

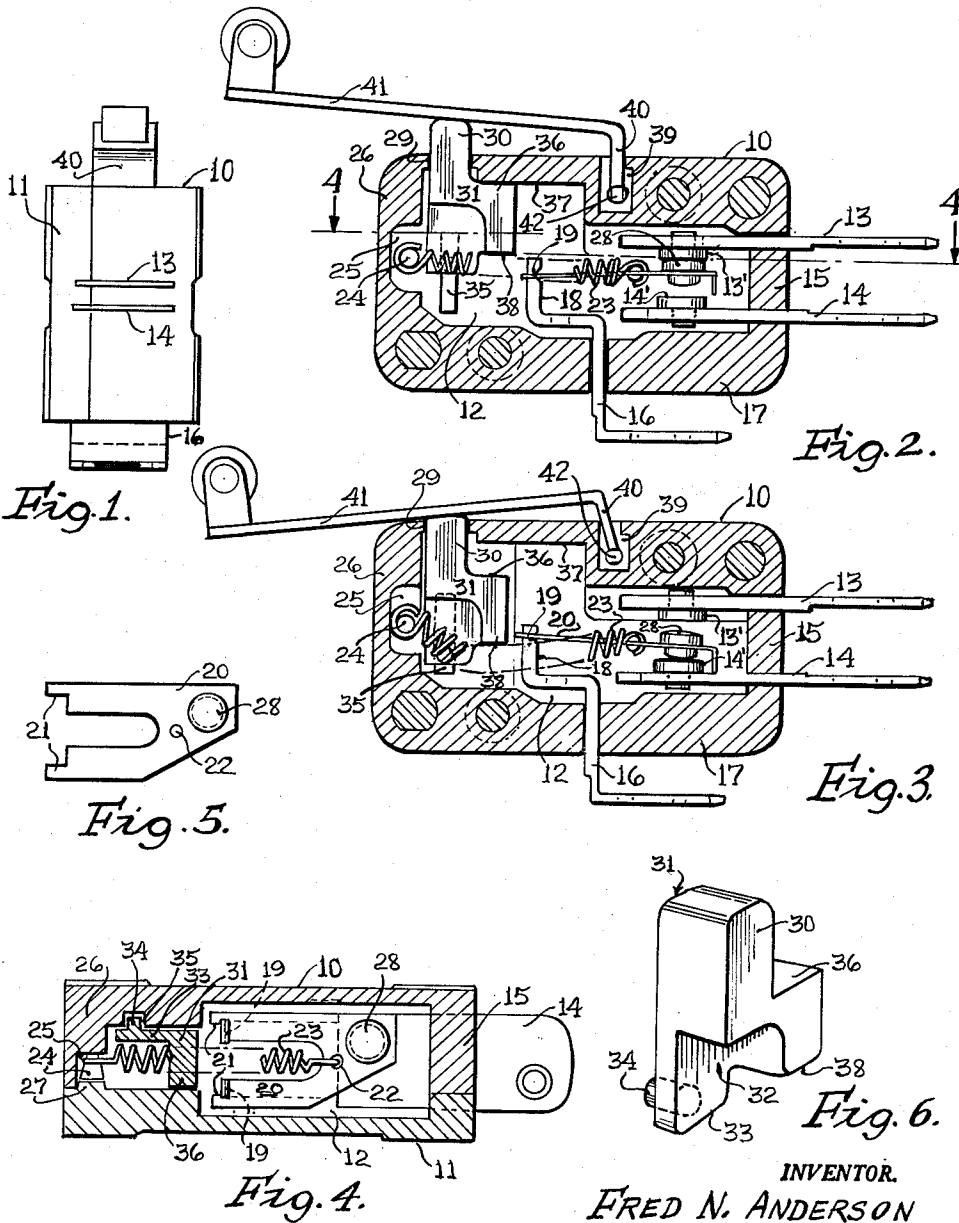
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SNAP ACTION SWITCH

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SNAP ACTION SWITCH

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My invention relates to a new and useful improvement in a snap action switch and more particularly to a switch having a movable blade that by means of an over-centering device, is moved with a snap action into and out of circuit making contact.

A particular object of my invention is in the provision in a snap action switch of this character of an actuator that has a positive path to travel, and which engages a tension member at a point immediately adjacent to the pivotal connection of the movable switch blade and its supporting member.

Another important object of my invention is in the provision in a switch of this character of an arrangement of parts which properly locate the tension member in a predetermined position with respect to the movable switch blade and the switch blade actuator.

Yet another object of my invention is in the provision in a switch of this character of a cantilever movable switch blade that will move relative to a stationary contact with a rocking motion which will effect a wiping action between electrical contacts.

Yet another object of my invention is in the provision in a switch of this character of an arrangement of parts that is economical in manufacture, simple in assembling, and positive in its operation.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

FIG. 1 is an end elevational view of my switch.

FIG. 2 is a side elevational view with the cover plate removed.

FIG. 3 is a side elevational view similar to FIG. 2 but with the parts thereof in their actuated positions.

FIG. 4 is a detailed sectional view taken on line 4-4 of FIG. 2.

FIG. 5 is a top plan view of the movable switch blade, and

FIG. 6 is a perspective view of my improved switch actuator.

My improved snap action switch includes a housing 10 provided with a complementary side cover plate 11. Within the housing 10 and the cover plate 11 there is provided a cavity 12. Within this cavity 12 is positioned the switch mechanism of this invention.

The switch is provided with spaced apart fixed contact bearing terminals 13 and 14 which extend through the end wall 15 of the housing 10 and cover 11 as shown. These fixed terminal members 13 and 14 provide spaced apart confronting contacts 13' and 14' positioned within one end of the cavity 12. A fixed terminal member 16 projects into the cavity 12 through the bottom wall 17 of the housing 10 and cover 11. This fixed terminal member 16 is angularly formed to position in a pre-determined location within the cavity 12 a bifurcated pivot post 18. Each of the free ends of the bifurcated post 18 has formed in corresponding faces aligned V-notches 19.

Formed from a spring material is a substantially flat U-shaped switch blade 20. The inner corresponding corners of the free arms of the U-shaped blade 20 are notched as at 21, and such notched corners are adapted to pivotal-

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ly set in each of the V-notches 19 formed in the bifurcated ends of the pivot post 18 as seen in FIG. 4. The mid-section of the blade 20 is provided with an aperture 22 through which is hooked one end of a tension member 23. This tension member 23 is in the form of a coiled spring which extends between the arms of the blade 20 as well as between the bifurcated ends of the pivot post 18, and has its opposite end hooked upon a stud 24.

The stud 24 is a molded part of the casing that comprises the housing 10 and is located in a small recess 25 formed in a back wall 26 of such housing 10. The cover 11 is provided with a corresponding laterally extending boss 27 (FIG. 4) that is adapted to constitute one side wall of the recess 25 when the cover 11 is mounted on the housing 10. It should be noted that the stud 24 is tapered inwardly in the direction of its base so that when the one end of the spring 23 is hooked thereon, it will gravitate toward the smaller diameter stud 24 and thus be properly located in a predetermined longitudinal plane with respect to the flat plane of the blade 20 and with respect to the pivotal connection between the arms of such blade 20 with the bifurcated ends of the pivot post 18.

By forming the stud 24 as an integral part of the housing 10 and tapering the longitudinal length thereof in the manner aforementioned, the spring 23 is properly located with respect to the blade 20 thereby removing the necessity of the assembler working within close manufacturing tolerances to achieve this arrangement.

By the arrangement of parts above described, the blade 20 will have its contact 28 held in bearing engagement with the contact 13' of the fixed terminal member 13.

The housing 10 in the top wall thereof is provided with a passage 29 which communicates with the cavity 12. Within the passage 29 is slidably projected the stem portion 30 of a switch actuator 31. The actuator 31 is formed in a substantially L-shape with the lower corner thereof notched out as at 32, and with a portion 33 of the base leg thereof extending in a depending plane with respect thereto.

A laterally extending guide 34 is carried by the depending portion 33 as seen in FIGS. 4 and 6. This guide 34 is adapted to ride in a groove 35 formed in the side wall of the casing 10. The L-shaped actuator 30 provides a shoulder 36 which in normal position is in contact with a portion of the top wall 37 which defines the cavity 12. This shoulder 36 prevents outward movement of the actuator 31 from within the cavity 12 of the housing 10.

By reason of the actuator 31 being L-shaped, an offset foot portion 38 thereof, will engage the tension spring 23 at a point adjacent the bifurcated ends of the pivot post 18 as seen in FIGS. 2, 3, and 4, and thus be laterally distant from the long axis of movement of such actuator, for a purpose hereinafter explained.

The casing 10 is provided with a recess 39 formed in the top wall thereof. Within this recess 39 is inserted one end 40 of a switch actuator lever 41. The one end 40 of the lever 41 is provided with laterally extending circular studs 42 which are adapted to be rotatably seated in corresponding circular apertures formed in opposite walls of the recess 39. Downward pressure on the free end 42 of the lever 41 will cause the switch actuator 31 to slide through a controlled path inwardly of the housing 10. The switch actuator 31 has a controlled path of movement by reason of the fact that the guide 34 is contained in the groove 35 while certain portions of the L-shaped actuator 31 have sliding contact with wall portions of the casing 10 and cover 11, as seen in FIG. 4.

When the actuator 31 moves inwardly of the housing 10 in its controlled path, it will depress the tension member 23 below the point of pivotal connection between the blade 20 and the pivot post 18 creating tension in the blade 20 causing the same to move with a snap action into the

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position shown in FIG. 3 where the contact 28 of the blade 20 engages contact 14' of the fixed terminal member 14. As the blade 20 is of a cantilever configuration the contact 28 will actually rock off the contact 13 before the blade 20 moves with a snap action into its actuated position. As the tension spring 23 is deformed by the downward movement of the switch actuator 31, the end thereof that is hooked upon the stud 24 is permitted to rotate thereabout so as to prevent frictional wear on the parts thereof and to eliminate frictional resistance between the movable parts. A positive action of the blade 20 results from the fact that the tension member 23 is actuated through the pressure of the foot 38 of the switch actuator 31 engaging a portion of the tension member 23 at a point as close as possible to the pivotal connection of the blade 20 with the pivot post 18, thus reducing the amount of deformation of the spring necessary to actuate the blade. This also has a direct bearing on the amount of external pressure required to cause movement of the actuator relative to the spring.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A snap action switch comprising a housing including a removable side cover which cooperates to provide an internal cavity, fixed terminal members extending into the cavity from one end of the housing and providing spaced apart confronting contacts, a third fixed terminal member extending into said cavity through the bottom wall of said housing and having its inner end bifurcated so as to provide spaced apart pivotal posts, a movable blade pivotally connected to said posts and having its opposite end extending between and in contact with one of the contacts of said fixed terminal members, a tension member connected at one end to said movable blade and anchored at the other end to said housing for tensioning said blade in pivotal connection with said pivotal posts, means carried by said housing and said side cover for pivotally anchoring the opposite end of said tension member so that the same lies in a predetermined vertical and horizontal plane with respect to said blade, an actu-

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ator extending through an opening in the top wall of said housing, one wall of said actuator being of an elongated substantially rectangular shape so as to lie in facial abutment throughout its length with one wall of said housing and having its lower edge extending beneath the predetermined horizontal plane of said tension member, said one wall of said actuator provided with a laterally extending guide member movable in a corresponding slot formed in said one wall of said housing defining said cavity, said actuator providing a lateral offset portion intermediate its ends for engaging said tension member adjacent one side of said pivotal posts, said offset portion movable through the same axis of movement of said actuator so as to cause said tension member to be deformed out of its horizontal plane to cause the blade to move with a snap action movement into contact with the other of said fixed contact bearing terminal members.

2. A snap action switch as defined by claim 1 wherein said tension member is a coil spring extending between said bifurcated pivotal posts, said spring connected at one end to said movable blade and provided at its opposite end with a hook element adapted to be rotatably projected on to the supporting means provided by said housing, said supporting means including a pin extending laterally from one wall of said housing in the direction of said cover and transversely to the longitudinal length of said tension member, said pin being tapered throughout its longitudinal length in the direction of said one wall so that said hook element provided at one end of said tension member will normally be positioned at the base of said pin in a predetermined vertical and horizontal plane, and means on said cover for contacting the end of said pin after the tension member has been rotatably positioned thereon and the cover placed on said housing for preventing lateral displacement of said tension member from said pin.

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