Jan. 23, 1962 E. BASSANI 3,018,341

LOCKING AND SAFETY DEVICE FOR ELECTRIC SWITCHES

Filed Feb. 9, 1959

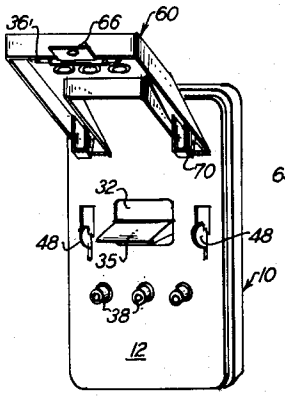


Fig. 1

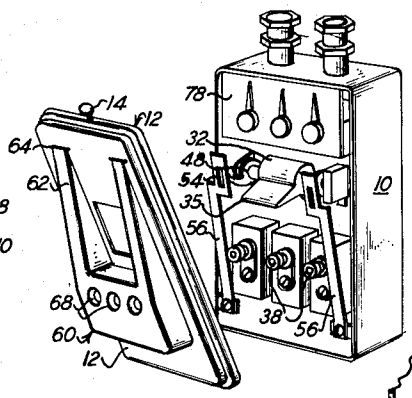


Fig. 2

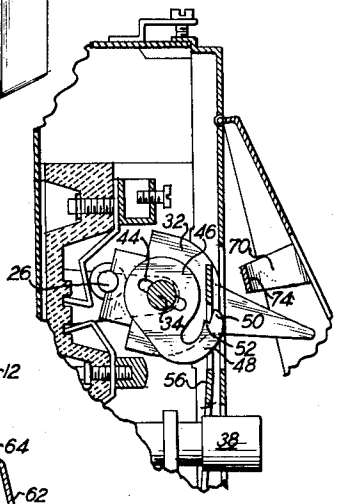


Fig. 5

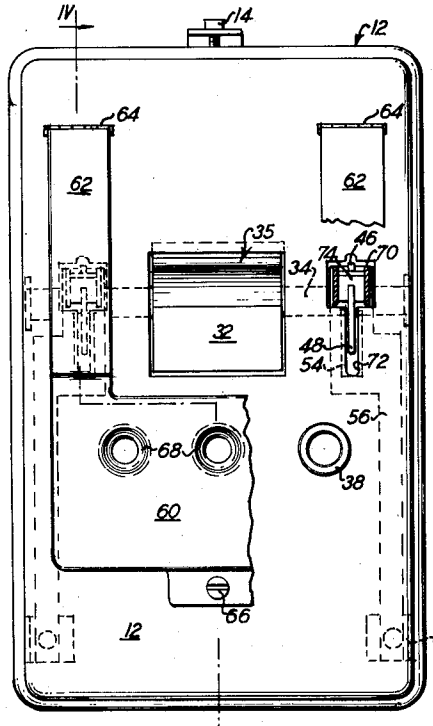


Fig. 3

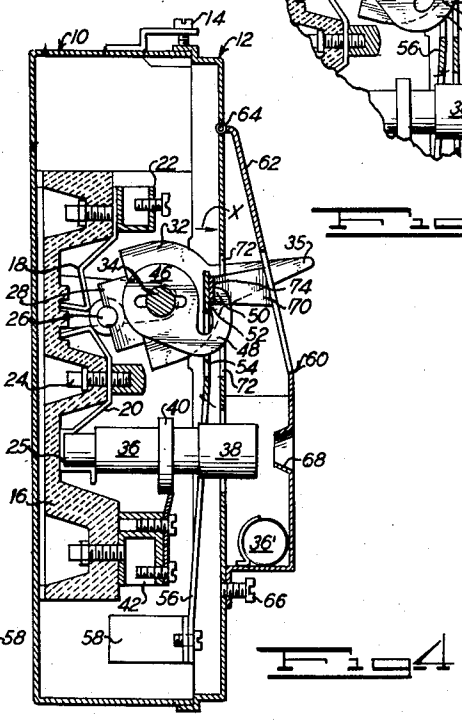


Fig. 4

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LOCKING AND SAFETY DEVICE FOR ELECTRIC SWITCHES

Ermanno Bassani, Milan, Italy, assignor to Societa per Azioni Bassani, Milan, Italy, an Italian joint-stock company

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This invention relates to a lock and safety device for electric switches. According to the invention the handle or other actuating member is locked during removal of protective arrangements or other safety devices in order to positively prevent actuation of the switches, in case they are not insulated against the voltage carrying members.

Referring particularly, but not exclusively, to the switches as used in low and middle voltage electrical installations, it is well known that such switches are manufactured so that all metal members be duly protected, and that, should the protection be removed, the switches must first be locked.

This is also the case when the switches are fitted with safety devices, as for instance fuses, overcurrent relays and the like.

In addition, the replacement or re-calibration of the above members must be made after disconnection of the switches, to prevent possible accidents.

The main purpose of the invention is the provision of a device which can be fitted on electric switches in general, and particularly on switches of the enclosed and protected type, to cause the movable members thereof to be positively locked, when the safety devices, or in general the casings within which such switches are fitted, are to be removed, or opened.

A further purpose of the invention is to allow the fuses to be replaced, or the relays or the like to be calibrated, without any danger of accident, whereas when voltage is carried by the different members, the access thereto is positively prevented.

According to the invention movable contact pieces are actuated by a swinging or cross-member characterized, in that said swinging member is provided with at least one pawl cooperating with an associated spring arm secured to the switch. At least one cover or like protective member in which the enclosed switch metal members are therewith engaged, whereby when removing the cover the spring arm is released, thus locking the swinging member by which the switch is actuated.

Moreover, locking means are formed on the pawl secured to the switch actuating member. Such means engage, when the switch is closed, with at least a portion of the cover to prevent opening thereof, thus shutting off access to all voltage carrying members.

It is to be understood that the invention extends also to switches (being such general term inclusive of all devices provided not only for breaking and making a circuit, but also for switching-over, shunting and reversing purposes).

Other objects and features of the invention will become apparent from the following detailed description of a preferred embodiment thereof, as applied to a conventional switch.

In the drawings:

FIG. 1 is a perspective view of a switch adapted for replacement of the fuses.

FIG. 2 shows the device of FIG. 1 with the switch cover removed.

FIG. 3 is a partly cut-away view of the switch.

FIG. 4 is a cross-section view along the line IV—IV of FIG. 3.

FIG. 5 is a perspective view of a detail.

The switch consists of a box or enclosure **10**, provided with a cover **12** secured thereto by the nuts **14**. The members of said switch are fitted, in known manner, on a small supporting block **16**, preferably made of ceramic materials secured inside the box.

In greater detail, said block is fitted with one or more pairs of suitably shaped spring contacts **18** and **20**, which are provided with the associated terminals **22** and **24** and which cooperate with a contact roller **26**, kept in place by a small plate **28**, which is under the action of the spring means (not shown). Such plate and its spring are seated into a suitable opening, formed on a cross member **32**, provided on both ends with pins **34**, which are secured on suitable supports, formed in the block **16**. Thus, the rollers **26** can be brought into two positions, i.e. one in which they engage with the ends of spring contacts (circuit making) and another in which they are wholly disengaged therefrom (circuit breaking).

The contact **20** is also formed with a clamp-shaped extension **25** to engage with one end of a fuse **36**, whose opposite end is secured in known manner, as for instance by a cap **38** made of insulating material, on a plate **40**, whereon a terminal **42** is also secured. Said cross member **32** is provided with an actuating handle **35**, that comes out of the cover through a suitable opening; further openings are also provided for the caps **38** of fuses **36**, whereby said fuses can be replaced from the outside of the box without having recourse to removal of the cover.

According to this invention, radial extensions **44** are formed on both ends of cross member **32**, near the pins **34**; a plate **46**, secured to said extensions has a hook-shaped extension **48**, two dogs **50** and **52** being formed on the outer end thereof.

Each one of said hooks **48** engages in a slit **54** cut near one end of a spring arm **56**, secured to a small bracket **58**, fastened to the inside wall of box **10**. This arm, which extends with its longitudinal axis at a right angle to the rotation axis of cross member **32**, consists of a spring plate, shaped in such a manner as to urge said arm in the direction of arrow X in FIG. 4, i.e. toward the cover **12**.

Said cover **12** is provided with a countercover **60**, that extends on the area of the openings through which the fuse caps **38** project out of cover, and is provided with arms **62**, connected by the hinges **64** to said cover, said countercover being removably secured to cover **12** by means of threaded nut **66**. Thus the caps **38** of fuses are made inaccessible by said countercover, which on the other hand is provided with holes or windows **68** for the visual check of the condition of the fuses.

The countercover **60** is box-shaped, thus leaving a suitable space for the caps **38** by which the fuses **36** are kept in position, and in addition countercover **60** is provided with spring tongues to keep spare fuses **36'**.

Stirrups **70** are secured to countercover **60**, opposite to ends of arm **62**. These stirrups can be extended beyond the cover **12**, through the openings **72**, out of which extend also the hooks **48**.

When the countercover **60** is in its closed position, the dog **50** of hook **48** engages with the end **74** of each stirrup **70**. Moreover, as clearly shown by FIG. 4, the end **74** of each stirrup **70** abuts with its lower face against the end of the spring arm **56**, whereby this latter, when the countercover **60** is kept against the cover **12**, is forced in a direction opposite to that of arrow X.

Under such conditions, it is to be understood that the cross member **32** (FIG. 1) may be caused to swing around the pins **34**, whereby the switch can be actuated in the usual manner.

None of the voltage carrying members, as for instance the terminals **22**, **24** and **42** and the fuses **36** are accessible, since neither the cover **12** nor the countercover **60**

can be removed, when the switch is closed, by loosening the screws **14** and **66**. In fact, even after loosening of said screws, both the cover **12** and the countercover **60** are kept fastened to box **10** by the dogs **50** of hooks **48**. The switch must be switched off to allow lifting of the cover **60** and consequent access to cap **38** of fuses **36**, i.e. the cross member **32** is to be swung in a clockwise direction (see FIG. 4), thus disengaging the dogs **50** of hooks **48** from stirrups **70**. Then, the countercover can be lifted by swinging it around its hinges **64**, whereupon the cover **12** can be removed from box **10** by loosening the screws **14**.

As shown in the FIG. 2, the switch output terminals **42** are made accessible by the removal of cover **12**, whereas the input terminals are covered by a plate **78** made of an insulating material.

It will be understood that after lifting of countercover **60** or removal of cover **12**, the switch cannot be further actuated, since while lifting the countercover **60** or removing the cover **12**, each spring arm **56**, by virtue of its elasticity, is moved in the direction of arrow X, and the ends of slit **54** thereof will engage with the dogs **52**, whereby preventing any swinging in counterclockwise direction of cross member **32**, which is thus locked, whereby the circuit cannot be closed. The circuit can be then closed only after lowering of the arms **56**, and this operation can be carried out only after bringing back the cover **12** and the countercover **60** to their original places.

In the manner as above described, all accidental contacts can be always positively prevented, even when burnt fuses are to be replaced.

Many modifications and changes may be made in the above described device, according to the construction and operational features of the switch in which the invention is to be embodied.

What is claimed is:

1. A switch comprising a base, spaced contacts on said base, a pivotal member on said base and adapted to connect said contacts, at least one electrical component on said base in operative association with said contacts, a

hooked member on said pivotal member and having an outer end, two dogs on said outer end, a spring on said base and provided with an opening accommodating the passage of said dogs, a cover shielding said component, and a stirrup on said cover and engaged by one of said dogs for locking the cover on said base, said stirrup bearing, under the influence of said one dog, against said spring and maintaining the latter in a position whereby unimpeded movement of said hooked member and pivotal member is permitted with the cover in position, said spring assuming, upon removal of said cover and release by said stirrup, a position of interference with the other of said dogs to prevent movement of the pivotal member and a resulting actuation of the switch with the cover removed.

2. A switch as claimed in claim 1, wherein said cover includes a first section engaging said base and having openings respectively accommodating said stirrup and exposing said component, and a second section hinged on said first section, the second section pivotally supporting said stirrup.

3. A switch as claimed in claim 2, comprising locking means for fixing said second section on said first section and said first section on said base.

4. A switch as claimed in claim 2, wherein one of said contacts includes a U-shaped bracket portion detachably engaging said component.

5. A switch as claimed in claim 2, wherein said pivotal member includes a roller adapted to couple said contacts electrically.

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