United States Patent [19]

Roberts

[11] **3,757,102**

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[54] **LAMP CAPSULE**

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[73] Assignee: **Daniel Woodhead Inc.**, Northbrook, Ill.

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[52] **U.S. Cl.** ..... **240/2 R**, 339/176 L, 339/213 R, 340/381

[51] **Int. Cl.** **F21v 33/00**

[58] **Field of Search** ..... 240/2 R, 2 SP, 8.16, 240/153; 339/145, 176 L, 200, 201, 213; 340/381

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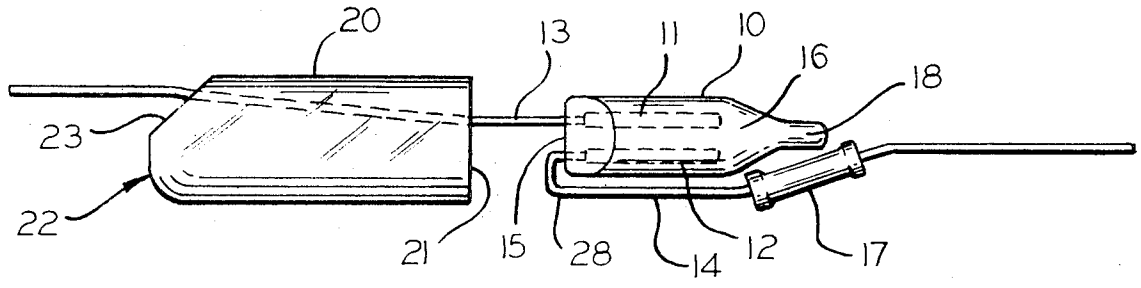
Primary Examiner—Fred L. Braun

Attorney—Johnston, Matthew C. Thompson et al.

[57] **ABSTRACT**

A lamp capsule and uses thereof in electrical receptacles, connectors and plugs for indicating circuit-energization and location in dark areas. The capsule consists of a light-transmitting, tubular, dielectric, synthetic polymer capsule having an open end and a closed end encapsulating a small neon lamp having a pair of bare wires projecting from its base. One wire extends through an opening in the closed end of the capsule and the other wire is curvately bent at its end adjacent the base of the lamp and extends along the lamp and out the open end of the capsule.

7 Claims, 6 Drawing Figures



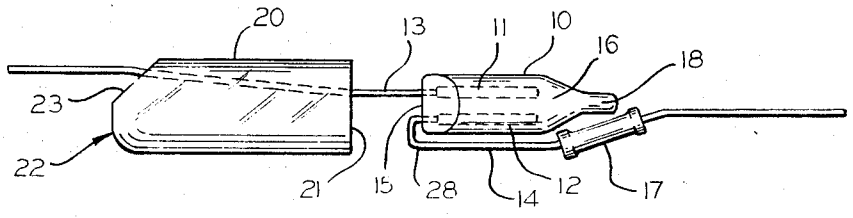


FIG. 1

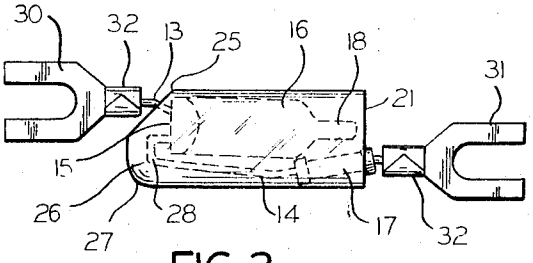


FIG. 2

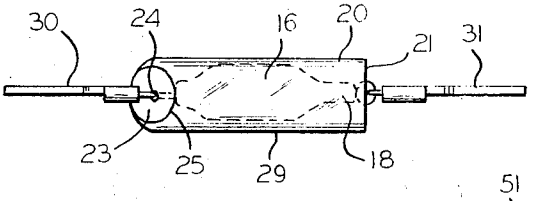


FIG. 3

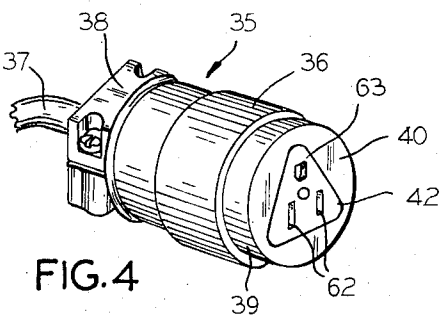


FIG. 4

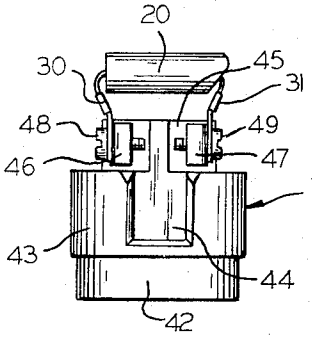


FIG. 5

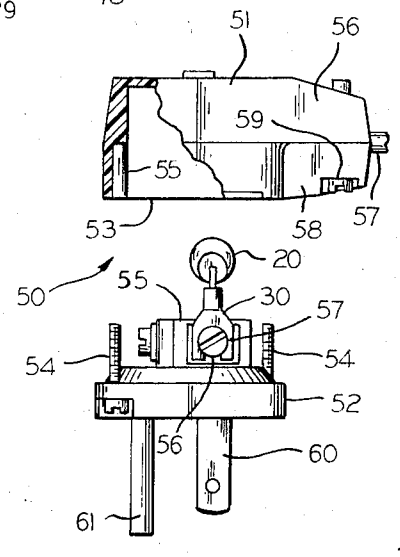


FIG. 6

LAMP CAPSULE

This invention concerns improvements in encapsulation of small lamps, such as low wattage neon lamps. The lamp and its capsule are advantageously used in electrical receptacles, connectors and/or plugs by connecting the lamp wires across terminal posts of such receptacles, connectors and/or plugs. This combination provides a continuous emission of light from the lamp whenever the connector, receptacle and/or plug is energized. By making a portion of the connector, receptacle and/or plug from a light-transmitting material, e.g., a transparent or translucent synthetic polymer, the light from the small lamp is visible from within the housing forming the connector, receptacle or plug.

This light emission has several practical uses, one of which is the function of an indicator that the circuit of a connector or a receptacle is actually energized. Personnel using such connectors or receptacles therefore will not be misled in believing them to be energized at the time they are connected with an electrical plug. In case of lighted plugs, personnel can ascertain at the time of insertion of such plugs by the presence or absence of the emitted light whether or not the plug is connected to an energized receptacle or connector. Another practical feature of the lighted connectors, receptacles and/or plugs is their visability in dark areas. This is a safety feature which allows ready location of extension cords having lighted connectors, or plugs which are inserted in unlighted or lighted connectors or receptacles.

THE INVENTION

The invention herein pertains to improvements in lamp capsules which encapsulate small lamps used for the purposes aforesaid. The lamp capsules preferably are made of light transmitting, dielectric, synthetic polymer in a tubular form of circular or oval cross section. The capsules have an open end and a closed end portion. An opening is provided in the closed end portion, preferably in the end wall. A small lamp such as a small neon lamp having bare wires projecting from the base of the lamp is inserted in the open end of the capsule.

One of the bare wires extends through the opening in the closed end portion. The other bare wire is bent curvately at its base and runs along the side of the lamp and out of the open end of the capsule. This wire contains a small ballast resistor used in the lamp circuit.

The capsule has as its closed end an end wall having a diagonal corner wall portion. The base of the lamp lies contiguous to the intersection of the diagonal corner portion and the side wall of the capsule. The opposite corner of the end wall is spaced from the base of the lamp, whereby the curvately bent wire is accommondated in a space provided at the opposite corner prior to its running along the side of the lamp. The ballast resistor preferably is substantially completely positioned within the capsule at its open end.

After the lamp is inserted in the capsule, connectors such as metal U-blades are attached to the projecting portions of the wires contiguous to the respective ends of the capsule. The bare wires are thus substantially completely located within the confines of the capsule and are positioned therein in a manner avoiding possible accidental touching of the bare wires within the capsule.

This assembly of the lamp capsule may be mounted across terminal posts of electrical connectors, receptacles, or plugs. When the latter are energized, a light will be emitted from the small lamp and transmitted through transparent or translucent portions of these electircal devices for the purposes aforesaid.

THE DRAWINGS

Preferred embodiments of the invention are illustrated in the drawings, wherein:

FIG. 1 is a side elevation of the capsule and lamp in a state of initial assembly;

FIG. 2 is a side elevation of the lamp and capsule in the assembled state with U-blade connectors attached to the lamp wires;

FIG. 3 is a top plan view of the assembly of FIG. 2;

FIG. 4 is a perspective view of an electrical connector having a light-transparent, terminal post-bearing member forming the plug-receiving face of the connector;

FIG. 5 is a side elevation of the transparent, terminal post-bearing member of FIG. 4 with the light capsule connected across its terminal posts; and

FIG. 6 is an exploded view in side elevation of a right-angle electrical plug with the lamp capsule mounted across its terminal posts.

THE ILLUSTRATED EMBODIMENTS

Referring to the drawings, a small lamp **10** having a low wattage rating, e.g., a neon lamp having a long continuous life, comprises a pair of electrodes **11** and **12** connected by bare wires **13** and **14** extending through the base **15** of the lamp envelope **16.** The wire **14** contains a ballast resistor **17** connected in the wire **14** so that it lies adjacent the small tip **18** at the tapered end of the lamp **10** when the wire **14** is configured as shown in FIGS. **1** and **2.**

The lamp **10** is encapsulated in a dielectric, light-transmitting, synthetic polymer capsule **20,** preferably having a circular or oval cross section. The capsule **20** is a tubular capsule having an open end **21** and a closed end **22.** The latter is provided with a diagonal corner wall portion **23** provided with a small opening **24** through which the wire **13** projects. In the assembled combination, the base **15** of the lamp **10** is drawn by the wire **13** into a position contiguous to the juncture **25** between the diagonal corner wall portion **23** and the circular or oval side wall **29** of the capsule.

This positioning of the lamp **10** in the capsule **20** keeps the base **15** spaced from the opposite corner portion **27** of the closed end **22** of the capsule — providing therein a space **26** to accommodate the curvately bent (180°) portion **28** of the bare wire **14.** A U-blade, terminal post connector **30** and **31** is clamped or soldered onto the projecting end of the respective wires **13** and **14** after the lamp has been inserted in the capsule **20.** The connectors preferably have their bases **32** contiguous to the respective ends **21** and **22** of the capsule **20** — leaving a minimum amount of the bare wires **13** and **14** outside the capsule **20.**

FIGS. **4–6** illustrate uses of the encapsulated lamp of FIGS. **1–3** in electrical connectors, receptacles and plugs. The extension cord connector **35** of FIGS. **4** and **5** has an opaque, dielectric, cylindrical housing **36,** e.g., one made of a synthetic elastomeric polymer. The extension cord or cable **37** enters one end of the housing **36** having a cord or cable clamp **38** attached thereto.

The cylindrical end 39 of the housing has a disc end wall 40 with a rounded cornered, triangular opening in which the corresponding shaped section 42 of a transparent molded plastic polymer body 41 is seated. The body 41 includes a rearward segment 43 of cylindrical shape with three rectilinear relief recesses 44 spaced equi-distant around its periphery.

The body 41 is a back-wired connector having a Y-divider wall 45 of the type shown in U.S. Pat. No. 3,617,981, issued to David E. Kramer on Nov. 2, 1971. The respective ends of the three wall segments of wall 45 are coplanar with and above the relief recesses 44.

The three spaces between the three wall segments have therein three terminal posts, one for a ground pin-ground wire connection (not shown). The other two terminal posts 46 and 47 for the live wire connections have the U-blade connectors 30 and 31 mounted thereon by the screws 48 and 49, which also are used to connect the live wire connections for the wires of the cord or cable 31. As can be seen in FIG. 5, the lamp capsule 20 lies across the rearward edges of the Y-divider wall 45.

The electrical plug 50 of FIG. 6 is a right angle plug, i.e., one with its contact blades at right angles to the entrant direction of its electrical cable or cord. Its cap or housing 51 is made as a hollow molding of light-transmitting (transparent or translucent) synthetic polymer. Its male, contact blade-and-ground pin mounting base 52 is also a molding of synthetic polymer which is mounted across the open side 53 of the housing 51 by two or more screws 54 threaded into cylindrical screw-receiving columns 55 at the four inner corners of the housing 51.

The housing 51 has a hollow, upper, lateral extension 56 through which extends the electrical cord or cable 57. A hollow cord or cable-clamping segment 58 is attached to the extension 56 by screws 59 to form therewith a lateral extension from the housing 51.

The blades 60 and ground pin 61 of plug 50 and the blade-receiving openings 62 and ground-pin-receiving opening 63 of connector 35 may have any industry-standardized, industry-accepted, or special cross-section, length, spacing and relative geometric positioning. The illustrated embodiments show a commonly used configuration for non-locking plugs and connectors approved by the National Electrical Manufacturers Association for grounded 125 volt circuits of low ampere rating.

It is thought that the invention and its numerous attendant advantages will be fully understood from the foregoing description, and it is obvious that numerous changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the forms herein disclosed being preferred embodiments for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. A lamp capsule comprising a synthetic polymer light-transmitting, dielectric capsule having an open end and a closed end portion, an opening in the closed end portion of the capsule, said capsule having therein a small lamp having bare wires projecting from the base thereof, one of said wires extending through said opening, and the other of said wires running along the lamp and out the open end of the capsule.

2. A lamp capsule as claimed in claim 1, a small resistor connected in the other of said wires, and said resistor being substantially completely positioned within the capsule at the open end thereof.

3. A lamp capsule as claimed in claim 1, said closed end being an end wall having a diagonal corner wall portion with said opening therein, said base of said lamp being spaced from the opposite corner of said end wall, and said other of said wires extending curvately from said base through the space in said opposite corner and then along said lamp.

4. A lamp capsule as claimed in claim 1 mounted inside an electrical connector having a translucent or transparent body portion, terminal posts for connection of current wires within said body portion, and the wires of the lamp being connected to said terminal posts whereby light from the lamp is visible through said translucent or transparent body portions.

5. A lamp capsule as claimed in claim 4, said connector having a dielectric, opaque housing and a light-transmitting face with the plug-receiving openings therein.

6. A lamp capsule as claimed in claim 1 mounted in a light-transmitting housing, terminal posts for connection of current wires within said housing, and the wires of the lamp being connected to said terminal posts whereby light from the lamp is visible through said housing.

7. A lamp capsule as claimed in claim 6 wherein said housing is the housing of an electrical plug having its contact blades electrically connected with said terminal posts.

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