Feb. 16, 1954 J. S. FERGUSON 2,669,624

SAFETY SWITCH AND FUSE CONSTRUCTION

Filed July 24, 1952

2 Sheets-Sheet 1

FIG. 1

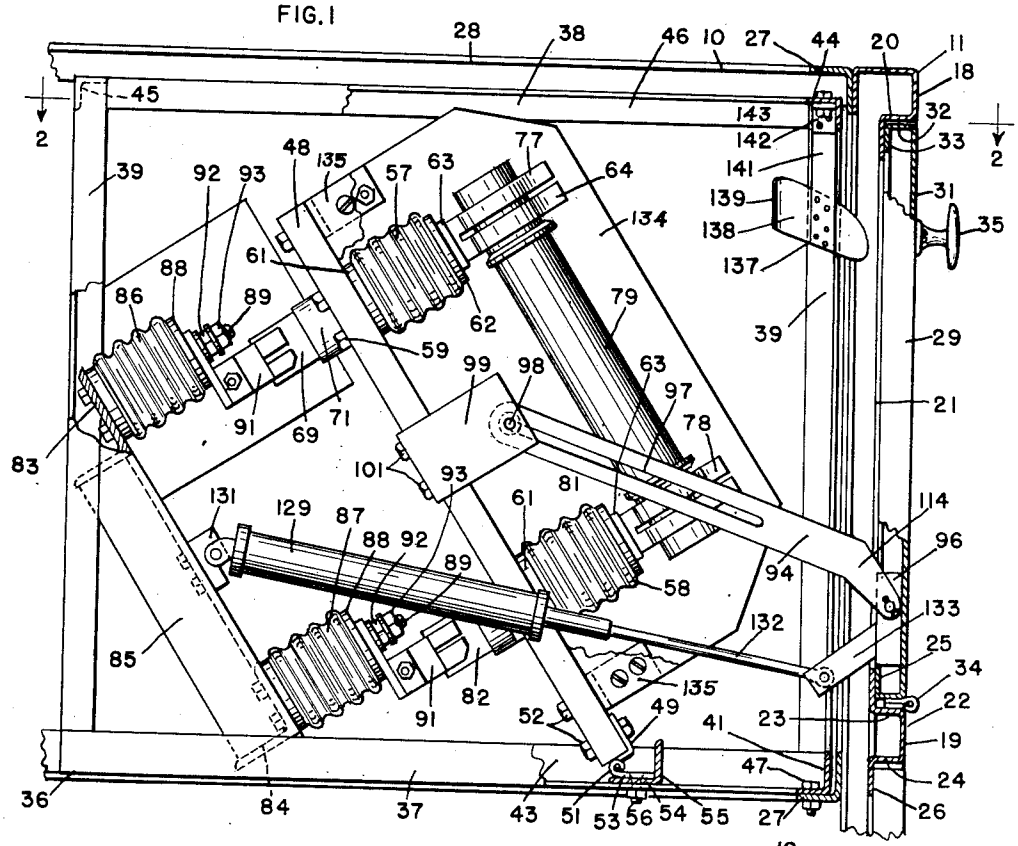
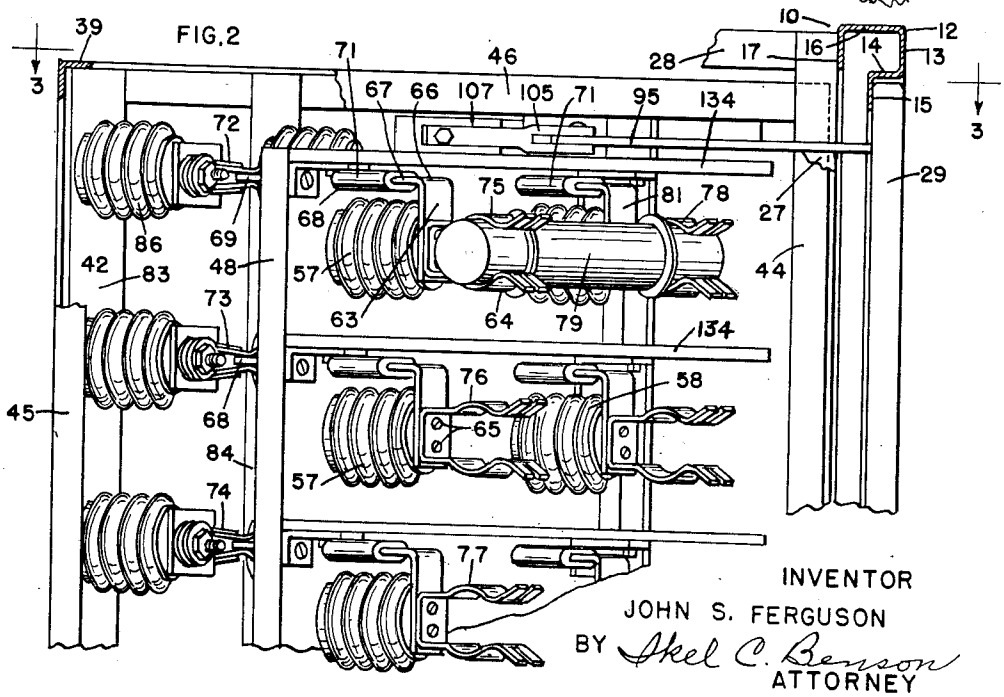


FIG. 2



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2 Sheets-Sheet 2

FIG. 3

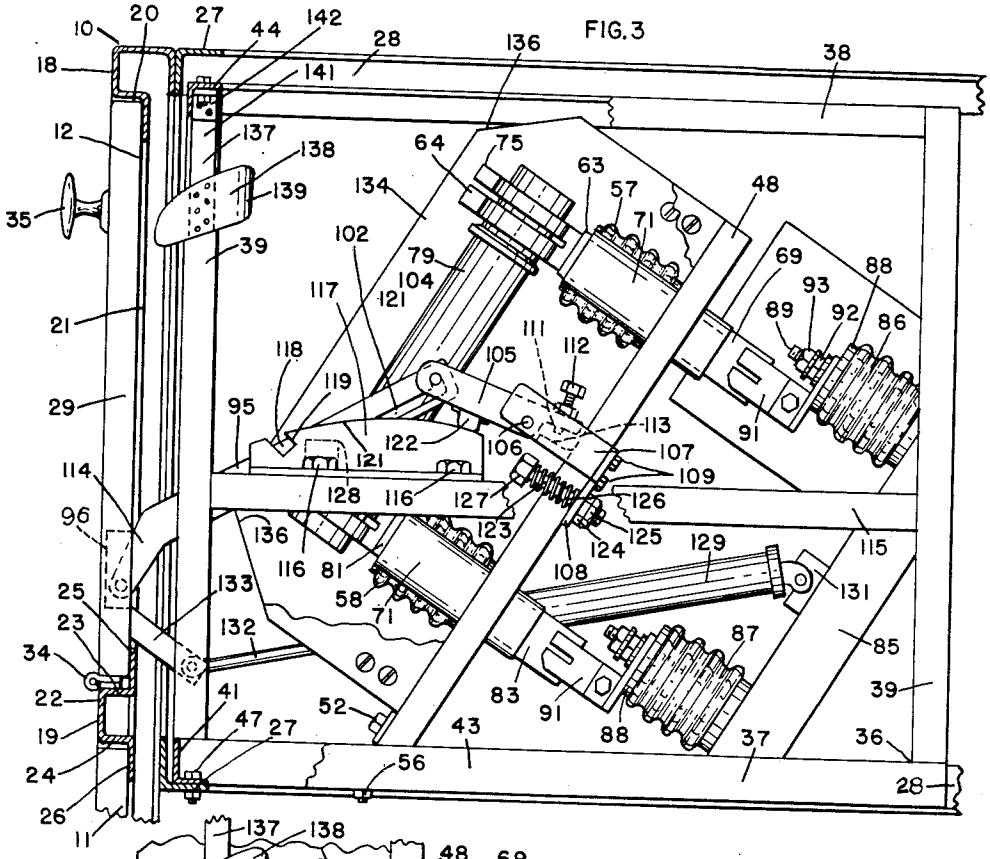
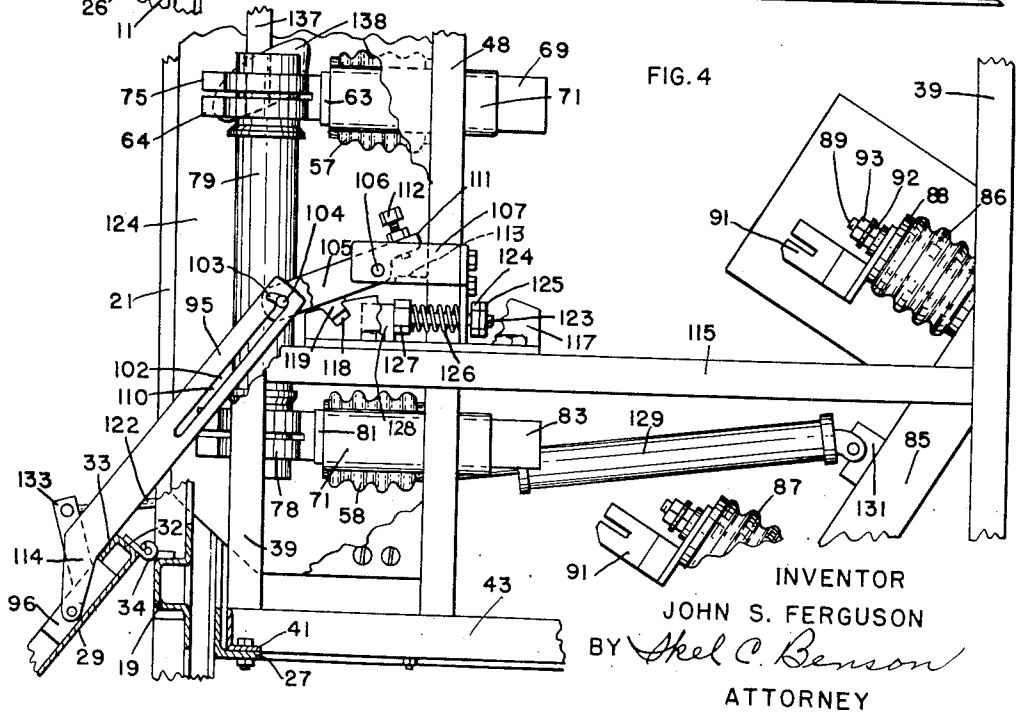


FIG. 4



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UNITED STATES PATENT OFFICE

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SAFETY SWITCH AND FUSE CONSTRUCTION

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Application July 24, 1952, Serial No. 300,736

15 Claims. (Cl. 200—114)

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The herein disclosed invention relates to safety switch and fuse construction and has for an object to provide a construction in which the fuse is disposed within an enclosure having an access opening closed by a door and in which the fuse may be disconnected from the circuit with which it is used upon opening the door.

Another object of the invention resides in providing a fuse carrier mounted within the enclosure and carrying a fuse and in providing the switch with a fuse contact connected to the fuse and movable with the carrier having a terminal contact connected to a terminal of the circuit with which the fuse is used and fixed relative to the enclosure, said carrier being pivoted to a part of said enclosure and having an area sufficient to cause said carrier to close the access opening when the door and switch are in open position and being adapted to bring the fuse contact of the switch into engagement with the terminal contact when the door is in closed position.

A still further object of the invention resides in providing a construction whereby the fuse carrier is moved by movement of the door and in which the door may be moved independently of the fuse carrier to permit closing the door while the fuse carrier is in either position.

Another object of the invention resides in providing a grounding device operable to ground the fuse contact of the carrier when the carrier is moved into position to close the access opening.

An object of the invention resides in providing locking means for locking the carrier in open position of the switch when the door is fully open.

Another object of the invention resides in providing a link pivoted to the door and having a bayonet slot therein formed with a longitudinal portion and an offset portion and in providing a part movable with the carrier with a pintle movable in said slot.

Another object of the invention resides in providing a link pivoted to a part fixed relative to the carrier and having a latch lug adapted to cooperate with a shoulder formed on a track along which said lug rides for the purpose of locking the carrier in open position.

An object of the invention resides in providing an arm pivoted to the door and having a longitudinally extending slot in which a pintle carried by the link may slide, whereby the carrier may be moved to open position and along which the pintle may slide upon closing of the door.

An object of the invention resides in providing

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an arm pivoted to a part carried by said carrier and carrying said pintle, and in providing stop means between said arm and part for limiting the swinging movement of said arm.

A still further object of the invention resides in forming on said arm a latch lug and in providing a guide carried by the enclosure along which said lug travels and in further forming said guide with a notch providing a shoulder against which said lug may abut to restrain movement of said closure.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the drawings:

Fig. 1 is a side elevational view of a safety switch and fuse construction illustrating an embodiment of the invention with the door closed.

Fig. 2 is a plan sectional view of the structure shown in Fig. 1 and taken on line 2—2 of Fig. 1.

Fig. 3 is an elevational sectional view looking from the opposite side and taken on line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 3 showing the door in open position.

In the drawings a safety switch and fuse construction has been shown which includes a framework forming part of the control apparatus of an electric power system with which the invention is to be used. This construction embodies an enclosure forming part of the control apparatus and including a panel forming a part of the switchboard of the control apparatus. Within this enclosure is mounted a switch and a fuse carrier pivoted to the enclosure. This carrier has movable switch contacts cooperating with fixed switch contacts carried by the enclosure and connected to suitable terminals of the electric line being fused. The carrier supports fuse clips connected to the movable contacts which serve as a fuse holder for supporting fuses. A door is hingedly connected to the enclosure and has pivotally connected to it a link having a slot therein and receiving a pintle attached to an arm pivoted to a part fixed relative to the carrier. When the pin reaches the outer end of said slot the opening of the door procures swinging of the carrier and disengagement of the movable switch contact from the switch contacts, thus deenergizing the fuse circuits and removing voltage from the fuses. The slot in the pivoted link is of the type known as a "bayonet" slot and has a longitudinal portion along which the pintle may slide permitting the door to be

closed while the carrier is in switch-opening position. The said slot further has an offset portion in which the pintle may be disposed and by means of which the carrier may be moved into switch-closing position. The arm on which the pintle is mounted has formed on it a latch lug which rides along a guide having a notch providing a shoulder against which the latch lug may abut when the carrier is in switch-opening position and which serves to maintain the carrier in such position while the fuses are being examined or replaced. The carrier is constructed of a plate of insulating material which has an area sufficient to substantially close the opening through the closure and obstruct access to the live parts of the electric power system. A shorting device carried by the enclosure engages the fuse clips and grounds the same when the fuse carrier is in switch opening position.

The invention is used as part of a control apparatus for controlling and indicating the conditions of a power system or any other system in which electrical circuits are to be fused. A portion of such apparatus has been shown in the drawings and consists of a main framework 11 forming part of a switchboard indicated in its entirety by the reference numeral 10. This framework 11 consists of stiles 12 which are arranged at spaced intervals and which are preferably constructed of sheet metal formed in the desired shape. The said stiles have faces 13 constructed with offsets 14 from which issue flanges 15 disposed inwardly of the said faces. The said stiles have legs 16 extending inwardly from the faces 13 and from which flanges 17 issue which are parallel to the faces 13. These stiles of the switchboard are connected together by means of headers 18 similarly constructed and which are formed in the same manner. In addition, rails 19 are provided which are also connected to said stiles. These rails are also constructed of sheet metal and are bent to form faces 22 with legs 23 and 24 extending inwardly therefrom and from which flanges 25 and 26 issue. The flanges 25 lie in continuation of the flanges 15 of the stiles 12 and the flanges 17 of the said stiles lie in the plane of the corresponding flanges of the header 18 and form a rabbet 29 extending about the access opening 21. These stiles, headers and rails provide sections in the switchboard having access openings 21 and through which the parts disposed within the same are accessible. Attached to the flanges 17 are angle frame members 27 which are disposed rearwardly of the rails 19 and other frame members 28 which are connected into and which extend rearwardly from the frame members 27. This construction forming no particular part of the invention, has not been shown in its entirety, and it is to be understood that any suitable construction such as now employed for the purpose may be used for supporting the invention and for forming the enclosure thereof.

The access opening 21 in the main framework 11 is closed by means of a door 29, best shown in detail in Fig. 1, which is received in the rabbet 29. This door is constructed from sheet metal and has a panel 31 with walls 32 bent inwardly therefrom. From these walls issue flanges 33 which lie in a common plane and which are adapted to overlie the flanges 25 of the rail 19 and the flanges 15 of the stiles 12 and the header 18. The door 29 is hingedly supported by means of hinges 34 which are secured to leg 23 of rail 19 and to the lowermost of the walls 32 of said door. The door 29 is adapted to swing from closing position, as shown in Fig. 3, to a fully open position, as shown in Fig. 4, and may be manipulated by means of a handle 35 secured to the panel 31. A suitable lock, not shown in the drawings, may also be incorporated if desired.

The switch and fuse construction, forming the dominant portion of the invention, is mounted on a switch and fuse framework 36. This framework consists of a lower frame 37 and an upper frame 38 connected together by means of uprights 39. The lower frame 37 consists of a front angle frame member 41, a rear angle frame member 42, and side angle frame members 43. All of these frame members are welded together and to the uprights 39. The upper frame 38 is similarly constructed with front angle frame members 44, a rear angle frame member 45, and side angle frame members 46. All of these frame members are welded to the upper ends of the uprights 39. The framework 36 is supported through the lower frame 37 which rests on the angle frame member 27 of the main framework 11 and which is attached thereto by means of bolts 47. The framework 36 is further supported on other supports not shown in the drawings but forming part of the main framework 11.

The invention utilizes a fuse carrier 48 which is constructed from a slab of insulating material and which is of an area commensurate with the area of the access opening 21. This carrier has attached to it at its lower end one leaf 49 of a hinge 51 which hinge extends throughout the length of said carrier. Bolts 52 extending through the said carrier and hinge leaf attach the hinge to the carrier. In a similar manner the other hinge leaf 53 of said hinge is secured to one of the flanges 54 of an angle frame member 55 by means of bolts 56. Frame member 55 is mounted on and attached to the lower frame 37 by welding or otherwise. By means of this construction the carrier 48 may move from switch-closing position as illustrated in Figs. 1 and 3 to switch-opening position as shown in Fig. 4.

The particular switch and fuse construction illustrated in the drawings has been designed for a three-wire power line and three switches 72, 73 and 74 together with the corresponding fuse holders 75, 76 and 77 have been shown. These switches and fuses are similar in construction so that only the switch 72 and fuse holder 75 will be described in detail.

The fuse holder 75 is supported on two insulators 57 and 58 which have mounting plates 61 and 62 at the ends of the same. These insulators are attached to the carrier 48 by means of cap screws 59 extending through said carrier and screwed into the mounting plates 61. Overlying the mounting plate 62 of insulator 57 is a bar 63 of conducting material. Overlying this bar is a fuse clip 64 best shown in Fig. 2. Screws 65 extend through said clip and said bar and are screwed into the mounting plate 62 and thus attach said bar and clip to the insulator. The bar 63 is formed with a bend 66 to provide a leg 67 issuing angularly therefrom. This leg passes through a hole 68 in the carrier 48 and the end of the same forms a switch blade designated by the reference character 69. A sleeve 71 of insulating material encircles the leg 67 and further insulates said leg and the blade 69 from the carrier and adjoining objects. Attached to the insulator 58 is another fuse clip 78 which together with the fuse clip 64 supports a cartridge fuse 79 in the customary manner. The insulator 58, similar to the insulator 57, has attached to it a bar

81 which is bent and formed with a switch blade 82 similar to the switch blade 69. This switch blade is insulated in the same manner as the switch blade 69.

To prevent flash-over between the various fuse holders, a number of barriers 134 are employed which are constructed of insulating material and which extend outwardly from the carrier 48. These barriers are attached to the said carrier by means of clip angles 135. The corners of the said barriers are cut away as indicated at 136 to cause the barriers to clear the framework 36 and to confine movement of said barriers to the space within said framework. These barriers are located one between each fuse and one at each end of the carrier.

The switch 72 is supported on two angle frame members 83 and 84 connected together by means of outwardly inclined angle frame members 85. All of these frame members are welded to the frame 37 and to the uprights 39. Attached to the angle frame members 83 and 84 are insulators 86 and 87 which are secured in the same manner as the insulators 57 and 58. The manner of attachment is best shown in Fig. 1 in conjunction with the insulators for the switch 74. The insulators 86 and 87 have mounting plates 88 at the outer ends of the same similar to the mounting plates 62 and 81 and from which issue studs 89. Mounted on the studs are switch jaws 91 which are adapted to receive the blades 69 and 82. These jaws are held in place upon the studs 89 by means of nuts 92 and lock nuts 93. It will readily be comprehended that when the carrier 48 is moved from the position shown in Fig. 4 to that shown in Fig. 3 that the blades 69 and 82 are brought into engagement with the jaws 91 and the fuse 79 connected in the circuit, and that when the carrier is moved to the position shown in Fig. 4 the blades are disconnected from the switch jaws and the fuse is isolated from the circuit.

For moving the carrier 48 two links 94 and 95 are employed. These links are pivoted to lugs 96 which are secured to the panel 31 of door 29 by welding or in any other suitable manner. The link 94 has a slot 97 in it which receives a pin 98 attached to an angle bracket 99 which is secured to the carrier 48 by means of bolts 101. The pin 98 can slide in the slot 97 so that the door 29 can be closed whether the carrier 48 is in switch-opening or switch-closing position. The link 95 is similarly constructed and is best shown in Fig. 4. This link has a longitudinally extending slot 102 which is bayonet in form and is provided with a longitudinal portion 110 and an offset portion 103. A pin 104 extending through an arm 105 is received in the slot 102 and may ride along the longitudinal portion 110 or enter the offset portion 103. This arm is pivoted by means of a pintle 106 to a bracket 107 secured to a plate 108 by means of cap screws 109. Plate 108 is in turn secured to the carrier 48 by bolts not shown. The bracket 107 is bifurcated at its end as best shown in Fig. 3 to receive the arm 105 therebetween. Arm 105 has a finger 111 extending outwardly therefrom and which is tapped to receive an adjusting screw 112. This screw may engage a lug 113 formed on the bracket 107 whereby the swinging of the arm 105 in an upward direction is restrained. The link 95 and the link 94 operate in unison to disengage the switch blades 69 and 82 from the jaws 91 and to permit of opening the switches when the door 29 is moved to the position shown in Fig. 4. It will be noted that both

of the links 94 and 95 are constructed with offsets 114 which cause the said links to engage the flanges 33 of the door 29 and to limit swinging movement of the door relative to said links.

Extending across the uprights 39 of the framework 36 adjacent the link 94 is an angle cross frame member 115. This frame member is welded to said uprights and has attached to it by means of bolts 116 an arcuate guide 117. This guide is constructed with a notch 118 best shown in Fig. 3 and which forms a shoulder 119 facing outwardly of the guide. The guide 117 has an arcuate surface 121 which is concentric with the axis of the hinge 51 for the carrier 48. The arm 105 has attached to the underside thereof a latch lug 122 which is adapted to ride on the surface 121 as the carrier 48 swings from one position to the other. When the latch lug 122 reaches the notch 118, it drops into said notch and the shoulder 119 restrains movement of the carrier into switch-closing position.

Extending through the plate 108 is a bolt 123 which is provided with a nut 124 and a lock nut 125. A compression coil spring 126 encircles this bolt and is seated at one end against the plate 108 and at its other end against the head 127 of said bolt. This head is adapted to engage a lug 128 cast on the guide 117 and serves as a bumper for absorbing the shock when the blades 69 and 82 are disengaged from the jaws 91 and the carrier is brought into switch opening position.

For checking the movement of the door 29, a door check 129 is employed which is pivoted to a block 131 secured to one of the angle frame members 85. This door check has a piston rod 132 which is pivoted to a bracket 133 fastened on the door 29. In this manner, slamming the door during either opening or closing operations does not injure the door or the structures controlled thereby.

To further safeguard the operator in the removal of fuses from the fuse holders, a grounding device 137 is used for each fuse holder. This grounding device consists of a contact blade 138 having a curved leading edge 139. The said blade is supported on a flexible hanger 141 which is secured to a clip 142. Clip 142 is mounted on an angle cross frame member 143 which is attached to the upper frame 38 of the framework 36. When the carrier 48 is moved into switch-opening position, the clip 64 engages the contact blade 138 and the same are grounded through the framework 36 and the main framework 11.

The method of operation of the invention is as follows:

Assume that the door 29 is closed as shown in Figs. 1 and 3 and that the switches 72, 73 and 74 are in closed position. Pins 98 and 104 are at the ends of the slots 97 and 102 of links 94 and 95. Outward movement of the door 29, hence, causes both of these links to disengage the blades 69 and 82 from the switch jaws 91 and to swing the door to the position shown in Fig. 4. As the carrier 48 is moved forwardly, the lug 122 rides on the surface 121 of guide 117 until it drops into the notch 118. As the said carrier reaches this position, the head 127 of bolt 123 engages lug 128 and the movement of the said carrier is retarded. When the lug 122 is received in slot 118, as shown in Fig. 4, the carrier 48 is restrained from movement. In such position the fuse holders 75, 76 and 77 are completely disconnected from the line and safety to the operator from high voltage is assured. Additionally, the upper clips, namely, the fuse clips

64, engage the contact blade 138 of the grounding device 137 and the safety of the operator is further assured. As the door opens, the check 129 prevents slamming of the door into open position. The links 94 engaging the flange 33 of door 29 at the bottom of the same hold the door in the position shown in Fig. 4. The fuses are now at the front of the opening 21 where the same may be inspected or exchanged as the occasion requires. If, during opening of the door, a flash-over occurs, the same is prevented from injuring the operator due to the barriers 134. The dimensions of the carrier 48 are such that when the said carrier is in switch-opening position, as shown in Fig. 4, the said carrier substantially closes the opening 21 and prevents the operator from accidentally coming in contact with any of the live parts within the interior of the enclosure. At the same time the grounding devices insure that the fuse holders are at ground potential. The weight of the link 94 causes the pin 104 to be received in the offset portion 103 of slot 102. Upon closing of the door the arm 105 is first moved upwardly due to the direction of thrust of the link 94 and lug 122 is disengaged from notch 118. When bolt 112 strikes lugs 113 movement of the arm 105 is terminated and further movement of the door causes carrier 48 to swing about the axis of the hinge 51. The carrier is then moved into position so that the blades 69 of the various fuse holders engage the switch jaws 91 and connect the fuses back into the circuits which they serve. If at any time, it becomes desirable to leave the carrier 48 in switch-opening position, link 94 may be manually raised to disengage the pin 104 from the offset portion 103 of slot 102. As the door is closed, the pin 104 then travels along the longitudinal portion 110 of said slot and the door 29 may be closed without interfering with the carrier in its switch-opening position.

The advantages of the invention are manifest. The structure is foolproof in operation and completely prevents high voltage accidents or hazards to the operator when changing or inspecting the fuses. It becomes impossible for the operator to inject his hand into the interior of the enclosure until after the switches have been opened and fuses disconnected. After the switches are opened, the carrier closes the access opening and the disconnected parts are then accessible for inspection and exchange of fuses. The structure shown is particularly applicable to high-voltage circuits. The switch and fuse construction embodying the invention can be constructed at a nominal expense and will operate indefinitely without requiring attention.

Changes in the specific form of the invention, as herein described, may be made within the scope of what is claimed without departing from the spirit of the invention.

Having described the invention, what is claimed as new and desired to be protected by Letters Patent is:

1. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier separate from said door disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, said carrier being of substantially the same area as the area of said access opening and serving to close said opening when the fuse contact is disconnected from the terminal contact, and linkage between said fuse carrier and door, said linkage bringing said carrier into closing position when the door is in open position.

2. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier separate from said door including a plate disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, said plate being of substantially the same area as the area of said access opening and serving to close said opening when the fuse contact is disconnected from the terminal contact, and linkage between said fuse carrier and door, said linkage bringing said carrier into closing position when the door is in open position.

3. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, said carrier being of substantially the same area as the area of said access opening and serving to close said opening when the fuse contact is disconnected from the terminal contact, a link pivoted to a part carried by said door and extending inwardly thereof, connecting means between said link and fuse carrier, said link being adapted to occupy two positions relative to said connecting means, said link in one position being restrained from movement in the direction of its length relative to said fuse carrier to cause movement of the fuse carrier upon movement of said door, and in its other position being adapted to move in the direction of its length relative to the carrier to accommodate closing of the door when the fuse carrier is in its outermost position and the contacts are disconnected.

4. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from

said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, said carrier being of substantially the same area as the area of said access opening and serving to close said opening when the fuse contact is disconnected from the terminal contact, a link pivoted to a part carried by said door and extending inwardly of the door, connecting means between said link and fuse carrier, said link being adapted to occupy two positions relative to said connecting means, said link in one position being restrained from movement in the direction of its length relative to said fuse carrier to cause movement of the fuse carrier upon movement of said door, and in its other position being adapted to move in the direction of its length relative to the fuse carrier to accommodate closing of the door when the fuse carrier is in its outermost position and the contacts are disconnected, and locking means acting between said enclosure and carrier and holding said carrier from movement when in its outermost position.

5. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a link pivoted to a part carried by said door and extending inwardly of said door, connecting means between said link and fuse carrier, said link being adapted to occupy two positions relative to said connecting means, said link in one position being restrained from movement in the direction of its length relative to said fuse carrier to cause movement of the fuse carrier upon movement of said door, and in its other position being adapted to move in the direction of its length relative to the fuse carrier to accommodate closing of the door when the fuse carrier is in its outermost position and the contacts are disconnected, guide means carried by said enclosure and engaging a part carried by said link, and lock means carried by said guide means and engageable with a part carried by said fuse carrier and holding the fuse carrier in its outermost position.

6. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a link pivoted to a part carried by said door and extending inwardly thereof, said link being formed with a bayonet slot having a longitudinal portion and an offset portion, a pin carried by the fuse carrier and movable along said slot, said pin when in said offset portion thereof causing movement of the fuse carrier upon movement of the door and when in said longitudinal portion accommodating sliding movement of the link relative to the pin when the fuse carrier is in its outermost position to close the door without causing movement of the carrier.

7. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a link pivoted to a part carried by said door and extending inwardly of said door, said link being formed with a bayonet slot having a longitudinal portion and an offset portion, an arm pivoted to a part carried by said fuse carrier, a pin carried by said arm and extending through said slot, and adapted to be received in either the longitudinal portion of the bayonet slot or the offset portion thereof, a guide, a lug on said arm engaging said guide and movable along the same, said guide having a notch therein near one end into which said lug may enter upon movement of the lug, said notch forming a shoulder restraining movement of said lug and preventing inward movement of said fuse carrier.

8. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a link pivoted to a part carried by said door and extending inwardly of said door, said link being formed with a bayonet slot having a longitudinal portion and an offset portion, an arm pivoted to a part carried by said fuse carrier, a pin carried by said arm and extending through said slot, and adapted to be received in either the longitudinal portion of the bayonet slot or the offset portion thereof, a guide, a lug on said arm engaging said guide and movable along the same, said guide having a notch therein near one end into which said lug may enter upon movement of the lug, said notch forming a shoul-

der restraining movement of said lug and preventing inward movement of said fuse carrier, said link being independently movable relative to said pin when the pin is in said notch to bring the pin into the longitudinal portion of the slot in the link for accommodating movement of the link independently of the fuse carrier to close the door.

9. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier and having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a link pivoted to a part carried by said door and extending inwardly of said door, said link being formed with a bayonet slot having a longitudinal portion and an offset portion, an arm pivoted to a part carried by said fuse carrier, a pin carried by said arm and extending through said slot, and adapted to be received in either the longitudinal portion of the bayonet slot or the offset portion thereof, a guide, a lug on said arm engaging said guide and movable along the same, said guide having a notch therein near one end into which said lug may enter upon movement of the lug, said notch forming a shoulder restraining movement of said lug and preventing inward movement of said fuse carrier and stop means for restraining movement of said arm in one direction relative to said carrier to force said latch lug out of said notch upon initial movement of the door toward closing position.

10. In combination, a grounded enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, said fuse carrier including a fuse clip, a fuse mounted in said clip, said clip having a fuse contact, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, a grounding contact electrically connected to and carried by said enclosure and adapted to make contact with said clip upon disconnection of the fuse contact from the terminal contact, and linkage between said fuse carrier and door, said linkage bringing said carrier into closing position when the door is in open position.

11. In combination, an enclosure having an access opening therein, a door for said opening pivoted to said enclosure near an edge thereof and adapted to swing outwardly from said opening, a fuse carrier disposed inwardly of said opening and pivoted to a part fixed relative to said enclosure and movable toward and from said opening, a fuse carried by said fuse carrier, a fuse contact in contact with said fuse, an electrical terminal disposed inwardly of said access opening and fuse, a terminal contact connected to said terminal and adapted to make contact with the fuse contact when the fuse carrier is in its innermost position and to become disconnected therefrom when the fuse carrier is moved toward said opening, said carrier being of substantially the same area as the area of said access opening and serving to close said opening when the fuse contact is disconnected from the terminal contact, barriers at the sides of said carrier and extending outwardly therefrom toward said opening, and a linkage between said fuse carrier and door, said linkage bringing said carrier into closing position when the closure is in open position.

12. In combination, an enclosure having a vertically disposed access opening, a door extending across said opening, pivot means for said door disposed substantially at the lowermost portion thereof, said door being adapted to swing through an angle greater than 90°, a fuse carrier disposed inwardly of said opening and normally extending in a rearwardly inclined direction with its lower edge disposed rearwardly of said door, pivot means for said carrier disposed substantially at the lowermost edge thereof and having its axis parallel to the axis of the pivot means for the door, and a link connected to said carrier and to said door and to the carrier at a greater distance from the pivot of the same than the distance from the pivot means for the door to the connection between the door and link, whereby the carrier is moved to a substantially vertical position upon the swinging of the door throughout its extent.

13. In combination, an enclosure having an access opening therein, a door for said opening, a pivot for pivoting said door to said enclosure near an edge thereof, said door being adapted to swing outwardly from said opening, a fuse carrier planiform in shape pivoted to said enclosure near said pivot to swing outwardly in the same direction as said door, said carrier being disposed inwardly from said door, a fuse carried by said fuse carrier and mounted on the surface of said carrier facing said door, an electrical terminal disposed within said enclosure, a terminal contact disposed inwardly of said fuse carrier and connected to said terminal, a fuse contact on the other surface of said carrier and normally engaging said terminal contact and linkage between said fuse carrier and door, said linkage serving to swing said carrier toward said access opening to disengage said contacts and move said fuse into accessible position when the door is opened.

14. In combination, an enclosure having an access opening therein and being provided with a supporting structure extending inwardly from an edge of the opening, a door normally closing said opening, a first pivot for said door disposed at said edge of the opening and attached to said door and supporting structure, said pivot guiding said door for outward swinging movement to uncover said opening, a fuse carrier disposed within said enclosure inwardly of said door, a second pivot for said carrier having its axis parallel to the axis of said door and disposed inwardly of said opening, said second pivot being connected to said carrier and supporting structure, a fuse carried by said carrier, a fixed terminal, contact means between said terminal and fuse and adapted to be disconnected upon movement of said carrier in an outward direction, and

linkage between said fuse carrier and door, said linkage serving to swing said carrier toward said access opening to disengage said contacts and move said fuse into accessible position when the door is opened.

15. In combination, an enclosure having an access opening therein, a door for said opening, a first pivot for pivoting said door to said enclosure near an edge thereof, said door being adapted to swing outwardly from said opening, a fuse carrier, a second pivot between said carrier and supporting structure and supporting said carrier to swing outwardly in the same direction as said door, said carrier being disposed inwardly from said door, a fuse carried by said fuse carrier, an electrical terminal disposed within said enclosure, contact means between said terminal and fuse and adapted to be disconnected upon movement

of said carrier in an outward direction, a link between said door and carrier, a third pivot between said carrier and link, a fourth pivot between said door and link, said third pivot being further from the second pivot than the distance between the fourth pivot and the first pivot whereby the door may be moved to a fully-open position while the carrier is being moved a distance sufficient to disengage said contacts.

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