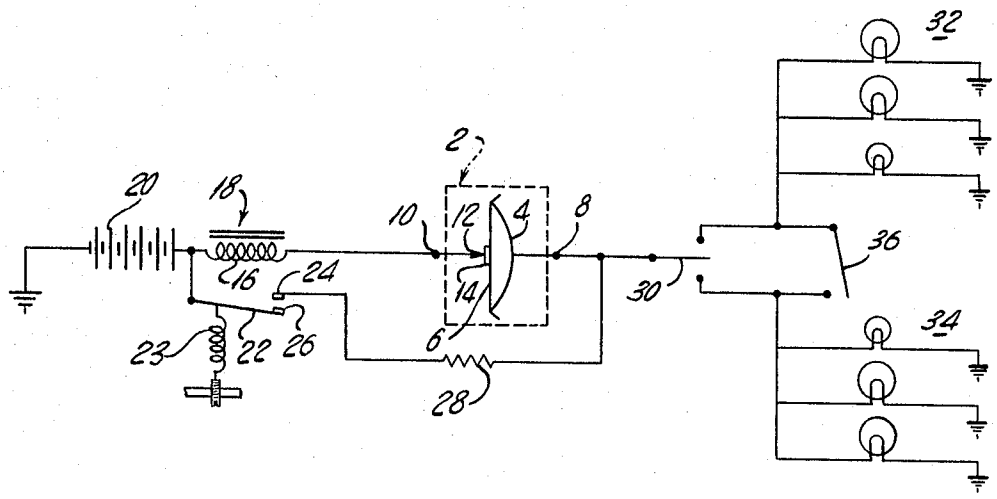
Jan. 31, 1967 H. G. SIIBERG 3,302,057

FLASHER FOR DIRECTIONAL AND EMERGENCY SIGNALS

Filed Oct. 20, 1964



INVENTOR
HEMMING G. SIIBERG
BY
Eyre, Mann & Lucas
ATTORNEYS

United States Patent Office

3,302,057

Patented Jan. 31, 1967

3,302,057

FLASHER FOR DIRECTIONAL AND EMERGENCY SIGNALS

Hemming G. Siiberg, Union, N.J., assignor to Tung-Sol Electric Inc., a corporation of Delaware

Filed Oct. 20, 1964, Ser. No. 405,149
6 Claims. (Cl. 315—77)

The present invention relates to flashers for automobile directional signals and comprises a novel combination of series type flasher with a magnetic relay which permits the system to be utilized optionally for control of directional signals or for emergency flashing of all signals.

The series type flashers are now in wide use in the automobile industry and in general comprise a vane which is deformed along one axis and held in a constrained position against the bias introduced by the deformation by an expansible pull ribbon. When current is passed through the flasher the pull ribbon expands and permits the vane to assume its biased position, opening the circuit of the signal lamps and causing the pull ribbon to cool and contract to snap the vane to circuit closing position.

Such type flasher must be designed for a specific lamp load if it is to operate at a given rate and ratio and if it is to provide proper pilot indication. In emergency operation, that is, when it is desired to flash all signal lights simultaneously, the lamp load is doubled and accordingly the more expensive shunt type flashers which are independent of load have heretofore been employed. The present invention makes it possible to use the simpler, less expensive type series flasher for emergency as well as directional signals.

In accordance with the invention a series flasher is connected in series with the winding of a relay. A resistor which is substantially equal in resistance to that of the series flasher combined with the winding of the relay is connected in parallel with the flasher and relay when the relay picks up its armature. When the system is used to flash only the directional signals, the current through the relay is insufficient to cause the armature to be picked up to close the circuit through the by-passing resistor. When, however, emergency signals are to be flashed, the lamp load is doubled and consequently the current through the flasher is increased and the current through the relay is sufficient to cause the relay to attract the armature and close the circuit through the by-passing resistor. Once the armature is attracted, equal currents flow through the flasher and through the by-passing resistor and consequently the flasher current is reduced to normal and the flasher will continue to operate at the same rate and ratio as when flashing the directional signals.

For a better understanding of the invention reference may be had to the accompanying drawing of which the single figure is a diagram of a circuit embodying the invention.

In the drawing a series type flasher is shown diagrammatically within the dotted line enclosure **2** as comprising a vane **4** and pull ribbon **6** with a terminal **8** for the load and an input terminal **10**. Terminal **10** is connected to the fixed contact **12** which, when the pull ribbon **6** is cold, engages the movable contact **14** mounted on the pull ribbon. In accordance with the invention, terminal **10** is connected through the winding **16** of a relay **18** to the positive terminal of a source **20** of direct current which may be the car-carried battery of nominally 12 volts. The negative terminal of source **20** is grounded. Also connected to the positive terminal of the battery **20** is the movable armature **22** of the relay **18**, the armature being biased by an adjustable spring **23** to retracted position. A fixed contact **24** is positioned to be engaged by

an armature carried contact **26** when the relay is energized. The fixed contact **24** is connected through a resistor **28** to the output terminal **8** of the flasher. The conventional signal switch **30** is connected to terminal **8** and the movable arm thereof, when in one circuit closing position, is connected to flash a lamp load **32** and when in the other circuit closing position is connected to flash a lamp load **34**. In the diagram each of the lamp loads **32** and **34** is shown as comprising two signal lamps and a pilot lamp, these representing the front and rear directional signal lamps and the pilot lamps on the dashboard of the automobile. A manual switch **36**, when closed, connects the lamp loads together so that in either circuit closing position of switch **30** both lamp loads **32** and **34** are connected to the flasher output terminal **8**.

In operation, when one lamp load only is to be flashed, switch **30** is moved to connect such load to the flasher terminal. Current then flows from the battery through the coil **16** and through the flasher to the lamp load. This current is insufficient to cause the relay **18** to pick up its armature but is sufficient to heat the pull ribbon **6** and cause it to expand and permit vane **4** to move to contact open position. When the contacts open the lights are extinguished and the pull ribbon cools and contracts causing re-closure of the contacts and re-closure of the circuit to the lamp load. If now it is desired to flash all lamps simultaneously under emergency conditions, switch **36** is closed and switch **30** is moved to either of its controlling positions. Twice the current will then flow through the relay and flasher and this increased current will be sufficient to cause the relay **18** to pick up its armature and close the circuit through resistor **28**. In the specific circuit shown, resistor **28** is designed to be equal to the resistance of the winding **16** and of the flasher with the result that the current through the flasher is restored to the value it had when flashing a single lamp load. Accordingly, the flashing rate and the ratio of on to off-time of the flasher will be maintained constant. Although the current through the relay winding also reduces to one-half of that required for pickup of the armature, the current is still sufficient to maintain the armature in the contact closing position. Thus, although there will be at each flash a momentary surge of high current in order to pick up the armature, the operating current through the flasher will be that for which the flasher is designed when serving to flash directional signals.

No attempt has been made in the drawing to show details of the flasher or other structural elements of the invention for the reason that, as heretofore indicated, any series type flasher can be employed. It is only necessary that the relay winding, the flasher terminals, the directional signal switch and the lamp loads be connected in a series circuit. The location of the movable contact of the flasher, whether on the pull ribbon or on the vane, is immaterial as is the particular configuration of the vane, whether circular, rectangular or square. Examples of suitable series type flashers for use in the invention are described and claimed in Schmidinger Reissue Patent No. 24,023 and in Schmidinger Patent No. 3,131,274. By proper adjustment of spring **23** and thus of the current at which the relay picks up its armature, the functioning of the pilot lamps is not impaired with the circuit as shown in the drawing. When switch **30** is thrown to flash the lamp load **32**, for example, and one of the lamps is burned out, the current through the flasher will be reduced to such an extent that the contacts will not open. Consequently the pilot lamp of the load **32** will burn steady and thereby indicate failure of one of the signal lamps. Under these conditions, that is, with one signal lamp out, if switch **36** is closed for emergency signals the relay will be energized and the circuit through resis-

tor **28** thereby completed. The rate of flashing will change because of the difference in the lamp load and, therefore, this change in flashing rate of the pilot lamps will indicate that there is a lamp failure in the system.

The invention has now been described with reference to a single embodiment. Obviously the number of lamps to be flashed, the particular design of series flasher and the location of the switches form no part of the invention.

The term "series type flasher" as used in the appended claims means a flasher switch which opens the circuit when the lamps of the load are to be extinguished and which is in series with the lamp load when the lamps are lit, as described herein and as distinguished from a "shunt type flasher" which dims the lamps but does not open the circuit of the lamp load.

The following is claimed:

1. A circuit for flashing lamps comprising a source of energy, a relay having a winding and an armature biased to retracted position and movable to attracted position when the current through the winding reaches a given value, one end of said winding and said armature being connected to one terminal of said source, a series type flasher having input and output terminals, the other end of said winding being connected to the flasher input terminal, a pair of lamp loads, means for optionally connecting either or both of said loads between the flasher output terminal and the other terminal of the source, an armature carried contact, a fixed contact positioned for engagement with said armature carried contact when said armature is in attracted position and a resistor connected between said fixed contact and said flasher output terminal so as to be in parallel with said winding and flasher when the armature is in attracted position.

2. The circuit according to claim **1** wherein said lamp loads are substantially equal and the resistance of said resistor is substantially equal to the sum of the resistance of said winding and flasher.

3. The circuit according to claim **1** including means for adjusting the bias of said armature toward retracted position to adjust the current value at which the armature is moved to attracted position.

4. In an automobile directional signal system energized from a car-carried battery and having a series type flasher, two lamp loads and switch means for selectively connecting either load in series with the flasher across the battery, the improvement comprising a relay having a winding connected in series with the flasher and an armature movable between retracted and attracted positions, a resistor connected in parallel with said winding and flasher only when said armature is in attracted position and manually operable means for optionally connecting both lamp loads to the flasher, the current through said relay winding when one lamp load is connected to the flasher being insufficient to move the armature to attracted position but sufficient, when both lamp loads are connected in circuit to move the armature to attracted position and thereby bypass part of the current about the flasher through said resistor.

5. The improvement in an automobile directional signal system according to claim **4** wherein the resistance of said resistor is substantially equal to the sum of the resistances of the flasher and relay winding whereby when both lamp loads are connected to the flasher and said armature is in attracted position, equal currents flow through the flasher and resistor.

6. The improvement in an automobile directional signal system according to claim **4** wherein said relay is designed to require about twice as much current to move the armature from retracted to attracted position as to hold the armature in attracted position.

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JAMES W. LAWRENCE, *Primary Examiner.*

R. JUDD, *Assistant Examiner.*