United States Patent

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[73] Assignee **General Electric Company**
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[54] **LUMINAIRE**
5 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **240/25**
[51] **Int. Cl.** **F21s 1/10**
[50] **Field of Search** 240/25, 48, 52, 3

[56] **References Cited**
UNITED STATES PATENTS

2,289,160	7/1942	Yost	240/25
2,489,076	11/1949	Bjontegard	240/25

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ABSTRACT: Luminaire for street lighting comprises an inverted bowl-shaped casing having a flat leveling pad formed on its top surface and having a slipfitter socket at its rear end arranged with its axis parallel to the plane of the leveling pad. The rim of the casing is at an acute angle to the leveling pad. Leveling screws on the slipfitter enable the luminaire casing to be tilted at the correct angle by adjusting the screws with reference to a spirit level placed on the leveling pad.

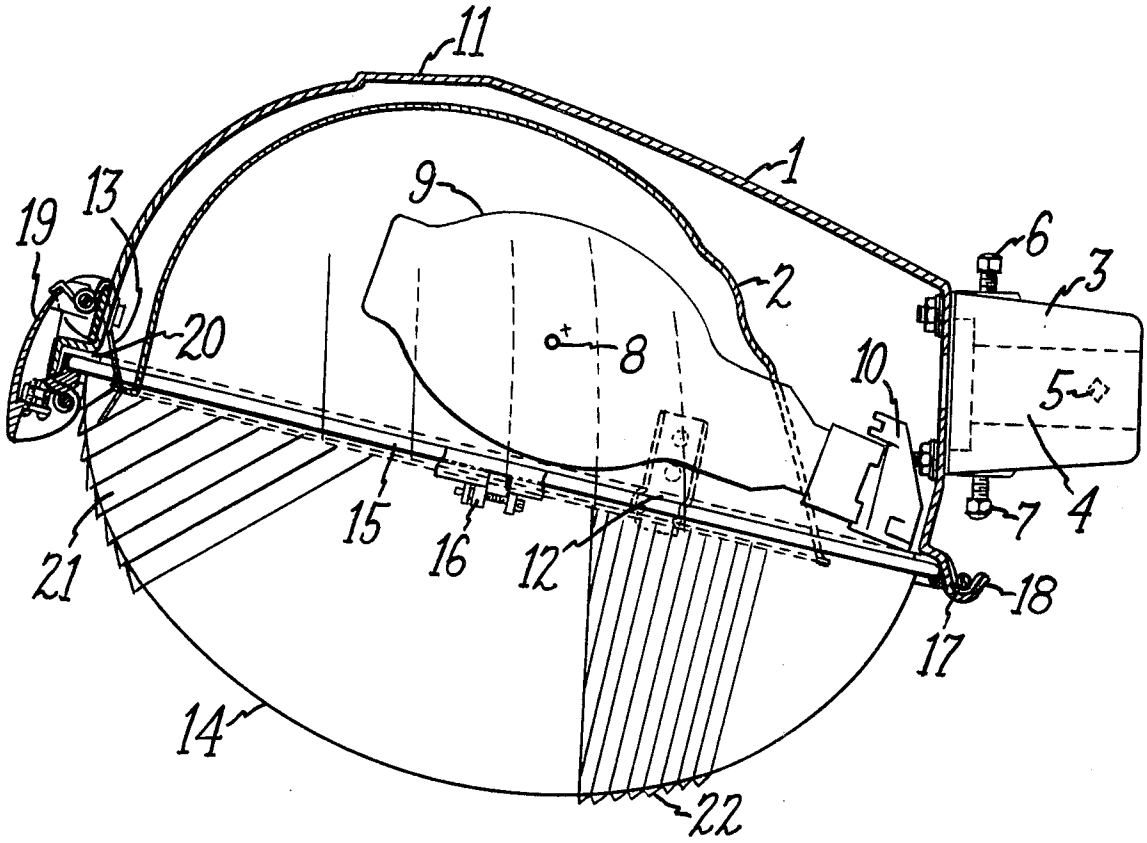


Fig. 1.

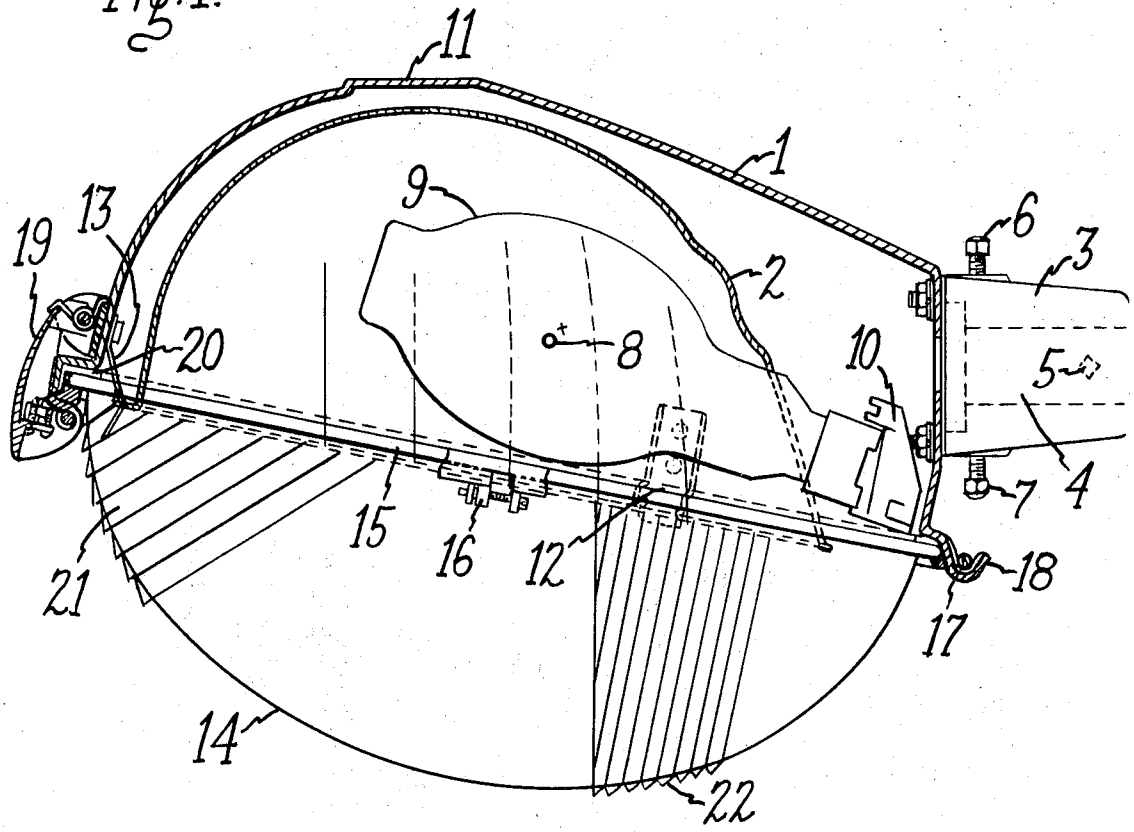
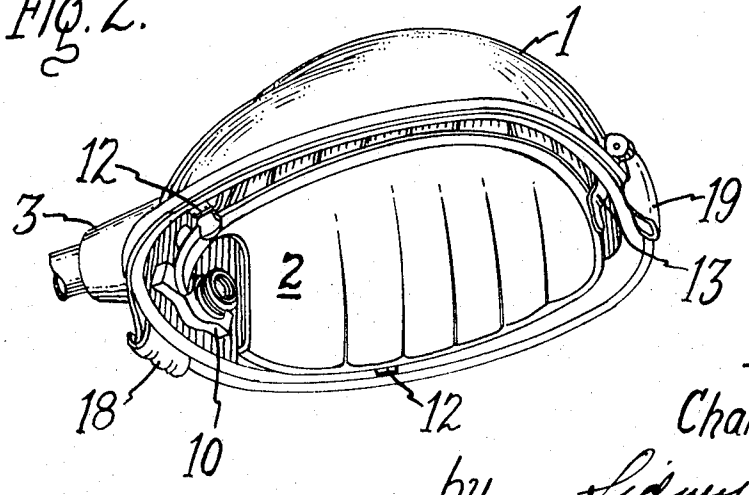


Fig. 2.



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LUMINAIRE

This application is a continuation of application Ser. No. 626,906, filed May 27, 1966, which in turn is a division of application Ser. No. 542,267, filed Oct. 24, 1955, now U.S. Pat. No. 3,283,140, both assigned to the same assignee as the present invention.

My invention relates to luminaires, and more particularly to street or roadway luminaires of the enclosed type including an upper bowl-shaped reflector and a lower bowl-shaped refractor closing the mouth of the reflector.

It has heretofore been proposed to use a luminaire having an ovate horizontal configuration. By disposing such an ovate luminaire at one side of the road with its larger end facing the road, the lower side portions of the reflector may be arranged to direct a large portion of the available light flux into a pair of main oblique reflected light beams directed toward locations in opposite directions along said roadway. By combining a refractor with such a reflector, it is possible to raise the main beams of reflected light from a light source located a substantial distance within the reflector and at the same time direct into or toward the main beams a large portion of the remaining available direct and reflected light. By establishing the main beams at a low vertical angle and raising them by refraction, a wide vertical solid angle of light flux may be directed into the main beams, and the cross-sectional area of a main beam as it leaves the refractor may be increased for advantages such as larger brightness areas.

In such arrangements, the light may be obtained from concentrated filament source such as provided by an incandescent lamp or from an elongated light source such as provided by the arc of a mercury arc lamp. In each case, the optical system may be designed with regard to the geometric center of such a light source, and where an elongated light source is employed, this has been positioned horizontally to the roadway surface. The candle power and lumen output from a mercury lamp arc is highest at angles perpendicular to the lamp axis with comparatively little light being obtained from the ends thereof. With a horizontal location of such a mercury lamp in the luminaire, double reflection may be required from the reflector thereof and the prismatic areas of the refractor have been compromised so as to handle both the reflecting light and light obtained directly from the light source. This complicates the design of the luminaire and does not make the most effective and efficient use of the light from the light source.

In many luminaires heretofore proposed, the arrangement of parts is not conducive to ease in installation or servicing of the luminaire. Furthermore, any particular luminaire may be lacking in flexibility in that it may not be suitable for controlling the lateral light distribution to a roadway in accordance with the varying widths of the roadways to be lighted.

Accordingly, therefore, it is a general object of my invention to provide a new and improved street or roadway luminaire for side-of-the-roadway mounting having improved optical performance resulting from better light control of an elongated light source which places more light within the pattern of the roadway.

It is also an object of my invention to provide a luminaire having its elongated light source tilted up toward the roadway at an acute angle to make better use of the candle power and lumen output of mercury arc lamps which is highest at angles perpendicular to the lamp axis and having the lower edge of its reflector terminating in a plane which is inclined up toward the roadway for improved use of the rear portions of the reflector for direction of light to the roadway whereby better use is obtained from the shielding opaque cutoff of the reflector edge and advantageous use is made of the shielding action obtainable from light depressing prisms.

Additional objects of my invention will become apparent from the following description of an embodiment thereof.

For a better understanding of my invention and a further appreciation of its various objects and advantages, reference may be had to the following detailed specification taken in

connection with the accompanying drawings in which FIG. 1 is a side view of my luminaire with the casing and reflector thereof shown in section and FIG. 2 is a perspective view of the casing-reflector assembly as viewed from below with the refractor removed.

The mechanical construction of my luminaire includes an ovate bowl-shaped casing enclosing a snap-in reflector and a bowl-shaped refractor which closes the mouth of the casing and is supported at its rim by a holder which is attached by a pickoff hinge at the house side of the casing and is held in closed position on the street side thereof by an adjustable roller latch. The reflector nests in the cavity of the casing and the opening in the refractor seats against a gasket on the rim of this casing with its cavity facing the cavity of the reflector to enclose the reflector, lamp, lamp socket, and the required wiring. The casing is supported by a bracket, commonly referred to as a slipfitter, whose supporting axis is at an acute angle to the opening in the casing and the projection of which passes through the light source provided by a mercury arc lamp mounted in the casing. The top of the casing is provided with a leveling pad having a surface parallel to the axis of support of the supporting bracket or slipfitter of the luminaire. The socket for the mercury lamp is attached to the inside of the casing below openings in the bracket and casing for lead wire entrance to the terminals thereof. When the arc length of the mercury arc lamp used requires, because of its length, a magnetic control, an electromagnet may be mounted on the inside top portion of the casing above the lamp. When such a construction is employed, an opening is provided in the top of the reflector to accommodate the electromagnet. The reflector is also cut away at the lower portion on the house side thereof to provide a passageway for a lamp mounted in the socket of the luminaire and projecting into the cavity of the reflector and for affording access to the socket terminals without removing the reflector.

As previously noted, the candle power and lumen output from a mercury arc lamp arc is highest at angles perpendicular to the lamp axis with comparatively little light near the ends of its axis. If the lamp axis is positioned horizontally and transversely to the roadway, an approximately equal amount of light would be delivered to the house side and street side of the roadway. But less light is wanted on the house side and more lamp light is needed on the street side toward the pavement center line. To obtain this desirable asymmetry and more efficient street side use of downward direct light from the lamp, the axis of the light source in luminaires constructed in accordance with these teachings is tilted up toward the roadway by about 10° to 20° in a plane transverse to the roadway and the rim of the reflector associated therewith is also cutoff in a plane tilted up by about 10°. The upwardly directed light from this up tilted light source is controlled by a reflector which directs reflected light through a refractor toward the roadway.

As previously noted, the mouth of the reflector is inclined to the roadway in the same direction as the elongated light source. This results in a lower angle of shielding on the house side of the luminaire to vertical angles such as 70° without lowering the 75° vertical angle of maximum candle power supplied by the reflected light beams. Inclination of the elongated light source and of the reflector and refractor also facilitates control of the light distribution for reduction of the adverse effects of disability or veiling glare.

In a transverse across-the-road vertical section through the luminaire, hereafter known as the vertical median plane, most of the light from the inclined elongated light source is transmitted through the refractor without vertical prismatic action. There are, however, prisms on the upper front portion of the refractor which depress direct light incident thereto downwardly to the roadway. These prisms occupy a visor-shaped area wrapped around the entire upper front portion of the refractor for shielding and build up of light along the far side of the roadway pattern. On the house side of the refractor immediately behind the areas thereof which intercept the main beams of reflected light, a bond of wraparound prisms

may also be provided for deflecting light incident thereto to the roadway. In this same median plane, control of upward light from the light source is obtained by deflection across the roadway largely without the aid of prismatic control. The reflector contour proportions the light distribution toward the center and far side of the roadway. Elliptical transverse top sections of the reflector distribute light along longitudinal roadway lines between locations where the maximum candle power of the reflected light beams impinge on the roadway. The desired pavement brightness along the far side of the roadway is obtained in part by the three dimensional twist contouring in this upper portion of the reflector in combination with prismatic control by the refractor.

Referring to the drawing, and in particular to FIGS. 1 and 2 thereof, my luminaire comprises an ovate bowl-shaped casing 1 housing a detachable ovate bowl-shaped reflector 2 and supported by a bracket 3 at its rear or street side end. This bracket 3, commonly referred to as a slipfitter, is provided with a pipe socket 4 for mounting on the end of a support pipe, a portion of which is shown in FIG. 2, to which it is attached by a locking screw 5 which is threaded in and passes through the sidewall of the slipfitter. Top and bottom leveling screws 6 and 7, which also pass through the sidewall of the slipfitter, are provided for leveling the luminaire on its support member. The longitudinal support axis of the pipe socket 4 of slipfitter 3 is inclined at an angle of about 10° with the rim portion of casing 1 located about the open mouth thereof and a projection of this support axis passes through the elongated light source 8 of a mercury arc lamp 9 which is mounted in a lamp socket 10 attached to the lower bottom rear portion of casing 1. This lamp socket 10 is positioned in the casing 1 so that the longitudinal axis of the elongated light source 8 is tilted up toward the roadway at an angle of about 20°. In order that the angles of tilt above-described may be obtained, the casing 1 is provided with a leveling pad 11 at its top which has a surface parallel to the support axis of the slipfitter 3. By placing a spirit level on the top surface of the leveling pad 11 and adjusting leveling screws 6 and 7, the desired angularity of the rim portion of the casing and of the longitudinal axis of the lamp may be obtained with accuracy.

The open mouth of the casing 1 is closed by an ovate bowl-shaped glass refractor 14 which is mounted in a holder 15 which engages the rim portion of the refractor. This holder is of split ring construction and is provided with a clamping screw arrangement 16 to accommodate variations in rim sizes of different refractors. The holder is hinged at its house side by means of a steel pin 17 which forms a part thereof and rests in a hooked portion 18 of the casing 1 to provide a pickoff hinge connection between the casing 1 and the holder 15. The front end of the holder 15 is provided with a projection which is engaged by a roller latch 19 on the front outside edge portion of casing 1 when the refractor is in its closed position. The holder 15 is so constructed that the rim edge of refractor 14 rests directly against a gasket 20 which is cemented to or otherwise attached to the rim portion about the open mouth of the casing 1. Latch 19 may be made adjustable so as to obtain a tight seal between the rim of refractor 14 and gasket 20 mounted on the rim portion of casing 1.

As shown in FIG. 1, the refractor 14 is provided on its external surface with bands of wraparound prisms which are employed for light control. These prisms occupy a visor-shaped area 21 at the front end of the refractor and a band area 22 a slight distance behind the light center of the arc 8 of lamp 9. The structure and function of the surfaces of the refractor shown in FIG. 1 are fully disclosed in the aforesaid parent application of which this application is a division.

I claim:

1. A luminaire comprising, in combination, housing means having front and rear portions and a downwardly facing mouth, and having an external surface having portions defining a first plane and adapted to serve as horizontal leveling means, a concave reflector mounted in said housing means at the mouth thereof and having a downwardly facing mouth defined by a rim lying in a second plane at an acute angle to said first plane, and bracket means formed with a mounting socket secured to said housing means at its rear portion with its socket axis substantially parallel to said first plane, and a lamp socket attached to said housing means and arranged with its axis extending generally between said front and rear portions of said housing means, the axis of said lamp socket being at an acute angle to the axis of said mounting socket and to said first plane.

2. A luminaire as defined in claim 1, said second plane being at an angle of about 10° to said first plane.

3. A luminaire comprising, in combination, an inverted bowl-shaped casing having front and rear portions and having a top surface formed intermediate said front and rear portions with a flat portion adapted to serve as a horizontal leveling pad, said casing having a downwardly facing mouth defined by a rim lying in a plane at an acute angle to the plane of said flat top portion, a lamp socket arranged within said casing with its axis extending in a direction generally along the fore and aft axis of the casing, and bracket means formed with a mounting socket secured to said casing at the rear portion thereof with its socket axis substantially parallel with the plane of said flat top portion.

4. A luminaire as defined in claim 3, the axis of said lamp socket being at an acute angle to the axis of said mounting socket and to the plane of said flat top portion.

5. A luminaire as defined in claim 3, including means for attaching said bracket means to a support member adapted to be received in said mounting socket and for tilting said bracket means relative to the support member comprising leveling screws positioned opposite one another in a vertical plane and a clamping screw in a horizontal plane, all of said screws extending through said bracket means into said mounting socket thereof.