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P. H. MITCHELL

2,140,646

REFLECTOR FOR STREET AND HIGHWAY LIGHTING

Filed Oct. 4, 1935

Fig. 1.

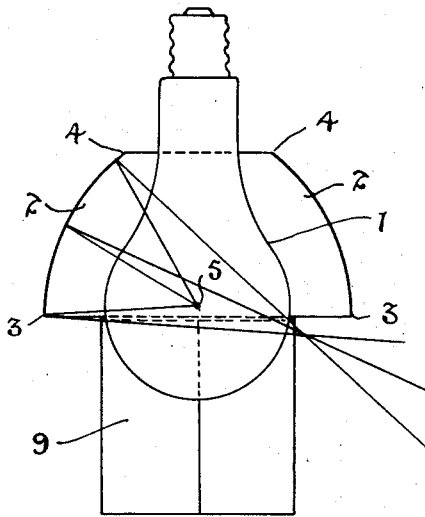


Fig. 3.

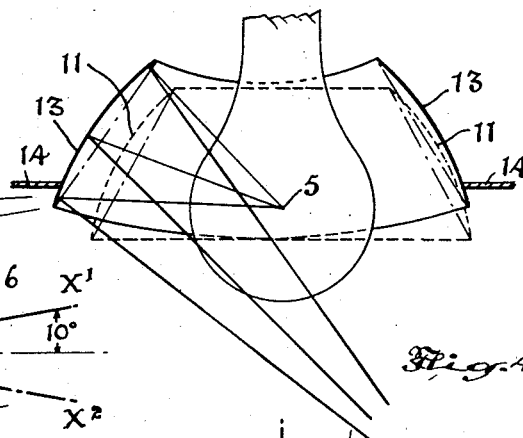
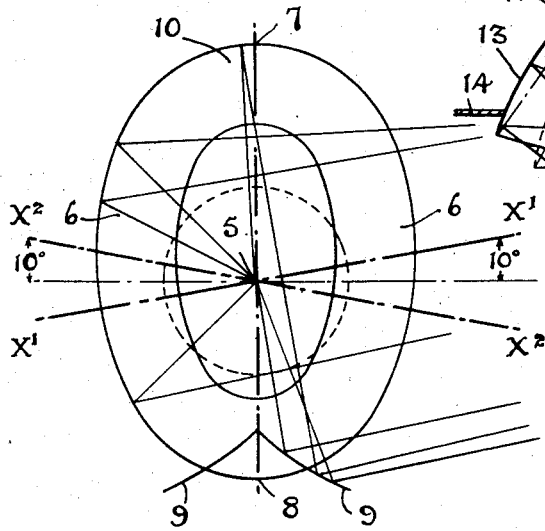
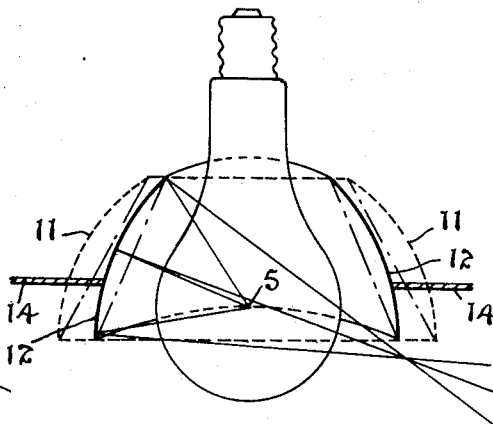


Fig. 4.

Fig. 7.

Fig. 6.

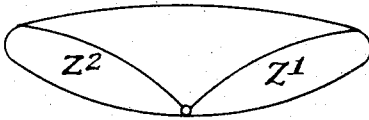
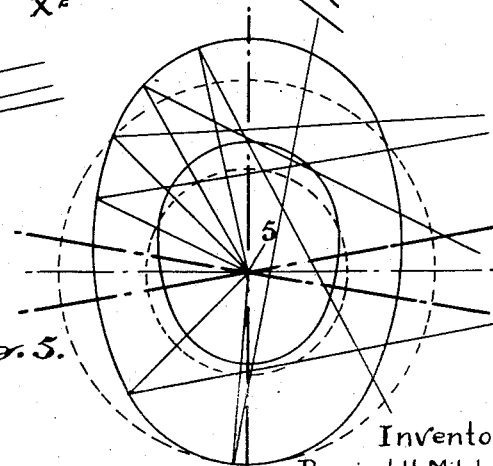


Fig. 5.



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REFLECTOR FOR STREET AND HIGHWAY LIGHTING

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3 Claims. (Cl. 240—103)

The principal objects of this invention are to improve the efficiency of street or highway lighting lamps by distributing the available light from the source in such directions and in such respective intensities as to be most useful.

A further object is to provide means for minimizing the effect of the glare upon the eyes of persons approaching a lamp and to accomplish the desired result in a simple, effective and economical manner.

The principal features of this invention consist in the novel shaping of a reflector member to surround a source of light whereby direct rays from the source of light will be shielded so as to prevent glare in zones where such direct rays would be objectionable or dangerous, and to direct rays reflected from such source of light in predetermined asymmetric zones while maintaining a limited and controlled symmetric distribution of light in respect to both horizontal and vertical angularity, and further, to effect localized intensities of reflected light in predetermined directions.

A further and important feature of this invention consists in the formation of a reflector of a flexible resilient material in a symmetrical shape, and then distorting such shaped reflector to the desired contours and retaining it in such distorted shape.

In the accompanying drawing, Figure 1 is a vertical sectional elevation showing an electric lamp and a reflector embodying the present invention.

Figure 2 is a diagrammatic plan view of the reflector illustrated in Figure 1 showing by light lines several arrangements of reflected rays.

Figures 3 and 4 are slightly modified vertical sectional views.

Figure 5 is a diagrammatic plan of the form illustrated in Figure 4.

Figure 6 is a plan diagram illustrating the zone intensification of light desirable.

It is understood by those conversant with the problems of street and highway lighting that the varying conditions, such as the highway surface and the adjacent surroundings have a great deal to do with the ultimate efficiency of the lighting equipment.

It is therefore desirable to provide a lighting equipment with which the light rays may be concentrated so as to direct same lengthwise of the highway and downwardly so as to effectively distribute the maximum of light rays upon the pavement, or upon objects which may be on the pavement, or to provide illuminated areas on the

pavement against which objects may be silhouetted.

In the diagrammatic illustration of reflector shown in Figure 1 the incandescent lamp 1 is surrounded by a reflector 2, the curvature of the reflecting surface extending from the bottom 3 to the top 4, being such that the rays of light emanating from the filament 5 of the lamp are reflected downwardly and outwardly, the rays reflected from points adjacent to the top 4 being directed mostly downward, while the rays directed from adjacent the point 3 are directed almost horizontally.

It will be noted that the lamp filament is arranged above the bottom point 3 of the reflector, and the eyes of persons approaching the light will be normally shielded from direct rays striking into them.

The horizontal contour of the reflector illustrated in Figures 1 and 2 is of ovate form, and the curved surfaces 6 on either side extending from the points 7 to 8 are so arranged that the axial lines X1 and X2 are asymmetric, preferably from 10° to 25° from an axis parallel with the roadway. This angularity of axis throws reflected light from the reflector surfaces between the points 7 and 8 and 3 and 4 longitudinally of the roadway, it being assumed that the lamp is arranged at or near the curb.

The result of such concentration of light and the direction of same is to present concentrated light zones as represented by Z1 and Z2 on Figure 6.

With this type of lamp it is preferred to arrange reflectors 9, where the light is mounted upon a post, which extend vertically and present substantially vertical surfaces diverging backwardly from the axis of the reflector to either side, which will intercept direct rays from the light source as well as rays reflected back from the rounded end surface 10 and direct them in a direction substantially parallel to the asymmetric axes, thus effectively utilizing rays which would otherwise impinge on the post supporting the light.

It will be appreciated that there are areas of this ovate-shaped reflector which will not be directing rays coincident with the asymmetric axis, nor which will be projected from the secondary reflectors parallel with such axes, but which will be reflected from curved surfaces at the ends of the parabolic side portions in such a manner that the transition in light intensity and direction will be gradual and the light will be spread

from the longitudinal zones to the transverse zones.

In the illustrations in Figures 4 and 5 of the drawing is shown a desired and economical manner of forming a reflector. As shown in Figure 3 the curved dotted line 11 represents the original transverse curvature of a circular-shaped reflector made of sheet metal. The circle shape is deformed by pressing the opposite sides inwardly to form the shape illustrated by the outline 12.

In Figure 4 the dotted line 11 illustrates the original circular curvature, and the outline 13 indicates the longitudinal outline of the deformed reflector.

The formed reflector may be held to the shape shown by upsetting the metal, but it is a much simpler method and more preferable to simply deform the stamped circular plate by inserting it into an orifice in a rigid plate 14 which has a profile corresponding to the desired ovate shape of the deformed reflector. This plate is suitably secured to the reflector and forms a very convenient means for attaching and for supporting same.

In reference to the distribution of light, in the diagram illustrated in Figures 1 and 3, the centre of the light filament is so arranged in relation to the bottom rim of the reflector and the curve 3-4 which may be elliptical as shown or may be any other desired curvature, that the rays reflected from each side of the reflector will pass under the said rim at the opposite side of the reflector.

It will be readily understood that the dimensions and relative curvatures of reflectors such as described may be varied considerably and a vertical angularity of light directed along the asymmetric axes may be selected to intercept the roadway throughout a length several times the width of the roadway, or of the more intensely illuminated road areas while the light distributed transversely may be directed downwardly to meet the roadway at a more obtuse angle and between these there will be a smooth transition from the steeper angle of the upper limits of the directed light to the lower angle of the asymmetrically directed light.

In the illustrations herein shown, the light

source is represented as an incandescent lamp producing a concentrated light zone adjacent a point, but other forms of lamps may be used and in all cases the source will be of considerable area rather than concentrated as above which will greatly enhance the evenly graduated distribution of illumination in all directions.

What I claim as my invention is:—

1. A reflector for street or highway lighting units comprising a dished annulus having a convergently curved transverse formation and presenting a continuously smooth circumferential curvature of ovate form, and a pair of convergent reflector surfaces extending downwardly adjacent the smaller end of the ovate formation and reflecting light rays directly from the light source and rays reflected from the opposite larger end of the ovate reflector in a direction substantially parallel with the rays reflected by the side walls of the reflector.

2. A lamp for mounting on the road-side of a post or pole disposed at the side of the roadway having in combination an ovate reflector mounted on the pole with the larger end adjacent the roadway and the smaller end adjacent the pole, a light source located substantially midway between the large and small end extremities of said ovate reflector and co-operating therewith to concentrate the light rays mainly asymmetrically in substantially opposite directions along the roadway, and a reflector arranged to overlie the post or pole below the aforesaid reflector and intercepting direct light rays and reflected rays that would otherwise strike the post or pole below the first-mentioned reflector and directing same in paths substantially parallel with the asymmetrically directed rays from the first-mentioned reflector.

3. A reflector construction comprising in combination a rigid metal retaining member formed with an opening therein, the profile of which represents the shape of reflector desired, and a dished circular reflector of annular form fitting into the said opening and deformed by contact with the edges thereof, and firmly secured to said retaining member to preserve its deformed shape.

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