

Sept. 18, 1945.

W. R. YOUNG

2,384,985

ELECTRICAL SWITCH

Filed July 20, 1943

Fig. 1.

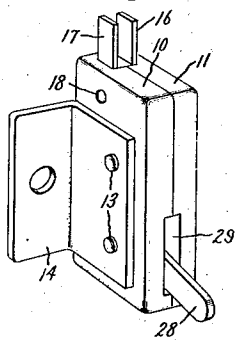


Fig. 2.

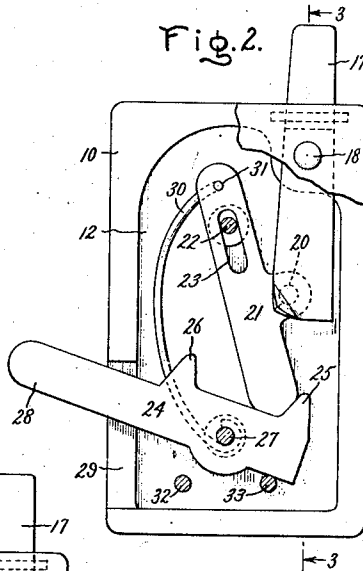


Fig. 3.

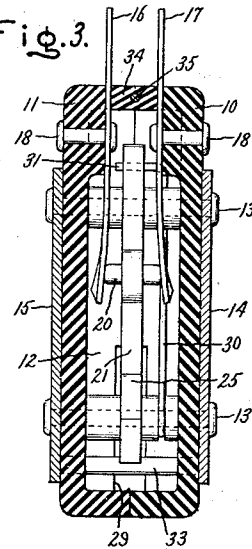


Fig. 4.

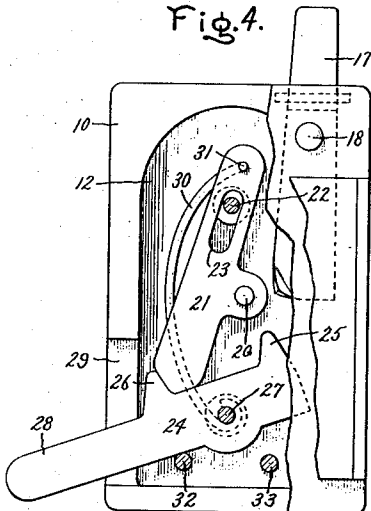


Fig. 6.

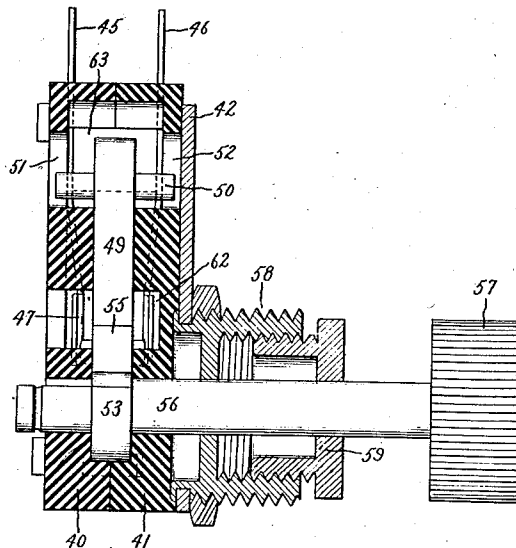
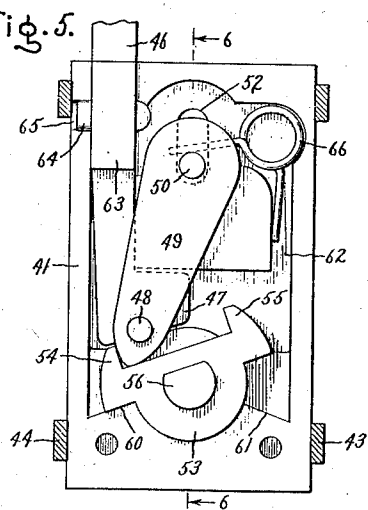


Fig. 5.



Inventor:
William R. Young,
by *Nancy E. Dunham*
His Attorney.

UNITED STATES PATENT OFFICE

2,384,985

ELECTRICAL SWITCH

William R. Young, Fairfield, Conn., assignor to
General Electric Company, a corporation of
New York

Application July 20, 1943, Serial No. 495,411

3 Claims. (Cl. 200—68)

The present invention relates to electrical switches of the type including stationary contacts and a movable contact member or contact bridging member operated by a snap action mechanism.

The object of my invention is to provide an improved construction and arrangement of such electrical switches which is simple in construction, safe in operation, and may be manufactured at comparatively low cost.

For a consideration of what I believe to be novel and my invention, attention is directed to the following description and the claims appended thereto in connection with the accompanying drawing.

In the drawing Fig. 1 illustrates an electrical switch embodying my invention; Fig. 2 is an enlarged view partly broken away of the switch shown in Fig. 1; Fig. 3 is a section along line 3—3 of Fig. 2; Fig. 4 shows the arrangement of Fig. 2 in a different operating position; Fig. 5 illustrates a modification embodying my invention; and Fig. 6 is a section along line 6—6 of Fig. 5.

The switch comprises a casing having two halves 10 and 11 made of insulating material and forming a chamber 12. The casing halves are secured together by means of rivets 13 which also serve to attach two supporting brackets 14, 15 to opposite sides of the casing. Two spaced stationary contacts 16, 17 are disposed within the chamber and have outer ends projecting through the casing for connection to an electric circuit. The stationary contacts 16, 17 are secured to the casing halves by rivets 18. A contact bridging member or movable switch member 20 is disposed within the chamber 12 and is carried by an arm or lever 21. The arm 21 is connected to the casing 10, 11 by means of a loose slot and pivot connection. In the present example a pivot 22 secured to the casing projects through a slot 23 of the lever 21.

Means are provided to bias the lever 21 into either of two end positions, a switch opening and the switch closing position. This means comprises another lever or cam 24 having two spaced projections or stops 25, 26 and being supported on the casing 10, 11 by means of a pivot 27. The lever 24 has an arm 28 projecting through an opening 29 in the casing. In the switch closing position (Fig. 2) the lever 21 engages the stop 25 of the lever 24 and is biased into this position by means of a simple arced spring 30 which has an upper bent end portion 31 (Fig. 3) projecting through an opening in the upper end of the lever

21. The lower end of the spring 30 is connected to the pivot 27.

The stops 25 and 26 of the actuating lever 24 are located on opposite sides of the center line through the pivots 22 and 27. Rotary movement of the lever 24 is limited by two stops 32 and 33 in the form of pins secured to the casing 10, 11. In the position of Fig. 2 the lever 24 engages the stop 33 and the contact bridging member 20 connects the contacts 16 and 17. Downward movement of the lever 28 into engagement with the stop 32 removes the contact bridging member 20 from the contacts 16, 17, thus causing opening of the latter (Fig. 4). During such movement the lever 21 turns gradually about the pivot 22 and simultaneously is moved upward until the lever 22 reaches dead center position through the centers of the pivots 22, 27 whereupon further movement of the lever in clockwise direction about the pivot 22 is accelerated by snap action effected by the spring 30 until the lever 22 reaches the opening position (Fig. 4) in which its lower end engages the stop 26.

The levers 21, 24 are preferably made from insulating material such as a phenolic condensation product.

In the present example the contacts 16, 17 are held in spaced relation by means of the rivets 18 and a spacer block 34 engaging adjacent sides of the contacts 16, 17 and supported on the casing 10, 11 by a pin 35 projecting through the block 34 and having free ends each located in adjacent recesses of the casing halves 10, 11.

The arrangement of Figs. 5, 6 comprises an insulating casing having two halves 40, 41 held together by means including a sheet metal cover 42 engaging the face of the casing half 41 and having strip portions 43, 44 bent around opposite sides and the rear of the casing 40, 41. Two stationary contacts 45, 46 are disposed within the casing, each having an end portion 47 located in a recess of the casing. A movable switch member is disposed within the casing and comprises a metallic rivet 48 corresponding to the member 20 of Fig. 1. It is held on the lower end of a lever 49. An upper end portion of the lever is provided with a pivot 50 which has a tight fit in the lever and slidably projects into opposite slots 51, 52 of the casing halves 40, 41, respectively. The lower end of the lever 49 engages a cam 53 which has two projections 54, 55 and is held on a shaft 56 rotatably supported on the casing. The shaft projects through the face of the casing half 41 and has a free end provided with an actuating knob 57. A mounting nozzle 58 is secured and

sealed to the metal cover 42 for mounting the switch on a suitable support such as, for example, the base of a lamp. A cup 59 is threaded into the mounting nozzle forming a stuffing box for receiving suitable stuffing material to seal the mounting nozzle 58 to the shaft 56 and thereby to prevent leakage of fluid into the switch casing.

The projections 54, 55 in the end positions of the cam 53 engage walls or shoulders 60 and 61 formed in the casing. The lever 49 is biased downward into engagement with the respective projections 54, 55 by means of a spring 66 which has a single turn with one end engaging the pivot 50 and another end located in a recess 62 in the casing.

The stationary contacts 45, 46 which are loosely positioned in recesses of the casing are held in spaced relation by a spacer block 63 corresponding to the block 34 in Fig. 3 and engaging adjacent sides of the blades 45, 46. The block is securely held on the casing halves 40 and 41 by means of a pin 64 secured to the block and projecting into adjacent openings 65 of the casing halves.

In the switch closing position (Fig. 5) the lever 49 engages the stop 54 of the cam 53 and the contact bridging member 48 connects or bridges the contacts 45, 46. Upon clockwise turning of the knob 57 and the cam 53 the lever 49 is forced upward with the pin 50 sliding along the slots 51, 52 and the contact bridging member 48 moving along the contact portions 47. As in the arrangements of Figs. 1 to 4, this gradual turning movement of the lever 49 continues until the lever reaches a dead-center position through the centers of the cam 53 and the pin 50. Further turning movement of the lever 49 is accelerated by the snap action caused by the spring 61 until the lever 49 reaches its other end or switch opening position in which it engages the stop 55 of the cam 53. The arrangement of parts is preferably such that the switch opening takes place during the accelerated movement of the lever 49 in order to reduce arcing between the stationary and movable contact members. In the switch opening position the projection 55 of the cam 53 engages the lower end of the lever 49 and in turn is engaged by the shoulder 61 on the casing.

Having described the method of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, I wish to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

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

1. A switch comprising a casing of insulating

material, stationary contact means supported on said casing, a first lever carrying contact means for engaging and disengaging said stationary contact means, a slot and pivot connection supporting said lever on the casing for pivotal and sliding movement, a second lever pivotally supported on said casing and being provided with spaced projections for alternately engaging a portion of said first lever, and spring means cooperating with the first lever for biasing it into engagement with one of said projections, pivotal movement of said second lever causing the first lever to move longitudinally through said slot and pivot connection and pivotally past a center portion whereby said spring biases the lever into engagement with the other projection.

2. A switch comprising a casing of insulating material, a stationary contact element supported on said casing, a first lever carrying contact means for engaging and disengaging said contact element, a slot and pivot connection supporting one end of said lever on the casing for pivotal and sliding movement, a second lever pivotally supported on said casing with its pivot substantially in line with the aforementioned slot and pivot connection, said second lever being provided with spaced projections on opposite sides of its pivot for alternately engaging the opposite end of said first lever and spring means carried by the second lever and cooperating with the first lever for biasing it into engagement with one of said projections, pivotal movement of said second lever causing the first lever to move longitudinally and then pivotally past dead center so that said spring biases the first lever into engagement with the other projection.

3. An electric switch comprising a casing of insulating material, stationary contact means carried by said casing, a first lever carrying contact means for engaging and disengaging said stationary contact means, a slot and pivot connection supporting one end of said lever on the casing, a second lever pivotally supported on said casing, said second lever being provided with spaced stops for alternately engaging the opposite end of said first lever and an arced spring, one end of said spring being carried by the second lever, the other end of said spring cooperating with the first lever for biasing it into engagement with one of said stops, pivotal movement of said second lever causing the first lever to move longitudinally and then pivotally past dead center so that said spring biases the first lever into engagement with the other stop.

WILLIAM R. YOUNG.