

Jan. 3, 1933.

J. SACHS

1,892,854

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Filed Oct. 14, 1931

Fig. 1

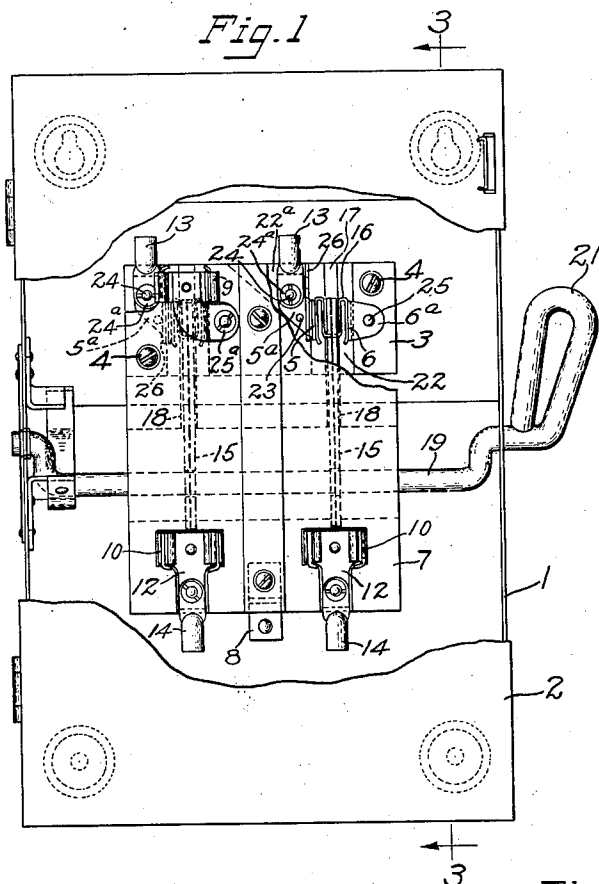


Fig. 3

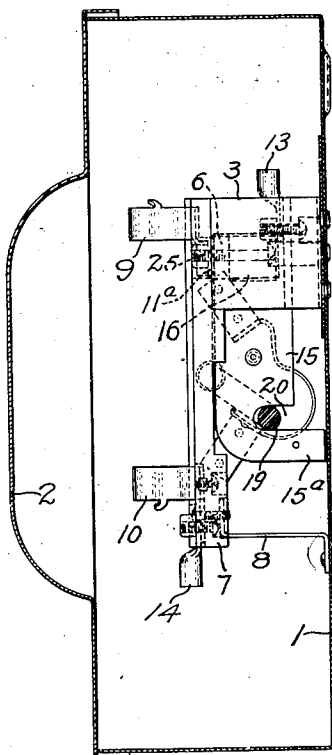


Fig. 2

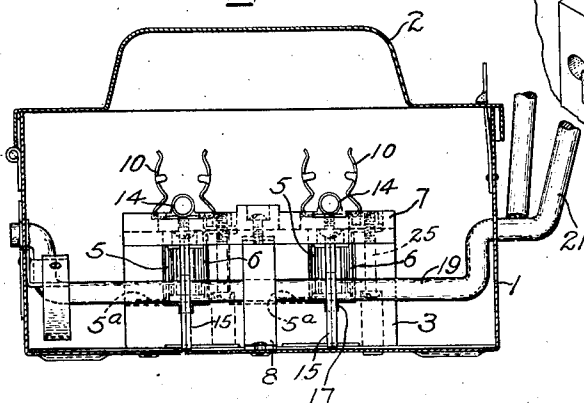


Fig. 4

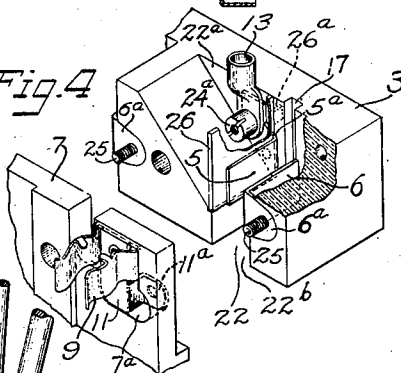
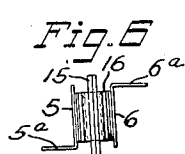


Fig. 5



Fig. 6



Inventor.
Joseph Sachs.
By S. Jay Teller
Attorney.

UNITED STATES PATENT OFFICE

JOSEPH SACHS, OF WEST HARTFORD, CONNECTICUT

ELECTRIC CIRCUIT CONTROLLING APPLIANCE

Application filed October 14, 1931. Serial No. 568,807.

The present invention relates particularly to electric circuit controlling devices of the type described in my Patents No. 1,754,445 and No. 1,790,324 dated respectively April 15, 1930 and January 7, 1931.

The principal object of the present invention is to provide a switch of this general type having an improved arrangement and mounting for the stationary switch contacts in order to insure effective engagement between the contacts under all conditions. The improved construction is particularly advantageous for relatively small and inexpensive switches in which it is difficult to avoid minor inaccuracies in the sizes and spacings of the contacts without adjustment and fitting.

In the accompanying drawing I have shown the embodiment of the invention which I now prefer, but it will be understood that the drawing is 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:

Fig. 1 is a front view of a switch embodying the invention, a portion of the front cover of the enclosing cabinet being broken away as is also a part of the plate carrying the fuse contacts.

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

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

Fig. 4 is a perspective view showing the stationary switch contacts and the supporting device thereof, certain parts being broken in order that other parts may more clearly appear.

Figs. 5 and 6 are diagrammatic views illustrating the advantages of the novel contact mounting herein shown and described.

The switch embodying the invention is particularly adapted to be mounted within an enclosing cabinet, such as 1, and it is so shown. The cabinet 1 may be of any usual or preferred construction and is illustrated as being rectangular in form with an openable front cover 2. The rear wall and the

side walls of the cabinet serve to support the various parts of the switch.

As shown, there are two separate switching devices for two legs of a circuit, but it will be understood that the exact number is immaterial. For the sake of convenience and simplicity of description, I will confine the description chiefly to those parts at the right side, it being understood that the other parts are, or may be similar or identical in construction.

Secured to the rear supporting wall, in this case the rear wall of the cabinet 1, is an insulating supporting device 3 held in place by screws 4, 4. Carried by the supporting device 3 are two opposed stationary switch contacts 5 and 6 having at their inner sides parallel contact faces. Preferably the stationary contacts are so arranged that their said contact faces are vertical and are perpendicular to the rear supporting wall.

When fuse contacts are associated with the switch contacts, there is preferably provided at the front of the said switch contacts an insulating plate 7 which is substantially parallel with the rear supporting wall. Various means may be provided for supporting the plate 7, but preferably and as shown the supporting device 3 is made relatively thick and the upper portion of the plate 7 contacts directly with the front face of the said supporting device. The lower portion of the plate 7 is connected with the rear supporting wall by means of a metal bracket 8. Mounted on the insulating plate 7 are fuse contacts 9 and 10. The upper contact 9 is connected with a conductor 11 having a portion 11^a which is offset toward the rear and which projects into a hole 7^a formed in the plate 7. The rear face of the offset portion 11^a is substantially flush with the rear face of the plate 7 and is electrically connected with the switch contact 6 as hereinafter described. The lower fuse contact 10 is connected with a conductor 12 secured to the plate 7. A wire terminal 13 is electrically connected with the stationary switch contact 5 and a second wire terminal 14 is electrically connected with the conductor 12 and thus with the lower fuse contact 10.

For making and breaking the circuit between the stationary switch contacts 5 and 6, I provide a switching member which preferably is movable in a vertical rectilinear path. When a front insulating plate such as 7 is provided, the switching member moves at the rear of said plate. The switching member comprises an insulating element 15 and a conducting contact 16. The insulating element 15 is preferably a thin flat plate which is vertical and which is perpendicular to the rear supporting wall. The contact 16 extends through a slot in the flat insulating element and is provided with substantially parallel outward facing contact faces adapted to electrically engage the respective contact faces of the contacts 5 and 6.

The switching member as an entirety is preferably guided for rectilinear movement between the insulating supporting device 3 at the rear and the plate 7 at the front. The insulating device 3 and the plate 7 are provided respectively with grooves 17 and 18 for receiving the edge portions of the insulating element 15, but it will be observed that these grooves are wider than the said element so as to permit the switching member to adjust itself transversely without being closely limited by the walls of the grooves. Preferably the insulating element 15 has a rearward extension 15^a which is adapted to engage the rear wall of the cabinet which thus serves as an additional guide for the movable switching member.

For operating the switching member there is provided a cranked operating member 19 which is pivotally mounted in suitable apertures or bearings in the opposite side wall of the cabinet 1. The crank portion of the operating member extends through a slot 20 in the insulating element 15 of the switching member. When there are two or more switching members as shown they are all operated by the same operating member. Carried by or connected with the operating member is a handle 21 and as shown this handle is an integral part of the operating member.

Figs. 1, 2 and 3 of the drawing show the switch parts in their closed circuit positions, the handle 21 being in its uppermost position. It will be obvious that by moving the handle 21 downward the switching members will be moved upward, thus disengaging each movable contact 16 from the corresponding stationary contacts 5 and 6. In this way the circuit is broken at two places and at the same time the flat insulating element 15 is interposed between the two stationary contacts 5 and 6 thus serving as an insulating barrier between them.

The two stationary contacts 5 and 6 are preferably formed from relatively resilient material and they are positioned with their longitudinal lines substantially perpendicular to the direction of movement of the switch-

ing member. In the present instance, wherein the switching member moves vertically, the longitudinal lines of the contacts 5 and 6 are horizontal. The means for mounting or supporting the respective stationary contacts 5 and 6 are at the opposite ends thereof, that is, in the present instance, one of them is supported at the rear and the other is supported at the front.

The details of the supporting means for the contacts 5 and 6 may be varied, but preferably and as shown most clearly in Fig. 4 the supporting device 3 is formed with a relatively large vertical passage 22 at the sides of which the said contacts 5 and 6 are located and through which the switching member moves. The passage 22 is enlarged at one side as indicated at 22^a and the contact 5 is provided with a right angle extension 5^a which engages the rear wall of the enlarged portion 22^a of the passage. The extension 5^a is held in place by means of screws 23 and 24, the latter screw being also engaged by a nut 24^a which serves to hold the before-mentioned wire terminal 13. The stationary contact 6 is provided with a right angle extension 6^a which is seated in a shallow recess at the front of the supporting device 3. It is held in place by means of a screw 25, this same screw extending through the conductor 11 and being engaged by a nut 25^a. The contact 6 is sufficiently spaced from the adjacent wall of the passage 22 to permit limited flexure. It will be seen that the nut 25^a cooperating with the screw 25 serves not only to hold the conductor 11 in firm electrical engagement with the contact extension 6^a, but also serves to hold the plate 7 in proper position with respect to the supporting device 3.

Inasmuch as the two contacts 5 and 6 are supported at their respectively opposite ends they are free for transverse flexure in substantial parallelism in conformity with the thickness of the movable contact 16. In order to insure good electrical engagement between the contacts, the movable contact 16 is so formed that the distance between its opposite contacts is slightly greater than the distance between the faces of the contacts 5 and 6. If there are inaccuracies of manufacture this difference may in some instances be abnormally large, and then the novel mounting of the contacts becomes particularly important. This will be more apparent from an inspection of the diagrammatic Figs. 5 and 6 wherein the aforesaid difference in dimensions is greatly exaggerated.

Fig. 5 shows two contacts 5' and 6' mounted in accordance with prior practice. A movable contact 16' has been pushed between them but on account of inaccuracies in manufacture the distance between the faces of the contact 16' is considerably greater than the distance between the faces of the two contacts 5' and 6'. The result is that the

said contacts 5' and 6' are forced apart with the consequence that electrical contact is obtained only at the rear edges of the contact 16'.

5 Fig. 6 is similar to Fig. 5, but shows contacts 5 and 6 mounted in accordance with the present invention. Here again it is assumed that the distance between the faces of the contact 16 is considerably greater than the
10 distance between the faces of the two contacts 5 and 6. It will be observed, however, that by reason of the opposite mounting the two contacts 5 and 6 remain substantially parallel when they are flexed in conformity
15 with the thickness of the contact 16. As the contact 16 moves between the contacts 5 and 6 it flexes them, with the result that, notwithstanding the described variations, good electrical contact is obtained over the entire sur-
20 faces of the contacts. It will be observed that freedom of the switching member for transverse adjustment permits it to assume an angular position as indicated.

Preferably I provide insulating walls immediately adjacent the paths of movement of the opposite contact faces of the contact 16. One of these walls is formed integrally with the insulating supporting device 3, being in fact one of the side walls of the vertical passage 22 as indicated at 22^b. The other
30 insulating wall is formed by means of a separate insulating plate 26 adjacent the stationary contact 5. Preferably the plate 26 is formed with a small extension 26^a at the
35 rear, which projects into a corresponding hole in the supporting device 3. In this way the plate 26 is held against vertical movement. Movement in the forward direction is prevented by the front plate 7. The two insu-
40 lating walls at 22^a and 26 prevent the expansion of any arc that may be formed and also serve to absorb the heat of the arc, thus materially aiding in the prompt extinguishing thereof.

45 What I claim is:

1. In an electric switch, the combination of a movable switch contact having two opposite parallel contact faces, two stationary switch contacts at opposite sides of the path of movement of the movable contact with the longitudinal lines of the said contacts substantially perpendicular to the direction of such movement, the said stationary contacts having opposite parallel contact faces adapted to be engaged and disengaged by the respective contact faces of the movable contact, and means at opposite ends of the respective stationary contacts for supporting them in such manner as to leave them free for trans-
50 verse flexure in substantial parallelism.

2. In an electric switch, the combination of a rectilinearly movable switching member comprising an insulating element guided at its edges and also comprising a contact on
65 the said insulating element having two op-

posite parallel contact faces, two stationary resilient switch contacts at opposite sides of the path of rectilinear movement of the switching member with the longitudinal lines of the said contacts substantially perpen- 70 dicular to the direction of such movement, the said stationary contacts having opposite parallel contact faces adapted to be engaged and disengaged by the respective contact faces of the movable contact, and means at 75 opposite ends of the respective stationary contacts for supporting them in such manner as to leave them free for transverse flexure in substantial parallelism when engaged by the movable contact. 80

3. In an electric switch, the combination of a movable switch contact having two opposite parallel contact faces, two stationary resilient switch contacts at opposite sides of the path of rectilinear movement of the movable contact with the longitudinal lines of the said contacts substantially perpendicular to the direction of such movement, the said stationary contacts having opposite parallel contact faces adapted to be engaged and disengaged by the respective contact faces of the movable contact, and an insulating supporting device engaging the said stationary contacts at opposite ends thereof and supporting them in such manner as to leave them free for transverse flexure in substantial parallelism when engaged by the movable contact. 85 90 95

4. In an electric switch, the combination of a rectilinearly movable contact having two opposite parallel contact faces, an insulating supporting device having a passage therein through which the said contact moves, and two stationary resilient switch contacts at opposite sides of the passage and of the path of movement of the movable contact and having opposite parallel contact faces adapted to be engaged and disengaged by the respective contact faces of the movable contact, one of the contacts being connected with the supporting device at the front of the passage and projecting rearward and the other being connected with the supporting device at the rear of the passage and projecting forward and both of them being free for transverse flexure when engaged by the movable contact. 100 105 110 115

5. In an electric switch, the combination of a rectilinearly movable switching member comprising an insulating element with a longitudinal guiding edge and also comprising a contact on the said insulating element having two opposite parallel contact faces, an insulating supporting device having a passage therein through which the switching member moves, the bottom wall of the passage engaging the said guiding edge of the insulating element, and two stationary resilient switch contacts at opposite sides of the passage and of the path of movement of the 120 125 130

switching member and having opposite parallel contact faces adapted to be engaged and disengaged by the respective contact faces of the movable contact, one of the contacts being connected with the supporting device at the front of the passage and projecting rearward and the other being connected with the supporting device at the rear of the passage and projecting forward and both of them being free for transverse flexure when engaged by the movable contact.

In testimony whereof I have hereunto set my hand this 10th day of October, 1931.

JOSEPH SACHS.

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