Jan. 30, 1968 H. P. KELLEY 3,366,787

LUMINAIRE

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Fig. 1.

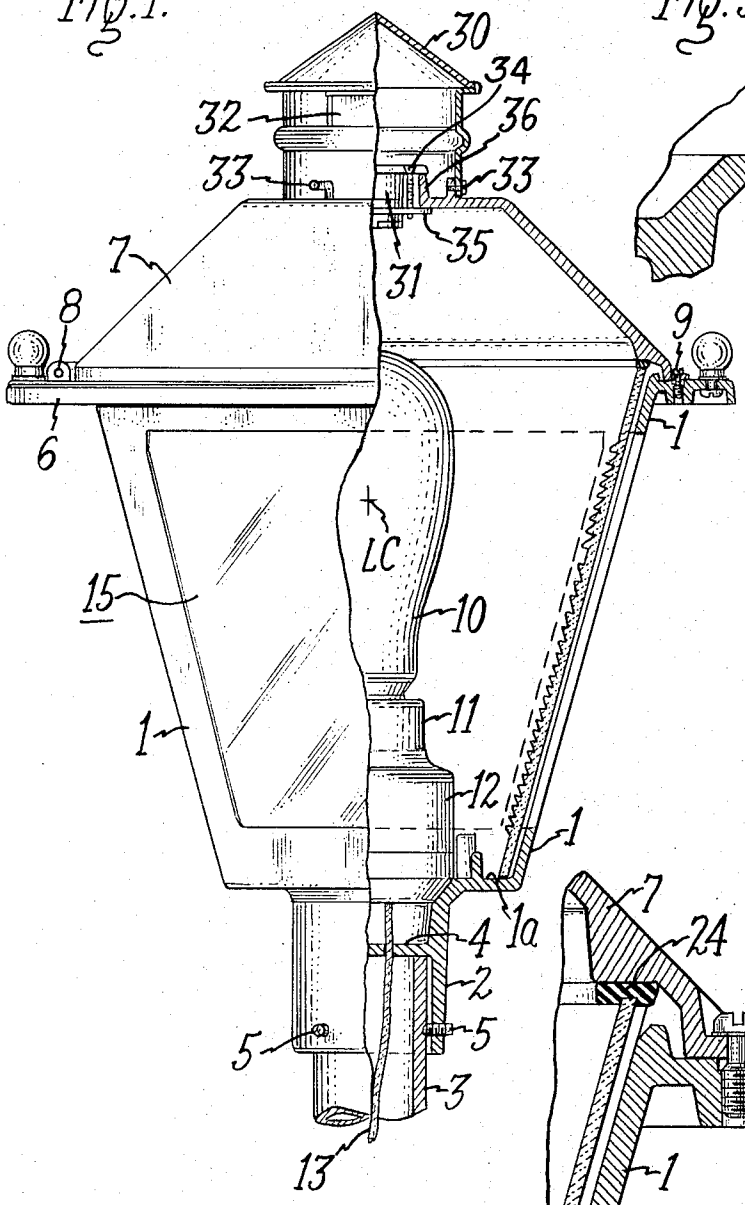


Fig. 3.

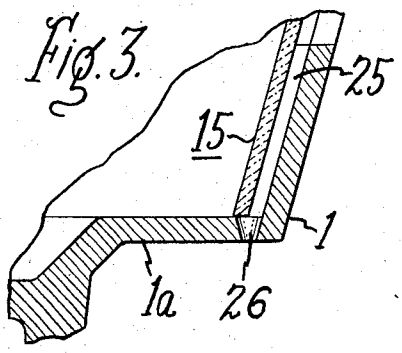
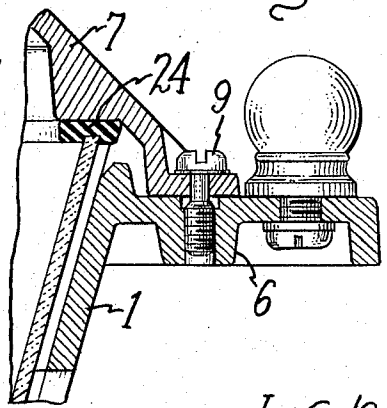


Fig. 2.



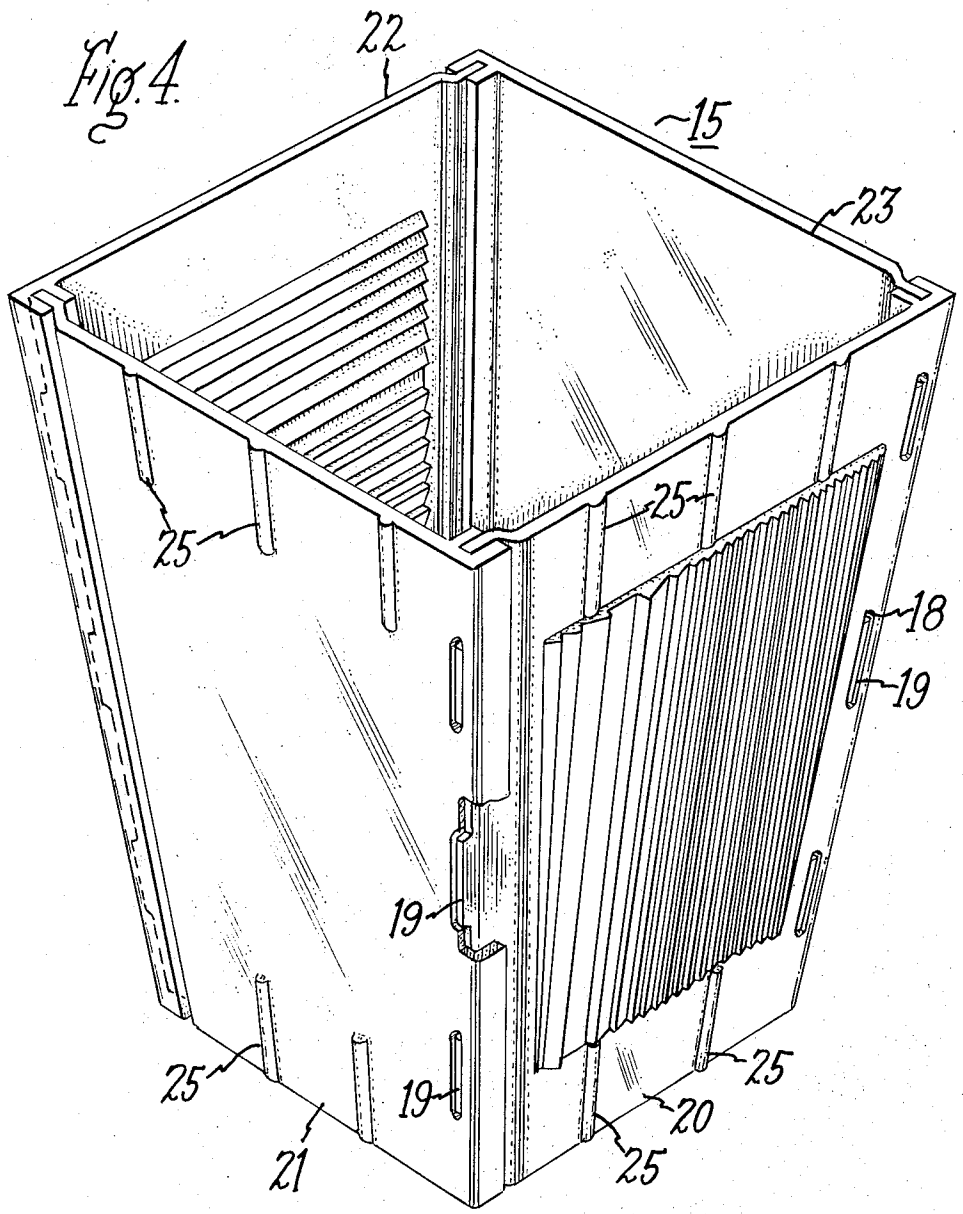
Inventor,
Harold P. Kelley,
by Sidney Greenberg
His Attorney.

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Fig. 4.



Inventor,
Harold P. Kelley,
by Sidney Greenberg
His Attorney.

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Fig. 5.

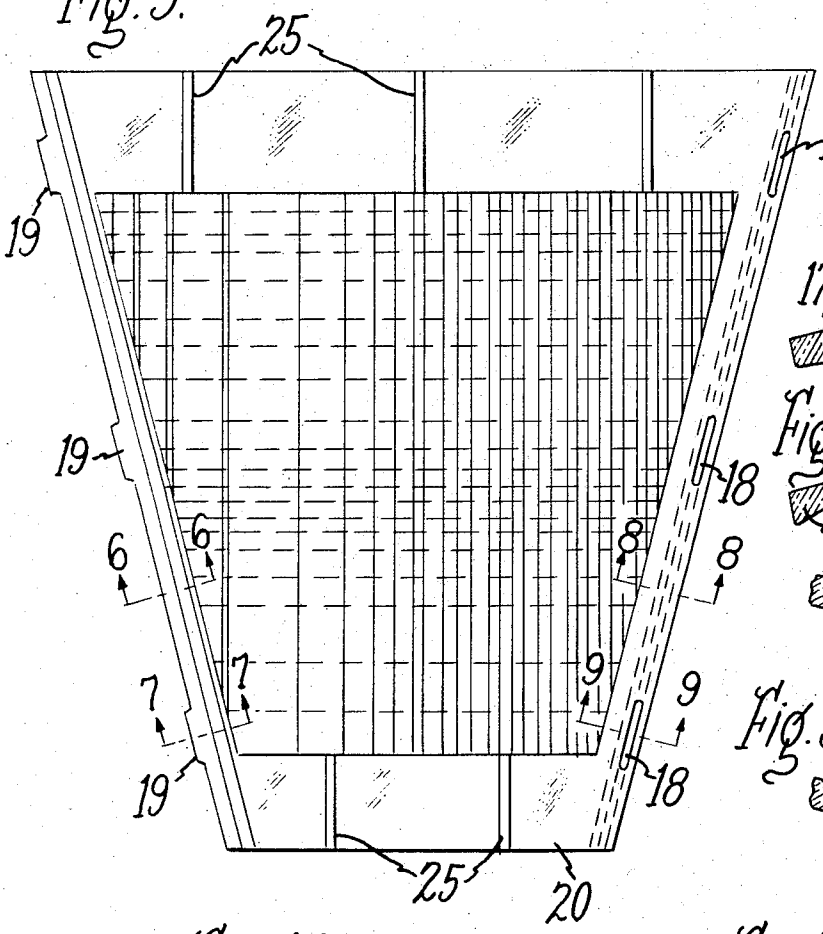


Fig. 6.

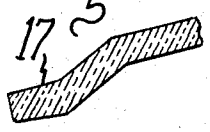


Fig. 7.

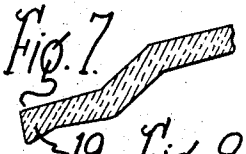


Fig. 8.

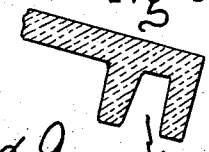


Fig. 9.

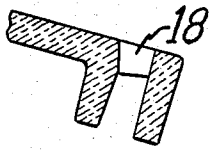


Fig. 13.

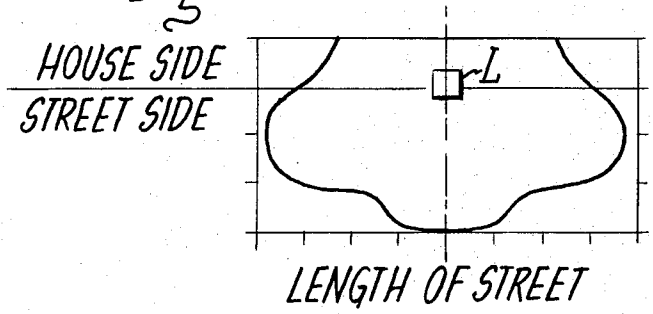
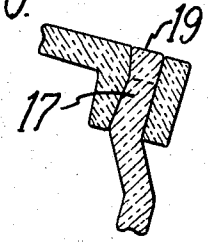


Fig. 10.



Inventor,
Harold P. Kelley,
by Sidney Greenberg
His Attorney.

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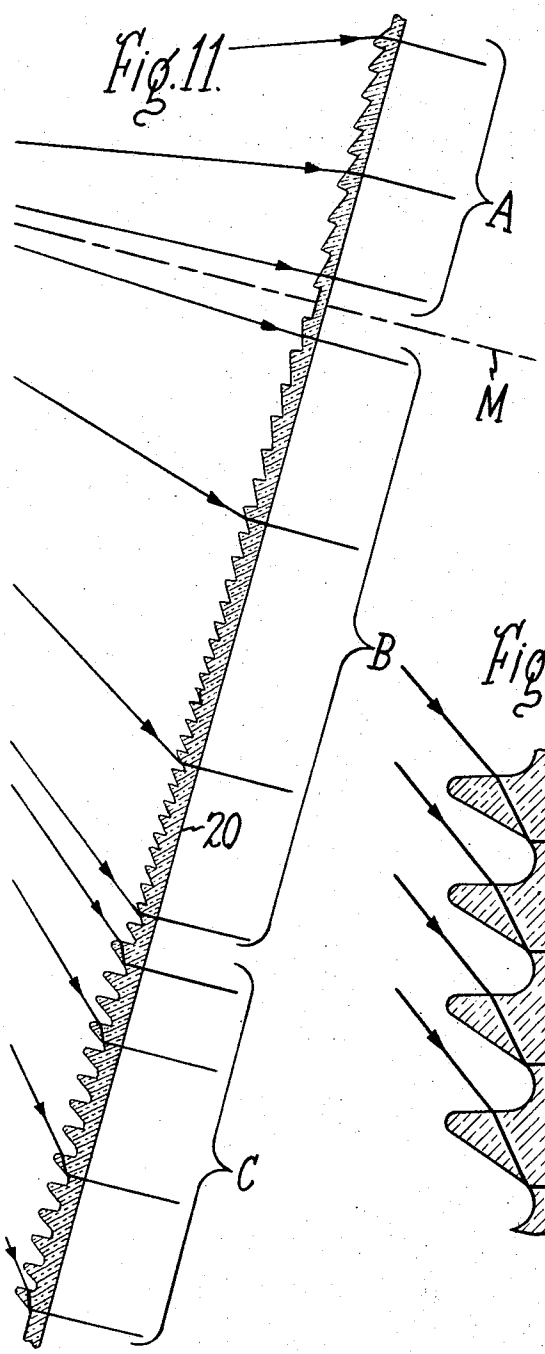


Fig. 11.

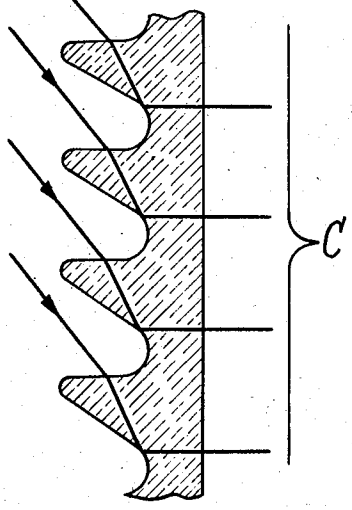


Fig. 11a.

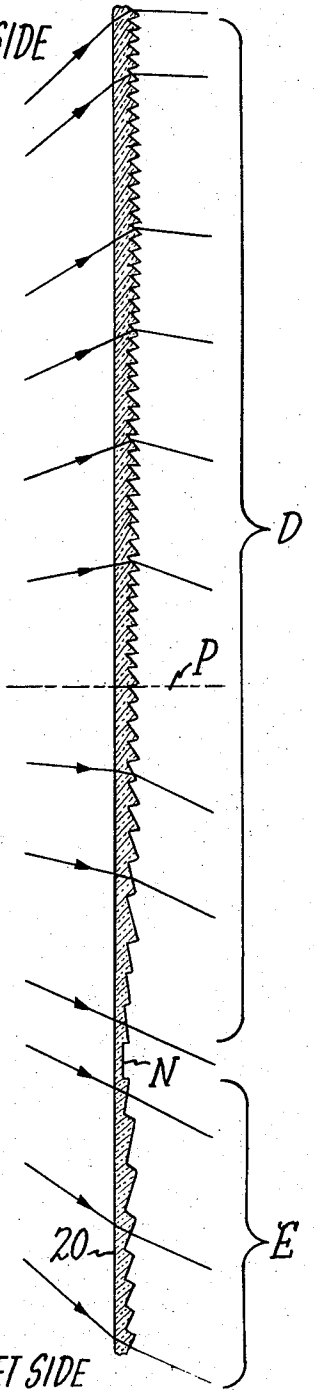


Fig. 12.

Inventor,
Harold P. Kelley,
by Sidney Greenberg
His Attorney

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3,366,787

LUMINAIRE

Harold P. Kelley, Hendersonville, N.C., assignor to General Electric Company, a corporation of New York

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13 Claims. (Cl. 240—25)

ABSTRACT OF THE DISCLOSURE

A post top luminaire comprises a frame open at its top, a lamp within the frame, a light transmitting globe open at its top and bottom and arranged within the frame surrounding the lamp and resting freely as a unit within the frame free of engagement with the frame at its top, and a hood covering the open top of the frame and the globe and hinged to the frame for movement away therefrom to open position providing access to the interior of the frame and freeing the globe for lifting the latter out of the frame, and to a closed position engaging the top of the globe for securing the same within the frame, the globe comprises a plurality of detachably secured panels.

The present invention relates to luminaires, and more particularly to luminaires of residential type.

It is an object of the invention to provide a luminaire of the above type which is readily manufactured and assembled, which has good aesthetic appearance, which provides for desired light distribution, and is weatherproof and rugged in construction.

It is a particular object of the invention to provide an improved light transmitting and refracting globe for luminaires of the above type, wherein the globe is formed of a plurality of parts which are readily joined in proper assembly to provide the desired light distribution.

It is still another object of the invention to provide light transmitting parts of the above type having improved light control structures.

Other objects and advantages will become apparent from the following description and the appended claims.

With the above objects in view, the present invention relates to a luminaire comprising a frame open at its top, light producing means within the frame, a light transmitting globe having an open top and bottom and arranged within the frame surrounding the light producing means and a hood covering the open top of the frame and detachably secured thereto for movement away therefrom to an open position providing access to the interior of the frame, the globe resting freely as a unit within the frame.

In a particular aspect of the invention, the frame is formed with a plurality of sides defining window openings facing in different directions, the globe comprising a plurality of interfitting detachably secured panels respectively arranged adjacent corresponding window openings in the frame for covering the same.

The invention will be better understood from the following description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a view in elevation, partly in section, of a residential-type post top luminaire embodying the invention;

FIGURE 2 is an enlarged detailed view in section of a portion of the closure assembly of the FIGURE 1 luminaire;

FIGURE 3 is an enlarged detailed view in section of a lower corner portion of the FIGURE 1 luminaire;

FIGURE 4 is a perspective view of the globe panel assembly of the FIGURE 1 luminaire;

FIGURE 5 is a front elevational view of one of the prismatic panels of the globe assembly;

FIGURES 6, 7, 8 and 9 are sectional views of the lateral edge portions of the FIGURE 5 prismatic panel taken along the lines, respectively, 6—6, 7—7, 8—8, and 9—9 in FIGURE 5;

FIGURE 10 is a sectional view of the interfitting corner portions of adjacent globe panels;

FIGURE 11 is a sectional view of the FIGURE 5 prismatic panel showing the internal horizontal prisms thereof;

FIGURE 11*a* is an enlarged detail view of a portion of the prismatic panel shown in FIGURE 11;

FIGURE 12 is a sectional view of the FIGURE 5 prismatic panel showing the external vertical prisms thereof; and

FIGURE 13 is a diagrammatic view of the light distribution pattern produced by a luminaire constructed in accordance with the invention.

Referring now to the drawings, and particularly to FIGURE 1, there is shown a post-top luminaire applicable for residential use comprising a 4-sided supporting frame **1** having openings on its four sides, and formed with a tubular base **2** adapted to fit over a supporting hollow post **3**. Transverse wall **4** which extends across the interior of base **2** rests on the top of post **3** and limits the extent to which post **3** projects into base **2**. A plurality of set screws **5** spaced around base **2** secure luminaire base **2** in position on the post. Frame **1** is generally square in horizontal cross-section and tapers downwardly from its upper open end to base **2** which is integral therewith. At its upper end, frame **1** is surrounded by an integral flange **6**, to which canopy or hood **7** is pivotally attached by hinge **8** so as to be swingable thereon from an open position providing access to the interior of the luminaire to a closed position as shown in FIGURE 1. Hood **7** is secured in its closed position by screw **9** (see FIGURE 2) which engages a threaded aperture in flange **6** and is captive in the hood.

Hood **7** is surmounted by a cupola **30** which encloses an electrical receptacle **31** for receiving a photoelectric control unit of conventional type (not shown) for electrically controlling the operation of the luminaire lamp **10** in accordance with ambient light conditions. Cupola **30** is formed with a window opening **32** through which light may pass to the photoelectric control unit, and is removably secured to hood **7** by circumferentially spaced screws **33** by means of which it is adjustably mounted for orientation of its window opening in different directions. Electrical receptacle **31** is clamped by means of screws **34** and ring member **35** to an annular boss **36** surrounding an aperture in the top of canopy **7** in which receptacle **31** is inserted. Loosening of screws **34** (arranged on opposite sides of receptacle **31**) allows the receptacle to be rotationally oriented relative to the cupola window **32**.

Lamp **10**, such as a mercury vapor gas discharge lamp, having a light center LC is removably mounted within frame **1** by means of socket **11** which projects upwardly from the top of ballast housing **12** in which is enclosed a ballast unit (not shown) for operating lamp **10**. Conducting lead **13** connected to the ballast unit passes through an aperture in transverse wall **4** and extends through base **2** and hollow post **3** to a source of electrical supply.

In accordance with the invention, the luminaire is provided with a light transmitting globe **15** which comprises four removably attached panels of generally trapezoidal shape (see FIGURES 4 and 5). Panel assembly **15** nests within frame **1** surrounding lamp **10** and rests at its bottom edges on floor portion **1***a* of frame **1**. As seen in FIGURE 4, the four component panels of globe **15** interlock with one another at their corners so as to form a square, unitary globe assembly. Each panel is formed along one lateral edge with an inwardly facing U-shaped channel **16** (see

FIGURE 8) and along the opposite lateral edge with an inwardly offset edge portion **17** (see FIGURE 6) which is snugly received in channel **16** of the adjacent panel. As seen in FIGURES 6 and 8, edge portion **17** and channel **16** have complementary wedge shapes. The globe panels are preferably made of plastic material, such as a polycarbonate or acrylic synthetic resin, which is slightly compressible.

At points spaced along its length, channel **16** is formed with slots **18** passing through the bottom of the channel. Slots **18** are wedge-shaped in cross section and taper inwardly so as to form with channel **16** a passage which has a constriction in the interior thereof as seen in FIGURE 9. On the opposite lateral edge each globe panel is formed with spaced projecting tabs **19** located correspondingly to slots **18** and adapted to fit into and interlock with slots **18** of the adjacent panel. As shown in FIGURE 7, tab **19** flares outwardly in a wedge shape from the adjoining tapered edge portion of the panel. The resultant shape in this region of the globe panel is complementary to the shape of the composite passage formed by channel **16** and slot **8**. In assembling two adjacent panels, the tabs **19** of one panel are inserted into the corresponding slots **18** of the other panel to form an interlocking corner joint as shown in FIGURE 10. Since the plastic material is slightly compressible, the flared tabs **19** may be forced through the constriction between channel **16** and slot **18** and into the fully inserted position of FIGURE 10 in which they expand slightly to normal shape and thereby securely retain the adjoining panels in assembly. To disassemble the panels, they are simply pulled apart in order to disengage tabs **19** from slots **18**.

In the fully assembled condition, four panels **20**, **21**, **22**, **23** form a four-sided globe **15** which is readily inserted as a unit into frame **1** through its open top, the globe nesting within frame **1** and being freely removable therefrom. With globe **15** in nested position, canopy **7** is swung down to closed position over the top of the globe and secured in that position by means of screw **9**. In such closed position, a resilient gasket **24** attached to and extending around the underside of canopy **7** is urged against the entire top edge of globe **15** (see FIGURE 2) and thereby seals the interior of the luminaire against the entry of water, insects, and other foreign matter. The downward force exerted by closed canopy **7** on globe **15** also urges the bottom edge of the latter into effective sealing engagement with the floor **1***a* of frame **1** due to the slight compressibility of the plastic material of the globe.

The upper and lower margins of the exterior surface of each globe panel are formed with spaced vertically elongated bosses or ribs **25** (see FIGURES 4 and 5) which contact the upper and lower frame portions in the assembly as shown in FIGURE 1 and serve to space the panel surfaces inwardly from frame **1**. As a result, rain water striking the exterior surfaces of the panels is enabled to flow downwardly between the panels and the frame and out of the luminaire through drain apertures **26** provided in the frame floor **1***a*, e.g., in the corners thereof.

The detachability of the component panels of globe **15** makes it possible to readily provide desired light distribution from the luminaires simply by re-arranging or replacing panels of particular refractive or other light modifying function. In a typical arrangement as shown in the drawings, which is adapted to be used for example for illuminating a street in front of a house, panels **20** and **22** are provided with prisms designed to redirect the light from lamp **10** in a direction along the street, while panels **21** and **23** have no prisms (or non-effective prisms) and are pigmented or otherwise treated to simply diffuse the light. With such arrangement, the luminaire would be mounted adjacent the street so that the planes of prismatic panels **20**, **22** are perpendicular to the length of the street. To provide the desired distribution of light,

panels **20**, **22** are formed with a combination of vertical and horizontal prisms on opposite sides. The vertical prisms are preferably on the exterior surface to facilitate self-cleaning action, e.g., by the washing action of rain. FIGURE 11 shows the internal horizontal prisms as viewed in a vertical section of panel **20**. Normally, the panels are inclined at an angle of about 15° to the vertical, with the result that the horizontal prism structures described below project the light rays essentially perpendicular to the plane of the panel. The horizontal prisms, which are parallel to one another, are of three general types grouped from top to bottom as shown in regions A, B and C. Prisms A and prisms B are located respectively above and below a dividing strip at line M, the latter being in a plane including the light center which has a vertical angle of about 75°. As understood in the art, the vertical angle is measured upwardly from a median plane extending vertically downwardly from the light center and representing 0°. Prisms A are constructed to depress the light rays received from the light source and are so graduated in refractive power from lower to upper prisms as to transmit the light in a parallel beam sloping at about the above-mentioned vertical angle. Prisms B, on the other hand, are constructed and graduated in the opposite sense to lift the received light rays and transmit them in a parallel beam of about the same angle as that from prisms A. Lowermost prisms C, as seen more clearly in FIGURE 11*a*, serve to successively refract and reflect the received light rays in order to transmit a parallel beam directed at about the same angle as prisms A and B. As is seen in FIGURE 11*a*, the surfaces between adjacent prisms in group C are concavely curved and serve by refractive action to spread and distribute light in uniform fashion in the immediate vicinity below the luminaire and to blend such illumination with the light pattern produced by the main beams.

The vertical prisms on the external surface of the panels, as seen in the horizontal sectional view of FIGURE 12, are comprised of two groups, prisms D and prisms E, located on opposite sides of a dividing strip N, and with the light center located on a vertical plane P which bisects the panel. In the typical arrangement of the luminaire adjacent a street as above described, the prisms on the prismatic panels **20**, **22** will be so arranged on the respective panels that prisms E of both panels **20**, **22** will be closer to the street than prisms D. As seen in FIGURE 12, which shows panel **20**, prisms D have increasing refractive power from dividing strip N to the outer edge (i.e., house side) so as to bend all of the light received from the interior forwardly toward the street in the desired light distribution. Prisms E, on the other hand, are constructed and graduated in the opposite sense to re-direct the received light rays toward and along the main beams produced by prisms D. As a result of this prismatic action of the exterior vertical prisms of both opposite panels **20**, **22**, coupled with the action of their internal horizontal prisms, a light pattern along the street is produced approximately as shown in the diagram in FIGURE 13. The illumination pattern thereby provided is elongated for a substantial distance along the street on both sides of luminaire L, the light therein is relatively uniformly distributed, and a minimum of light is directed toward the house side and across the way (street side) where bright illumination is unwanted.

The arrangement and construction of the interior horizontal prisms as above described is such that the entire panel appears fully lighted to the observer when the lamp is on, and the parts inside the globe cannot be seen from the outside when the lamp is off.

There is thus provided by the invention a residential-type luminaire which has good aesthetic appearance, provides effective and uniform lighting along adjacent walkways and streets while avoiding the projection of light on nearby houses, is weatherproof and rugged in construction, permits easy maintenance, and provides for ready

control of light distribution in a variety of patterns as required by different conditions and locations.

While the present invention has been described with reference to particular embodiments thereof, it will be understood that numerous modifications may be made by those skilled in the art without actually departing from the scope of the invention. Therefore, the appended claims are intended to cover all such equivalent variations as come within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A luminaire comprising a frame open at its top, light producing means within said frame, a light transmitting globe having open top and bottom and arranged within said frame surrounding said light producing means, and a hood covering the open top of said frame and detachably secured thereto for movement away therefrom to an open position providing access to the interior of said frame, said globe resting freely as a unit within said frame, said frame having a plurality of sides defining window openings facing in different directions, said globe comprising a plurality of detachably secured panels respectively arranged adjacent said window openings in said frame for covering the same, each panel having on opposite lateral edges thereof complementary slot means and tab means, respectively, the tab means of each panel interfitting within the slot means of the adjacent panel for holding said panels in detachable assembly, the lateral edge of each panel having said slot means being formed along its length with an inwardly opening channel containing said slot means, the opposite lateral edge of each panel fitting within the channel of the adjacent panel.

2. A luminaire as defined in claim 1, the material of said panels being at least slightly compressible, said tab means having an end portion slightly thicker than the narrowest portion of said slot means, whereby said tab means is force fitted within said slot means.

3. A luminaire comprising a frame open at its top, light producing means within said frame, a light transmitting globe having open top and bottom and arranged within said frame surrounding said light producing means, and a hood covering the open top of said frame and detachably secured thereto for movement away therefrom to an open position providing access to the interior of said frame, said globe resting freely as a unit within said frame, said frame having a plurality of sides defining window openings facing in different directions, said globe comprising a plurality of detachably secured panels respectively arranged adjacent said window openings in said frame for covering the same, said frame being rectangular and said globe comprising four panels, two of said panels opposite each other being light diffusing, the remaining two opposite panels being formed with prisms on their surfaces for directing the light from said light producing means in a predetermined pattern in the vicinity of the luminaire.

4. A luminaire as defined in claim 3, the inner surface of each prismatic panel being formed with parallel horizontal prisms, and the outer surface thereof being formed with parallel vertical prisms.

5. A luminaire as defined in claim 4, said horizontal prisms being formed and arranged to receive light from said light producing means and transmit it in a beam of substantially parallel rays.

6. A luminaire as defined in claim 4, the horizontal prisms on the lower portion of each prismatic panel being formed to first refract and then reflect the light rays received from the light producing means.

7. A luminaire as defined in claim 6, the horizontal prisms on the remaining portion of each prismatic panel comprising upper horizontal refracting prisms for depressing the received light rays, and intermediate horizontal refracting prisms for lifting the received light rays.

8. A luminaire as defined in claim 4, the vertical prisms of said opposite prismatic panels being formed and arranged to receive light rays from said light producing means and direct them toward one side of the luminaire.

9. A luminaire as defined in claim 8, said vertical prisms comprising a group adjacent said one side and a remaining group spaced from said one side, said remaining group of prisms beinding the received light rays toward said one side and said adjacent group of prisms bending the received light rays away from said one side.

10. A luminaire as defined in claim 6, said prismatic panels being inclined relative to one another so as to converge downwardly, the inner surfaces between adjacent ones of said refracting-reflecting horizontal prisms being concave for substantially uniformly spreading the light rays incident thereon.

11. A luminaire comprising a frame open at its top, light producing means within said frame, a light transmitting globe having open top and bottom and arranged within said frame surrounding said light producing means, and a hood covering the open top of said frame and detachably secured thereto for movement away therefrom to an open position providing access to the interior of said frame, said globe resting freely as a unit within said frame, said hood having gasket means on the underside thereof in sealing engagement with the upper edge of said globe when said hood is secured in said closed position, said frame having a floor portion on which the bottom edge of said globe rests and against which said bottom edge is urged in sealing engagement when said hood is secured in closed position, said globe having rib means formed on the outer surfaces thereof spacing said surfaces from said frame, said floor portion of said frame having aperture means communicating with the space thereby provided between said globe surfaces and said frame for draining the same.

12. A luminaire globe comprising a plurality of similarly shaped light transmitting panels interconnected with one another to form a unitary globe open at top and bottom, each panel having on opposite lateral edges thereof complementary slot means and tab means, respectively, the tab means of each panel interfitting within the slot means of the adjacent panel for holding said panels in detchable assembly, the lateral edge of each panel having said slot means being formed along its length with an inwardly opening channel containing said slot means, the opposite lateral edge of each panel fitting within the channel of the adjacent panel.

13. A globe as defined in claim 12, the material of said panels being at least slightly compressible, said tab means having an end portion slightly thicker than the narrowest portion of said slot means, whereby said tab means is force fitted within said slot means.

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NORTON ANSHER, *Primary Examiner.*

G. M. HOFFMAN, *Assistant Examiner.*