Oct. 9, 1962 C. HUETTEN 3,057,978

THERMO-MAGNETIC CONTACT DEVICE

Filed Oct. 24, 1960

FIG. 2

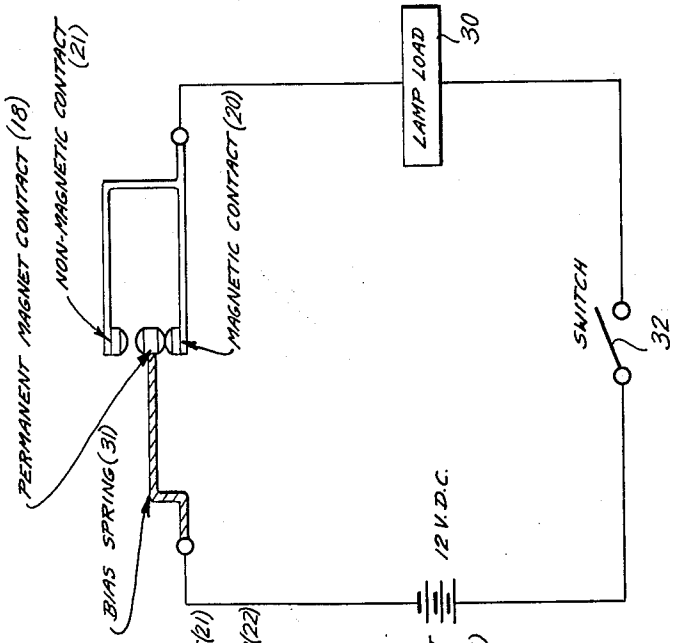
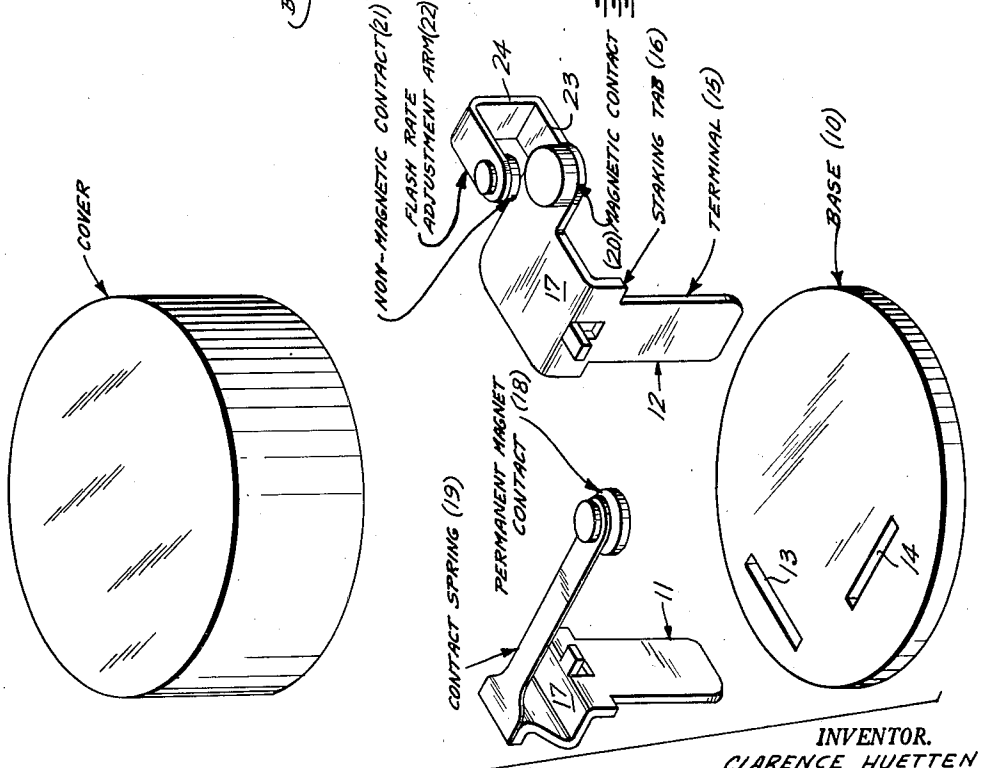


FIG. 1



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THERMO-MAGNETIC CONTACT DEVICE

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The present invention relates to devices for intermittently varying electrical currents generally known as flashers and has particular reference to such devices incorporating thermo-magnetic contacts.

An object of the present invention is to provide an electrically operable flasher circuit and switching mechanism in which a flasher periodically alters the current supplied to a lamp or other signal devices so that the lamp or device may be caused to flash or operate periodically.

Prior periodic or flasher switches were of the mechanical or electromechanical variety requiring a great many moving parts and complicated construction tending to increase the cost in order to obtain reliability.

It is therefore an object of the invention to provide a flasher switch which is compact in construction, inexpensive to manufacture, simple of installation and particularly adapted for controlling the turn signals and pilot lights of an auto turn signal system.

It is also an object of the invention to provide an electric current interrupter in which the contacts per se, are important in determining the flashing frequency of the device.

The foregoing and other objects are attained in the embodiment of the invention shown in the drawings, in which

FIG. 1 represents an embodiment of the flasher invention constructed in a manner such that a permanent magnet contact is used in conjunction with a contact fabricated from a magnetic material whose permeability changes as a function of temperature, and

FIG. 2 is a diagram of the electrical circuit of the flasher of the present invention.

Generally speaking, many magnetic materials exhibit a decrease in permeability when heated. The present invention describes a closed electrical circuit utilizing a permanent magnet as one contact, and as a second contact, a magnet material exhibiting a decrease in permeability when heated. The latter contact can open and close the electrical circuit by being heated with the passage of an electrical current therethrough. The characteristic of the circuit is variable, as desired, by altering the permeability range of the contact to a point where its permeability is reduced to allow a bias spring to pull magnetic contact having variable permanence away from a permanent magnet so as to determine the flashing frequency of the circuit.

Referring now to the figures of the drawing, FIG. 1 represents the flasher embodiment in which three contacts are used; a permanent magnet contact, a magnetic contact of variable permanence and a non-magnetic contact. The flasher comprises a base **10** on which a pair of contact assemblies **11** and **12** are placed in cut-out forms **13** and **14** in the base. Each contact assembly comprises a terminal section **15** integrally joined to a collar or staking tab section **16**. To the tab section there is placed an offset portion **17** horizontally extending therefrom. A permanent magnet contact **18** held on a contact spring **19** is joined to one of the assemblies, while a magnetic contact **20** is connected to the other assembly. Above the magnetic contact **20** is placed a non-magnetic contact **21** held on a flash rate adjustment arm **22** integrally joined to the magnetic contact arm **23** by means of a vertically extending section **24**. When fitted together the permanent magnet contact mates with the magnetic contact and is situated between it and the non-magnetic contact.

In FIG. 2, there is shown the flasher circuit illustrated in the embodiment of FIG. 1 and the mode of operation thereof. A lamp load **30** of 4 amperes and a voltage source of 12 volts D.C. is used. In the "off" or "hold" position, the permanent magnetic contact is attracted to the magnetic contact. This magnetic contact is fabricated of a material so that its resistance and thermal mass is controlled in such a way that a current through the contact pair will heat the magnetic contact material to a temperature which reduces its permeability to a point to allow a bias spring **31** to pull the magnetic contact away from its associated permanent magnet.

Thus when switch **32** is closed, current flows through the circuit and the magnetic contact begins to heat up due to its resistance. The lamp at this point will not glow due to the high voltage drop across the magnetic contact in series with the lamp. When the magnetic contact heats up an amount sufficiently to decrease its permeability, the bias spring flips the permanent magnet contact over to the non-magnetic contact. In this position the light glows and the magnetic contact begins to cool. As soon as the magnetic contact cools an amount sufficient to increase its permeability, the premanent magnet contact again is attracted to and is "flipped" over to the magnetic contact. The cycle is repeated while the switch is closed. The magnetic contact during the operation had a resistance of approximately 5 ohms. The resistance was obtained for the contact by mixing a nickel-iron powder with a ferrite powder, pressing and sintering the compact. If necessary, to alter the frequency of operation, the construction as shown in FIG. 1 utilizes an adjustment arm **22** for varying the contact spacing between the non-magnetic contact and the magnetic contact.

It is apparent, therefore, that the construction as described allows for an exceedingly simple, sturdy and reliable flasher. Moreover the principle of utilizing a magnetic contact operation wherein the current flow allows for a decrease in magnetic permanence for controlling switching operations is adaptable to many other devices and accordingly it is intended that other modifications and certain changes in design and construction may be resorted to from time to time by persons versed in the art, without departing from the spirit and intent of the invention or the scope of the appended claims.

What is claimed is:

1. A flasher comprising an electrical circuit connected to a power source and to a load, said circuit including a permanent magnet contact, a magnetic contact of varying permeability, said permeability being varied by the heat generated in the current passing therethrough, said permanent magnet contact being placed on a bias spring adjacent said magnetic contact and a non-magnetic contact placed adjacent and above said magnetic contact of varying permeability, said magnetic contact being moved alternately against said permanent magnetic contact and said non-magnetic contact upon the flow of electric current through said magnetic contact so as to heat the same to vary the permeability thereof whereby said load is intermittently affected.

2. A flasher comprising an electrical circuit connected to a power source and to a load, said circuit including a permanent magnet contact, a magnetic contact of varying permeability, said permeability being varied by the heat generated in the current passing therethrough, said permanent magnet contact being placed on a flexible spring holder, a non-magnetic contact connected to said load, said magnetic contact connected to said load in parallel therewith and being moved alternately between said permanent

magnet contact and said non-magnetic contact when current passes therethrough to vary its permeability.

3. A signal flasher comprising an electrical circuit connected to a direct current power source and to a load, said circuit including a permanent magnet contact, a thermomagnetic contact of varying permeability, said permeability being varied by heat generated by current passing therethrough, said permanent magnet being placed on a bias spring, a non-magnetic contact connected to said load, said magnetic contact connected to said load in parallel therewith, means for adjusting the spring between said magnetic and non-magnetic contact to vary the frequency of movement between said latter contacts when current passes through said magnetic contact to vary its permeability and whereby said load frequency is varied accordingly.

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