Jan. 19, 1937. F. G. VON HOORN 2,068,582

ELECTRIC SWITCH

Filed May 1, 1934

Fig. 1.

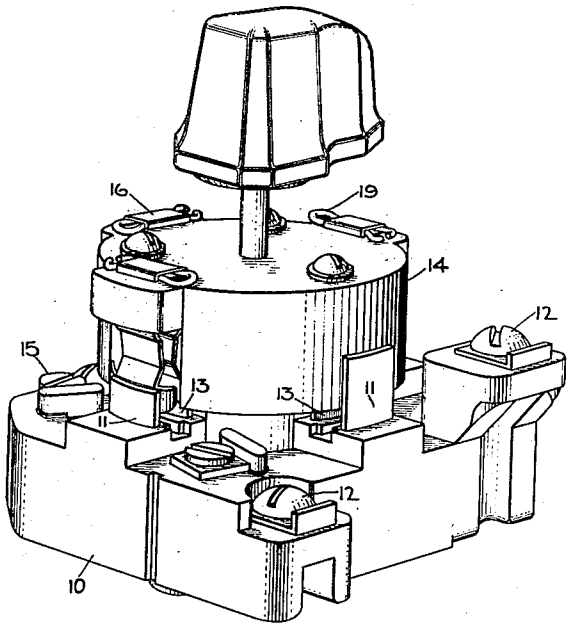


Fig. 5.

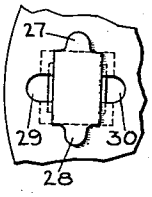


Fig. 2.

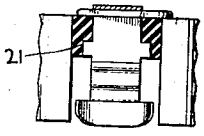


Fig. 3.

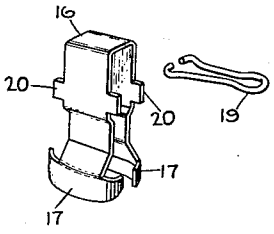


Fig. 6.

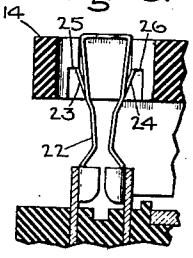
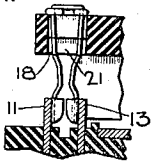


Fig. 4.



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Patented Jan. 19, 1937 2,068,582

UNITED STATES PATENT OFFICE

2,068,582

ELECTRIC SWITCH

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Application May 1, 1934, Serial No. 723,313

5 Claims. (Cl. 200—166)

My invention relates to electric switches and more particularly to movable switch contacts. In rotary switches of the type used on electric ranges the conditions under which the switches operate are relatively severe because of the heavy load currents and because of the frequency of operation of the switch. The life of a switch as a general proposition has been no greater than the life of any one of its component parts. This is true because of the fact that the switches when made sufficiently rugged to withstand the hard usage could most conveniently be made so that it was impossible to repair the switch and that upon the breakage of any part the switch as a whole had to be replaced. Quite frequently the cause of breakdown of a switch has been the breakage of the switch operating mechanism or a part of the movable switch element. The most common single cause of the failure of the switch to operate has been burning of the switch contacts especially one of the movable switch contacts. The source of damage to the switch contacts is the arc drawn on the making and breaking of the circuit which pits the contact surface and ultimately causes the contacts to stick or the resultant heating at the contacts will remove the spring tension from the movable contact and thus cause it to assume a permanent set in a position in which it will not engage a stationary contact. Also, in order to provide the necessary contact pressure upon engagement of the movable contact with the stationary contact it is necessary for some movement or give of one of the contacts against its inherent spring tension. The repeated flexing of the contact which is generally the movable contact may cause its breakage.

The object of my invention is to provide an improved switch contact for electric switches which may be manufactured at a relatively low cost, is easily secured in position in the switch, may be replaced upon its breakage or for any cause without the necessity of replacing the switch as a whole and which will automatically center itself with respect to the stationary contact upon engagement of the stationary contact.

What I consider to be novel and my invention will be better understood by reference to the following specification and appended claims when considered in connection with the accompanying drawing in which Fig. 1 is a perspective view of a rotary electric switch with my improved switch contacts; Fig. 2 is a sectional view of a part of the switch of Fig. 1 showing my improved switch contacts secured in position in the rotary element; Fig. 3 is a perspective view of the switch contact and its securing means; Fig. 4 is a side sectional view of part of the switch of Fig. 1 showing an end view of the switch contact in engagement with the stationary contacts and Figs. 5 and 6 are detail views of a modified form of switch contact. The switch shown in Fig. 1 is substantially the same as that shown in Kempton Patent No. 1,919,949 which is assigned to the same assignee as the present invention. A stationary member 10 is provided to which is secured contacts 11 which may be connected to a supply circuit through the intermediary of binding posts 12. Other stationary contacts 13 are provided partly hidden by rotor 14 but are better illustrated in Fig. 4. Contacts 13 are spaced radially from contacts 11 and are adapted to be connected to the load circuit by means of binding posts 15. To interconnect contacts 11 and 13, bridging contacts 16 are provided and secured to rotor 14. As better indicated in Figs. 2, 3, and 4, bridging contact 16 is formed from a flat strip of metal, preferably phosphor bronze, into a substantial U-shape. Contact surfaces 17 are provided at each of the free ends of the U and formed in arcuate cross section to conform to the shape of the stationary contacts 11 and 13 and also to provide an entering wedge for the contact 16 when moving into engagement with the stationary contact. Contacts 16 are secured in slots 18 provided in rotor 14 by means of compressible cotterpins 19 which pass under the top of the U and engage the top of rotor 14. Integral transverse projections 20 are provided on contact 16 which seat in grooves 21 provided in rotor 14. It may be desirable to use other securing means than the compressible cotterpin 19 such as by the provision of the projections from the top of the U of contact 16 which may be turned down after the contact is inserted into slot 18 from the bottom. As best indicated in Fig. 4, the means of securing the contact 16 in rotor 14 and the clearance on each side of the contact permits relative transverse movement of the contact 16 upon its engagement with stationary contacts 11 and 13. This feature is important because it makes it unnecessary to carefully align slot 18 and contact 16 with the center line of contacts 11 and 13. Thus the contact 16 automatically centers itself upon engagement of the stationary contacts 11 and 13. Also, it has been found that the contact 16 has a greater life than contacts which are rigidly secured to the rotor because of its relatively free transverse move-

ment which thus reduces the strain on the contacts which may result from slight inaccuracies in the centering of the stationary movable contacts with respect to each other. Contact 16 may readily be replaced if its contact surfaces 17 are pitted or damaged or the contact broken merely by the removal of cotterpin 19 and the substitution of a new contact 16. As pointed out above, the possibility of replacing the movable contact 16 eliminates the necessity of replacing the whole switch or the rotor element upon the damage to one of the contacts.

In Figs. 5 and 6 a modified form of movable switch contact 22 is shown. Contact 22 is similar in its general shape to contact 16. Two integral projections 23 and 24 are provided and may be formed by pressing them out from the sides of the U of the contact 22. Projections 23 and 24 extend outwardly from the sides of the U and engage shoulders 25 and 26 respectively when the contact is located in rotor 14. Two integral projections 27 and 28 are provided from the top of the contact 22 which engage the top wall of rotor 14. By this arrangement contact 22 may be inserted from the top of the rotor and when the contact is forced home to its normal position the projections 23 and 24 spring outwardly into engagement with shoulders 25 and 26 to secure the contact in position. In order to permit removal of contact 22 from the rotor 14, two longitudinal recesses 29 and 30 are provided to acommodate a tool which may compress the projections 23 and 24 to permit the contact 22 to be drawn upwardly out of recess 16. By this arrangement, contact 22 may be inserted and removed while the rotor 14 is in its normal position with respect to base 10. Thus it makes it unnecessary to remove rotor 14 for replacement of the movable switch contacts.

From the foregoing it may be seen that an improved switch contact has been provided which has a relatively low cost of manufacture, has a relatively long life, is easy to assemble to the switch and may be replaced upon injury to the contact without necessitating replacement of any other part of the switch or the switch as a whole.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an electric switch, stationary contacts spaced apart, a movable contact of U shape adapted to bridge said stationary contacts, and securing means connected to removably support said movable contact at the top of the U and permit transverse movement of the contact upon engagement with the stationary contacts.

2. In an electric switch, a stationary member, contacts secured to said stationary member, a movable member having spaced slots, contacts of U-shape located in the slots of said movable member, and means to removably secure said last named contacts at the top of the U in said slots to permit free transverse movement of the contacts upon engagement with the stationary contacts secured to said stationary member.

3. In an electric switch, a stationary member, contacts secured to said member, a rotor having spaced slots, U shaped bridging contacts located in said slots, and means to removably secure said last named contacts in the slots of said rotor so that they may pivot about the top of the U upon engagement of the ends of the contacts with the first named contacts.

4. In an electric switch, a stationary member, contacts secured to said member, a rotor having spaced slots, U shaped bridging contacts located in said slots and having integral projections seated in grooves communicating with said slots, and removable securing means for said last named contacts adapted to permit relative transverse movement of the free ends of said bridging contacts.

5. An electric switch comprising a base of insulating material, stationary contacts secured to said base, a rotor of insulating material, contacts of U-shape adapted to bridge said stationary contacts located in spaced slots in said rotor, and means securing the last named contacts in the slots in said rotor at the top of the U whereby the contacts of U-shape may pivot about the top of the U and adjust themselves to irregularities in the location of the stationary contacts.

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