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[11] 3,721,815

Wall

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[45] March 20, 1973

- [54] **ACYLINDRICAL ORNAMENTAL ILLUMINATION DEVICE AND ADAPTER**

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- [22] Filed: **Dec. 1, 1971**
- [21] Appl. No.: **203,774**

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Attorney—Robert Berliner et al.

Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 27,064, April 9, 1970, Pat. No. 3,624,385.
- [52] U.S. Cl.....**240/10 R, 240/1 EL, 240/10 T, 240/81 R**
- [51] Int. Cl.....**F21v 17/04**
- [58] Field of Search.....**240/1 EL, 10 R, 10 P, 10 S, 240/10 T, 81 R, 81 C; 350/96 R, 96 B**

[57] ABSTRACT

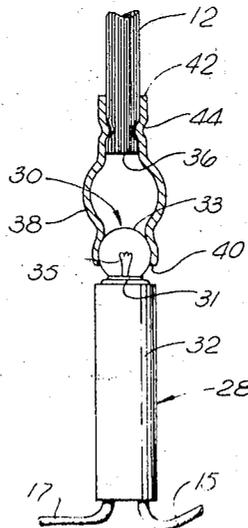
An adapter is provided whereby a spray of optical fibers can be readily connected or disposed in proximity to a light source by means of an acylindrical casing therefor. A plurality of optical fiber sprays are connected for illumination by the light bulbs on a string of light bulbs which may then be used for decorating a Christmas tree or the like.

References Cited

9 Claims, 4 Drawing Figures

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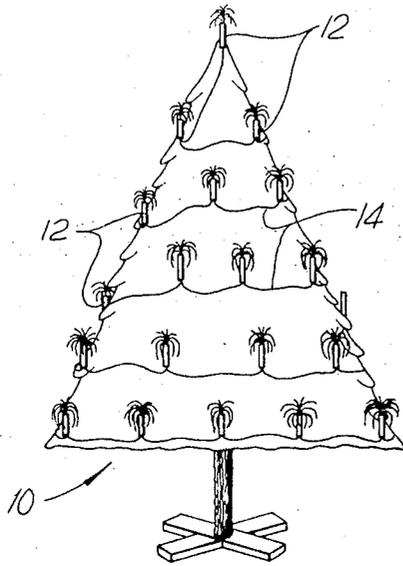


Fig. 1.

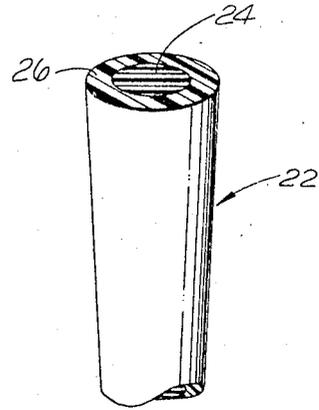


Fig. 2.

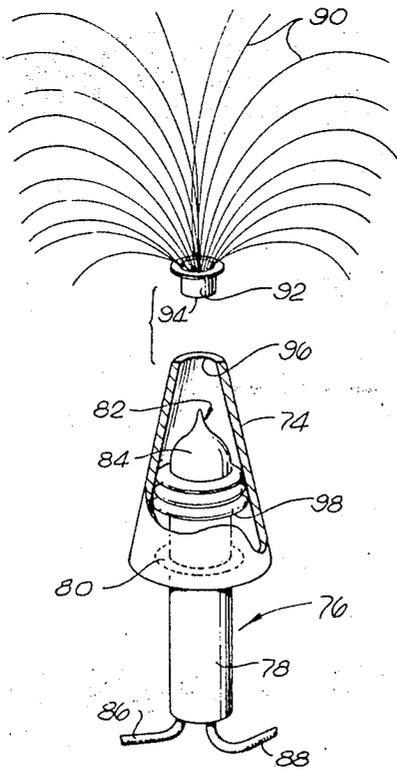
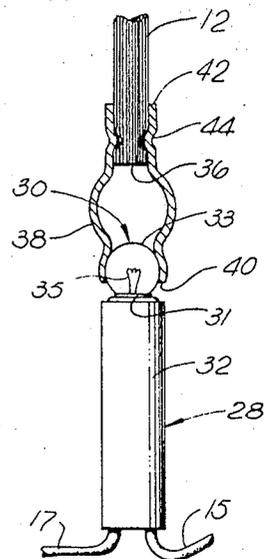


Fig. 4.

Fig. 3.



ACYLINDRICAL ORNAMENTAL ILLUMINATION DEVICE AND ADAPTER

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 27,064, filed Apr. 9, 1970, now U.S. Pat. No. 3,624,385.

FIELD OF THE INVENTION

The fields of art to which the invention pertains include the fields of optics and radiant energy, particularly with respect to light conducting rods, such as optical fibers, and decorative lights including displays and ornaments of the tree decorating type.

BACKGROUND AND SUMMARY OF THE INVENTION

The advent of modern manufacturing procedures for fabricating plastic as well as glass optical fibers has made such fibers available for decorative purposes. In such utility, the fibers are often bundled together at one end with the fibers at the other end unrestrained to flare outwardly forming a spray or bouquet of light. An illumination source for the fibers must be provided and this has generally been accomplished by the special construction of a holder including a light bulb and particularly adapted to maintain the light receiving bundled ends of the fibers a predetermined distance from the bulb. The holder is shaped internally to concentrate light from the bulb onto the bundled fiber ends and is formed with vent openings so that heat may be readily dissipated. Provision is made for disposing a light filter and/or heat reflector between the light bulb and bundled fiber ends. Such structures enable the utilization of optical fibers for a variety of decorative purposes whereby unique aesthetic lighting effects can be achieved. The holders themselves have been designed with aesthetic exterior lines so that they can be in view without detracting from the visual pleasantness of the effect. However, the holder is a significantly large component of the entire structure and does limit the utility of the optical fiber spray as a decorative unit. Furthermore, the cost of the illumination source and holder, as well as its bulkiness, inhibits the widespread use of optical sprays for decoration, particularly where a plurality of individual units are required, for example, in the decoration of a Christmas tree or the like.

The present invention enables the illumination of optical fiber sprays without requiring bulky and expensive light source holders. The invention enables a single spray to be illuminated in such a manner that it can be worn by a person, for example, as a component of a corsage, or a plurality of illuminated sprays can be strung out and draped around a Christmas tree or the like. In particular, an adapter is provided herein which enables a spray of optical fibers to be secured to an ordinary light bulb or miniature light bulb such as is found on a string of Christmas tree lights. The adapter carries the bundled ends of the optical fibers at one end and is formed to engage the light bulb so as to dispose the bundled fiber ends adjacent the light bulb. The adapter includes a casing for the light bulb which is acylindrically shaped for aesthetically attractive lines and ease of removal and insertion and formed to be secured to the bulb. The casing may be formed inter-

nally to slidably engage the bulb, or the open end of the casing may be formed to slide or clip onto the bulb. The light receiving optical fiber ends are bundled within a sleeve which is slidably secured at the forward end of the casing. Alternatively, the casing may be integrally formed as an extension of the bundling sleeve so that they constitute a single structural unit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a Christmas tree which is draped with a string of optical fiber sprays in accordance with this invention;

FIG. 2 is a perspective view of an optical fiber utilized in this invention;

FIG. 3 is a combined elevational, partial cross sectional view of an adapter utilized in this invention and connected to a light bulb; and

FIG. 4 is an elevational partially exploded, cut-away view of an alternative adapter structure of this invention connected to a light bulb.

DETAILED DESCRIPTION

Referring to FIG. 1, there is shown a Christmas tree 10 which has been decorated by disposing thereabout a plurality of optical sprays 12. Each spray 12 can be illuminated by an ordinary light bulb, or a miniature light bulb can be utilized. The manner of such illumination and mechanism of attachment to the light bulb will be described in more detail hereinafter. The light bulbs are strung out on electrical wiring 14 so that the bulbs receive current from a common electrical source through a standard household electrical outlet. In this regard, a string of lights which is ordinarily utilized to decorate a Christmas tree or the like can be utilized with the light bulbs in parallel or series connection, or any other arrangement appropriate to the structure to be decorated can be utilized.

The optical fiber sprays utilized in this invention are composed of a plurality of single optical fibers bundled together at one end and unrestrained at the other end to flare outwardly from the point of bundling with a visually pleasing fullness. One can utilize from ten to about twenty optical fibers to constitute a decorative spray useful herein, but any reasonable number of optical fibers can be utilized.

Referring to FIG. 2, each optical fiber 22 comprises a central light conducting core 24 encased within a light reflecting jacket 26. The optical fiber 22 is constructed of materials well known to the art wherein the light conducting core 24 has a higher index of refraction than the jacket 26. For example, a core 24 can be formed of polystyrene having an index of refraction of 1.60 and the jacket 26 can be formed of a polymethylmethacrylate having an index of refraction of 1.49. Methods of forming such fibers are well known in the art. For use in the present invention, a balance should be struck between flexibility of the fibers and light emitting capability. The fibers should be sufficiently flexible to allow the formation of decorative spray shapes in a variety of forms, and yet the fibers should conduct sufficient light to be decoratively aesthetic. To obtain an aesthetically attractive display, one can utilize optical fibers having diameters of 7 mils or more.

Referring to FIG. 3, there is illustrated the manner of attachment of an optical spray 12, such as is illustrated

in FIG. 1, to a light source 28. The light source 28 comprises a light bulb 30 (which may be a six volt light bulb if used in series) and a socket husk 32 therefor. The bulb 30 includes a threaded electrical contact neck 31 and an envelope 33 enclosing a filament 35, the envelope 33 being of the spherical type. Electrical leads 15 and 17 are connected through the socket husk 32 to activate the filament 35 through the contact neck 31, all in the usual manner.

The optical fibers constituting the spray 12 have their ends bundled together and cut to define a light receiving lower surface 36. An adapter 38 connects the bundled ends of the optical fiber spray to the light source 28 by connection directly to the bulb envelope 33. The adapter 38 can be of metal or plastic and is formed hollow with the lower portion having an ogee shape in cross-section. The diameter of the lower end 40 of the adapter 38 is just slightly larger than the point of largest diameter of the bulb envelope 33 and can be pushed onto the envelope 33 to snap past that point. The bottom portion of the adapter 33 is formed in cross-section to the shape of the bulb so as to secure the adapter upright from the bulb. The lower surface 36 of the bundled fiber ends is disposed within the forward end 42 of the adapter 38 which is then crimped as shown at 44 to secure the fiber ends. The adapter 38 in this embodiment is thus formed integrally as a simple structural unit with the means for bundling the ends of the optical fiber spray 12.

Referring to FIG. 4, there is illustrated another embodiment of the invention in which an adapter 74 is provided for utilization with a miniature or sub-miniature light assembly 76. The miniature assembly 76 includes a husk 78 carrying a socket 80 and miniature, elongate bulb 82 therefor, energized via electrical leads 86 and 88 in the usual manner. The bulb 82 includes an envelope 84 carried by a threaded electrical contact neck (not shown). The adapter 74 is in the form of a hollow truncated cone, formed from a single plastic blank. A spray 90 of optical fibers have their ends bundled within a metallic sleeve or grommet 92, the fiber ends being cut coplanar with the rear end of the grommet to define a light receiving surface 94. The grommet 92 is disposed and held by friction in the top, narrower opening 96 defined by the adapter 74. The adapter 74 is fitted internally with a spiral spring 98 which has an internal uppermost diameter slightly smaller than the diameter of the body of the bulb envelope 84 and a lower diameter sufficiently greater than the bulb diameter to allow insertion of the bulb envelope 84 therein. In use, the adapter 74 is slid onto the bulb envelope 84, the envelope 84 being held frictionally within the adapter 74 by force of the spring 98.

In accordance with the foregoing, the bundled ends of the optical fibers constituting the spray 12 or 90 are disposed adjacent the light bulb 30 or 82 so that the light receiving ends of the fibers are directly illuminated by the bulb. To aid such illumination, the internal surfaces of the adapter 38 or 74 can be coated with a highly light-reflecting material. In this regard, the adapter 38 and 74 can be constructed of aluminized molded plastic having interior and exterior surfaces coated with aluminum. By the utilization of an adapter 38 or 74 constructed as described hereinabove, a simple, inexpensive and convenient method is provided for

rapidly affixing and removing optical fiber sprays such as 12 or 90 to a plurality of strung lights. The bundled fiber ends are disposed in close proximity to the light bulb so that illumination therefrom is adequate to properly illuminate the optical fibers in the spray.

It is to be understood that the foregoing embodiments merely exemplify the invention which may take many different forms that are radically different from the specific illustrative embodiments disclosed. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims which define the scope of the invention.

I claim:

1. A decorative device for use with a light bulb and bulb holder, said light bulb comprising a filament enclosed by an envelope, comprising:

a plurality of optical fibers having light emitting ends and light receiving ends;

means for bundling said light receiving fiber ends constituting sole fiber contact support;

an adapter, comprising a casing for said light bulb, carrying said bundled fiber ends at one end thereof and formed acylindrically to dispose said bundled fiber ends adjacent, but spaced from, said light bulb envelope; and

means internally of said casing for connecting and securing said casing to said light bulb envelope;

said fibers being unrestrained exteriorly of said bundling means whereby to flare outwardly from said bundling means.

2. A decorative device, comprising:

a miniature light assembly of a bulb and holder, said bulb comprising a filament enclosed by an envelope;

a plurality of flexible optical fibers having light emitting and light receiving ends;

a member short relative to the length of said fibers for bundling said light receiving fiber ends and constituting sole fiber contact support; and

means comprising an acylindrical casing formed for connecting and securing said bundling member to said bulb envelope to dispose said light receiving fiber ends in close proximity to, but spaced from, said bulb envelope and constituting sole support for said bundling member;

said fibers being unrestrained exteriorly of said bundling member whereby to flare outwardly from said bundling member.

3. A decorative device for use with a miniature light assembly of a bulb and holder, said bulb comprising a filament enclosed by an envelope, said device comprising:

a plurality of flexible optical fibers having light emitting and light receiving ends;

a member short relative to the length of said fibers for bundling said light receiving fiber ends and constituting sole fiber contact support; and

means comprising an acylindrical casing formed for connecting and securing said bundling member to said bulb envelope to dispose said light receiving fiber ends in close proximity to, but spaced from, said bulb envelope and constituting sole support for said bundling member;

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said fibers being unrestrained exteriorly of said bundling member whereby to flare outwardly from said bundling member.

4. The invention according to claim 3 in which said connecting means is formed for ready release from said bulb envelope.

5. The invention according to claim 3 in which said connecting means is formed to snap onto said bulb envelope.

6. The invention according to claim 3 in which said bundling member comprises a sleeve encasing said light

receiving fiber ends and said acylindrical casing is formed to slidably receive said sleeve at one end.

7. The invention according to claim 3 in which said bundling member and connecting means constitute a one-piece unit.

8. The invention according to claim 3 in which said casing has a conical cross-section.

9. The invention according to claim 3 in which said casing defines an ogee in cross-section.

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