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OVER CENTER ELECTRICAL FLASHER SWITCH

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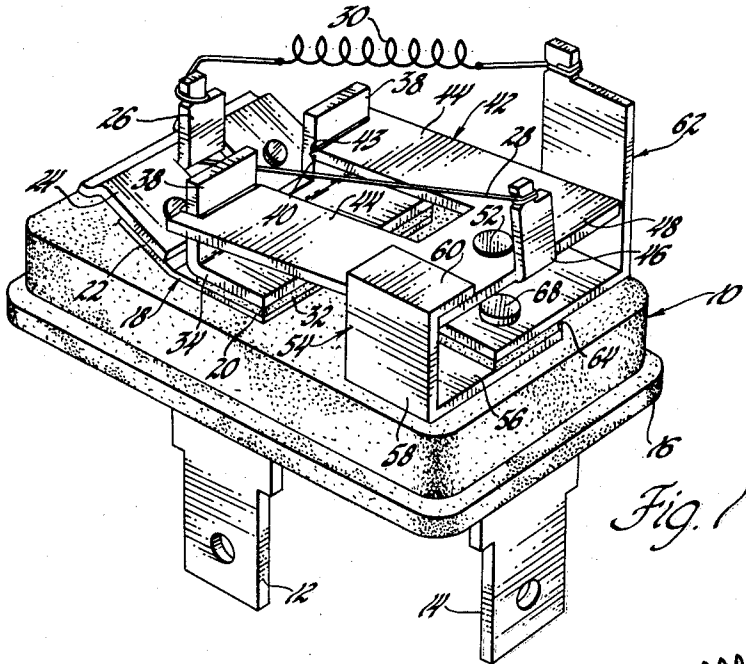


Fig. 1

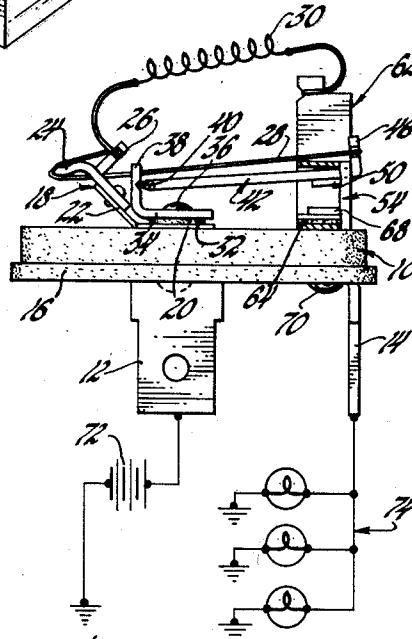


Fig. 2

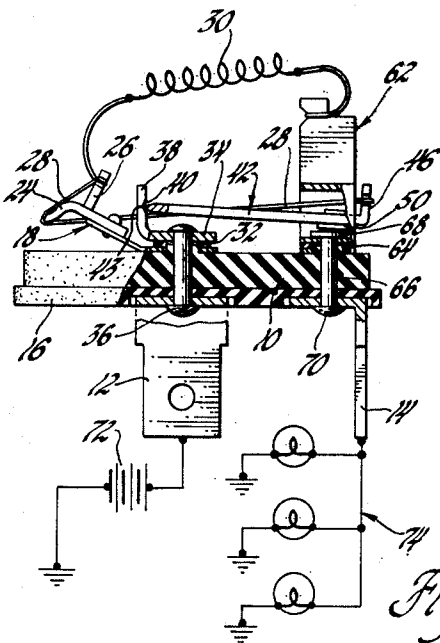


Fig. 3

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OVER CENTER ELECTRICAL FLASHER SWITCH
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4 Claims. (Cl. 200-113)

This invention relates to an electrical switch and more particularly to a flasher of the type used to periodically actuate the warning lights of a vehicle. The object of the invention is to provide an improved flasher having a snap action to thereby minimize wear on the contacts due to sparking.

The invention is carried out by providing a switch with a pivoted armature which is moved in response to the pull of a heat expansible wire. The direction of the pull of the wire is changed by a spring member arranged to cause the wire to cross the pivot axis of the armature upon expansion or contraction of the wire, thereby pivoting the armature with a snap action.

The advantages of the invention will become more apparent from the following description read in conjunction with the accompanying drawings wherein like numerals refer to like parts and wherein:

FIGURE 1 is a perspective view of the flasher embodying the invention;

FIGURE 2 is an elevational view, partly broken away, of the flasher of FIGURE 1 in contact open condition with associated electrical circuitry; and

FIGURE 3 is a partly broken away elevational view of the flasher of FIGURE 1 in contact closed condition with associated circuitry.

Referring now to FIGURE 1, a flasher comprises a dielectric base 10 having a pair of terminals 12 and 14 depending from the lower surface thereof. A flange 16 around the periphery of the base 10 forms a seat for a cover, not shown. A spring 18 composed of flat sheet material constrained in a shallow V-shape is mounted on the upper surface of the base 10 so that one portion 20 of the V lies flush with the base 10 and the other portion 22 extends upwardly at an angle to the base 10. The spring tends to flatten out and pull the upwardly extending portion 22 down toward the base 10. The upwardly extending portion 22 of the spring 18 supports a spring arm 24 secured thereto by rivets. The spring arm 24 has a struckout upwardly extending tab portion 26 adapted to form a connection point for a pair of wires 28, 30 later to be described. A layer of insulating material 32 covers the portion 20 of the spring 18 which lies on the base 10 and forms a seat for an L-shaped support member 34. The support member 34 is secured to the base 10 by a pair of rivets 36, one of which also is secured to the first depending terminal 12 thereby forming an electrical connection between the terminal 12 and the support member 34. The upwardly extending portion of the support member 34 is slotted to form a pair of supports 38, each having a horizontal V-notch 40 formed therein.

A U-shaped armature 42 has knife edges 43 formed on the ends of the legs 44 of the U which are adapted to engage the V-notches 40 of the support member thereby providing a pivotal mounting for the armature 42 on the pivot axis defined by the knife edges 43. Both the armature 42 and the support member 34 are made of conductive materials. An upwardly extending tab 46 on the base portion 48 of the U-shaped armature 42 has attached thereto a taut heat expansible wire 28 which extends near the pivot axis through the slot in the support member 34, underneath the spring arm 24 and is connected to the up-struck tab 26 on the spring arm, whereby the force of the spring 18 is exerted on the wire. The base portion 48 of the armature 42 carries a downwardly

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extending contact button 50 shown in FIGURES 2 and 3, the upper non-contacting surface of which is shown by numeral 52 in FIGURE 1.

Also mounted on the base 10 is a C-shaped stop member 54 having a first side 56 flush with the base 10, a vertical center portion 58 and a third side 60 extending over one corner of the base portion 48 of the U-shaped armature 42 thereby limiting the extent of upward movement of said armature 42. An L-shaped connector strip 62 extends upwardly past the armature 42 and is supported by the first side 56 of the stop member 54 but separated therefrom by a pad 64 of insulating material. Both the stop member 54 and the connector strip 62 are secured to the base 10 by a rivet 66, the upper head 68 of which forms a contact located in alignment with the contact button 50 on the armature 42. The opposite end 70 of the rivet 66 secures the second depending terminal 14 to the base 10 and serves to electrically connect the terminal 14 with the connector strip 62 although the stop member 54 is insulated therefrom. A resistance element 30 is connected between the upper portion of the connector strip 62 and the up-struck tab 26 on the spring arm 24 whereby it makes electrical contact with the end of the heat expansible wire 28.

As can be seen in FIGURE 2, when the armature is in the upper position and the contacts 50 and 68 are open, current will flow from a battery 72 into the first terminal 12, through the rivet 36, the support member 34, the armature 42 the tab 46, the heat expansible wire 28, the resistance element 30, and the connector strip 62 to the second terminal 14 which in turn is connected to a series of lamps 74. The value of the resistance in the resistance element 30 is chosen so that when the element 30 is in series with the lamps 74, as in FIGURE 2, the current flowing to the lamps 74 will be insufficient to light the lamps 74, although ample current is provided to heat the heat expansible wire 28 upon its passage therethrough.

When the armature 42 is in the lower position and the contacts 50 and 68 are closed as shown in FIGURE 3, obviously the current will flow directly from the first terminal 12 through the rivet 36, the support member 34, the armature 42, the contacts 50 and 68, and the second terminal 14 thereby shunting out the heat expansible wire 28 and the resistance element 30. In this condition, the current to the lamps 74 will be sufficient to light the lamps 74 but there will be no current flow through the heat expansible wire 28 thereby permitting the wire 28 to cool.

The mechanical aspect of the operation of the flasher is as follows. When the armature is in its upper position as shown in FIGURE 2, the heat expansible wire 28 passes above the pivot axis or knife edge 43 of the armature 42 thereby producing an upward component of force tending to maintain the armature in the upper position. When the heat expansible wire 28 becomes heated, it will expand thereby permitting the spring arm 24 to move down toward the base. As this occurs, the heat expansible wire 28 will pass across the pivot axis of the armature 42 so that a downward component of force exerted on the armature by the wire 28 will cause the armature 42 to move downwardly. As the armature moves, the component of downward force will increase as the distance of the wire 28 from the pivot axis increases, thereby giving rise to a snap action of the armature 42. Since no current flows through the heat expansible wire 28 when the contacts 50 and 68 are closed, the wire 28 will cool and contract to thereby pull the spring arm 24 upwardly until the wire again crosses the pivot axis of the armature 42. It is obvious then that the armature will be pulled upwardly with a snap action and the cycle of the flasher will be repeated.

It is understood that the above-described structure is

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merely illustrative of the preferred embodiment of the invention and is intended in no way to limit the scope of the invention which is defined in the following claims.

It may be readily seen then that this invention provides an improved heat expansible wire flasher of simple construction which has a snap action thereby minimizing sparking of the contacts.

I claim:

1. A flasher comprising an armature pivoted about a fixed axis, a heat expansible wire attached thereto, said pivoted armature being movable responsive to the pull of the wire toward either side of the pivot axis of the armature, and spring means producing tension in said wire and moving the axis of the wire across the pivot axis of the armature upon expansion or contraction of the wire to change the direction of pull on the armature.

2. A snap action switch having an armature pivotally movable about a fixed axis at one end to two different circuit controlling positions, a heat expansible wire connected to the other end, tension means pulling on said wire moving the axis of said wire to one side of said pivot axis upon expansion of said wire and moving the axis of the wire to the other side of said pivot axis upon contraction, whereby the armature will be pivoted to each circuit controlling position according to the direction of pull of said wire.

3. A flasher switch comprising a base, support means secured to said base, an armature pivoted at one end to said support means at one side thereof, a heat expansible wire attached to the other end of the armature and passing

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near the pivot axis of the armature, and spring means secured to the base and having a movable portion extending beyond the other side of the support means and attached to said wire moving the wire across the pivot axis in one direction and pulling the armature to one position upon expansion of the wire and moving the wire across the pivot axis in the other direction and pulling the armature to another position upon contraction of the wire.

4. A snap action flasher switch comprising a base, support means secured to said base, a leaf spring secured to said base with its free end extending away from said support means, a U-shaped armature having its legs pivoted on said support means with the base portion of said U extending away from said leaf spring, a heat expansible wire stretched between the free end of said leaf spring and the base of said U-shaped armature and passing near the pivot axis of said armature, a contact on said armature, a contact on said base, said leaf spring pulling said wire across the said pivot axis and between said armature legs upon expansion of said wire thereby causing said armature to pivot in one direction to close said contacts and upon contraction of said wire permitting said wire to re-cross the said pivot axis thereby causing said armature to pivot in the other direction to open said contacts.

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