and locking of said cover.

9. In a safety switch, a casing having an opening, a cover for closing said opening, said cover having a disk-shaped catch secured thereto in spaced relation to the inner surface thereof, a switch in said casing, a switch-operating member, a plunger slidably and rotatably mounted upon one side wall of said casing, a coiled torsion spring interposed between a part of said casing and said plunger to bias the latter slidably to its upper extreme position and to simultaneously bias the same to a given rotary position, said plunger having a lateral projection at the upper end thereof, said projection being positioned adjacent to said catch when the cover is closed and being operable automatically to interlock with said catch when said switch is closed, said plunger also having a lateral projection at the lower end thereof, said last mentioned projection cooperating with a part of said casing to normally prevent closing movement of said switch-operating member while the cover is open, and said plunger being operable manually at will or automatically upon closure of said cover to release said last-mentioned projection from said casing part whereby closure of said switch may be effected.

In testimony whereof, I have affixed my signature to this specification.

JOSEPH JOHN DANTE.