

April 30, 1946.

B. J. PRUSSACK

2,399,449

ELECTRICAL SWITCH

Filed June 24, 1943

2 Sheets-Sheet 1

Fig. 1.

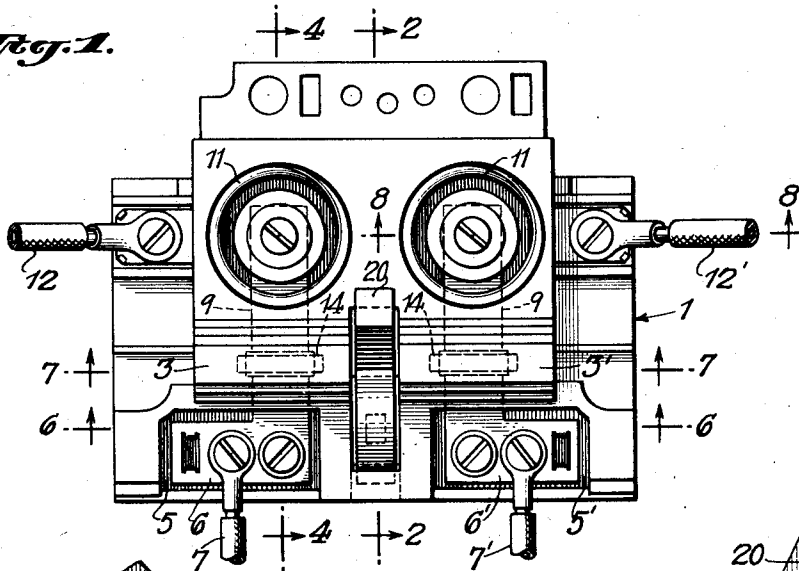


Fig. 2.

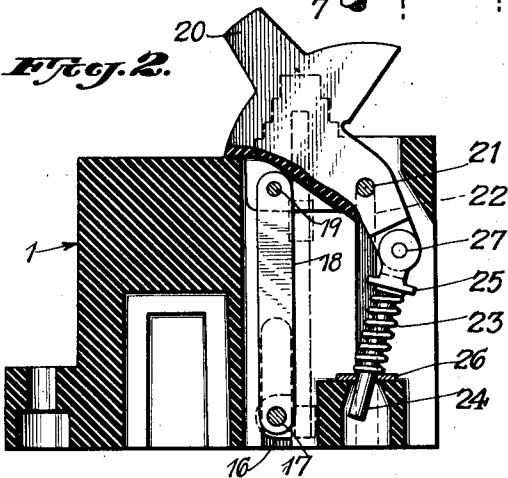


Fig. 3.

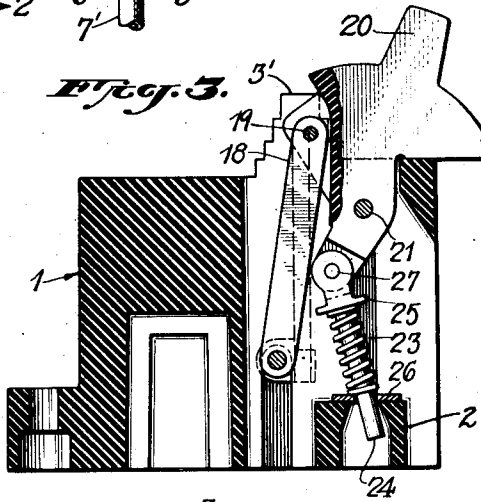


Fig. 4.

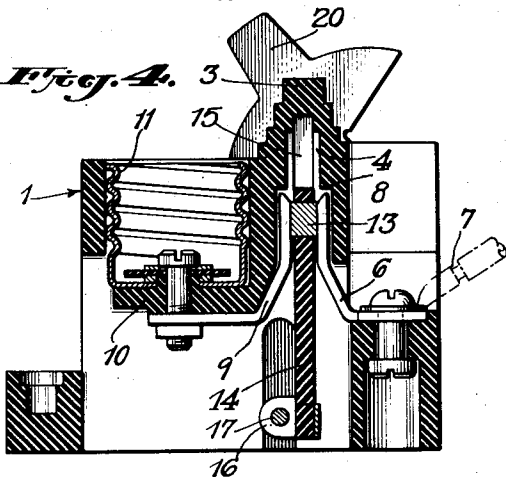
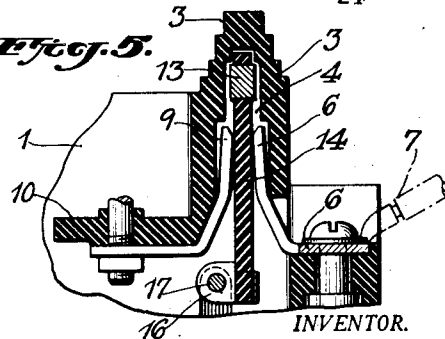


Fig. 5.



INVENTOR.
BENJAMIN J. PRUSSACK.
BY
Hard Assaly & Neal
his ATTORNEYS.

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Fig. 6.

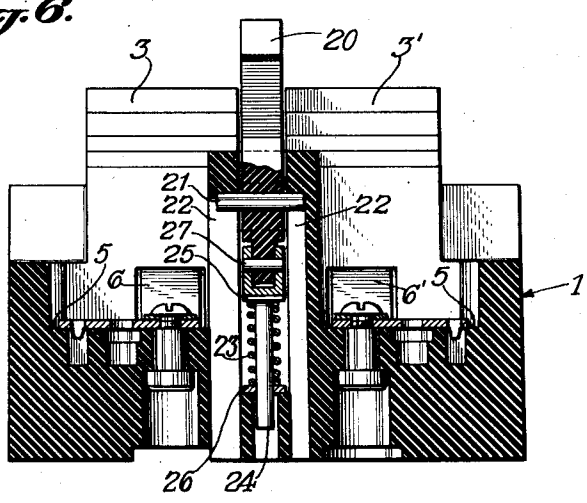


Fig. 7.

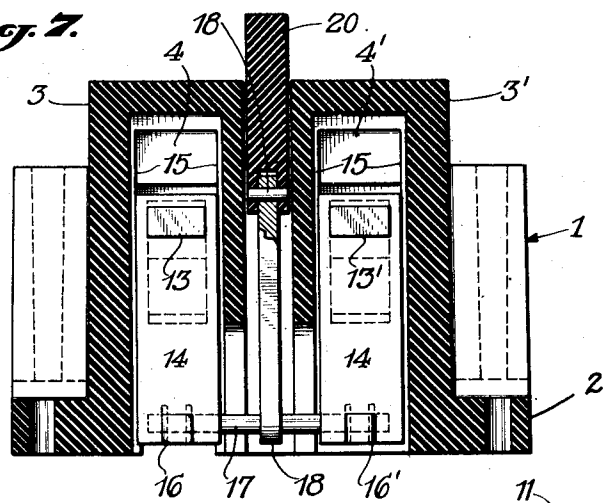


Fig. 9.

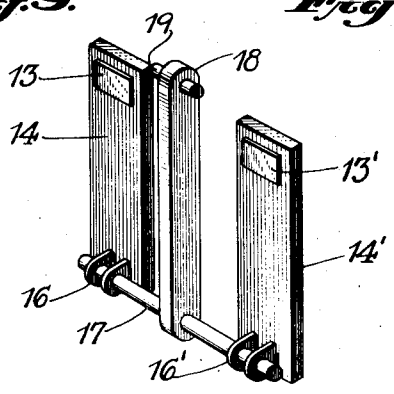
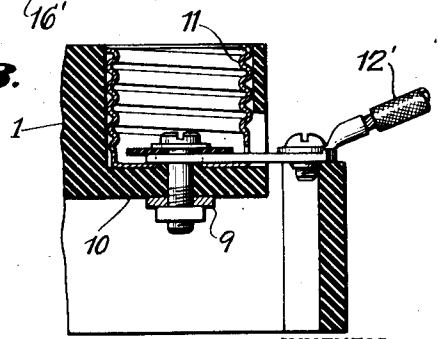


Fig. 8.



INVENTOR.

BENJAMIN J. PRUSSACK.

BY

Hard Crosby & Neal

his ATTORNEYS.

UNITED STATES PATENT OFFICE

2,399,449

ELECTRICAL SWITCH

Benjamin J. Prussack, Brooklyn, N. Y.

Application June 24, 1943, Serial No. 492,055

3 Claims. (Cl. 200-149)

This invention relates to electrical switches, such as are utilized for interrupting electrical circuits. The invention is especially useful in circuits carrying such a load that the drawing of an arc may be detrimental to the contacts, and otherwise be undesirable.

An object of this invention is to provide an improved switch in which the arc is restricted and suppressed.

Another object is to provide a sturdy, simplified and dependable switch.

The invention consists in the novel features, arrangements and combinations of parts embodied by way of example in the device hereinafter described as illustrating a preferred form of the invention, and the invention will be more particularly pointed out in the appended claims.

Further objects, features and advantages of the invention will more fully appear from the following specification and claims taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of an embodiment of the invention illustrating a 2-pole switch;

Fig. 2 is a cross-sectional view taken at line 2-2 of Fig. 1 and showing in end elevation the actuating mechanism in closed position of the switch;

Fig. 3 is a view similar to Fig. 2 but showing the mechanism moved to open position of the switch;

Fig. 4 is a cross-sectional view taken at 4-4 of Fig. 1 and showing in end elevation the contacts for one side of the switch in closed position;

Fig. 5 shows certain parts of Fig. 4 with said contacts in open position;

Fig. 6 is a cross-sectional view taken at 6-6 of Fig. 1 and showing in side elevation further details of the actuating mechanism and switch body;

Fig. 7 is a cross-sectional view taken at 7-7 of Fig. 1 and showing in side elevation further details of the switch body and the arrangement of the movable contacts and actuating mechanism;

Fig. 8 is a cross-sectional view taken at 8-8 of Fig. 1 and showing further details of the parts; and

Fig. 9 is a perspective view showing the movable contacts for both poles of the switch and the means of mounting the same.

Referring to the drawings, and more particularly to Figs. 1, 2 and 3, the switch body is designated in general as 1 and is preferably formed as an integral whole of porcelain or other suitable dielectric material which also preferably is resistant to burning and which may be molded or

cast. The body consists in general of a base portion 2 and vertically extending laterally spaced housing portions 3 and 3'. The housings 3 and 3' are provided respectively with vertically disposed cavities 4 and 4' which are closed at their upper ends and which are open at their lower ends (see also Figs. 4 and 7). Since the relative arrangement and disposition of the contacts within the respective cavities 4 and 4' are identical, the arrangement in one of these cavities will suffice for a complete understanding, and corresponding parts in the other cavity will be referred to by the same numerals with a prime suffix added where reference is made to the other corresponding parts; likewise, since the switch is symmetrical about a center line corresponding to the section line 2-2 of Fig. 1, respectively corresponding parts on opposite sides of said line will be designated by the same numerals with the prime suffix added to parts on the right-hand side where it is necessary to refer to them specifically.

Referring more particularly to Figs. 1 and 4: The base portion 2 of the body 1 is provided with suitable recesses 5, 5', forming platforms on which are rigidly secured the lower ends of fixed blade contacts 6, 6' which are adapted to be connected to the respective sides or poles of electrical line conductors 7, 7'. Further details of the construction and arrangement of the parts will be described with reference to the left side of the device, it being understood that corresponding parts in the right side of the device are identical. The stationary contact 6 is disposed with its upper free end extending into the cavity 4 and lying contiguous the front wall, partly within a recess provided in the cavity and terminating adjacent the upper end of the recess designated 8. A cooperating stationary contact 9 has its free upper end similarly disposed contiguous the opposite or rear wall of the cavity 4 and together with the contact 6 forms a pair of stationary contacts. The lower end of the contact 9 is seated on and rigidly secured to the lower face of a table portion 10 formed within the body 1. The contact 9 is secured to one terminal of a fuse socket 11 mounted on the upper side of the table 10 and whose other terminal is connected to a conductor 12 forming one side or pole of an electrical load, in such manner that when the fuse is placed in the fuse socket, the conductor 12 is connected to the stationary contact 9. The upper free ends of the contacts 6 and 9 are tapered upwardly and outwardly from their inner to their outer faces, and in the open position (Fig. 5) the contacts are

inclined inwardly to insure a resilient wiping contact with a movable contact to be described.

A movable contact 13 in the form of a slug (Figs. 4, 7 and 9) is mounted in a hole extending through an insulation carrier 14 adjacent its upper end with the opposite faces of the slug 13 adapted to engage the inner faces of respective stationary contacts 6—9 with a wiping action when the switch is in closed position (Fig. 4). The carrier 14 is made of fibrous or the like insulating material of a character which when subjected to an arc between the stationary and movable contacts will liberate a gas. I have found that material known as "Vulcoid" is entirely satisfactory for this purpose; but numerous other fibrous materials having this characteristic are well known to those skilled in the art. With the switch in the position shown in Fig. 4, the parts are so proportioned that the outer faces of the pair of stationary contacts 6, 9 are flexed outwardly and lie closely adjacent the respective cavity walls, and the space between the pair of contacts 6, 9 is slightly greater than the thickness of the carrier 14. The carrier 14 has its opposite longitudinal edges seated in oppositely disposed guideways such as 15 (Figs. 4 and 7) provided as longitudinal recesses in the cavity 4 and serving to guide the carrier 14 in its vertical travel from the closed position of the switch indicated in Fig. 4 to the open position of the switch indicated in Fig. 5. With the switch in the position indicated in Fig. 5, the contacts 6, 9 assume their converged position and together with the carrier 14 serve to substantially close the lower end of the cavity 4, leaving only a restricted passage from a chamber defined by the housing 3, contacts 6, 9 and carrier 14. In general, for optimum results the thickness of the cavity should be substantially equal to or slightly greater than the combined thicknesses of the contacts 6, 9 and 13; and the thickness of the carrier 14 should be such as to provide a sloppy fit between the contacts 6 and 9; the higher the voltages the greater the space between the carrier 14 and contacts 6 and 9.

The carriers are mounted for reciprocation in the following manner (Figs. 9 and 7). The lower ends of the carriers 14 and 14' in the closed position of the switch extend downwardly adjacent the bottom of the body 1 and are provided with U clips 16, 16' of metal whose sides extend through slots in the carrier from the rear side and project outwardly beyond the front side. The clips 16, 16' are provided with aligned holes receiving a cross rod 17 interconnecting them for simultaneous vertical movement. A link 18 at its lower end pivotally engages the middle of the rod 17 and at its upper end is provided with a trunnion pin 19 which serves to pivotally connect the link 18 between bifurcations provided in a switch-actuating handle 20. The link 18 and handle 20 are positioned in a slot or opening provided in the body 1 between the housing portions 3, 3'. The handle 20 is provided with a pivot pin 21 (Fig. 2) which is seated in the upper end of a slot 22 provided in the body 1, and is urged upwardly thereagainst by means of a helical compression spring 23 surrounding a toggle stem 24 and restricted between a shoulder 25 formed integral with the stem 24 and a fixed shoulder 26 seated on a portion of the body 1; the stem being pivotally attached at its upper end as at 27 to a lower extension of the switch handle 20. The parts are so constructed and arranged that when the handle is moved to the left past the center, the spring 23 snaps the switch over to closed posi-

tion (Fig. 2), where its movement is limited by engagement with the body 1, and the spring 23 serves to hold the contacts in closed position; and when the handle 20 is moved to the right a similar snap-action moves the switch to the open position indicated in Fig. 3, and the spring serves to hold the contacts in open position.

Having thus described my invention in detail in its present preferred embodiment, it will be obvious to those skilled in the art, after understanding my invention, that various changes and modifications may be made therein without departing from the spirit and scope thereof, and I aim in the appended claims to cover all such changes and modifications.

What I claim is:

1. In an electrical switch, the combination of a relatively stationary insulating housing providing a longitudinal chamber closed at one end, a pair of stationary contacts adapted to be attached to electrical conductors to be connected, said contacts being disposed in spaced apart relation with free ends disposed within said chamber and being seated in respective recesses provided in said housing, an insulation carrier vertically slidably disposed in guideways provided by grooves in said housing and mounted between said contacts and providing with said contacts closure means for the other end of said chamber, and a movable contact carried by said carrier and movable by said carrier into and out of engagement with said stationary contacts, said closure means having a restricted passage providing for emission of gas liberated by said carrier resulting from an electric arc between said stationary and movable contacts, said chamber providing space for receiving the upper end of said carrier and said movable contact when it is disengaged from said stationary contacts.

2. In an electrical switch, the combination of a relatively stationary insulating housing providing a pair of spaced apart longitudinal chambers closed at their upper ends, corresponding pairs of stationary contacts adapted to be attached to electrical conductors to be connected, said respective contact pairs being disposed in spaced apart relation with free ends positioned within respective of said chambers, corresponding insulation carriers mounted respectively between said pairs of contacts and providing therewith closure means for the other ends of said chambers, corresponding movable contacts carried by respective of said carriers and movable thereby into and out of engagement with said stationary contacts, said closure means having restricted passages providing for emission of gas resulting from electric arcs between said stationary and movable contacts, said chambers providing spaces for receiving the respective upper ends of said carriers and said movable contacts when disengaged from said stationary contacts, the lower ends of said carriers extending downwardly, a transversely extending member interconnecting said carriers for simultaneous movement, an upwardly extending member secured at its lower end to said transverse member between said carriers, and actuating means secured to the upper end of said upwardly extending member for selectively holding said carriers in respective raised and lowered positions.

3. In an electrical switch, the combination of a relatively stationary insulating housing providing a cavity closed at one end, a pair of longitudinally extending laterally spaced and laterally flexible blade contacts converging toward their upper free

ends when said switch is in open position, said blades being disposed in said cavity and secured against longitudinal movement therein, a fibrous insulation carrier disposed between said blade contacts and movable longitudinally therebetween and serving to partially close the space between said blade contacts, a movable contact carried by and movable with said carrier into wiping contact between said stationary contacts and outwardly therefrom into the closed end of said cavity, and 10

means for moving said carrier and contact relative to said housing, the space between the inner wiping contact faces of said blades being less than the distance between the corresponding wiping faces of said movable contact, and the cavity width being sufficient to permit outward flexure of said blades when said movable contact is positioned between said blades.

BENJAMIN J. PRUSSACK.