

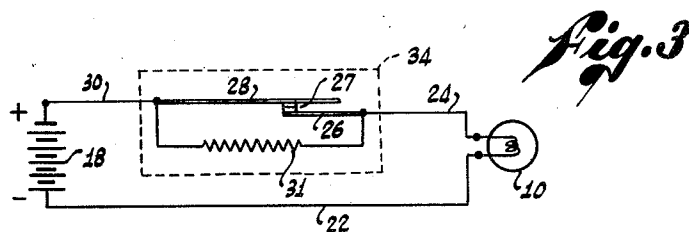
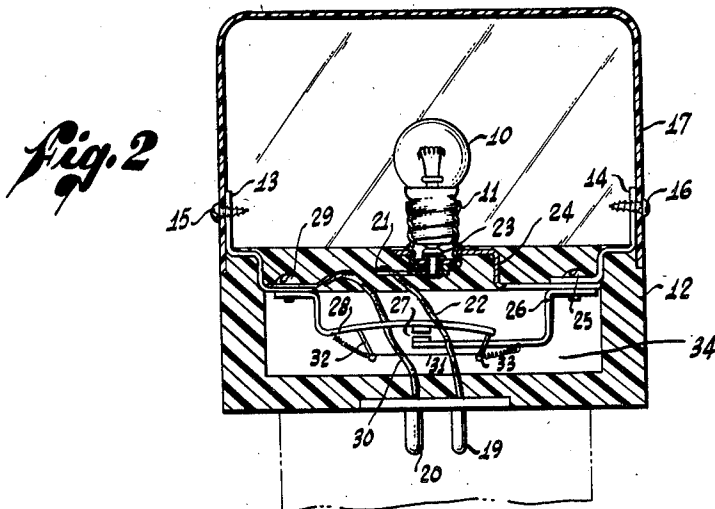
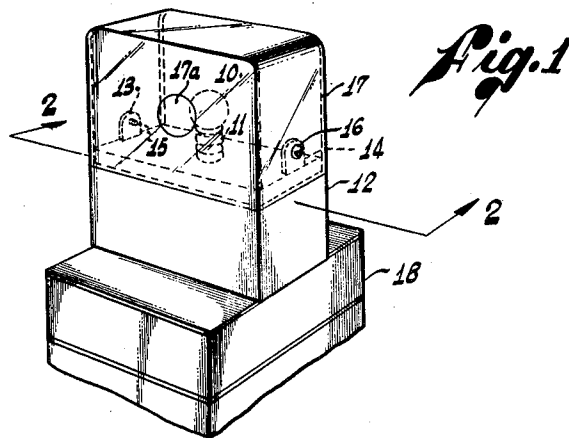
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FLASHING LIGHT FOR SIGNALLING

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FLASHING LIGHT FOR SIGNALLING

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3 Claims. (Cl. 340—366)

My invention relates generally to signalling systems, and more particularly to systems of this type utilizing an electrically operated flashing light.

The need often arises for a signalling means which will provide a warning, or draw attention to a particular location. Several devices have been used for this purpose, including brilliantly colored materials, reflectors, and various types of flares. Each of these devices, however, is somewhat unsatisfactory in certain situations. They are either inadequate to gain attention, or they require fuel in which event the signal provided is relatively short lived. Electrically-operated signals, as lamps, have therefore been preferred as a means of providing a long-lived attention-commanding signal.

In order to make such signals more commanding, as well as to decrease energy requirements, systems have been devised for causing the signal to be intermittent in operation. One such prior system for producing an intermittent signal makes use of a magnetically operated pulsing mechanism. The present device operates by utilizing the characteristic of certain materials to change in size with variations in temperature. Such a material is formed into an expansion element whose length is varied to control an electrode switch. The expansion element is then arranged to be alternatively heated by an electrical current, and then given a cooling period. Intermittent switching is thus accomplished by a heat-operated element.

Such devices operate satisfactorily under normal conditions; however, if conditions are such that water, or other liquids, may accumulate about the expansion element, then the heat generated in the expansion element will be dissipated so rapidly that the element will not be capable of heating sufficiently to effect switching. In addition, these devices are somewhat uncertain of operation, if rapidly moving air currents may pass around the expansion element and thereby prevent the element from rapidly heating.

It is therefore a major object of my invention to provide a signalling light to attract attention or give a warning by intermittent operation, which will be more reliable in operation.

Another object of my invention is to provide a system of this type in which intermittent signals will be given in spite of certain adverse conditions as shock, cold, or water.

It is a further object of my invention to provide a signalling system which is rugged, simple, and economical, and which operates more reliably.

These and other objects and advantages of my invention will become apparent from the following description of the preferred form thereof, and from the drawings illustrating that form in which:

Figure 1 is a pictorial view of a signalling light constructed in accordance with the principles of my invention.

Figure 2 is a cross-sectional view of the signalling light illustrated in Figure 1.

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Figure 3 is a schematic wiring diagram of a system which may be used in the practice of my invention.

Referring now to the drawings and particularly to Figure 1 thereof, the numeral 10 designates a lamp, which will be operated in an intermittent fashion as a signalling means. The lamp 10 is mounted in a socket 11, which is rigidly held by being embedded in a wall of a base 12. Also supported by being embedded within the wall of the base 12 are mounting brackets 13 and 14. The enclosure 12 is preferably formed of a tough material, such as some of the synthetic plastics, and acts as the body or principal member of the signalling device. Various members are cast or embedded in the base 12, such as the socket 11, previously mentioned, electrical elements hereinafter described, and the mounting brackets 13 and 14 that are positioned to receive screws 15 and 16, which hold a lamp cover 17 in position. The lamp cover 17 provides protection for the lamp 10, and may be formed of plastic or other transparent or translucent material that is so formed as to provide a waterproof and gas-proof connection to the base 12, as by a rabbeted joint. The lamp cover 17 may be formed of a colored material to provide a colored-light signal, or may be formed so as to be transparent or translucent only in certain areas to thereby provide a directional signal. A lens or refracting element 17a may be formed as a part of the cover 17 when so desired.

The base 12 contains certain electrical circuitry, which will be later described, and which is connected to a battery 18 for power. The battery 18 may be a six volt dry cell type, for example, and may or may not be provided with an additional protective covering.

In Figure 2, I have illustrated a cross-sectional view of the system, and as shown in that view, prongs 19 and 20, carried by the base 12, are adapted to be inserted in the battery 18, to provide energy for the operation of the system. The prong 19 is connected to a lug 21, by means of a lead wire 22. The lug 21 is in turn attached to a contact 23, which is in direct electrical connection with the bottom terminal of the lamp 10. The threaded terminal of the lamp 10 makes contact with the socket 11, which is mounted in electrical connection upon the bracket 24, which is in turn connected by means of a screw 25 to the bracket 14. The brackets 14 and 24 are connected by the screw 25 to an arm 26, located within a flasher element 34, the arm carrying one of the electrical contacts 27. The other of the contacts 27 is carried by an arm 28, likewise within the flasher element 34, which is attached to the bracket 15 by a screw 29. The screw 29 also connects a lead wire 30 from the prong 20 to the arm 28.

The arm 28 is formed of a metal spring material, and is held in a flexed position by an expansion element, i. e., resistance wire 31. The resistance wire 31 is mounted in tension between studs 32 and 33, which are composed of electrical-insulating material. The resistance wire 31 is electrically connected between the arms 28 and 26. The material forming the resistance wire 31 has a high electrical resistance, and a positive coefficient of heat expansion. Thus when the resistance wire 31 is heated, it will increase its length, and allow the flexed arm 27 to straighten out and thereby close the contacts 27.

The electrical circuit of the described embodiment is shown schematically in Figure 3. The battery 18 has its positive terminal connected by wire 30 to a parallel circuit, within the flasher element 34, comprising the resistance wire 31 and the contacts 27, mounted on the arms 26 and 28. The parallel circuit is then connected by bracket 24 through the lamp 10 to the negative terminal of the battery 18 by wire 22.

At the time when the system is first energized, the contacts 27 will be in an opened position due to the flexed position of the arm 28. During the following

interval an electrical current flows from the positive terminal of the battery 18, through the resistance wire 31, the lamp 10, and back to the negative terminal of the battery 18. This current is small due to the high resistance of the resistance wire 31, which is much higher than the resistance of the lamp 10. Such a current is therefore not sufficient to cause the filament of the lamp 10 to glow, and therefore no light will emanate from the signal during this time. After a short interval the current passing through the resistance wire 31 will heat the resistance wire 31 thereby causing it to expand. With the expansion of the resistance wire 31, the arm 28, which is normally held in a fixed position, will be allowed to straighten to some extent, thereby closing the contacts 27. With the closure of the contacts 27, the resistance wire 31 is shunted electrically by a low resistance path through the contacts 27. During the period when the contacts 27 are closed, a circuit will be completed from the battery 18 through the contacts 27 and the lamp 10, and the current flowing through the circuit will be sufficient to cause the filament of the lamp 10 to glow. As essentially no current flows through the resistance wire 31 during this interval, it will cool, and will contract in length to again flex the arm 28 and open the contacts 27. When the contacts 27 are again opened, the current through the lamp 10 will again be reduced to an amount inadequate to cause the filament to glow. This cycle will then repeat as the resistance wire 31 effects automatic circuit-interrupter operation, to intermittently operate the lamp 10.

The reliability of the operation as described above depends to a large extent upon the resistance wire 31 being heated when an electrical current is passed through it, and permitted to cool when no electrical current is passed through it. If the rate of heat transfer from the wire 31 is materially changed, the operation will likewise be changed. If the wire 31 loses heat too rapidly, the contacts 27 may never close, or if closed, will open too soon. If the wire 31 loses heat too slowly, the contacts 27, once closed, may not open, or may open for too short a time. To prevent these undesirable effects, the flasher element 34 is mounted in a housing which in turn is embedded in the plastic base or enclosure 12. In this way the desired thermal and electrical insulation is achieved.

The cover 17 makes a water-tight and gas-tight seal with the base 12, and the resulting unit will operate dependably in all kinds of weather. Even if the entire unit is submerged in a puddle of rain water, it will continue to operate until the disintegration of the battery 18 causes a failure of the power source. Likewise, being sealed, the unit may operate in explosive atmosphere where normal flashing lights are prohibited. Should the bulb 10 burn out, it can easily be replaced by removing the cover 17, and it will be appreciated that the battery 18 can be replaced in a matter of seconds by merely unplugging the unit from one battery and plugging it into another. In this connection, the simplicity of connecting the unit to a power source eliminates the need for a separate switch, thereby simplifying manufacture and reducing cost.

The flasher element 34 is a standard article of commerce that has proven dependable over an extended period of time. No claim is made to the flasher element 34 by and of itself, but only as it may be combined with other devices and elements to provide a complete combination.

From the foregoing, it will be apparent to those skilled in the art that I have provided a greatly improved and very satisfactory signalling light fully capable of achieving the objects and advantages hereinbefore set forth. It will be apparent, however, that variations may be made in the system without departing from the novel features thereof. Consequently, I do not wish to be limited to the particular values of the various components nor to the

exact method of connection herein described and shown, except as limited by my claims.

I claim:

1. A signal light of the class described which includes: an electrically operated source of light; an electrically operated thermally actuated electrical circuit interrupter; connector means adapted to make electrical connection to a source of power; conductor means establishing a series electrical circuit from one of said connector means, through said interrupter, through said source of light, and to another of said connector means; encasing means of thermally and electrically insulating material enclosing said interrupter and said conductor means and a portion of said connector means to form a unitary structure in which said connector means project from one side of said structure and said light source projects from another side, said structure sealing all of the elements therein from external fluids; and protective means of generally transparent material making a sealing fit with said encasing means and enclosing said light source, said protective means forming a continuation of said encasing means and with said encasing means forming a unitary light and flasher combination in which all elements except a power source are sealed and encased within a unitary structure.

2. A signal light of the class described which includes: an electrically operated source of light; an electrically operated electrical circuit interrupter of the type actuated by the generation of heat caused by the passage of current through said interrupter; connector means adapted to make electrical connection to a source of power; conductor means establishing a series electrical circuit from one of said connector means, through said interrupter, through said source of light, and to another of said connector means; encasing means of thermally and electrical insulating material enclosing said interrupter and said conductor means and a portion of said connector means to form a unitary structure in which said connector means project from one side of said structure and said light source projects from another side, said structure sealing all of the elements therein from external fluids and thermally insulating said interrupter from the effects of external heat and temperature; and protective means of generally transparent material making a sealing fit with said encasing means and enclosing said light source, said protective means forming a continuation of said encasing means and with said encasing means forming a unitary light and flasher combination in which all elements except a power source are sealed and encased within a unitary structure.

3. A signal light of the class described, adapted to be plugged into a battery having a socket or plug-receiving jack, and to form a unitary structure therewith, including: an electrically operated source of light; an electrically operated electrical circuit interrupter of the type actuated by the generation of heat caused by the passage of current through said interrupter; a pair of connector means in the form of plugs spaced to fit into the jacks of said battery to complete a circuit thereto; conductor means establishing a series electrical circuit from one of said connector means, through said interrupter, through said source of light, and to another of said connector means; encasing means of thermally and electrically insulating material enclosing said interrupter and said conductor means and a portion of said connector means to form a unitary structure in which said connector means is firmly held to said structure and projects from one side thereof to enter the jacks of the battery to hold said structure to said battery, said light source projecting from another side of said structure, all of the said elements within said structure being sealed by the latter from external fluids, said encasing means thermally insulating said interrupter from the effects of external heat and temperature; and protective means of generally transparent material making a sealing fit with said encasing means and enclosing said

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light source, said protective means forming a continuation of said encasing means and with said encasing means forming a unitary light and flasher combination in which all elements except a power source are sealed and encased within a unitary structure.

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