March 23, 1937. J. SACHS 2,074,861

ELECTRIC CIRCUIT CONTROLLING DEVICE

Filed Jan. 30, 1935 2 Sheets-Sheet 1

Fig. 1

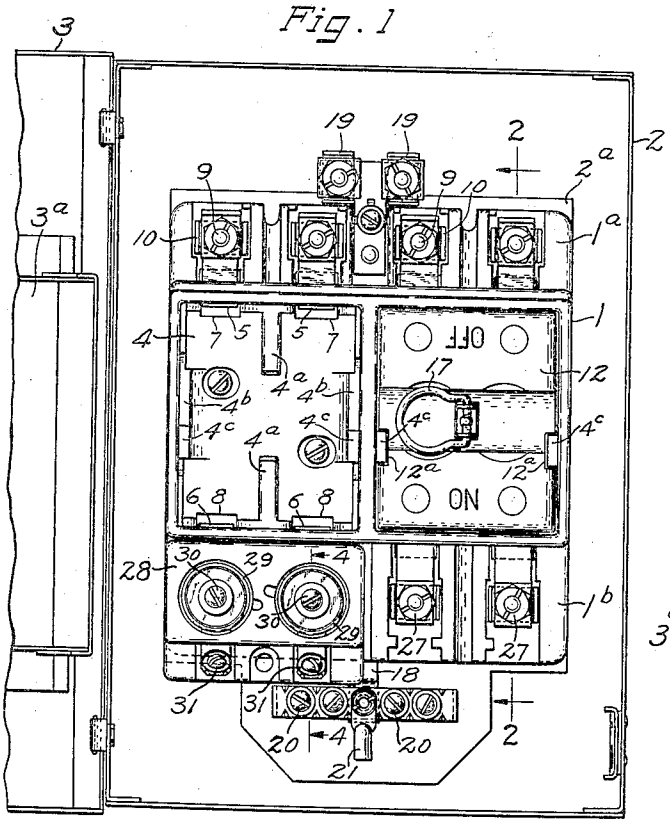


Fig. 2

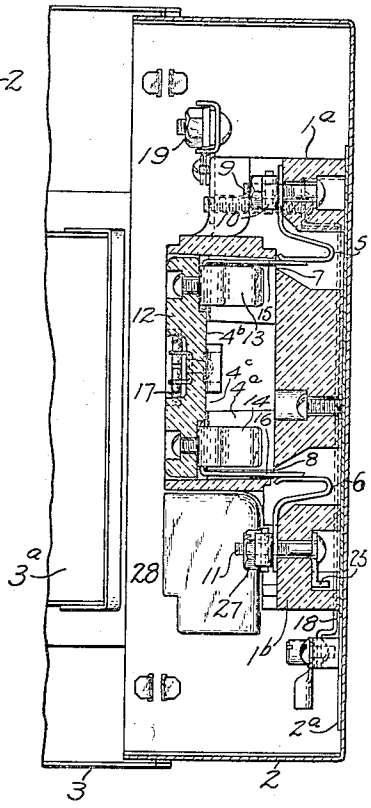


Fig. 3

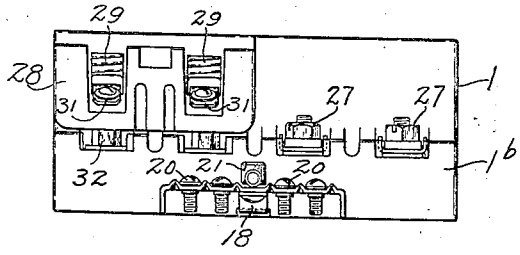


Fig. 4

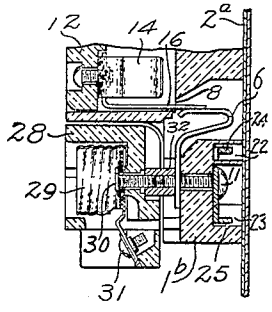
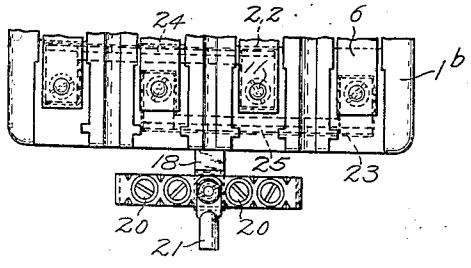


Fig. 5



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Fig. 6

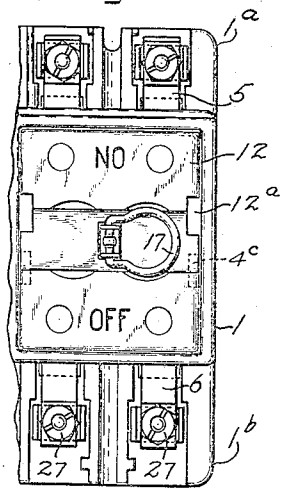


Fig. 7

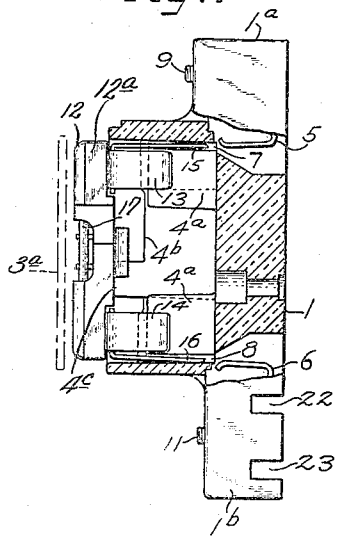


Fig. 8

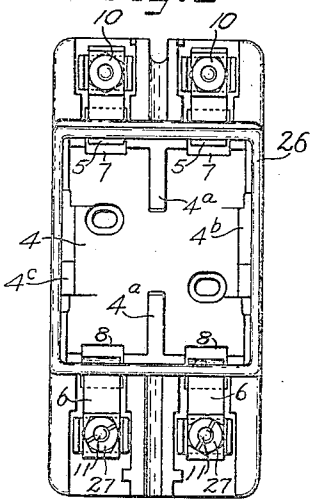


Fig. 10

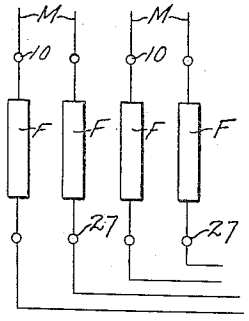


Fig. 9

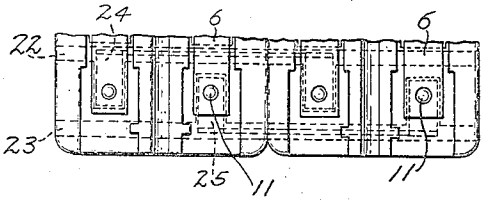


Fig. 11

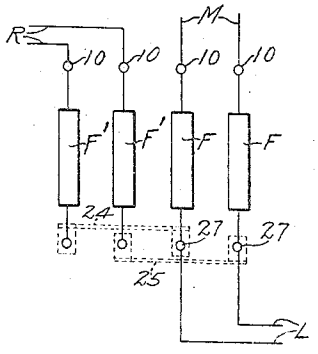


Fig. 12

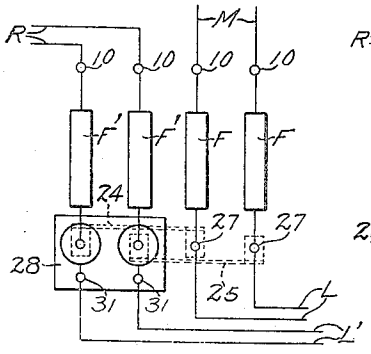
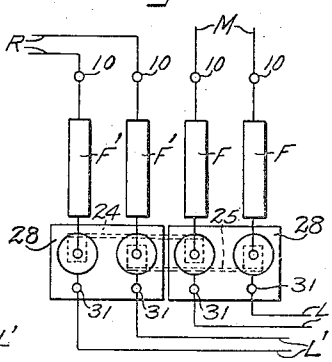


Fig. 13



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ELECTRIC CIRCUIT CONTROLLING DEVICE

Joseph Sachs, West Hartford, Conn.

Application January 30, 1935, Serial No. 4,015

9 Claims. (Cl. 200—114)

The invention is particularly applicable to an electric circuit controlling device having a main base with circuit connections thereon and having main fuses which are mounted upon a removable carrier. In a device of this character the removal of the carrier and the fuses from the base serves to break the circuit and the device thus functions as a switch.

One of the objects of the present invention is to provide a device of the character described wherein the removable carrier can be turned to a position other than the upright position and replaced and wherein the said carrier when so replaced is prevented from entering the base sufficiently to reestablish the electrical connection.

Other objects of the invention will be apparent from the following specification and claims.

In the accompanying drawings one principal embodiment of the invention is disclosed and several alternative embodiments, 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 front view of an electric circuit controlling device embodying the invention, one of the two removable fuse carriers being removed in order that parts of the base may more clearly appear.

Fig. 2 is a vertical sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a bottom view of the insulating base and of the various parts carried thereby.

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary front view of the main base and showing in dotted lines the transverse electrical connections at the rear thereof.

Fig. 6 is a fragmentary front view showing one of the fuse carriers in its inverted or upside down position.

Fig. 7 is a combined side and sectional view of the base and fuse carrier, the latter being in its upside down position. In this view a portion of the cabinet cover is shown in dot-and-dash lines.

Fig. 8 is a front view of an alternative form of main base adapted to receive only a single fuse carrier.

Fig. 9 is a fragmentary front view of the bottom portions of two single bases like the base shown in Fig. 8 and showing in dotted lines the transverse electrical connections between them at the rear thereof.

Figs. 10, 11, 12 and 13 are diagrammatic views showing some of the electrical connections that may be obtained by means of a device embodying the invention.

Referring to the drawings, 1 represents a main insulating base which is adapted to be secured to a suitable rear supporting wall, as for instance the rear wall of an enclosing cabinet 2. An insulating sheet 2a may be interposed if desired. The cabinet 2 may be provided with a hinged cover 3, and preferably the cover 3 is provided with an opening which permits access to the fuses in the box without opening the cover. This opening in the main cover is adapted to be closed by an auxiliary cover 3a.

The base 1 is provided with at least one recess 4 adapted to receive a removable fuse carrier, and as shown in Fig. 1 there are two such recesses arranged side by side. Each recess 4 is closed or substantially closed at the top, bottom and both sides and also the rear but is open at the front.

Carried by the main base near the rear thereof is at least one pair of electrical contacts 5 and 6, and preferably there are two pairs of contacts associated with each of the recesses 4. Formed at the rear of each of the recesses 4 are openings or slots 7, 7 and 8, 8 which are in register with the respective contacts 5, 5 and 6, 6, as clearly shown in Figs. 1 and 2.

The base 1 is provided with an upward projecting ledge 1a and an integral portion of each contact 5 extends upward along the front of this ledge and is held in place by a forward extending screw 9. Also held by the screw 9 is a wire terminal 10. The base 1 is also provided with a downward projecting ledge 1b and an integral portion of each contact 6 extends downward along the front face of this ledge. The said portion of the contact is held in place by a forward extending screw 11. The forward end of this screw may serve for holding a wire terminal or an auxiliary fuse block, as will be hereinafter more fully explained.

Fuse carriers 12 are provided which are preferably of insulating material and which are adapted to enter and approximately fit the respective recesses 4 in the base 1. Each fuse carrier 12 is provided on its rear face with at least one pair of contacts 13 and 14 adapted to receive a cartridge or other fuse, and preferably there are two pairs of such contacts on each fuse carrier. Also carried by each fuse carrier is at least one pair of conducting blades or prongs 15 and 16 which are electrically connected with the cor-

responding fuse contacts. When there are two pairs of fuse contacts there are two pairs of conducting prongs. The fuse carrier is preferably provided at the front with a suitable pivoted handle 17 by means of which the carrier may be conveniently withdrawn from the recess.

The base 1 may be provided with integral barriers 4a, 4a located within the recess 4 and positioned between the respective fuse contacts when the carrier 12 is in its normal position. Ledges 4b, 4b are provided to act as stops to limit inward movement of the carrier.

When the carrier is in its normal upright position in the recess, as shown in Fig. 2, the conducting prongs 15 and 16 of each pair engage respectively with the corresponding stationary contacts 5 and 6, and in this manner a circuit through the device is established, provided of course that there are fuses in place in the several contacts 13 and 14. The fuses are concealed and access can be had to them for purposes of inspection or replacement only by entirely removing the fuse carrier from the base and thus withdrawing the prongs 15 and 16 from the contacts 5 and 6 so as to break the circuit and completely disconnect the fuses.

The removable fuse carrier may be withdrawn from the recess in the base not only for the purpose of inspecting or renewing the fuses but also for the purpose of breaking the circuit. When the purpose is to maintain the interruption of the circuit it is desirable to replace the fuse carrier in the device in such a manner that it may be conveniently retained, but without there being any possibility of accidental reestablishment of the circuit. In accordance with the present invention, the fuse carrier is always positioned with its front and rear faces in normal relationship to the base, that is with the conducting prongs always extending rearwardly into the recess in the base, but the fuse carrier and the base are so related to each other in construction that the carrier can be fully inserted into the base recess only when in its normal or upright position, as already fully described. The carrier may, however, be turned to a predetermined extent or entirely inverted, while still facing normally with respect to the base, and may then be restored to a position in approximate register with the recess in the base. However, when so turned or inverted it cannot fully enter the recess and the circuit cannot be reestablished.

The front of the enclosing cabinet 2 and the openable front cover 3 for the cabinet are spaced forward from the front of the base 1 as will be readily apparent from an inspection of Fig. 2. This forward spacing of the cover 3 is sufficient to provide space for the fuse carrier when the said carrier is prevented from fully entering the recess in the base and is held in its forward position as shown in Fig. 7.

The recess 4 in the base 1 is so shaped that the prongs 15 and 16 on the carrier engage the opposite end walls of the recess when the carrier is out of its upright position; and the prongs thus serve to insure re-assembly in a predetermined relationship and they also serve to prevent turning of the carrier about a horizontal axis. This is accomplished by providing the recess with end walls which are non-cylindrical. Preferably the end walls are flat as shown, the entire recess being rectangular.

The cabinet cover 3 and the auxiliary cover 3a are so constructed that they serve in the closed position (shown by dot-and-dash lines in Fig. 7) as a means additional to the base 1 for normally preventing movement of the carrier 12 away from the base when the said carrier is out of its upright position and when the prongs 15 and 16 are out of engagement with the contacts 5 and 6. It will be apparent that, when the prongs are out of engagement with the contacts, as shown in Fig. 7, the carrier 12 is only loosely held and it might tend to move outward away from the base as the result of vibration or otherwise. The cover 3, serving as an additional retaining means, prevents such outward movement.

The details of construction for preventing the complete entry of the fuse carrier in its turned or inverted position may be varied, but I prefer to provide the base and the carrier with ribs and grooves which are adapted to fit each other when the carrier is upright but which interfere with each other and prevent entry of the carrier when it is upside down. As shown, the base is provided with two opposite ribs 4c, 4c and the carrier 12 is provided with corresponding grooves 12a, 12a in which the ribs are positioned when the carrier is in its normal upright position. The ribs and grooves are spaced away from the horizontal median plane of the carrier and the recess, and the result is that when the carrier is turned upside down, with the conducting prongs still extending rearwardly as shown in Figs. 6 and 7, the ribs and grooves are out of register with each other and the forward ends of the ribs engage directly with the rear face of the carrier to prevent it from entering the recess. The fuse contacts 13 and 14 and the prongs 15 and 16 may enter the recess 4, but the prongs cannot enter far enough to establish electrical connection with the stationary contacts 5 and 6. The prongs 15 and 16 engage the end walls of the recess 4 sufficiently to hold the carrier and associated parts in place and prevent it from falling out. It will be observed and understood that there is a sufficient clearance between the front of the base 1 and the cover 3 to permit the fuse carrier to occupy the forward position shown in Fig. 7.

If desired, the base 1 may have provision for the mounting thereon of a neutral conductor and suitable wire terminals therefor. As shown, there is a neutral conductor 18 which is centrally positioned and extends from the top to the bottom of the block near the rear thereof. It is provided at the top with wire terminals 19, 19 and at the bottom with wire terminals 20, 20 and 21.

For certain wiring arrangements it is desirable to provide transverse electrical connections, and to this end the base 1 is provided near the bottom with transverse rear grooves 22 and 23. A transverse conductor 24 is positioned in the groove 22 and serves to electrically connect the first and third screws 11 and the corresponding parts in the same legs of the circuit. A transverse conductor 25 is positioned in the groove 23 and serves to connect the second and fourth screws 11 and the corresponding parts in the same legs of the circuit.

In Fig. 8 I have shown an insulating base 26 which is similar to the base 1, except that it is adapted for only two legs of a circuit instead of four legs of a circuit. The construction is otherwise similar and further description is unnecessary.

Two bases 26 may be placed side by side, as shown in Fig. 9, to provide a four leg arrangement similar to that shown in Figs. 1, 3 and 4. If transverse connections are desired conduc-

tors 24 and 25 may be used similar to those shown in Figs. 4 and 5.

The screws 11 which hold the contacts 6 in place may also serve as devices for holding wire terminals 27, 27, as shown at right side of Fig. 1 and as also shown in Fig. 2. Alternatively, the screws or devices 11 may be used for holding a supplemental fuse block 28, as shown at the left side of Fig. 1 and as also shown in Fig. 4. The fuse block 28 is provided with contacts 29 and 30 adapted to receive plug fuses. Wire terminals 31, 31 are connected with the threaded shell contacts 29, 29. Relatively long bushings or nuts 32 are engaged with the front ends of the screws 11, and the screws 30 forming the center fuse contacts engage the same bushings 32. In this manner the fuse block 28 is held in place and is electrically connected.

It will be understood that the supplemental fuse block 28 may be entirely omitted if desired, or that when provided it may be positioned at either side of a block, or that there may be two similar supplemental fuse blocks. Some of the wiring connections that are possible are indicated in the diagrammatic Figs. 10 to 13. In each of these figures the neutral connection is omitted for the sake of simplicity.

Fig. 10 shows an arrangement without any supplemental fuse blocks and without any transverse connections between different legs of the circuit. The several fuses F may be regarded as constituting two sets of main line fuses.

In Fig. 11 the main line wires are connected with the fuses F, F at the right and a lighting or other load circuit L may be connected with the wire terminals 27, 27. By means of the transverse conductors 24 and 25 the fuses F', F' are connected in series with the fuses F, F and may serve for another load circuit such as a range circuit R.

In Fig. 12 the arrangement is similar to that shown in Fig. 11 with the exception that a supplemental fuse block 28 is added and a second load circuit L' is connected to the terminals 31, 31 thereof.

In Fig. 13 the arrangement is similar to that in Fig. 12 except that there are two supplemental fuse blocks 28, the two load circuits L and L' being connected with the wire terminals 31, 31 of the respective blocks.

It will be understood that still other wiring arrangements are possible with my novel construction, but those illustrated will sufficiently exemplify the possibilities.

I do not claim as a part of the present invention the fuse blocks 28 either alone or in combination with other parts, these features constituting the subject matter of my copending application for Electric circuit controlling device, Ser. No. 55,291, filed December 19, 1935, as a division of this present application.

What I claim is:

1. In a device of the class described, the combination of an insulating base having a recess open at the front, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, a removable fuse carrier, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward into the recess and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base, and means on the base serving when the carrier faces normally but is out of its upright position to prevent the carrier from moving rearward sufficiently to enable the prongs to engage the contacts on the base.

2. In a device of the class described, the combination of an insulating base having a recess open at the front, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, a removable fuse carrier shaped to enter and approximately fit the recess, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward into the recess and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base and is fully entered in the recess, means on the base serving when the carrier faces normally but is out of its upright position to prevent the carrier from moving rearward sufficiently to enable the prongs to engage the contacts on the base, and means additional to the base for normally preventing movement of the carrier away from the base when it is out of its upright position and when the prongs are out of engagement with the contacts.

3. In a device of the class described, the combination of an insulating base having a recess open at the front and formed with non-cylindrical walls at opposite ends, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, a removable fuse carrier shaped to enter and approximately fit the recess, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward into the recess and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base and is fully entered in the recess and the said prongs engaging the said non-cylindrical walls of the recess to insure assembly of the carrier with the base in a predetermined relationship when the carrier is out of upright position, means on the base serving when the carrier faces normally but is out of its upright position to prevent the carrier from moving rearward sufficiently to enable the prongs to engage the contacts on the base, and means additional to the base for normally preventing movement of the carrier away from the base when it is out of its upright position and when the prongs are out of engagement with the contacts.

4. In a device of the class described, the combination of an insulating base having a recess open at the front, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, a removable fuse carrier, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward into the recess and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base, and means on the base and on the carrier serving when the carrier faces normally but is out of its upright position to prevent the carrier from moving rearward sufficiently to enable the prongs to engage the contacts on the base.

5. In a device of the class described, the combination of an insulating base having a recess open at the front, two electrical contacts near the rear of the base and adjacent opposite ends

of the recess, a removable fuse carrier adapted to be positioned within the recess, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base and is fully entered in the recess, and means on the base and on the carrier serving when the carrier faces normally but is out of its upright position to prevent the carrier from fully entering the recess and to thereby prevent the prongs from engaging the contacts on the base.

6. In a device of the class described, the combination of an insulating base having a recess open at the front, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, a removable fuse carrier adapted to be positioned within the recess, fuse contacts on the carrier at the rear thereof, conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward and engaging the contacts on the base when the carrier is upright and faces normally with respect to the base and is fully entered in the recess, and means on the base and on the carrier serving when the carrier faces normally but is turned upside down to prevent the carrier from fully entering the recess to thereby prevent the prongs from engaging the contacts on the base.

7. In a device of the class described, the combination of an insulating base having a recess open at the front and a removable fuse carrier adapted to be positioned within the recess, the said base and carrier being provided with a rib and a groove adapted to fit each other when the carrier is upright and faces normally with respect to the base but adapted to interfere and prevent entry of the carrier when facing normally but upside down, two electrical contacts near the rear of the base and adjacent opposite ends of the recess, fuse contacts on the carrier at the rear thereof, and conducting prongs on the carrier at the rear thereof and electrically connected with the respective fuse contacts, the said prongs extending rearward and engaging the contacts on the base when the carrier is upright and is fully entered in the recess and the said prongs being out of such engagement when the carrier is upside down and is prevented from entering the recess.

8. In a device of the class described, the combination of an insulating base having a recess open at the front, two pairs of electrical contacts near the rear of the base and arranged with the contacts of each pair adjacent opposite ends of the recess, a removable fuse carrier adapted to be positioned within the recess, two pairs of fuse contacts on the carrier at the rear thereof, two pairs of conducting prongs on the carrier at the rear thereof and electrically connected with the fuse contacts of the respective pairs, the said prongs extending rearward and engaging the pairs of contacts on the base when the carrier is upright and is fully entered in the recess, and means on the base and on the carrier serving to prevent the said carrier from entering the recess when the carrier is turned upside down with the fuse contacts and prongs remaining at the rear.

9. In a device of the class described, the combination of an insulating base having a recess open at the front, two pairs of electrical contacts near the rear of the base and arranged with the contacts of each pair adjacent opposite ends of the recess, a removable fuse carrier adapted to be positioned within the recess, two pairs of fuse contacts on the carrier at the rear thereof, two pairs of conducting prongs on the carrier at the rear thereof and electrically connected with the fuse contacts of the respective pairs, the said prongs extending rearward and engaging the pairs of contacts on the base when the carrier is upright and is fully entered in the recess and the said prongs engaging the end walls of the recess so as to support the carrier when it is not fully entered in the recess, and means on the base and on the carrier serving to prevent the said carrier from entering the recess when the carrier is turned upside down with the fuse contacts and prongs remaining at the rear.

JOSEPH SACHS.