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3,497,981

SIGN FORMED OF LIGHT CONDUCTING AND EMITTING MEMBERS

Filed Dec. 13, 1967

FIG. 1

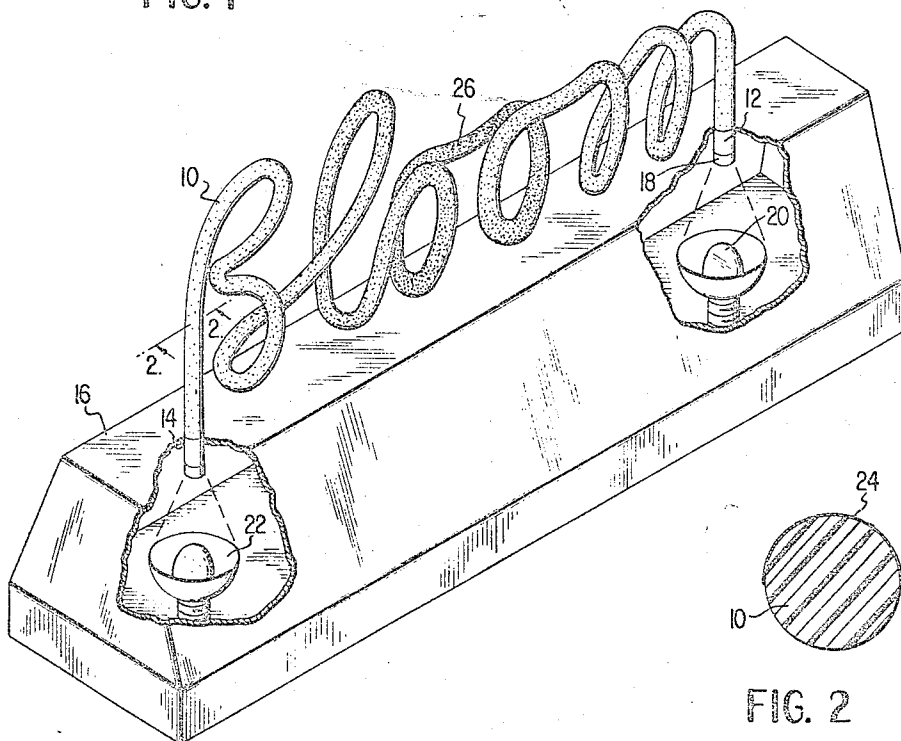


FIG. 2

FIG. 4

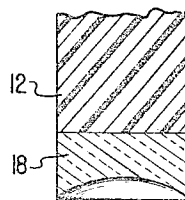
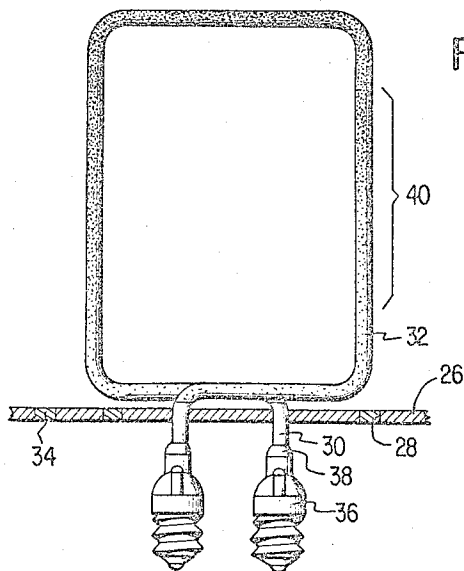


FIG. 3

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**SIGN FORMED OF LIGHT CONDUCTING AND
 EMITTING MEMBERS**

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1 Claim

ABSTRACT OF THE DISCLOSURE

The disclosure is directed to illuminated signs of the type utilizing a light conducting rod to form the various sign characters. The rod is differentially etched along at least a portion of its length and is illuminated at opposite ends thereof. The degree of etching is maximal adjacent the center of the rod and diminishes toward the illuminated ends for the purpose of controlling light emission.

BACKGROUND OF THE INVENTION

The invention relates to that class of illuminated signs, that rely on the light-pipe phenomenon for illumination of the various sign characters. U.S. Patents 2,173,371 and 3,208,174 are illustrative of the type signs with which this invention is concerned. British patent 523,706, published in 1940, discloses a method of varying the light diffusion properties of a transparent sign material that is related to that disclosed herein. Although light conducting rods are referred to hereinafter, it will be apparent that tubular bodies exhibiting light-pipe characteristics are suitable for the practice of the invention.

Previous attempts to produce commercially successful light-pipe signs have, in general, been unsuccessful because a great number of light sources were required to illuminate the ends of the rods which, each, formed a single small sign character. The requirement that each character be formed from a single rod and be individually illuminated is due to the substantial dissipation of light intensity that occurs due to emission along that portion of the character adjacent the light source. Accordingly, the light reaching portions of the rod remote from the source is greatly diminished and, if the rod forming the character is of any substantial length, the disparity in luminous intensity is quite apparent.

SUMMARY OF THE INVENTION

It is a primary object of the invention to provide an illuminated sign wherein several characters may be formed from a single light conducting rod having a substantially constant luminous intensity which requires only two light sources to illuminate the same from opposite ends thereof.

It is among the further objects of the invention to provide a support for light conducting rods forming single sign characters that may be readily substituted for other sign characters formed from such rods; to provide a compact housing for signs of the type contemplated that enclose the incandescent luminous sources along with optical focusing equipment to direct the light into the ends of the rods; to provide a surface coating that improves the efficiency of light rod conducting signs particularly as regards directivity of emission; and to provide a method of masking that portion of the rod that is not to be viewed.

The foregoing and other objects are achieved by providing a differential etching along at least the viewing surface of the rod which increases directly with the distance away from the light source; by providing a combination light source and focusing means that coats with additional means in the form of lens attached to the ends of the rods or formed integrally therewith; by coating the

surface of the rod, remote from the viewer, with a light reflecting material; by providing a support housing having knock-out plugs positioned adjacent illuminating sources to permit the substitution of one character for another; and by providing an opaque paint or tape on those portions of the rods which are not to be viewed.

DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view, with parts broken away, depicting a first embodiment of the invention;

FIGURE 2 is a cross-sectional view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary enlarged cross-sectional elevation of one end of the light conducting rod shown in FIGURE 1; and

FIGURE 4 illustrates a second embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One embodiment of the invention is depicted in FIGURE 1 wherein a rod 10 of methyl methacrylate, polystyrene or other material exhibiting light-pipe characteristics is formed to spell a script word. The ends 12 of rod 10 extend through openings 14 in housing 16 and have secured thereto concave lenses 18 which, together with incandescent sources 20 and ellipsoidal reflectors 22, provide a concentrated light source for the ends of rod 10.

The rear surface of rod 10, remote from the viewer, is coated with a light reflective substance 24 such as aluminum paint or foil.

Etching 26 is applied to rod 10 throughout its length to provide the desired light emissive qualities as by chemical etching or sand blasting. Inasmuch as light emission is directly related to the degree of etching and the light intensity transmitted by rod 10 diminishes directly with increased distance from the light sources due to losses by absorption and emission, the degree of etching is maximal at those portions of the rod most remote from the light sources and diminishes toward the ends adjacent the sources. Because of the fact that the letters B and m in the script word shown in FIGURE 1 are more lightly etched than are the intermediate letters, the total light emission intensity can be made to appear fairly constant throughout the word. The etching may be applied uniformly about the circumference of the rod prior to applying reflective coating 24 in which event that portion of the rod facing the viewer will not only emit light directly but will also emit light reflected from the etched portion remote from the viewer. Reflective coating 24 not only enhances the directivity of the light traversing rod 10 but also reflects back, toward the viewer, that light which may be reflected thereonto by the etched surface.

If desired, lenses 18 may be dispensed with and the ends of the rods formed with concave depressions to provide lenses integral with the rod ends.

In some instances where greater emissive directivity is desired the rear surface of the rod, remote from the viewer, may be of parabolic cross-section and the front surface of the rod provided with a narrow etched line lying at the focus of the parabola.

In FIGURE 4 is fragmentarily illustrated a sign housing 26 having apertures 28 to receive opposite ends 30 of a light conducting rod 32 in the form of a single sign character. Conventional knock-out plugs 34 may be initially provided with housing 26 and it is contemplated that rubber plugs, not shown, may be used to plug the unused apertures after plugs 34 have been removed. Conventional lamps 36 having concentrating lenses 38 are positioned adjacent each aperture to abut the downturned ends of a rod forming a given character when inserted through the appropriate apertures. Rod 32 has been shown

in the form of a block letter O which may easily be converted into a C by applying an opaque covering throughout the bracketed portion of the rod indicated at 40.

It will be apparent that the formation of various words and symbols may be readily accomplished by inserting the downwardly turned ends of previously formed characters into appropriate ones of the regularly arranged apertures 28. Rubber plugs may then be inserted in any apertures previously uncovered and the appropriate lamps turned on to produce an illuminated sign.

Although in the case of small letters the differential etching described in connection with the embodiment shown in FIGURE 1 may not be necessary, the use of differential etching for characters of the type shown in FIGURE 4 will normally be advantageous for the reasons previously discussed.

Although two preferred embodiments of the invention have been specifically disclosed it is to be understood that many changes may be made in the size, shape, composition and arrangement of parts without departing from the spirit of the invention as defined by the accompanying claim.

What is claimed is:

1. An illuminated sign comprising a rod defining a path

of light conduction therethrough, each end of said rod being provided with illuminating means of equal intensity, said rod being etched to provide a plurality of light-refractive surfaces, and the degree of said etching increasing proportionately from each end of said rod and being maximal at the midpoint of said path of light conduction whereby the intensity of light emitted from said rod is constant through its length.

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UNITED STATES PATENTS

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2,360,663	10/1944	Eddy.

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