

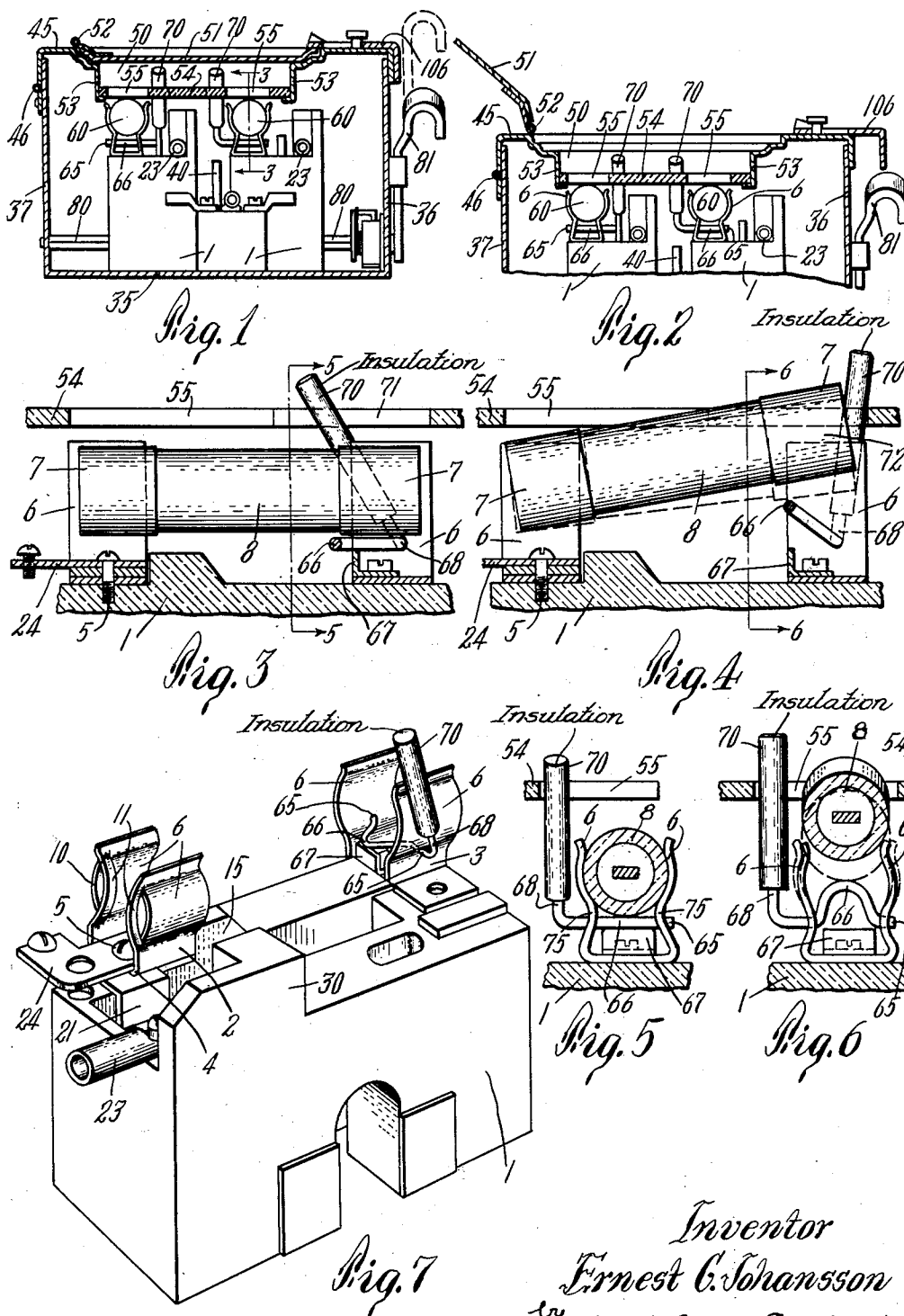
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FUSE MECHANISM

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FUSE MECHANISM

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When enclosed fuse switches are employed it is important, particularly when operation of the switch is liable to be effected by persons not highly skilled in the handling of electrical mechanisms, that the fuses shall be accessible for inspection and replacement but only when they are disconnected from live conductors and that the conductors be not readily accessible to unauthorized persons.

In order to protect the live conductors from ready access, barrier means may be positioned between them and the accessible fuse or fuse portion. This means may be in the nature of a relatively small protecting enclosure or receptacle wherein the fuse may be made accessible. This enclosure or receptacle may be provided with a suitable cover, and some sort of interlock between means for securing the cover shut and the switch actuating means may be provided, whereby the cover closes off the receptacle and prevents access to the fuse when the switch is closed and the fuse terminal may be alive, but which permits opening of the cover when the switch is open. While the fuse should not be accessible to unauthorized persons except when disconnected from live terminals, it should be possible for an authorized person to obtain access to the fuse, switch and terminals when the switch is either open or closed, so that the switch may be actuated while accessible so that proper inspection may be made of its operating parts. It is also important that when a fuse is carrying current it be positioned where it may radiate heat freely, as it is found that if it be enclosed within a relatively small chamber where such radiation is limited it becomes hot after a period of service and is liable to blow after a time under less than rated current flow.

The present invention, which covers matter divided from my application Serial No. 504,762, filed December 26, 1930 for Switch and fuse mechanism, relates to means for ejecting a fuse of the cartridge type from one of its holding jaws or clips, and which when used in an enclosed fused switch of the type hereinbefore mentioned may also project this end through a barrier which hinders access to conductors in the relatively large switch enclosure which may be alive into the small protecting enclosure or receptacle wherein it may be made accessible so that the fuse may be removed or replaced without the use of tools.

For a more complete understanding of this invention, reference may be had to the accompanying drawing in which

Figure 1 is a cross section through the casing with the parts at operative position.

Figure 2 is a fragmentary section similar to a portion of Figure 1 but showing the cover open to render the fuse and its ejecting device accessible.

Figure 3 is a detail section to a larger scale on line 3—3 of Figure 1.

Figure 4 is a view similar to a portion of Figure 3, but showing the fuse end ejected.

Figures 5 and 6 are detail sections on the correspondingly numbered section lines of Figures 3 and 4, respectively.

Figure 7 is a perspective of a fuse block.

Referring to the drawing, at 1 is shown insulating blocks which carry switch and fuse parts. The fuse parts, as shown best in Figure 7, comprise spaced clips 2 and 3. Each of these clips comprises a base 4 which is secured to the upper face of the block 1 in any suitable manner such as by a screw 5, and upstanding therefrom are jaws 6 spaced to receive therebetween the terminals 7 of a cartridge type fuse 8. If desired one or both of the fuse clips may have the outer edge portion of each of the jaws provided with a slit 10, the material outwardly of the slit being bowed inwardly as shown at 11 to form a stop to limit endwise movement of the fuse. This is of particular utility when the block 1 is so mounted in service that the fuse is in substantially a vertical position.

The block 1 is shown as provided with a slot 15 within which may ride a switch arm (not shown) cooperating with a fixed terminal 21 in electrical connection with a fuse clip as 2 and another fixed terminal (not shown) in electrical connection with a terminal such as 23. The fuse clip 2 is likewise in electrical connection with a terminal 24, these parts together constituting the terminal connection for the fuse. The switch arm may be carried by a rock shaft 80 which is actuated by a handle 81.

The terminal 23 is partially surrounded by an angular wall portion 30 of the block 1 which forms a barrier obstructing access thereto. Two of these blocks 1 with the switch terminals are shown as placed side by side and secured to the base portion 35 of an enclosing casing having side walls 36 and 37. While two of these blocks are shown, one or more might be employed, depending on the particular type of circuit being controlled, two being suitable for a three-wire circuit with a grounded neutral, in connection with which this invention will be more particularly described. It should be understood, however, that the number of blocks will depend on the type of circuit which

is to be controlled. Between the two blocks are shown a barrier 40 of insulation.

The top of the casing or enclosure is formed by a main cover 45 hinged at one side as at 46 to the side wall 37 and having a marginal flange extending about the sides and ends of the enclosure when the main cover is closed. This main cover is shown as provided with an opening 50 which may be closed by means of a supplemental cover 51 hinged to the main cover as at 52. Carried on the inside of the main cover about the opening 50, are inwardly projecting wall portions 53 supporting a base plate 54 of insulating material which forms with the wall portions 53, a shallow box portion which may be closed by the supplemental cover 51. Through the base member 54 are openings 55 positioned immediately above the fuse clips 2 and 3 and of a size just sufficient so that a fuse 60 may be inserted through each opening 55 into engagement with the clips or removed from the clips therethrough. The base 54 forms an apertured barrier which obstructs free access to the switch and the various conductors within the main enclosure but is spaced above the fuses 60 so that these fuses when in engagement with their clips are within the relatively large main enclosure wherein the switches are carried where they may radiate heat freely, since the entire body of air within the enclosure may circulate thereabout but they may be inspected through the openings 55 while in operative position, when the door 51 is open though these openings are too small to permit access of the fingers therethrough for removal of the fuse from the enclosure. At 106 is shown a slidable latch plate for securing or releasing the cover 51 which, as more fully explained in the parent application, cooperates with the switch actuating handle 31 to prevent the cover 51 from being opened except when the switch is open and to prevent closing of the switch while the cover is open. The main cover 45 is intended to be sealed closed.

Provision is made, in accordance with this invention, so that when desired, each fuse may be projected outwardly through its opening 55 sufficiently so that it may be grasped and removed and this without the use of tools. To this end one of the clips such as the clip 3 may be provided with fuse ejecting mechanism. As shown best in Figures 3 to 7 this mechanism comprises a rod 65 journaled in opposite jaw portions 6 on an axis transverse to the fuse and having between these jaw portions an offset portion 66 eccentrically disposed to the journals. When the fuse is in position between the jaws this offset portion may rest upon the upper edge of an angle stop member 67 beneath the fuse, as shown best in Figure 3. Outwardly of one of the jaws 6 the rod 65 is bent to form a handle portion 68 which is preferably enclosed with insulation as at 70. This handle portion extends outwardly through a laterally extended portion 71 of the slot 55 into the shallow box portion back of the supplemental cover 51 where it may be grasped by the fingers. By pressing the handle 68 in the proper direction, as shown in Figure 4, the offset portion 66 is pressed against the fuse terminal 72 and by exerting pressure on the handle 68 this fuse terminal may be forcibly ejected as shown best in Figures 4 and 6 so that it projects through the barrier 54 where it can be grasped by the fingers sufficiently so that the entire fuse may be removed from between its clips. Since the handle 68 is movable longitudinally of the fuse it does not interfere with adjacent laterally positioned fuses, it being usual practice

to mount a plurality of fuses side by side, and it is maintained substantially within the endwise limits of the fuse-holding means. By freeing one end only of the fuse by the ejecting means the fuse is held against falling out of the enclosure onto the floor but in position where it can be removed readily by the fingers.

The rod 65, as shown best in Figures 5 and 6, may be journaled in the jaws 6 slightly below a portion 75 of each, these portions 75 being spaced a distance less than where the rod 65 is journaled, and the maximum width of the offset portion 66 may be greater than the normal spacing of the portions 75 so that as the handle 68 is turned these more widely spaced portions of the rod 65 wedge in between the portions 75 and spread the jaws 6 thus to facilitate ejection of the fuse.

From the foregoing description of an embodiment of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:—

1. In combination, an enclosure defining a relatively large compartment and including an apertured wall, a fuse normally within said compartment opposite to said aperture and subject to free circulation of the air in said compartment therearound, said compartment being of sufficient size to permit free heat radiation from said fuse and said aperture being of sufficient size to permit said fuse to be passed therethrough but sufficiently small to cause said fuse to be inaccessible for removal by the fingers therethrough, and means actuable to project a portion of said fuse through said aperture to be accessible to the fingers for removal of said fuse.

2. In combination, an enclosure, a pair of spaced fused clips within said enclosure for supporting a cartridge fuse, said enclosure being substantially larger than said fuse and providing for free circulation of air in said compartment therearound to provide heat radiation therefrom and having an opening through which said fuse may be inspected while held by said jaws but too small for access to said fuse by the fingers for removal from said enclosure, and means actuable to project said fuse outwardly for access outside of said enclosure.

3. In combination, a support, a fuse clip fixed to said support and having a pair of spaced jaws for resilient holding engagement with opposite portions of a fuse terminal, a rod journaled in said jaws and provided with an offset portion between said jaws, one end of said rod being turned outwardly from said support to form an actuating handle for turning said rod, said offset portion being positioned to engage and eject said fuse terminal from between said jaws on rocking of said actuating handle in one direction.

4. In combination, a support, a fuse clip fixed to said support and having a pair of spaced jaws for resilient holding engagement with opposite portions of a fuse terminal, a rod journaled in said jaws and provided with an offset portion between said jaws, one end of said rod being turned outwardly from said support to form an actuating handle for turning said rod, said offset portion being positioned to engage and eject said fuse terminal from between said jaws on rocking of said actuating handle in one direction, said offset portion engaging the inner faces of said jaws as it is being turned to ejecting

position and spreading said jaws to facilitate such ejection.

5. In combination, a support, a fuse clip fixed to said support and having a pair of spaced jaws for resilient holding engagement with opposite portions of a fuse terminal, said jaws having opposed portions above their lower ends normally closer together than said ends, a rod journaled in said jaws below said more closely positioned portions and having an intermediate part between said jaws eccentrically disposed and of a maximum width greater than the spacing between said more closely positioned portions to engage and spread said jaws as said rod is turned, said rod having a handle portion arranged at an angle to its journal portions and by which it may be turned.

6. In combination, an enclosure defining a relatively large compartment, a plurality of fuses normally within said compartment and freely exposed to air circulating in said compartment, said enclosure having openings therethrough of sufficient size to permit the passage of said fuses but insufficient to permit access by the fingers for the removal of a fuse from the compartment, and means for selectively projecting a portion of any fuse from said compartment in position to be accessible for removal therefrom.

7. In combination, an enclosure defining a relatively large compartment having a door, a plurality of cartridge fuses having supporting means within the compartment, a barrier inwardly of said door having openings through which said fuses are visible when said door is open but sufficiently small to prevent access to said fuses for removal by the fingers, said barrier being spaced from said holding means to permit free circulation of air in said compartment about said fuse and accessible means in-

dividual to each fuse manually operable to project a portion of said fuse from one of its supports to an accessible position outwardly of said barrier where it may be grasped by the fingers for its removal from the enclosure.

8. In combination, means for holding a cartridge fuse, an element movable longitudinally of said fuse and substantially within the endwise limits of said holding means, and connections from said element acting to free a portion of a fuse by lateral movement from said holding means by movement of said element in one direction.

9. In combination, an enclosure, a pair of spaced fuse clips within said enclosure for supporting a cartridge fuse within said enclosure, said enclosure having a wall member provided with an aperture of a size just sufficient to permit the insertion of a fuse into engagement with said fuse clips therethrough, said wall member acting as a barrier preventing free access to the interior of said enclosure and removal of said fuse from said clips by the fingers, a support for said clips spaced inwardly of said wall member to permit free circulation of air in said enclosure about said fuse and means accessible for actuation outside of said enclosure actuable to eject a portion of said fuse through said opening to permit said fuse to be grasped by the fingers and to be completely removed from within said enclosure.

10. A cartridge fuse holder and ejector comprising a clip having opposite side portions for gripping the sides of a cartridge, a U-shaped member below the cartridge having laterally projecting ends pivotally engaging said side portions and an operating extension on said member forming a lever for rotating it.

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