Sept. 27, 1960 T. A. TUCKER 2,954,461

LENS BULB

Filed Dec. 10, 1958

Fig. 1.

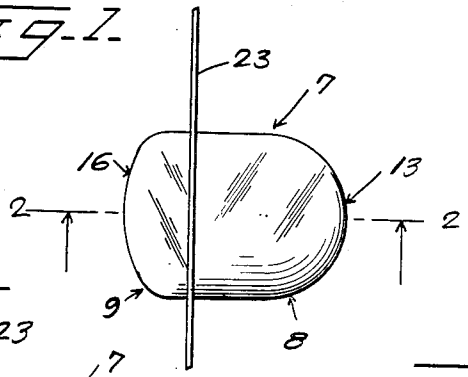


Fig. 2.

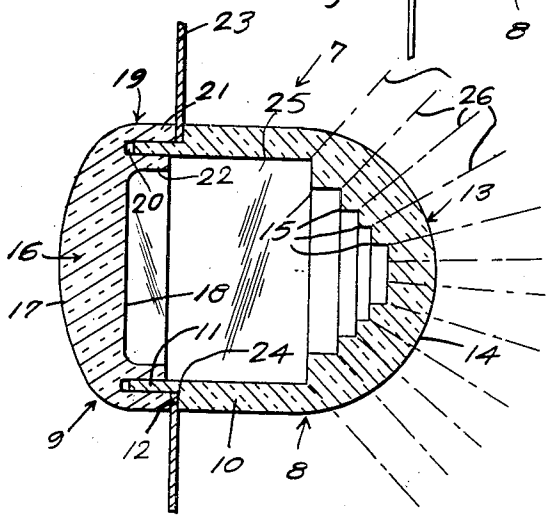
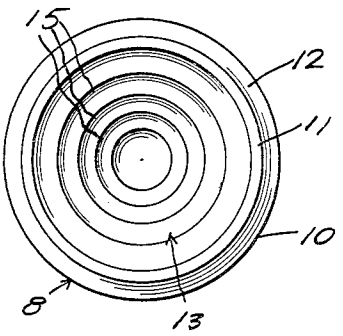


Fig. 3



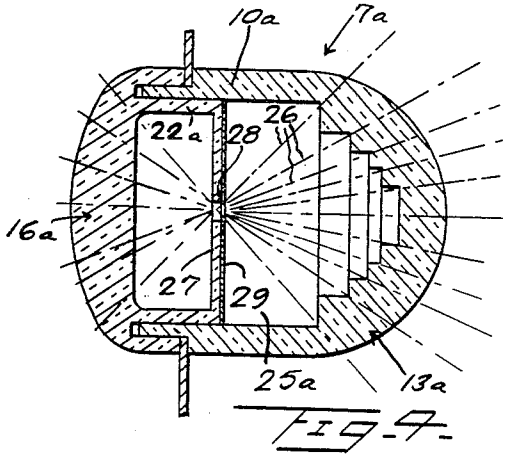
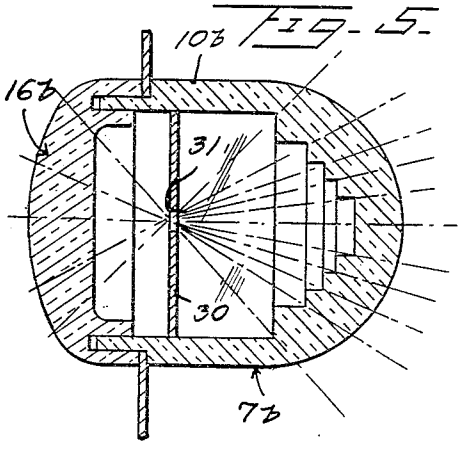


Fig. 4.

Fig. 5.



Thomas A. Tucker

INVENTOR

BY John N. Randolph

ATTORNEY

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LENS BULB

Thomas A. Tucker, Abilene, Tex., assignor to Sparkle-Lite, Inc., Winters, Tex., a corporation of Texas

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5 Claims. (Cl. 240—106)

This invention relates to a novel element primarily intended to form a part of an illuminated sign and including a double lens unit in the form of a hollow bulb or globe having a lens at each end thereof.

More particularly, it is an object of the present invention to provide a lens bulb of the aforedescribed character one of the lenses of which gathers, magnifies and intensifies light rays passing therethrough toward the other lens, by which the magnified and intensified light rays are dispersed in a wide angle to cause the light rays emitted from the last mentioned lens to cover an arc of as much as 160°.

A further object of the invention is to provide a double lens of the aforedescribed character a number of which can be used together to form letters, symbols, numerals or other sign indicia and wherein a low wattage light source may be employed to furnish illumination for a number of the double lens globes, the light rays from each of which will be substantially more brilliant than the light rays from the source.

Still a further object of the invention is to provide a double lens unit which is substantially nonbreakable and thus hail-proof, and which may be utilized in connection with numerous types of illuminated signs to enable such signs to be operated with a minimum of current consumption and with substantially trouble-free operation, since the individual lens globes never require replacement.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating presently preferred embodiments thereof, and wherein:

Figure 1 is a top plan view showing one of the lens globes in an applied position;

Figure 2 is an enlarged vertical sectional view, taken substantially along a plane as indicated by the line 2—2 of Figure 1;

Figure 3 is an end elevational view looking toward the inner side of one section of the double lens globe;

Figure 4 is a view similar to Figure 2 illustrating a slightly modified form of the lens globe, and

Figure 5 is a view similar to Figure 2 illustrating still another modification of the lens globe.

Referring more specifically to the drawing, and first with reference to Figures 1 to 3, the double lens globe in its entirety is designated generally **7** and is composed of a forward section, designated generally **8**, and a rear section, designated generally **9**. Each of the lens globe sections **8** and **9** is preferably formed of a translucent or transparent material which is substantially nonbreakable, such as plastic, the globe sections preferably being formed of a material commercially known as "Lucite."

The forward globe section **8** includes a hollow cylindrical part **10** constituting the rear end thereof, said cylindrical body portion **10** having an open rear end, and the wall thereof being of reduced thickness at the rear end thereof to provide a thin annular wall portion **11** of a lesser external diameter than the remainder of the cylindrical wall **10**. The cylindrical wall **10** forms an annular rearwardly facing shoulder **12** around the restricted wall portion **11**. The globe section **8** has a forward end constituting an extension of the opposite forward end of the cylindrical wall **11** and forming a lens **13** the exterior of which is smooth and substantially hemipherical, as seen at **14**. The interior of the lens **13** is provided with a plurality of stepped annular recessed portions of outwardly diminishing diameters forming prismatic zones **15**, constituting the hollow interior of the forward lens or head **13** of the globe **7**. Said lens or head **13** closes the forward end of the globe section **8** as well as the forward end of the assembled globe **7**.

The rear globe section **9** constitutes a magnifying lens **16** having a convexly rounded outer or rear side **17** and a substantially flat inner side **18**. The rear globe section **9** also includes an annular forwardly extending wall **19** of a length substantially less than the length of the wall **10** and of greater thickness. The wall **19** is provided with an annular forwardly opening groove **20** dividing said wall **19** into an annular external apron **21** and an annular internal apron **22**, which is of a length somewhat less than the length of the apron **21**. The diameter and radial thickness of the annular groove **20** is such that it is adapted to snugly receive the restricted cylindrical wall portion **11**, and the outer diameter of the apron **21** is approximately equal to the outer diameter of the remainder of the cylindrical wall **10**.

A plurality of the lens globes **7** are adapted to be mounted in openings of a panel or plate forming the front wall or face of a sign, and which openings are arranged so that the lens globes **7** will form letters, numerals or other symbols. A portion of such a plate or panel is shown at **23** in Figures 1 and 2, including an opening **24** for receiving one of the globes **7**. The opening **24** is of a diameter to slidably receive therein the restricted wall portion **11** which is inserted rearwardly therethrough. The lens section **9** is then attached to the forward lens section **8** by applying the aprons **21** and **22** slidably over the outer and inner sides of the wall portion **11** and so that said wall portion is received in the groove **20**. A portion of the panel **23**, immediately surrounding the opening **24**, fits snugly between the annular shoulder **12** and the forward end of the outer apron **21**. The lens sections **8** and **9** are then permanently joined together in any conventional manner as by an adhesive or other bonding medium, for permanently securing the globe **7** in the panel or plate **23**.

It will be readily apparent that when a plurality of the globes **7** are thus assembled, in the aforedescribed manner, in the panel or plate **23** to form sign indicia, a single light source, not shown, such as a florescent type lamp bulb, may be disposed behind or to the left of the panel **23** for illuminating a plurality of the globes **7**. Light rays from such a light source will be magnified in passing through the rear magnifying lens **16** and the light rays will be caused to converge by said rear lens **16** so as to intersect in the hollow interior **25** of the globe **7** and to thereafter diverge toward the front lens or head **13**. The prismatic zones **15** will increase the divergence of the light rays, as indicated by the numeral **26**, emitted therefrom, so that the emitted light rays will be emitted over a wide angle, of as much as 160°, to effect a maximum wide angle of viewing. In addition, the light rays will be substantially magnified in passing through the rear lens **16** so that the light rays emitted from the forward lens **13** will be of substantially greater brilliance than the rays received by the lens **16**. The thickness of the panel **23** is such that, in combination with the length of the cylindrical wall **10** and apron **21**, the focal point of the magnifying lens **16** will be correctly disposed relative to

the front prismatic lens 13 to effect a maximum dispersion of the emitted light rays 26.

In addition to the aforedescribed advantages of utilizing a plurality of the lens globes 7 in combination with a single low wattage light source over utilizing a plurality of individual light bulbs for accomplishing the same amount of illumination, the lens globes 7 in addition provide structures whereby substantially all of the light rays are emitted only through the prismatic or forward lenses 13, rather than around the entire globe of a conventional light bulb. Thus, the outer lenses or heads 13 will be illuminated to a substantially greater extent than the cylindrical walls 10 of the globes 7. This is of particular advantage where the globes 7 are closely clustered in forming one or more letters, numerals or symbols, so that the symbol or symbols produced by a plurality of the globes will be clearly delineated rather than obscured due to the light rays being emitted from one light source toward another, as frequently occurs in illuminated signs employing conventional light bulbs. Figures 4 and 5 illustrate slight modifications of the globe 7 and whereby even less illumination of the cylindrical wall 10 will occur, so that the illuminated forward lenses 13 stand-out from one another even more distinctively.

In the modification of the lens globe as shown in Figure 4, and designated generally 7*a*, the inner apron 22*a* is extended forwardly and is provided on its inner or forward end with a transverse wall 27 which extends across the hollow interior or chamber 25*a* and which has a central opening 28 located at the focal point of the rear lens 16*a*. The partition wall 27 is rendered opaque as by having applied to its outer or forward side an opaque coating 29. Thus, all of the light rays 26 passing from the magnifying lens 16*a* to the prismatic lens 13*a* pass through the aperture 28. Consequently, there is substantially no illumination of the cylindrical wall 10*a*. Thus, the illuminated head or lens 13*a* stands out more distinctively and where a number of the lens tubes 7*a* are located in close proximity to one another the symbol produced by the illuminated globes is very distinct.

Figure 5 illustrates another variation for accomplishing the same result as that accomplished by the globe 7*a*, and wherein the globe 7*b* differs only from the globe 7 in that it is provided with a disc 30 of an opaque material which is secured within and extends across the cylindrical wall 10*b*. Said opaque wall or partition 30 has a central opening 31, located at the focal point of the lens 16*b*, which functions in the same manner and for the same purpose as the aperture 28.

It will be readily understood that the globes may be made in various sizes and that various other modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A lens globe for illuminated signs comprising a hollow elongated body formed of a translucent material including a forward end having a substantially hemispherical exterior surface, said forward end being internally recessed to provide prismatic zones cooperating with said hemispherical exterior to form a prismatic lens, and said globe having a rear end forming a magnifying lens, said lenses being disposed relative to one another such that the focal point of the rear magnifying lens is substantially midway between said lenses.

2. A lens globe as in claim 1, said globe being formed of end sections including a forward section having a cylindrical wall extending rearwardly from said prismatic lens and a rear section including an annular wall extending forwardly from the magnifying lens and provided with an annular forwardly opening groove, said cylindrical wall having an externally restricted rear end adapted to extend through a panel opening and fitting said groove for connecting the globe sections together and for assembling the globe in the panel.

3. A lens globe as in claim 2, said assembled globe sections forming a hollow internal chamber, and means forming an opaque partition extending across said chamber and having an aperture disposed at the focal point of the magnifying lens through which light rays are adapted to pass from said magnifying lens to the forward prismatic lens.

4. A lens globe as in claim 3, said annular wall having an inner apron disposed internally of the groove thereof and extending into the cylindrical wall of the forward globe section, said apron having a transverse wall at its inner end provided with a central aperture and an opaque coated surface forming said partition means.

5. A lens globe as in claim 1, said globe defining a hollow chamber disposed between said lenses, an opaque partition member extending across the globe chamber and having a central aperture disposed at the focal point of the magnifying lens through which the light rays are adapted to pass from the magnifying lens to said forward prismatic lens.

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