June 18, 1935. J. SACHS 2,005,686

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Filed July 17, 1934 2 Sheets-Sheet 1

Fig. 1

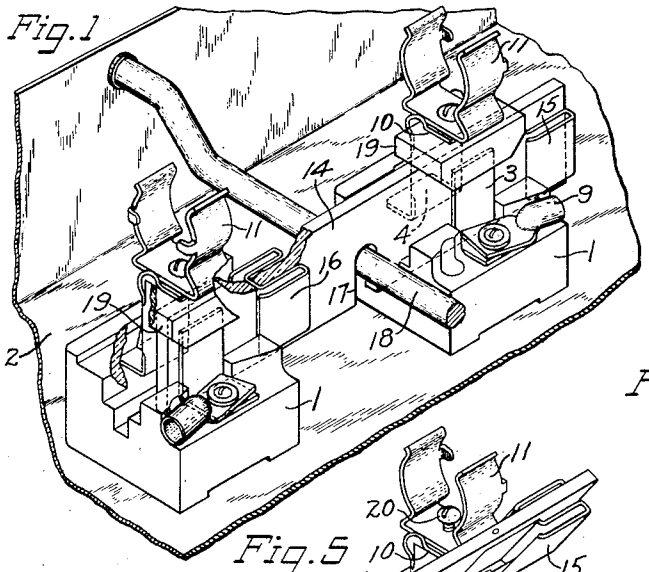


Fig. 2

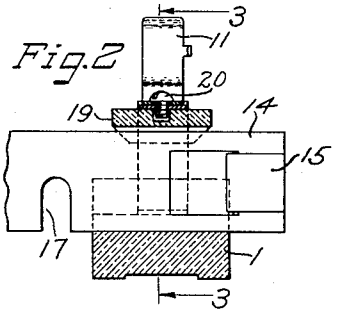


Fig. 3

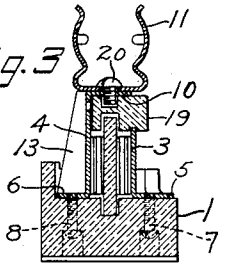


Fig. 5

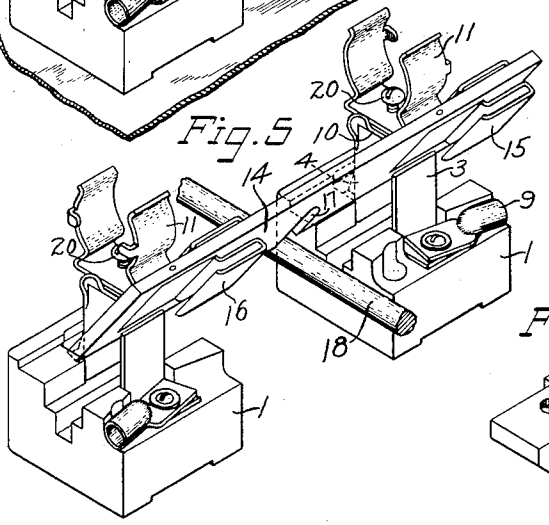


Fig. 4

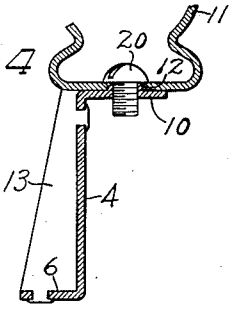


Fig. 6

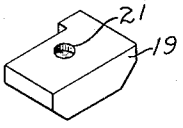


Fig. 7

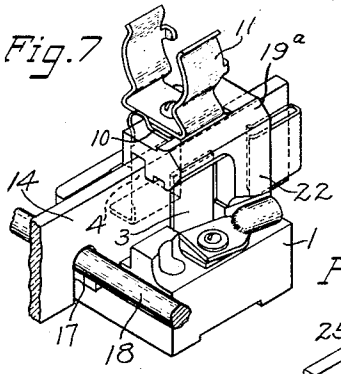


Fig. 8

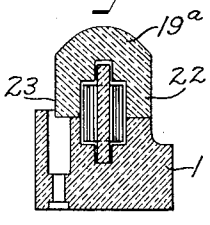


Fig. 9

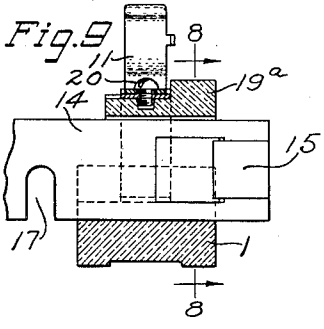
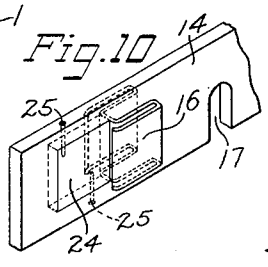


Fig. 10



Inventor
Joseph Sachs
By S. Jay Teller
Attorney

June 18, 1935. J. SACHS 2,005,686

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Filed July 17, 1934 2 Sheets-Sheet 2

Fig. 11

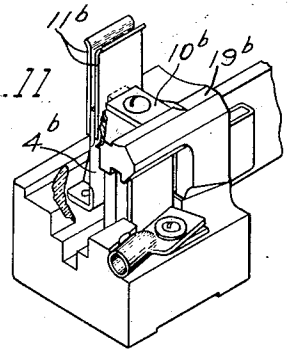


Fig. 12

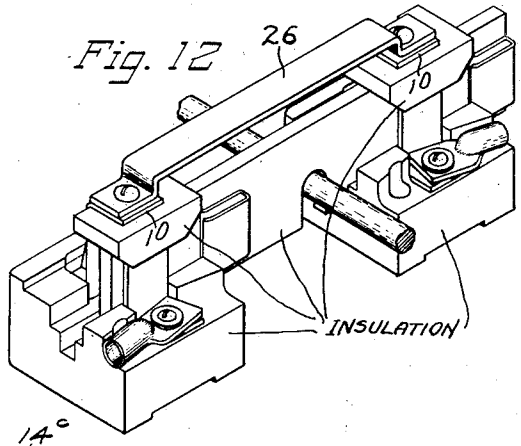


Fig. 13

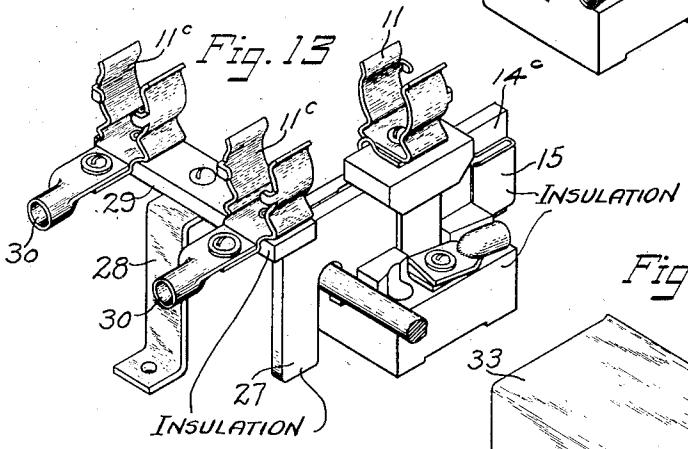


Fig. 15

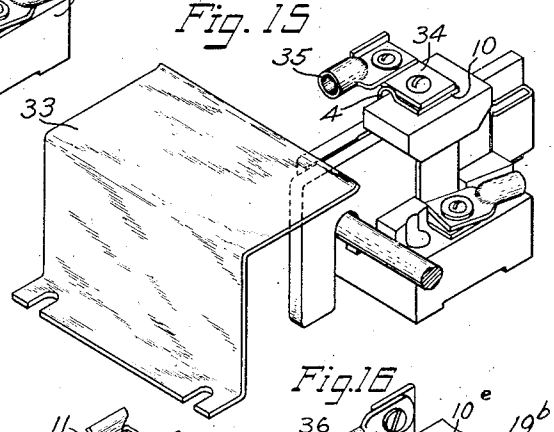


Fig. 16

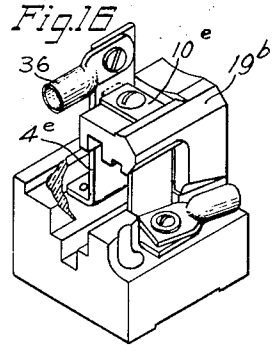
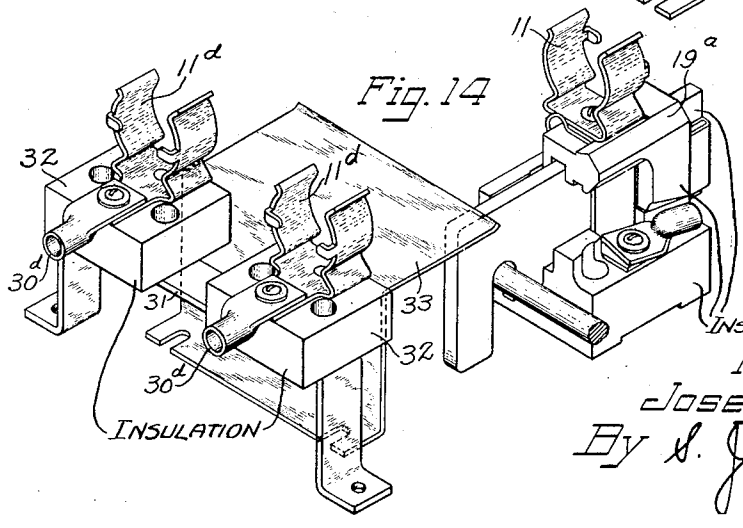


Fig. 14



Inventor
Joseph Sachs
By S. Jay Teller
Attorney

Patented June 18, 1935 2,005,686

UNITED STATES PATENT OFFICE

2,005,686

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Joseph Sachs, West Hartford, Conn.

Application July 17, 1934, Serial No. 735,564

10 Claims. (Cl. 200—114)

The invention relates particularly to appliances of the type disclosed in my Patent No. 1,755,367 for Electric circuit controlling appliances dated April 22, 1930, the appliance of the said patent having stationary switch contacts arranged in oppositely disposed pairs and having a fuse contact directly mounted upon, or at least permanently connected with, one switch contact of each pair. A rectilinearly movable switching member is provided which is normally held in place by a guide plate at the front, but the switching member, by being forcibly tilted in the manner disclosed in Fig. 4 of the patent, may be removed without disturbing the connection between the fuse contacts and the switch contacts.

In my Patent No. 1,755,369 for Electric circuit controlling appliances dated April 22, 1930, which patent has been reissued as No. 18,524, there is disclosed an appliance of the same general character as that in the first-mentioned patent, but the switching member, instead of being guided at the front by a fixed plate, is guided by relatively movable elements which upon being moved permit the switching member to be readily removed without any flexing or distorting of the stationary switch contacts.

In my application Serial No. 659,922 for Electric circuit controlling appliances, filed March 7, 1933, there is disclosed an appliance of the same type as those disclosed in the said patents, but the movable element at the front for guiding the switching member is a plate of substantial size which may serve not only as a guide for the switching member but also as a support for one of the fuse contacts and as a support for insulating walls positioned adjacent the path of movement of the conducting element of the switching member.

In accordance with the present invention there is provided a front guiding element which is entirely removable as disclosed in my said copending application and which may if desired have formed thereon insulating walls adjacent the path of movement of the conducting element of the switching member. The invention relates particularly to various advantageous features of construction and mounting, as hereinafter described in detail.

The invention further relates to an arrangement or combination of parts which makes it possible for the major portion of the parts to be used either for a fused switch or an unfused switch as may be desired. By removing one part or assembly of parts and substituting another, the switch unit may be adapted for use with a fuse or for use without a fuse.

In the accompanying drawings I have shown several embodiments of the invention, but it will be understood that the drawings are intended for illustrative purposes only and are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

Fig. 1 is a perspective view, with certain parts broken away, of so much of the appliance as is used in one leg of a circuit. In this view a portion of the usual enclosing box is shown.

Fig. 2 is a longitudinal sectional view through the upper unit shown in Fig. 1.

Fig. 3 is a transverse sectional view taken along the line 3—3 of Fig. 2.

Fig. 4 is an enlarged view similar in part to Fig. 3 and showing in detail the combined switch contact and fuse contact.

Fig. 5 is a view similar to Fig. 1 with the front guide members removed and with the switching member partly removed.

Fig. 6 is a detail view showing one of the retaining members.

Fig. 7 is a fragmentary view similar to the upper part of Fig. 1 and showing an alternative embodiment of the invention.

Fig. 8 is a transverse sectional view taken along the line 8—8 of Fig. 9.

Fig. 9 is a longitudinal sectional view through the unit shown in Fig. 7.

Fig. 10 is a fragmentary view showing in detail a portion of the movable switching member.

Fig. 11 is a fragmentary view similar to the lower part of Fig. 1 and showing an alternative embodiment of the invention.

Fig. 12 is a view similar to Fig. 1 and showing an unfused switch instead of a fused switch.

Fig. 13 is a view in some respects similar to Fig. 1, but showing a two break switch instead of a four break switch. This view shows means for supporting two lower fuse contacts, but for the sake of simplicity only one switching unit is shown and, therefore, only one upper fuse contact.

Fig. 14 is a view similar to Fig. 13, but showing an alternative mounting means for the lower fuse contacts.

Fig. 15 is a view similar in part to Fig. 14, but showing the unit modified to provide an unfused switch instead of a fused switch.

Fig. 16 is a view similar to Fig. 11, but showing the unit in use as a part of a two break switch

and modified to provide an unfused switch instead of a fused switch.

Referring to the drawings, particularly Figs. 1 to 6 thereof, 1 represents a rear insulating supporting block or means which is secured to a suitable rear wall. This rear wall may be and preferably is the rear wall of an enclosing cabinet 2, of which a portion is shown in Fig. 1. A pair of stationary opposed switch contacts 3 and 4 are mounted on the supporting means in opposed relationship to each other and perpendicular to the said supporting means. The switch contacts are provided respectively with flanges 5 and 6, which are engaged by screws 7 and 8 extending through the insulating block 1. A wire terminal 9 is connected with the switch contact 3. The switch contacts 3 and 4 are preferably of different lengths, the contact 3 as shown being considerably shorter than the contact 4. The contact 4 may carry an element 10 which projects transversely toward the contact 3. As shown the element 10 is formed integrally with the contact 4 but this is not essential.

The element 10, when provided, may serve as a means for supporting a fuse contact 11. As shown more clearly in Fig. 4 the element 10 is provided with an upward projecting portion at 12 which is riveted over to engage and retain the fuse contact. Inasmuch as the switch contact 4 directly supports the fuse contact 11 and must resist the force incident to inserting or removing a fuse it may be preferable to reinforce the said contact by means of a brace, such as 13. As shown the brace 13 is a plate having extensions which project through holes in the main body of the contact 4 and in the flange 6 thereof. These projections are riveted over as shown in Fig. 4.

Figs. 1 and 5 of the drawings show an appliance comprising two separate units, each comprising an insulating supporting means 1 with switch and fuse contacts mounted thereon, as already described. When there are two such units I provide a single switching member to cooperate with both of them, this switching member comprising an insulating plate or element 14 and also comprising two movable contacts 15 and 16 spaced apart longitudinally and adapted to engage or disengage the stationary contacts of the respective pairs. The insulating element 14 is provided with a slot 17 for receiving the crank portion of an operating spindle 18. This spindle may be mounted in the side walls of the enclosing box 2 or in any other usual or preferred manner. The switching member is directly behind the position of a fuse in the two contacts 11, 11. By moving the spindle 18 the switching member can be moved to its upper position out of engagement with the stationary switch contacts as shown in Fig. 1 or it can be moved downward to a position in which the two movable contacts 15 and 16 respectively engage and electrically connect the stationary switch contacts of the respective pairs.

Associated with the stationary switch contacts of each pair is a retaining member or retainer 19 which is at the front of the switching member and normally engages the insulating element 14 thereof to constitute a front guide. Preferably and as shown, the retainer 19 is engaged and partly supported by the end of the shorter switch contact 3 as shown most clearly in Fig. 3, and the said retainer is positioned behind the said transversely extending element 10 as shown in the same figure. In order that the switching member may be removed, the retainer 19 is removably mounted but its relationship with the element 10 is such that it cannot be removed in the forward direction. It is, however, removable longitudinally, that is, in the direction of movement of the switching member. It is normally held against longitudinal movement by a suitable means, such as a screw 20, extending through the element 10 and entering a suitable recess 21 in the retainer.

Preferably the supporting block 1 and the retainer 19 are provided with longitudinal grooves into which the edge portions of the insulating element 14 extend, but these grooves do not closely fit the said element and they are of such size to permit the switching element as an entirety to adjust itself transversely in order to properly engage and contact with the stationary switch contacts.

With the retainers 19, 19 in place as shown in Fig. 1, the switching member is retained and guided and it can be moved by the operating spindle 18 in the manner already described. The circuit is broken in four places, there being two breaks in advance of the fuse and two breaks beyond the fuse.

When it is desired to remove the switching member in order to inspect or clean the switch contacts or for any other purpose, the screws 20, 20 are removed or partly withdrawn so as to disengage the retainers 19, 19. These are then removed longitudinally, that is, either upward or downward, and then the switching member by being slightly tilted can be entirely removed from the appliance in a forward direction as is clearly shown in Fig. 5.

In Figs. 7 to 9 I have shown an alternative construction wherein there is provided a retainer 19a somewhat larger than the retainer 19 and provided with rearward extending projections 22 and 23 located to provide opposite insulating walls closely adjacent the paths of movement of the faces of the corresponding movable contact. These walls serve to confine, muffle and cool any arcs that may be formed. Preferably and as shown these extensions 22 and 23 engage at their rearward ends with forward projections on the insulating block 1, there thus being provided insulating walls which entirely surround the path of movement of the movable contact.

Fig. 10 illustrates certain details of construction which may advantageously be used for the movable switching member. The insulating element 14 is provided with a rectangular opening for each of the movable contacts 15 and 16, each opening being large enough to permit the corresponding contact to be put in place through the opening after having been previously bent to its required shape. After the contact has been put in place an insulating block 24 is inserted in the opening, this block being of such size as to completely fill the opening and to hold the movable contact in place. The block 24 may be held in position in the opening in any suitable way, as for instance by means of nails 25, 25 driven into it through the insulating element 14 at opposite edges thereof.

In Fig. 11 I have shown an alternative unit adapted for use with a knife blade fuse. In lieu of the stationary contact 4 there is provided a stationary contact 4b having secured at opposite sides thereof the two companion members of a fuse clip 11b. Secured to one of the members of the fuse clip is a transversely extending ele-

ment 10b corresponding to the element 10 already described. The retainer 19b is similar to the retainer 19a.

In Fig. 12 I have shown a construction similar to that shown in Fig. 1 except that it is an unfused switch instead of a fused switch. Instead of mounting fuse contacts on the elements 10, 10 there is provided a connecting conductor 26 which extends directly between the two elements 10, 10. The construction is or may be otherwise similar to that shown in Fig. 1 and repetition of the description is unnecessary.

I have thus far described a switch having two switching units and adapted to break the circuit at four places. However, a four-break switch is not always necessary and for many classes of service satisfactory results can be obtained with a two-break switch. Fig. 13 shows a two-break switch and the switching unit thereof is or may be exactly like one of the switching units of the four-break switch shown in Fig. 1. However, the switching member itself is different in that it has but a single movable contact 15 instead of two such contacts. The insulating element 14c of the switching member preferably extends rearward as shown at 27 so as to be guided at the rear on the rear wall. Inasmuch as there is only one switching unit, only one fuse contact of each pair can be mounted directly on a switch contact. The remaining fuse contact 11c must be separately mounted, and Fig. 13 shows one mounting means which may be provided when there are two pairs of fuse contacts. A metal bracket 28 is secured directly to the rear supporting wall and it carries at its forward end a transverse insulating bar 29 on which the two fuse contacts 11c, 11c are directly mounted. These fuse contacts are connected with wire terminals 30, 30. The transverse insulating bar 29 serves not only to support the fuse contacts as already stated, but it also serves as a supplemental front guide for the switching member. The insulating bar 29 serves to prevent the lower portion of the switching member from moving forward.

Fig. 14 shows an alternative means for mounting the fuse contacts 11d, 11d. A metallic yoke 31 is provided which carries two separate insulating blocks 32, 32 which in turn carry the said fuse contacts 11d, 11d and wire terminals 30d, 30d. Fig. 14 shows the appliance adapted for a longer fuse, and with such a longer fuse it is necessary or at least desirable to provide a separate auxiliary means for guiding the lower portion of the switching member. I have shown a metallic plate 33 having a flange at the rear by means of which it is secured to the rear wall of the cabinet and having a flange at the front which overlies the lower part of the switching member and serves as a front guide therefor.

In Fig. 15 I have shown a construction similar to that shown in Fig. 14, but having certain parts substituted to provide an unfused switch instead of a fused switch. Instead of mounting a fuse contact, such as 11, directly on the transversely extending element 10, there may be mounted on the said element a short transverse conductor 34 which carries a wire terminal 35. In practice, alternative sub-assemblies may be provided, one comprising a contact 4 with a fuse contact 11 mounted thereon as shown for instance in Fig. 13, and the other comprising a contact 4 with a wire terminal 35 mounted thereon, as shown in Fig. 15. In assembling the complete switching unit, one or the other of these sub-assemblies may be used according to whether it is desired to provide a fused switch or an unfused switch. The other parts of the switching unit remain entirely unchanged.

In Fig. 16 I have shown a unit similar to that shown in Fig. 15 but having the wire terminal differently mounted on the fuse contact. There is provided a switch contact 4e having a wire terminal 36 mounted directly thereon adjacent the top and having a transversely extending element 10e secured thereto. The sub-assembly, consisting of the parts 4b, 11b and 13b shown in Fig. 11, may be used interchangeably with the sub-assembly consisting of the parts 4e, 36 and 10e shown in Fig. 16, according to whether it is desired to provide a fused switch or an unfused switch.

What I claim is:

1. In an appliance of the class disclosed, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, and an insulating retainer located at the front of the switching member and normally serving as a front guide therefor, the said retainer being held against removal in the forward direction but being removable longitudinally so as to permit removal of the switching member in a forward direction.

2. In an appliance of the class disclosed, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts perpendicular to the supporting means and projecting forward therefrom, one of them being shorter than the other, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, and an insulating retainer engaged and partly supported by the end of the shorter switch contact and normally serving as a front guide for the switching member, the said retainer being held by the longer switch contact against removal in the forward direction but being removable longitudinally so as to permit removal of the switching member in a forward direction.

3. In an appliance of the class disclosed, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, an element on one switch contact extending transversely toward the other contact, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, and an insulating retainer located at the front of the switching member and behind the said transversely extending element, the said retainer normally serving as a front guide for the switching member and being removable longitudinally so as to permit removal of the said member in a forward direction.

4. In an appliance of the class disclosed, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, an element on one switch contact extending transversely toward the other contact, a switching member rectilinearly movable between the stationary switch contacts and com-

prising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, an insulating retainer located at the front of the switching member and behind the said transversely extending element and normally serving as a front guide for the switching member, and a screw extending forward through the transversely extending element and releasably engaging the retainer, the said screw upon withdrawal permitting longitudinal removal of the retainer to thereby permit removal of the switching member in a forward direction.

5. In an appliance of the class disclosed, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, a pair of coacting fuse receiving contacts one of which is fixedly mounted on the forward portion of one of the said switch contacts, and an insulating retainer located at the front of the switching member and normally serving as a front guide therefor, the said retainer being held against removal in the forward direction but being removable longitudinally so as to permit removal of the switching member in a forward direction without disturbing the mounting of the said fuse contact on the said switch contact.

6. In a fused switch, the combination of a rear insulating supporting means, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, an element on one switch contact extending transversely toward the other, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, a pair of coacting fuse receiving contacts one of which is fixedly mounted on the forward portion of one of the said switch contacts, and an insulating retainer located at the front of the switching member and behind the said transversely extending element, the said retainer normally serving as a front guide for the switching member and being removable longitudinally so as to permit removal of the switching member in a forward direction without disturbing the mounting of the said fuse contact on the said switch contact.

7. The combination in an appliance of the class disclosed, of two separate insulating supporting means spaced apart longitudinally, two pairs of stationary opposed switch contacts on the respective supporting means and perpendicular thereto, a single switching member rectilinearly movable between the stationary switch contacts of the two pairs and comprising two movable contacts with oppositely disposed faces adapted to engage or disengage the stationary contacts of the respective pairs, two insulating retainers associated with the respective pairs of switch contacts and located at the front of the switching member and normally serving as a front guide therefor, the said retainers being held against removal in the forward direction but being removable longitudinally so as to permit removal of the switching member in a forward direction.

8. The combination in a fused switch, of two separate insulating supporting means spaced apart longitudinally, two pairs of stationary opposed switch contacts on the respective supporting means and perpendicular thereto, a single switching member rectilinearly movable between the stationary switch contacts of the two pairs and comprising two movable contacts with oppositely disposed faces adapted to engage or disengage the stationary contacts of the respective pairs, a pair of coacting fuse receiving contacts each of which is fixedly mounted on the forward portion of one switch contact of one pair, and two insulating retainers associated with the respective pairs of switch contacts and located at the front of the switching member and normally serving as a front guide therefor, the said retainer being held against removal in the forward direction but being removable longitudinally so as to permit removal of the switching member in a forward direction without disturbing the mounting of the said fuse contacts on the said switch contacts.

9. An appliance of the class disclosed comprising in combination, a rear wall, a rear insulating supporting means on the rear wall, a pair of stationary opposed switch contacts on the supporting means and perpendicular thereto, a switching member rectilinearly movable between the stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, an insulating retainer located at the front of the switching member and normally serving as a front guide therefor, the said retainer being removable to permit removal of the switching member in a forward direction, and a guide means secured directly to the rear wall independently of the said insulating supporting means and also serving as a front guide for the switching member.

10. In an electric circuit controlling appliance, the combination of a rear insulating supporting means, a stationary switch contact mounted on the supporting means and perpendicular thereto, two interchangeably usable assemblies adapted to be mounted on the supporting means and respectively comprising a switch contact and a fuse contact thereon and comprising a switch contact and a wire terminal thereon, each of the said assemblies being mountable with its switch contact perpendicular to the supporting means and in opposed relationship to the first said switch contact, a switching member rectilinearly movable between the two opposed stationary switch contacts and comprising a movable contact with oppositely disposed faces adapted to engage or disengage the said stationary contacts, and an insulating retainer located at the front of the switching member and normally serving as a front guide therefor, the said retainer being removable to permit removal of the switching member in a forward direction without disturbing the mounting of the said fuse contact or the said wire terminal on the switch contact.

JOSEPH SACHS.