Jan. 12, 1937. K. C. ALLISON 2,067,557

ELECTRIC SWITCH

Filed Aug. 28, 1936

Fig. 1.

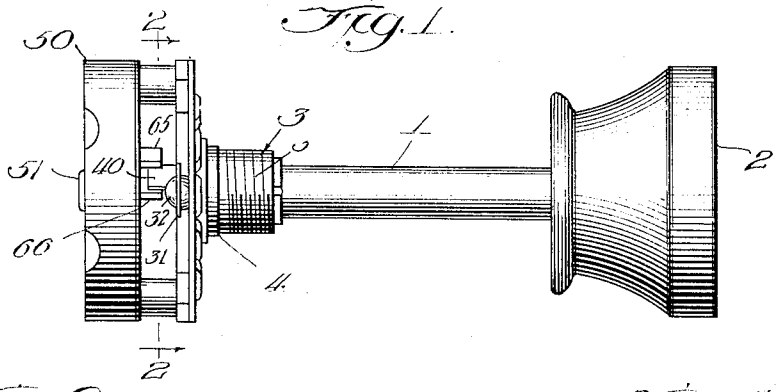


Fig. 2.

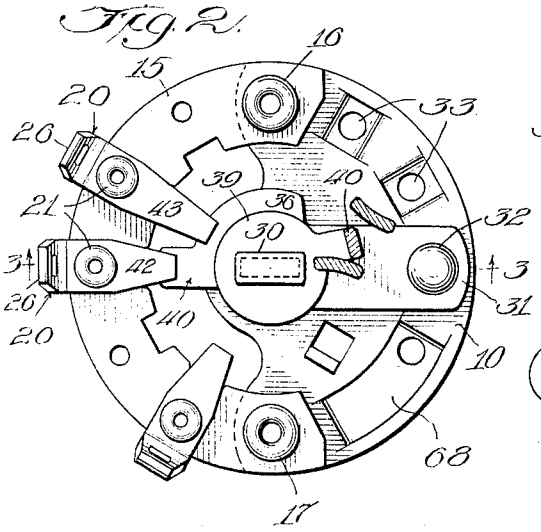


Fig. 4.

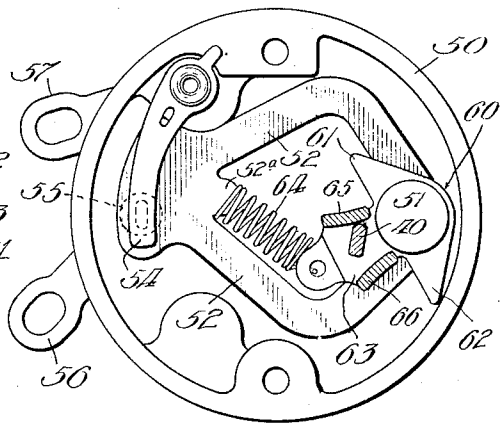
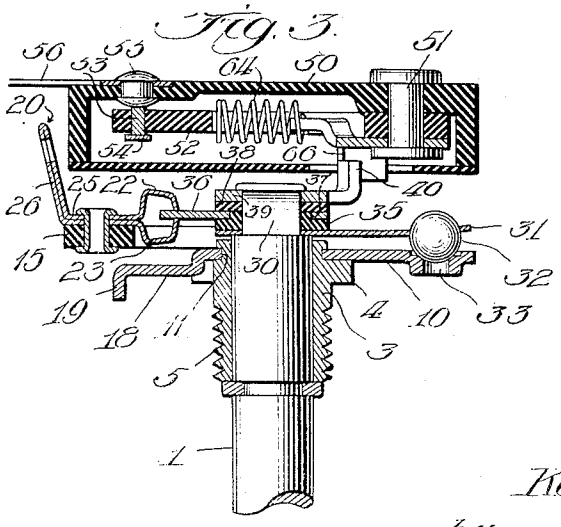


Fig. 3.



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ELECTRIC SWITCH

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Application August 28, 1936, Serial No. 98,283

12 Claims. (Cl. 200—9)

This invention relates to an electric switch and particularly to a composite switch wherein one switch has only a definite on and off movement while the other switch has a greater number of definitely indexed positions. The on-and-off switch is of the usual construction and tends to snap into either position. The other switch is provided with an indexing mechanism to control the motion thereof into the several positions. It has been found that the indexing means should be inoperative in the end position where both switches are operated together as otherwise the load is too great.

Referring to the drawing:

Fig. 1 shows a complete switch.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a section along 3—3 of Fig. 2 and showing the complete switch.

Fig. 4 is a section along line 4—4 of Fig. 3.

A shaft 1 carrying a knob 2 is rotatively mounted in a bushing 3 having a shoulder portion 4 and a threaded portion 5. The shaft is retained in place by a split washer 6 in slot 7 of shaft 1 at the end of bushing 3. Shoulder 4 of bushing 3 supports along its side a metal plate 10. This plate fits tightly around the reduced end 11 of bushing 3 and is maintained in position by having the bushing material peaned over. Plate 10 extends for substantially 180 degrees and is cut out as shown in Fig. 2 to permit an annular strip 15 of suitable insulating material to complete the circular outline of plate 10. Plate 10 which is preferably of metal is below strip 15 and the two are rigidly united by rivets 16 and 17. Plate 10 has a tongue 18 extending under insulating strip 15 which is adapted to lie in a slot of shoulder 4 of bushing 3. This tongue is bent over at 19 and is adapted to lock the switch against rotation in its mounting.

Strip 15 has a plurality of contacts 20 mounted thereon by means of eyelets 21. These contacts comprise oppositely bent jaws 22 and 23 coming together into two layers of metal 25 forming the body portion of the contact and terminating in a turned up soldering lug 26.

Shaft 1 has its free end 30 reduced to a flattened rectangular cross section as shown in Fig. 2. A spring arm 31 is slipped over end 30 of the shaft. The free end of this arm is perforated and supports a ball-bearing 32 which is adapted to play over a series of index indentations 33 in plate 10. Above spring 31 an insulating washer 35 is disposed and is adapted to support a rotor 36 away from shaft 1 by the collar portion 37 on the washer. Above rotor 36 an insulating washer 38 is provided and above that a metallic end washer 39 is disposed. The free end of the shaft may be flattened out to retain the assembly in position. End plate 39 is provided with a finger 40 bent up parallel to the shaft. It will be noted that rotor 36 may have a projecting tongue 40 which may cooperate with a short contact 42. The long contact 43 extends far enough at all times to touch the body portion of the rotor itself.

Supported by rivets 16 and 17 is a toggle switch comprising an insulating base 50 having a pivot pin 51 therein. Pivotally mounted on pin 51 is an insulating member 52 carrying a movable contact 53. Disposed on opposite sides of contact 53 are stationary contacts 54 and 55 molded in the base and connected to lugs 56 and 57. Movable member 52 is snapped back and forth by means of a metal member 60 having side extensions 61 and 62 and a tailpiece 63. Piece 63 is connected to a coil spring 64 whose other end bears against a projection 52a in member 52, the interior of this member being cut out to clear the spring and tailpiece. Piece 63 has its opposite sides bent downwardly to form a pair of spaced fingers 65 and 66.

By the oscillation of tailpiece 63 member 52 is snapped back and forth to open or close the switch. In the operation of the switch the side extensions 61 and 62 of metal member 60 cooperate with the sides of base 50 to stop the action of the switch. A stop 67 is punched out of metal plate 10 to define one of the limits of rotor travel.

It will be noted that plate 10 is provided with rest perforations 33 only in those positions where the on-and-off switch is no longer operated. The end portion 68 of the track in which ball 32 rides is depressed but not perforated so that the index mechanism is not in any set position. In this way, when both switches are operated together as in the end position—it is understood of course that it may be in any intermediate position also—the index mechanism is inoperative and reliance is had upon the indexing of the toggle switch.

It is obvious that this invention only applies where the relative indexing torques are comparable to each other.

This application is a continuation in part of my application S. N. 67,629 filed March 7, 1936.

Having described this invention what is claimed is:

1. In combination, an electric switch having spring means for biasing said switch in either one of two positions, an additional switch having means providing more than two positions, indexing means associated with said second switch for setting it in its various positions, means for cou-

pling said switches together so that said two switches are operated together with common index positions, said coupling means being operative only over the two positions of said first switch, and means for rendering inoperative said indexing means on the second switch during the coupling engagement with said first switch.

2. In combination, an electric snap switch having means providing only two positions, an additional switch having means providing more than two positions, indexing means for said second switch, means for operatively coupling said first switch to said second only in an end position of said second switch so that said first switch is operated with said second switch, and means for rendering said indexing means inoperative during the coupling.

3. In combination, an electric switch having means providing more than two positions, a snap switch having means providing only two positions, means for mechanically coupling said two switches together only over the operating range of said second switch whereby said switches are actuated together and have common positions, and index means for said first switch only and operative only when said two switches are uncoupled.

4. In combination, an electric switch having means providing more than two positions, a snap switch having means providing only two positions, means for mechanically coupling said two switches together only for the last two positions of said first switch whereby said two switches are actuated together and have two common positions, and index means for said first switch only and operative only from next to the end position to the other end position of said first switch.

5. The construction of claim 4 wherein said index means comprises a spring pressed arm acting on an index plate having indexing depressions therein and wherein said plate has said indexing depressions at all positions of said first switch except the first mentioned end position.

6. In combination, an electric switch having means providing more than two positions and including a member rotatable about a center, a snap switch having means providing only two positions and including a member rotatable about a center, means for mounting said two switches so that said rotatable members move in substantially parallel intersecting paths, said members being so shaped as to mechanically engage each other only for an extent to operate said snap switch from said other switch, and index means for said first switch only and operative only over those positions of the first switch outside of the range of the second switch.

7. In combination, an electric switch having means providing more than two positions and including a member rotatable about a center, a snap switch having means providing only two positions and including a member rotatable about a center, means for mounting said two switches so that said rotatable members move in substantially parallel intersecting paths, said members being so disposed as to mechanically engage each other sufficiently to operate the snap switch when said other switch is moved between one end position and the adjacent position, and index means for said first switch only and operative only between the adjacent position and the other end position.

8. In combination, an electric switch having a stator and rotor, said switch having means providing more than two positions, a snap switch having means providing only two positions, means for mechanically coupling said two switches together so that when said first switch is moved between two predetermined positions said snap switch is operated, index means for said first switch only, said index means providing maximum resistance to change between switch positions, said index means including means for maintaining a constant resistance level low in comparison to maximum index resistance levels over the range in which said snap switch is operated.

9. In combination, an electric switch having means providing more than two positions, a snap switch having means providing only two positions, coupling means for operating said snap switch when said first switch is moved between two adjacent positions at one end of its range, indexing means for said first switch only having a continuous index position over said two adjacent switch positions and thereafter having definite index positions for switch positions.

10. In combination, an electric switch having means providing more than two positions, a snap switch having means providing only two positions, coupling means for operating said snap switch when said first switch is operated between two positions, and indexing means for said first switch only, said indexing means having a continuous index position over said two positions and having definite index positions beyond said two positions.

11. In combination, one electric switch having means providing a plurality of positions, a second switch having means providing a greater number of pistons, means including a spring for each switch tending to set the switch in any one of its positions as opposed to intermediate positions, means for coupling said two switches together only over the operating range of the first switch so that operation of said second switch will cause said first switch to operate during the coupling thereof, and means included in said spring inclusive means of the second switch for rendering said spring means inoperative during the coupling of said two switches.

12. In combination, an electric switch having means providing a plurality of positions and having means inclusive of a spring for biasing said switch in any one position, a second switch having means providing a greater number of positions, means for coupling said two switches together only over the operating range of the first switch so that operation of said second switch will cause said first switch to operate, and means inclusive of a spring on said second switch only for biasing said second switch in any of its positions outside of the operating range of the first switch but having no discrimination for positions of the second switch within the operating range of the first switch.

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