July 16, 1946. W. G. HARLOW ET AL 2,404,230

DEAD FRONT SAFETY SWITCH

Filed Nov. 23, 1943 2 Sheets-Sheet 1

Fig.2.

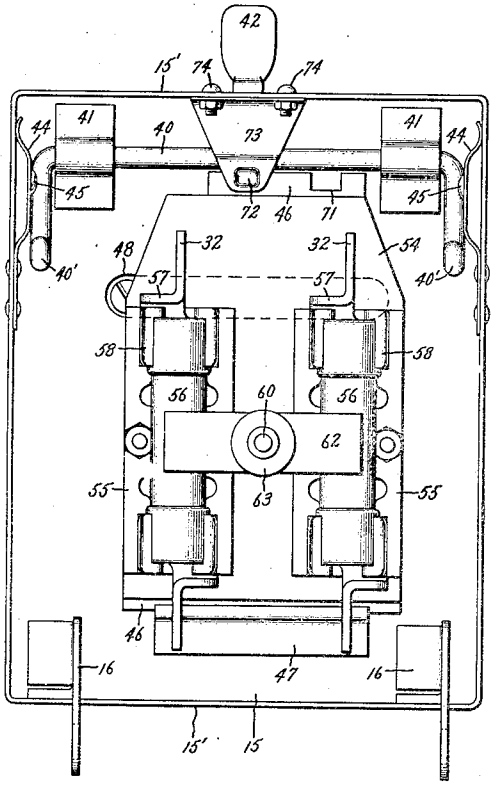


Fig.1.

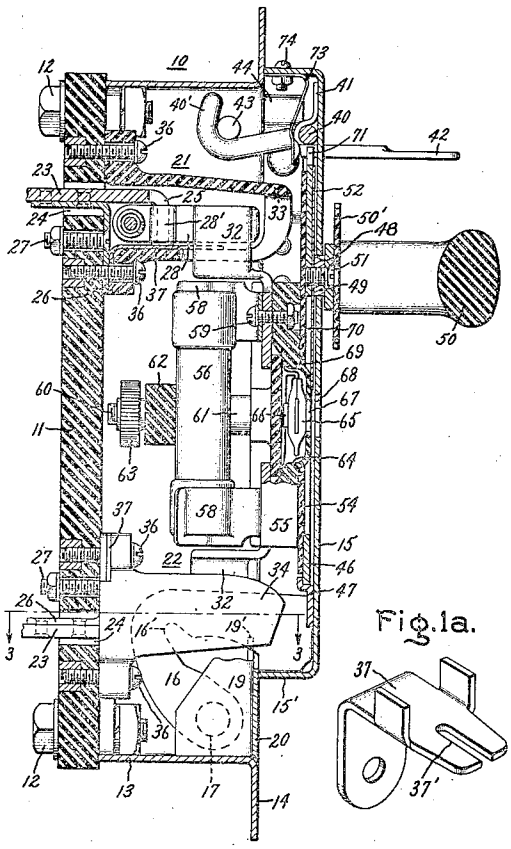


Fig.1a.

Fig.3.

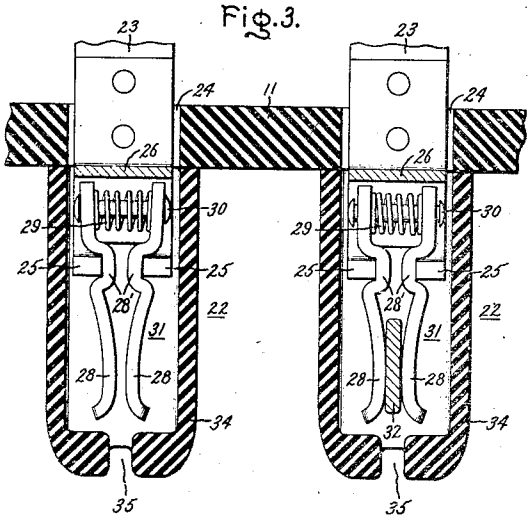
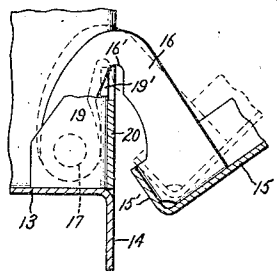


Fig.4.



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Fig. 5.

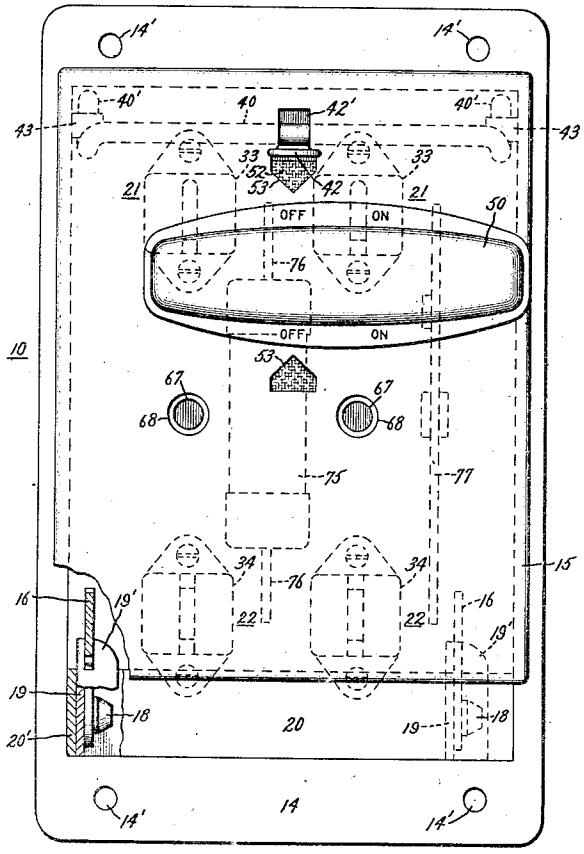


Fig. 6.

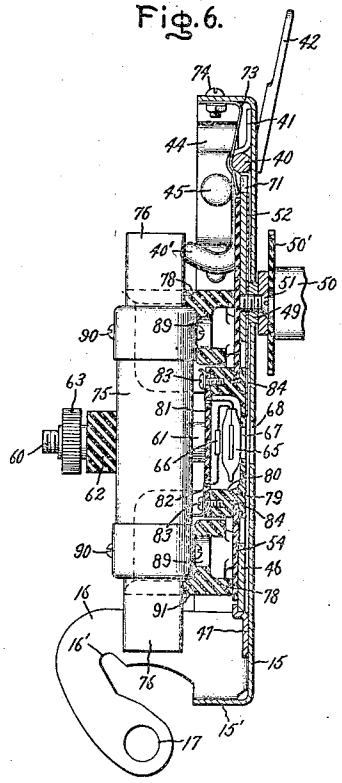


Fig. 8.

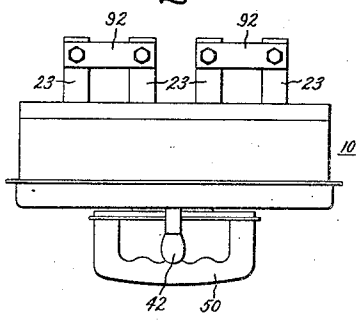
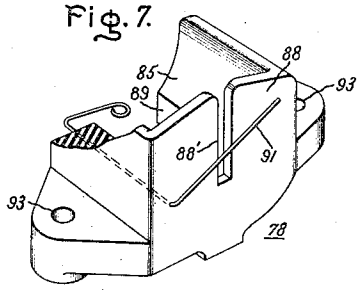


Fig. 7.



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UNITED STATES PATENT OFFICE

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DEAD-FRONT SAFETY SWITCH

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Application November 23, 1943, Serial No. 511,388

14 Claims. (Cl. 200—114)

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Our invention relates to dead front safety switches and more particularly to improvements in enclosed switches wherein the operation of the switch is effected by manipulation of the switch door or cover for the switch enclosure.

Dead front switches have become quite popular in recent years particularly for use on switchboards or panel boards. Dead front switches which have been so used have comprised an enclosure for a fuse switch in which fuses are mounted on the door of the enclosure and both ends thereof entirely disconnected by a single movement of the door. The fuses are mounted on the inner surface of the door which, when opened, moves the fuses out of the enclosure and into a position where they may be readily handled without danger of contact with any of the live portions of the switch structure. In such an arrangement the fuses may be dispensed with and replaced by an ordinary conductor so that the device may operate either as an ordinary switch or as a fuse switch.

It is an object of our invention to provide a new and improved dead front switch of the above mentioned type.

It is another object of our invention to provide improved means in a switch of the type described for locking the switch in either an "on" or an "off" position which means are inoperative when the switch cover is in the closed position.

It is another object of our invention to provide new and improved contacts for engaging a switch blade.

Further objects and advantages of our invention will become apparent as the following description proceeds and the features of novelty which characterize our invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of our invention, reference may be had to the accompanying drawings in which Fig. 1 is a sectional view of one modification of a dead front fuse switch embodying our invention; Fig. 1*a* is a perspective view of one element of the fuse switch shown in Fig. 1; Fig. 2 is an elevational view looking at the inside of the cover of the dead front switch of Fig. 1; Fig. 3 is a view taken on line 3—3 of Fig. 1 but only showing the arc barrier and contact assemblies with one fuse removed; Fig. 4 is a partial view similar to Fig. 1 showing the switch door in the open position; Fig. 5 is a front elevation view, partly in section, of the dead front switch of Fig. 1 with the switch in the off position, and a modification thereof being indicated

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by dotted lines thereon; Fig. 6 is a sectional view of a modification of the cover of the dead front switch of Fig. 1; Fig. 7 is an enlarged perspective view of a portion of Fig. 6; and Fig. 8 is a top view of a modification of a dead front switch embodying our invention.

Referring now to Figs. 1 to 5 of the drawings, we have illustrated our invention specifically as comprising a housing which is readily adaptable for assembly in a panelboard or a switchboard. It should be understood, however, that the application of our switch is in no way limited and may be employed wherever a knife or safety type switch is adaptable. Thus as is shown in Fig. 1, we provide a housing or an enclosing case 10 which comprises a back or base 11 of insulating material to which is suitably bolted, as indicated at 12, a rectangular frame 13 preferably constructed of metal and provided with a flange 14. The open front of the enclosing case 10 is closed by a cover 15 to be described in greater detail hereinafter. Preferably the enclosing case 10 is mounted in the vertical position shown directly to a panelboard which is provided with an opening sufficiently large into which the housing 10 may be inserted with the flange 14 engaging the surface of the panelboard. The flange 14 is provided with suitable openings 14' (Fig. 5) so that it may be bolted or otherwise secured to a suitable panelboard.

The cover 15, best shown in Figs. 1, 2, 5, and 6, is also rectangular in shape so as to fit the opening of enclosing case 10 and includes a flange 15' surrounding the entire inside of the cover. Door or cover 15 is preferably hinged at the bottom of the enclosing case or housing 10 by suitable hinging means. In accordance with our invention this hinging means comprises a pair of U-shaped members 16 suitably fastened as by welding to the inside of the cover 15 so as to extend into enclosing case 10 when the door 15 is in the closed position. Each of these U-shaped members 16 is provided with an opening 17 adapted to engage a trunnion 18, best shown in Fig. 5 suitably supported within enclosing case 10. As is shown in Fig. 5, the left-hand trunnion, for example, is mounted so as to extend inwardly from the left-hand wall of the enclosing case 10, while the right-hand trunnion is suitably supported from a trunnion supporting member 19 in spaced relationship from the right-hand wall of the enclosing space 10 so that both trunnions extend in the same direction, permitting disengagement of the U-shaped members 16 from trunnions 18 by lateral movement of the door 15

relative to enclosing case 10. Preferably the trunnions are both suitably fastened as by welding to identical trunnion supporting members 19, which in turn are suitably fastened as by welding to a tie member or plate 20. Tie member or plate 20 is adapted to extend across the lower front of enclosing case 10 and is provided with inturned flanges 20' which are suitably fastened, as by welding, to member 13 of enclosing case 10.

In accordance with our invention the hinging means for cover 15 comprising U-shaped members 16, trunnions 18 and trunnion supporting members 19, are so constructed that the cover 15 may be removed only in a predetermined open position thereof. To this end trunnion supporting members 19 are each provided with an upwardly extending portion or interference member 19', best shown in Figs. 1, 4, and 5, which prevent lateral movement of cover 15 relative to door 10 as well as disengagement of the hinge members 16 from trunnions 18. The U-shaped members 16 are provided with a notch 16' which is adapted to accommodate interference members or upwardly extending portions 19' so that when cover or door 15 is in a predetermined position lateral movement thereof is permitted and door 15 may be completely removed from enclosing case or housing 10. The opening movement of door 15 relative to the hinging means is limited by the engagement of the notches 16' with a tie plate or member 20. In the fully open position of door 15, as shown in Fig. 4, the interference members 19' prevent cover 15 from being moved laterally for removal from enclosing case 10. It is necessary to lift the cover slightly in the closed direction, as is indicated by dotted lines in Fig. 4, before such disengagement of the hinging means may obtain, thereby eliminating any accidental removal of the cover 15 from the enclosing case 10. It should also be observed, as will become apparent from the following description, that removal of cover 15 from the enclosing case is impossible until the switch to be described hereinafter is in the open position.

It should be understood that dead front switches, in accordance with our invention, might be single-pole or multi-pole switches. Furthermore, they may be single-throw or double-throw switches. In order to illustrate our invention we have specifically shown a two-pole, single-throw switch, but it should be understood that our invention is equally applicable to other single-throw or double-throw arrangements.

Suitably supported from insulating base 11 of enclosing case 10 are upper contact assemblies 21 and lower contact assemblies 22. Except for the arc barrier to be described hereinafter, these contact assemblies are substantially identical, and consequently the corresponding parts of the upper and lower contact assemblies will be designated by the same reference numerals. Each of these contact assemblies includes a terminal 23 which is preferably a flat conductor member extending through a cooperating opening 24 in base member 11. A portion of terminal 23 extending into enclosing case 10 is bent at right angles to the main portion of the terminal member which right angle portion is bifurcated or forked so as to present two separate portions 25, the purpose of which will become apparent from the following description. The terminal 23 is suitably supported from base 11 of enclosing case 10. We have illustrated the terminals 23 as being suitably fastened to a supporting member 26, which in turn is fastened to base 11 as indicated at 27.

The bifurcations or bifurcated portions 25 of terminal member 23 act as supports for the substantially stationary contacts which comprise contact fingers 28, best shown in Fig. 3. Each contact assembly comprises two identical contact fingers 28 which have an indented portion 28' to engage the bifurcated portions 25 which act as a pivot for the contact fingers 28. The contact fingers are arranged into a unitary contact comprising two cooperating contact fingers 28, a spring 29, and a combined spring retainer and contact spreader 30, which latter comprises a hollow rivet or the like, extending through openings in the contact fingers 28. It is obvious that with this arrangement the contact unit which we shall generally designate as 31, comprising fingers 28, spring 29, and combined spring retainer and contact spreader 30, is readily removable from between the bifurcations 25 and is merely held in position by the force of spring 29 acting to cause the portions 28' of the contact fingers to frictionally engage the bifurcations 25 of terminal 23. It should be observed that the right-hand contact assembly 22 in Fig. 3 shows a blade contact 32 engaging contact unit 31, while the contact assembly 22 shows this blade in the removed position in order to illustrate how the combined spring retainer and contact spreader 30 keeps the contact fingers 28 somewhat separated to prevent stubbing of the contact blade such as 32 upon entering the contact unit 31.

The live parts of the contact assemblies 21 and 22 extending into enclosing casing 10 are covered by arcing barriers 33 and 34, respectively, which prevent accidental contact of any live parts when the cover 15 is in the open position. These arcing barriers are preferably formed of suitable insulating material and the openings 35 in the barriers for accommodating contact blades such as 32, are arranged to direct arc gases away from the grounded metal parts. As a matter of fact, only the upper arcing barriers 33 are ever used to facilitate arc extinction since arcs are drawn only at the upper contact assemblies 21. The arc barriers 33 and 34 are suitably fastened to base 11 by fastening means 36, best shown in Fig. 1. In order to prevent breakage of arc barriers 33 and 34, which may be of molded material, we have provided a member 37 associated with each arc barrier as best shown in Figs. 1 and 1a. This member 37 forms part of the contact assembly and is provided with a slot 37' so that when the blade contact 32 is inserted between contact fingers 28 it also is inserted in slot 37'. With this arrangement the blade 32 cannot move sideways to break the arc barriers 33 and 34.

The cover 15 is provided with a suitable locking means to maintain the cover in the closed position comprising a locking rod 40 being generally U-shaped in construction and each end of the U being provided with a hooked portion 40'. This locking rod 40 is pivotally mounted to the inside top of cover or door 15 by lock bar guide or hinge members 41 pivotally engaging the base of the U-shaped locking rod 40. In order to operate locking rod 40 exteriorly of enclosing case 10, we provide a manual locking lever 42 which extends through a suitable opening 42' (best shown in Fig. 5) in cover 15 and is suitably fastened as by welding or the like, to the base portion of U-shaped locking rod 40. When locking rod 40 is rotated in a counterclockwise direction as viewed in Fig. 1, it assumes the unlocked position indicated in Fig. 2. In the locked position of locking rod 40 shown in Fig. 1, the

hooked portions 40' engage cooperating locking members 43 which extend inwardly from the upper ends of the side walls of enclosing case 10. In order to hold the locking bar 40 in either its locked position indicated in Fig. 1 or its unlocked position indicated in Fig. 2, we provide suitable spring means 44 suitably fastened to the flange 15' of cover 15. Each spring 44 is provided with a bumped portion 45 which engages locking rod 40 in its intermediate position so that the spring means 44 will be stressed when locking bar 40 engages portion 45 and the spring means will tend to hold locking rod 40 in either of its two extreme positions, namely its fully locked or fully unlocked position.

Mounted on the inside of cover 15 is a subpanel or slidable panel including a slide or fuse mounting plate 46. Plate 46 is slidable along the inside of cover 15 and is guided at the lower edge by a suitable guide member 47, best shown in Fig. 2. The cover 15 is provided with an elongated opening 48 (see Figs. 1 and 2) in which is slidable the member 49. A suitable handle 50 is fastened to slide 46 by means of screws 51 whereby the handle 50 and slide 46 are movable as a unit laterally of cover 15 and controllable from outside of enclosing casing 10. The size of member 49 slidable in opening 48 in the cover 15 determines the maximum sliding movement of member 46. As is best shown in Fig. 1 and as will be apparent from the following description, a suitable target 52 may be fastened to slide 46 between the inside of cover 15 and slide 46. One half of target 52 is preferably painted or otherwise suitably colored with one color while the other half is suitably colored with a different color. This target 52 is visible through suitable arrow-head shaped openings 53 in cover 15. These arrow-head shaped openings will permit one color of the target to be visible for one position of the slide 46 and the other color of the target to be visible for the other position of slide 46. Also the handle 50 may include a suitable plate 50' having indicia such as "Off" and "On" suitably inscribed thereon, which indicia are adjacent the arrow-head shaped openings 53 when the fuse is in the "Off" and "On" positions, respectively, as is obvious from Fig. 5. It will be observed from Fig. 5 that the upper arrow-head shaped opening 53 is actually an extension of opening 42' through which manual lever 42 extends.

Mounted on slide 46 is an insulating sheet or member 54 upon which are supported fuse or switch supporting blocks or members 55, also formed of suitable insulating material. Insulating members 54 and 55 are suitably bolted to slide 46 so as to be slidable therewith. Since we have illustrated our invention as particularly adapted for use as a fuse switch, the switch blocks 55 support suitable adaptors for engaging fuse terminals. Standard cartridge fuses of low ampere ratings are provided with cylindrical terminals rather than the blade type terminals employed in higher ampere fuses. Since our dead front safety switch is adapted to employ either type of fuse, we have illustrated Figs. 1 and 2 as employing fuses of the cylindrical terminal type, indicated at 56. Accordingly, we provide a conducting member or adaptor 57 for each end of each fuse block 55 which conducting member includes the blade portion 32 which engages contact units 31. Conducting member 57 also has mounted thereon contact clips 58 for engaging the terminals of fuses 56. It will be obvious to

those skilled in the art that conducting members 57 may be adapted to accommodate fuses of different dimensions. As is best shown in Fig. 1, conducting members 57 are suitably fastened to switch blocks 55 as by fastening means 59, which fastening means also hold the contact clips 58 to conducting members 57.

In order to be sure that the fuses 56 cannot accidentally fall out of contact clips 58 due to jarring or vibration, a suitable locking means may be employed. This has been illustrated in the drawings as a bolt 60 suitably fastened to slide 46. A sleeve of insulating material 61 preferably surrounds bolt 60 and a block of insulating material 62 is provided to hold fuses 56 in contact clips 58. Block 62 is held in position by a nut 63 suitably engaging bolt 60.

In certain cases it may be desirable to provide means visible outside of enclosing casing 10 indicating the condition of fuses 56. To this end we have provided in each of the fuse blocks 55 a recess 64 which accommodates an indicating circuit comprising a lamp 65 and a serially arranged resistor 66. This serially connected lamp and resistor, which may be substantially identical with the indicating circuit disclosed in copending Powell application Serial No. 463,752, filed October 29, 1942, and assigned to the same assignee as the present application, is connected across the terminals of the fuse 56 as by being connected to fastening means 59 at either end of the fuse. The resistor 66 is used in series with the lamp 65 as a ballast to limit the current flowing through the lamp when the fuse is blown. Upon rupture of fuse 56 the potential across the indicating circuit increases sufficiently to cause lamp 65 to be lighted and indicate that replacement of fuse 56 is necessary. In order that this lamp may be visible from the front of enclosed casing 10, fuse block 55 is provided with an opening 67 which cooperates with an opening 68 in the cover 15. It will be understood that a separate indicator circuit will be provided for each fuse in the safety switch unit. The recess 64 in fuse block 55 requires a bulge in the fuse block which protrudes through an opening 69 in insulating member 54 and an opening 70 in slide 46.

When moving the sliding panel comprising slide 46 and the fuses mounted thereon, it is desirable to have some positioning means tending to position the sliding panel in either of its plurality of positions. To this end slide 46 is provided at its upper end with a plurality of notches such as 71, the number depending upon the number of positions which the sliding panel may assume. Since we have illustrated a single throw switch the sliding panel only assumes two positions and consequently only two notches are provided. The notches 71 in slide 46 cooperate with a bumped out portion 72 on a positioning spring 73 suitably fastened to the rim 15' of cover 15 as indicated at 74. The bumped out portion 72 engages with one or the other of the notches 71 so as to tend to hold the sliding panel in either one of its two positions when moved to that position whereby the cover may be closed without fear that the sliding panel may have moved to a different position.

The notches 71 perform an additional function in that they cooperate with the manual lever 42 for locking the door in closed position to lock the sliding panel including slide 46 in either one of its predetermined positions. When the lever 42 is in its locked position as indicated in Fig. 1, it engages with one of the notches 71 in the sliding

panel assembly including slide 46 and positively locks the panel in a predetermined position. In this locked position, as may be observed in Fig. 1, the positioning spring 73 is moved out of engagement with the notch 71 by manual lever 42. It will be observed, therefore, that we have provided a combination door and sliding panel lock which is substantially fool-proof in operation.

The arrangement described thus far has employed standard cartridge fuses of the cylindrical terminal type. It will be obvious that with very minor changes, our improved enclosed safety switch may employ standard cartridge fuses of the blade terminal type or may dispense with fuses entirely by substituting for the fuses a conductor member to act as a switch blade. In Fig. 5 we have indicated our dead front safety switch in the "off" position. Furthermore, we have indicated by dotted lines a standard cartridge fuse 75 having blade type terminals 76 which might be employed instead of the cartridge fuses 56 of Figs. 1 and 2. We have also indicated a blade type conductor 77 in dotted lines, which might be employed instead of the fuses. It will be understood that the fuse 75 and the contact blade 77 are merely indicated in dotted positions to illustrate modifications and they would not both be employed at the same time in the dead front safety switch. Either two fuses such as 56 in Fig. 1, two fuses such as 75 in Fig. 5, or two conductors such as 77 in Fig. 5 would be employed in a two-pole safety switch in accordance with our invention.

When fuses of the blade terminal type such as 75 are employed in our dead front switch, it will be obvious that except perhaps for the size of the enclosing casing the only change in construction necessary will be the fuse supporting means. Accordingly in Fig. 6 we have illustrated a door 15 of our improved dead front switch in sectional view as in Fig. 1, upon which is mounted a fuse of the blade terminal type 75. The corresponding parts of Fig. 6 are designated by the same reference numerals as in Fig. 1. In this case the fuse block 55 of Figs. 1 and 2 is replaced by three separate members, namely, fuse supports 78, one at each end of the fuse 75 and if the indicator circuit is employed a housing 79 for the indicator circuit, which includes a portion having a recess 80 therein provided with a cover plate 81. The indicator circuit comprising a serially arranged lamp 65 and resistor 66 extends through openings 82 in cover plate 81 to terminal screws 83 which hold the cover plate in position. The indicator housing 79 is held in position by insulating member 54 which engages suitable notches 84 in the housing 79.

Fuse supports 78 at either end of the fuse 75 are formed of insulating material and are best shown by the perspective view of Fig. 7. Each fuse support is provided with a rounded portion 85 for accommodating the cylindrical fuse body. An end wall 88 positions the cylindrical portion of the fuse 75. This wall 88 is provided with a notch 88' through which the fuse terminal blade 76 may extend. The base of the fuse support 78 is provided with an opening 89 (see Fig. 6) so that screws such as 90 with which blade fuses are usually provided may not interfere with the positioning of the fuse body in fuse support 78. Fuse support 78 is suitably fastened to the sliding panel assembly by means of suitable fastening means passing through openings 93 in fuse support 78.

In order that the blade terminal 76 may be

electrically connected with the indicator circuit extending to terminals 82 we have provided a new and improved connection comprising a spring wire 91 preferably made of phosphor bronze or the like, which is electrically connected to terminal 83 and arranged to normally assume the position shown in Fig. 7 so as to be held in torsion against the fuse blade 76 when the fuse is inserted in position. With this arrangement, good electrical connection is assured between the indicator circuit and blade terminal 76 which will in no way interfere with the ready removal and replacement of fuses 75.

In Fig. 8 we have disclosed a double-throw, double-pole switch in other respects substantially identical with the dead front safety switch described above. In this construction four terminals 23 extend out of the top of the enclosed case 10 and four terminals 23 extend out of the bottom of the enclosed case 10 rather than half that many in the heretofore described arrangements. It will be obvious that in a double-throw arrangement it may be desirable to interconnect sets of terminals either at the top or at the bottom of enclosed case 10. With our proposed arrangement these common connections such as 92 in Fig. 8 can be made either at the top or the bottom of the fuse housing. The corresponding parts of Fig. 8 are designated by the same numerals as in the other figures of the drawings.

From the above description it will be obvious that we have provided a new and improved dead front safety switch which is compact, economical in construction and substantially fool-proof in operation. It should be noted that the blades 32 of Figs. 1 to 5 and the blades 76 of Fig. 6 can merely be interchanged to engage with the lower contact assemblies if they should be burned by arcing after extensive use.

While we have described what we at present consider preferred embodiments of our invention, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from our invention, and we therefore aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of our invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electric circuit, an arcing barrier for each stationary contact constructed so as to prevent accidental engagement with said contacts so as effectively to provide substantially a dead front construction, a member carried by said cover in slidable relation therewith in a plane parallel with said cover, a fuse having blade terminals mounted on said member slidably movable therewith so as to provide a switch blade for completing the circuit between said contacts in said enclosure, and means for opening the circuit between said contacts in said enclosure by opening said cover to draw an arc between one of said blade terminals of said fuse and one of said stationary contacts.

2. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electric circuit, an arcing barrier for each stationary contact constructed so as to prevent accidental engagement with said contacts so as effectively to provide a

substantially dead front construction, a member carried by said cover in slidable relation therewith in a plane parallel with said cover, a fuse mounted on said member and movable therewith so as effectively to provide a switch blade for completing the circuit between said contacts in said enclosure, means for opening the circuit between said contacts in said enclosure by opening said cover, and means for readily removing said cover from said enclosure by a simple movement thereof.

3. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electric circuit, a member carried by said cover in slidable relation therewith in a plane parallel with said cover, a fuse mounted on said member movable therewith so as effectively to provide a switch blade for completing the circuit between said contacts in said enclosure, means for opening the circuit between said contacts in said enclosure by opening said cover, and means for readily removing said cover from said enclosure to replace said fuse including a simple movement of said cover from the open position toward the closed position.

4. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure, a switching means carried by said hinged cover adapted to complete the circuit between said stationary contacts when said cover is in a predetermined closed position, means for limiting the opening movement of said cover, and means for bodily removing said cover from said enclosure comprising means requiring movement of said cover slightly toward the closed position from the open position thereof and then movement thereof in a lateral direction, whereby accidental removal of said cover from said enclosure is prevented.

5. An electric switch including an enclosure including trunnions extending in a common direction mounted thereon, a hinged cover therefor removably mounted on said trunnions, stationary contacts within said enclosure, a switching means carried by said hinged cover adapted to complete the circuit between said stationary contacts when said cover is in a predetermined closed position, means for limiting the opening movement of said cover, and means associated with said last mentioned means requiring a slight closing movement of said cover from the open position before bodily removal of said cover from said trunnions can take place.

6. An electric switch including a housing, a door hingedly attached to said housing, stationary contacts mounted within said housing, a switching member movably supported by the door of said housing and arranged when in one predetermined position to complete the circuit between said contacts when said door is closed, means for moving said switching means to another predetermined position so that said switching member is out of engagement with said contacts when said door is closed, and a single locking means for locking said switching member in either one of said predetermined positions on said door and for locking said door in the closed position.

7. An electric switch including a housing, a door hingedly attached to said housing, stationary contacts within said housing, a switching member comprising a panel having a fuse fixedly mounted thereon movably mounted on the door of said housing and arranged when in one predetermined position to complete the circuit between said contacts when said door is closed, means for moving said switching means to another predetermined position so that said switching member is out of engagement with said contacts when said door is closed, a notch on said panel and a locking means for engaging said notch to lock said switching member in one of said predetermined positions on said door and to lock said door in the closed position.

8. An electric switch including a housing, a door hingedly attached to said housing, stationary contacts mounted within said housing, a switching member movably supported on the door of said housing and arranged when in one predetermined position to complete the circuit between said contacts when said door is closed, means for moving said switching means to another predetermined position so that said switching member is out of engagement with said contacts when said door is closed, a pair of notches associated with said switching means, and a positioning spring associated with said housing for engaging one of said notches to hold said switching member in one of said predetermined positions while said cover is moved relative to said housing.

9. An electric switch including a housing, a door hingedly attached to said housing, stationary contacts within said housing, a switching member slidably carried by the door of said housing and arranged when in one predetermined position to complete the circuit between said contacts when said door is closed, means for moving said switching means to another predetermined position so that said switching member is out of engagement with said contacts when said door is closed, a positioning spring mounted on said door for holding said switching member in one of said predetermined positions while said cover is moved relative to said housing, and a single locking means for locking said switching member in either one of said predetermined positions on said door and for locking said door in the closed position.

10. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure, an arcing barrier for each stationary contact constructed so as to prevent accidental engagement with said contacts so as effectively to provide a dead front construction, a switching member carried by said cover and adapted to interconnect said stationary contacts when said cover is in a predetermined closed position, and a member mounted within each of said barriers adjacent said contacts for limiting the movement of said switching member under shock conditions to prevent breakage of said arcing barriers.

11. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electric circuit, an arcing barrier for each stationary contact constructed so as to prevent accidental engagement with said contacts so as effectively to provide substantially a dead front construction, a member carried by said cover in slidable relation therewith in a plane parallel with said cover, a fuse having terminals mounted on said member slidably movable therewith so as to provide a switch blade for completing the circuit between said contacts in said enclosure, and means for opening the circuit between said contacts in said enclosure by opening said cover to draw an arc between one of said terminals of said fuse and one of said stationary contacts.

12. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electric circuit, a member carried by said cover and relatively movable therewith in a plane parallel with said cover, a fuse mounted on said member and movable therewith so as to provide a switch blade for completing the circuit between said contacts in said enclosure when in one predetermined position and said cover is closed, means for opening the circuit between said contacts in said enclosure by opening said cover, and indicating means for said fuse mounted within said enclosure on said member so as to indicate outside of said enclosure the condition of said fuse when in said one predetermined position.

13. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electrical circuit, a member carried by said cover and relatively movable therewith in a plane parallel with said cover, a fuse having terminals mounted on said member and movable therewith so as to provide a switch blade for completing the circuit between said contacts in said enclosure when in one predetermined position and said cover is closed, means for opening the circuit between said contacts in said enclosure by opening said cover, indicating means for said fuse mounted within said enclosure on said member including an indicating circuit so as to indicate outside of said

enclosure the condition of said fuse when in said one predetermined position, and means for connecting said indicating circuit across said fuse terminals so that said fuse may be removed readily without removing or disturbing said indicating means.

14. An electric switch including an enclosure, a hinged cover therefor, stationary contacts mounted within said enclosure and adapted to be connected to an associated electrical circuit, a member carried by said cover and relatively movable therewith in a plane parallel with said cover, a fuse having terminals mounted on said member and movable therewith so as to provide a switch blade for completing the circuit between said contacts in said enclosure when in one predetermined position and said cover is closed, means for opening the cricuit between said contacts in said enclosure by opening said cover, indicating means for said fuse mounted within said enclosure on said member including an indicating circuit so as to indicate outside of said enclosure the condition of said fuse when in said one predetermined position, and means for connecting said indicating circuit across said fuse terminals without interfering with the ready removal and replacement of said fuse, comprising a fuse support at each end of said fuse each provided with a member biased into electrical engagement with said fuse terminals.

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