June 9, 1942. E. C. TANNER 2,285,624

ELIMINATION OF CONTACT BURNING ON CONTROLS

Filed Nov. 4, 1939

Fig. 1.

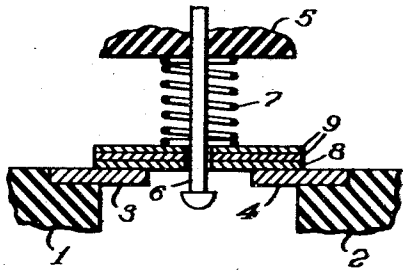


Fig. 2.

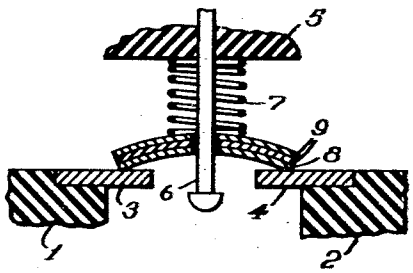
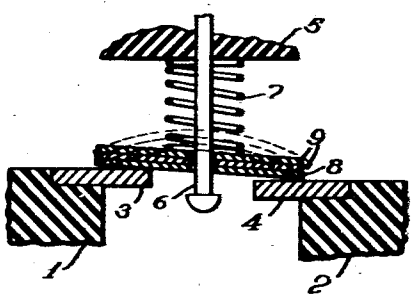


Fig. 3.



WITNESSES:

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ELIMINATION OF CONTACT BURNING ON CONTROLS

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2 Claims. (Cl. 200—166)

My invention relates to an electrical switch and more specifically to an electrical switch which will be devoid of arcing or sparking across its contacts.

In electrical switches of well known design, there is sometimes a failure to either snap open or close firmly. As a result of this, sparking or arcing occurs and in time this arcing or sparking burns the contacts and may even start a fire.

An object of my invention is to provide an electrical switch in which at least one of its contact elements incorporates the use of a bimetal, thereby minimizing or eliminating the possibility of the occurrence of sparking across the contact members.

Another object of my invention is to provide an electrical switch which is self adjusting with respect to imperfections which arise during manufacture which cause uneven bearing of the movable contact member with respect to the stationary contact member.

Other objects and advantages will become more apparent from a study of the following specification when considered in conjunction with the accompanying drawing, in which:

Figure 1 is a diagrammatic showing of a switch involving the principles of my invention;

Fig. 2 shows the same switch illustrated in Fig. 1 except that the parts assume a different position as the result of arcing across the contact members; and

Fig. 3 shows a switch which, due to defective manufacture, has uneven bearing or contact pressure between the movable and stationary contact members.

Referring more particularly to Figures 1 and 2, numerals 1 and 2 denote the stationary support members which carry the stationary contact elements 3 and 4, respectively. A movable contact element comprises a contact-carrying arm 5 having rigidly secured thereto a stem 6 with an enlargement at the lower extremity thereof and a spring 7 which normally urges the movable contact element 8 of silver or the like into intimate engagement with the stationary contact elements 3 and 4. The movable contact element 8 in accordance with my invention has a bimetallic backing element 9.

Assume that the switch is in the closed position, as shown in Fig. 1 and that no sparking occurs across the contacts. Thus, the elements 8 and 9 assume a substantially flat position, such as shown in Fig. 1. Spring 7 in this instance, will bias the contact element 8 into engagement with the stationary contact members.

Assume now that due to poor contact pressure or the like, sparking or arcing occurs between the movable and stationary contact members resulting in heating of movable contact element 8 and its bimetallic backing element 9. The effect of this heat will be to cause a distortion or curvature of the bimetallic element together with the movable contact element 8 rigidly secured thereto, such as shown (exaggerated) in Fig. 2. This distorted shape of elements 8 and 9 which is shown exaggerated for purposes of explanation will accomplish two things; one, if the switch is closed and not ready to open yet, the curvature increases the contact pressure by compressing spring 7 resulting in reduction of heat generated, and two, if the switch is on the verge of being opened, the additional force or motion resulting from the curvature will afford snap action in the separation of the contact members and in the case of a toggle switch (not shown) will snap such switch overcenter and open the circuit.

It will be obvious that the same benefits will be obtained if the stationary contact members may incorporate the bimetal instead of the movable contact members or if the switch comprised only a pair of contact members, one movable and one stationary, one of which contact members included the bimetal. It will be apparent further that element 8 itself may be part of a bimetallic element with element 9 as the other part instead of element 9 being the complete bimetallic element.

Another advantage of the switch in accordance with my invention is that it tends to correct itself for imperfections or variations in manufacture which cause uneven contact pressure between the movable and the two stationary contact members, as shown in Fig. 3, wherein, at the right-hand side a small separation or gap (shown enlarged) occurs causing arcing between the right-hand stationary contact member and the contiguous movable contact portion. As the result of this arcing, the movable contact element will flex, as shown in dotted lines, thereby re-establishing contact relationship between the movable contact member and both of the stationary contact members. It will thus be seen that the manufacturing defects resulting in imperfect contact will automatically correct themselves.

Another advantage is the inherent wiping action afforded by the curving of the bimetal which helps to clear the surfaces. Furthermore, successful operation of my device can be obtained

even without arcing, in other words, poor contact pressure may cause high resistance and consequent heating without the occurrence of arcing.

I am, of course, aware that others, particularly after having had the benefit of the teachings of my invention, may devise other devices embodying my invention, and I, therefore, do not wish to be limited to the specific showings made in the drawing and the descriptive disclosure hereinbefore made, but wish to be limited only by the scope of the appended claims and such prior art that may be pertinent.

I claim as my invention:

1. An electrical switch including a pair of coacting contact members, one of said contact members comprising a centrally supported member with freely movable extremities which member serves as the current bridging member having superposed thereon a second metallic piece having a different coefficient of expansion than the first thereby forming therewith a bimetallic element, the other of said contact members consisting of two flat separate metallic pieces located in the same plane and which are parallel to the first mentioned bimetallic contact member, and helical spring means for centrally supporting said centrally supported contact member and acting to normally bias said contact members into engagement when they are in the closed position, said bimetallic member being adapted to increase said contact pressure due to the deformation thereof in response to increase in temperature such as due to arcing, the compressive force of said spring progressively increasing as the result of said deformation.

2. An electrical switch comprising, in combination, a pair of stationary contact members located in substantially the same plane, a flat progressively acting, non-snapping bimetallic element which in itself forms the movable contact member and which is adapted to bridge the stationary contact members, a spring which centrally supports said movable contact member for normally urging the extremities of said bimetallic contact member into engagement with said stationary contact members when in the closed position and adapted to progressively increase said contact pressure as the result of deformation of the bimetallic contact member and compression of said spring which occurs as the result of temperature rise such as due to arcing.

ELO C. TANNER.