

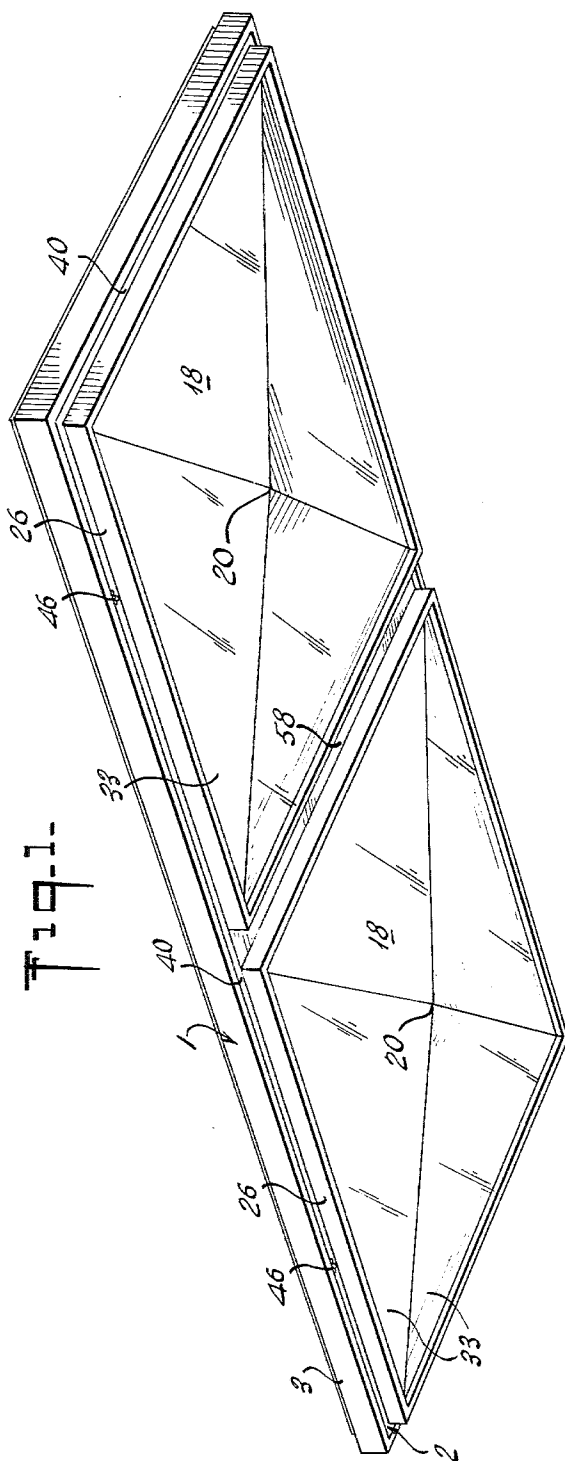
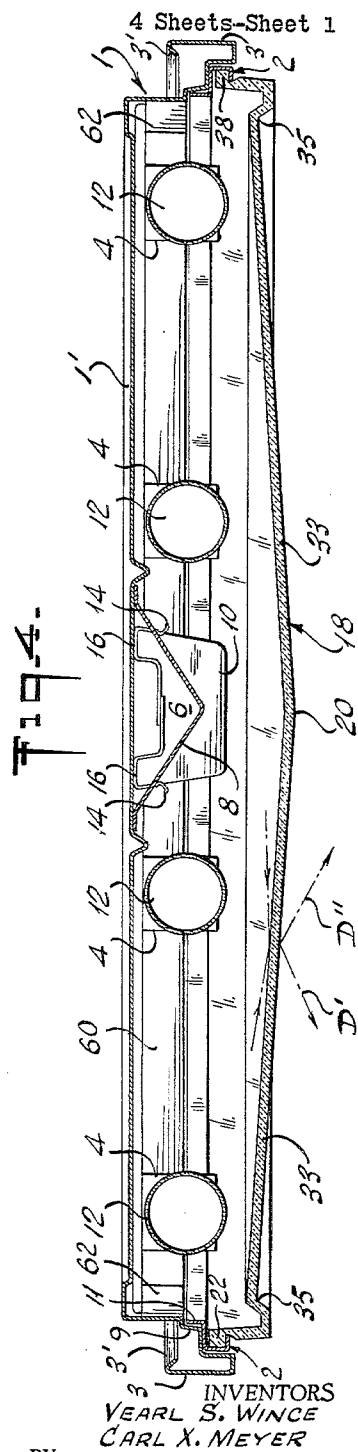
March 8, 1966

V. S. WINCE ET AL

3,239,661

SURFACE-ATTACHED LUMINAIRE

Filed May 9, 1962



BY

Nolte & Nolte
ATTORNEYS

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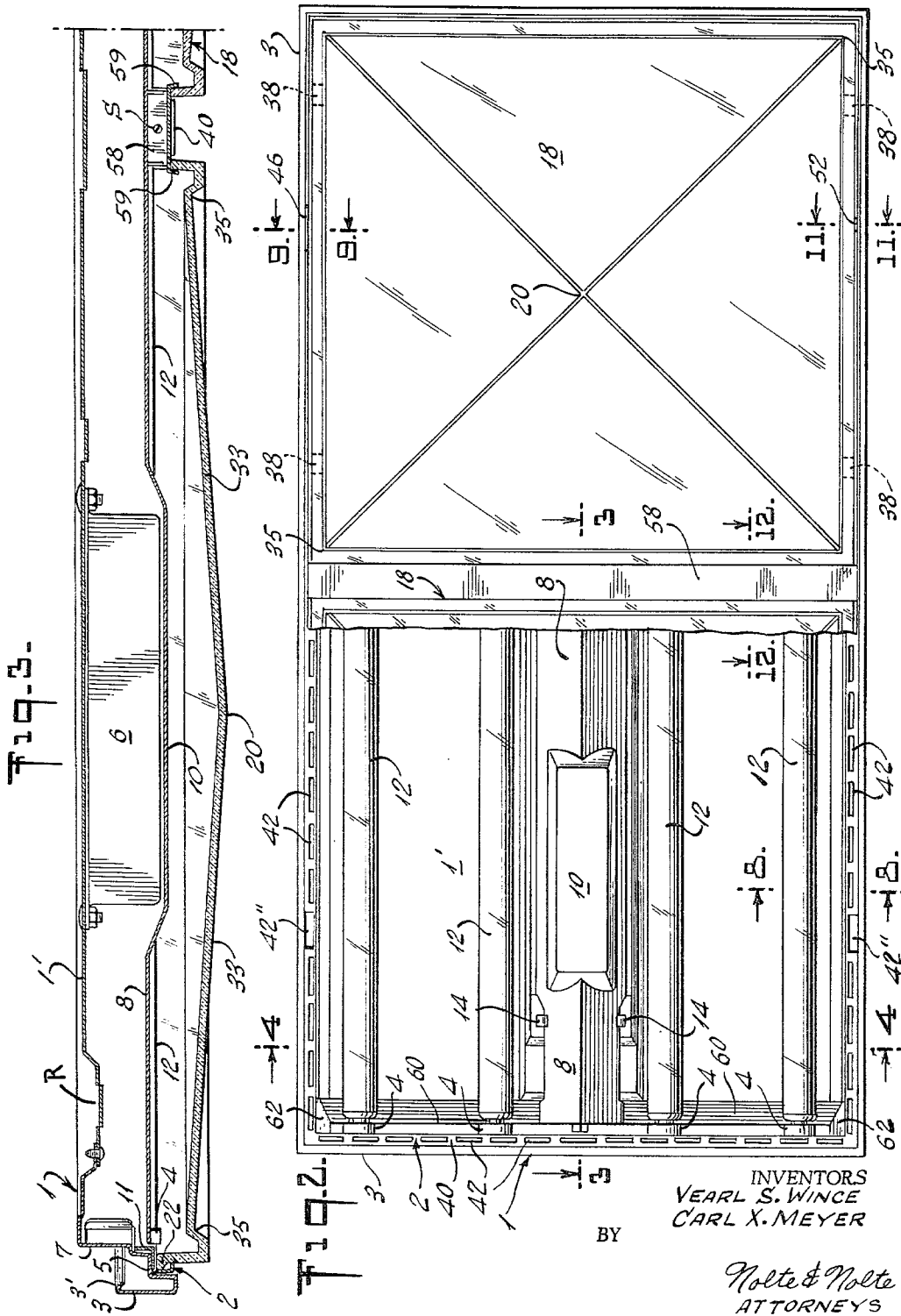
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Fig. 5.

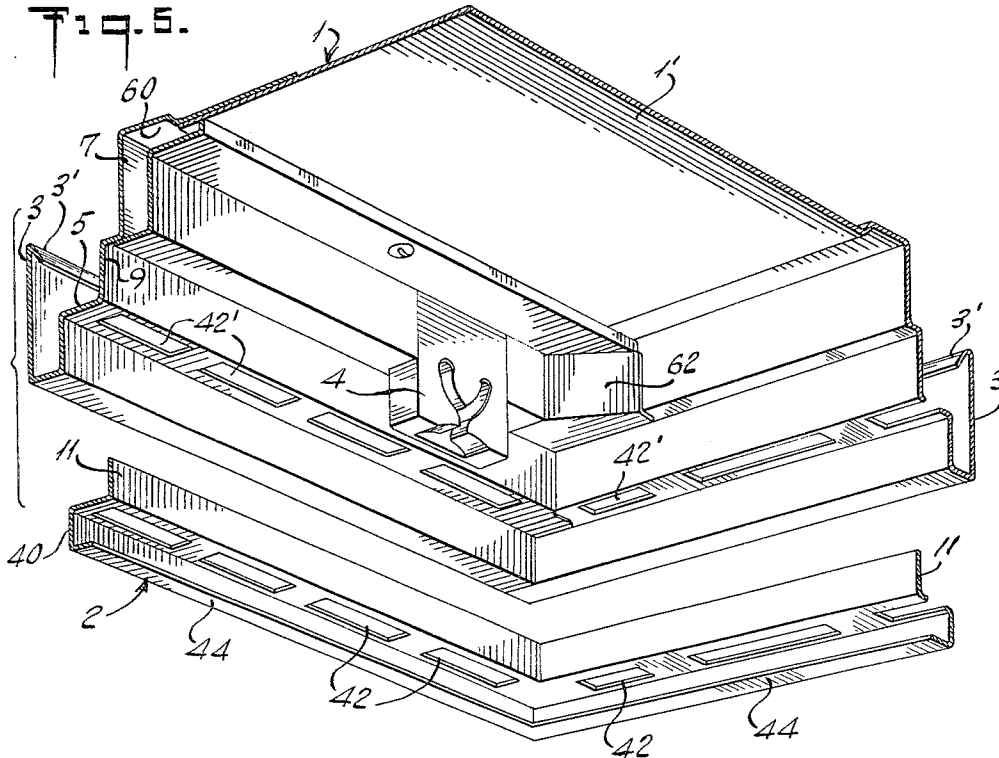


Fig. 6.

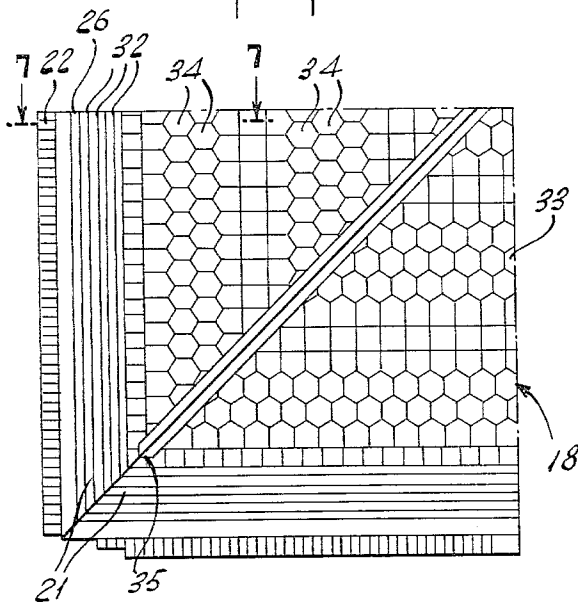
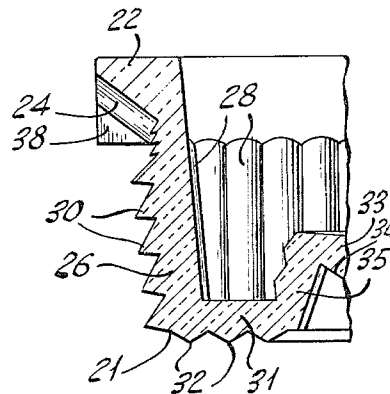


Fig. 7.



INVENTORS
VEARL S. WINCE
CARL X. MEYER

BY

Nolte & Nolte
ATTORNEYS

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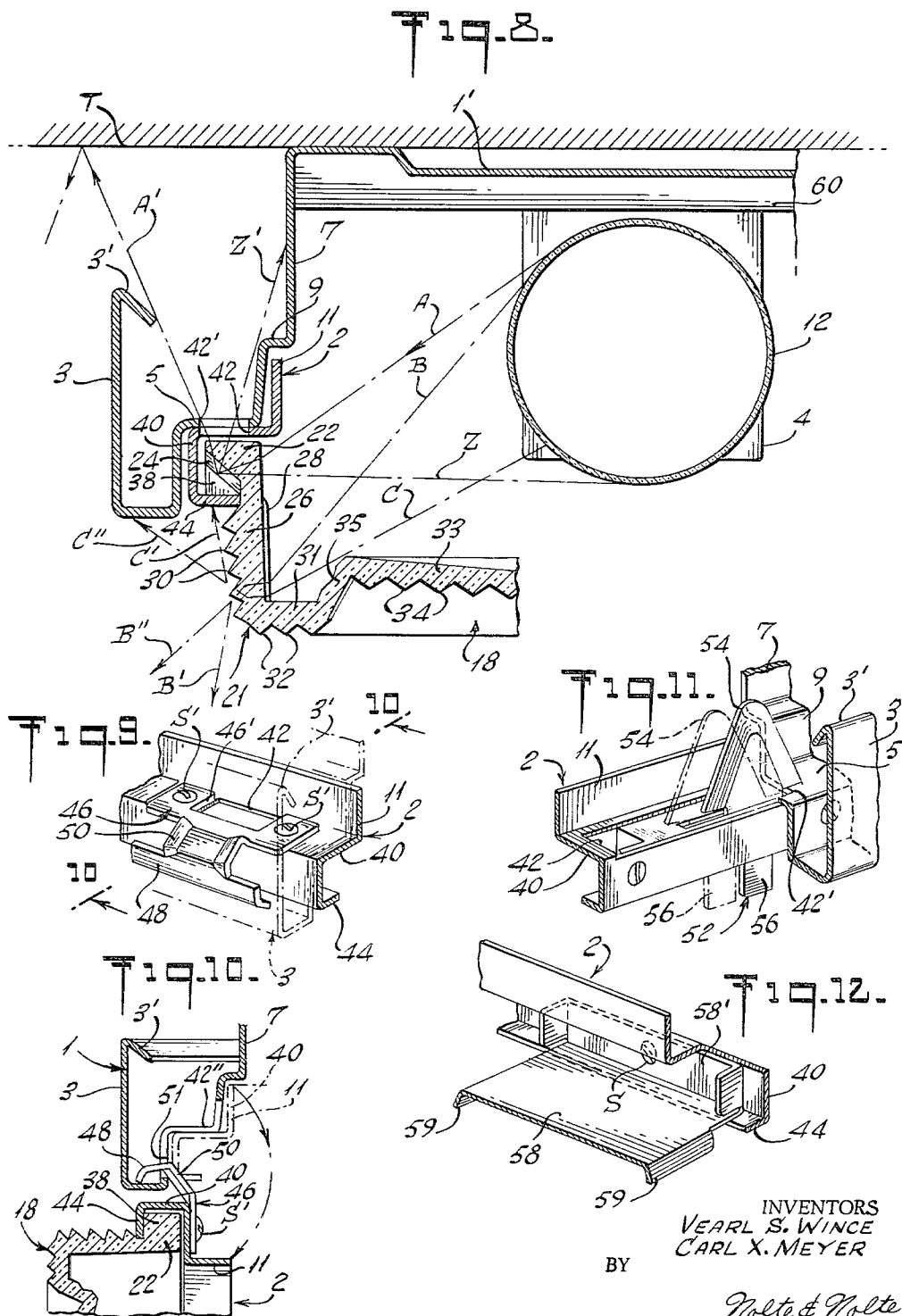
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SURFACE-ATTACHED LUMINAIRE

Vearl S. Wince, Newark, Ohio, and Carl X. Meyer, St. Louis, Mo., assignors of one-half to Holophane Company, Inc., New York, N.Y., a corporation of Delaware, and one-half to Day-Brite Lighting, Inc., St. Louis, Mo., a corporation of Missouri

Filed May 9, 1962, Ser. No. 193,396
9 Claims. (Cl. 240—51.11)

This invention relates to ceiling mounted luminaires for use with linear light sources, and more particularly to such luminaires of modular construction.

For architectural and illumination engineering purposes, it has often been found advantageous to use square luminaires. Considerations warranting such a luminaire include improved appearance, flexibility in modular designing, variation possibilities in the layout of the luminaires for architectural, decorative and illumination engineering purposes. It is a well known fact that the more efficient and more economical fluorescent lamps are the ones of a larger size and to build square luminaires capable of accommodating such long tubes would require the size of the luminaires to be excessively large for effective or flexible decorative or light pattern arrangements.

Another design drawback of prior art, surface mounted, luminaires is that light emission is generally obtainable from only lower portions of the luminaire. Resultingly, sharp delineations are perceived between the luminaire and the mounting surface.

It is an object of the invention to provide a luminaire which is compatible with a great variety of architectural and illumination engineering layout patterns.

It is another object of the invention to provide luminaires having an overall appearance of a square design and which at the same time will utilize the relatively larger, more efficient fluorescent tubes.

Yet another object of the invention is to provide means for directing a part of the light towards the mounting surface from upper portions of the luminaire to produce a decorative glow, like a halo of light, giving the visual impression that the fixture is a floating luminous element. At the same time, this upwardly directed light relieves sharp contrasts about the luminaire and assures balanced illumination.

According to another object of the invention, the exposed, peripheral surfaces of the luminaire as well as areas in the mounting surface around the luminaire fixture are illuminated by light from the lower portions of the luminaire further eliminating undesirable contrast effects while still maintaining efficient lighting patterns.

The luminaire according to the invention is oblong and made of sufficient length to incorporate long, economical fluorescent lamps. The width of the luminaire is a fraction of its length and the luminous light controlling lenses are made square and correspond in number to the denominator of the above mentioned fraction. In the preferred embodiment there are two square lenses provided, creating the cumulative appearance of having two square luminaires mounted adjacent each other and the width of the luminaire is one-half of its length.

The lenses are fitted into a door member of the luminaire and the lenses are provided with a variety of prisms to create a desired light distribution substantially downwards into the area to be illuminated, substantially upwards onto the non-light emitting parts of the luminaire and onto the adjacent mounting surface. The upper edges of the frame are provided with cutout areas to provide a passage for a part of the light which is directed upwardly by the lenses. Hinges and catch mechanisms are provided for the door containing the lenses. The frame is provided with knock-out plugs at selected locations for the electrical connection

of adjacent modular luminaires and other electrical connections.

The luminaire module can be surface mounted or alternatively suspended or supported from a ceiling or wall, although the preferred way of mounting the luminaire module of the present invention is directly onto a ceiling surface.

Other features and advantages of the invention will become apparent from the following detailed description and the enclosed drawings, wherein:

FIG. 1 is a bottom perspective view of the luminaire according to the invention;

FIG. 2 is a bottom plan view with a portion thereof broken away;

FIG. 3 is a longitudinal section taken along line 3—3 of FIG. 2;

FIG. 4 is a transverse section taken along line 4—4 of FIG. 2;

FIG. 5 is an exploded sectional perspective of an inside corner of the fixture as seen from below;

FIG. 6 is a bottom plan view of a corner of the lens, showing the prismatic construction thereof;

FIG. 7 is an enlarged fragmentary section taken along line 7—7 of FIG. 6;

FIG. 8 is an enlarged fragmentary section taken along line 8—8 of FIG. 2;

FIG. 9 is a sectional perspective taken along line 9—9 of FIG. 2, showing the hinge construction;

FIG. 10 is a section taken along line 10—10 of FIG. 9, showing the door swung open about the hinge, the dotted line showing the door closed;

FIG. 11 is a sectional perspective taken along line 11—11 of FIG. 2 showing the latch; and

FIG. 12 is a sectional perspective taken along line 12—12 of FIG. 2 showing the cross-plate between the lenses.

The luminaire includes a rectangular housing 1 adapted for mounting on a ceiling T (FIG. 8 only) and having a door structure 2 hinged therein. Lamp sockets 4 and at least one ballast 6 are secured within the housing 1. An elongated plate 8 is secured to the housing ends and lies approximately along the longitudinal center line of the housing providing a supporting cover for electrical wiring (not shown), which extends between the two housing ends. The plate 8 is made of a stamped sheet-metal having one or more downwardly oriented recesses 10 therein, depending upon the number of ballasts 6, and are formed to underlie and cover the ballast 6. Spring fingers 14 (FIGS. 2 and 4), are secured to the interior of the roof of the housing 1 at a point 16 on either side of the center line of the housing from where they extend downwardly and are biased outwardly to connect and restrain the cover plate 8 in position. Apertures, not shown, in the cover 8 are provided to accommodate the spring fingers 14.

The luminaire can be mounted from the ceiling, for example, by a screw attachment (not shown) through holes (not shown) in the recess R, at the ends of the luminaire (FIG. 3).

The outer periphery of the housing 1 is formed to provide an outer, upwardly opening, channel-shaped trim 3, the upper edge of which is formed with a finishing flange 3' spaced below the ceiling and outwardly of the housing 1. The inside leg of the channel-shaped trim 3 extends from a horizontal portion 5 which, in turn, extends from the housing walls 7 via an outwardly then downwardly shaped portion 9 which receives an upstanding flange 11 of the door frame 2 when in the closed position.

The door frame is formed of inwardly facing channel structures 40, the upper legs of which provide a plurality of elongated apertures 42 spaced around the four sides of the frame 2 and aligned, when the frame 2 is closed, with similarly shaped apertures 42' in the horizontal

member 5 extending from the lower edge of member 9 of the housing 1.

A wiring channel 60 (FIG. 5) is formed within the housing 1 to accommodate the transverse conductors connecting the lamp sockets 4. Knock out plugs (not shown) are provided adjacent the wiring channel 60 and in a corner box 62 for connection to adjoining luminaire modules. Additional knockout plugs are provided at the top of the housing 1, adjacent the covering plate 8, for wire access from the mounting surface.

The lenses 18, which underlie lamps 12 when the door frame 2 is in the closed position, are provided with outwardly extending flanges 22 at the periphery thereof, by which they are supported within the inwardly facing channels 40 of the door structure 2.

As best seen in FIGS. 6-8, the lenses are constructed with a U-shaped strengthening peripheral area 21, the outer section of which comprises the horizontal flange 22 which supports the lens within the door structure 2. The flange 22 is formed with a downwardly and inwardly sloping lower face which is provided with similarly sloping prisms 24 arranged, with reference to the lamps 12, to reflect light upwardly through the slots 42, 42' so that light may be emitted at the upper portion of the housing and the adjacent portions of the ceiling T in order to utilize light which ordinarily would be wasted at the supporting edges of the luminaire and to create the "halo" effect, as previously described. Since the flange 22 is sloped on its outside, integral lugs 38 having horizontal lower surfaces (FIGS. 2 and 7) are provided at spaced locations along the sides of the lens on the sloping undersurfaces of the flange 22. These act to support the lens in the channels 40 of the door frame 2.

The outer vertical portions 26 of the peripheral area 21 are provided on their inside surfaces with vertical diffusing flutes 28 and horizontal reflecting-refracting prisms 30 are formed on the outer surface. The lower faces of the horizontal webs 31 of the U-shaped peripheral areas 21 are provided with horizontally extending cut-off prisms 32.

The webs 33 of the lenses 18 comprise triangular sections which slope downwardly from their bases at the inner vertical legs 35 of the peripheral areas 21, and which terminate in a central apex 20. This form of the lens 18 is not only decorative, but it accommodates the recesses 10 in the plate 8 which, as seen in FIG. 4, extend below the line of the lamps 12 and would prohibit light from falling on the mid portions of the lenses if the lenses were planar.

The light emergent surfaces of the webs 33 are covered with cones 34 which confine the downwardly transmitted light into non-glare angles, as indicated for example, in FIG. 4 with arrows D', D''.

As best shown in FIG. 8, rays of light emitted by the lamp 12 at angles between typical rays A and Z, are reflected upwardly by the prisms 24 through the apertures 42 and 42' at angles between the corresponding reflected rays A' and Z', to illuminate the walls of the housing 1 and the ceiling mounting surface T adjacent thereto.

Light projected towards the vertical portion 26 of the refractor periphery 21 at angles between typical rays B and C, depending on the point of incidence upon the prisms 30, is either refracted toward their upper faces and reflected substantially downwardly at angles between reflected rays B' and B'', or refracted towards the lower faces of the prisms 30 and reflected upwardly at angles between reflected rays C' and C''.

As best seen in FIGS. 1, 2, 3 and 12, the channel structures 40 of the door frame 2 extend along the sides and ends of the rectangular form of the luminaire. The two square lenses are retained therein throughout their sides and their outer ends. The two opposing, inner ends of the lenses 18 are not retained within any structures (FIG. 3) but are restrained in a snug fit against the

lower portion of a center plate 58 which divides the rectangular form of the luminaire into two square lens outlines and provides a neat separation between the two square lenses 18. The center plate 58 extends from one side of the normally horizontal upper leg of the door frame channels 40, and are provided with an aperture 46' in alignment with the apertures 42 of the door frame 2 (FIGS. 9 and 10), so that the passage of the upwardly directed light will not be hampered at the location of the hinges. The hinge brackets 46 include an outside anchoring portion 48 and a narrow intermediate portion 50, the latter connecting the outside anchoring portion of the hinge bracket to the part which is fastened to the door frame channels. Enlarged apertures 42' may be provided in the horizontal member 5 to accommodate the fastened portions of the hinge brackets 46 flush therein, when the door 2 is closed. Narrow cutouts 51 (FIG. 10) in the inside vertical wall portion of the trim 3 communicate with the apertures 42' and are dimensioned to accommodate entry of the intermediate portion 50 of each bracket 46 when the frame is opened.

When the door frame 2 is swung open, it will be supported by the anchoring portion 48 supported in turn on the web of the trim 3 at its inwardly bent outer edge. The door frame 2 can be separated from the housing by lifting the intermediate portion 50 out from the cutout 51 so that the anchoring portion 48 can be slipped through the enlarged aperture 42'.

Locking means 52 are provided on the channel 40 opposite the channel onto which brackets 46 are mounted to keep the door 2 in a closed position. The locking means 52 includes a spring loaded sliding member 54, best shown in FIG. 11. When the door 2 is closed, the locking member 54 locks onto and over the edges of one of the apertures 42' of the housing 1 as shown by the solid line in FIG. 11, so that the door 2 is held closed. The lenses 18 are recessed at the location of the locking means 52. A handle 56 projects below the channel 40, and is integral with the locking member 52. When the door is desired to be opened, the handle is moved causing the locking member to move in the same direction whereby it will occupy the position shown by dotted line, and disengages from the edge of the aperture 42' and makes the door free to swing open around its hinge brackets 46.

While a preferred embodiment has been shown and described, it is to be understood that the full scope of the invention is to be interpreted from the appended claims.

What we claim is:

1. A luminaire, comprising means for mounting a refractor, said mounting means being formed with slots opening upwardly in a horizontal upper portion thereof, a refractor having a web portion adapted to direct light in a substantially downward direction, an illuminating trim extending from and around the periphery of said web portion and substantially perpendicular thereto, a supporting flange extending outwardly of the free edge of said illuminating trim and mounted by said mounting means, and prism means disposed on said supporting flange below the slots in said mounting means for reflecting light in a substantially upward direction through the slots of said mounting means.

2. A luminaire according to claim 1, further comprising a housing formed with slots around the periphery thereof, the slots of said housing being in vertical alignment with the slots of said mounting means for the transmission of the light therethrough.

3. A luminaire according to claim 2, including a hinge formed with a slot therein, said hinge being attached to said mounting means, the slot in said hinge being in alignment with a slot in said mounting means for transmission of the light therethrough, said hinge hingedly mounting said support means from said housing.

4. A rectangular luminaire, comprising a downwardly opening housing two square refractors disposed in the housing opening in a substantially parallel relation with

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opposing inner edges thereof being in spaced relation, each refractor having a web portion to direct light substantially in a downward direction, a horizontal illuminating trim around the periphery of said web portion, a supporting flange on the edges of the three outer sides of the illuminating trim of each refractor and extending in a common plane, light reflecting prisms disposed on said supporting flange, said opposing inner edges having upper edges extending in a plane below the plane common to said supporting flange, an upper portion of said housing formed with slots opening above said supporting flange and said reflecting prisms, a frame portion of said luminaire mounting said refractors, said frame portion being hingedly attached along one side thereof to said housing and being formed with slots in vertical alignment with said slots in said upper portion of said housing, and a center plate affixed to said frame portion between said refractors and overlying said opposing inner edges of said refractors.

5. A luminaire comprising an elongated housing, an elongated light source supported in said housing parallel to the longitudinal axis thereof, a plurality of lenses supported at their periphery from said housing below said light source in end to end relationship, said lenses being as wide as they are long, and opaque means physically interposed between the ends of adjacent lenses for separating the same and for forming demarcations therebetween, whereby said luminaire appears to be composed of separate single lens units smaller than said housing, said housing includes means for mounting the same in close proximity to a surface, the periphery of said housing is formed with apertures oriented for opening toward the mounting surface, said lenses having reflecting prisms along the peripheral portions thereof and underlying said apertures in the periphery of said housing, said reflecting prisms directing light incident thereon from said light source through said apertures for lighting the mounting surface.

6. The luminaire of claim 5 wherein a single frame supports said lenses at the periphery thereof and said frame is formed with apertures oriented for opening toward the mounting surface and substantially in alignment with the apertures in the periphery of said housing.

7. A prismatic lens for disposition beneath a linear light source comprising a web having a light incident and a light emergent surface and including means for directing light from the source in directions outwardly of the light emergent surface, side portions extending from the periphery of and substantially perpendicular to said web

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and including prismatic light directing means for directing light from the source outwardly and toward and away from the first mentioned direction and a mounting flange bounding and extending outwardly of said side portions at the free edges thereof, said flange including prism means oriented for reflecting light from the source incident thereon in direction substantially upwardly, said prism means for reflecting light extending in paths diverging directly from said side portions.

8. The prismatic lens of claim 7 for horizontal orientation upon a support surface and wherein a plurality of lugs depend from and are spaced along said flange and extend below said reflecting prism means, said lugs comprising means for supporting the lens upon the support surface.

9. A luminaire, comprising a downwardly opening elongated housing, an inwardly facing substantially channel shaped frame hingedly mounted along one side thereof within the housing opening, a plurality of prismatic lenses supported in end to end relationship at their outer peripheral portions within the channel of said frame, opaque spacer means interposed between the ends of said lenses for delineating one lens from the next, said housing having walls extending upwardly from the opening thereof, a linear light source extending parallel with the longitudinal axis of said housing above said lenses and being disposed relative to said walls thereof and to said peripheral portions of said lenses so that light therefrom impinges upon said lens peripheral portions, reflecting prisms on said peripheral portions which reflect light from said light source in upward directions, said frame and said housing having vertically aligned apertures formed therein and in vertical alignment with said reflecting prisms.

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NORTON ANSHER, *Primary Examiner*.