May 17, 1966 V. S. WINCE 3,251,987

REFRACTOR

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Fig. 1a.

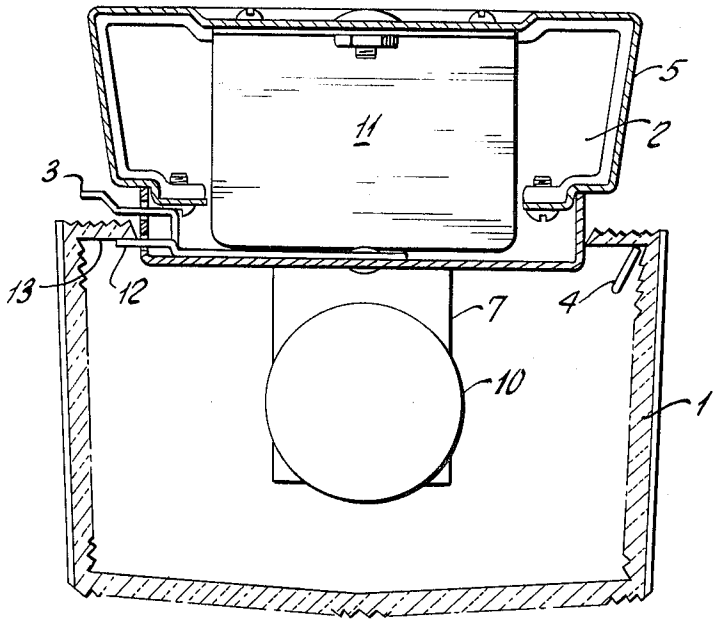

Fig. 1b.

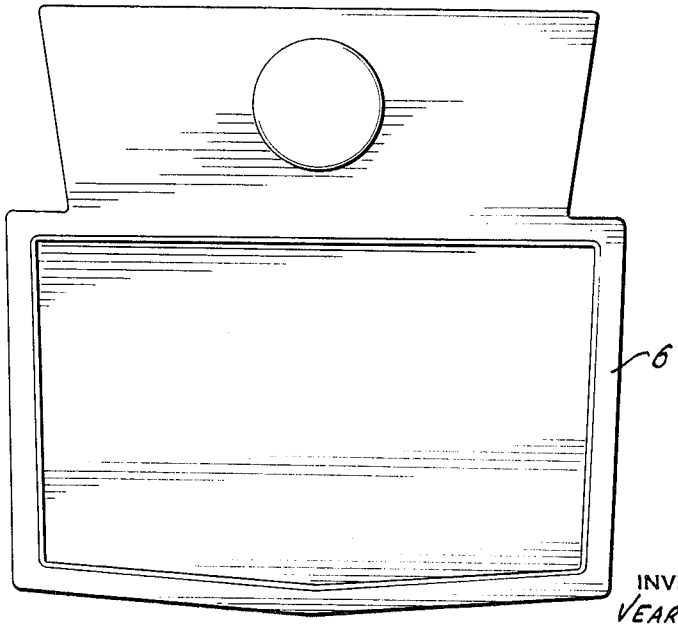

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Fig. 2.

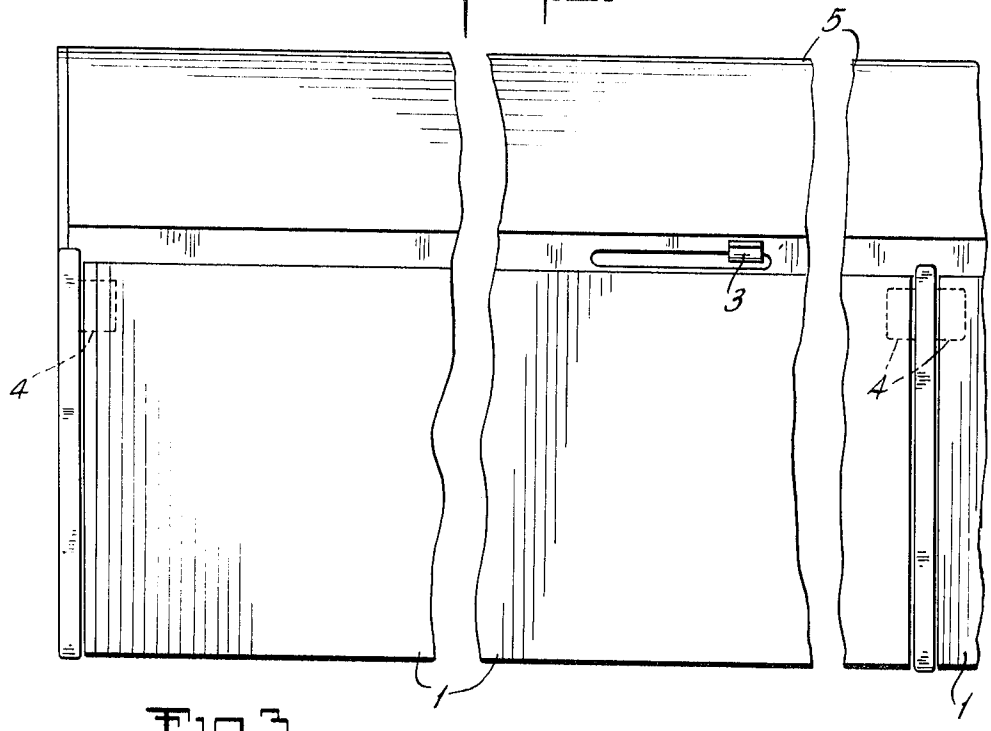

Fig. 3.

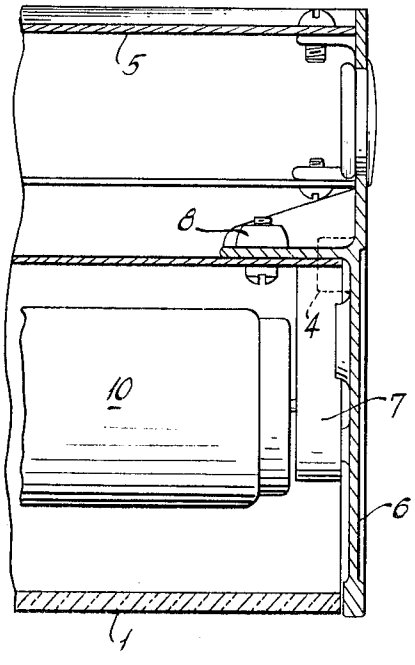

Fig. 4.

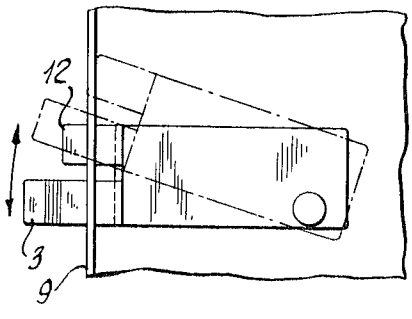

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Fig. 5.

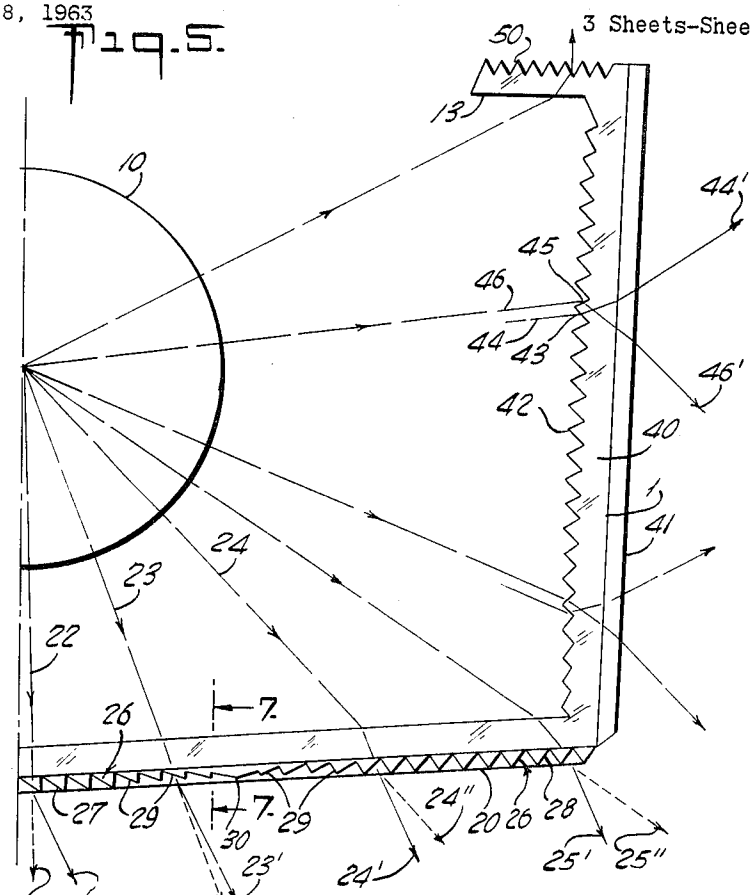


Fig. 6.

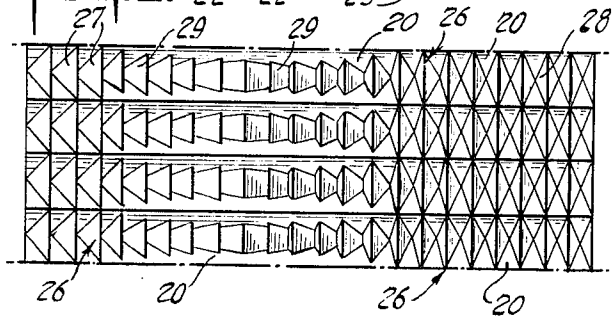


Fig. 8.

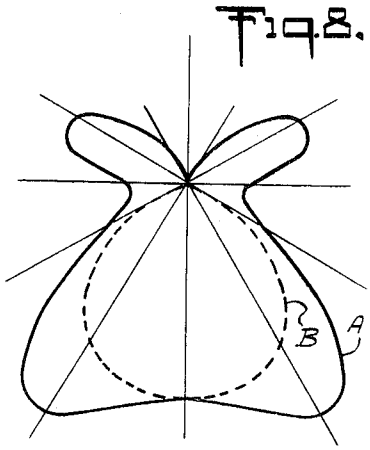
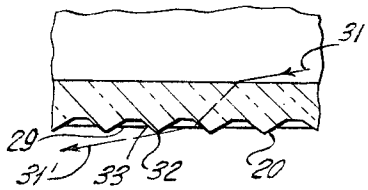


Fig. 7.



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United States Patent Office 3,251,987
Patented May 17, 1966

3,251,987

REFRACTOR

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Filed Nov. 8, 1963, Ser. No. 322,563
6 Claims. (Cl. 240—106)

This invention relates to luminaires, and more particularly to a refractor for use in a luminaire.

The luminaire described herein uses fluorescent lamps and may be used to illuminate building corridors, although it could also be used in other areas where a unit of similar output and distribution is required.

In lighting corridors, it is not only desirable to illuminate people and objects in the corridor, but also to delineate the corridor itself by directing light to the walls, ceiling and floor. At the same time, brightnes of the unit must be at a comfortable level, not only along the corridor, but also across the corridor, since some occupants will at times be facing that direction through open doorways or in work areas along the corridor.

Accordingly, the object of this invention is to provide and improved refractor for use in a corridor or the like.

In the attached drawings:

FIG. 1*a* is a cross section of the unit;

FIG. 1*b* is an end view of the unit;

FIG. 2 is a side elevation of the unit;

FIG. 3 is a cross section at the end of the unit;

FIG. 4 is a plan view of the latch;

FIG. 5 is a large scale cross section of the optical system;

FIG. 6 is a fragmentary plan of the bottom prism;

FIG. 7 is a section 7—7 of FIG. 5;

FIG. 8 is a candle power curve of the unit;

In detail, the luminaire consists of a plastic refractor **1**, for example, four feet in length. Refractor **1** is held to a fixture **2** by means of latches **3** and hinge lugs **4**.

The fixture **2** consists of a channel member **5**, which can be of four feet or eight feet lengths. This channel is capped by end plates **6** which carry lamp sockets **7** and provide a means **8** for supporting a channel cover strip **9**. Ballast equipment for operating the lamp **10** is shown at **11**.

Access to the lamp is obtained by rotating the latches **3** as shown in FIG. 4 until the fingers **12** clear the flange **13**. The refractor can then swing open by pivoting on the lugs **4**. The refractor can also then be removed if desired by simply lifting it off the lugs.

The desired candlepower distribution curves are shown in FIG. 8. Curve "A" is the distribution in a plane transverse of the corridor while curve "B" is in a plane along the corridor.

Cut-off prisms **20** extend transversely across the face of refractor **1**, as shown in FIG. 5, and form with their surfaces a series of peaks with valleys therebetween. These prisms prevent glare light being emitted in directions along the corridor, but they modify the light rays very slightly in transverse directions, as shown by rays **22, 22", 23, 23", 24, 24"** and **25, 25"**.

To obtain the candlepower curve "A," another set of refracting prisms described generally as **26** extend longitudinally through the transverse cut-off prisms **20**. These prisms **26** concentrate the light as shown by rays **22, 22', 23, 23', 24, 24'** and **25, 25'**. The deeper prisms, such as prisms **27** and **28** have their own cut-off action in longitudinal directions (see Rolph Pat. No. 2,648,763). However, the more shallow prisms **29**, near the nodal point **30**, have little or no cut-off action, and could therefore emit light up to the horizontal in directions along the corridor. This undesirable feature is avoided in this design by locating these prisms at a controlled depth in the

transverse prisms **20** so that the transverse prisms act as shields. This is shown by ray **31–31'** in FIG. 7. Note that point **32** of cut-off prism **33** acts as a shield. The angle of shielding can be controlled by locating the refracting prisms **29** higher or lower.

In the area of refracting prisms **27** and **28**, the cut-off prisms **20** are theoretically not required since the refracting prisms themselves provide sufficient cut-off. However for the transverse light distribution required, the arrangement shown in FIG. 5 is satisfactory.

The side panels **40** of refractor **1** carry vertical cut-off prisms **41** on their outer faces and longitudinal refracting prisms **42** on their inner faces. The lower face **43** of prisms **42** refract the incident light upwardly as shown by typical ray **44–44'** while the upper face **45** refracts the incident light downwardly as shown by typical ray **46–46'**.

The upper horizontal flange **13** carries prisms **50** which direct the incident light upward to light the sides of channel **5** and the immediate ceiling area.

Although a specific embodiment of the invention has been described, the invention is not so limited and should only be defined by the following claims.

What is claimed is:

1. A refractor for use with a line source of light mounted on a ceiling of a corridor or the like, comprising a plurality of transverse cut-off prism means for internally reflecting high angled light which would otherwise be emitted at glare angles in the direction of said corridor, said prism means being formed of surfaces defining peaks and valleys, a plurality of refracting prisms extending longitudinally through said transverse prisms, some of said refracting prisms comprising shallow prisms lying in planes at a predetermined depth and inwardly of the peaks of said prism means, said cut-off prism means further comprising means for shielding light emitted by said shallow prisms approaching the horizontal in the direction of said corridor.

2. A refractor for use with a linear light source mounted on a ceiling of a corridor or the like, comprising a light emergent surface, a plurality of transversely oriented cut-off prisms formed on said light emergent surface, said cut-off prisms including means for internally reflecting high angled light along the corridor, a plurality of refracting prisms also formed on said light emergent surfaces, and extending in the direction of the corridor and through said transverse prisms, some of said refracting prisms being shallower than said transverse cut-off prisms, whereby said cut-off prisms constitute means for shileding near horizontal light emitted by said shallow prisms in the direction of the corridor.

3. Refractor means for receiving and transmitting light from a light source, said refractor means comprising a light emergent surface elongated in a first direction, a plurality of first prisms on said light emergent surface and extending in a second direction transversely relative to said first direction, said first prisms being defined by surfaces converging outwardly into peaks with alleys therebetween, a plurality of second prisms on said light emergent surface and including active surfaces extending in said first direction and superimposed on said surfaces of said first prisms between the peaks thereof, said active surfaces including means for redirecting light in said second direction transversely of said first direction and for emitting some light in said first direction at glare angles in paths close to said emergent surface, at least some of said second prisms extending entirely in planes inwardly to the peaks of said first prisms, said first prisms comprising means for shielding the light emitted in said first direction at said glare angles by said some of said second prisms.

4. The refractor means of claim 3, wherein said first prisms further comprise means for internally reflecting light which would otherwise be emitted in said first direction at glare angles.

5. A refractor as recited in claim 4, wherein said some of said second prisms are disposed at varying depths between the peaks of said first prisms and the others of said second prisms lie in paths on either side of said some of said second prisms.

6. A refractor as recited in claim 5, wherein said light emergent surface comprises two symmetrical portions extending in said first direction on either side of a longitudinal center line, each of said symmetrical portions having said some of said second prisms disposed at varying depths between the peaks of said first prisms, and the others of said second prisms lying in paths on either side of said some of said second prisms.

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