July 31, 1962 H. C. CLARK 3,047,771

SAFETY HEADLIGHT SWITCH

Filed Nov. 20, 1958

Fig. 1

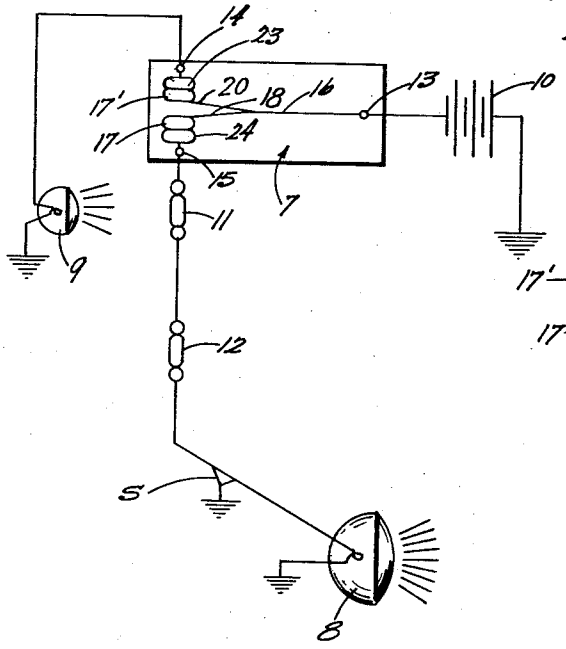


Fig. 2

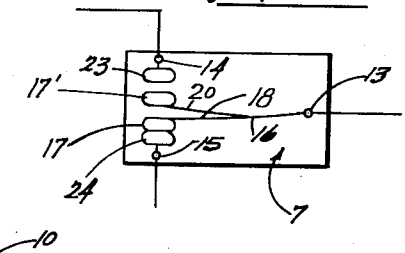


Fig. 3

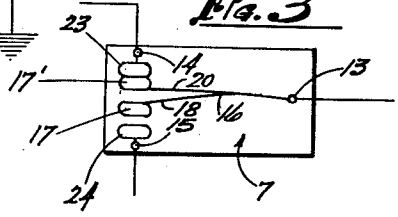


Fig. 4

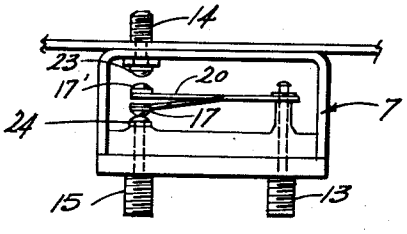
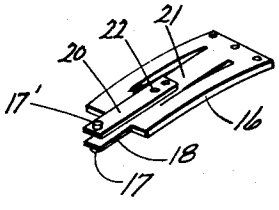


Fig. 5



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SAFETY HEADLIGHT SWITCH

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This invention relates to a safety snap-action headlight switch which is so designed and so connected that, in the event of a "short" (which condition with the unimproved graduating type thermostatic switches now in common use would result in the headlights being turned off and on intermittently, this being intended as a signal to the driver that something is wrong and requires fixing, but giving rise to the danger of a collision or wreck occurring in the interval that the lights are off), turns the parking lights on the instant the headlights are turned off, and vice versa, thereby eliminating a lights-off situation and giving the driver enough light to drive on with reasonable safety, while still signalling the fault and the necessity for the short to be remedied.

The invention is illustrated in the accompanying drawing, wherein—

FIG. 1 is a circuit diagram showing the snap-action headlight switch of my invention, the same being shown at a point where it has just turned on the parking light automatically, as the result of a "short" in the headlight circuit, the headlight being on the verge of being shut off, this switch avoiding, therefore, even a fraction of a second lights-off situation;

FIGS. 2 and 3 are views of the switch of FIG. 1 in its two extreme positions;

FIG. 4 is a longitudinal section through the switch shown diagrammatically in FIGS. 1–3, without the forked free end portion, and

FIG. 5 is a perspective view of the bimetallic snap-action blade unit of FIGS. 1 to 4.

The same reference numerals are used to designate corresponding parts throughout these views.

Referring to FIGS. 1 to 3, wherein the three-terminal snap-action switch provided in accordance with my invention is shown diagrammatically at 7, I have shown only one headlight 8 and one parking light 9 connected with the battery 10 through switch 7, but it will be understood that a single switch 7 serves two headlights and two parking lights. 11 is the hand dash switch and 12 the dimmer switch. Switch 7 has three terminals 13, 14 and 15 in insulated relationship to one another, and includes a main bi-metallic snap-action blade element 16 electrically connected at its fixed end with the terminal 13, and carrying contacts 17 and 17′ on its outer end, contact 17 being carried directly on an arm 18 extending from the outer end of the bi-metallic snap-action blade element 16, whereas the other contact 17′ is carried on a secondary or auxiliary bimetallic blade 20 welded or otherwise suitably secured at its inner end to the middle portion 21 thereof, as indicated at 22, and extending outwardly in more or less diverging relationship to the arm 18 of the element 16. Element 16 operates with snap-action but blade 20 operates with a graduating action, and heats up only by conduction from element 16 so that the contact 17′, which is normally in a predetermined spaced relationship to contact 17, is moved farther away from it toward contact 23 as the element 16 heats up, to be either actually closing the circuit for the parking lights 9 a fraction of a second before the snap-action of element 16 occurs, or at least coming so close to closing the circuit for the parking lights 9 before the snap-action occurs that there is no noticeable lights-off condition. If a short should occur anywhere in the approximately twenty-five feet of wire extending to the headlights 8, as indicated at S in FIG. 1, the suddenly increased current flow through the bi-metallic snap-action

blade 16 will be enough to heat it sufficiently to cause it to snap over to the other side of the switch 7 as seen in FIG. 3, engaging the contact 23 on terminal 14 to light the parking lights 9. Once the circuit is closed by blade 20, that circuit remains closed until the short is corrected, because even though the snap-action blade 16 snaps back to its initial position engaging contact 17 with contact 24 to test whether the short is still present, the blade 20 will remain in closed position. If the short is still present, the blade 16 will, of course, heat up and snap over center again, and this snapping back and forth of blade 16′ occurs much faster than the graduating action of blade 20.

In operation, FIGS. 2 and 4 show blade 16 in its normal "no short" position, engaging contact 24. FIG. 3 shows it in the opposite position, and, of course, the blade 16 will snap back and forth as it cools off and heats up again, but, due to the compound action obtained with the addition of the graduating action bimetallic thermostat 20, there is either only a very brief lapse in the lighting or, as illustrated in FIG. 1, no lapse at all, assuming contact 17′ engages contact 23 either simultaneously with or a fraction of a second before the snap-action of blade 16. As stated before, once a short has caused snap-action of blade 16, the circuit for the parking lights remains closed until the short is fixed.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. In a vehicle lifting system, the combination with a source of electric current supply, of a headlight and a parking light, means connecting the same in parallel, and a switch connected with said means and normally completing a circuit through said headlight from the source of electric current supply, said switch including a bimetallic snap-action blade element through which the current flows normally at a rate too low to cause snap-action and which in the event of a ground fault between said headlight and said switch heats up due to increased current flow through the bimetallic snap-action blade element and snaps over center to disconnect said headlight from and connect said parking light to said current source, said bimetallic snap-action blade element having one contact means on one side of the free end portion thereof, and another contact means on the opposite side of a bimetallic graduating action arm carried by said blade element, said arm being heated by conduction from said blade element and arranged in heating to distort in diverging relation to the free end portion of said blade element, whereby to accelerate closing of the circuit for the parking light in relation to what would be obtainable by snap-action of said blade element alone, and also to maintain the parking light circuit once it has been closed until the condition causing the unusual heating up has been corrected.

2. In a grounded electric circuit, a snap-action switch, a main current using device in series with said switch and connected to ground, said switch having a bimetallic snap-action blade element which due to the current normally flowing therethrough being at a rate too low to cause snap-action is normally in one position engaging one of two contacts spaced on opposite sides of the movable free end of said blade element, said switch being adapted to heat up in response to increased current flow therethrough and snap over center to break said circuit upon the occurrence of a ground fault between said device and said switch, an auxiliary current using device also connected to ground, and means connecting said second device in series with said switch via the other of said contacts which is engaged by the free end of said

blade element when it snaps over center from its normal position, said bimetallic snap-action blade element having one contact means on one side of the free end portion thereof, and another contact means on the opposite side of a bimetallic graduating action arm carried by said blade element, said arm being heated by conduction from said blade element and arranged in heating to distort in diverging relation to the free end portion of said blade element, whereby to accelerate closing of the auxiliary circuit in relation to what would be obtainable by snap-action of said blade element alone, and also to maintain the auxiliary circuit once it has been closed until the condition causing the unusual heating up has been corrected.

3. In combination, in a thermostatic snap-action assembly, a main bimetallic snap-action blade element that is supported at one end and is arranged to have its other end portion free to move with snap action from one extreme position upon heating to a predetermined temperature to another extreme position upon cooling to a predetermined temperature, and a graduating action bimetallic blade element having one end portion thereof carried on said first-mentioned blade element and arranged to be heated and cooled with it, this other end portion of said second mentioned blade element being free and lying in spaced relation to the free end portion of the first mentioned blade element and being arranged upon heating to distort in diverging relation thereto.

4. In a thermostatic switch comprising opposed fixed contacts, a snap-action thermostatic switch assembly operative between said contacts to engage one at a certain temperature and engage the other at another temperature, said assembly comprising a main bimetallic snap-action blade element that is supported at one end and is arranged to have its other end portion free to move with snap action from one extreme position upon heating to a predetermined temperature to another extreme position upon cooling to a predetermined temperature, and a graduating action bimetallic blade element having one end portion thereof carried on said first mentioned blade element and arranged to be heated and cooled with it, the other end portion of said second mentioned blade element being free and lying in spaced relation to the free end portion of the first mentioned blade element and being arranged upon heating to distort in diverging relation thereto.

5. The combination of claim 3, wherein the main element is heated by electric current flow therethrough, and the other element is heated by conduction from said main element.

6. A switch as set forth in claim 4, wherein the main element is heated by electric current flow therethrough,

and the other element is heated by conduction from said main element.

7. In combination, in a thermostatic assembly, a main bimetallic blade element that is adapted to have electric current flow therethrough and is supported at one end and is adapted to be heated by such current flow and is arranged to have its other end portion free to move from one extreme position upon heating to a predetermined temperature to another extreme position upon cooling to a predetermined temperature, and a second bimetallic blade element having one end portion thereof carried on said first-mentioned blade element and arranged to be heated and cooled with it by conduction, this other end portion of said second-mentioned blade element being free and lying in spaced relation to the free end portion of the first-mentioned blade element and being arranged upon heating to distort in diverging relation thereto.

8. In a thermostatic switch comprising opposed fixed contacts, a thermostatic switch assembly operative between said contacts to engage one at a certain temperature and engage the other at another temperature, said assembly comprising a main bimetallic blade element that is adapted to have electric current flow therethrough and is supported at one end and is adapted to be heated by such current flow and is arranged to have its other end portion free to move from one extreme position upon heating to a predetermined temperature to another extreme position upon cooling to a predetermined temperature, and a second bimetallic blade element having one end portion thereof carried on said first-mentioned blade element and arranged to be heated and cooled with it by conduction, the other end portion of said second-mentioned blade element being free and lying in spaced relation to the free end portion of the first-mentioned blade element and being arranged upon heating to distort in diverging relation thereto.

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