

[54] **COSTUME JEWELRY WITH
LIGHT-EMITTING DIODE**

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- [58] Field of Search 240/6.4 W, 10.65, 10.66,
240/2 S, 6.43

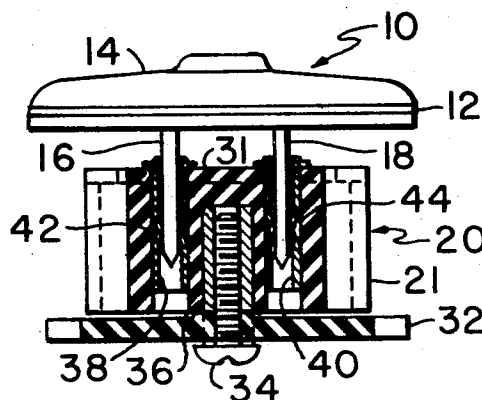
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[57] **ABSTRACT**

An item of costume jewelry comprises a transparent encapsulation in which is housed a light-emitting diode along with associated electronic circuitry. The power supply is housed in a battery pack which serves as the clasp for the item of jewelry.

8 Claims, 6 Drawing Figures



COSTUME JEWELRY WITH LIGHT-EMITTING DIODE

BACKGROUND OF THE INVENTION

The present invention relates to the field of costume jewelry of the type which includes a flashing light source. The prior art contains a number of patents which have utilized certain aspects of this invention. These patents include U.S. Pat. Nos. to Young 3,521,049, Wood 3,384,740, Montgomery 3,383,503, Smith, et al., 3,458,205, Aiello, Jr. 3,450,872, Henrich 3,392,275, Madden 3,501,628, Power 3,689,758, Cleveland 2,739,419, and Sweany, et al., 3,508,041. This invention constitutes an advance over all of the known prior art in several respects. First, it utilizes the power supply pack as the clasp for the jewelry article. Second, it utilizes the electronic circuitry as part of the decorative feature of the article of jewelry. Third, it utilizes the low current drain characteristics of the light-emitting diode. Fourth, it provides a novel battery pack which simultaneously serves as the holding device for the batteries, the switch, and the clasp.

THE DRAWINGS

FIG. 1 is a section view taken through the line 1—1 in FIG. 3;

FIG. 2 is a view looking from the bottom of the article of costume jewelry;

FIG. 3 is a top view;

FIG. 4 is a perspective view looking from the bottom;

FIG. 5 is a perspective view looking from the top; and

FIG. 6 is a schematic representation of the electronic circuitry, battery pack, and switch.

DESCRIPTION OF THE EMBODIMENT

Referring to FIG. 1, the article of jewelry is a decorative tie tack generally shown at 10 and consisting of a printed circuit board 12 on which is mounted the electrical circuit 13 illustrated schematically in FIG. 6 but not shown in FIG. 1. The entire tie tack 10 is encapsulated in a transparent case 14 so that at least a portion of the electronic elements shown in FIG. 6 are visible and form a part of the decorative aspects of the tie tack.

Conducting metallic pins 16 and 18 provide the electrical connections to the electric circuit. The pins 16 and 18 are connectable to a battery pack generally indicated at 20.

As seen in FIGS. 2 to 5, the battery pack 20 comprises a one-piece molded housing 21 having two cylindrical cavities 22 and 24. As best seen in FIGS. 3 and 5, the tops of the cavities are partially closed by a top wall 26, while as best seen in FIGS. 2 and 4, the bottoms of the cavities are open for the insertion of two cylindrical batteries 28 and 30. The batteries are maintained within their cavities by means of a rotatable switch knob 32. The switch knob 32 is secured to a central portion 31 of the molded battery pack housing 21 by means of a screw 34 anchored into a ferrule 36 molded into the housing. Also molded into the housing of battery pack 20 are two metallic sockets 38 and 40 positioned to mate with the metallic pins 16 and 18. The pins and sockets are indented at 42 and 44 to provide a spring grip for maintaining the tie tack 10 and the pack 20 in firm electrical and mechanical connected relationship.

Connection of the encapsulated electrical circuit is made to the battery pack through the electrical connections between the pins 16 and 18 and the sockets 38 and 40, respectively. The connection to the battery 30 includes a spring metal electric conducting strip 45 bent around one edge 48 of the top wall 26 with the free end 52 extending into the cavity for spring contact with the battery 30. The connection to battery 28 also includes a spring metal electric conducting strip 46 bent around the other edge 50 of top wall 26 with the free end 54 extending into the cavity 22 for spring contact with battery 28. The strips 45 and 46 are anchored to the wall 26 by the pinned end of the sockets 38 and 40, respectively.

An on-off connection to the batteries is provided by a metal conducting strip 56 secured on the rotatable switch knob 32 and folded over to provide spring tabs 57 and 59. When oriented as shown in FIG. 4, the tabs 57 and 59 make contact with the respective poles of the batteries 28 and 30. When rotated 90°, contact is broken.

The electrical circuitry shown in FIG. 6 comprises an oscillator circuit which functions to flash a light-emitting diode 60 on and off at the oscillator rate. The oscillator circuit comprises a first transistor 62 having a base 64, an emitter 66, and a collector 68, and a second transistor 70 having a base 72, an emitter 74, and a collector 78. The emitters 66 and 74 are interconnected at pin 16. The collector 68 is connected to the pin 18 through the light-emitting diode 60 while the collector 78 is connected to the pin 18 through a resistor 80. Base bias is provided by resistors 82 and 84 connected between the pin 18 and the bases 72 and 64, respectively. Feedback between the transistors is provided by capacitor 83 connected between collector 68 and base 72, and a capacitor 85 connected between collector 78 and base 64. Capacitors 83 and 85 determine the pulse repetition rate of the oscillator.

One terminal of the battery 28 is connected to the socket 38 through the strip 44 while one terminal of the battery 30 is connected to the socket 40 through the strip 46. The other terminals of the batteries 28 and 30 are interconnected to complete the circuit through the strip 56 on the switch knob 32.

To wear the jewelry item, the pins 16 and 18 of the tie tack 10 are inserted through the fabric of the wearer's clothing and are secured to the clothing by mating the pins 16 and 18 with the sockets 38 and 40 in the battery case 20. Because of the complementary indentations in the sockets and pins, the tie tack is spring fixed into position on the battery case and a firm electric connection is simultaneously made.

The light-emitting diode 60 provides an efficient and concentrated light source such as to produce an attractive and decorative effect when pulsed on and off at a relatively slow repetition rate, preferably around 5 to 10 cycles per second. The electronics circuit is physically small and inexpensive and the duty cycle is readily selectable by variation of the electrical value of one or more of the components. The circuit is in essence a multivibrator which uses a light-emitting diode as the collector load for one of the two transistors. It was found that a repetition rate of approximately 6 cycles per second with the light-emitting diode 60 illuminated approximately 20% of the time provided a pleasing effect while at the same time consumed a minimum amount of power, permitting operation for several

hours by two miniature mercury battery cells in series.

While the invention has been disclosed in conjunction with a tie tack, it will be obvious that it is applicable also to other types of jewelry, such as cuff links, brooches, and hair ornaments. It may also find application in advertising displays of many types. In addition, it will be apparent that the invention is subject to various modifications. For example, while the specification discloses a transparent case 14 so that the printed circuit forms a decorative feature of the jewelry, it is also within the scope of this invention that the case 14 be made of a translucent material so that only the light-emitting diode is visible when illuminated. Furthermore, while the specification shows the case as encapsulating the printed circuit board, it is also within the scope of this invention to provide a watch-type case which simply encloses the printed circuit board with removable closure means including the transparent or translucent "crystal" and the back closure plate. Another modification well within the scope of this invention is to reverse the locations of the sockets and pins; i.e., the pins may conveniently be placed on the battery housing while the sockets are included in the jewelry article. It is intended, therefore, that this invention be limited only by the scope of the appended claims.

I claim:

1. In combination, an article of jewelry adapted to be attached to the clothing of a wearer, said article comprising an insulated printed circuit board having a plurality of electrical components mounted thereon, said components when energized forming an oscillator circuit, said oscillator circuit including a light-emitting diode;

light transmitting means enclosing said printed circuit board and said electric circuit, at least said illuminable device being visible therethrough when said device is illuminated;

a housing for a two-terminal battery, and mating connectors on said housing and said article for mechanically interconnecting said article and

said housing, said article and said housing in combination with said mating connectors providing a clasp for securing said article of jewelry to said clothing, said mating connectors also electrically connecting said battery to said circuit for energizing said circuit.

2. The invention as defined in claim 1 wherein said mating connectors comprise first and second pins electrically connected to said oscillator circuit, said pins projecting from said article, and first and second mating sockets on said housing.

3. The invention as defined in claim 2 wherein said housing for said battery is provided with a cavity open at one end for containing said battery; a closure for said opening, said closure carrying a movable switch for connecting and disconnecting the terminals of said battery and said sockets.

4. The invention as defined in claim 3 wherein said cavity is cylindrical.

5. The invention as defined in claim 2 wherein said housing is of one-piece molded plastic having first and second adjacent parallel cylindrical cavities therein for containing first and second cylindrically shaped batteries, the bottom ends of said cavities being open; means for closing said open ends of said cavities, said means including a disc shaped member rotatably mounted on an axis intermediate said cavities, said member carrying a metallic conductor strip adapted to contact the terminals of said batteries when in one position and to disconnect said terminals when rotated to a second position.

6. The invention as defined in claim 5 wherein the ends of said strip provide spring tabs for providing a positive contact with said battery terminals.

7. The invention as defined in claim 6 wherein said oscillator is free running.

8. The invention as defined in claim 7 wherein said illuminating device is a light-emitting diode.

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