

[54] **LAMP ASSEMBLY FOR EDGE LIGHTED PANEL**

[75] Inventor: **James N. Dupree**, South El Monte, Calif.

[73] Assignee: **Dupree, Inc.**, El Monte, Calif.

[22] Filed: **Jan. 10, 1972**

[21] Appl. No.: **216,852**

Related U.S. Application Data

[62] Division of Ser. No. 55,905, July 17, 1970.

[52] U.S. Cl. 339/17 D, 240/8.16, 339/145 R

[51] Int. Cl. H01r 33/46, H05k 1/18

[58] Field of Search 339/17, 18, 88, 89, 339/119, 125, 126, 127, 130, 131, 132, 144, 145, 147, 176, 180, 188; 240/8.16

[56] **References Cited**

UNITED STATES PATENTS

3,005,907 10/1961 Dupree 240/8.16
3,176,255 3/1965 Jensen 339/130 R X

2,847,654 8/1958 Peak et al. 339/130 R
2,884,609 4/1959 Fraser et al. 339/17 D
3,100,085 8/1963 Dover 339/127 R X

FOREIGN PATENTS OR APPLICATIONS

1,123,304 8/1968 Great Britain 339/17 D

Primary Examiner—Marvin A. Champion

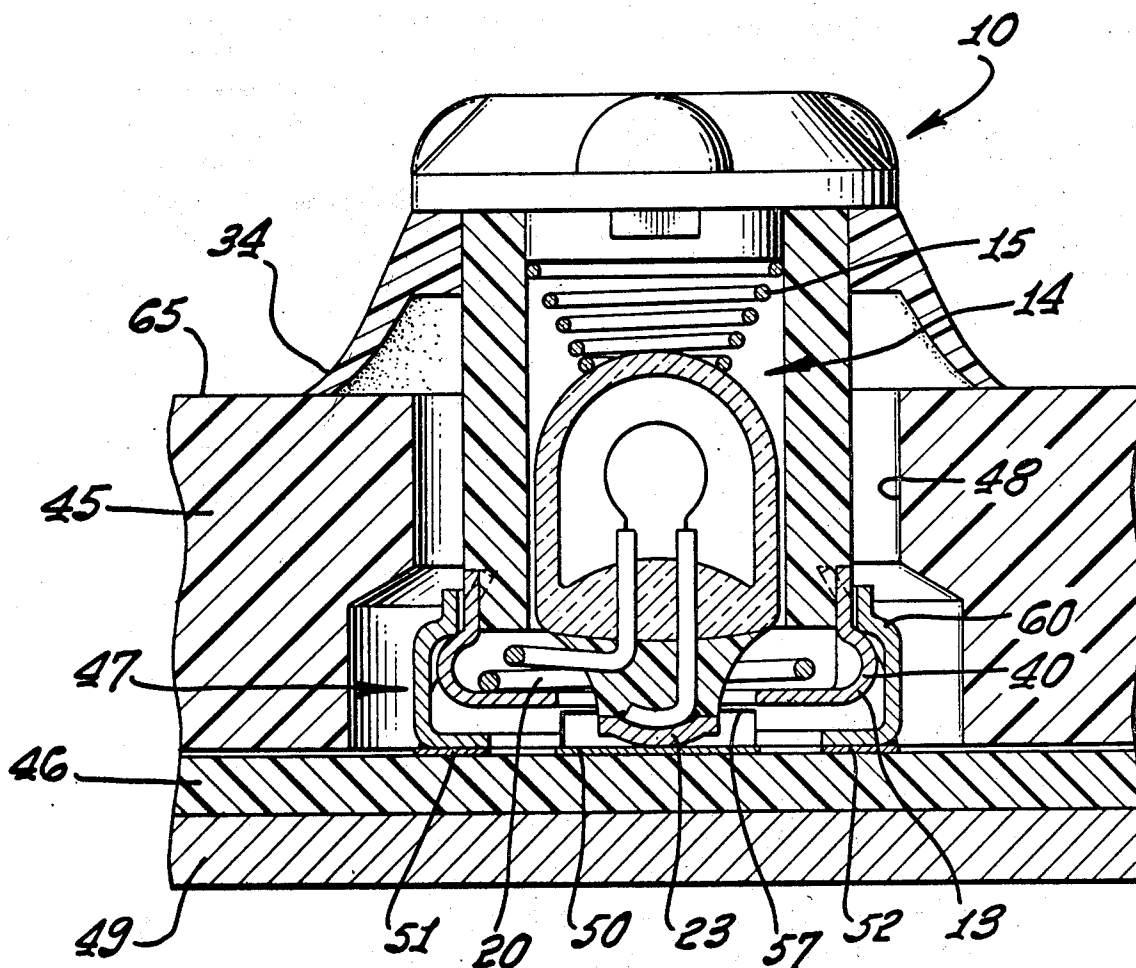
Assistant Examiner—Terrell P. Lewis

Attorney—Harris, Kern, Wallen & Tinsley

[57] **ABSTRACT**

A lamp with a bulb slidable within a housing. A spring member within the housing urging the bulb outward for engagement with a fixed contact when the lamp is placed in a socket, such as a metal ring mounted on a printed circuit board. A retainer on the housing for keeping the bulb in the housing and also providing a bayonet type base for mounting the lamp in a socket. A lamp with a spring loaded movable bulb for insertion and removal from the front surface of an edge lighted instrument panel.

3 Claims, 8 Drawing Figures



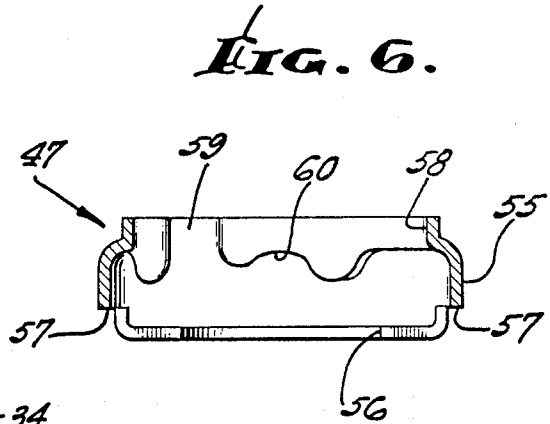
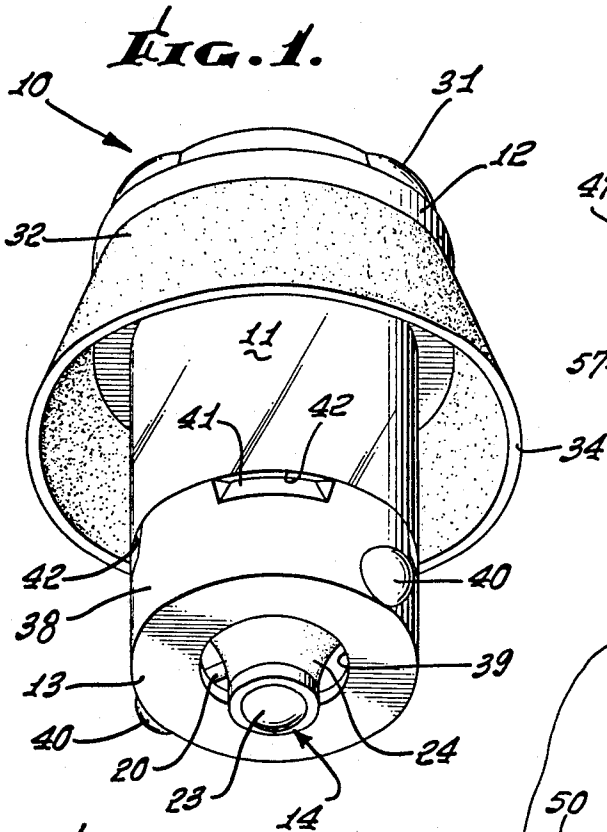


FIG. 5.

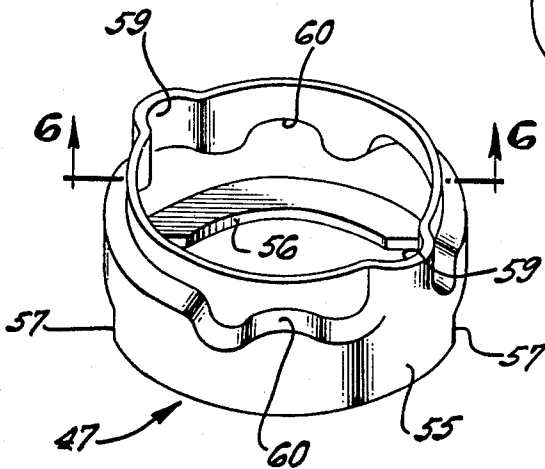


FIG. 7.

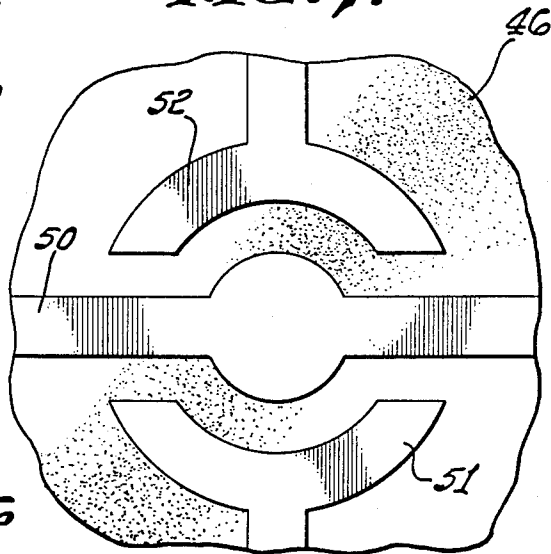
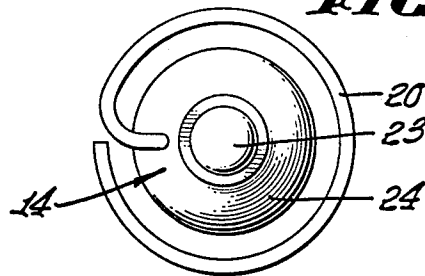
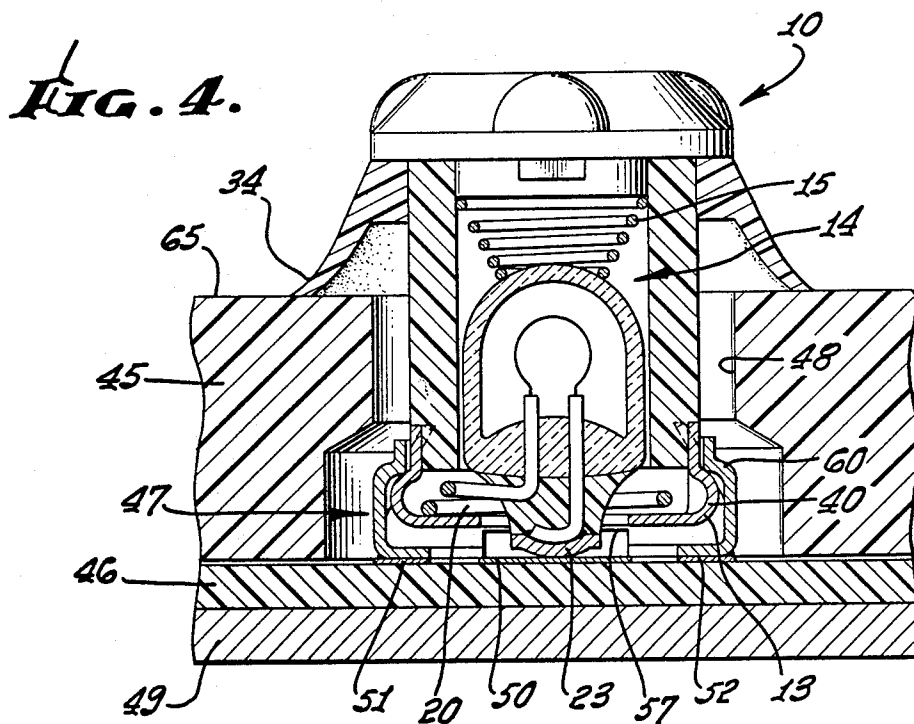
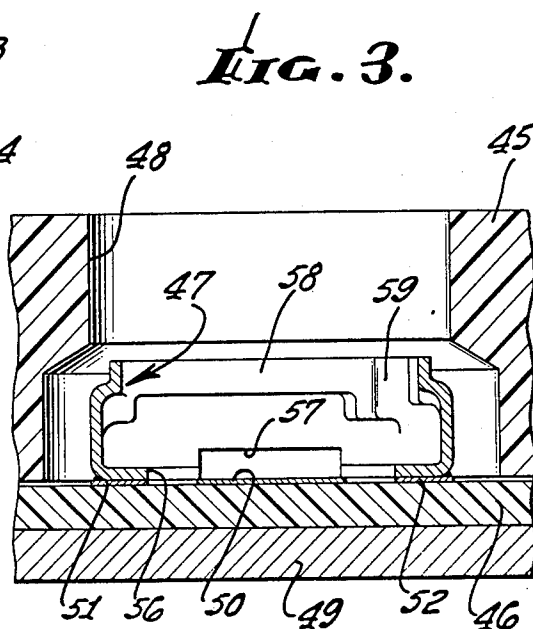
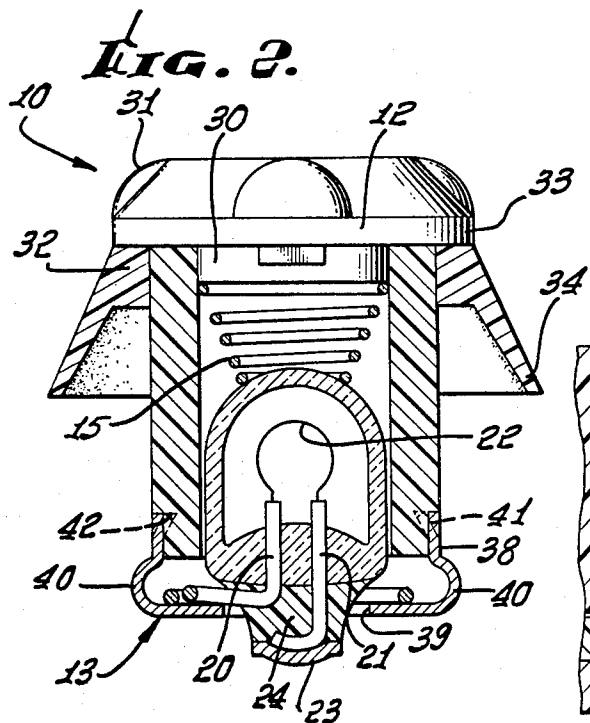


FIG. 8.





LAMP ASSEMBLY FOR EDGE LIGHTED PANEL

This is a division of application Ser. No. 055,905, filed July 17, 1970.

This invention relates to lamps having an electric light bulb and intended to be removably mounted in a socket. A lamp and socket combination desirably should have a resilient or moving member for maintaining pressure at the electrical contacts between the two components. Customarily, the lamp structure is a fixed or rigid component and the resilient or moving member is incorporated into the socket. In general, most maintenance problems arise in conjunction with moving parts rather than with fixed parts, and, except for bulb burn-out, most maintenance work on lamp and socket combinations requires work on the socket rather than the lamp. This problem has now been solved to some degree by providing a socket with no moving parts and a lamp with the moving parts incorporated therein, as shown in my U.S. Pat. No. 3,506,943, entitled Lamp Socket Assembly, and in my copending application for United States patent, Ser. No. 650,518, filed June 30, 1967, now allowed, entitled Lamp With Spring Biased Contact.

The present invention is directed to a further improvement in lamps and is particularly suitable for use with edge lighted panels. Edge lighted panels are widely used in instrument panels and the like, such as in aircraft cockpits. A typical edge lighted panel will include a sheet of clear or translucent plastic with an opaque coating on the front surface. A printed circuit board may be positioned at the back surface of the plastic sheet to provide appropriate electrical circuitry. Various switches, lamps and other devices may be mounted on a support plate with the printed circuit board and the plastic sheet placed thereover, and with the switches, etc., projecting through the front surface of the sheet. Legends will be provided on the panel by cutting through the opaque coating. Visibility of the legends is enhanced by incorporating one or more light sources at edges of the plastic sheet and/or in openings in the plastic sheet at various locations throughout the sheet. In a typical installation, a socket is mounted on the circuit board and is positioned within an opening in the plastic sheet. A lamp is installed in the socket in the opening in the plastic sheet and provides the edge illumination for the sheet. The present invention is directed to a new and improved lamp and socket.

The objects, advantages, features and results of the invention will more fully appear in the course of the following description. The drawings merely show and the description merely describes a preferred embodiment which is given by way of illustration or example.

In the drawings:

FIG. 1 is an isometric view of a lamp incorporating a preferred embodiment of the present invention;

FIG. 2 is a longitudinal sectional view of the lamp of FIG. 1;

FIG. 3 is a longitudinal sectional view of a portion of an edge lighted panel showing a preferred embodiment of the socket for the lamp of FIG. 1;

FIG. 4 is a view showing the lamp of FIG. 2 mounted in the socket of FIG. 3;

FIG. 5 is an isometric view of the socket of FIG. 3;

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 5;

FIG. 7 is a plan view of the circuit board of the edge lighted panel of FIG. 3; and

FIG. 8 is an end view of the bulb of the lamp of FIGS. 1 and 2 showing the electrical lead configuration.

FIGS. 1 and 2 illustrate a lamp 10 having a housing including a sleeve 11, a cap 12 and a retainer 13. A bulb 14 is positioned within the housing sleeve 11, with a resilient member such as a spring 15 between the housing cap 12 and bulb 14 urging the bulb outward from the housing.

The bulb has electrical conducting leads 20, 21 joined to a filament 22. A contact disc 23 may be soldered or welded to the outer end of the lead 21 providing a center terminal for the lamp, with the space between the glass of the bulb and the contact 23 filled with a nonconductor such as an epoxy cement 24.

The other lead 20 of the bulb may be used to provide a resilient contact with the retainer 13, with the retainer preferably serving as one electrical terminal for the lamp, the disc 23 being the other electrical terminal. The lead 20 may be connected to the retainer 13 by welding or soldering. In the embodiment illustrated, the lead 20 is formed into a generally circular configuration (FIG. 8), generally in a plane perpendicular to the vertical axis of the lamp as viewed in FIG. 2, and is connected to the retainer 13 adjacent the outer end of the lead.

The sleeve 11 of the lamp housing preferably is formed of an electrical insulating material and typically may be a clear or colored or translucent plastic. The housing cap 12 also preferably is formed of an electrical insulating material and typically may be an opaque plastic. With this arrangement, light from the bulb is directed radially but not axially from the lamp. The cap 12 may have a shoulder 30 positioned within the sleeve 11, with the cap and sleeve cemented together. A plurality of projections 31 may be provided on the cap to enhance the grip for rotating the lamp during insertion and removal.

A gasket 32 may be positioned about the sleeve 11 and abutting a projecting portion 33 of the cap. The gasket may be made of a flexible material such as neoprene and preferably includes an outwardly flaring flange 34 directed toward the terminal end of the lamp for pressure engagement with the edge lighted panel to provide a light seal around the lamp, as is best seen in FIG. 4.

In the preferred embodiment illustrated, the retainer 13 is a metal cup 38 with a central opening 39 and opposed radially projecting bosses 40. The retainer is affixed to the sleeve after the cap, spring and bulb have been installed, by bending one or more flanges 41 of the cup 38 inwardly into corresponding notches 42 provided in the sleeve 11.

Referring now to FIG. 3, the edge lighted panel depicted therein includes a plastic sheet 45 with a printed circuit board 46 carried at the back side of the plastic sheet 45. A lamp socket 47 is mounted on the board 46 and projects into an opening 48 in the plastic sheet 45. The opening 48 may be cylindrical, or may be stepped as shown in FIG. 3, or may have other configurations as desired. The panel may be disposed against a support plate 49 carrying various switches, etc., (not shown). The circuit board 46 includes electrical conductors 50, 51, 52 which may have the configurations shown in FIG. 7.

The socket 47 may take the form of a metal cup 55 having a central opening 56 and opposed notches 57. The open upper end 58 of the cup is designed to receive the lamp and includes opposed enlarged sections 59 for the projecting bosses 40 of the lamp. Opposed recesses 60 are provided in the wall of the cup 55 for receiving the bosses 40 after the lamp has been inserted and rotated.

The socket 47 is mounted on the board 46, as by soldering the socket to the conductors 51, 52 (FIG. 3). The socket provides a circuit path between the conductors 51, 52, and the notches 57 in the socket provide clearance so that the socket does not make contact with the conductor 50. The installation of the lamp in the socket of the edge lighted panel is illustrated in FIG. 4. Before the lamp is inserted, the spring 15 urges the bulb 14 outward to the position of FIG. 2, with engagement of the bulb lead 20 with the retainer 13 blocking further movement of the bulb. The lamp is inserted by sliding the housing into the opening of the plastic panel and sliding the retainer 13 into the socket 47, with the bosses 40 passing through the passages provided by the sections 59. After the lamp is in the socket, the lamp is rotated to bring the bosses 40 into alignment with the recesses 60. The components of the lamp and socket are dimensioned so that the contact 23 at the end of the bulb engages the conductor 50 of the board, causing the bulb to slide within the lamp housing and compress the spring 15. When the lamp is released in the installed position of FIG. 4, the spring urges the lamp housing upward providing a pressure contact between the retainer 13 and the socket 47, and urges the bulb downward providing a pressure contact between the bulb contact 23 and the conductor 50.

The output or illumination intensity of the bulbs is in a generally figure eight pattern. In the preferred embodiment, the filament 22 and the bosses 40 of each lamp are disposed in the same plane so that the illumination intensity in the panel can be controlled by suitably orienting the sockets on the circuit board.

The flange 34 of the gasket 32 covers the sleeve 11 of the lamp housing and the opening 48 of the plastic sheet so that light from the lamp does not escape to the front face of the panel (upward as viewed in FIG. 4). This arrangement provides the desired edge lighting for the plastic sheet, with the only light visible being through the legends in the opaque coating 65 on the front surfaces of the plastic sheet 45.

The lamp is removed from the socket by pressing inward to additionally compress the spring 15, and then rotating the lamp to bring the bosses 40 into alignment with the sections 59. The spring 15 will then push the lamp outward or it may be pulled out manually. In normal use, the entire lamp is discarded when the bulb

burns out, and a new lamp is installed.

Most edge lighted panels have many holes for the lights and other components positioned therein, leaving very little surface on the circuit board for the conductors. The resulting circuit paths on the board are usually quite complicated. The socket 47 by interconnecting the two conductors 51, 52 provides a crossover of the conductor 50, permitting simpler circuit paths and redundancy in the circuitry.

Although an exemplary embodiment of the invention has been disclosed and discussed, it will be understood that other applications of the invention are possible and that the embodiment disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

I claim:

1. In combination:

an insulating board having at least two electrical conductors on one face thereof; and

a lamp socket consisting of an annular metal member mounted on said board at said one face and fixed rigidly in electrical and mechanical engagement with one of said board conductors, with the other of said board conductors positioned centrally of said socket, with all of said socket on one side of said board.

2. A combination as defined in claim 1 in which said insulating board has first, second and third conductors on one face thereof, with said first conductor disposed between said second and third conductors, and

with said socket having spaced depending portions fixed rigidly in electrical and mechanical engagement with said second and third conductors, respectively, providing an electrical circuit therebetween, and

with said first conductor positioned between said depending portions.

3. A combination as defined in claim 1 including:

a housing;

a bulb slidably carried within said housing;

a resilient member positioned within said housing in engagement with said housing and bulb, urging said bulb out of said housing;

said housing including a retainer for engaging said bulb blocking movement of said bulb out of said housing, with said bulb sliding within said housing toward and away from said retainer;

said housing, bulb and resilient member forming a lamp, with said lamp positioned in said socket with said housing engaged with said socket and with said bulb engaging the other of said board conductors.

* * * * *