

1,360,047.

Fig. 1.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23.

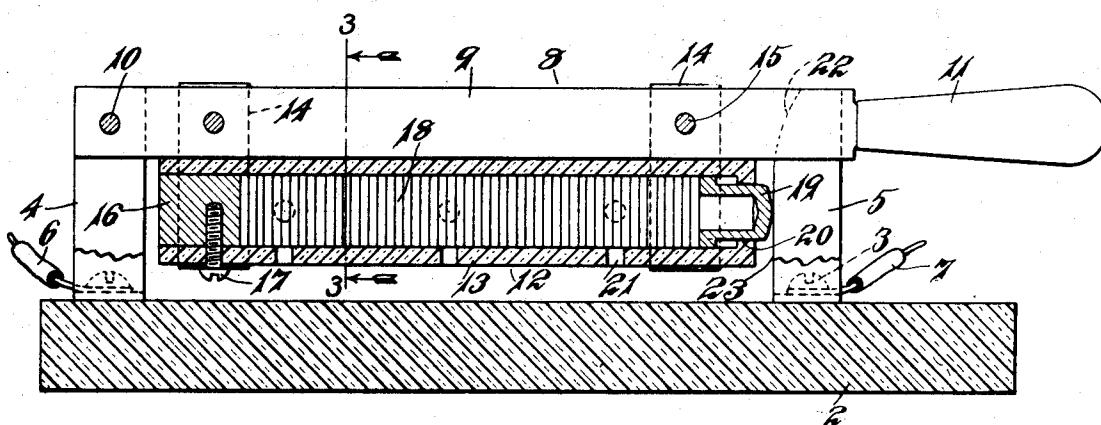
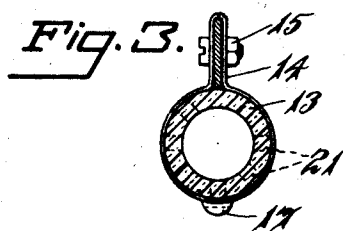


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

1,360,047.

Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed January 14, 1920. Serial No. 351,371.

To all whom it may concern:

Be it known that I, CLARENCE C. STIRLING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

This invention relates to electric switches. I use the designation "electric switch" in a broad or general sense for the reason that the invention as to some if not all of its features, is not only successfully usable in conjunction with a switch, but with a differently-functioning electric instrument, of which a rheostat is typical. Probably the primary motive of the invention, is the provision, in an article of one or the other of the characters set forth, of means, which is simple in construction, susceptible of inexpensive manufacture, and positive and certain in action, by which sparking is practically eliminated. The device possesses other features of advantage and novelty which with the foregoing will be set forth at length in the following description wherein I will outline in detail that form of embodiment of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. This disclosure is provided primarily to enable those skilled in the art to practice the invention. I am in no sense restricted thereto. I may depart therefrom in several respects within the scope of the invention defined by the claims following said description.

Referring to said drawings:

Figure 1 is a side elevation of a switch involving the invention in open-circuited relation.

Fig. 2 is a sectional side view with the container and the base in longitudinal section.

Fig. 3 is a cross section on the line 3—3 of Fig. 2 looking in the direction of the arrows.

The number of poles of the switch may vary; that is there may be one or more. The switch selected for illustration is of single pole type.

Said switch comprises in its makeup, a base or foundation member of any desirable construction or material. The base in shape may be practically rectangular, and it is of insulating material such as is com-

mon in electric switches and other like electrical devices of the ordinary kind. The base shown is denoted in a general way by 2. On this base are fastened in some convenient way as by screws 3 for example, the contacts or terminals as 4 and 5 but which obviously might be of some other type than as shown. The screws 3 which extend through the feet of the terminals or contacts 4 and 5 also hold wires as 6 and 7 in electrical connection with the respective contacts or terminals. The contact or terminal 4 constitutes the mounting or supporting terminal, for the blade of the switch, while the contact or terminal 5 presents the rupturing contact. As shown both of the contacts 4 and 5 comprise, as quite common in the art, mating or similar branches more or less resilient.

The circuit-controlling or switching member is denoted in a general way by 8. I have given it the dual designation because while it constitutes in the construction shown a switching member, it need not always exactly so function as will be clear; more broadly therefore it constitutes a circuit-controlling member. The switching member 8 includes in its makeup a practically flat blade as 9 pivoted as at 10 at its rear end between the resilient branches of the contact 4. The front of the blade 9 is furnished with a handle 11 which presents a simple way of manipulating the blade 9 which really constitutes the body of the circuit-controlling or switching member. In Fig. 2 the blade 9 is shown in its closed circuited position fitting closely or snugly at this time between the branches of the contact 5.

The blade 9 or lever as is its form in the construction shown, is obviously of some conducting material and there is movable with it a suitable container such as that denoted in a general way by 12 the two parts being rigidly associated in some convenient way one of which I will hereinafter describe.

This container 12 as shown is in the form of an elongated tube a little less in length as represented, than the body of the blade or lever 9. This tube 13 which is of insulating material, receives around it as shown duplicate clips as 14 the free portions of which straddle the blade 9 near the opposite ends thereof and are screwed thereto in some convenient way as by screws 15. This tube 13 contains a variable resistance which

functions as I will later set forth. In the rear end of the tube 13 is set a plug 16 held properly in place by a screw as 17, the screw being threaded into the plug and through the tube 13 and cross portion of the rear clip 14. In front of this plug 16 which constitutes a suitable stop or support, is a large number of flat metal disks as 18 the forward one of which abuts against a stop member as 19 which like the disks is of metal. This stop 19 is circumferentially reduced and its circumferentially-reduced portion extends through a perforation 20 in the front end of the tube 13 mounted to co-operate with the rupturing terminal or contact 5. The tube 13 as shown has a large number of perforations 21 intended primarily for ventilation. It will of course be understood, that the rear of the superimposed elements 18 bears against the stop or plug 16 while the front one bears against the stop 19. The batch of superimposed disks or metallic pieces 18 is compressible and expansible and an advantage is secured by this. The upper end portion of the contact or terminal 5 is cammed off as at 22.

In Fig. 1 the circuit-controlling member 8 is supposed to be open and the disks 18 have assumed their maximum expansion, advancing solidly against the stop 19 owing to the mechanical resistance interposed by the plug or stop 16. It will be assumed that the circuit-controlling or switching member is closed through the manipulation of the handle 11. As the closed position is reached the stop member or plug 19 strikes the upper end of the cam surface 22 and as the closing movement continues, the stop or plug 19 is retracted or moved backward and therefore tends to further compress the disks 18, the maximum compression being obtained when the plug 19 reaches the end of the cam surface 22 and rides along the straight surface 23 of the rupturing contact 5. When the circuit-controlling or switching member 8 is opened and when the stop or plug 19 strikes the cam surface 22 the disks 18 are free to expand, the expansion continuing as the stop or plug 19 rides along the cam face 21, the maximum expansion obviously occurring when the said plug or stop 19 leaves the said cam face 22 and remaining in the said condition until the switch is again closed in the manner I have described.

From the foregoing description taken in connection with the annexed drawings, it will be evident that I provide in an electric switch a movable tubular member having therein expansible and contractible conducting means, together with means for causing the compression of the inclosed means on one movement of the tubular member and allowing expansion thereof on another movement of said tubular member. The switch or analogous implement also has a low re-

sistance path and a path of variable resistance connected in multiple, together with means for automatically varying the resistance at different points. Desirably the increase in resistance at this variable resistance, is brought about when the switch is opened or as it might be otherwise stated in another case when the resistance element is brought to the open circuited-relation.

I deem it desirable to refer somewhat briefly to the electrical action of the switch. On the circuit breaking movement the lever or blade 9 leaves the contact 5. The current then having no other path must go by way of that presented by the compressed pile of plates or disks 18. At this particular time the pile of plates or disks is compressed to its maximum extent its electrical resistance as a consequence being low. As a result there is little or no spark as the lever 9 leaves the contact 5, as the current has no objection to passing by way of a low resistance path. Now as the motion, in an upward direction as shown, continues the pressure on the pile of plates or disks 18 becomes less and less by reason of the cam surface 22, the electrical resistance presented by said pile progressively increasing so that at the moment the circuit is broken at the end of the pile, the current has been automatically reduced to a practically harmless extent. Thus arcing is prevented on the first break by presenting a low resistance path. On the last break by a high resistance path, the resistance of the by-passing path being automatically changed in transit or motion from a low to a high resistance, the maximum resistance being presented when the plug 19 leaves the contact 5.

What I claim is:

1. A switch having an expansible and contractible resistance and means for causing a contraction of the resistance on one movement of the switch and an expansion of the resistance on another movement thereof.

2. A switch comprising a lever, a tube to move with said lever and expansible and contractible conducting means inclosed by the tube, and a contact engageable by the lever, the contact having means for causing the contraction and expansion of the conducting means on different movements of the lever.

3. An electric switch comprising a movable tubular member, expansible and contractible conducting means inclosed in the tubular member, and a contact engageable by the tubular member and provided with means for causing the compression of the inclosed means on one movement of the tubular member and the expansion thereof on another movement of said tubular member.

4. An electric switch comprising a swinging tubular member, expansible and contractible conducting means inclosed in the

tubular member, and a contact for causing the compression of the inclosed means when the tubular member swings in one direction, and the expansion of the inclosed conducting means when the tubular member swings in the opposite direction.

5 5. An electric switch comprising a movable tubular member, a series of superimposed plates in the movable member, a contact engageable by the movable member and provided with means for causing the compression and contraction of the plates to vary the resistance of the switch.

10 6. An electric switch comprising a lever, 15 a contact to which said lever is connected for

swinging movement, a tube to swing with the lever, a series of superimposed conducting plates in the tube electrically connected with the lever, a plug in engagement with the plates, and a contact engageable by the plug to cause the movement of the plates and their contraction and expansion respectively on the closing and the opening of the switch.

In testimony whereof I affix my signature 25 in the presence of two witnesses.

CLARENCE C. STIRLING.

Witnesses:

ELSIE M. RABENSTEIN,
HEATH SUTHERLAND.