

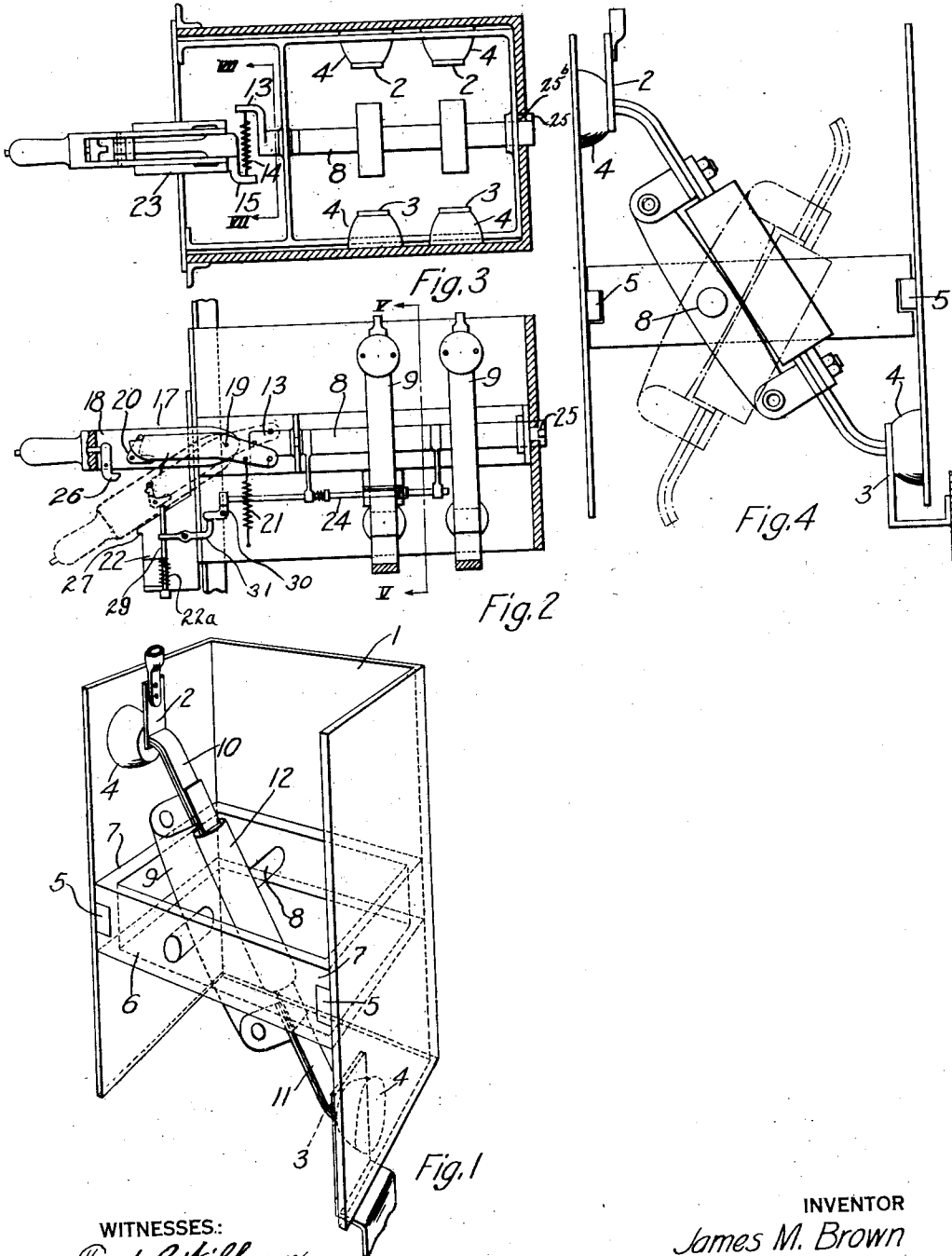
Mar. 13, 1923.

1,448,383

J. M. BROWN
SWITCHING DEVICE

Filed June 17, 1918

2 sheets-sheet 1



WITNESSES:
Fred. C. Wilham
J. A. Procter

INVENTOR
James M. Brown
BY
Wesley C. Carr
ATTORNEY

Mar. 13, 1923.

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2 sheets-sheet 2

Fig. 5

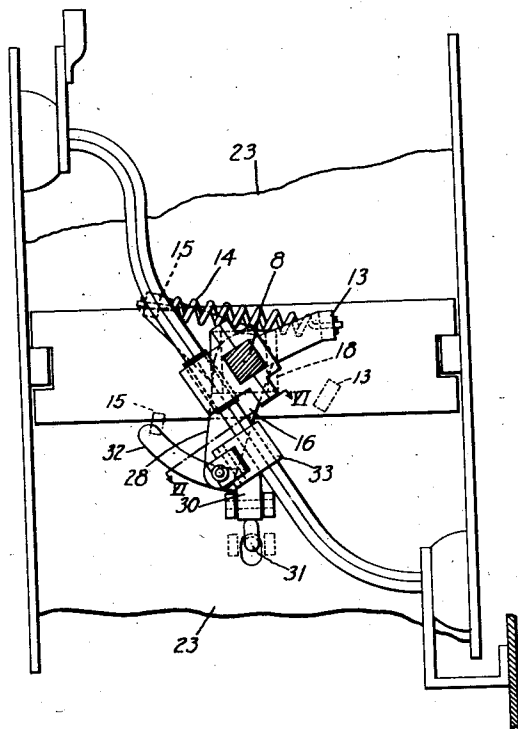


Fig. 6

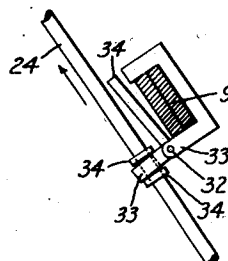


Fig. 7

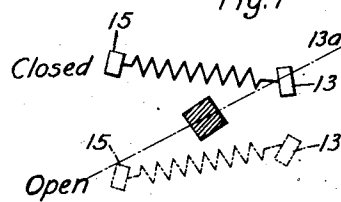
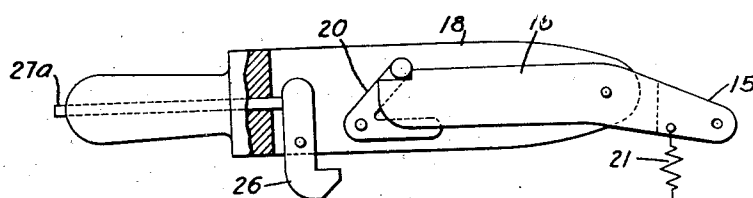


Fig. 8



WITNESSES:

Frederick C. Milharm
J. H. Kending

INVENTOR

James M. Brown

BY

Verley & Co.
ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES M. BROWN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE
ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

SWITCHING DEVICE.

Application filed June 17, 1918. Serial No. 240,316.

To all whom it may concern:

Be it known that I, JAMES M. BROWN, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switching Devices, of which the following is a specification.

My invention relates to switching devices and particularly to switches and circuit interrupters of the safety type.

One object of my invention is to provide a switch that shall have means for easily removing and electrically disconnecting the movable contact members from the switch housing under predetermined conditions.

Another object of my invention is to provide a switching device, of the above indicated character, that shall have fuses that are accessible only when the same are disconnected from the circuit.

A further object of my invention is to provide a device of the above indicated character that shall be simple and inexpensive to construct and effective in its operation.

In practicing my invention, I provide a switch compartment or housing having stationary contact members therein. A movable frame is slidably mounted in the housing and is adapted to support the movable contact members. The frame is adapted to be locked in position so long as the contact members are in engagement, and a means is provided for obtaining quick operation of the movable contact members. The fuses may be mounted on the frame and thus can only be replaced when they are disconnected from the circuit.

Figure 1 of the accompanying drawings is a perspective view of a switching device embodying my invention; Fig. 2 is a side view, partially in elevation and partially in section, of a switch embodying my invention; Fig. 3 is a top plan view of the switch shown in Fig. 2; Fig. 4 is a front elevational view of the switch shown in Fig. 1, Fig. 5 is a transverse section through the switch mechanism and taken on the line V—V of Fig. 2 and looking in the direction of the arrows shown in Figs. 2 and 3, the mechanism

being shown partly in elevation and partly in section; Fig. 6 is a detail view of the overload tripping device used in my invention, the section being taken on the line VI—VI of Fig. 5; Fig. 7 is a view taken along the line VII—VII of Fig. 3 diagrammatically illustrating the relative position of the crank arms, and Fig. 8 is a detail view of the operating handle and latching device shown in Fig. 2 of the drawings.

A compartment or housing 1 is provided with guiding members 5 and stationary contact members 2 and 3 that are insulated from the housing by members 4. A frame 6, having recesses in the sides 7 thereof, is adapted to be slidably mounted on the guiding members 5 and is provided with a rotatable shaft 8. A plurality of members 9 are mounted on the shaft 8 and have attached to the ends thereof leaf spring contact members 10 and 11. Fuses 12 are connected between the respective contact members 10 and 11 and, with the contact members, constitute bridging members that are adapted to engage the stationary contact members 2 and 3.

As illustrated in Figs. 2, 3 and 5, a crank arm 13 is mounted on the shaft 8 and is connected, through a spring 14, to a crank arm 15 at one end of a member 16 of a two-lever operating device 17. The operating device 17 comprises the member 16 and a handle lever member 18 that are pivotally mounted on a pin 19. A latch 20 is mounted on the member 18 for the purpose of holding the members 16 and 18 in latched engagement, under predetermined conditions, and a spring 21 is provided for moving the member 16 when the same is released by reason of the operation of a tripping device 22. The shunt tripping device 22, comprising an electromagnet 22a and an armature rod 29, is mounted on a panel 23 that is supported on the frame 6 and constitutes a closure for the compartment 1.

A projection 25 is mounted at the inner end of the shaft 8 and is adapted to extend through an oblong opening 25a in the rear of the compartment 1. The projection 25

which is smaller than the opening 25a and of similar oblong shape is so disposed with respect to the opening in the compartment 1 that it is permitted to pass through the opening when the shaft 8 is in such position that the contact members 10 and 11 are disengaged from the stationary contact members 2 and 3, respectively.

When the shaft 8 is in such position that the contact members are disengaged, the projection 25 moves to such a position with respect to the opening in the compartment 1 that the frame 6 may be moved relatively to the compartment 1 to permit inspection of the contact members or replacement of the fuses 12.

When the switch is in open position, as illustrated in full lines in Fig. 3, the latch 20 engages the lever 16 and causes that lever to move with the handle 18 when the latter is moved to closed position, indicated in dotted lines in Fig. 3. When the handle is in closed position, the latch 26 engages a projection 27 on the tripping-device bracket and holds the switch in closed position. This latch is normally released by a trip rod 27a which extends through the handle and engages one end of the latch 26.

When the handle is moved from closed position, indicated in full lines in Figs. 3, 5 and 7, the crank arm 15 is moved to the position indicated in dotted lines in the said figures and, when the crank 15 passes the dead-center line 13a, Fig. 7, the switch crank 13 is moved from closed position to the open position, shown in dotted lines, with a snap-action. Closing movement of the crank 15 similarly causes closing movement of the switch crank with a snap-action.

When the switch is in closed position, the latch 20 occupies a position adjacent the free end of the armature rod 29. When the relay coil 22a is energized, the armature trips the latch 20 free of the lever 16, and the spring 21 causes the crank 15 to be moved to open position. The latch 20 may be tripped by a rod 24 that is actuated by an overload or short-circuit current passing through the switch blade 9.

The rod 24 is slidably mounted in brackets 28, which are secured to the shaft 8, and serves to actuate the armature rod 29 through the medium of a bell-crank lever 30 and a lever 31 that are pivoted to the panel 23. The lever 30 is provided with an arcuate wing 32 with which the end of the rod 24 registers, regardless of the position of the switch shaft.

The rod 24 is actuated by means of an electromagnet 33 that surrounds the switch-blade members 9 and which is energized by means of the current passing therethrough. The magnet is provided with a pivoted armature 34 that is hinged at 32 to the magnet, and which is provided with a forked

arm 33 which engages collars 34 secured to the rod 24. When the current passing through the switch members 9 increases, due to an overload or a short circuit, the rod 24 is moved toward the lever 30 and causes it to trip the rod 26 which, in turn, trips the latch 20 and causes the switch to be opened in the manner hereinbefore described.

My invention is not limited to the particular devices illustrated, as it may be variously modified without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. A switching device comprising a switch compartment having guide-ways and stationary contact members therein, a rectangular frame slidable on the guide-ways, movable contact members pivoted in the frame and means for actuating the movable contact members into and out of engagement with the stationary contact members when the frame is in position.

2. A switching device comprising a switch compartment having horizontal guide-ways on the side walls and stationary contact members mounted on opposite side walls of the compartment, a frame slidably mounted on the guide-ways, movable contact members on the frame, means for actuating the movable contact members and means for preventing the movement of the frame unless the contact members are disengaged.

3. Switch mechanism comprising a compartment having vertical rear and side walls, horizontal guide-ways mounted on the side walls, a rectangular frame slidably supported on the guide-ways, contact members on the side walls, a bridging member for the contact members pivotally mounted on the frame and rotatable in a plane transverse to the direction of movement of the frame and means for preventing movement of the frame so long as the bridging member is in engagement with the contact members.

4. Switch mechanism comprising a compartment having vertical rear and side walls, horizontal guide-ways mounted on the side walls, a rectangular frame slidably supported on the guide-ways for movement into and out of the compartment, contact members on the side walls, a bridging member for the contact members, a horizontal operating shaft pivoted to the front and rear portions of the frame, and supporting the bridging member for rotary movement and means for preventing movement of the frame so long as the bridging member is in engagement with the contact members.

5. Switch mechanism comprising a compartment having vertical rear and side walls, horizontal guide-ways mounted on the side walls, a frame having an opening therein and slidably supported on the guide-ways for movement into and out of the compart-

ment, contact members on the side walls, a bridging member for the contact members, a horizontal operating shaft pivoted to the front and rear portions of the frame and supporting the bridging member in the said opening for rotary movement into and out of engagement with the contact members, and means for preventing movement of the frame so long as the bridging member is in engagement with the contact members. 10

In testimony whereof, I have hereunto subscribed my name this 31st day of May, 1918.

JAMES M. BROWN.