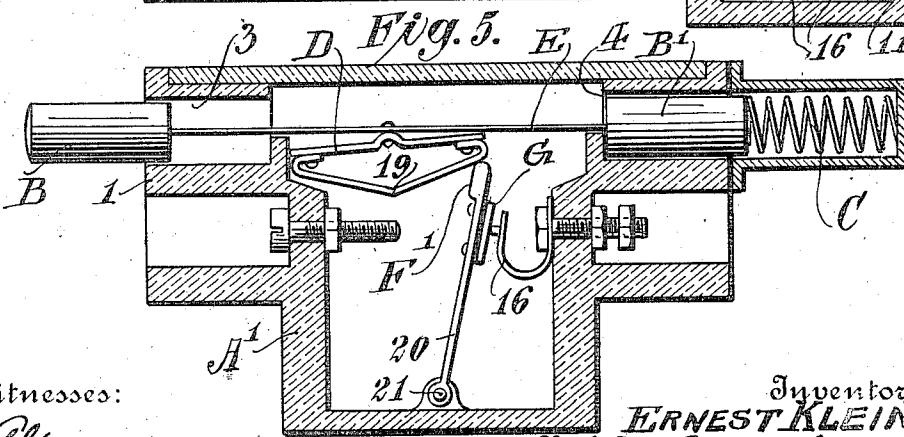


APPLICATION FILED APR. 27, 1914.

Patented Nov. 12, 1918.



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SNAP-SWITCH.

1,284,367.

Specification of Letters Patent.

Patented Nov. 12, 1918.

Application filed April 27, 1914. Serial No. 834,706.

To all whom it may concern:

Be it known that I, ERNEST KLEIN, a citizen of the United States, and a resident of the borough of Manhattan, county, city, and State of New York, have invented certain new and useful Improvements in Snap-Switches, set forth in the following specification.

This invention relates in its preferred application to snap switches, in which the circuit controlling element has imparted to it by an operating means an accelerated movement independent from and in a direction opposite from the movement of the operating means. The purpose of the invention broadly is to perfect a mechanical movement especially adapted for snap-switches so that the circuit controlling element of the switch moves with an accelerated movement independent from and in an opposite direction from the movement of an operating means. More specifically the object of the invention is to provide means for effecting the general object just recited which does not embody the defect of a cam and a spring in direct engagement one with the other as for instance as disclosed and claimed in Patent No. 985,421.

To the above ends there is contemplated within the invention a cam and a cam-follower constrained to oscillate between respective extreme positions in coöperating relation with each other. The term "oscillate" is used broadly with the understanding that an oscillation the radius of which is large enough constitutes a reciprocation or a back and forth movement in a straight line. The cam and the cam-follower are arranged directly to engage one with the other so that one coöperates with the other to impart thereto an independent accelerated movement in the opposite direction from the movement of the driving element. An operating means, as for instance push buttons, are provided for moving the driving element and spring means is secured to one of the elements to cause it yieldingly to engage the other.

In addition to the above the invention is pointed out particularly in the following claims which should be read in connection with the illustrative embodiments of the invention which are described in the following specification and which are illustrated in the accompanying drawings which form

a part of this application, in which like characters designate corresponding parts, and in which—

Figure 1 is a vertical cross section through an embodiment of the invention showing the parts in their relative positions for the commencement of a movement of the driven part to the right;

Fig. 2 is a view similar to Fig. 1, showing the parts in their relative positions after a movement to the right of the driven part has been effected;

Fig. 3 is a section through line III—III of Fig. 2 looking in the direction of the arrows;

Fig. 4 is a fractional top plan view showing the spring and a push button; and

Fig. 5 is a view corresponding to Fig. 1, but showing a modification in which the driven element oscillates in a path having a shorter radius of oscillation.

Any suitable supporting structure suitably insulated such as the case A or the case A' may be provided. The embodiment illustrated is a somewhat diagrammatic representation of a double throw push button snap-switch. In opposite walls 1 and 2 are provided guideways 3 and 4 for the operating means shown in the form of two tandem push buttons B and B'. Stops 5 and 6 for limiting the inward movement of the operating means are shown. The operating means shown is for manual manipulation in both directions. However, the application of a compression spring C to push against one of the push buttons will render the switch automatic as for the control of closet lights automatically in response to the opening and closing of the closet door.

The driving element of the switch is shown in the form of a cam D having two oppositely inclined faces 7 and 8. A leaf spring E interlinks the push buttons B and B' to which it is suitably secured at its ends. The upper portion of the cam D is provided with a rib 9 which engages the lower side of the spring E and at which locality it is secured to the spring D by rivets 10 so that the entire cam may be free to rock slightly beneath the spring 3 on the rib 9.

In Figs. 1, 2 and 3 the driven element, the cam-follower F coöperating with the cam D is constrained to oscillate or reciprocate like a sled upon the guide ways 11. This cam follower F is shown stamped from stiff

sheet metal to form the engageable portion or nose 12 and the broad sliding feet 13 and 14. Projecting downwardly between the ways 11 is an arm 15 of reduced width to which the switch contact G is secured, but from which it is insulated. The switch contact G coöperates with the fixed contacts 16.

The extreme positions between which the cam follower F oscillates are determined by the stop walls 17 and 18. In like manner the extreme positions between which the cam D oscillates are determined by the stop walls 5 and 6 limiting the inward travel of the push buttons B and B'.

In the modification of Fig. 5 the cam follower F' is constrained to oscillate in a well defined arc-shaped path through the medium of the radial guide 20 working on the hinge pin 21. In this modification the switch contact plate G is carried by the radial guide 20. In other respects the structure is the same as has been described in connection with the other figures.

Operation.

In Fig. 1 the parts are shown after the push button B' has been pushed in to the limit of its travel. The inclined face 7 of the cam D has been driven over the nose 12 of the cam follower F so that the apex 19 of the cam D has just passed by the nose 12. This movement has caused a lateral deflection (as shown in the figure in an upward direction) of the spring E. This deflection of the spring E causes the cam D forcibly to engage the cam follower F. As a result the nose 12 of the cam follower F is forced with an accelerated movement to the right which carries the contact bridge 6 into electrical connection with the contacts 16. This movement is totally independent of and in an opposite direction from the left hand movement of the operating button B' which effected it. Fig. 2 shows the positions assumed by the parts after the cam follower movement to the right has been effected. In this position the cam D is still held in direct engagement with the cam-follower F so that the contact G is forcibly held in electrical connection with the contacts 16. In this figure the parts are in position to commence an operation to break the electrical circuit. The pushing in of the push button B causes the inclined cam-face 8 to ride up the nose 12 of the cam-follower F until the apex 19 passes over the nose 12. When this position has been reached an accelerated motion to the left of the cam-follower F results which is exactly similar to the motion to the right previously described.

In connection with the modification shown in Fig. 5, the operation is the same except that the cam-follower F swings on the hinge pivot 21 instead of sliding along ways 11.

In the illustrative embodiments the cam-

follower is shown oscillating unyieldingly in a fixed path while the cam is yieldingly pressed into coöperation with the cam-follower by a spring. It is, of course, understood that the cam might be caused to oscillate in an unyielding path and the cam-follower be guided on spring ways or on a resiliently compressible radial guide or the cam and cam-follower might be interchanged although this is not the preferred form of my invention which has been described in detail.

What is claimed and what is desired to be secured by United States Letters Patent is:—

1. In an electric snap-switch, two directly engaging movable parts consisting of a cam and a cam-follower; a leaf spring of longitudinal form movable bodily in the general approximate direction of its length, bodily carrying and pivotally supporting said cam so as to press said cam and cam-follower into yielding engagement; operating means coöperating with said spring for imparting an actuating movement to said cam in one direction to cause said cam to impart an accelerated operating movement to said cam-follower in the opposite direction independently of said operating means; and a switch contact associated with said cam-follower and actuated thereby.

2. In an electric snap-switch, a base; two tandem push buttons guided through said base; a leaf spring linking said push buttons together whereby the pushing in of one pushes the other out; a cam secured to said leaf spring intermediate said push buttons; a cam-follower; an electric contact controlled by said cam-follower; and means for guiding said cam-follower between two extreme positions in a path coöperatively to engage said cam whereby an operative movement of said cam in one direction causes an independent accelerated movement of said cam follower in the opposite direction.

3. In a snap-switch, a leaf spring; operating means fixed to the opposite ends of said spring for imparting thereto a lengthwise movement in either of two directions but permitting the lateral bending of said spring intermediate its ends; a cam carried by the mid-portion of said spring and having oppositely inclined faces; a cam-follower constrained to oscillate in a path so as to be engaged by the faces of said cam; an electric contact means operated by said cam-follower; and means for constraining the relative movements of said parts so that a complete movement of said cam to the left causes a snap of said cam-follower to the right and vice versa.

4. In a snap switch, a cam-follower constrained to oscillate into each of two extreme positions; electric contact means operated by said cam-follower; a double faced

cam disposed adjacent said cam-follower, a leaf spring of longitudinal form to which said cam is secured and by which alone it is carried, said leaf spring being movable 5 bodily in the general direction of its own length for the purpose of moving said cam across said cam-follower in each of two directions to cause said cam-follower to snap into its extreme position in the opposite 10 direction.

5. In an electric snap switch, two directly engaging movable parts consisting of a cam and a cam-follower; a guiding means constraining one of said parts to an 15 oscillating movement into each of two extreme positions; said part having associated with it an electric contact; a leaf spring having a general longitudinal form and movable in the proximate direction of its 20 own length, said leaf spring alone carrying the second of said parts, means for actuating said leaf spring so as to cause a yielding engagement between said parts and whereby a movement of the yielding part to

the left causes a snap of the other part 25 to the right and a movement of the yielding part to the right causes a snap of the other part to the left.

6. In a mechanical movement, an oscillating driving part and an oscillating driven 30 part, one being a cam and the other a cam-follower; and a leaf spring movable in the general direction of its own length and serving as the carrier of one of said parts for the purpose of yieldingly pressing it to effect 35 coöperative engagement with the other part, whereby an independent accelerated movement is imparted to the driven part in the opposite direction from the movement of the driving part causing the oscillation. 40

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNEST KLEIN.

Witnesses:

L. ALTMAN,
HENRY SCHWED.