

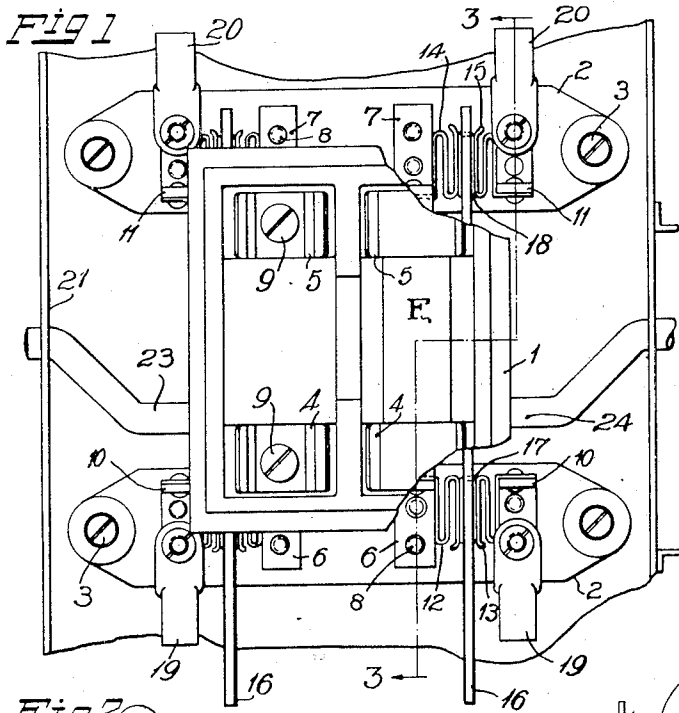
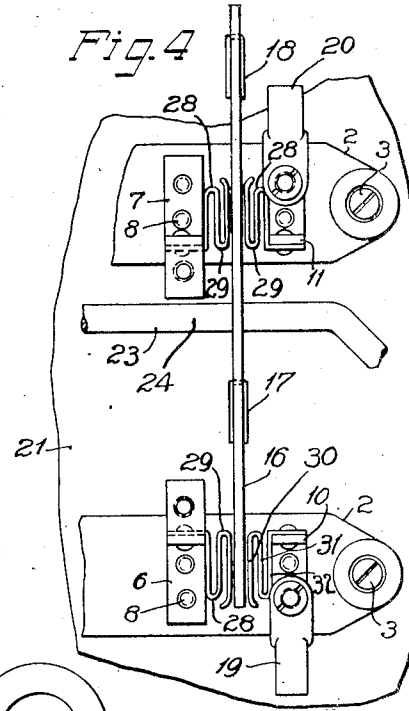
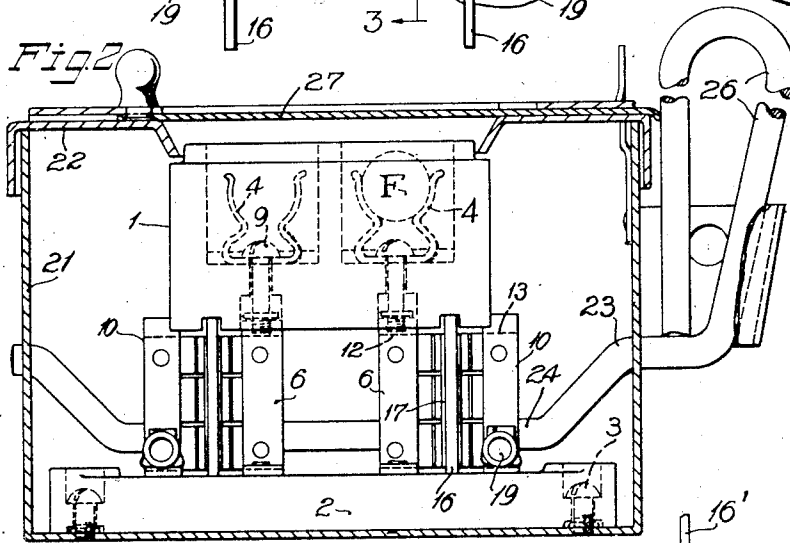
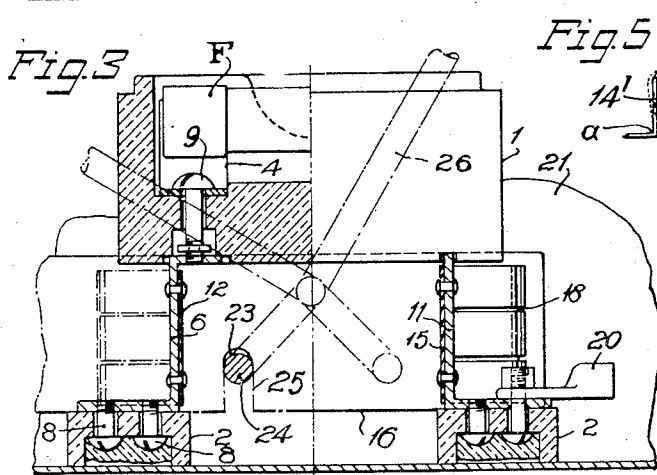
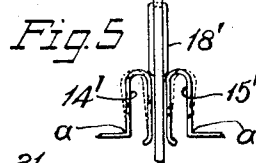
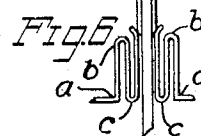
April 15, 1930.

J. SACHS

1,754,446

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Filed Jan. 18, 1928



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UNITED STATES PATENT OFFICE

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ELECTRIC-CIRCUIT-CONTROLLING APPLIANCE

Application filed January 18, 1928. Serial No. 247,731.

The invention is particularly applicable to switches of the type disclosed in my copending applications for Electric circuit controlling appliances, Serial No. 153,966 filed December 10, 1926 and Serial No. 165,645 filed February 3, 1927, but it is not necessarily so limited. The general object of the invention is to provide, for switches of the type referred to, contacts which are so formed as to more satisfactorily engage with the movable switching element. Contacts constructed in accordance with the invention have increased resiliency, are less liable to distortion, and in general provide improved contact conditions with the movable switching element.

In the accompanying drawing I have shown one embodiment of the invention, but it will be understood that the drawing is intended for illustrative purposes only and is 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 drawing:

Figure 1 is a front view of a circuit controlling appliance embodying the invention, parts of the enclosing cabinet being broken away.

Fig. 2 is a bottom view of the appliance shown in Fig. 1, the enclosing cabinet being shown in transverse section.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary front view similar to Fig. 1 but showing the fuse carrying base removed and showing the movable switching member in its "off" position.

Fig. 5 is a fragmentary diagrammatic view illustrating the difficulties which are incident to contacts as heretofore constructed.

Fig. 6 is a view somewhat similar to Fig. 5 but showing contacts embodying the invention.

Referring to Figs. 1 to 4 of the drawing, 1 represents an insulating base mounted in fixed spaced relationship with a rear supporting wall which may be the rear wall of the cabinet. 2, 2 are insulating bars spaced apart and secured to the rear wall of the

cabinet by suitable means such as screws 3, 3. Carried by the base 1 at the front thereof are pairs of fuse contacts 4 and 5, the contacts as shown being adapted for cartridge enclosed fuses such as F. The fuse base 1 is connected with the insulating bars 2, 2 by means of supporting elements 6, 6 and 7, 7. These supporting elements may be varied as to shape but as shown, particularly in Fig. 3, they are Z-shaped each of them being connected with the corresponding bar 2 by means of screws 8, 8 and with the base 1 by means of a screw 9. The screw 9 as shown also engages and holds in place the corresponding fuse contact and serves as an electrical connection between the said contact and the supporting element.

Also connected with the insulating bars, 2, 2 are supporting elements 10, 10 and 11, 11 similar to the supporting elements 6, 6 and 7, 7 but connected with the insulating bars only and not with the base. Carried by the supporting elements are stationary switch contacts, these being arranged in pairs with the contacts of one pair connected respectively with the adjacent supporting elements 6 and 10 or 7 and 11. The contacts of the lower pairs are designated by 12 and 13 and the contacts of the upper pairs are designated by 14 and 15.

For establishing electrical connections through the appliance there is provided a rectilinearly movable switching element which comprises a plate 16 of insulating material and two movable contact elements 17 and 18 carried by the said plate. The movement of the plate 16 is guided by the bars 2, 2 and by the base 1. The said contact elements 17 and 18 are so positioned with relation to each other that, when the plate 16 is in its lower position as shown in Fig. 1, the said contact elements engage the stationary switch contacts of the respective parts to establish electrical connection between them. When the switching member is moved to its upper position as shown in Fig. 4 the said contact elements 17 and 18 are disconnected from the stationary switch contacts and the circuit through the appliance is interrupted. For the convenient attachment of circuit

wires suitable terminals 19, 19 and 20, 20 are connected respectively with the supporting elements 10, 10 and 11, 11. When the switch is in closed position as shown in Fig. 1 a circuit is established from each lower terminal 19 through the switch contacts 13, 17 and 12 to the lower fuse contact 4. The circuit extends through the fuse to the upper fuse contact 5 and from the last said contact it extends through the switch contacts 14, 18 and 15 to the wire terminal 20.

The fused switch appliance as described is ordinarily mounted in a cabinet such as 21 having an openable front cover 22. For operating the sliding switching members there is provided a spindle 23 which is mounted in bearing apertures in side walls of the cabinet. The spindle 23 has a crank portion 24 which extends through slots 25 in the plate 16 and the said spindle is provided with an exterior handle 26. It will be obvious that by oscillating the handle 26 the switching members can be moved to "on" or "off" positions as desired.

In order that access may be had to the fuses when the main front cover 22 of the cabinet is closed the said cover is provided with an opening therein through which the fuses are accessible. In order to prevent access to the fuses through the said opening except when the circuit is broken there is provided an auxiliary cover 27 which is so related to the handle that the cover can be opened only when the handle is in switch opening position and so that the handle can not be moved to switch closing position when the cover is opened. The details of the cover and handle construction form no part of the present invention being covered by my patents for Enclosed fused switches, Nos. 1,721,493, 1,721,494 and 1,721,495, all issued July 16, 1929.

Each of the before-mentioned stationary switch contacts 12, 13, 14 and 15 is of novel construction. Each of these contacts is formed of a strip of resilient sheet metal and each of them has at least two oppositely disposed U-shaped bends 28 and 29 which provide an inner section 30 in position to be directly engaged by the corresponding movable switching element and which provide at least two other integrally connected resilient supporting sections 31 and 32 substantially parallel with the said inner section 30. As will be observed each of the inner sections 30 has an inward facing contact surface which is in position to be directly engaged by the corresponding outward facing contact element. Switch contacts have heretofore been constructed of simple U-shape form as shown diagrammatically in Fig. 5 but this simple construction is sometimes disadvantageous, particularly when the movable switching element must enter between the stationary contacts at the closed ends thereof as shown.

Fig. 5 shows a movable switching member comprising a plate 16' and a contact element 18' carried thereby, the said contact element being about to enter between two stationary U-shaped contacts 14' and 15'. It will be observed that, in order for the movable contact element to enter, the said contacts 14' and 15' must yield to the positions shown by dotted lines. As the result of the unavoidable excessive yielding there is a tendency for the contacts to take a permanent set at the points *a, a*. It will be apparent that by substituting the construction as shown in Figs. 1 and 4 I am enabled to provide much more resilient contacts and to distribute the flexure between at least two points. As shown in the diagrammatic Fig. 6 the deflection instead of occurring entirely at the points *a, a* is divided and occurs substantially equally at the points *a, a, b, b* and *c, c*. Thus I do not only provide a much more resilient contact and one much better adapted to firmly engage the movable switching member but in addition I divide the flexure among three points, thus avoiding excessive flexure at any one point and avoiding any permanent set.

The invention is particularly advantageous when used in a device of the class described wherein the contacts of two associated pairs are oppositely arranged. A reference to Fig. 4 shows that the movable switching element 18 enters between the contacts of the upper pair at the free ends thereof whereas the switching element 17 enters between the contacts of the lower pair adjacent one of the U-bends thereof. It will be observed that the construction is such that satisfactory engagement is obtained in either case and that in either case deflection is distributed between at least two points.

Although the switching member is guided between the base 1 and the rear supporting device 2 and is held by these parts against forward or backward movement, it is entirely free to adjust itself laterally to conform to the positions of the several stationary switch contacts. If there are any defects in the initial construction or mountings of these stationary contacts or in the subsequent adjustment thereof, the switching member will conform thereto and will at all times effect firm engagement with the contacts and will establish effective electrical connections therewith. Thus the increased flexibility of the stationary contacts as already described and the freely adjustable mounting of the switching member cooperate with each other to provide the maximum insurance of firm engagement and effective electrical connections.

What I claim is:

1. In an electric switch, the combination of a movable switching member comprising an insulating element and a conducting element having opposed contact surfaces respectively adjacent opposite faces of the insulating ele-

ment, a pair of opposed electrically insulated stationary switch contacts located at opposite sides of the switching member so that the conducting element thereof is moved into and out of engagement with them to make and break electrical connection between them, each of the said contacts being formed of a strip of resilient sheet metal having at least two oppositely disposed U-shaped bends which provide an inner section with an inward facing contact surface in position to be directly engaged by the corresponding contact surface of the switching element and which provide at least two other integrally connected resilient supporting sections substantially parallel with the inner section, and stationary means associated with the stationary switch contacts and serving to guide the switching member for rectilinear movement in either direction, the said guiding means leaving the switching member free for lateral adjustment perpendicularly to the contact faces of the stationary contacts so as to be controlled as concerns such adjustment solely by the said contacts.

2. In an electric switch, the combination of a movable switching member comprising an insulating element and two spaced conducting elements each having opposed contact surfaces respectively adjacent opposite faces of the insulating element, two pairs of opposed electrically insulated stationary switch contacts located at opposite sides of the switching member so that the conducting elements thereof are moved into and out of engagement with them respectively to make and break electrical connection between them, each of the said contacts being formed of a strip of resilient sheet metal having at least two oppositely disposed U-shaped bends which provide an inner section with an inward facing contact surface in position to be directly engaged by the corresponding contact surface of the corresponding switching element and which provide at least two other integrally connected resilient supporting sections substantially parallel with the inner section and the contacts of the two pairs being oppositely arranged so that the free ends of the inner sections thereof extend in opposite directions, and stationary means associated with the stationary switch contacts and serving to guide the switching member for rectilinear movement in either direction, the said guiding means leaving the switching member free for lateral adjustment perpendicularly to the contact faces of stationary contacts so as to be controlled as concerns such adjustment solely by the said contacts.

60 In testimony whereof I have hereunto set my hand this 31st day of December, 1927.

JOSEPH SACHS.