July 26, 1949. H. R. GROSS 2,477,408

FLASHER

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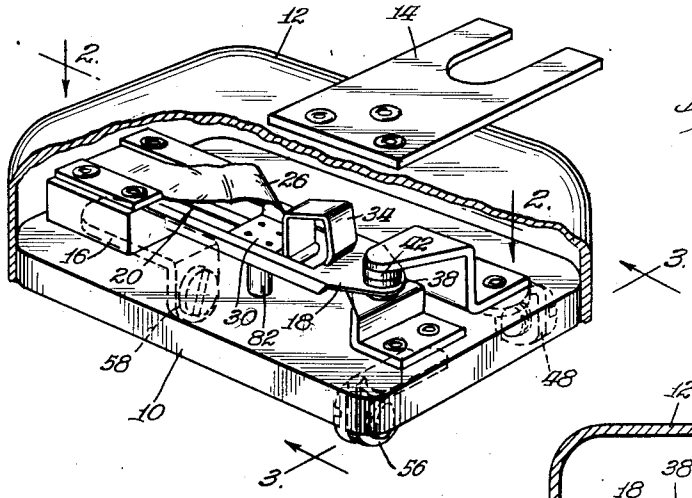


Fig. 1.

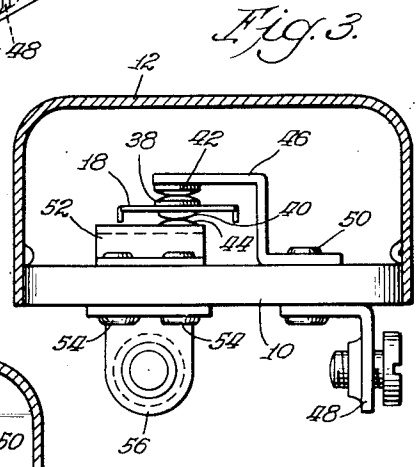


Fig. 3.

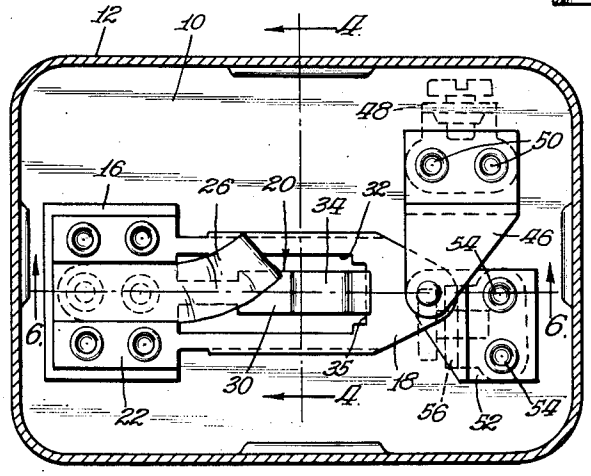


Fig. 2.

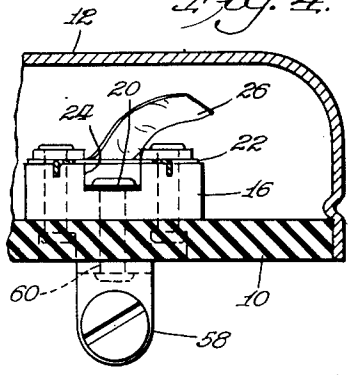


Fig. 4.

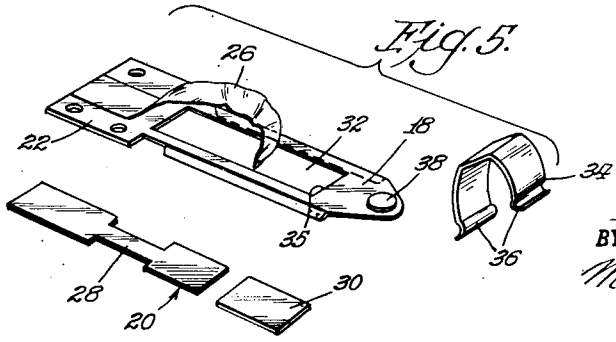


Fig. 5.

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Fig. 6.

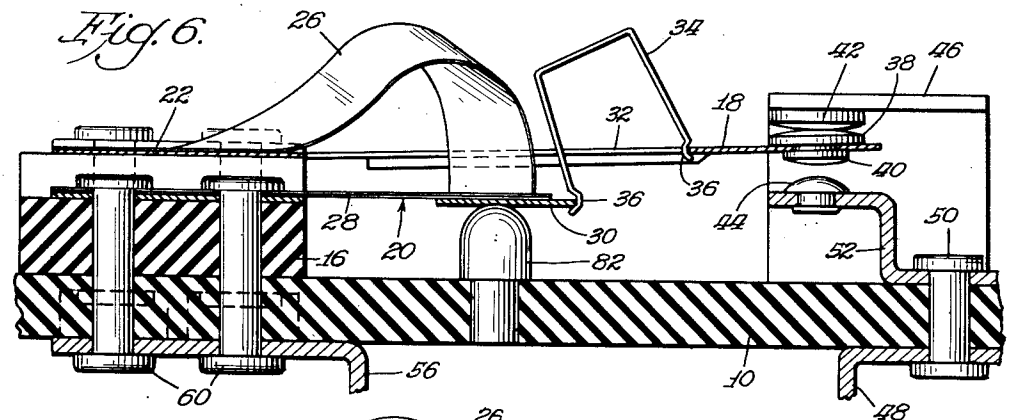


Fig. 7.

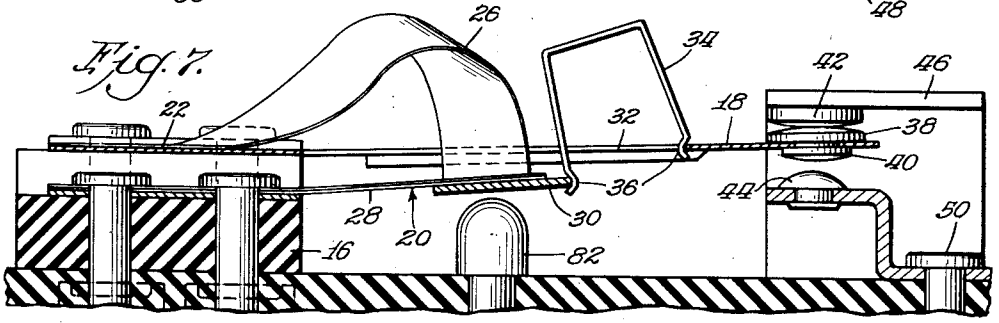
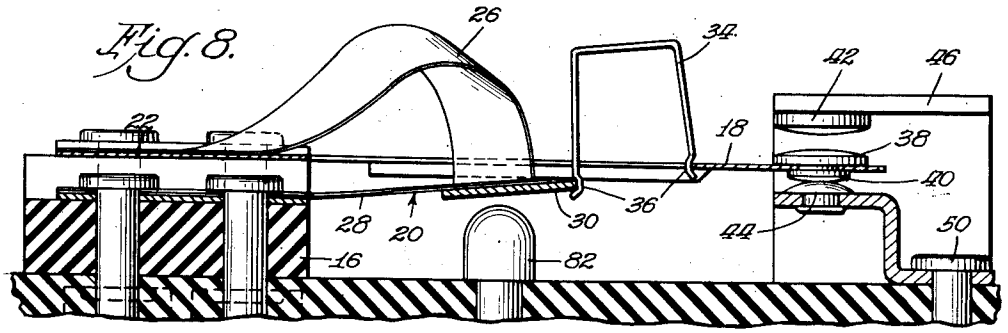


Fig. 8.



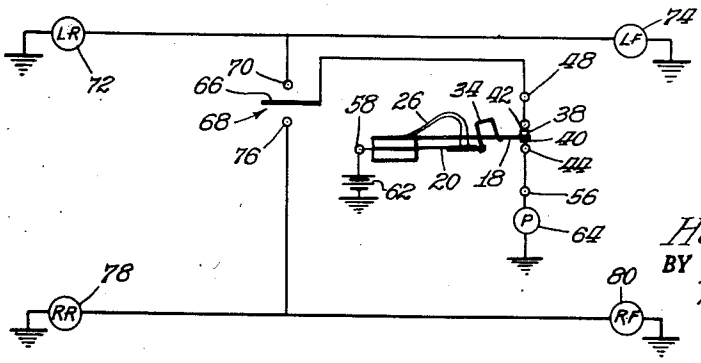


Fig. 9.

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FLASHER

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1 Claim. (Cl. 200—113)

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This invention relates to flashers, and particularly to thermal flashers.

An object of this invention is to provide an improved thermal flasher having a rapid and positive switching action and which is particularly well adapted to be used, for example, in vehicle turn signal systems.

Another object is to provide an inexpensive flasher having a bimetallic member so constituted that it may oscillate rapidly and yet is capable of satisfactorily operating the movable switch parts associated therewith. I have found that by so forming the bimetallic member that it has a highly flexible working portion and a relatively stiff free end portion, the member is instantly responsive to variations in electric current of small magnitude flowing through it for opening or closing the switch contacts with relatively small movement of the working portion. The stiff end portion of the member amplifies the motion of the working portion and imparts sufficient rigidity and leverage to the free end of the member to operate the switch in the desired manner, making and breaking an electrical circuit to the signal lights or other indicators at a rate of from 60 to 120 times per minute and yet effecting definite closure of the circuit each time so that the lights come to full brilliance before the circuit is interrupted.

Further objects of the invention are to eliminate the necessity for precise balancing of spring pressures in a thermal flasher and to equalize the on-time and off-time of the flasher. These features are realized by a construction in which the bimetallic strip is mounted in offset relation to a switch contact blade to which it is connected by a toggle or the like, and wherein the bimetallic member is worked between temperature limits which are considerably higher than the ambient temperature so that the heat dissipation is always at a relatively high rate while the flasher is in operation.

Various other objects, advantages and features of the invention will be apparent from the following specification when taken in connection with the accompanying drawings wherein a certain preferred embodiment is set forth for purposes of illustration.

In the drawings, wherein like reference numerals refer to like parts throughout:

Fig. 1 is a perspective view of a flasher constructed in accordance with and embodying the principles of the invention, a portion of the housing being broken away to show the working parts of the flasher;

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Fig. 2 is a sectional view through the housing taken on the line 2—2 in Fig. 1 and showing the flasher in plan;

Fig. 3 is a sectional view through the housing on the line 3—3 in Fig. 1 and showing the flasher in end elevation;

Fig. 4 is a fragmentary sectional view taken on the line 4—4 in Fig. 2;

Fig. 5 is a disassembled detail view of a portion of the flasher;

Fig. 6 is a longitudinal section taken on the line 6—6 of Fig. 2 and showing the positions of the parts when the flasher is not operating;

Fig. 7 is a sectional view similar to Fig. 6 but showing the parts in certain relative positions which they may occupy when the flasher is operating;

Fig. 8 is a view similar to Fig. 7 but showing the flasher parts in still other operative positions; and

Fig. 9 is a schematic diagram of a vehicle turn signal circuit in which the flasher may be connected.

Referring now to the drawings, and particularly to Figs. 1 through 4 thereof, the flasher is mounted on an insulating base or plate 10 and is covered by a suitable metal housing 12 to which is attached a bracket 14 for mounting the flasher in its position of use. A block 16 of insulating material is secured to the base 10 and serves as a support for a spring contact blade or yoke 18 and a bimetallic strip or member 20, these parts being shown in detail in Fig. 5. The blade 18 has a tail portion 22 which is secured to the top of the block 16. A central channel or recess 24, Fig. 4, is provided in the block 16, and one end of the bimetallic member 20 is disposed in said channel and anchored to the block 16 by rivets 60. To insure a good electrical connection between the bimetallic strip 20 and the contact blade 18, a pigtail 26 of suitable conducting material such as copper foil extends between and is soldered or otherwise suitably secured to the tail portion 22 and the bimetallic strip 20. It will be noted that the fixed ends of the contact blade 18 and the bimetallic member 20 are disposed in planes which are substantially offset with respect to each other, the purpose of this construction being explained presently.

The bimetallic member 20, as shown more clearly in Fig. 5, has a narrow, highly flexible working portion 28 intermediate its fixed end and the free end thereof. This enables the strip 20 to respond rapidly to changes in temperature such as may be produced by variations in an electric current of small magnitude flowing through the member 20. The free end of the

member 20 is stiff, such stiffening preferably being accomplished by securing a small rigid piece 30 to the free end of the member 20.

The contact blade 18 is formed with a longitudinal opening 32 therein so that it resembles a yoke. The blade 18 and member 20 extend in generally the same direction from the block 16, the member 20 terminating short of the far end of the opening 32. An arched spring 34 having cuplike indentations or sockets 36 at its ends is disposed between the blade 18 and the member 20, the spring 34 arching upwardly through the opening 32 in the blade 18 and its cupped ends 36 respectively engaging the free end of the member 20 and an abutment 35 on the blade 18.

Near its free end the contact blade 18 carries two contacts 38 and 40, Figs. 3 and 5, on opposite faces thereof, these contacts respectively cooperating with fixed contacts 42 and 44. The fixed contact 42 is positioned above the blade 18 and is carried by a bracket 46 which is attached to the insulating base 10. A terminal 48 is mounted on the exterior of the base 10 and is electrically connected to the bracket 46 as by rivets 50 which pass through the bracket 46 and terminal 48. The fixed contact 44 is carried by a bracket 52 mounted on the base 10, the bracket 52 being connected as by rivets 54 to a terminal 56 on the exterior of the base 10. A terminal 58, Fig. 4, on the base 10 is electrically connected to the fixed end of the bimetallic member 20 by suitable means such as rivets 60 which extend through the base 10 and block 16.

A wiring diagram which illustrates the flasher in association with a typical vehicle turn signal system is presented in Fig. 9. As there shown, the terminal 58 is connected to a suitable source of electric current represented by the battery 62. The terminal 56 is connected to a grounded pilot light 64 located on the dashboard of the vehicle. Terminal 48 is connected to the movable arm 66 of a single-throw, double-pole selector switch 68. One pole 70 of the switch 68 is electrically connected in parallel to the left rear and left front turn signal lights 72 and 74, respectively. The other pole 76 of the switch 68 is electrically connected in parallel to the right rear and the right front turn signal lights 78 and 80, respectively. The turn signal lights 74 and 80 are mounted on the front of the vehicle to the left and right, respectively, of the operator, while the turn signal lights 72 and 78 are mounted on the rear of the vehicle to the left and right, respectively, of the operator. All of the turn signal lights 72, 74, 78 and 80 are grounded on the sides thereof opposite those which are in electrical connection with the switch poles 70 and 76.

The positions occupied by the various parts of the flasher when the same is in a non-operating condition are illustrated in Fig. 6. The spring 34 normally urges the contact blade 18 upwardly so that the contact 38 carried thereby bears against the stationary contact 42. Likewise, when the bimetallic strip 20 is at ambient temperature, the spring 34 urges the bimetallic strip 20 downwardly, this motion being limited by a stop 82 fixed in the base 10 to prevent the member 20 from acquiring a permanent set.

When the operator of the vehicle desires to signal a turn, say to the left, he moves the arm 66 of the selector switch 68, Fig. 9, until it engages the pole 70 of this switch. This establishes a circuit from the battery 62 through the bimetallic member 20, blade 18, and switch 68 to the turn signal lights 72 and 74. As the current flows through the member 20, this member is heated and curls upwardly, passing through the position shown in Fig. 7 and into the position shown in Fig. 8. The action of the spring 34 is such that as the stiff end 30 of the member 20 approaches the blade 18, the blade 18 is toggled and snaps sharply downwardly to separate the contacts 38 and 42 and bring the contacts 40 and 44 into engagement as shown in Fig. 8. Such action breaks the circuit to the turn signal lights 72 and 74 and establishes a circuit through the pilot light 64. The current drawn by the pilot light is insufficient to maintain the member 20 heated to the extent necessary for remaining in the position shown in Fig. 8. Hence the member 20 cools and commences to straighten. When it assumes the position shown in Fig. 7, the contact blade 18 is again toggled by the spring 34 to separate the contacts 40 and 44 and engage the contacts 38 and 42. Assuming that the selector switch 68 is still closed as described, current again passes through the bimetallic strip 20 and blade 18 to the signal lights 72 and 74 until the member 20 becomes sufficiently heated to assume the position shown in Fig. 8 whereupon the above described cycle of operations is repeated. The flasher thus functions alternately to make and break the circuits to the turn signal lights and the pilot light, causing these lights to flash at the rate of from 60 to 120 times per minute.

It should be noted that the bimetallic member 20 never assumes the inoperative or "cold" position thereof shown in Fig. 6 so long as the selector switch 68 is closed. That is to say, the member 20 oscillates between the positions illustrated in Figs. 7 and 8 without coming to rest against the stop 82, while the signal lights are being flashed. When the switch 68 is opened, the member 20 then cools and straightens until it is arrested by the member 82.

When the right turn signal lights 78 and 80 are to be flashed, the operator moves the switch 68 to bring the arm 66 thereof into engagement with the pole 76, whereupon the above described operations are repeated except that the signal lights 78 and 80 and the pilot light 64 are flashed.

Numerous outstanding advantages are afforded by the invention herein disclosed. The particular form of bimetallic strip 20, Fig. 5, which is employed has been found to give highly satisfactory performance in vehicle turn signal systems where the current flowing in the circuit is apt to be of relatively small magnitude. The narrow, highly flexible working portion 28 of the member 20 enables it to respond rapidly to variations in a current flowing through it so that the member 20 is able to oscillate quite rapidly. The stiff end portion 30 of the member 20 amplifies the motion of the working portion 28 and imparts sufficient rigidity to the free end of member 20 for satisfactory coaction with the arched spring 34. The toggle action of the member 20 on the blade 18 through the medium of the spring 34 produces a positive snap motion of the blade 18 for making and breaking the associated electrical circuits. There is no fluttering of the contacts and hence a minimum of sparking. Resort may be had to conventional expedients for further reducing contact sparking, if desired, such as by making the movable and stationary contacts of different materials, a satisfactory com-

bination for this purpose being tungsten and silver.

Still another advantage is the ease of adjustment of the flasher which is realized by mounting the member 20 and the yoke or blade 18 in different planes so that they are transversely offset from each other. This feature has been found to reduce materially the amount of time required for adjustment of spring pressures and the number of factory rejects. Furthermore, the flasher is not likely to fail in service as a result of factors which normally would affect the sensitivity of such a device.

A still further feature is that of continually working the bimetal while it is hot. In the past considerable trouble has been experienced in equalizing the on-time and off-time of bimetallic switches used in flashers. There is a tendency for the bimetal to take considerably more time to straighten on cooling than to curl when heated. However, if the bimetal is maintained at a relatively high temperature where the heat dissipation is comparatively more rapid than it is at or near room temperature, a greater equality of the "on" and "off" periods results.

The above features and other advantages which will be apparent to those skilled in the art combine to make the device particularly well suited for use in vehicle turn signal systems and adapted to mass production at low cost; while in service it is highly dependable and efficient in its operation.

It is obvious that various changes may be made in the specific embodiment set forth for purposes of illustration without departing from the spirit of the invention. The invention is accordingly not to be limited to the specific embodiment shown and described, but only as indicated in the following claim.

The invention is hereby claimed as follows:

A flasher comprising a bimetallic strip fixed at one end thereof and free at the other end thereof, a rigid member secured to the free end of said strip and extending therebeyond, said strip being adapted to be heated in response to current flowing in a circuit and having an intermediate portion of reduced width for rapid response to the initiation and termination of current flow in said circuit, a resilient sheet metal switch blade anchored at one end thereof and free at the other end thereof, fixed members between which the free end of said blade moves, one of said fixed members being provided with a switch contact cooperating with the switch blade to make and break said circuit, the fixed ends of said switch blade and said bimetallic strip being mounted in spaced relation and the switch blade and bimetallic strip extending in overlapping relation, said blade extending beyond the end of the bimetal strip and having an opening therein, an arched spring positioned in said opening and rockably connected at one end to the switch blade and at the other end to the rigid member carried by the bimetallic strip, and a stop limiting movement of the bimetallic strip under the influence of said spring when said strip is at ambient temperatures, and the other of said fixed members between which the free end of the blade moves limiting movement of the blade under the influence of the spring when the bimetal strip on heating operates the switch blade through said spring to move it out of contact with the contact carrying fixed member.

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