July 2, 1963 K. FRANCK ETAL 3,096,033

CEILING PANEL

Original Filed March 11, 1957 3 Sheets-Sheet 1

Fig. 1.

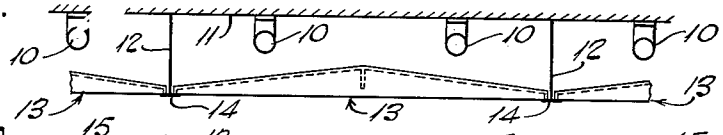


Fig. 2.

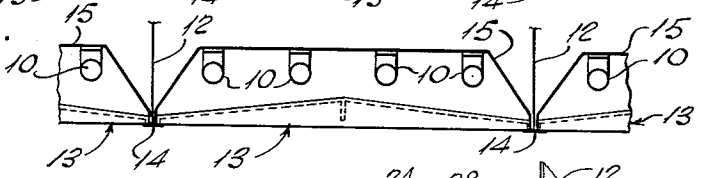


Fig. 3.

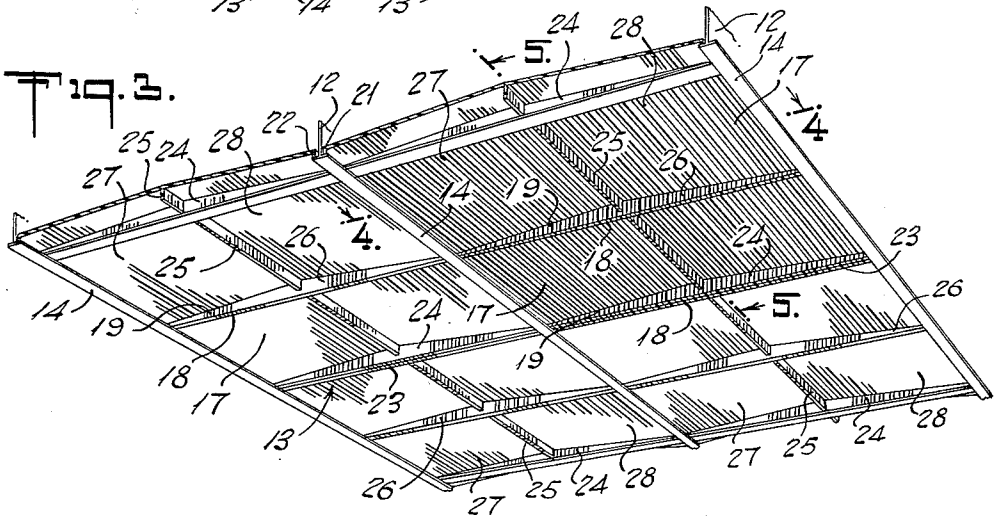


Fig. 4.

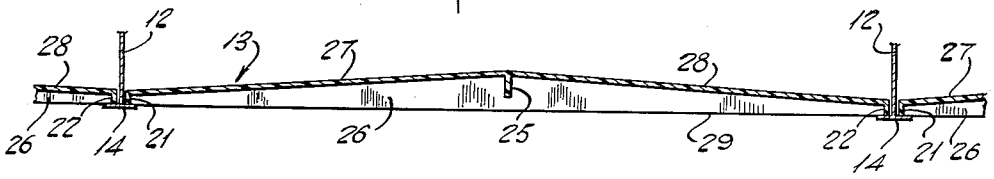
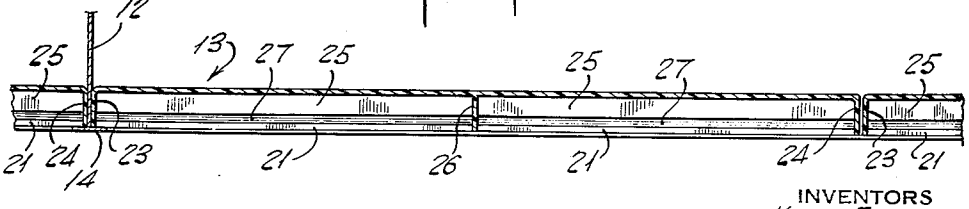


Fig. 5.



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FIG. 6.

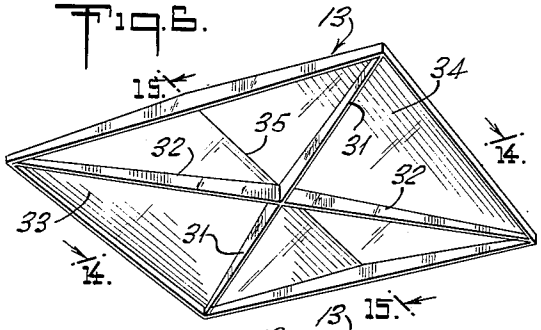


FIG. 7.

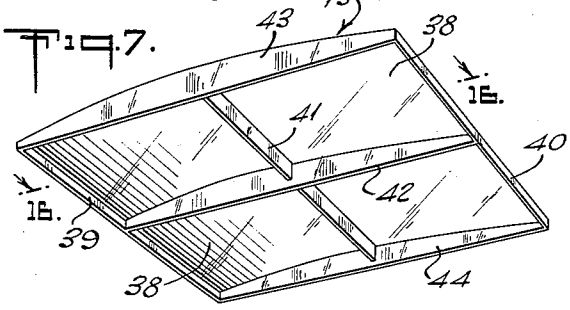


FIG. 9.

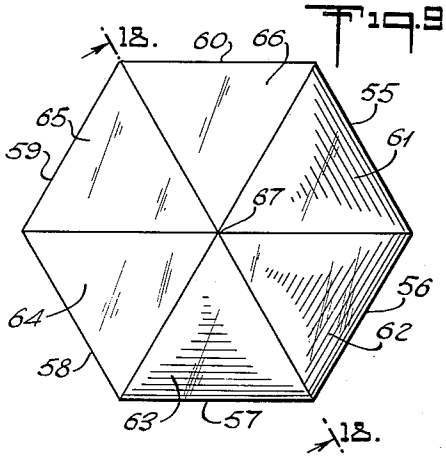


FIG. 10.

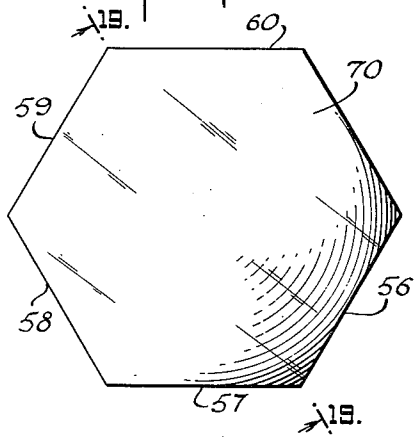


FIG. 11.

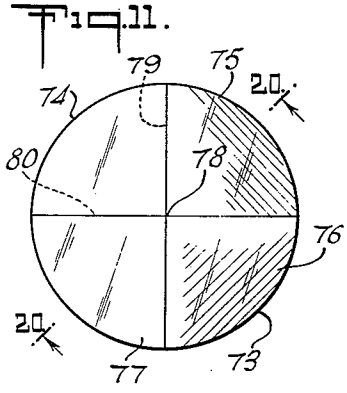


FIG. 13.

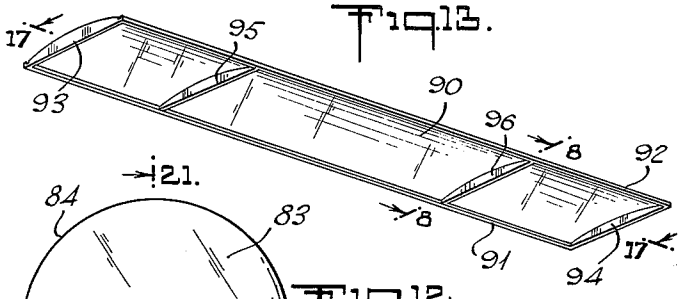
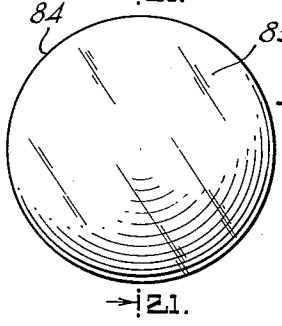


FIG. 12.



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Fig. 14.

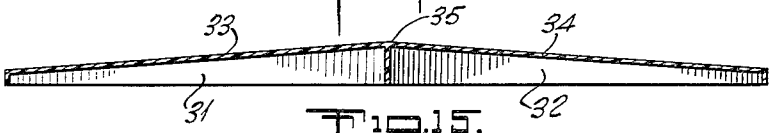


Fig. 15.

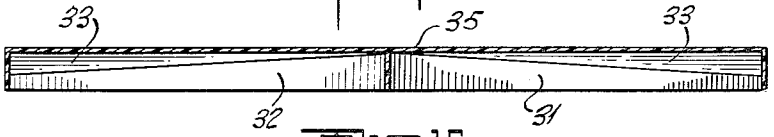


Fig. 16.

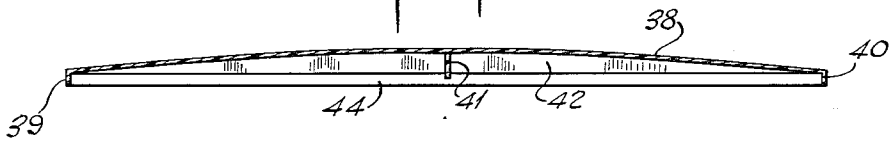


Fig. 18.

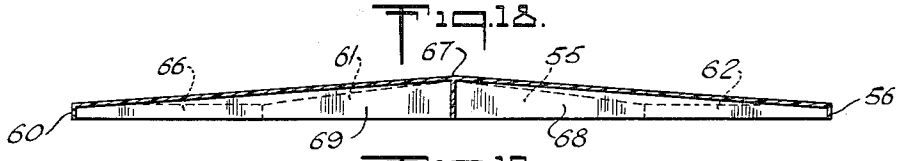


Fig. 19.

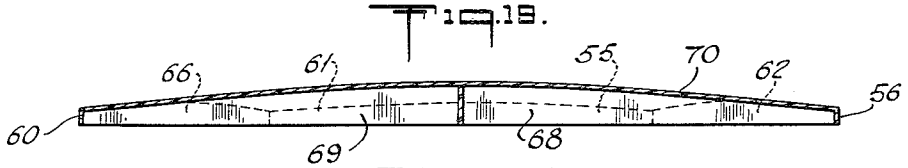


Fig. 20.

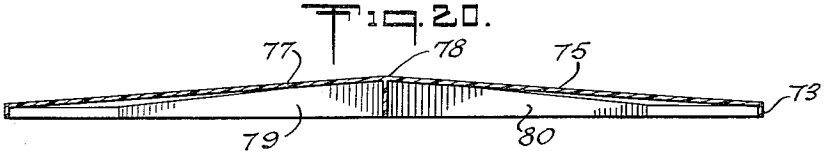


Fig. 21.

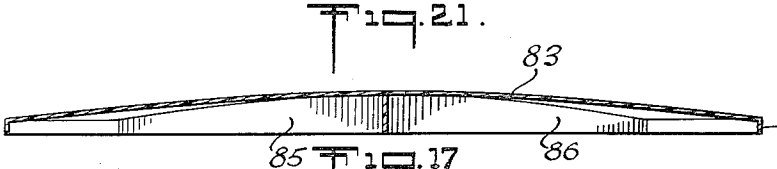


Fig. 17.

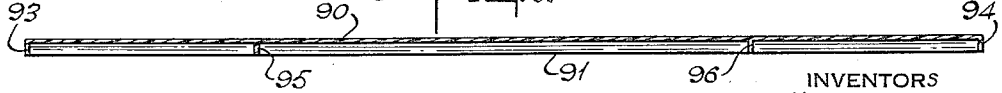
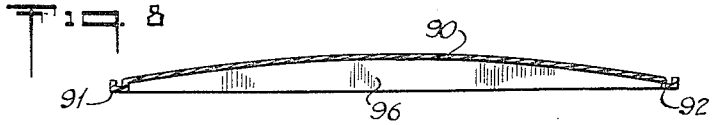


Fig. 8



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United States Patent Office

3,096,033
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3,096,033

CEILING PANEL

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Continuation of application Ser. No. 645,315, Mar. 11, 1957. This application Jan. 22, 1960, Ser. No. 4,049

8 Claims. (Cl. 240—106)

The present invention relates to a light transmitter or a lens particularly for ceiling lights.

This is a continuation of application Serial No. 645,315, filed March 11, 1957 and abandoned on January 25, 1960.

The invention provides a light transmitter or panel which can be readily manufactured and has a very light weight so that it may be readily supported from a ceiling. The panel may, for example, be formed of a single piece of molded plastic material. In several forms of the invention a panel may be formed so that it can be used with other similarly shaped panels to cover an extended ceiling area as is usually required for fluorescent lamps. The panels are adapted to be mounted below the fluorescent lamps and form a substantially continuous surface for completely obscuring the fluorescent lamps and preventing glare. The panels are adapted to form a totally closed fixture for the fluorescent lamps and to be readily mounted and removed.

The objects of the invention are attained by providing a light transmitter which may be polygonal or circular and usable below fluorescent lamps alone or with other similarly shaped light transmitters to cover an extended ceiling area, the transmitter being made of a single piece of molded plastic transparent material consisting of peripheral stiffening flanges with coplanar edges and a flange interconnecting web, the web being either concave or convex so that it forms a recess which is crossed by ribs, which may intersect one another centrally of the web, to stiffen the transmitter against deformation. The lower surface of the web is preferably covered with light redistributing prisms to alter the direction of the transmitted light and prevent glare.

Other objects and advantages of the invention will become apparent and the invention will be fully understood from the following description and the drawing, in which:

FIG. 1 is an end view of a fluorescent lamp fixture;

FIG. 2 is an end view of another type of fluorescent lamp fixture;

FIG. 3 is a bottom perspective view of a lens assembly covering an extended ceiling area;

FIG. 4 is a sectional view along the line 4—4 of FIG. 3;

FIG. 5 is a sectional view along the line 5—5 of FIG. 3;

FIG. 6 is a perspective view of a lens according to the invention;

FIG. 7 is a perspective view of another lens according to the invention;

FIG. 8 is a sectional view taken along the line 8—8 of FIG. 13;

FIG. 9 is a top view of a hexagonal lens;

FIG. 10 is a top view of another hexagonal lens;

FIG. 11 is a top view of a circular lens;

FIG. 12 is a top view of another circular lens;

FIG. 13 is a perspective view of a rectangular lens;

FIG. 14 is a sectional view taken along the line 14—14 of FIG. 6;

FIG. 15 is a sectional view taken along the line 15—15 of FIG. 6;

FIG. 16 is a sectional view taken along the line 16—16 of FIG. 7;

FIG. 17 is a sectional view taken along the line 17—17 of FIG. 13;

FIG. 18 is a sectional view taken along the line 18—18 of FIG. 9;

FIG. 19 is a sectional view taken along the line 19—19 of FIG. 10;

FIG. 20 is a sectional view taken along the line 20—20 of FIG. 11; and

FIG. 21 is a sectional view taken along the line 21—21 of FIG. 12.

Referring particularly to FIGS. 1 and 2, there are shown a plurality of fluorescent lamps 10 mounted on a ceiling 11. T shaped runners 12 extend downwardly from the ceiling and longitudinally of the fluorescent lamps 10. The runners 12 are suitably spaced from each other for supporting the panels or lenses 13 on the transverse portions 14 of the runners 12. A white diffusing ceiling cavity is formed between the runners 12 and the ceiling 11. This cavity may be provided by a white diffuse reflector 15 of the type well known in the art and capable of housing a plurality of fluorescent lamps. Where reflectors 15 are used, they may be supported on the runners and the panels 13 may be mounted in the reflectors. As shown in FIGS. 3, 6, 7 and 8, the lenses or light transmitters 13 may be square or rectangular. FIG. 3 shows two longitudinal rows of panels with two panels in each row, but it will be understood that any number of rows of any desired length, may be used to cover the required ceiling area. As shown in FIGS. 3–5, the lens includes four peripheral flanges 21–24 and intersecting ribs 25, 26 extending between opposite flanges. The top of the lens is formed by a web interconnecting the peripheral flanges and consisting of two flat or plane panels 27 and 28. Panels 27 and 28 preferably slope upwardly to form an inverted V having an apex angle of 170°. The bottom of panels 27 and 28 may be covered entirely by light redistributing prisms 17 to alter the direction of the transmitted light and to obscure the fluorescent lamps and thereby prevent glare. For the sake of simplicity the prismatic surfaces are not herein illustrated in detail. The lower edges of flanges 21 to 24 terminate in a horizontal plane 29. The lower edge of stiffening rib 25 is preferably above the plane 29. In order to further prevent glare, the peripheral flanges 23 and 24 and the ribs 25 and 26 may be provided with prims 18 along their lower edges and the inside of flanges 21 to 24 and both sides of ribs 25 and 26 may be provided with vertically extending flutes 19. The upper sides of panels 27 and 28 are smooth. The entire panel may be formed of a single piece of molded plastic transparent material.

Referring to FIGS. 6, 14 and 15 there is shown a light transmitter similar to that illustrated in FIGS. 3–5, except that the ribs 31 and 32 are diagonal and intersect at the center of the light transmitter. The peripheral flanges are again interconnected by flat panels 33 and 34 forming an inverted V, having a ridge 35. The panels 33 and 34 may be provided with prisms on their lower sides and the flanges and ribs may be provided with prisms and flutes in the manner described in connection with FIGS. 3 to 5.

FIGS. 7 and 16 show a modification of the light transmitters previously described, wherein the web is arched or dome-shaped, instead of being V shaped or ridged. The dome-shaped web 38 is arched between the side panels 39 and 40. The strengthening ribs 41 and 42 may extend parallel to the side flanges 39 and 40 and end flanges 43 and 44 or they may be arranged diagonally as shown in FIG. 6.

FIGS. 9 and 18 show a light transmitter of an hexagonal

form comprising peripheral flanges 55–60 and a plurality of triangular panels 61–66 extending from the peripheral flanges to an apex 67. Within the recess formed by panels 61–66 and flanges 55–60, strengthening ribs 68, 69 extend from the corners of the hexagon to the apex 67. As in the previously described transmitters, the lower sides of the panels 61–66 are covered with light obscuring prisms and the ribs and flanges may be provided with vertically extending flutes and have prisms on their lower edges. A plurality of hexagons of the type shown in FIG. 9, may be used to cover an extended ceiling area, but in this case, of course, additional triangular elements are required to completely cover a rectangular ceiling area.

The transmitter shown in FIGS. 10 and 19 is similar to that shown in FIG. 9 except that the web covering the transmitter is formed from a single spherical panel 70 instead of a plurality of triangles 61–66 as in FIG. 9. It will be evident that the dome-shaped panel 70 can be conical as well as spherical.

FIGS. 11 and 20 show a circular light transmitter comprising a circular flange 73 and four flat panel sectors 74–77 extending from circular flange 73 to an apex 78. Strengthening ribs 79, 80 extend radially, preferably along the junctures of panels 74–77, in the recess formed by flange 73 and the panels. The lower side of sectors 74–77 may be prismatic and the inner side of flange 73 may be fluted and its lower edge may be provided with prisms.

FIGS. 12 and 11 show a variation of the transmitter shown in FIGS. 11 and 20 in that the covering web is a single curved sheet 83 extending upwardly from the upper edge of the peripheral flange 84 to an apex. The web or panel 83 may be dome-shaped and, in particular, it may be spherical, but it will be apparent that it could also be conical. The transmitter of FIG. 12 is also provided with radial strengthening ribs 85 and 86 which may be similar to those illustrated in FIG. 11. Here again, the entire bottom surface of the web 83 may be covered with light obscuring prisms and the ribs and flanges may be provided with vertical flutes on their sides and with prisms along their lower edges.

FIGS. 13, 8 and 17 show a rectangular transmitter which may be long and wide enough to cover one or more fluorescent lamps. For example, it may be about four feet long and one foot wide. It has an upwardly arched web 90 extending between side flanges 91, 92. The transmitter includes also end flanges 93 and 94, and the ribs 95 and 96 intermediate the end flanges. The lower face of the web may be provided with prisms and the ribs and flanges may have flutes on their sides and prisms on their bottom edges, as in the previously described transmitters.

While I have illustrated and described several forms of my invention, it will be apparent to those skilled in the art that many variations and modifications thereof can be made. For example, the transmitter shown in FIGS. 4–7 could be turned upside down although in that case, the light obscuring prisms which cover the panels 27, 28 or 33, 34, or the web 38 would be placed on their convex side. Many other variations and modifications of the invention will be apparent to those skilled in the art and therefore the invention is not to be construed as limited except as defined in the following claims.

What is claimed is:

1. A rectangular light transmitter for use below fluorescent lamps and with other similar shaped light transmitters to cover an extended ceiling area and made of a single piece of transparent plastic material, the transmitter having peripheral stiffening edge flanges terminating in a normally horizontal plane, the flanges extending upwardly from said horizontal plane, upwardly and inwardly sloping plane panels extending from the top of the flanges and meeting centrally of the transmitter to provide a shallow, upwardly intended cross section of inverted V shape, and

vertical ribs extending between the flanges and located entirely between said horizontal plane and said panels, the ribs intersecting one another centrally of the transmitter to stiffen it and break up its lower surface into smaller areas, prisms covering the bottom edges of the ribs, said areas being substantially covered by light redistributing prisms to alter the direction of the transmitted light so as to obscure the fluorescent lamps and prevent glare.

2. A rectangular light transmitter for use below fluorescent lamps and with other similar shaped light transmitters to cover an extended rectangular ceiling area and made of a single piece of plastic transparent material, the transmitter having peripheral vertical walls constituting stiffening edge flanges terminating in a normally horizontal plane, a plurality of plane panels sloping upwardly and inwardly from the top of the flanges to provide a shallow inverted V shaped cross section, and vertical ribs extending between the flanges parallel to said walls and intersecting one another centrally of the transmitter to stiffen the transmitter and break up its lower surface into smaller areas, the bottom edges of said ribs being covered by prisms and both sides of the ribs being covered by vertical flutes, said areas being substantially entirely covered by light redistributing prisms to alter the direction of transmitted light so as to obscure the fluorescent lamps and prevent glare.

3. The transmitter of claim 2, wherein the sides of the flanges are covered by vertical flutes whereby glare through the flanges is prevented.

4. A rectangular light transmitter for use below fluorescent lamps and made of a single piece of plastic transparent material, the transmitter having peripheral stiffening flanges extending upwardly from a normally horizontal plane, an upwardly and inwardly sloping web of generally concave outline extending from the top of the flanges, and ribs located entirely between said horizontal plane and said web and extending between the flanges to stiffen the transmitter and break up its lower surface into smaller areas, said ribs having prisms covering the bottom edges thereof, said smaller areas of said transmitter being substantially covered by light redistributing prisms, said light redistributing prisms being arranged to alter the direction of the transmitted light so as to obscure the fluorescent lamps and prevent glare.

5. A rectangular light transmitted for use below fluorescent lamps and made of a single piece of plastic transparent material comprising a concave web, peripheral stiffening flanges connecting said web and extending downwardly therefrom and terminating in a normally horizontal plane, ribs extending between the flanges to stiffen the transmitter and break up its lower surface into smaller areas, said ribs being located between said horizontal plane and said panel and having prisms covering the bottom edges thereof, said smaller areas being substantially entirely covered by light redistributing prisms to alter the direction of the transmitted light so as to obscure the fluorescent lamps and prevent glare.

6. A rectangular light transmitter for use below fluorescent lamps and made of a single piece of plastic transparent material, the transmitter having peripheral stiffening edge flanges extending upwardly from a normally horizontal plane, a concave web panel extending over and connecting the tops of said flanges and being of shallow concavity, a rib extending between a pair of opposite flanges to stiffen the transmitter and break up its lower surface into smaller areas, each of said smaller areas being entirely covered by light redistributing prisms to alter the direction of the transmitted light so as to obscure the fluorescent lamps and prevent glare, and prisms covering the bottom edges of said rib.

7. A rectangular light transmitter for use below fluorescent lamps and made of a single piece of plastic transparent material, the transmitter having peripheral stiffen-

ing edge flanges extending upwardly from a normally horizontal plane, a web panel extending over and connecting the tops of said flanges, a rib extending between a pair of opposite flanges to stiffen the transmitter and break up its lower surface into smaller areas, said smaller areas being covered by light redistributing prisms to alter the direction of the transmitted light so as to obscure the fluorescent lamps and prevent glare, and prisms covering the bottom edges of said rib.

8. A rectangular light transmitter for use below fluorescent lamps and made of a single piece of plastic transparent material, the transmitter having a web panel, intersecting rib means extending downwardly from the light emergent surface of said web panel for strengthening said web panel and extending between the edges of said web panel, prism means substantially covering the light emergent surfaces of said panel between said intersecting rib means for altering the direction of transmitted light therethrough so as to obscure the fluorescent lamps and prevent glare, and further prism means on the bottom edges of said rib means for altering the direction of light transmitted therethrough so as to prevent glare.

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