

Dec. 29, 1964

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3,163,365

LANTERNS FOR STREET LIGHTING

Filed March 21, 1961

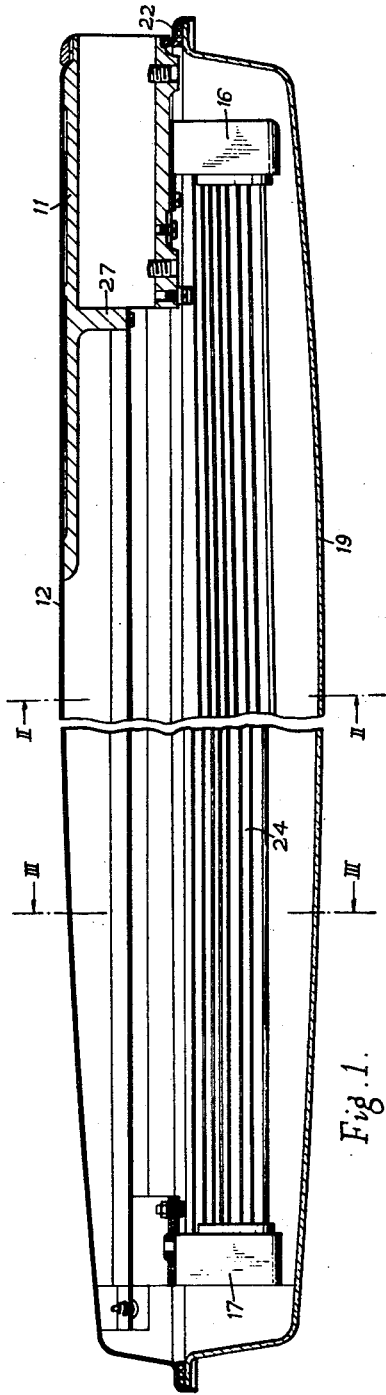


Fig. 1.

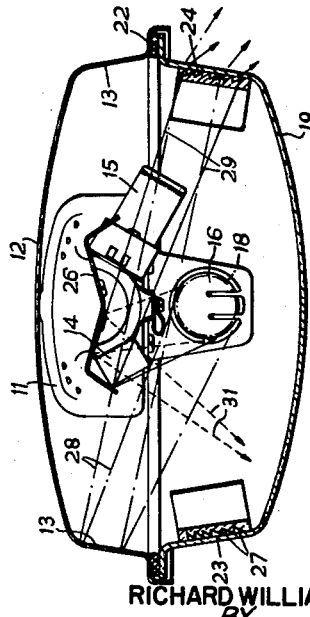


Fig. 2.

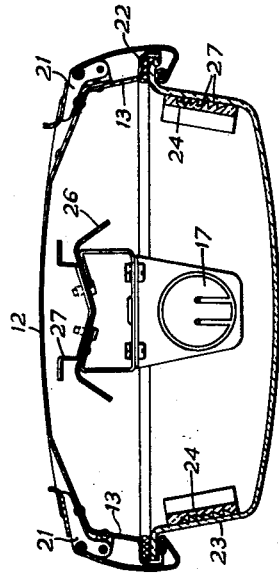


Fig. 3.

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3,163,365

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Filed Mar. 21, 1961, Ser. No. 97,279

Claims priority, application Great Britain Mar. 23, 1960

1 Claim. (Cl. 240—25)

The present invention relates to lanterns for street lighting, and in particular to improved efficiency and light distribution.

To obtain maximum benefit from a given light source, a lantern to be used in conjunction with it must provide carefully controlled light distribution, and it is desirable that the distribution should be such as will reduce or tend to eliminate glare. The development of the 200-watt linear sodium lamp provides a new light source for street lighting which is both compact and of high output. Because the luminous intensity of bare lamps of this type is high (of the order of 2000 candelas) it is especially important that the lanterns should be designed to shield road users from glare. The lantern according to the present invention is of particular value for use in conjunction with the linear sodium lamp, but it will be understood that it is equally applicable to other tubular light sources.

According to the present invention a lantern for street lighting comprises a lamp-holder adapted to support a tubular lamp with its axis generally horizontal, an opaque top canopy in the general form of an elongated inverted trough, mounted to be above and generally parallel to the lamp, two elongated refractor panels mounted below the canopy parallel to and on either side of the lamp and so formed that light from the lamp incident on their inwardly facing surfaces is deflected downwards by its passage through the panels, the panels being so disposed with respect to the lamp and the lower edge of the canopy that substantially no light from the lamp can emerge from the lantern at an angle of 90° or more to the downward vertical in a direction normal to the axis of the lamp, and light-reflectors located on the inner surfaces of the side walls of the canopy and so disposed with respect to the lamp that a major portion of the light from the lamp which falls on the light-reflectors is reflected thereby to leave the lantern at an angle of less than 90° to the downward vertical.

The lantern is preferably provided with an elongated auxiliary reflector mounted above and generally parallel to the lamp and so disposed with respect to the lamp and the said light-reflectors that a major proportion of the light leaving the lamp in a direction above the horizontal is reflected to leave the lantern at an angle of less than 90° from the downward vertical.

A construction giving particular advantages in street lighting is one in which the reflectors and the refractor panels are so disposed relative to the lamp that part of the light emitted by the lamp at angles of more than 75° to the downward vertical is deflected to leave the lantern at angles between 70 and 75° to the downward vertical, the intensity of the emergent light falling off rapidly at angles above 75°.

The light-reflectors located at the side walls of the canopy may conveniently be constituted by highly light-reflective, preferably specular, inner surfaces provided on the side walls. The auxiliary reflector may be of inverted channel form, the side portions of the channel being disposed to reflect light from the lamp onto the inwardly facing surfaces of the refractor panels and the central web portion of the channel serving to reflect light generally downwards without passing through the refractor panels.

One embodiment of the invention will be described by

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way of example with reference to the accompanying drawings in which:

FIG. 1 is a fragmentary vertical longitudinal section of a lantern according to the invention,

FIG. 2 is a vertical cross-section taken along the line II—II in FIG. 1, showing the paths of selected rays of light, and FIG. 3 is a vertical cross-section taken along the line III—III in FIG. 1.

The lantern consists of a support frame 11 which carries an opaque top canopy 12 fabricated, for example, from sheet metal and having the general form of an inverted trough. The side walls of the canopy are provided with polished or otherwise specular reflective inner surfaces 13. The support frame 11 carries a terminal block 14, a starter assembly 15 and also a lamp-holder 16 adapted to support, in conjunction with a secondary holder 17 mounted below the canopy at the other end of the lantern, a tubular lamp such as a linear sodium lamp, the position of which is indicated at 18 in FIG. 2 by a chain-dotted line. An elongated bowl 19 of transparent material such as glass or acrylic resin is mounted below the canopy 12 to which it is secured by toggle clamps 21 pivotally mounted on the canopy. The flanged conjunction of the edges of the canopy and of the bowl is sealed against the ingress of dust and rainwater by a packing 22.

The side walls 23 of the bowl 19 carry refractor panels 24 of transparent material formed with longitudinally extruding prisms 25 of such form as will downwardly deflect light falling on the inwardly facing surfaces of the panels, and in particular will deflect substantially horizontal light from the lamp downwards to emerge from the bowl 19 at an angle of about 70° to the downward vertical. The panels 24 extend up the side walls 23 to a height such that no light can escape from the bowl above the tops of the panels. Thus light from the lamp can escape freely through the bowl 19 in generally downward directions, but no light can without passing through the refractor panels 24 pass through the bowl above the line joining the bottom of the lamp and the bottom of the panels 24. This line thus represents the greatest angle from the downward vertical at which any appreciable light can emerge from the lantern, and in the embodiment described this angle is about 87°. Light emitted by the lamp in generally horizontal directions falls on the inwardly facing surfaces of the refractor panels 24 and is refracted downward to supplement the direct light in the direction about 70° from the downward vertical. The light-distribution diagram thus shows a maximum at an angle of 70–75°, with a rapid falling-off above 75°.

An auxiliary reflector 26 of inverted W-section, having a mirror-like reflective undersurface, is carried within the canopy 12 on brackets 27 at either end of the lantern and extends parallel to and above the lamp. A major proportion of the light emitted by the lamp in directions above the horizontal will thus fall on and be reflected by either the reflective surfaces 13 or the auxiliary reflector 26. The paths of selected typical rays are shown in FIG. 2. The chain-dotted lines 28 indicate the path followed by a beam of light falling on the reflective surface 13, the beam being reflected to fall on the opposite refractor panel, from which it emerges with a further downward deflection. A beam emitted by the lamp in a still higher direction is indicated by the continuous lines 29, the beam being reflected by a side member of the auxiliary reflector 26 and passing through the opposite refractor panel. A beam emitted in the highest zone of all is indicated by the broken lines 31 which show how the beam is reflected by the centre web portion of the auxiliary reflector to pass out the base of the bowl 19. Light reflected from the centre portion of the auxiliary reflector emerges from the lantern in directions of from 20 to 40° from the downward vertical.

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It will be understood that the lantern according to the invention is suitable for mounting not only in an exactly horizontal position above a street to be lit, but also at small angles to the horizontal, and references herein to the generally horizontal direction of the axis of the lamp are intended to include such small departures from the exact horizontal as are sometimes employed in mounting trough-shaped lanterns.

I claim:

A lantern for street-lighting comprising: a lamp-holder adapted to support a tubular lamp with its axis generally horizontal; an opaque top canopy in the general form of an elongated inverted trough, mounted to be above and generally parallel to the lamp; two elongated refractor panels mounted below the canopy parallel to and on either side of the lamp and spaced apart and so formed that light from the lamp incident on their inwardly facing surfaces is deflected downwards by its passage through the panels, the panels being so disposed with respect to the lamp and the lower edge of the canopy that substantially no light from the lamp can emerge from the lantern at an angle of at least 90° to the downward vertical in a direction normal to the axis of the lamp; light-reflectors located on the inner surfaces of the side walls of the canopy and so disposed with respect to the lamp that a major portion of the light from the lamp which falls on the light-reflectors is reflected thereby to leave the lantern at an angle of less than 90° to the downward vertical; an elongated auxiliary reflector mounted above and generally parallel to the lamp and so disposed with respect

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to the lamp and the said light-reflectors that a major proportion of the light leaving the lamp in a direction above the horizontal is reflected to leave the lantern at an angle of less than 90° from the downward vertical; said reflectors and said refractor panels being so disposed relative to the position in which the lamp is supported by the lampholder that part of the light emitted by the lamp at angles of more than 75° to the downward vertical is deflected to leave the lantern at angles between 70 and 75° to the downward vertical, the intensity of the emergent light falling off rapidly at angles above 75°; said auxiliary reflector being of inverted channel form, the side portions of the channel being disposed to reflect light from the lamp onto the inwardly facing surfaces of the reflector panels and the central web portion of the channel serving to reflect light generally downwards without passing through the refractor panels.

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