

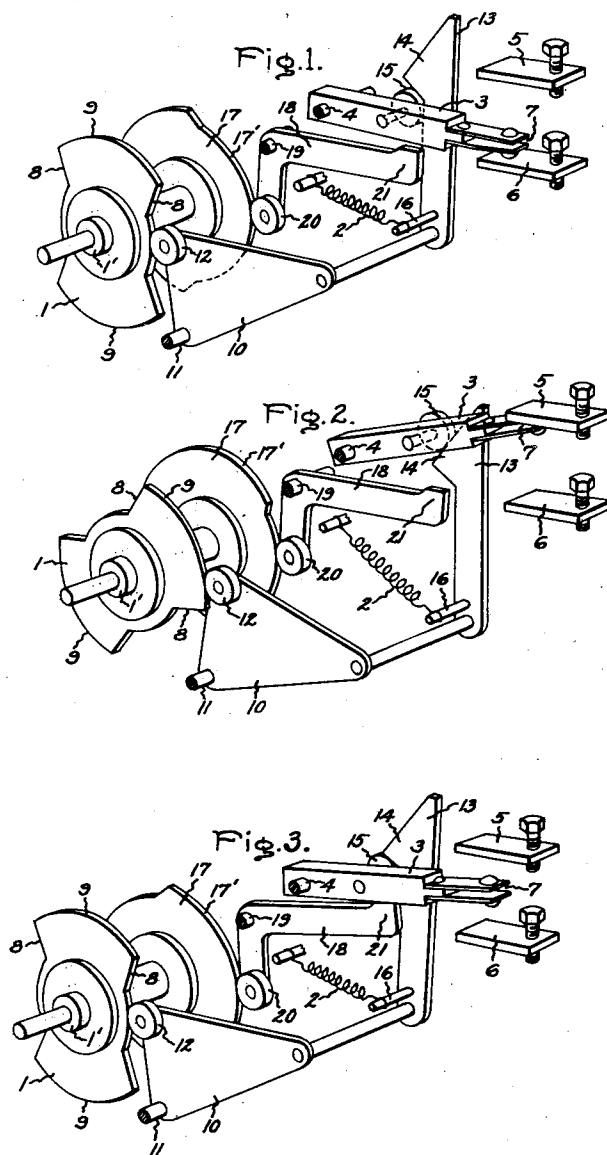
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ELECTRIC SWITCH

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ELECTRIC SWITCH

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My invention relates to electric switches, more particularly to those of the double-throw type such as, for example, snap action switches wherein an energy storing device comprising a spring or its equivalent is operatively related to a movable switch member for actuating the same between limiting circuit controlling positions, and has for its principal object the provision of an improved switch of the aforesaid type which can be operated in predetermined succession to both contact making and intermediate positions. A further object of my invention is to provide a double-throw snap action switch which can be operated from one contact closing position to another and then to a blocked intermediate circuit opening position. These and other objects of my invention will appear in more detail hereinafter.

My invention will be more fully set forth in the following description referring to the accompanying drawing, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Referring to the drawing, Figs. 1 and 2 illustrate an electric switch embodying the present invention in the two limiting positions respectively, and Fig. 3 illustrates the switch in an intermediate position.

In accordance with my invention in a specific structural embodiment thereof, a cam controlled switch wherein a cam controls the release of spring energy for snap-over operation of a switch actuating element is also provided with a cam control member effective to hold the movable switch member in an intermediate position against the bias of said spring in response to a predetermined movement of the cam structure.

Referring more particularly to the drawing, the cam structure includes a main actuating cam 1 secured to an operating shaft at 1' and operatively related to the energy storing device, such as a spring 2, and to the movable switch member 3 pivotally mounted at 4 for rotation between two limiting positions defined by the contacts 5 and 6. The movable contact 7 is shown in Fig. 1 in contact engagement at 6 and is held in this position by the spring 2 in a manner presently described.

The cam 1 is provided with suitably designed cam surfaces at 8 and 9 for co-action with a crank 10 that is pivotally mounted at 11 and carries a cam engaging roller 12 at one part and a pivoted link 13 at another part. The link 13 is provided with a cam portion 14 that is held

against a roller 15 of the movable switch member 3 by the bias of spring 2 which is connected to the link 13 at 16.

In the arrangement so far described, it will be apparent that rotation of the cam 1 in accordance with the actuation of the operating shaft 1' is effective, by reason of the cam surface at 14, to move the switch member 3 by snap action into engagement with either contact 5 or 6. The upper limiting or circuit controlling position is shown in Fig. 2 wherein the cam 1 has moved clockwise approximately 45° from the position shown in Fig. 1 to stress the spring 2 and lower the link 13 for moving the roller 15 of the movable switch member by snap action past the high point of the cam portion 14.

For the purpose of moving the switch member 3 to an intermediate position and holding the same in a positive manner in such position, there is provided an additional cam structure indicated at 17. The cam 17 is also mounted on the shaft 1' so that it has a fixed angular relation with respect to the cam 1. The cam 17 is operatively related to the switch member 3 through a stop member, such as a crank 18 pivoted at 19 and provided with a roller 20 coacting with the cam face 17'. An extension 21 is adapted to engage the switch lever 3. Accordingly, it will be noted that the cam 17, which is provided with a suitably designed operating face 17' is operable to rotate the crank 18 counterclockwise as indicated in Fig. 3 to serve as a stop and hold the switch member in an intermediate or open circuit position against the bias of spring 2.

The cam faces of the cam portions 1 and 17 can be suitably designed so that rotation of the shaft 1' in a given direction is effective to cause a predetermined sequence of switching operations including definite stop positions of the switch member at both limiting and intermediate positions.

It should be understood that my invention is not limited to specific details of construction and arrangement thereof herein illustrated, and that changes and modifications may occur to one skilled in the art without departing from the spirit of my invention.

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

1. An electric switch of the double-throw type comprising a movable switch member operable between two limiting positions, means in which energy is adapted to be stored for moving said member by snap action to either of said positions,

means operable independently of said energy-storing means for holding said member in an intermediate position, and means comprising an operating member movable in one direction to energize said energy-storing means and to operate said holding means.

2. An electric switch of the double-throw type comprising a movable switch member operable between two limiting positions, spring means for moving said member by snap action to either of said positions, cam means operable independently of said spring means for holding said member in an intermediate position, and means comprising an operating member movable in one direction to energize said spring means and to operate said holding means.

3. An electric switch of the double-throw type comprising a movable switch member operable between two limiting positions, a spring operatively related to said member, cam means for storing energy in said spring for effecting movement of said member by snap action to either of said positions, additional cam means operable independently of said spring for holding said member in an intermediate position, and means comprising an operating member rotatable in one direction to actuate both of said cam means.

4. An electric switch of the double-throw type comprising a movable switch member operable between limiting positions, a spring operatively related to said member for causing snap movement thereof to either of said positions, cam means for stressing said spring for effecting the aforesaid snap action, additional cam means operable to hold said switch member at an intermediate position against the bias of said spring, and a member continuously rotatable in one direction to actuate said two cam means.

5. An electric switch of the double-throw type comprising a movable switch member operable between two limiting positions, a spring operatively related to said member for causing snap action to either of said positions, a cam for stressing said spring for effecting said snap action, a second cam having a fixed angular relation with respect to said first cam, and a stop member operatively related to said second cam and said switch member for holding said switch member against the bias of said spring in an intermediate position whereby predetermined rotation of said cams is effective to move said switch member in predetermined succession with respect to said limiting and intermediate positions.

6. An electric switch of the double-throw type comprising a movable switch member operable between two contact closing positions and means for actuating said switch member comprising a rotatable member, means in which energy is stored by movement of said rotatable member in one direction for moving said switch member from one contact closing position to another contact closing position, and means controlled by further movement of said rotatable member in said one direction for moving said switch member from said other contact closing position to a position intermediate both of said contact closing positions and blocking the switch member in said intermediate position.

7. An electric switch of the double-throw type comprising a movable switch member operable between two contact closing positions, and means for actuating said switch member comprising a movable member, means responsive to the movement of said movable member in one direction for moving said switch member from one contact closing position to another contact closing position, and means controlled by further movement of said movable member in said one direction for moving said switch member from one of said contact closing positions to a position intermediate both of said contact closing positions and blocking the switch member in said intermediate position.

8. An electric switch of the double-throw type comprising a movable switch member operable between two contact closing positions and means for actuating said switch member comprising a movable member, means responsive to the movement of said movable member in one direction for moving said switch member from one contact closing position to another contact closing position and to the movement of said movable member in the opposite direction for moving the switch member back to said one contact closing position, and means controlled by further movement of the movable member in said one direction when the switch member is in said other contact controlling position for moving said switch member from said other contact closing position to a position intermediate both of said contact closing positions and blocking the switch member in said intermediate position.

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