Jan. 24, 1933. L. A. KEMPTON 1,895,330

ROTARY SNAP SWITCH

Filed July 24, 1931

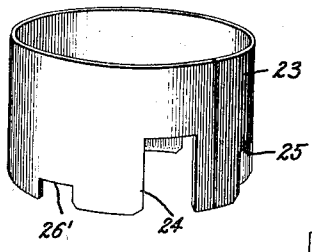
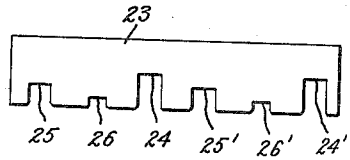


Fig. 1.

Fig. 4.



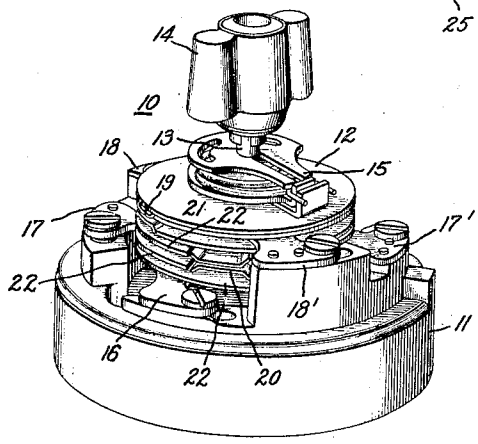


Fig. 6.

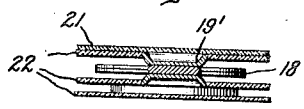


Fig. 5.

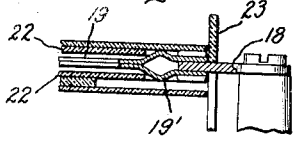


Fig. 2.

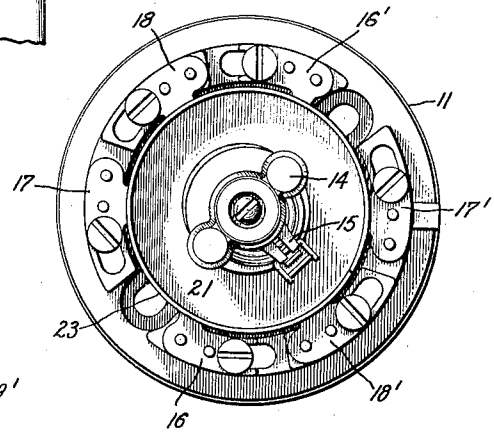


Fig. 7.

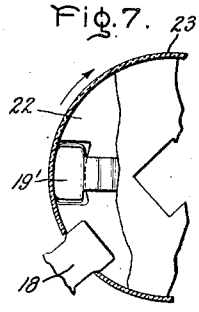
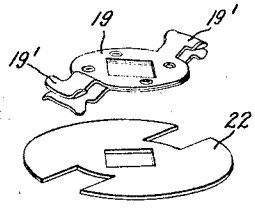


Fig. 3.



Inventor:
Leslie A. Kempton,
by Charles E. Lullar
His Attorney.

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UNITED STATES PATENT OFFICE

LESLIE A. KEMPTON, OF TRUMBULL, CONNECTICUT, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

ROTARY SNAP SWITCH

Application filed July 24, 1931. Serial No. 552,915.

My invention relates to a rotary snap switch and more particularly to a rotary snap switch of the double action type which is adapted to interconnect one or more circuits.

An object of my invention is to provide an improved rotary snap switch which may be utilized to interconnect circuits of high current carrying capacity.

My invention will be better understood from the following description when taken in connection with the accompanying drawing and the scope of the invention will be pointed out in the appended claims.

Fig. 1 is a perspective view of the switch with the insulating sleeve shown above the switch; Fig. 2 is a plan view of the switch with the insulating sleeve in position; Fig. 3 is a detailed perspective view of a rotor contact and insulating disc; Fig. 4 is a developed view of the sleeve; and Figs. 5, 6 and 7 are detail views.

10 indicates a double action rotary snap switch which is adapted to interconnect three load circuits with three supply circuits. For example, it may be used as a starting switch for a three-phase motor. The switch comprises a base 11 of insulating material to which the stationary contacts are secured. A rotor 12 is provided mounted on a shaft 13 which is journaled in a bushing (not shown) in the base member 11. An operating handle 14 is provided to move the rotor from one position to another and also to indicate the position the rotor occupies. An operating mechanism 15 is provided and mounted on shaft 13. The operating mechanism may be any of the well known types of mechanisms which serve to move a rotor from one position to another with a snap action. The switch is provided with a usual metallic cover having a lining of insulating material but it is not shown because it is not a part of the present invention.

Six stationary contacts are secured to the base member and mounted in groups of two at different elevations. Contacts 16 and 16′ are mounted at the same elevation on opposite sides of the base. Contacts 17 and 17′ are mounted at a slightly higher elevation on integral projecting portions of base member 11. Contacts 18 and 18′ are mounted at a still higher level on integral projecting portions of the base member 11. Three rotor contacts are mounted on the rotor and spaced apart corresponding to the difference in elevation of the different pairs of stationary contacts. Two of these rotor contacts 19 and 20 which are adapted to interconnect respectively the stationary contacts 18, 18′ and 17, 17′ may be seen in Fig. 1. The similar remaining rotor contact which is adapted to interconnect contacts 16 and 16′ is hidden from view but is spaced angularly from contact 20 an amount equal to the angular displacement between rotor contacts 19 and 20.

A circular disc 21 is provided to insulate the contact 19 from the operating mechanism 15. Two horizontal discs 22 are provided cooperating with each of the rotor contacts 19 and 20 to confine any arc drawn upon the breaking of a circuit by these contacts within a small longitudinal space. One of these insulating discs 22 is provided cooperating with the remaining rotor contact to confine any arc drawn within a small space between it and the adjacent portion of base member 11. In Fig. 3 rotor contact 19 is shown with one of the cooperating discs 22. As may be seen in this figure disc 22 has a portion cut away at opposite sides to accommodate the projecting ends 19′ which engage the stationary contacts. To confine completely the arcs drawn upon the breaking of the circuit by the rotor contacts, a sleeve 23 of insulating material is provided of a diameter substantially the same as that of the rotor contacts and insulating discs to cooperate with the discs. This sleeve 23 is made of fiber or other insulating material which is flexible. In Figs. 2 and 5 it may be seen that the sleeve

23 very closely surrounds the rotor when located in position. In order to mount the sleeve 23 in a position surrounding the rotor and to prevent its movement with the rotor, slots are provided as may be seen in Fig. 4. The different length of slots is made necessary by the difference in elevation of the different stationary contacts and their supports. The long slots 24 and 24′ are provided for the stationary contacts 18 and 18′. Slots 25 and 25′ of intermediate length are provided for the stationary contacts 17 and 17′. The shallow slots 26 and 26′ are provided for the stationary contacts 16 and 16′. This sleeve 23 may be made from a flat strip of insulating material, the slots cut in it, and then the strip folded into circular form and inserted in position around the rotor. The slots will cooperate with the stationary contacts to hold the sleeve in a position around the rotor. In Fig. 5 it will be seen that the sleeve 23 cooperates with discs 22 to confine completely any arc which may be drawn upon the separating of the rotor contacts from the stationary contacts. The cooperation of the two discs 22 on both sides of the rotor contact 19 to confine the arc longitudinally is better shown in Fig. 6. These two discs in addition to confining the arc longitudinally in a very small space to snuff out the arc also serve as baffles to prevent the arc from jumping from the rotor or stationary contacts to an adjacent metallic part such as the operating mechanism or another stationary or rotor contact. The effect of the sleeve 23 is also indicated in Fig. 7. In this figure the rotor contact 19′ is shown slightly displaced angularly from the stationary contact 18 which indicates the relative position of the contacts when the circuit is first broken by the movement of the rotor in a clockwise direction. Any arc drawn between these contacts is prevented from extending radially by the sleeve 23. Thus the sleeve assists in quickly snuffing out the arc and also aids in preventing the arc from jumping radially from either the rotor or stationary contact to an adjacent metallic part. The importance of the sleeve 23 closely surrounding the rotor is readily apparent upon reference to Figs. 5 and 7. If the sleeve 23 were of a slightly larger diameter than the insulating discs or rotor contacts its effectiveness would be very greatly reduced or, in other words, the current carrying capacity of the switch would be very much lower. It is therefore a requisite of my invention that the sleeve be flexible so it may closely surround the rotor and at the same time will not create a large amount of friction by engagement with the moving rotor.

Switch 10 may be readily adapted to interconnect one or two circuits instead of the three as shown in the drawing. For example, if it were desired to use the switch to interconnect two circuits the unnecessary contacts 18 and 18′ would be removed as well as the corresponding rotor contact 19 and the two cooperating discs 22. The slots 24 and 24′ in the sleeve 23 would also be eliminated.

By my invention I have provided an improved rotary snap switch which may be used as a motor starting switch and will be capable of breaking circuits of high current carrying capacity without serious damage to the switch. Also, my switch will cause the arcs drawn between the corresponding rotor and stationary contacts as the circuit is broken to be snuffed out very rapidly thereby reducing the pitting of the contacts and the usual rapid deterioration of the contacts.

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

1. A rotary snap switch comprising a base, spaced rotor contacts, cooperating stationary contacts, discs of insulating material between said rotor contacts, and a flexible sleeve of insulating material closely surrounding said rotor contacts and cooperating with said discs to provide restrictive paths for the arcs drawn on the separating of the rotor and stationary contacts.

2. A rotary snap switch comprising a base, spaced rotor contacts, cooperating stationary contacts supported by the base, discs of insulating material between said rotor contacts of substantially the same diameter as said rotor contacts, and a flexible sleeve of insulating material with an internal diameter substantially the same as the diameter of said discs and cooperating with said discs to provide restrictive paths for the arcs drawn by separating of the rotor and stationary contacts.

3. A rotary snap switch comprising a base of insulating material, a plurality of contacts secured to said base, a rotor having contacts adapted to interconnect said contacts secured to the base, discs of insulating material between the rotor contacts, and a flexible sleeve of insulating material supported at one end by the base and closely surrounding said rotor and cooperating with said discs to provide restrictive paths for arcs drawn on the separating of the rotor and base contacts.

4. A rotary snap switch comprising a base of insulating material, contacts secured thereto, a rotor having contacts arranged one above the other and adapted to interconnect the contacts secured to said base, insulating discs between said rotor contacts, a flexible sleeve of insulating material of substantially the same diameter as said rotor discs surrounding said rotor and cooperating with the edges of said discs to provide restrictive paths for the arcs drawn by the separating of the rotor and base contacts, and means preventing the sleeve from rotating.

5. A rotary snap switch comprising a base

of insulating material, a plurality of contacts secured to said base, a rotor, contacts secured to said rotor, insulated therefrom and arranged one above the other, thin horizontal discs of insulating material located between said rotor contacts and secured to said rotor, and a flexible sleeve of insulating material closely surrounding the edges of all of the discs, said discs and sleeve cooperating to define restrictive paths for arcs drawn by the separation of the rotor and the base contacts.

In witness whereof I have hereunto set my hand.

LESLIE A. KEMPTON.