E. G. KERMODE.

ELECTRIC SWITCH.

APPLICATION FILED OCT. 10, 1916.

1,366,466.

Patented Jan. 25, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

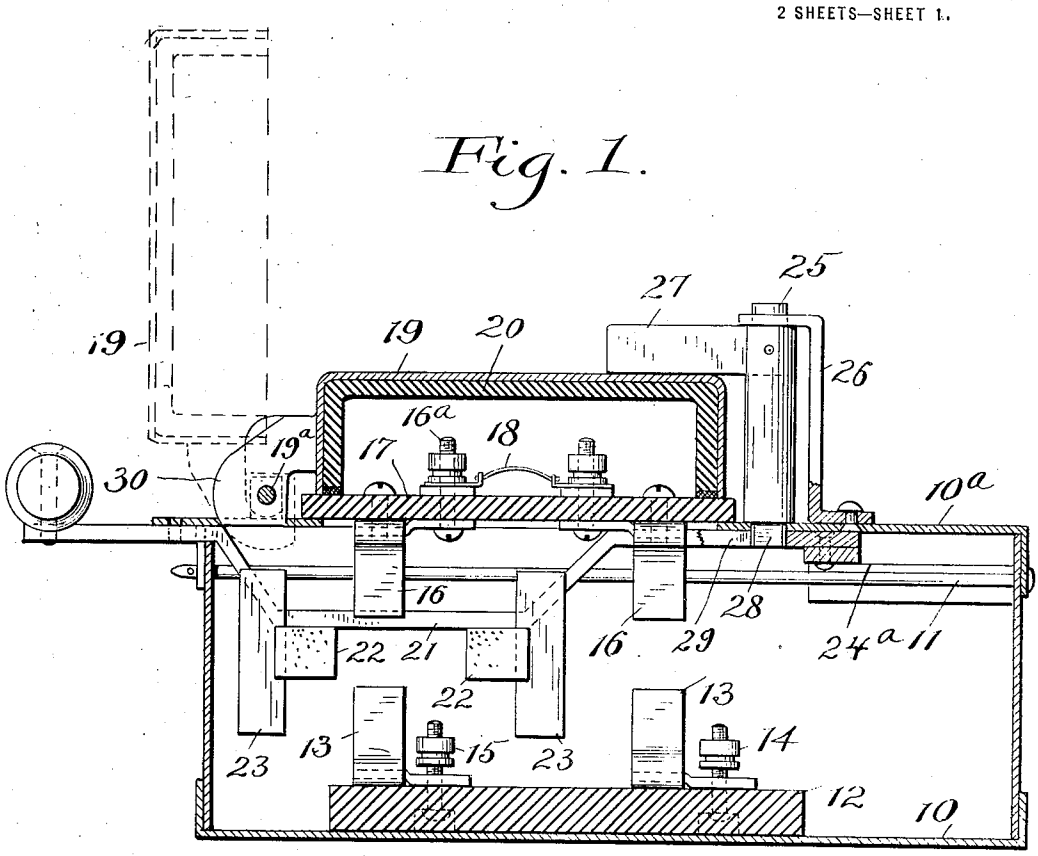
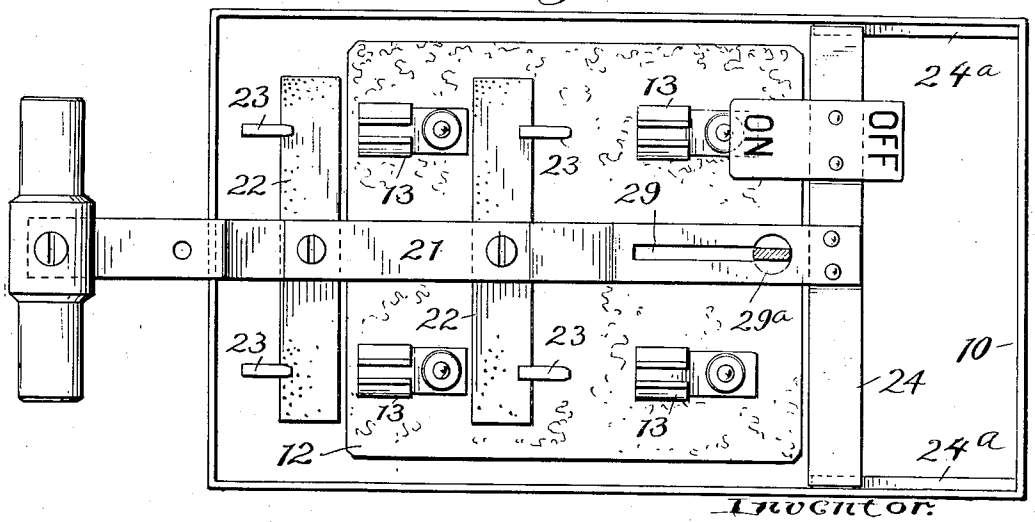


Fig. 2.



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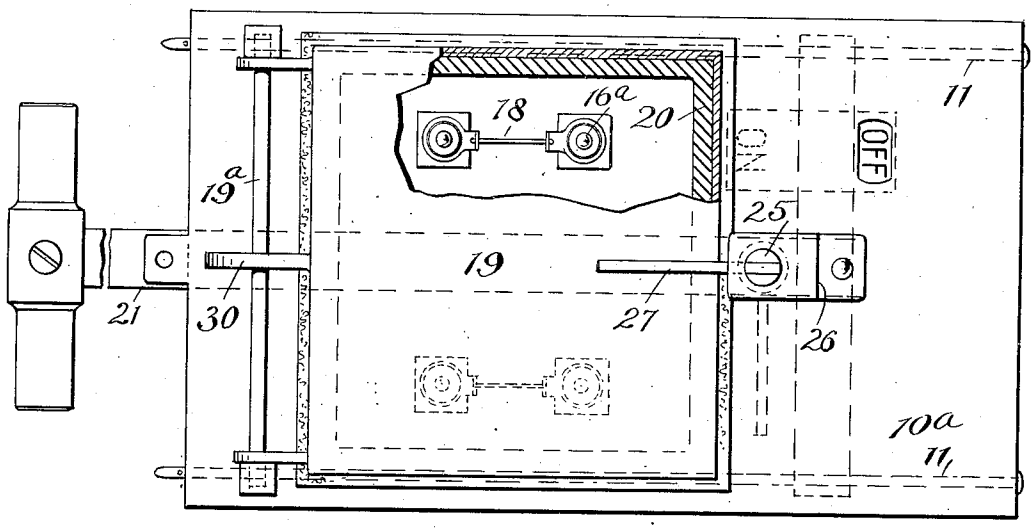
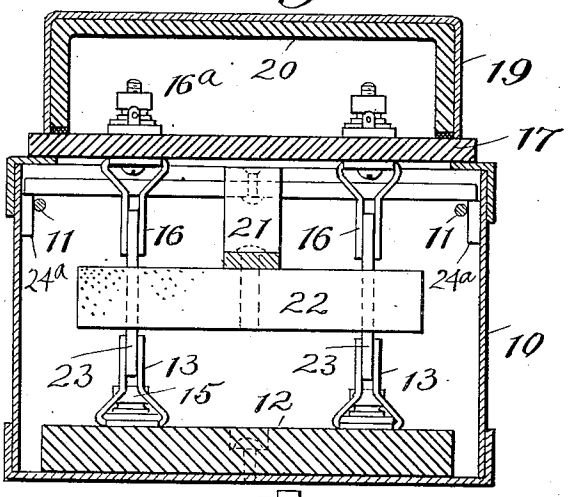


Fig. 3.

Fig. 4.



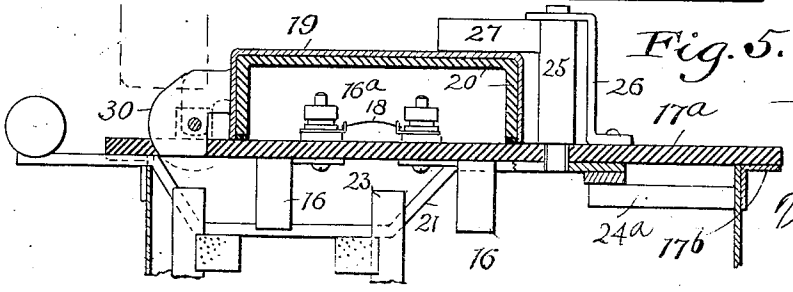


Fig. 5.

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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,366,466. Specification of Letters Patent. Patented Jan. 25, 1921.

Application filed October 10, 1916. Serial No. 124,789.

To all whom it may concern:

Be it known that I, ELMER G. KERMODE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Electric Switches, of which the following is a full, clear, and exact description.

This invention relates to electric switches and particularly to a switch having combined therewith a fuse compartment for one or more fuses.

One of the objects of the invention is to provide a construction including a compartment for the fuses which is adjacent but separate and distinct from the switch compartment, and wherein the fuses are accessible, and also stationary and therefore separate from the movable switch member, but nevertheless directly connected to the contacts of the switch without requiring long connecting conductors between the switch contacts and fuse terminals. Additionally the invention aims to provide a switch having the characteristics above stated, and which is so constructed that it is substantially proof against theft of current, and which is safe in the respect that access cannot be had to live parts of the switch, and at the same time the switch cannot be fused or access had to the fuse compartment unless the switch is in open position, while closure of the switch is prevented unless the fuse compartment is first closed and locked.

The above and additional objects are attained by this invention which may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheets of drawings wherein I have shown the preferred form of my invention, Figure 1 is a longitudinal sectional view through the switch with the switch open, and with the cover or box of the fuse compartment shown in closed position by full lines, and in open position by dotted lines; Fig. 2 is a top plan view of the same with the cover of the switch box removed; Fig. 3 is a similar view with the cover in position; Fig. 4 is a transverse sectional view through the switch; and Fig. 5 is a partial longitudinal sectional view showing a slight modification in the construction of the cover.

The switch includes a switch box 10, which is rectangular in contour and is preferably formed of metal. This box is provided with a cover 10^a which may be secured to the body of the box in any suitable manner, but in this case by pins or rods 11 which extend lengthwise of the box along the sides thereof, and pass through openings in the ends of the box and in flanges which extend downwardly from the cover. The pins are provided with openings through which the wire seals may be passed. I wish to be understood, however, that any other means for locking and sealing the cover 10^a to the box may be employed.

The stationary contacts of the switch include lower contacts which are supported by the bottom of the box, and upper contacts which are supported by the cover. I prefer that there be four stationary contacts for each pole of the switch, arranged in two pairs so as to provide a switch of the four-break type. I prefer also that the switch have at least two poles as illustrated in the drawings.

The lower contacts are secured to a plate 12 of insulating material which is secured to the bottom of the box 10. These contacts which are of the form of spring clips are shown at 13. Two of such clips are provided for each pole, they being spaced a suitable distance apart one in advance of the other, and the two for one pole being spaced laterally a proper distance from the two for the other pole. It will be understood of course that my invention may be embodied in either a single pole switch or a switch of more than two poles. The forward clips 13 are provided with binding posts 14 to which service conductors are designed to be connected, and the rear clips 13 are provided with binding posts 15 to which the load conductors are designed to be connected. The conductors will extend into and from the switch box through openings which may be provided at any suitable points.

The upper stationary contacts which are shown at 16 are similar to the lower contacts 13 and arranged directly above the same, two such contacts being provided for each pole. These contacts 16 are secured to a plate 17 of insulating material carried by the cover 10^a of the switch box. This plate 17 of insulating material in effect constitutes part of the cover, the cover proper having an opening which is at all times closed by

this plate 17. The plate 17 and cover proper 10^a may be permanently fastened together in any desired manner, it being understood that the plate 17 is in no sense removable except when the cover as a whole is removed, and does not constitute a means by which access can be had to the interior of the switch box. As a matter of fact, the insulating plate on which the upper stationary contacts and fuses are mounted may constitute the entire cover of the switch box as shown in Fig. 5, in which event the metal part 10^a shown in Fig. 1 is eliminated. This insulating cover plate 17^a which may be formed of any approved insulating material, such as slate, marble, and the like, will be secured to the body of the switch box and sealed thereto so that it cannot be removed except by one authorized to do so. In this case the upper marginal part of the box is shown as provided with a lateral flange 17^b on which the marginal portions of the plate 17^a rest, and to which the plate may be secured. The other portions of the switch shown on this figure are precisely like those first described and therefore require no further description.

The upper contacts 16 are provided with terminals 16^a which extend upwardly through the plate 17 into the fuse compartment which is separate and entirely closed from the switch compartment in which all the switch contacts are located. These terminals which constitute the fuse terminals are designed to be connected together in pairs by fuses which are shown at 18. It will be understood of course, that any suitable type of fuse may be employed.

The fuse compartment is formed by the insulating base or plate 17 and a rectangular box 19 which is hinged at 19^a and is adapted to be swung upwardly to expose the fuses and to be lowered onto the plate 17 so as to form a tight inclosure for the fuses from which no flash can extend to the switch box in the event the fuses are blown. This box may be and preferably is completely lined with insulating material which is shown at 20. Other features of this fuse compartment, including the manner in which it is locked and unlocked, will be referred to after the description of the movable switch member.

The movable switch member includes a carrier 21 in the form of an endwise movable bar or rod which has sliding connection with the switch box and has a portion midway between its ends bent downwardly, and to this portion is secured two insulating cross pieces 22 to which are secured movable bridging contacts 23. These contacts are in the form of switch blades, two of which are provided for each pole of the switch, and each of which is designed to engage one pair of clips 13, 16, as will be apparent particularly from Fig. 1, so that when the switch is closed the circuit is completed through each pole of the switch from a service conductor connected to a binding post 14, through the lower stationary clip 13, blade 23, upper stationary clip 16, fuse 18, upper stationary clip 16, blade 23, lower stationary clip 13 and binding post 15 to a load conductor, and when the circuit is broken by opening the switch the break occurs at four points, as will also be apparent from Fig. 1. This movable switch member or carrier 21 at its forward end which slides just beneath the cover 10^a, is provided with a cross piece 24 which extends entirely across the switch box 10 and at its ends slides along shoulders 24^a, projecting inwardly from the side walls of the switch box 10. The rear part of the carrier 21 extends outwardly from the switch box through an opening provided in the rear end wall of the box, just beneath the cover. The carrier is thus effectively supported at its front and rear ends at three points.

In order that the switch may be safely fused I provide means whereby access cannot be had to the fuses unless the switch is first opened. This includes a rotary locking pin 25 which extends upwardly from the cover and is braced or supported by a bracket 26. The upper part of this pin is provided with a laterally projecting tongue 27 adapted to be swung over the fuse box 19 so as to prevent its being opened, or to be swung to one side so as to permit the opening of the fuse box. The lower part of the rotary pin 25 is provided with a locking tongue 28 which fits into a narrow slot 29 of the carrier 21 (see Fig. 2). This slot has a circular enlargement 29^a which receives the tongue 28 when the switch is in full open position.

The arrangement is such that the locking tongue or finger 27 which normally overlies the fuse box cannot be swung to one side so as to permit the fuse box to be opened unless the switch is in full open position, or until the circular enlargement 29^a has been brought up to the locking tongue 28 of the locking pin 25. And furthermore, after the pin 25 and locking tongue 27 have been swung so as to permit the fuse box to be opened the switch cannot be closed by reason of the transverse position of the lower locking tongue 28 until the upper locking tongue 27 is restored to normal position.

Additionally I provide an interlock between the fuse box and the movable switch member which interlock is effective to prevent the closing of the switch when the fuse box is open. This consists in providing on the fuse box a hinge member 30 having an extension in the form of a tongue normally

lying above the movable switch member or carrier 21 but arranged so that when the fuse box is opened this tongue will enter into a slot in the cover 10[a] and project into the path of movement of the carrier 21 in the manner illustrated in dotted lines in Fig. 1. In other words, as long as the fuse box is open the carrier cannot be moved to normal closed position because of its engagement with the extension of the hinge member 30, and it is not until the switch box is closed that the hinge is moved out of the path of the carrier, which can then be moved to closed position. Before this is done, however, it is necessary that the fuse box be locked closed by turning the tongue 27 over the fuse box as illustrated in Fig. 1, so as to bring the lower locking tongue 28 into registration or alinement with the slot 29.

It will be seen therefore, from the above, that the switch combines to a very high degree the features of safety in fusing, compactness, accessibility to the fuses, inaccessibility to live parts, complete separation of the fuse and switch compartments and a substantial proof against theft of current. Additionally the switch is durable, and by its construction is adapted for many specifically different purposes.

While I have described the preferred construction, it will be understood that the construction of the switch may be modified in its specific details without departing from the spirit and scope of the invention.

Having thus described my invenion, what I claim is:

1. A safety reversible switch and fuse comprising a switch box having separate switch and fuse compartments, said fuse compartment having a hinged cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a switch in the switch compartment comprising two sets of stationary terminals, the terminals of one set being connected to corresponding fuse terminals, the terminals of the other set being constructed for connection to both power and load line conductors and a set of movable switch members arranged to make and break connection between corresponding terminals of the two sets of stationary terminals, and an interlock between said cover and movable switch members by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

2. A safety reversible switch and fuse comprising a switch box having separate switch and fuse compartments, said fuse compartment having a movable cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a set of stationary terminals in said switch compartment constructed for connection to both power and load line conductors, a switch within said switch compartment arranged when closed to connect said stationary terminals to the fuse terminals, and when open to entirely disconnect all fuse terminals from all said stationary terminals, and an interlock between the cover and switch by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

3. A safety reversible switch and fuse comprising a switch box having separate switch and fuse compartments, the switch compartment being relatively permanently closed, the fuse compartment having a movable cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a set of stationary terminals in the switch compartment for connection to both power and load line conductors, a switch within the switch compartment arranged when closed to close connection between the fuse terminals and corresponding stationary terminals and when open to entirely disconnect all fuse terminals from all said stationary terminals, and an interlock between said cover and switch by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

4. A safety reversible switch and fuse having separate switch and fuse compartments, said fuse compartment having a hinged cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a switch in the switch compartment comprising two sets of stationary terminals, the terminals of one set being connected to corresponding fuse terminals, the terminals of the other set being constructed for connection to both power and load conductors and a set of movable switch members arranged to make and break connection between corresponding terminals of the two sets of stationary terminals, and an interlock between said cover and movable switch members by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

5. A safety reversible switch and fuse having separate switch and fuse compartments, said fuse compartment having a movable cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a set of stationary terminals in said switch compartment constructed for connection to both power and load line conductors, a switch within said switch compartment arranged when closed to connect said stationary terminals to the fuse terminals, and when open to entirely disconnect all fuse terminals with all said stationary terminals,

and an interlock between the cover and switch by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

6. A safety reversible switch and fuse having separate switch and fuse compartments, the switch compartment being relatively permanently inaccessible, the fuse compartment having a movable cover and a stationary fuse support, a set of fuse terminals mounted on said fuse support, a set of stationary terminals in the switch compartment for connection to both power and load line conductors, a switch within the switch compartment arranged when closed to close connection between the fuse terminals and corresponding stationary terminals and when open to entirely disconnect all fuse terminals from all said stationary terminals, and an interlock between said cover and switch by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

7. A safety switch comprising a switch box having a stationary fuse support and a movable cover therefor forming a fuse compartment, fuse terminals mounted on said fuse support, a switch arranged to connect and disconnect said fuse terminals with both power and load conductors, and an interlock between said cover and the switch by which the opening of the fuse compartment is prevented when the switch is closed and the closure of the switch is prevented when the fuse compartment is open.

In testimony whereof I hereunto affix my signature.

ELMER G. KERMODE.