An auxiliary electric lighting system is described which comprises plug means for insertion into an outlet of a public utility circuit, circuitry connected electrically to the plug means, an independent source of power connectable into said circuitry, a filament light source also in the circuitry which is illuminated by said independent source of power when the auxiliary system is in operation. The device also includes a bistable, transistorized, automatically reversible circuit portion which includes said light source. The auxiliary lighting system is inoperative during normal power supply to the outlet and operative only upon failure of such normal power supply.

2 Claims, 3 Drawing Figures
AUXILIARY LIGHTING SYSTEM

BACKGROUND OF THE INVENTION

Warning devices and systems which involve a battery powered auxiliary lighting system which can be put into operation upon the failure of the primary source of current have been developed and are presently available. However, with the present systems which are available, there are a number of drawbacks in addition to the relatively expensive cost of such apparatus. First of all, with the present systems known to the art, there is required a re-set button which must be activated to turn off the battery power system once the normal current in the building has been restored. Therefore, in practical use, it is necessary to manually adjust the system to once again place it in condition for operation as an auxiliary lighting system. In addition to this, the presently known auxiliary lighting systems for homes, schools and other public buildings including hospitals, require a constant examination of the system to be sure that the auxiliary battery which provides the source of current in the event of a power failure in the main circuit is not itself run down or discharged to the extent that it lacks sufficient power to activate the bulb or other filamentary light source which is included in the system. Still further, the present size of such systems render the device which employs them so large as to take up valuable space in an area where required, such as in an operating room.

OBJECTS OF THE INVENTION

With the foregoing deficiencies of the prior art in view, the primary object of the device of this invention is to provide an auxiliary lighting system and method of its use which is simple in design and construction, inexpensive to manufacture and install and which requires no maintenance or periodic inspection to determine its continued efficiency.

A further object of the invention is to provide a fail-safe lighting system for use indoors and outdoors in the event of failure in the normal source of electric power where the current is interrupted for periods of time extending from a few minutes to several hours. This power failure may be the result of a breakdown in the transformer or other power-producing equipment in one locality or over an entire geographic area. A second condition of use would be in the event of a disaster such as a hurricane or a tornado, flood or fire, which necessarily results in the temporary suspension of the normal supply of household electric current.

A specific object of this invention, therefore, is to provide a battery powered circuit including an illuminating device and a normally closed relay circuit so that upon loss of electrical power the relay fails and a switch closes the circuit which activates a filamentary light source to provide the necessary illumination of the area. The final object of this invention is to describe such a lighting system which does not require a re-setting of the system after a period when the device was employed.

DESCRIPTION OF THE INVENTION

The following figures of drawings and description will show in more detail the lighting system sought to be patented and will explain the circuitry involved which enables the auxiliary lighting system to become activated when the central source of electric household current is halted and inactivated when the central source of electric current is resumed. Furthermore, the drawings will describe the construction of a lighting system such that it cannot be deprived of its charge on the battery and will be thus ready for constant use, is shown in the specification and drawings.

FIG. 1 of the drawing shows a perspective view of the upper portion of the device including the external housing and the plug means which attach the circuitry and other components into the house current. FIG. 2 is also a perspective view of the battery housing and means for connecting the battery into this housing which contains the circuitry of the invention.

FIG. 3 describes diagrammatically the circuit which comprises the invention and which includes conductors, connectors, transistors and capacitors, among other components.

Referring first to FIG. 1 of the drawing, there is shown a generally rectangular housing component 1 which may be made of a hard, non-electrical conductive plastic or metal such as that material which has on its face a concave reflector 2 affixed for any light bulb 3 of suitable size, depending upon the area to be illuminated. This lamp light device has a clear plastic or glass cover 4, as the case may be. The entire component is connected to the household power supply through the plug means 5 which may be inserted into specially adapted wall outlets or, if desired, in standard conventional floor or wall outlets. In the preferred form of the device, a connector pin 6 which is mounted on a metal conductor plate 7a, having therein a receptor hole 7b, is employed to connect a battery housing 8 with the component housing 1 in a male/female relationship with a similar structure positioned in the base of the housing component 1. A battery is located within the battery housing 8 so as to be removable through an opening normally closed by a cover 9 if replacement is needed through end piece 9.

FIG. 3 illustrates the circuitry involved in the system and comprises an independent source of power such as the battery 10, which may be a two-cell battery of the slow leak, long life type, which has conductors 11 and 12 which are connected in any suitable or conventional manner as by plugs or switches (not shown), to main circuit lines 13 and 14, just prior to inserting plug elements 15 and 16 into an outlet 17 which normally supplies power to a house or building. For example, a suitable outlet would be that which supplies 110-115 Volt alternating current in a conventional arrangement. This connection between the connectors 11 and 12 and the circuit lines 13 and 14 is, therefore, accomplished without activating the circuitry or illuminating the filament of the light source 17. The light source 17 may be a three-thousand amp. flash light bulb, or other conventional bulb means of higher amperage.

One side of the bulb filament is in connection with line 13 and the other side is connected to the collector 18 of N-P-N transistor 19. The emitter 20 of this transistor leads to conductor 14. From base 21 of transistor 19, a resistor 22 (which may be one-fourth Watt/51 Ohms) leads to collector 23 of P-N-P transistor 24. The emitter 25 of this transistor is connected into line 13 forming part of a bistable type circuit. Conductor 26 leads from the base of transistor 24 parallel to conductor 14 and has a cross connection 27 with resistor 28 (one-fourth Watt/2.2 K). There is also a cross connection 29 of one-half micro farad/6 Volt capacitor 30 therein and between cross connections 27 and 29 there is a connection 31 having a (one-fourth Watt/2.2 K) resistor element 32 therein leading from line 26 to line 13. Lines 14 and 16 joining cross connection 29 are connected through diodes 35 and 36 from which there is an intermediate conductor 33 extending to plug element 16 and having a one-half Watt/20 K resistor 34 therein. Diode 35 functions as a rectifier for charging capacitor 36 which is to bias transistor 24 into an off condition to provide a trickle current through resistor 32. This trickle current flows through resistor 32 into the battery to provide a small but constant charge for the purpose of replacing battery capacity lost due to internal leakage and thereby extending battery life. Diode 36 provides back voltage protection for diode 35. A switch 37 is optional in the event the unit is so constructed as to be self-contained and it acts as a battery cut-off.

The entire circuit described above can be duplicated by reversing all components to obtain the same desired effect as postulated for the circuit described herein. In the interest of space, such a reversed circuit is not described although it is clear to those skilled in the art that the concept and equivalence of such circuitry is obvious and hence covered by the present language of the appended claims.

With the circuitry and values shown and according to Ohm's law, Z=E/I) where Z is impedance, I is effective voltage and I is current, the transistors are in a state of no conduction so long as an external current supply is available from the
public utility and household supplies obtained from the main. However, upon failure of the current supply the battery cuts in to supply the current which is fed through the connector pins 6 and 7 into the component housing 1 to turn on the lamp or bulb 3. When the current supply is restored, the feed of the electrical energy from the battery is again cut off, the bulb 3 is extinguished and the plug means 5 becomes usable again for the purpose of feeding the trickle charge into the circuitry to maintain the battery.

While the exterior housing shown in FIGS. 1 and 2 is arbitrarily assigned a shape in this illustration, there may be many variations in the design of the component housing 1, the reflector 2, the bulb means 3, the cover 4 and the battery house 8 and cover 9. The size and shape of the unit itself will vary at the area which it is intended to illuminate and the location of the auxiliary unit in that particular illuminating area.

While the preceding drawings and description of those drawings illustrate the construction and means of function of the auxiliary lighting device of the present invention, the scope of the invention may only be measured by reference to the several appended claims since this description and illustration herein is intended only to give a concrete indication of the manner of practice of the invention and is not intended to limit the scope of the concept involved.

What is claimed is:

1. In an auxiliary lighting system including plug means for insertion into an outlet of a public utility circuit, and electric light source, a battery, and circuit means connected to said light source, said battery and said plug means for providing a path for current through said light source from said battery upon failure of a supply of power at said plug means, and for interrupting said current path when power is supplied to said plug means, an improvement wherein said circuit means comprises: rectifier means connected to said plug means, a biasing resistor connected in series with said rectifier means and said battery for supplying a trickle charging current to said battery when power is supplied to said plug means; a first transistor having a control electrode, and having a pair of principal conducting electrodes connected in series with said battery and said light source; a second transistor having a control electrode, and having a pair of principal conducting electrodes connected in series with said battery and said control electrode of said first transistor; and means connecting said control electrode of said second transistor to said biasing resistor for biasing said second transistor into a non-conducting state during the presence of said trickle charging current, and for biasing said second transistor into a conducting state upon cessation of said trickle charging current, wherein current conduction through said second transistor biases said first transistor into a conducting state to provide said current path through said light source.

2. An improved system as set forth in claim 1, in which said first transistor is an NPN type transistor having its collector connected to one side of said light source, and having its emitter connected to said plug means and to the negative terminal of said battery, said second transistor is a PNP type transistor having its collector coupled to the base of said first transistor, and having its emitter connected to the other side of said light source and to the positive terminal of said battery, and in which said rectifier means provides a positive voltage applied to the base of said second transistor, said biasing resistor being connected between said second transistor base and said positive battery terminal.

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