

July 2, 1935.

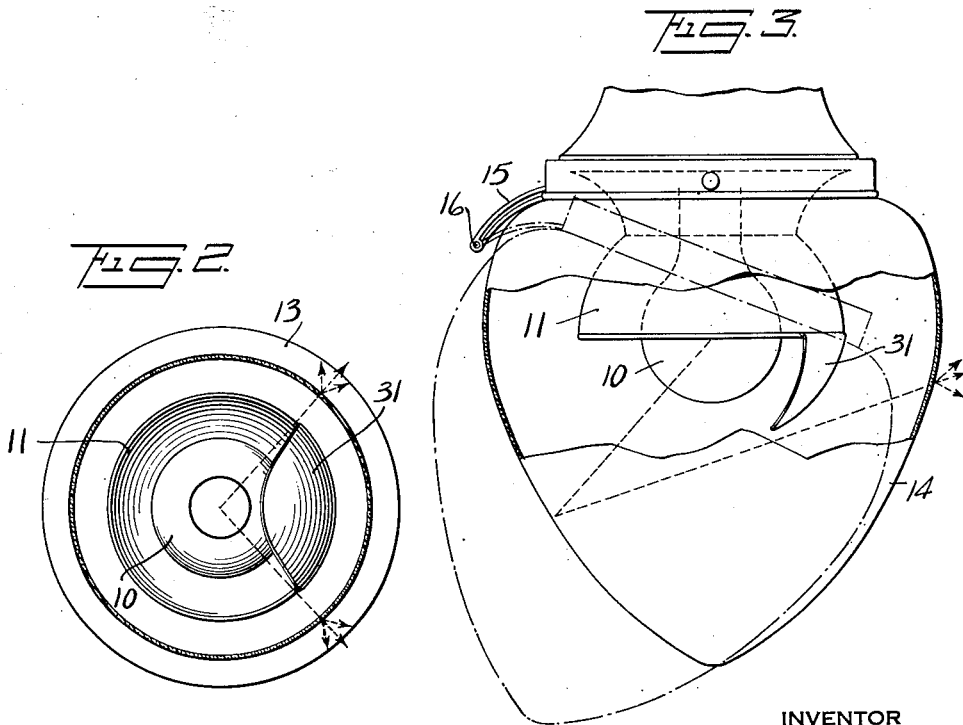
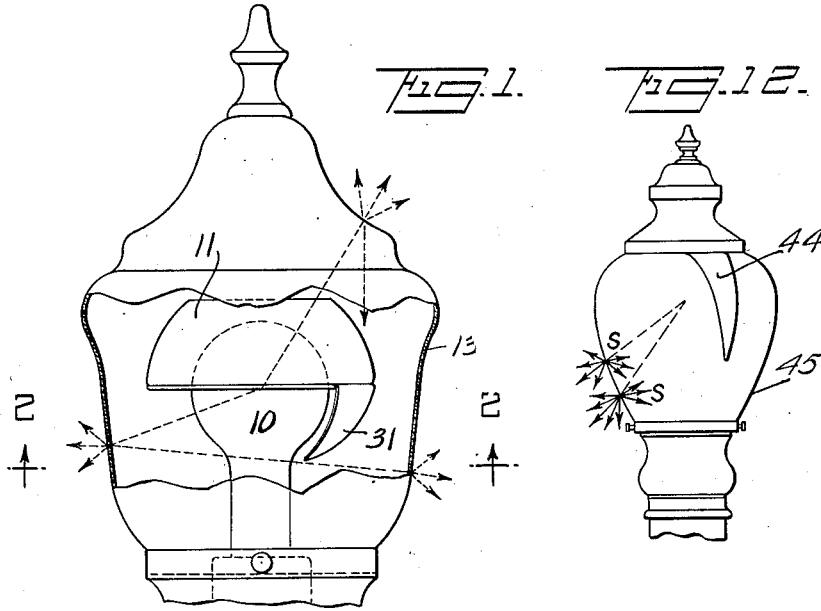
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2,007,033

LIGHTING UNIT

Filed Jan. 2, 1932

3 Sheets-Sheet 1



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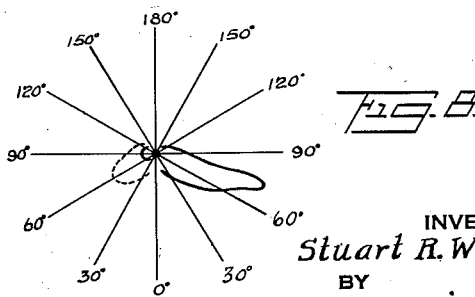
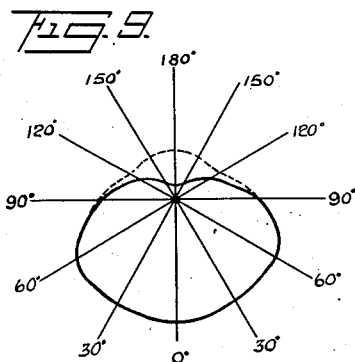
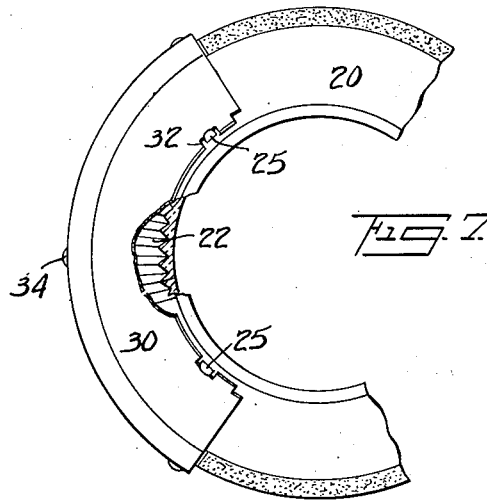
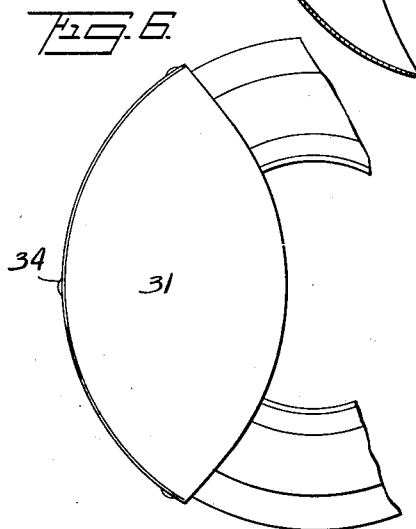
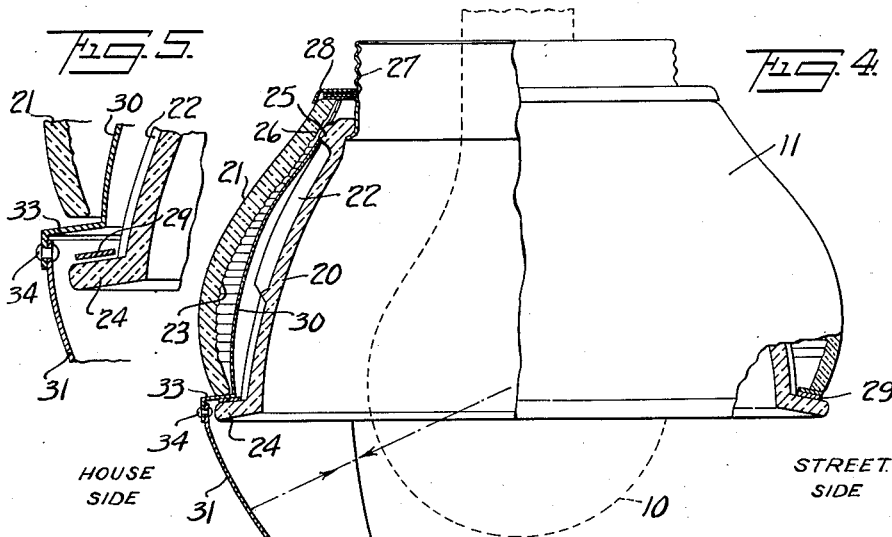
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LIGHTING UNIT

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3 Sheets-Sheet 2



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LIGHTING UNIT

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Fig. 10

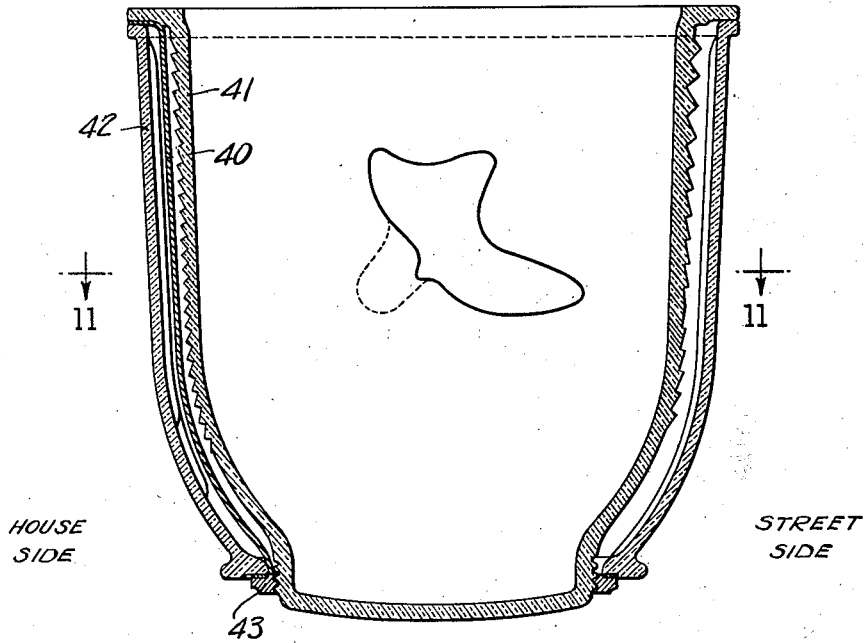
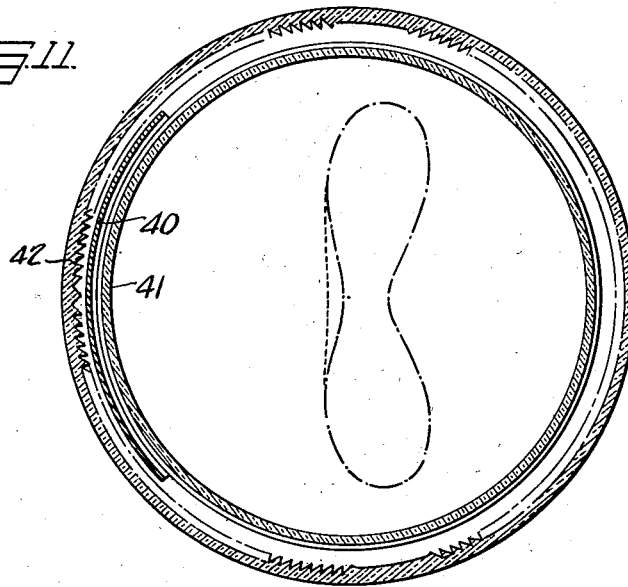


Fig. 11



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UNITED STATES PATENT OFFICE

2,007,033

LIGHTING UNIT

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Application January 2, 1932, Serial No. 584,323

12 Claims. (Cl. 240—25)

The present invention relates to lighting units and is more particularly directed toward lighting units having light shields for cutting off light in predetermined directions.

5 In lighting installations employing globes with or without refractors, (either of symmetric or asymmetric types) there is the possibility that a more or less objectionable light beam may be emitted in a direction where it causes glare or a
10 bright spot of an objectionable contrasting nature. The present invention contemplates providing light shields which cut off this objectionable light, preferably without noticeably altering the appearance of the unit when casually observ-
15 ing the same.

When controlled street lighting is obtained by refractors which direct the light on to the street surface, difficulties frequently arise on account of the casting of a beam of light, more or less
20 intense, in directions where the light is not desired, as for example, toward buildings along the side of the street. Various expedients have been tried to cut off this undesired light but have been unsatisfactory on account of the appearance, the
25 possibility of breakage, the inability to replace in proper position, and difficulty of adjustment.

The present invention contemplates a luminaire more especially designed for street lighting provided with a light shield which effectively cuts
30 off the light in directions where it is not desired, remains in adjustment, and can be replaced whenever necessary.

The present invention contemplates the luminaire wherein the refractor carries an opaque
35 light shield which cuts off the light through a predetermined angle and prevents the emission of light in predetermined directions. Where the refractor is asymmetric, the light shield is generally placed on the side of the refractor opposite the maximum beam. According to the
40 present invention the refractor and shield are secured together forming a unit which can be replaced and adjusted without any possibility of the shield being improperly placed relative to the refractor. These parts are handled as a
45 unit and the shield may, therefore, be always properly oriented in the complete unit.

These street lighting units are generally provided with a slightly diffusing enclosing glass
50 globe through which the light from the refractor is transmitted. According to the present invention, the light shield is located in such a manner that while it functions to cut off light in undesired directions, it does not cast an objectionable
55 shadow on the enclosing globe.

In some forms of street lighting units, the refractors employed are open below the light source so that downwardly directed light is transmitted without refraction. Where such refractors are used, the lighting unit, so far as this direct light is concerned, is symmetrical irrespective of whether an asymmetric refractor or a symmetric refractor is employed. Some of this direct light may, therefore, form a beam of objectionable intensity or make a relatively bright area on the
5 sidewalk. The present invention also contemplates a light shield preferably secured directly to the refractor and acting to cut off this direct light through a predetermined angle so as to avoid brightly illuminating the adjacent area
10 of the sidewalk. In order to improve the appearance of the lighted unit and facilitate the opening of certain forms of this street lighting unit, the portion of light shield below the refractor is curved in vertical planes as well as in
15 horizontal planes.

Other and further objects of the invention will appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, several
25 embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same. In these drawings:

Fig. 1 is a sectional view more or less diagrammatic through a form of street lighting unit employing an upwardly removable enclosing globe;

Fig. 2 is a section taken on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a view similar to Fig. 1 illustrating a form of street lighting unit employing a pendant globe;

Fig. 4 is a sectional view with parts in elevation showing an asymmetric refractor open below the light source and provided with a light
40 controlling shield;

Fig. 5 is a fragmentary sectional view showing the same parts as Fig. 4;

Fig. 6 is an inverted plan view of the refractor and light shield of Fig. 4;

Fig. 7 is a top plan view of the inner member of the refractor showing the light shield in place thereon;

Fig. 8 is a diagram showing the vertical distribution of light of the asymmetric dome refractor of Fig. 4, with and without the light shield;

Fig. 9 is a diagram illustrating the lateral distribution of light at the angle of maximum distribution in vertical planes;

Fig. 10 is a vertical sectional view through a bowl type asymmetric refractor arranged to produce two light beams and provided with a light shield;

Fig. 11 is a sectional view on the line 11-11 of Fig. 10, and

Fig. 12 shows a lighting unit having an outer diffusing bowl and an enclosed light shield.

In the street lighting unit shown in Figs. 1 and 2, the light source is indicated at 10 and a dome type refractor of usual form is indicated at 11. It is designed for symmetrical or asymmetrical distribution of light as desired, and is surrounded by an enclosing structure which includes a lower globe 13 made of slightly diffusing glass.

In Fig. 3, the street lighting unit employed has a dome refractor 11 which may be the same as above referred to and this refractor is housed in an enclosing envelope or globe 14 made of slightly diffusing glassware and hinged to a supporting ring 15 as indicated at 16. This globe may be swung down as indicated in dotted lines to permit access to the lamp and refractor.

The refractor 11 is made of two annular glass rings 20 and 21 as usual. Where the refractor is asymmetric, it is provided with totally reflecting prisms 22 on its outer surface extending through a predetermined angle, such as 90°. The outer glass part 21 is provided with internal prisms and flutes as usual, flutes 23 being placed opposite the reflecting part of the inner glass ring. The inner glass part is provided with a flange 24 around its lower edge and with lugs 25 which normally enter recesses 26 in the inner surface of the outer ring so that the outer ring may be received in proper position on the inner ring. These rings are normally clamped together by metal rings indicated at 27 and 28. A gasket 29 is placed on the flange 24, this gasket having two thicknesses where the light shield, to be referred to, is not present, and a single thickness where the light shield is present.

The light shield for use with this form of refractor is made of two pieces of sheet metal. The upper piece is indicated at 30 and the lower piece at 31. The upper shield piece 30 is shaped to be received between the glass parts 20 and 21. It has notches 32 to fit lugs 25 so that the shield will be located back of the totally reflecting prisms. The stamping 30 has an annular flange-like portion 33 which extends out underneath the lower edge of the outer glass ring 21. The lower shield member 31 is secured to the upper member 30 by rivets as indicated at 34. This lower member is preferably curved in both horizontal and vertical directions as indicated. It may conveniently approximate a spherical surface and where such a surface is provided it reflects the light beam into the opposite side of the refractor for retransmission thereby. This light shield intercepts a spherical wedge of light.

As will be apparent from Figs. 1-3 inclusive, this light shield is close to the light source and spaced a substantial distance from the diffusing globe 13 or 14. There is always considerable spillage of light from the refractor and stray light reflected inside the globe so that the globe opposite the shield is dimly illuminated instead of presenting a sharp shadow. Light rays, effective for this purpose, are indicated by lines S in these figures.

By making the lower part 31 of the light shield of the shape indicated, the possibility of casting a marked shadow on the glass is lessened, a mini-

imum amount of material is required, and no interference is offered to the lowering of the pendant globe as indicated in Fig. 3.

Figs. 8 and 9 indicate the light distributions of a unit such as above described, the full line curves indicating light distribution in vertical and lateral directions when the light shield is employed, the dotted lines on the house side of the unit indicating the light which would be projected by the asymmetric unit in the absence of the light shield.

Figs. 10 and 11 indicate the application of the opaque light shield to bowl type refractors closed, or substantially closed at the bottom. The light shield is in the form of an opaque screen 40 interposed between the inner and outer glass parts 41 and 42. The light shield is secured in place when the clamping ring 43 is tightened so that in this construction the light shield is fixedly held in place and this refractor with light shield can be replaced and adjusted as a unit.

In Figs. 10 and 11 the vertical and lateral distributions of the light are illustrated by the dotted curves. It is, of course, understood that the refractor of Figs. 10 and 11 could be enclosed in a globe as usual.

In the unit shown in Fig. 12 the shield is indicated at 44. It is inside the slightly diffusing bowl 45, and like the other shields, is shaped to intercept light from the light source above an inclined plane passing through the source and through the boundary line of the street along the ground on the house side of the luminair, so that no direct light falls on the globe above this plane. Scattered light inside the globe illuminates the globe back of the shield to soften the shadow which would otherwise be cast.

It is obvious that the invention may be embodied in many forms and constructions, and I wish it to be understood that the particular forms shown are but a few of the many forms. Various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. A street lighting unit comprising a light source, an asymmetric refractor about the light source for producing asymmetric longitudinal distribution, an enclosing globe of slightly diffusing glass about the refractor, and a light shield fixedly carried by the refractor for cutting off all light in a predetermined horizontal angle opposite the direction of maximum beam, the light shield being spaced from the globe to permit stray light to illuminate the globe opposite the screen and soften the shadow which would otherwise be cast by the shield on the globe.

2. In a luminair, a light source, an asymmetric refractor about the light source and comprising two annular glass parts one outside the other, the glass parts having prisms for redirecting light from the light source in predetermined directions and including totally reflecting prisms on the outside surface of the inner ring through a predetermined horizontal angle thereof, and an opaque shield interposed between the glass parts and placed opposite the totally reflecting prisms so that no light is emitted from the refractor in that direction.

3. In a luminair, a light source, an asymmetric refractor about the light source and comprising two annular glass parts one outside the other, the glass parts having prisms for redirecting light from the light source in predetermined directions and including totally reflecting prisms

on the outside surface of the inner ring through a predetermined horizontal angle thereof, and an opaque shield interposed between the glass parts and placed opposite the totally reflecting prisms so that no light is emitted from the refractor in that direction, the glass parts and shield being secured together as a unit so that the unit may be installed in place without disturbing the adjustment of the parts.

4. In a luminair, a light source, an asymmetric refractor about the light source and comprising two annular glass parts one outside the other, the glass parts having prisms for redirecting light from the light source in predetermined directions and including totally reflecting prisms on the outside surface of the inner ring through a predetermined horizontal angle thereof, and an opaque shield interposed between the glass parts and placed opposite the totally reflecting prisms so that no light is emitted from the refractor in that direction, and a slightly diffusing glass globe outside the refractor and spaced therefrom so that spilled light and stray light within the globe may illuminate the globe opposite the shield to materially reduce the shadow cast on the globe by the shield.

5. In a luminair, a light source, a refractor about the light source and comprising two annular glass parts one outside the other, the glass parts having prisms for redirecting light from the light source in predetermined directions, the refractor being open below the light source so as not to intercept downwardly emitted direct light, and an opaque shield interposed between the glass parts and intercepting the light through a predetermined angle so that no light is emitted from the refractor in that direction, the shield having a downward extension below the glass parts which intercepts a gradually diminishing area of the direct light through the same horizontal angle as the upper part of the shield and also without intercepting the downwardly emitted direct light.

6. A street lighting unit comprising a light source, an asymmetric refractor about the light source for obtaining a more intense light distribution on the street side of the unit than on the house side, the refractor being made of two parts and open below the light source so as not to intercept downwardly emitted direct light, a slightly diffusing enclosing globe, and an opaque screen member below the refractor and the house side of the light source to intercept direct light and reflect it toward the street side, the screen member being close to the light source and spaced a substantial distance from the globe to reduce shadow both on the globe and on surrounding areas, the screen member being supported by a portion thereof which extends between the glass parts and intercepts light which would otherwise be transmitted through the outer glass part toward the house side of the unit.

7. A street lighting unit comprising a light source, an asymmetric refractor about the light source for obtaining a more intense light distribution on the street side of the unit than on the house side, the refractor being open below the

light source so as not to intercept downwardly emitted direct light, a globe supporting ring hingedly supported above the refractor on the street side of the unit, a slightly diffusing enclosing globe secured to the ring, and an opaque screen member below the refractor and on the house side of the light source to intercept direct light and reflect it toward the street side, the screen member being curved inwardly to permit the hingedly supported globe to be lowered, and being close to the light source and spaced a substantial distance from the globe to reduce shadow both on the globe and on surrounding areas.

8. In combination, a light source, an annular refractor intercepting light emitted upwardly from the light source and redirecting it into a downwardly slanting beam, the refractor being open below the light source so as not to intercept downwardly directed direct light, and an opaque screen member extending downwardly from the lower edge of the refractor for intercepting direct light through a predetermined angle and reflecting it toward the refractor for retransmission thereby.

9. In combination, a light source, an annular refractor intercepting light emitted upwardly from the light source and redirecting it into a downwardly slanting asymmetric beam, the refractor being open below the light source so as not to intercept downwardly emitted direct light, and an opaque screen member on the side of the refractor opposite the maximum beam and extending downwardly from the lower edge of the refractor for intercepting direct light through a predetermined angle and reflecting it in the general direction of the maximum beam.

10. In a street lighting unit, a light source, a refractor above the light source for concentrating upwardly directed light into a downwardly slanting beam, an upwardly opening enclosing globe for the globe refractor, a globe supporting hinge above and to one side of the refractor, the globe being lowered about said hinge to permit access to the lighting unit, and a light intercepting screen below the refractor for cutting off direct light, the screen being on the side opposite the hinge and close to the light source so as not to interfere with the lowering of the globe.

11. In combination, an asymmetric refractor comprising two annular glass parts secured together, the inner part having a flange to receive the outer part, the inner part having externally disposed totally reflecting prisms extending about a portion of its circumference to return the light inwardly, and an opaque light shield interposed between the glass parts outside the totally reflecting prisms to cut off stray light.

12. In a luminair, a light source, an asymmetric refractor about the light source for altering the light distribution and providing a predetermined asymmetrical distribution in horizontal planes and having a prismatic reflecting zone opposite the maximum beam of the refractor, and an opaque light shield intercepting light normally emitted through the prismatic reflecting zone.

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