June 28, 1932. E. NORDHEM 1,864,548

SWITCH LOCK

Filed Sept. 27, 1926

Fig. 1.

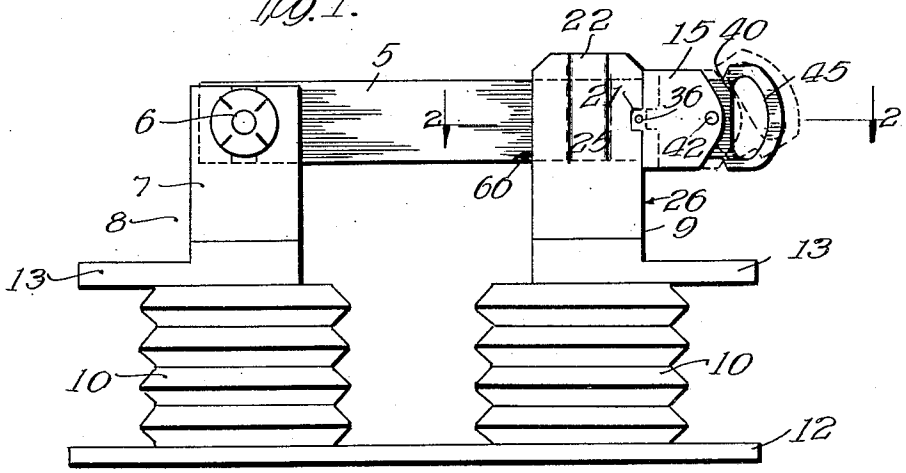


Fig. 2.

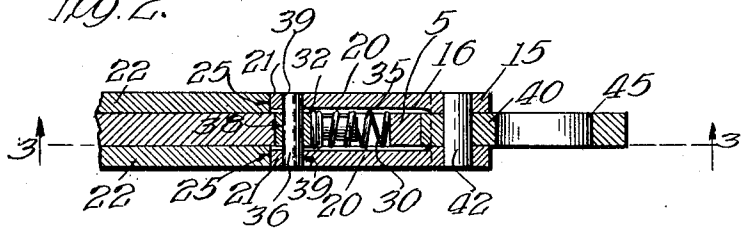


Fig. 3.

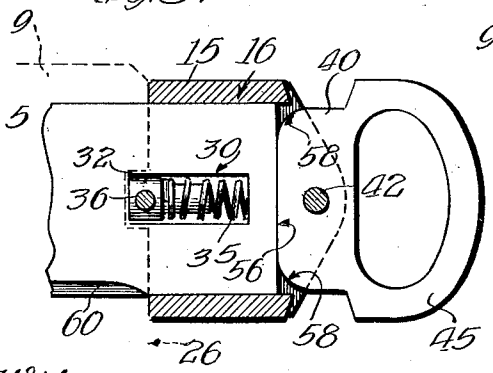
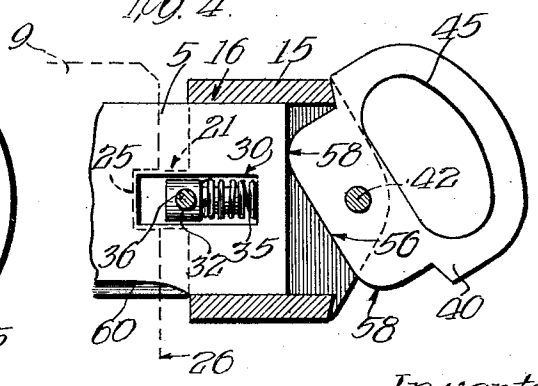


Fig. 4.



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UNITED STATES PATENT OFFICE

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SWITCH LOCK

Application filed September 27, 1926. Serial No. 137,833.

This invention relates to locking devices and more particularly to locking devices for electric switches and the like.

In stations, particularly those of large capacity, having circuits subject to abnormal current surges, it is well known that disconnecting switches are subject to stresses tending to open the same. The opening of a disconnecting switch under load conditions may result in destructive arcing and in serious operating troubles. Where such a switch is blown open, by an overload, for example, it is in danger of being destroyed and also of developing serious faults to ground or across phases.

It is the object of my invention to provide a generally improved and simplified locking device for holding the switch blade or movable switch member closed and against becoming accidentally disengaged from its cooperating clip or contact member.

Another object is to provide a locking device that is absolute in its locking action and a locking device that may be positively released with ease and facility.

Another object is to improve the mounting and guiding of the locking member and to provide a device that may be economically produced and which is compact and of relatively great strength, requiring few parts, and in which a relatively great releasing or opening effort may be conveniently imposed.

To acquaint those skilled in the art with the construction and manner of practicing my invention, I shall now describe a particular embodiment of the same in connection with the accompanying drawing, in which:—

Fig. 1 is a side elevational view of a switch embodying the invention;

Fig. 2 is an enlarged detail longitudinal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 2; and

Fig. 4 is a view similar to Fig. 3 showing the lock in its released position.

Referring to the drawing, the switch shown comprises a single blade or switch member 5 pivoted at 6 between the jaws 7 of the clip or pivot terminal member 8 and swingable into and out of contact at its opposite end with the other clip or contact terminal member 9.

The jaws of the pivot and contact terminals 8 and 9 may have cuts for slitting or separating the contact areas for the usual purpose and the blade pivot 6 may be provided with lock nuts and spring washers, as shown.

The terminal members 8 and 9 may be suitably mounted upon supporting insulators 10, which insulators 10 may in turn be mounted upon a common supporting base 12.

This and the details of the switch, per se, and its mounting may vary as will be apparent to those skilled in the art. The terminal members 8 and 9 may have suitable base projections 13 to which connection may be made, as through suitable terminal members which may be bolted to the base projections 13.

While the particular switch shown is of the single throw, single blade type, it is to be understood that the switch may be of the double throw type simply by arranging another contact terminal 9 on the other side of the pivot clip 8 and that the invention may be embodied in a multiple blade unit.

The locking member is designated at 15 and it comprises a hollow member of generally rectangular cross section slidably mounted upon and embracing the outer or free end of the blade member 5, with the end of the blade member extending into the opening 16 through the locking member 15. The opening 16 conforms to the periphery or cross section of the blade member 5 and the locking member is guided in its longitudinal sliding movement or movement of translation along the blade member 5 by its fit or mounting thereon. Additional guide pins or the like for the locking member may thereby be eliminated.

Each of the opposite sides 20 of the locking member 15 has at its inner end a projecting lug or catch 21 and each of the jaws 22 of the contact terminal 9, between which jaws 22 the free or outer end of the blade 5 is received, has a notch or recess 25 in its in its adjacent edge 26 in which the lugs or

catches 21 engage when the blade is closed.

For the purpose of yieldingly urging the locking lugs 21 into the recesses or notches 25, the outer end of the blade member 5 is provided with a longitudinal opening or slot 30. Interposed in this opening 30 between the portion of the blade across the outer end thereof and a pin or block 32 slidingly mounted in the opening 30 is a coiled spring 35 which normally urges the block or pin 32 toward the opposite end of the opening or slot 30. The block or pin 32 and the locking member 15 are connected for movement along the blade 5 together or in unison as by means of a transverse pin 36 extending through a transverse aperture 38 in the pin or block 32 and through registering apertures 39, one in each of the side walls 20 of the locking member 15. The cross pin 36 may be riveted in place or, alternatively, it may of course be removably secured if desired.

From the foregoing, it will now be apparent that the spring 35 normally urges the locking member 15 into locking position, so that as the blade is swung into position between the jaws 7 the lugs 21 will, upon moving past the upper end of the jaws 7 and reaching the recesses 25, be sprung into said recesses and hold the blade positively on each of its opposite sides against opening.

For the purpose of releasing the locking member from the notches or recesses 25, I provide a releasing member 40 pivoted at 42 in the outer end of the locking member 15 and within the opening 16 and between the side walls 20 of the locking member. The releasing member 40 may have an opening or eye 45 adapted to receive an operating hook or some suitable tool for releasing the lock and moving the blade or switch member.

The inner end of the releasing member 40 projects into cooperation with the outer end of the blade member 5 and forms, in effect, a cam projection for moving the locking member 40 outwardly to release the lugs 21 of the recesses 25 when the member 40 is rocked in either direction about its pivot 42. The shape of the periphery of the inner end of the member 40 is eccentric or wedge-like in its action between the outer end of the blade member 5 and the pivot 42 as the releasing member is rocked in either direction. This cam or wedge-like action imparts relative movement between the blade 5 and the pivot 42, and the blade member being fixedly pivoted at 6 and the pivot 42 carried by the member 40, the member 40 is moved outwardly along the blade member 5 into released position, as shown in Fig. 4, against the tension of the spring 35 which is compressed by such action, as shown.

The inner end of the member 40 may be substantially flat at 56 to be normally held in the position of Fig. 3 by its engagement with the substantially flat outer end of the blade member 5 and the opposite ends of this flat portion 56 may be rounded at 58 into the side edges of the cam projection of the member 40. The member 40 particularly the cam projection thereof, is preferably symmetrical to secure the same action in both directions of rocking movement of the member 40, although this may vary, if desired.

It will now be apparent that with the switch in the closed position of Fig. 1, a pull with a suitable switch hook or tool inserted in the eye 45, in the direction of opening movement of the blade 5, will rock the member 40 about its pivot 42 and the cam action of the inner end of the member 40 on the outer end of the blade member 5 will move the locking member 15 outwardly along the blade member 5 and the lugs or catches 21 out of engagement with the recesses 25 and into position clear of the adjacent edges of the jaws of the clip 9. Further pull on the eye 45 will thereupon swing the blade member 5 into open position away from the contact member 9 and about the pivot 6. The spring 35 is compressed with the releasing movement of the locking member 15 and tends to force the locking member back into its normal position as the blade moves out of engagement with the contact terminal. When the switch is closed the lugs of the locking bolt will be sprung into the notches 25 to securely lock the blade member 5 in closed position.

In the closing movement of the switch, the pull on the eye 45 in the direction of closing movement of the blade member may, when the blade member comes into contact with the contact member 9 so that its further closing movement is resisted, at least somewhat by said contact member, thereupon move the locking member into released position, or the locking member may be otherwise moved outwardly as the blade member is closed. Where the switch is of the double throw type, the pull on the member 40 from either closed position similarly releases the locking member and the same direction of pull opens the blade member.

The cam action on the blade member provides a releasing effort and operating leverage of great magnitude to assure positive opening or release at all times and the locking action is positive and absolute. The device is simple, compact and economical and it is operated with great ease and facility.

I do not intend to be limited to the precise details shown or described.

I claim:—

1. In a switch, a contact member having a pair of contact jaws, a switch member movable into and from engagement between said jaws, a locking member embracing said switch member and slidable thereon, said locking member having means on opposite sides of the switch member for engaging

equally with each of said jaws to lock said switch member in engagement with said contact member, a cam member permanently mounted on said locking member and engaging the blade to slide the locking member longitudinally of said switch blade.

2. In a switch, a contact member, a switch member cooperable therewith, a locking member for said switch member, and a releasing member pivotally mounted to said locking member and having cam engagement with the switch member for releasing said locking member.

3. In a switch, a contact member, a switch member cooperable therewith, said switch member having a longitudinal opening, a locking member for the switch member, said locking member having means operable in said opening, spring means disposed in said opening and cooperable with said last means to urge said locking member to locking position, and a cam shaped member pivotally mounted on said locking member and adapted to draw said locking member lengthwise of the switch member to release said locking member.

4. In combination, a switch blade member, a locking member embracing said switch blade member and slidable thereon, and a releasing member comprising a cam pivotally mounted to the locking member and engageable with the blade member to release said locking member.

5. In combination, a switch blade member, a locking member therefor, and a movable lock and switch operating eye pivotally mounted on the locking member and having a cam portion cooperable with the blade member to release the locking member.

6. In combination, a switch blade member, a locking member therefor, and a movable lock and switch operating eye pivotally mounted on the locking member and having a cam portion cooperable with the blade member to release the locking member, said eye operating through the pivot to actuate the blade member.

7. In combination, a switch blade member, a locking member embracing said blade member and slidable with respect thereto, said locking member having side portions extending beyond the end of the blade member, means normally urging said locking member to locking position, and a releasing member pivotally mounted between the extending side portions of the locking member, said releasing member having a cam portion cooperable with the blade member and an eye for actuating the switch and the releasing member.

8. In a switch, a contact member having a pair of contact jaws, a switch member movable into and from engagement between the jaws, a locking member embracing said switch member and slidable thereon, said locking member having means on opposite sides of the switch member for engaging equally with each of said jaws to lock said switch member in engagement with said contact member and side portions extending beyond the end of the switch member, means normally urging said locking member to locking position, and a releasing member pivotally mounted between the extending side portions of the locking member, said releasing member having an eye for actuating the switch and the releasing member and a cam portion cooperable with the blade member.

9. In combination, a switch blade, a slide member embracing the end of the blade and guided for movement thereupon, said slide having a locking projection at its inner end and a pair of ears at its other end, a flat ended cam engaging the end of the blade and pivoted on said ears, said cam having an eye at its outer end, and spring means for urging the slide endwise of the blade and to hold the cam against the end of the blade.

10. In combination, a switch blade, a slide member embracing the end of the blade and adapted to slide thereupon, said slide having a locking projection at its inner end, a pair of contact jaws cooperating with said switch blade, a shoulder on one of said jaws cooperating with said locking projection, a cam pivotally mounted on said slide member having a flat surface adapted to engage the end of said blade, and yielding means for urging the slide endwise of the blade to engage said locking projection with said shoulder and to hold said cam against the end of the blade.

In witness whereof, I hereunto subscribe my name this 23rd day of September, 1926.

ERIC NORDHEM.