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3,395,273

REFRACTOR STREET LIGHTING LUMINAIRE

Filed May 26, 1966

2 Sheets-Sheet 1

FIG. 1

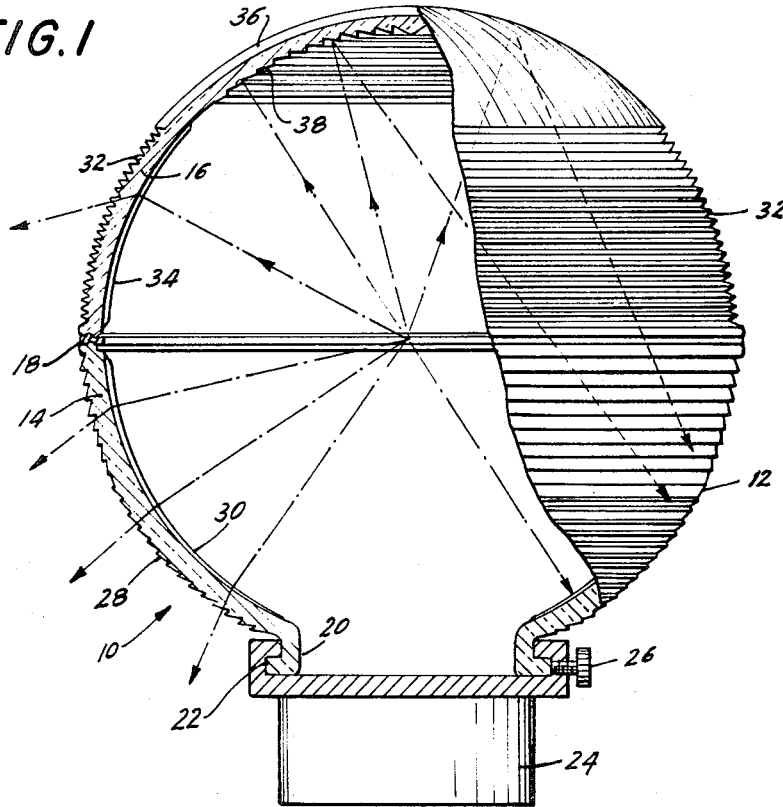
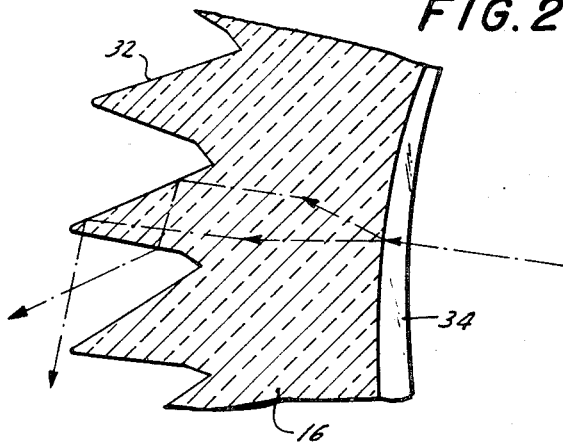


FIG. 2



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2 Sheets-Sheet 2

FIG. 3

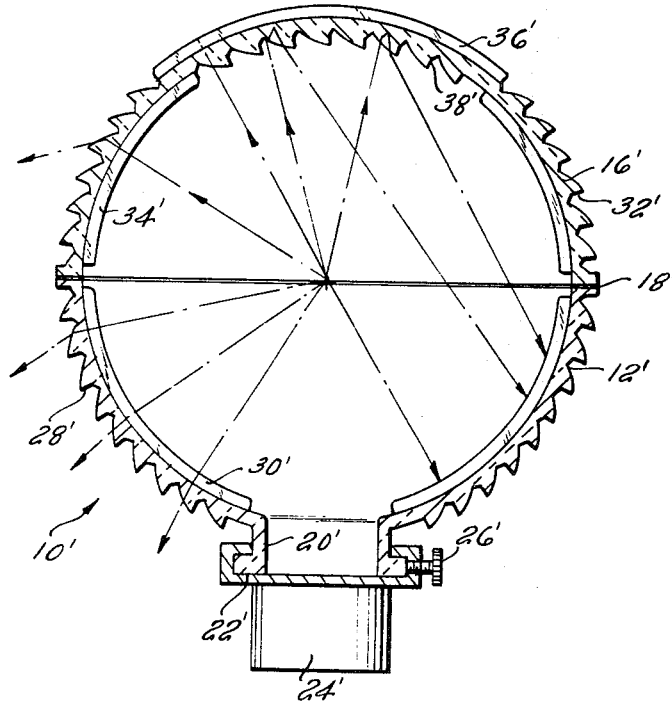
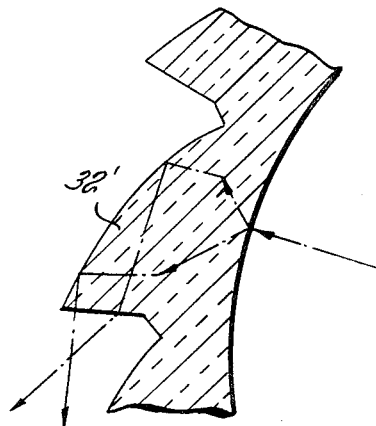


FIG. 4



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1

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REFRACTOR STREET LIGHTING LUMINAIRE
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ABSTRACT OF THE DISCLOSURE

A street-lighting refractor adapted to be mounted on top of a post. The refractor has a hollow substantially spherical globe consisting of a transparent wall having an open bottom portion surrounding a central axis and adapted to be mounted on the upper end of a post. This transparent wall carries prismatic light-directing means which in the lower half of said globe constitute means for forming a beam from direct light to provide proper fill below beam direction as well as for receiving reflected light from the upper half of the globe. This prismatic means also provides lateral light distribution to provide diffusion of the light for concealing the lamp and reducing glare. The prismatic means includes in the upper half of the globe light-directing prisms constituting means for directing light downwardly from a lower portion of the upper globe half and additional prisms situated at an upper portion of the upper globe half and constituting means for directing light downwardly to the lower globe half while avoiding the lower opening of the globe, so that a minimum amount of light is directed toward the top of the post.

The present invention relates to street-lighting.

In particular, the present invention relates to a refractor which is adapted to be mounted on top of a post.

It is an object of the invention to provide a refractor of this type which will provide a totally luminous street-lighting arrangement having substantially no metal parts situated above the lamp.

Thus, it is an object of the invention to provide the refractor of the above type which will increase the size of the light source while reducing glare.

The refractor of the invention is in the form of a hollow substantially spherical globe consisting of a transparent wall having a lower opening with the bottom end of the globe which surrounds this lower opening being connected to the top of a post with a lamp extending into the interior of the refractor. In accordance with the invention, the globe has prismatic light-distributing control means which provides proper fill from direct light at the lower portion of the globe and which has at the upper portion of the globe prismatic controls directing light down to the lower portion, avoiding the upper part of the post, so that a minimum amount of light is wasted while the control means also provides proper lateral distribution of the light.

The invention is illustrated by way of example in the accompanying drawings which form part of the application and in which:

FIG. 1 is a sectional elevation of one possible structure according to the invention schematically illustrated with a fitter for the top of a post, the section of FIG. 1 being taken in a vertical plane which includes the center of the refractor;

FIG. 2 shows on an enlarged scale a section of the wall of the refractor to illustrate in greater detail part of the prismatic structure;

FIG. 3 is a sectional elevation of another embodiment of a structure according to the present invention; and

FIG. 4 shows on an enlarged scale, as compared to

2

FIG. 3, a section of the wall of the refractor so as to illustrate in greater detail part of the prismatic structure thereof.

Referring now to the drawings, the refractor 10 illustrated therein includes a globe 12 made of a transparent wall material, such as glass which is clear, which has prismatic control means to obtain maximum light transmission and utilization on the street or other desired areas such as malls, city parks, etc. The refractor 10 can take the form of a sphere which is uniformly constructed with respect to the center of the sphere, while having prismatic structures providing desired light distribution.

The refractor 10 formed by the clear glass globe 12 includes a lower half 14 and an upper half 16 which are fastened together in a horizontal plane 18 which passes through the maximum diameter of the globe 12. The bottom half 14 has a knockout opening 20 formed at its bottom end and surrounding a vertical central axis containing the center of the globe. At its bottom end the globe has an outwardly directed flange 22 adapted to be fastened to the top of an unillustrated post by way of a suitable post top fitting 24 schematically indicated in FIG. 1 and provided with a thumb screw 26 for releasably holding the refractor fixed to the top end of the post. The lamp and socket extend upwardly through the opening 20 so as to place the light center at or near the center of the spherical interior of the refractor 10. While the two halves 14 and 16 may be fastened together with a metal or plastic band, it is preferred to cement or weld them together at the horizontal plane 18, since in this way there will not be any opaque ring around the center of the sphere.

The refractor of the invention carries a prismatic light-control means which includes in the bottom half 14 conventional circumferentially extending horizontal refracting prisms 28 situated at the exterior surface of the bottom half 14 of the globe respectively in horizontal planes normal to the central axis so as to form a beam from direct light and to provide the proper fill below beam direction. These prisms 28 also handle reflected light received from the top half 16, as described below. At its interior the lower half 14 of the refractor is provided with radial prisms 30 respectively situated in vertical planes which contain the central axis used to obtain the proper lateral distribution and also to provide diffusion for concealing the lamp and "flashing" larger areas of the refractor to reduce glare.

The top half 16 of the globe is provided also with portions of the prismatic control means of the invention, and at the upper half 16 this control means includes exterior reflecting-refracting prisms 32 which extend upwardly from the central flange to approximately 40° above the horizontal, these prisms also extending horizontally circumferentially around the refractor respectively in horizontal planes normal to the central axis. A typical prism 32 is indicated in FIG. 2. The upper surface is inclined so as to reflectively spread the light from beam direction downwardly through the lower surface which refracts the spread light through lateral angles to light the area below. These prisms will light up the top half of the refractor when viewed from the ground. This lower portion of the upper half 16 is provided at its interior with radial prisms or flutes 34 which spread the light laterally and make the entire globe luminous from normal viewing angles. The required prism angles at the exterior, as shown in FIG. 2, are of such a configuration that the mitre in the mold is very sharp. In order to strengthen the mitre, a small portion of the bottom surface of each prism is cut at a steeper angle, as indicated in FIG. 2.

The upper portion of the upper refractor half 16 is

provided with a portion of the prismatic control means in the form of exterior radial reflecting prisms 36 oriented perpendicularly with respect to prisms 32 and distributed in the manner shown in FIG. 1 across the space surrounded by the uppermost one of the lower prisms 32 5 respectively in vertical planes containing the central axis. In conjunction with these reflecting prisms the refractor has interior prisms of varying depths to reflect and re- 10 fract the reflected light from the reflecting prisms 36 toward the bottom half of the refractor and away from nadir for use in the street. These inside prisms 38 thus make it possible to utilize light which would normally be reflected toward the lamp socket and fitting 24. Prisms 38 are oriented perpendicularly with respect to prisms 34 and 36 and are respectively situated in planes which are 15 parallel to the central axis of the globe. The lines of the drawings which carry the arrowheads indicate the direction in which the light travels.

In the embodiment of FIGS. 3 and 4, it will be seen that there are groups of prisms corresponding to those of FIGS. 1 and 2, but having a different configuration. The reference characters of FIGS. 3 and 4 correspond to those of FIGS. 1 and 2 and indicate the same groups of prisms, the corresponding reference characters of FIGS. 3 and 4 being primed. Thus, the lower section 12' of 20 FIG. 3 has the horizontal circumferential prisms 28' curved differently from the prisms 28 of FIG. 1, and in addition the lower section 12' has the interior radial prisms 30'. The upper section of FIG. 3 has the exterior upper prisms 36' corresponding to the prisms 36 and the horizontal circumferential prisms 32'. In the interior of the upper section 16', there are the upper prisms 38' corresponding to the prisms 38 and the radial prisms or flutes 34', and of course the sections of FIG. 3 are joined 25 by the adhesive 18' which corresponds to the adhesive 18 of FIG. 1.

As may be seen from FIG. 4, the circumferential prisms 32' have upper convexly curved surfaces providing a somewhat different direction of movement for the light, as indicated by the arrows in FIG. 4.

What is claimed is:

1. A street-lighting refractor comprising a hollow substantially spherical globe consisting of a transparent wall having an open bottom portion surrounding a central globe axis and adapted to be mounted adjacent the upper end of a post, said transparent wall carrying prismatic light-directing means which in the lower half of said globe constitute means for forming a beam from direct light to provide proper fill below beam direction as well as for receiving reflected light from the upper half of 50 said globe, and said prismatic means also providing lateral light distribution to provide diffusion of the light for concealing the lamp and reducing glare, said prismatic means including in the upper half of said globe light-di-

recting prisms constituting means for directing light downwardly from a lower portion of said upper globe half and additional prisms situated at an upper portion of said upper globe half and constituting means for directing light downwardly to the lower globe half while avoiding the lower opening of said globe so that a minimum amount of light is directed toward the top of the post.

2. A refractor as recited in claim 1 and wherein said prismatic means includes at the lower half of said globe exterior prisms extending around said central axis and interior radial prisms respectively situated in planes which contain said central axis, said prismatic means including in the upper half of said globe at the lower portion of said upper half up through a distance of approximately 40° above the largest horizontal diameter of the globe exterior circumferential prisms surrounding said central axis and interior radial prisms respectively situated in planes which contain said central axis and in the upper portion of said upper half of said globe interior prisms respectively situated in planes parallel to said central axis and oriented perpendicularly with respect to said radial prisms in said lower portion of said upper globe half for refracting light down to the lower globe half at its portion which surrounds its bottom opening and exterior radial prisms respectively situated in planes containing said central axis and distributed between and oriented perpendicularly with respect to the exterior horizontal prisms in the lower portion of said upper globe half.

3. The combination of claim 2 and wherein the exterior prisms at the lower-portion of said upper globe half are of substantially V-shaped cross section and respectively have lower surfaces provided with innermost circumferential portions at a steeper angle than the remainder of the bottom surfaces of said prisms, respectively.

4. The combination of claim 3 and wherein all of the exterior surfaces of said exterior circumferential prisms of the lower portion of said upper globe half are straight in any plane which contains said central axis.

5. The combination of claim 3 and wherein the exterior upper circumferential surface of each exterior circumferential prism at the lower portion of said upper globe half has a convexly curved configuration in any plane which contains the central globe axis.

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