

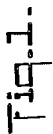
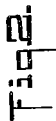
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E. M. JOHNSON

SNAP SWITCH

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SNAP SWITCH.

Application filed July 14, 1920. Serial No. 396,217.

To all whom it may concern:

Be it known that I, ERNEST M. JOHNSON, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Snap Switches, of which the following is a specification.

My invention relates to improvements in mechanisms more particularly adapted for snap switches and seeks the provision of a snap switch which can be manipulated by an extremely small force operating through a short distance, to open or close the circuit across power supply mains.

Another object of my invention is to provide in such a switch a mechanism in which the movable contact is held in one or the other of its operating positions by a spring whose tension does not vary as the operating parts of the structure move about.

In the drawings accompanying this specification and forming part of it, I have illustrated one particular embodiment of my invention as designed for single pole, single throw operation. In the drawings, Fig. 1 is a plan view of my improved switch and Fig. 2, is a side elevation thereof.

A single stationary switch contact is shown at 127 and the cooperating movable contact at 128. Both of these contacts and all other elements of the structure are supported from an insulating slab 129.

An arm or link 130 is provided for operating the switch. It may be connected at the end not shown to any suitable mechanism having requisite movement.

The arm 130 is connected to the short arm 131 of a bell-crank operating member 131' bifurcated as shown in Fig. 2. The other arm 132 of this bell-crank member is much longer and is laterally offset as shown at 133. The end of this arm remote from the pivot is provided with downwardly bent parts 134, in which are mounted screws 135, adapted to be locked in place by means of lock-nuts 136. The bell-crank member 131' is pivoted at 137 on a fixed member 138 supported on slab 129 and which is provided with a horizontal pin 139 grooved as shown.

Intermediate the ends of the arm 132 there is supported on the slab 129 a C-shaped member 149, open at 150 and bifurcated both at 151 and 152, above the opening 150, and at 153 and 154 below the opening.

Each of these pairs of bifurcations supports knife-edged member 155. These two members form bearings for an intermediate U-shaped member or contact manipulator 156 having arms 157 and 158 to cooperate therewith. The lower arm 158 of this U-shaped member is located between the ends of the screws 135, carried by parts 134 of the bell-crank 131' so that lost motion is provided for. A spring 159 is fastened to the central portion of the U-shaped member 156 and hooked in a groove of post 139. This spring will bias the member 156 to one side or to the other side of its dead-center. The member 156 is held to a limited range of movement by means of adjustable stops 160 and 161. The central portion of the U-shaped member 156 has fastened on each side thereof the Z-shaped arms 162 and 163, thereby providing bifurcations. The outer end of each of these Z-shaped members 162 and 163 is provided with adjustable stops 164 and 165.

The movable switch contact 128 is pivoted on knife-edged members 166 which are supported in bifurcations 167 and 168, 169 and 170 in a member 174 similar in shape to 149 and in a fashion similar to the U-shaped member 157. The central part of the contact 128 has a tongue 128' which projects to the left and is between the ends of the stops 164 and 165. The switch 128 is biased to one side or to the other side of dead-center by means of a spring 171 connected to the central part of the switch member and to a post 172 carried on the insulating slab 129. A suitable binding post 173 is connected to the C-shaped member 174 which supports the switch element. The other binding post 175 for supporting the fixed contact is provided with means to adjust the position of the fixed contact. In this case a screw 176 provided with a lock nut 177 is employed. The extent of movement of the switch element 128 in the opposite direction is limited by means of an adjustable stop 178 similar to the aforescribed means except that it is not electrically connected to a lead.

The arm 130 operates the bell-crank arm 131', the long arm of which is downwardly bent at 134, being there provided with adjustable stops 135. This bell-crank arm will move back and forth in accordance with

the movements imparted to the arm 130. It must move, however, a finite distance before the stops 135 will touch the lower portion 158 of the U-shaped member 156 and force said member past dead-center, so that the coiled spring 159 will snap the member 156 quickly against the limiting stop. The member 156 does not itself make electrical contact to open or close the circuit, but it is provided with adjustable stops 165 which engage with the tongue 128' on the movable switch element 128 to pull it to one side or the other side of dead-center so that the spring 171 can snap it either away from the fixed contact 127 of the switch or against the fixed stop 178. The delicate mechanism above described will not stick at any point nor can it flutter. It either makes a good contact or a clear break.

20 What I claim is:

1. In an electric switch, a pivotally mounted operating member, a pivotally mounted intermediate member, means on the first member to embrace the second member and provide lost motion therebetween, means to bias the intermediate member to one side or to the other side of its pivot, contact mechanism operated by the intermediate member, and fixed stops independent of the contact mechanism for limiting the movement of the intermediate member and holding the intermediate member out of contact with the operating member while the operating member is at rest.

35 2. In an electric switch, a pivotally mounted operating member, a pivotally mounted intermediate member, spaced apart portions of the first member embracing the second member to provide lost motion therebetween, means to bias the intermediate member to one side or to the other side of its pivot, contact mechanism operated by the intermediate member, and fixed stops independent of the contact mechanism for limiting the movement of the intermediate member and holding the intermediate member out of contact with the operating member while the operating member is at rest.

50 3. An electric switch having a fixed contact, a stop, a support, knife-edged members carried by the support, a U-shaped movable contact pivotally mounted on the ends of the U on said knife-edged members, a spring having one end fixed and the other end attached to the middle of the U, said spring urging the movable contact toward the stop or toward the fixed contact, a binding post on the support whereby the knife-edged members are current carrying, and means to move the movable contact past dead-center.

4. An electric switch having a fixed contact, a stop, a support, pivot members carried by the support, a U-shaped movable

contact pivotally mounted on the ends of the U on said pivot members, a spring having one end fixed and the other end attached to the middle of the U, said spring urging the movable contact toward the stop or toward the fixed contact, a binding post on the support whereby the pivot members are current carrying, and means to move the movable contact past dead-center.

5. An electric switch having a fixed contact, a stop, a support, pivot members carried by the support, a U-shaped movable contact pivotally mounted on the ends of the U on said pivot members, a spring having one end fixed and the other end attached to the middle of the U, said spring urging the movable contact toward the stop or toward the fixed contact, and a binding post on the support whereby the pivot members are current carrying.

6. In an electric switch, a pivoted contact, an oscillatory spring connected to the contact to hold it to one side or to the other side of its dead-center, a pivoted manipulator for operating the contact, and an oscillatory spring holding the manipulator at one side or at the other side of its dead-center.

7. In an electric switch, a pivoted contact, an oscillatory spring connected to the contact to hold it to one side or to the other side of its dead-center, a pivoted manipulator for operating the contact, and an oscillatory spring holding the manipulator at one side or at the other side of its dead-center, both said pivoted elements being U-shaped and pivoted at the ends of the U, said spring lying intermediate the respective pivots.

8. In an electric switch, a pivoted contact, an oscillatory spring connected to the contact to hold it to one side or to the other side of its dead-center, stops for the pivoted contact, a pivoted manipulator for operating the contact, an oscillatory spring holding the manipulator at one side or the other side of its dead-center and stops for the manipulator, both said pivoted elements being U-shaped and pivoted at the ends of the U, said springs lying intermediate their respective pivots.

9. In an electric switch, an insulating base, a fixed contact, a movable contact, a stop, a support carried by the base, knife-edged members on the support to provide pivots for the movable contact, a second support on the base also provided with knife-edged members, a contact operating member pivoted on the last mentioned knife-edged members, and two springs one of which is connected to the contact operating member to snap it away from dead-center, the other spring being connected to the movable contact to snap it away from dead-center.

10. In an electric switch, an insulating

base, a fixed contact, a movable contact, a stop, a support carried by the base, pivots on the support for the movable contact, a second support on the base also provided with pivots, a contact operating member pivoted on the last mentioned pivots, and two springs one of which is connected to the contact operating member to snap it away from dead-center, the other spring being connected to the contact to snap it away from dead-center.

11. In an electric switch, an insulating base, a fixed contact, a movable contact, a stop, a support carried by the base, knife-edged members on the support to provide pivots for the movable contact, a second support on the base also provided with knife-edged members, a contact operating member pivoted on the last mentioned knife-edged members, and two springs one of which is connected to the contact operating member to snap it away from dead-center, the other spring being connected to the movable contact to snap it away from dead-center, the contact operating member during its movement engaging the movable contact to snap it away from the fixed contact against the stop or vice-versa.

12. In an electric switch, an insulating base, a fixed contact, a movable contact, a stop, a support carried by the base, pivots on the support for the movable contact, a second support on the base also provided with pivots, a contact operating member pivoted on the last mentioned pivots, and two springs one of which is connected to the contact operating member to snap it away from dead-center, the other spring being connected to the contact to snap it away from dead-center, the contact operating member during its movement engaging the contact to snap it away from the fixed contact and against the stop or vice-versa.

13. A device for manipulating an oscillating-snap switch-contact comprising a U-shaped member pivotally mounted at its ends, a spring connected at one end to the middle of the U, a fixed support for the other end of the spring located so that the axis of the spring is adapted to be at one side or the other side of the pivotal mounting of the U-shaped member, bifurcations on the U-shaped member on the side thereof

remote from the support, said bifurcations being adapted to embrace the oscillating contact.

14. A device for manipulating an oscillating-snap switch-contact comprising a U-shaped member pivotally mounted at its ends, a spring connected at one end to the middle of the U, a fixed support for the other end of the spring located so that the axis of the spring is adapted to be at one side or the other side of the pivotal mounting of the U-shaped member, bifurcations on the U-shaped member on the side thereof remote from the support, said bifurcations being adapted to embrace the oscillating contact, and adjustable stops on the bifurcations adapted to engage the switch contact.

15. A device for manipulating an oscillating-snap switch-contact comprising a U-shaped member pivotally mounted at its ends, a spring connected at one end to the middle of the U, a fixed support for the other end of the spring located so that the axis of the spring is adapted to be at one side or the other side of the pivotal mounting of the U-shaped member, bifurcations on the U-shaped member on the side thereof remote from the support, said bifurcations being adapted to embrace the oscillating contact, adjustable stops on the bifurcations adapted to engage the switch contact and adjustable stops for the U-shaped member.

16. A device for manipulating an oscillating-snap switch-contact comprising a U-shaped member pivotally mounted at its ends, a spring connected at one end to the middle of the U, a fixed support for the other end of the spring located so that the axis of the spring is adapted to be at one side or the other side of the pivotal mounting of the U-shaped member, bifurcations on the U-shaped member on the side thereof remote from the support, said bifurcations being adapted to embrace the oscillating contact, adjustable stops on the bifurcations adapted to engage the switch contact, adjustable stops for the U-shaped member, and a pivotally mounted member having stops engageable with the U-shaped member.

ERNEST M. JOHNSON.