

March 18, 1969

W. B. HALL
LIGHTING UNIT

3,433,941

Filed Dec. 30, 1966

Sheet 1 of 2

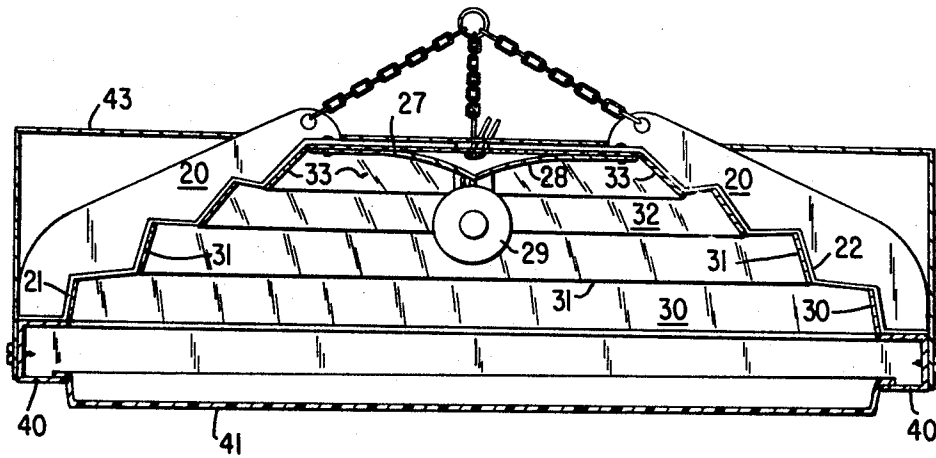
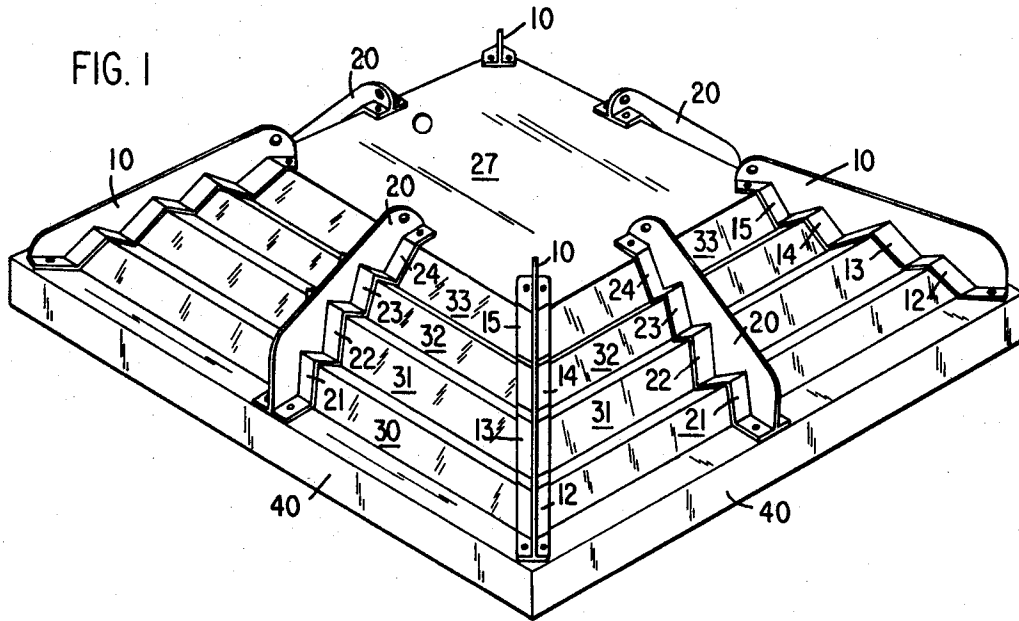


FIG. 2

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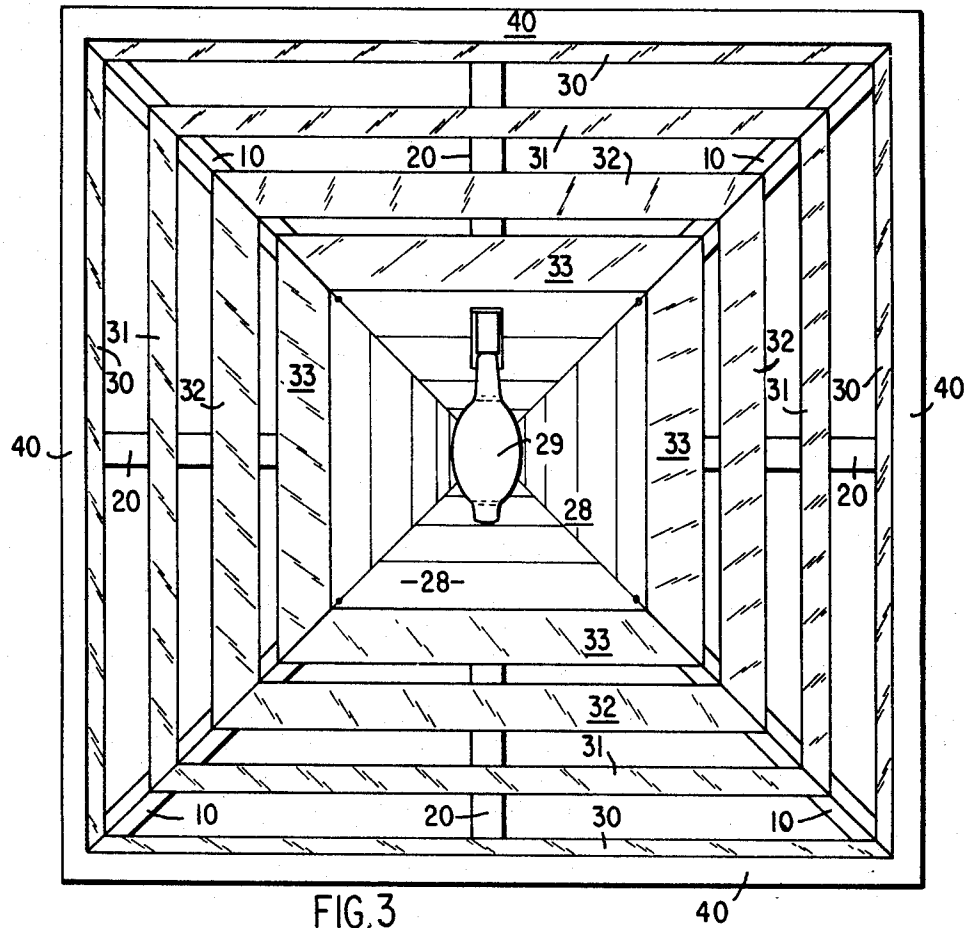


FIG. 3

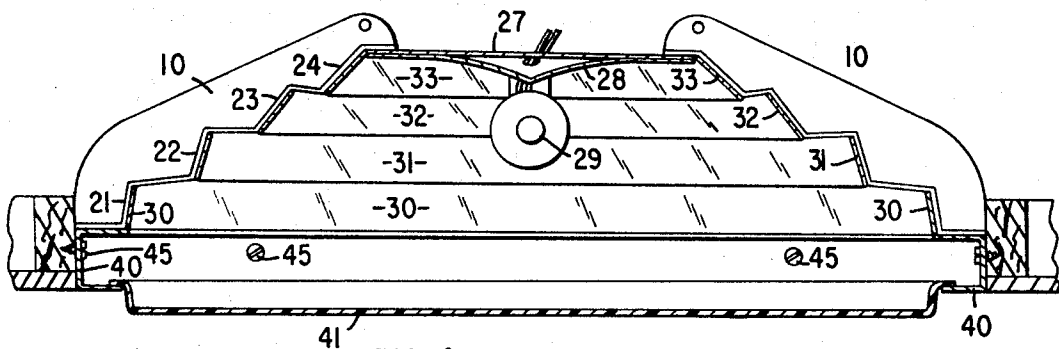


FIG. 4

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LIGHTING UNIT

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6 Claims

ABSTRACT OF THE DISCLOSURE

A luminaire employing a mercury vapor light source for illuminating large areas is disclosed wherein the fixture is fabricated of a tier of discrete bands of reflectors each formed in the configuration of a rectangular fence of substantially equal height but of increasing length and width from top to bottom of the fixture in stepped array, the bands being joined exteriorly by a plurality of stepped brackets such that the top of each band is spaced horizontally from the bottom of the band above to provide for the free circulation of air, and each band is increasingly inclined from the vertical proceeding from the bottom of the fixture such that a light source mounted centrally of the reflector at the top thereof has its rays directed downwardly by the tiered reflector surfaces and by an upper reflector disposed above the light source and joining with the top band.

This invention relates to lighting units for illuminating areas of substantial dimension. At present, such lighting units employ lamps of the fluorescent tube type for a light source. Such lamps have a relatively short life, requiring replacement at frequent intervals. Also, such lamps are adversely affected in their operation at low ambient temperature, as where the units are employed outdoors. In order to obtain desired density of light for the illumination of a large area, a plurality of the fluorescent tube lamps must be employed in each unit and, because of the form of the fluorescent tube lamp, the unit must only be of rectangular configuration.

This invention has as an object a lighting unit embodying a light weight vertically compact structural arrangement which is particularly economical to fabricate in different sizes and different shapes, the unit employing a high intensity mercury vapor lamp as a light source. The unit functions to give illumination of uniform intensity over an area of substantial dimension.

The lighting unit of my invention also provides extreme flexibility in the production of the units in different sizes and shapes, and in providing different types of light distribution, the main reflecting surfaces being in the form of strips of reflecting material not requiring any forming, or other types of tooling, for their production.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

In the drawings:

FIGURE 1 is a perspective view of a lighting unit embodying my invention.

FIGURE 2 is a central cross sectional view of the unit.

FIGURE 3 is a bottom plan view of the unit, and

FIGURE 4 is a view, similar to FIGURE 2, showing the unit mounted in a ceiling structure.

The lighting unit consists generally of a frame having downwardly diverging side members. An upper reflector

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is mounted at the top of the frame, and a light source is positioned below the upper reflector. A plurality of strips of reflecting material are mounted on the inner surface of the side members, the strips being arranged in step on opposite tiers that surround the vertical axis extending through the light source.

The embodiment of the light unit, as shown in the drawings, is of rectangular configuration wherein the side members are in the form of ribs 10 located at the corners of the unit, and having flanges 12, 13, 14 and 15, extending laterally from the ribs in right angular relationship. If the unit is of large dimension, it may also include intermediate ribs 20 formed with flat flanges 21, 22, 23 and 24. These latter flanges may extend from one side of the ribs 20, or from both sides, the flanges being arranged in registration with the flanges 12-15 respectively, on the corner ribs 10.

The frame may be formed with a top member integral with the ribs 10, 20. Preferably, the top member is formed separately and the ribs attached thereto. In the drawings, the top member is in the form of a plate 27, to the peripheral portion of which the ribs 10, 20, are attached, as being riveted, or otherwise affixed, thereto. An upper reflector 28 is mounted immediately below the top member 27, and a light source 29 is mounted centrally in the frame below the reflector 28.

Reflecting strips 30, 31, 32 and 33, are fixed to the flanges 12-15 and 21-24. The rib flanges are arranged in step formation, whereby the reflecting strips 30-33 are arranged in tiers one above the other, with the strips of each tier being located outwardly from the axis of the unit in relation to the strips in the tier next above, see FIGURES 2 and 4. The reflecting strips 30-33 are formed of flat sheet material, such as aluminum, or the like, processes to provide an efficient reflecting inner surface. The reflecting strips are simply cut to the proper length for a given frame structure and affixed to the rib flanges, as by rivets, adhesive, or the like.

Referring again to FIGURES 2 and 4, the rib flanges 12-15 and 21-24 and accordingly, the reflecting strips affixed thereto, incline at an angle upwardly and inwardly toward the vertical axis of the unit extending through the light source 29. The angle of inclination of the strips 30-33 in each tier is greater than the angle of inclination of the strips in the next lower tier. The outward spacing and inclination of the reflecting strips in the respective tiers is determined by the size of the lighting unit and the desired light distribution. The reflecting strips are located and arranged to simulate sections of a selected type of reflector, such as spherical, parabolic, or elliptical.

It will be observed, referring to FIGURES 2, 3 and 4, that there is an open space of substantial dimension laterally between the lower edges of the reflecting strips in each tier and the upper edges of the strips in the next lower tier. This provides for exceptional ventilation for the reflecting strips, whereby they are maintained at substantially ambient temperatures regardless of the heat generated by the high intensity mercury vapor lamp.

A bezel 40 of channel formation is fixed to the lower ends of the ribs 10, 20, for the reception of a drop in lens 41. In FIGURE 2, the unit is mounted by being suspended from a chain arrangement. For outdoor lighting, the unit may be enclosed by a casing 43. In FIGURE 4, the unit is illustrated as being mounted in a ceiling opening, as by means of screws 45. The upper edges of the reflecting strips 30, 31, 32, terminate at or above the plane of the lower edges of the strips next above, whereby the light beams emitted laterally from the lamp 29 only strike the reflecting surfaces of the reflecting strips, whereby with the step arrangement there is no loss of light.

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What I claim is:

1. A lighting unit comprising a frame having downwardly diverging side members, an upper reflector mounted in the frame, a light source mounted below said reflector, a plurality of discrete reflecting strips mounted on the inner surfaces of said side members, said strips being arranged in a plurality of tiers surrounding the vertical axis extending through said light source, said reflecting strips in each tier being located outwardly from said axis in relation to the strips in the tier next above and the top of each strip being horizontally spaced from the bottom of the higher strip, and said reflecting strips in each tier being inclined at an angle upwardly and inwardly toward said axis.

2. A lighting unit as defined in claim 1, wherein the angle of inclination of the reflecting strips in each tier is greater than the angle of inclination of said strip in the next lower tier.

3. A lighting unit comprising a frame including a plurality of downwardly diverging stepped rib members, an upper reflector positioned within said rib members at the upper ends thereof, a light source positioned below said reflector, a plurality of flat reflecting strips mounted on the inner surfaces of said ribs, said strips being arranged in a plurality of tiers surrounding the vertical axis extending through said light source, said reflecting strips in each tier being located outwardly from said axis in relation to the strips in the tier next above with the top of each strip

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being spaced horizontally from the bottom of the strip next above, and said reflecting strips in each tier being inclined at an angle upwardly and inwardly toward said axis wherein the angle of inclination of the reflecting strips in each tier is greater than the angle of inclination of said strip in the next lower tier.

4. A lighting unit as defined in claim 3, including a bezel attached to the lower ends of said ribs, and a lens carried by said bezel.

5. A lighting unit as defined in claim 3, wherein said frame includes a top member attached to the upper ends of said ribs.

6. A lighting unit as defined in claim 5, wherein said top member consists of a flat plate.

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U.S. Cl. X.R.

240—11.4