March 17, 1959 L. T. UHL 2,878,340

SNAP ACTING FLASHER SWITCH

Filed July 5, 1956

2 Sheets-Sheet 1

Fig. 1.

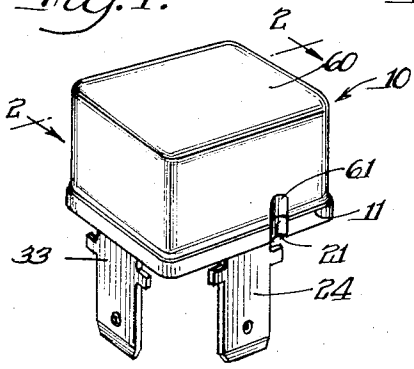


Fig. 2.

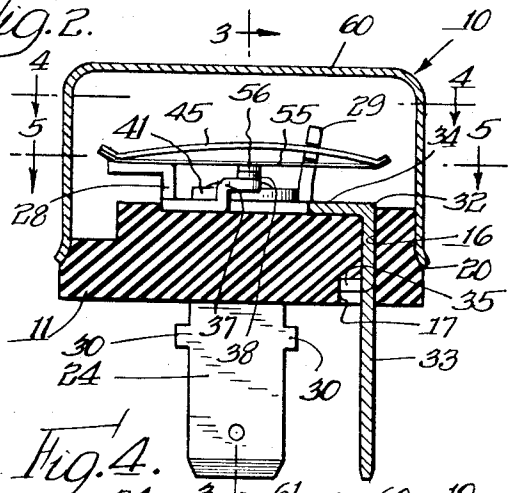


Fig. 3.

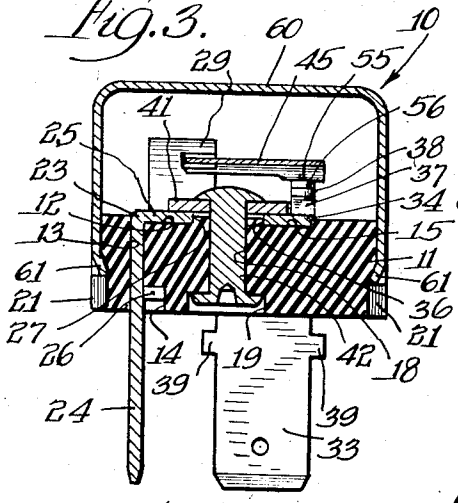


Fig. 4.

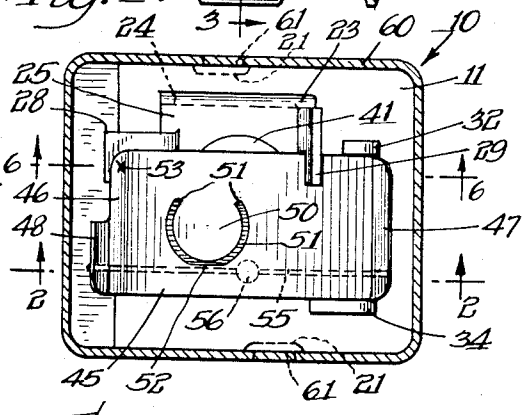


Fig. 5.

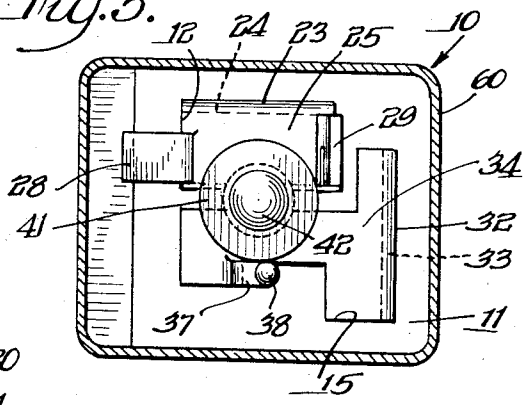
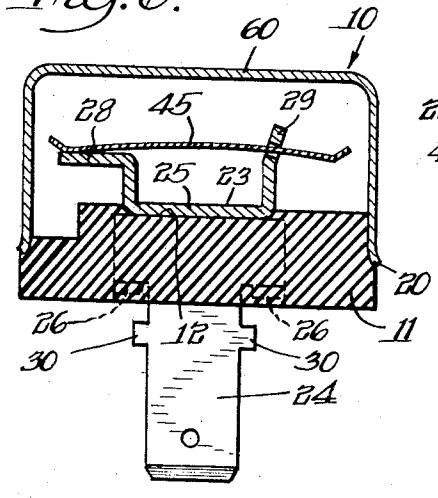


Fig. 6.



INVENTOR.

Leon T. Uhl

BY

Wallenstein + Spangenberg

Attys.

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Fig. 7.

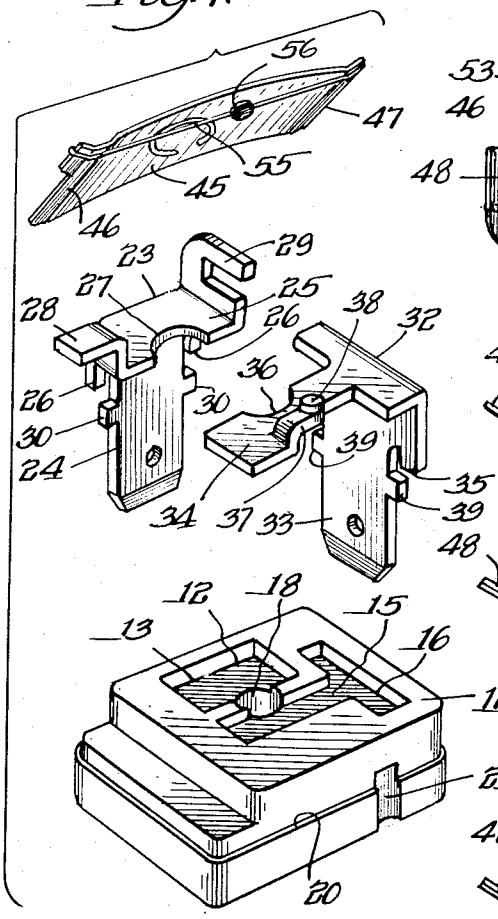


Fig. 8.

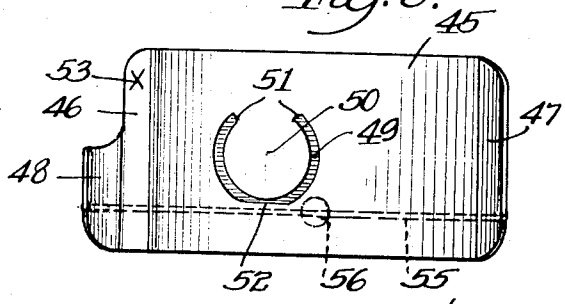


Fig. 9.

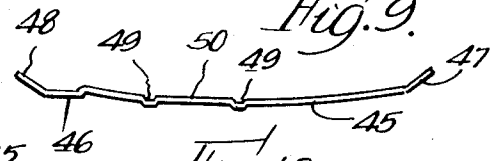


Fig. 10.

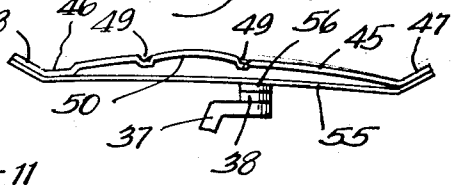


Fig. 11.

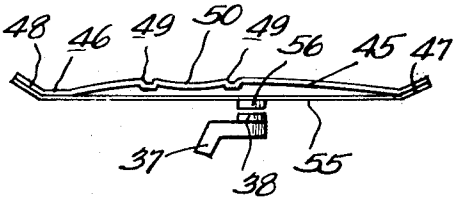
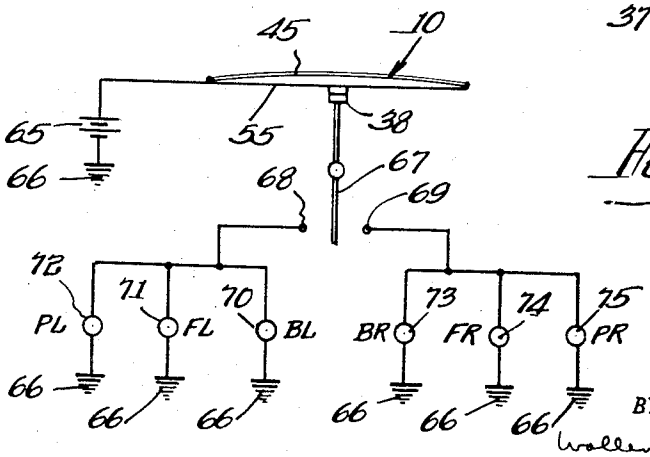


Fig. 12.



INVENTOR.
Leon T. Uhl
BY
Wallenstein & Spangenberg
attys

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2,878,340

SNAP ACTING FLASHER SWITCH

Leon T. Uhl, Morton Grove, Ill., assignor to Littlefuse, Inc., Des Plaines, Ill., a corporation of Illinois

Application July 5, 1956, Serial No. 595,889

20 Claims. (Cl. 200—113)

The principal object of this invention is to provide an improved snap acting electric flasher switch, which is particularly adaptable for use in directional turn signal systems for automotive vehicles, which opens and closes the turn signal electric circuits in regular and uniform fashion to provide substantially equal on and off periods, which remains closed in the event that one of the selected signal lights is not operative, which is sturdy in construction and reliable in operation, and which is inexpensive to manufacture and install.

Further objects of this invention reside in the detail of construction of the snap acting electric flasher switch of this invention and in the cooperative relationships between the component parts, including the construction and operation of the snap acting vane and its associated heater ribbon and contacts and the manner of mounting the same to form a sturdy and reliable flasher switch unit.

Other objects and advantages of this invention will become apparent to those skilled in the art upon reference to the accompanying specification, claims and drawings in which:

Fig. 1 is a perspective view of the snap acting electric flasher switch of this invention.

Fig. 2 is an enlarged vertical sectional view through the snap acting electric flasher switch taken substantially along the line 2—2 of Fig. 1 and 2—2 of Fig. 4.

Fig. 3 is a vertical sectional view taken substantially along the line 3—3 of Fig. 2.

Fig. 4 is a horizontal sectional view taken substantially along the line 4—4 of Fig. 2.

Fig. 5 is a horizontal sectional view taken substantially along the line 5—5 of Fig. 2.

Fig. 6 is a vertical sectional view taken substantially along the line 6—6 of Fig. 4.

Fig. 7 is an exploded perspective view illustrating various of the parts forming the snap acting electric flasher switch of this invention.

Fig. 8 is an enlarged plan view of the resilient snap acting vane.

Fig. 9 is a side elevational view of the snap acting vane illustrating its prestressed condition.

Fig. 10 is a side elevational view similar to Fig. 9 but illustrating the heater ribbon applied to and stressing the resilient snap acting vane and illustrating the contacts in closed position.

Fig. 11 is a view similar to Fig. 10 but illustrating the contacts in open position.

Fig. 12 is a wiring diagram illustrating the manner in which the snap acting electric flasher switch of this invention is utilized in a directional turn signal system for automotive vehicles.

The snap acting electric flasher switch of this invention is generally designated at 10 and it includes an insulating base 11 formed of suitable electrical insulating material such as Bakelite or the like. The outer face of the base 11 is provided with a pair of recesses 12 and 15, the recess 12 communicating with a slot 13 extending through

the base 11 and the recess 15 communicating with a slot 16 extending through the base 11. The inner or under face of the base 11 is provided with a pair of recesses 14 communicating with the slot 13 and a pair of recesses 17 communicating with the slot 16. A central hole 18 is arranged between the pair of recesses 12 and 15 and extends through the base 11, the inner face of the base 11 being provided with a recess 19 communicating with the hole 18. The side faces of the base 11 are provided with a peripheral shoulder 20 and two of the opposed side faces are provided with recesses 21. The base 11 with its various recesses, slots, hole, and shoulder, may be formed by any suitable molding process.

The base 11 carries a substantially L-shaped supporting terminal 23 having one leg 24 extending through the slot 13 and having another leg 25 received in the recess 12 in the outer face of the base. The leg 24 is provided with a pair of lugs 26 which are bent over into the recesses 14 to assist in securing the supporting terminal 23 in the base. The leg 25 of the supporting terminal is provided with a substantially semicircular opening 27 which is substantially concentric with the hole 18 in the base. The leg 25 of the supporting terminal is also provided with an outwardly extending mounting ear 28 and an outwardly extending stop ear 29. The leg 24 is also provided with a pair of lugs 30 which operate to facilitate the making of electrical connections thereto. The supporting terminal may be formed of cold rolled steel or the like which is preferably nickel plated, and may be fabricated by simple punch press die operations.

The insulating base 11 also carries a substantially L-shaped contact terminal 32 having one leg 33 extending through the slot 16 in the base and having another leg 34 received within the recess 15 in the outer face of the base. The leg 33 is provided with a pair of lugs 35 which are bent over into the recesses 17 in the inner face of the base 11 to assist in securing the contact terminal 32 in place on the base. The leg 34 of the contact terminal is also provided with a substantially semi-circular opening 36 which is substantially concentric with the hole 18 in the base 11. The leg 34 of the contact terminal is provided with an outwardly extending ear 37 which carries a fixed contact 38 and it is here noted that the ear 37 extends from the leg 34 at a point remote from the leg 33 so that the possibility of distortion of the ear 37, in the event of distortion of the leg 33, is minimized. The leg 33 is also provided with a pair of lugs 39 to facilitate making electrical connections to the contact terminal 32. Here, also, the contact terminal may be made from cold rolled steel or the like which is preferably nickel plated and may be fabricated by usual punch press die operations. The fixed contact 38 may be formed of any suitable contact material such as a platinum alloy or a palladium alloy or the like, and is preferably secured to the ear 37 by spot welding.

An insulating washer 41 formed from suitable insulating material such as laminated asbestos paper or the like, overlies the legs 25 and 34 of the mounting terminal and contact terminal, and a rivet 42 extends through the washer 41, between the legs 25 and 34, and through the central hole 18 in the base 11, into the recess 19 where the rivet is peened. Thus, the rivet 42 and insulating washer 41 operate firmly to secure the supporting terminal 23 and the contact terminal 32 on the insulating base 11 to provide an extremely rigid and rugged construction. The rivet 42 may be made from any suitable material such as soft steel, which is preferably nickel plated. The semi-circular recesses 27 and 36 in the terminals 23 and 32, are spaced from the rivet 42 and operate in conjunction with the insulating washer 41 to eliminate any possible short-circuiting between the terminals 23 and 32.

The snap-acting electric flasher switch of this invention also includes an elongated substantially rectangular and flat resilient vane 45 which is preferably made from spring steel, such as blue tempered spring steel, or the like. One end of the resilient vane is provided with an inwardly extending shelf 46 extending thereacross, and the other end of the resilient vane is provided with an outwardly extending tab 47 extending thereacross. The end of the resilient vane provided with the shelf 46 is also provided with an outwardly extending tab 48, this tab not extending across the entire end of the vane. The resilient vane 45 is provided with a prestressed area 50, which is bounded by an impression 49 forced in the vane from the outer face thereof near the end of the vane having the shelf 46. The impression 49 may be forced in the vane by a suitable punch having a corresponding configuration. The punch displaces metal directly below and adjacent to the punch so as to cause the center portion of the vane to have a greater effective length than the adjacent side portions thereof. The formation of the prestressed area 50 and the impression 49 operates to prestress the resilient vane 45 to urge the free end 47 thereof outwardly away from the base, as shown more particularly in Fig. 9. The impression 49 may have various configurations and it may completely enclose the prestressed area 50 if maximum prestressing is desired. Preferably, the impression 49 is open ended, as indicated at 51 in Fig. 8, so as not to completely enclose the prestressed area and this operates to provide a lesser amount of prestressing and to soften the snapping characteristics of the vane. For the purposes of this invention, it is found that exceedingly good results are obtained by making the impression 49 substantially C-shaped with the opening 51 in the impression 49 facing toward a long side edge of the vane. Also, preferably, the width of the impression 49 is reduced at a point facing the other long side edge of the vane as indicated at 52. In one arrangement of the vane, which provides exceedingly good results, the vane has a thickness of substantially .006 inch, an overall length of substantially .844 inch, an overall width of substantially .375 inch, a C-shaped impression having an outside diameter of substantially .200 inch, and an inside diameter of substantially .160 inch, with the opening at the ends of the impression being substantially .125 inch, and wherein the free end of the vane is raised substantially .035 inch by the prestressing operation, and wherein the distance between the free end of the vane and the impression 49 is substantially .421 inch.

A thermally expansible and contractible heater ribbon 55 is arranged in spaced relation along the inner face of the vane 45 and it is secured under tension at its ends to the ends of the resilient vane, and toward this end one end of the heater ribbon 55 is spot welded to the tab 47 on the free end of the vane, and the other end is spot welded to the tab 48 on the supported end of the vane. The heater ribbon is made from suitable electrically resistive and thermally expansible and contractible material such as nickel chrome alloy, and for use with the above-described vane dimensions the heater ribbon is substantially .003 inch thick and substantially .032 inch wide. A movable contact 56 is secured to the heater ribbon 55 adjacent its center by means of spot welding or the like. This movable contact 56 may also be formed from suitable material such as a platinum alloy or palladium alloy. By securing the ends of the heater ribbon 55 to the outwardly extending tabs 47 and 48, strains upon the securing welds therefor, which would be brought about by flexing of the resilient vane, are materially minimized. Further, by manipulating the tab 48 with a suitable tool, the tension in the heater ribbon 55 may be adjusted. The vane 45 is secured to the supporting ear 28 of the mounting terminal 23 and toward this end the shelf portion 46 is preferably spot welded to the mounting ear 28 at the point 53 as indicated in Figs. 4 and 8. When the vane is so mounted, the movable contact 56 carried by the heater ribbon 55 normally engages the stationary contact 38 carried by the contact ear 37 of the contact terminal 32. The shelf 46 and the tab 47, extending across the ends of the vane 45, operate to provide transverse stability to the vane.

When the heater ribbon 55 is secured under tension to the ends of the resilient vane 45, the vane 45 is stressed against the force of the prestressing occasioned by the impression 49 to hold the free end 47 of the vane 45 inwardly toward the base and to cause the bounded prestressed area 50 of the vane to dimple outwardly when the heater ribbon is relatively cool. Under these conditions, the movable contact 56 engages the fixed contact 38 as illustrated in Fig. 10. There, the free end 47 of the vane 45 is held inwardly by the heater ribbon 55, the bounded area 50 is dimpled outwardly, and the movable contact 56 is engaging the fixed contact 38. There is under these conditions, appreciable contact pressure, as is indicated by the bowing of the heater ribbon 55. Engagement of the contacts 38 and 56 normally completes an electric circuit from the contact terminal 32 through the fixed contact 38, the movable contact 56, the two halves of the heater ribbon 55, and the vane 45, to the supporting terminal 23. Completion of this circuit causes heating of the heater ribbon 55 due to the electrical resistivity thereof, and as a result of this heating the heater ribbon 55 gradually expands to allow the prestressing force of the vane to dimple the bounded prestressed area 50 inwardly when the heater ribbon becomes relatively hot. This, as shown in Fig. 11, causes the free end of the vane to snap outwardly away from the base and to snap the movable contact 56 from engagement with the fixed contact 38 quickly to break this circuit. Breaking of this circuit causes the heater ribbon 55 to cool and to gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area 50 of the vane outwardly when the heater ribbon becomes relatively cool. As a result, the free end of the vane is snapped inwardly toward the base, and the movable contact 56 is snapped into engagement with the fixed contact 38 to again complete the electric circuit. The two positions of the vane and the contacts are illustrated in Figs. 10 and 11, Fig. 10 showing the contacts closed and Fig. 11 showing the contacts open. With the relative dimensions described above, the vane snaps from the closed position to the open position under normal conditions with about 3.8 amps. at 12.8 volts. In the snapping operation of the electric flasher switch, the contact closed periods are substantially equal to the contact open periods, each period being about .40 second. The electric flasher switch in snapping between its two positions produces an audible sound, which has the advantage of audibly signalling the operation thereof, this being desirable in automotive turn signal systems. The character and amplitude of the noise of the signal is determined by the amount of prestressing and can be regulated by the configurations and dimensions of the prestressing impression.

The resilient blade 45 and its associated parts are enclosed by a cover 60 which engages the shoulder 20 on the base 11, and which is provided with a pair of detents 61 which are received in the pair of slots 21 in the base 11 for securing the cover in place upon the base.

The snap acting electric flasher switch of this invention is particularly adaptable for use in directional control systems for automotive vehicles and Fig. 12 is a wiring diagram illustrating such use. There, the resilient blade 45 is connected through the supporting terminal 23 to one side of a voltage source 65 such as a 12 volt battery of an automotive vehicle, the other side of the voltage source being connected to ground, as indicated at 66. The fixed contact 38 is connected through the

contact terminal 32 to the center pole 67 of a directional switch. This center pole 67 is adapted to engage a contact 68 when left turns are to be indicated and to engage a contact 69 when right turns are to be indicated. The left turn contact is connected to the back lamp 70, the front lamp 71, and the pilot lamp 72, for indicating left turns, these lamps in turn being connected to ground 66. In a like manner the right turn contact 69 is connected to a back lamp 73, a front lamp 74 and a pilot lamp 75 for indicating right turns, these lamps also being connected to ground 66. Thus, when the pole 67 of the turn switch engages the contacts 68, the left turn lamps 70, 71 and 72 are illuminated and they are illuminated in a flashing manner by operation of the snap acting electric flasher switch of this invention. In similar manner when the pole 67 of the turn switch engages the right turn contact 69, the lamps 73, 74 and 75 are flashed for indicating right turns. The resistance in the heater wire 55 is so selected with respect to the voltage source and the resistances of the indicating lamps, that flashing will occur so long as the lamps are all operative. If, however, either lamp 70 or 71 should become inoperative, there would be insufficient current flow through the heater ribbon 55 to heat the same sufficiently to open the circuit so that the remaining operative lamps 70 or 71 and 72 would burn steady to cause the pilot lamp 72 to indicate failure of the inoperative lamp.

While for purposes of illustration, one form of this invention has been disclosed, other forms thereof will become apparent to those skilled in the art upon reference to this disclosure and, therefore, this invention is to be limited only by the scope of the appended claims.

I claim as my invention:

1. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

2. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane having an inwardly extending shelf extending across one end of the vane and secured at the shelf to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the shelf and the free end of the vane and stressing the vane against the force of the presetressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

3. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane having an outwardly extending tab on each end of the vane and secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the tabs on the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to

break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

4. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane having an outwardly extending tab extending across one end of the vane, an inwardly extending shelf extending across the other end of the vane and an outwardly extending tab extending outwardly from the shelf, and secured at the shelf to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and extending over the shelf and secured under tension at its ends to the outwardly extending tabs on the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

5. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an open ended partially enclosing impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

6. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an open ended partially enclosing impression forced in the vane from the outer face thereof and near the supported end thereof with the open ended portion of the impression facing toward a long side edge of the vane and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

7. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an open ended partially enclosing impression forced in the vane from the outer face thereof and near the supported end thereof with the open ended portion of the impression facing toward a long side edge of the vane and the vane being prestressed

by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and adjacent the other long side edge of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

8. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by a substantially C-shaped impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

9. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base,

a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by a substantially C-shaped impression forced in the vane from the outer face thereof and near the supported end thereof with the opening of the substantially C-shaped impression facing toward a long side edge of the vane and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

10. A snap acting electric flasher switch comprising, an insulating base, a supporting terminal carried by the base, a contact terminal carried by the base and having a fixed contact thereon, an elongated substantially rectangular and flat resilient vane secured at one end to the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by a substantially C-shaped impression forced in the vane from the outer face thereof and near the supported end thereof with the opening of the substantially C-shaped impression facing toward a long side edge of the vane and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and adjacent the other long side edge of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of

said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

11. A snap acting electric flasher switch comprising, an insulating base, a substantially L-shaped supporting terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, a substantially L-shaped contact terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the base for securing the supporting terminal and the contact terminal to the base, an outwardly extending mounting ear on said other leg of the supporting terminal, an outwardly extending fixed contact on said other leg of the contact terminal, an elongated prestressed snap acting vane secured at one end to the mounting ear on the supporting terminal and overlying the fixed contact, a heater ribbon secured under tension at its ends to the ends of the vane for snapping the free end of the vane inwardly and outwardly, and a movable contact carried by the heater ribbon and engaging and disengaging the fixed contact as the free end of the vane is snapped inwardly and outwardly.

12. A snap acting electric flasher switch comprising, an insulating base, a substantially L-shaped supporting terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, a substantially L-shaped contact terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the base for securing the supporting terminal and the contact terminal to the base, lugs on said one legs of the supporting terminal and the contact terminal engaging the other face of the base for also securing the supporting terminal and the contact terminal to the base, an outwardly extending mounting ear on said other leg of the supporting terminal, an outwardly extending fixed contact on said other leg of the contact terminal, an elongated prestressed snap acting vane secured at one end to the mounting ear on the supporting terminal and overlying the fixed contact, a heater ribbon secured under tension at its ends to the ends of the vane for snapping the free end of the vane inwardly and outwardly, and a movable contact carried by the heater ribbon and engaging and disengaging the fixed contact as the free end of the vane is snapped inwardly and outwardly.

13. A snap acting electric flasher switch comprising, an insulating base having a pair of recesses in the outer face thereof, a pair of slots extending through the base and communicating respectively with the recesses and a hole extending through the base between the recesses, a substantially L-shaped supporting terminal having one leg extending through one of the slots in the base and the other leg seating in the communicating recess in the base, a substantially L-shaped contact terminal having one leg extending through the other slot in the base and the other leg seating in the communicating recess in the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the hole in the base for securing the supporting terminal and the contact terminal to the base, an outwardly extending mounting ear on said other leg of the supporting terminal, an outwardly extending fixed contact on said other leg of the contact terminal, an elongated prestressed snap acting vane secured at one end to the mounting ear on the supporting terminal and overlying the fixed contact, a heater ribbon secured under tension at its ends to the ends of the vane for snapping the free end of the vane inwardly and outwardly, and a movable contact carried by the heater ribbon and engaging and disengaging the fixed contact as the free end of the vane is snapped inwardly and outwardly.

14. A snap acting electric flasher switch comprising, an insulating base having a pair of recesses in the outer face thereof, a pair of slots extending through the base and communicating respectively with the recesses and a hole extending through the base between the recesses, a substantially L-shaped supporting terminal having one leg extending through one of the slots in the base and the other leg seating in the communicating recess in the base, a substantially L-shaped contact terminal having one leg extending through the other slot in the base and the other leg seating in the communicating recess in the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the hole in the base for securing the supporting terminal and the contact terminal to the base, lugs on said one legs of the supporting terminal and the contact terminal engaging the other face of the base for also securing the supporting terminal and the contact terminal to the base, an outwardly extending mounting ear on said other leg of the supporting terminal, an outwardly extending fixed contact on said other leg of the contact terminal, an elongated prestressed snap acting vane secured at one end to the mounting ear on the supporting terminal and overlying the fixed contact, a heater ribbon secured under tension at its ends to the ends of the vane for snapping the free end of the vane inwardly and outwardly, and a movable contact carried by the heater ribbon and engaging and disengaging the fixed contact as the free end of the vane is snapped inwardly and outwardly.

15. In a snap acting electric switch, an insulating base, a substantially L-shaped supporting terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, a substantially L-shaped contact terminal having one leg extending through a slot in the base, and the other leg engaging the outer face of the base, said other legs of the supporting terminal and the contact terminal being laterally spaced apart, a single insulating washer overlying and engaging said other legs of the supporting terminal and the contact terminal, a single rivet extending through the insulating washer, between and spaced from said other legs of the supporting terminal and the contact terminal and through the base for securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, a snap acting vane secured to said other leg of the supporting terminal and snapping inwardly and outwardly with respect to the base, and a movable contact operated by the snap acting vane and engaging and disengaging the fixed contact as the snap acting vane is snapped inwardly and outwardly.

16. In a snap acting electric switch, an insulating base, a substantially L-shaped supporting terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, a substantially L-shaped contact terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, an insulating washer overlying said other legs of the supporting terminal and the con-

tact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the base for securing the supporting terminal and the contact terminal to the base, lugs on said one legs of the supporting terminal and the contact terminal engaging the other face of the base for also securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, a snap acting vane secured to said other leg of the supporting terminal and snapping inwardly and outwardly with respect to the base, and a movable contact operated by the snap acting vane and engaging and disengaging the fixed contact as the snap acting vane is snapped inwardly and outwardly.

17. In a snap acting electric switch, an insulating base having a pair of recesses in the outer face thereof, a pair of slots extending through the base and communicating respectively with the recesses and a hole extending through the base between the recesses, a substantially L-shaped supporting terminal having one leg extending through one of the slots in the base and the other leg seating in the communicating recess in the base, a substantially L-shaped contact terminal having one leg extending through the other slot in the base and the other leg seating in the communicating recess in the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the hole in the base for securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, a snap acting vane secured to said other leg of the supporting terminal and snapping inwardly and outwardly with respect to the base, and a movable contact operated by the snap acting vane and engaging and disengaging the fixed contact as the snap acting vane is snapped inwardly and outwardly.

18. In a snap acting electric switch, an insulating base having a pair of recesses in the outer face thereof, a pair of slots extending through the base and communicating respectively with the recesses and a hole extending through the base between the recesses, a substantially L-shaped supporting terminal having one leg extending through one of the slots in the base and the other leg seating in the communicating recess in the base, a substantially L-shaped contact terminal having one leg extending through the other slot in the base and the other leg seating in the communicating recess in the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the hole in the base for securing the supporting terminal and the contact terminal to the base, lugs on said one leg of the supporting terminal and the contact terminal engaging the other face of the base for also securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, a snap acting vane secured to said other leg of the supporting terminal and snapping inwardly and outwardly with respect to the base, and a movable contact operated by the snap acting vane and engaging and disengaging the fixed contact as the snap acting vane is snapped inwardly and outwardly.

19. A snap acting electric flasher switch comprising, an insulating base, a substantially L-shaped supporting terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, a substantially L-shaped contact terminal having one leg extending through a slot in the base and the other leg engaging the outer face of the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through

the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the base for securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, an elongated substantially rectangular and flat resilient vane secured at one end to said other leg of the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

20. A snap acting electric flasher switch comprising, an insulating base having a pair of recesses in the outer face thereof, a pair of slots extending through the base and communicating respectively with the recesses and a hole extending through the base between the recesses, a substantially L-shaped supporting terminal having one leg extending through one of the slots in the base and the other leg seating in the communicating recess in the base, a substantially L-shaped contact terminal having one leg extending through the other slot in the base and the other leg seating in the communicating recess in the base, an insulating washer overlying said other legs of the supporting terminal and the contact terminal, a rivet extending through the insulating washer and between said other legs of the supporting terminal and the contact terminal and through the hole in the base for securing the supporting terminal and the contact terminal to the base, a fixed contact on said other leg of the contact terminal, an elongated substantially rectangular and flat resilient vane secured at one end to said other leg of the supporting terminal and overlying the fixed contact on the contact terminal, said resilient vane having a prestressed area bounded by an impression forced in the vane from the outer face thereof and near the supported end thereof and the vane being prestressed by said impression resiliently to urge the free end of the vane outwardly from the base, a thermally expansible and contractible heater ribbon arranged in spaced relation along the inner face of the vane and secured under tension at its ends to the ends of the vane and stressing the vane against the force of the prestressing thereof to hold the free end of the vane inwardly toward the base and to cause the bounded prestressed area of the vane to dimple

outwardly when the heater ribbon is relatively cool, a movable contact secured to the heater ribbon adjacent the center thereof and normally engaging the fixed contact on the contact terminal for normally completing an electric circuit from the contact terminal through the fixed contact, the movable contact, the two halves of the heater ribbon and the vane to the supporting terminal, completion of said electric circuit causing the heater ribbon to heat and gradually expand to allow the prestressing force of the vane to dimple the bounded prestressed area of the vane inwardly when the heater ribbon becomes relatively hot to snap the free end of the vane outwardly from the base and snap the movable contact from engagement with the fixed contact quickly to break said circuit, breaking of said electric circuit causing the heater ribbon to cool and gradually contract to cause the heater ribbon to act against the prestressing force of the vane to dimple the bounded prestressed area of the vane outwardly when the heater ribbon becomes relatively cool to snap the free end of the vane inwardly toward the base and snap the movable contact into engagement with the fixed contact quickly to complete said electric circuit.

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