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M. J. WOHL

2,404,874

ELECTRIC SNAP SWITCH

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Fig. 1.

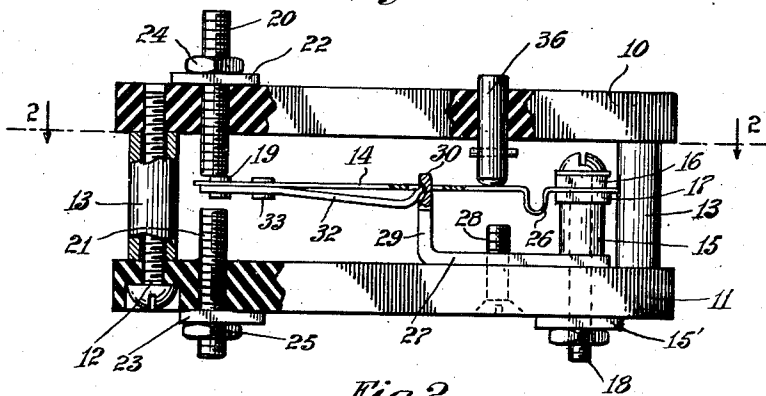


Fig. 2.

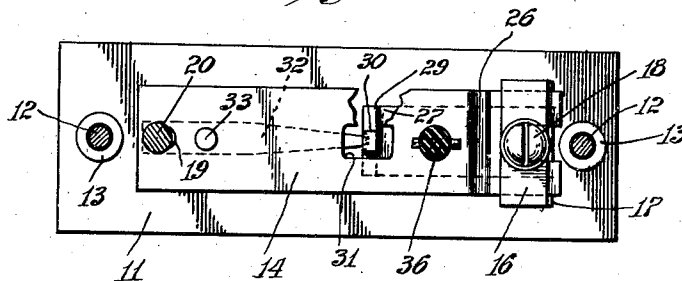


Fig. 3.

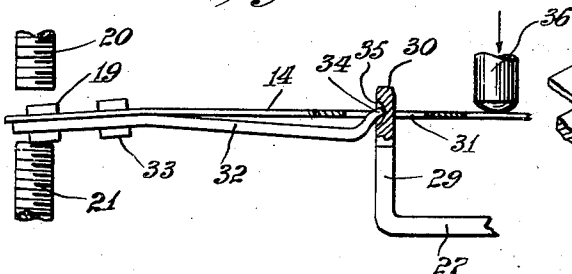
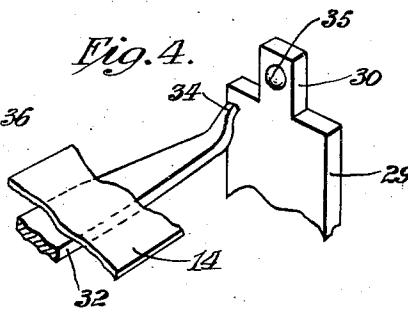


Fig. 4.



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ELECTRIC SNAP SWITCH

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2 Claims. (Cl. 200—67)

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This invention relates to electric snap switches. It is a primary object of my invention to produce a precision switch that operates in response to very slight movement of its operating plunger and with only a few ounces of operating force and which has a high central capacity.

Another object is to provide means for preventing bouncing or chattering of the movable switch member with respect to the stationary contact thereof when it is snapped into engagement with said contact.

Another object is to provide a switch of this kind that is simple but extremely sensitive and inexpensive to manufacture.

Another object is to provide a switch that will positively operate with a snap action to either one of two positions upon a predetermined force being applied.

Another object is to provide a switch which will open and/or close the circuit with a snap action.

Another object is to prevent distortion of the movable member of the switch and loss of energy thereof due to mechanical friction.

Other objects and advantages of my improved switch will be in part apparent and in part pointed out in the following description thereof taken in connection with the accompanying drawing in which—

Fig. 1 is a side view of my improved switch, parts being broken away and parts being shown in section.

Fig. 2 is a sectional view taken on the plane of the line 2—2 of Fig. 1 and looking in the direction of the arrows, parts being shown broken away.

Fig. 3 is a detail view showing the movable switch member moved into contact with the lower stationary contact member.

Fig. 4 is a fragmentary exploded perspective view on an enlarged scale of the pivotal finger member and its support.

The switch parts are mounted on a frame comprising an upper plate 10 and a lower plate 11, both formed of suitable insulating material. The plates may be tied together by a screw 12 passing through a metal tubular post 13.

An elongated armor or leaf 14 formed of thin flat spring metal is hinged fastened at one end to a post 15 between metal plates 16 and 17. A screw 18 secures the post and plates to the lower plate 11 and terminal plate 15'. The other free end of the arm 14 carries a pin contact 19 which is disposed between and adapted to engage an upper stationary electrical contact 20 sup-

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ported by plate 10 and a lower stationary electrical contact 21 supported by the lower plate 11. These contacts are preferably made adjustable, for instance, by forming them as threaded screws adjustable in the supporting plates.

A metal plate 22 may be fastened to the upper plate 10 forming a circuit terminal and a similar plate 23 may be secured to the lower plate 11. Set nuts 24 and 25 may also be provided for the contacts 20 and 21, respectively. At a point adjacent its hinge connection, the arm 14 is formed with a bent portion 26 for imparting springiness to the arm.

A bracket 27 is secured to the lower plate 11 by a screw 28, and has an upright portion 29 disposed substantially intermediate the ends of the arm 14. This upright portion is formed with an extending lug portion 30 which lug protrudes through an opening 31 in the arm 14.

Fastened to the underside of the arm 14 is a finger member 32 formed of flat stock but stiffer and more rigid than the arm 14. One end of this finger member is fastened to the underside of the contact carrying end of the arm by means of a rivet 33, and this end of the finger member is on substantially the same horizontal plane as the plane of the body of the arm 14. The finger member then extends slightly downwardly and inwardly toward the bracket 27, as viewed in Fig. 1, and at a point adjacent said bracket it extends upwardly at an acute angle terminating in a free horizontal portion formed with a tapered end 34. The tapered end seats in a semi-spherical shaped recess 35 formed in the end 30 of the bracket portion 29, which recess is disposed at a point substantially on the same horizontal plane as the body of the arm 14 whereby said tapered end is pivotally supported on substantially the same horizontal plane.

An operating plunger 36 of insulating material is preferably movably mounted in the upper plate 10 at a point between the hinged end of the arm 14 and the bracket 27.

The arm 14 may be considered to be normally in the position shown in full lines in Fig. 1, where the bias of the arm and the finger member 32 both tend to hold the contact end of the arm bowed or warped against the stationary contact 20. Upon downward pressure of the plunger 36, the portion of the arm 14, between its hinged connection to the post 15 and its rigid connection to the finger member 32, moves downwardly as viewed in Fig. 1 and becomes bowed and stores up power until said power overcomes the upward bias of the finger member 32 at which time the

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finger member will start to move downwardly about its pivotal point on the bracket carrying the contact end of the arm with it from normally straight position in engagement with the upper contact 20 and as soon as it passes the medial line or straight line position the finger member will add its force to the biasing tendency of the arm and snap the movable end of the arm to another position at the opposite side of the center into engagement with the lower contact 21.

When the pressure is released from the plunger, the finger member will instantaneously come into action and move upwardly around its pivotal point and move the contact carrying end of the arm back to normal engagement with the upper contact 20 with a snap action.

Obviously, after the active pivotal movement of the finger member has once started, the pressure of the contact carried by the arm against whichever stationary contact it may be engaged with, will be progressively decreased until the finger member assumes its normal straight position, thus avoiding the usual vibrating or chattering movement of the contact.

The result of this action is that the contact end of the arm is snapped from one position to the other, thus breaking the circuit through the contact 20 and establishing a new circuit through contact 21 and vice versa.

My improved switch constructed and arranged as aforesaid will be found useful in a number of electrical control applications and I desire to be limited only by the state of the prior art and the appended claims.

I claim:

1. A snap switch comprising a frame, a post adjacent one end thereof, a thin leaf spring hingedly fastened at one end to said post with the other end free to move, said leaf spring having an opening therein intermediate the ends thereof and having a bowed portion adjacent its hinged end, a pair of spaced contacts at the other

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end of the frame between which the free end of the leaf spring moves, the free end of said leaf spring being normally in contact with one of said contacts, a bracket member having a portion extending through said opening, said extending portion being provided with a semi-spherical shaped recess in substantially the plane of the leaf spring, an elongated substantially rigid finger member disposed below and along the leaf spring in substantially the same plane as the leaf spring with one end fastened to the free end of said leaf spring and with its other end pivotally seated in said recess and means for acting on a portion of said leaf spring to cause the free end thereof to move out of its normal position and into contact with the other contact with a snap action.

2. A snap switch comprising a frame, a post adjacent one end thereof, a thin leaf spring hingedly fastened at one end to said post with the other end free to move, said leaf spring having an opening therein intermediate the ends thereof and having a bowed portion adjacent its hinged end, a pair of spaced contacts at the other end of the frame between which the free end of the leaf spring moves, the free end of said leaf spring being normally in contact with one of said contacts, a bracket member having a portion extending through said opening, said extending portion being provided with a semi-spherical shaped recess in substantially the plane of the leaf spring, an elongated substantially rigid finger member disposed below and along the leaf spring in substantially the same plane as the leaf spring with one end fastened to the free end of said leaf spring and with its other end pivotally seated in said recess and a plunger guided by said frame and adapted to engage the leaf spring adjacent its hinge point to cause the free end of the leaf spring to move out of its normal position and into contact with the other contact with a snap action.

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