

April 21, 1942.

T. W. ROLPH ET AL

2,280,160

LUMINAIRE

Filed Oct. 10, 1940

3 Sheets-Sheet 1

Fig. 1.

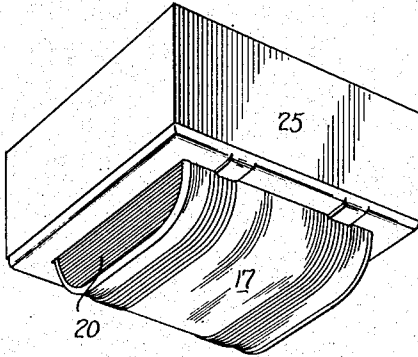


Fig. 2.

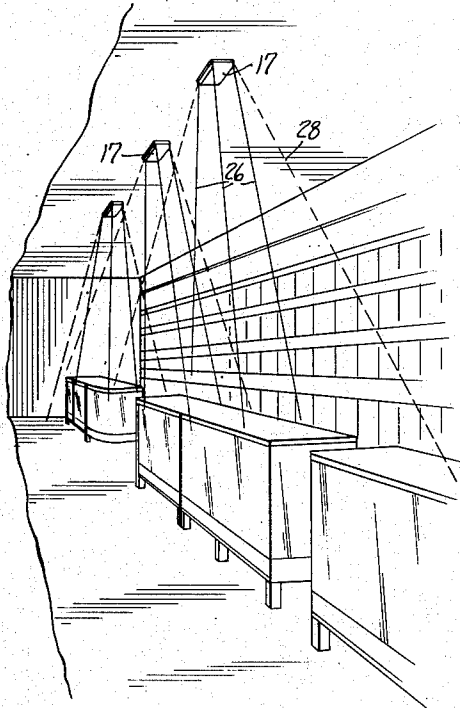
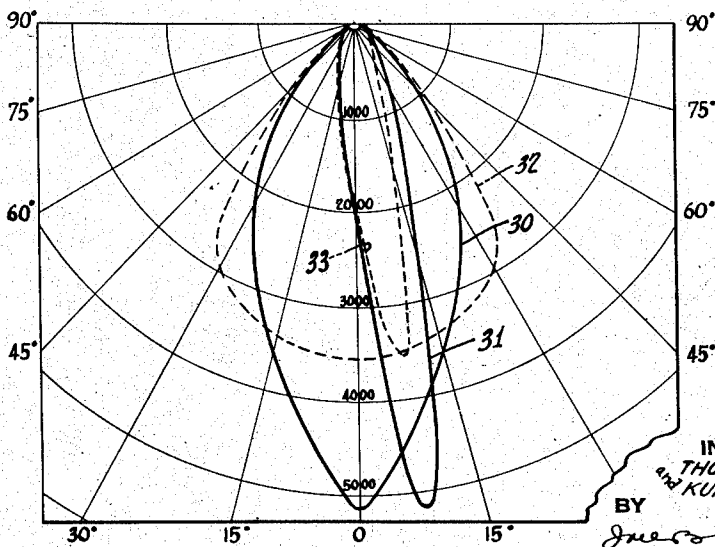


Fig. 6.



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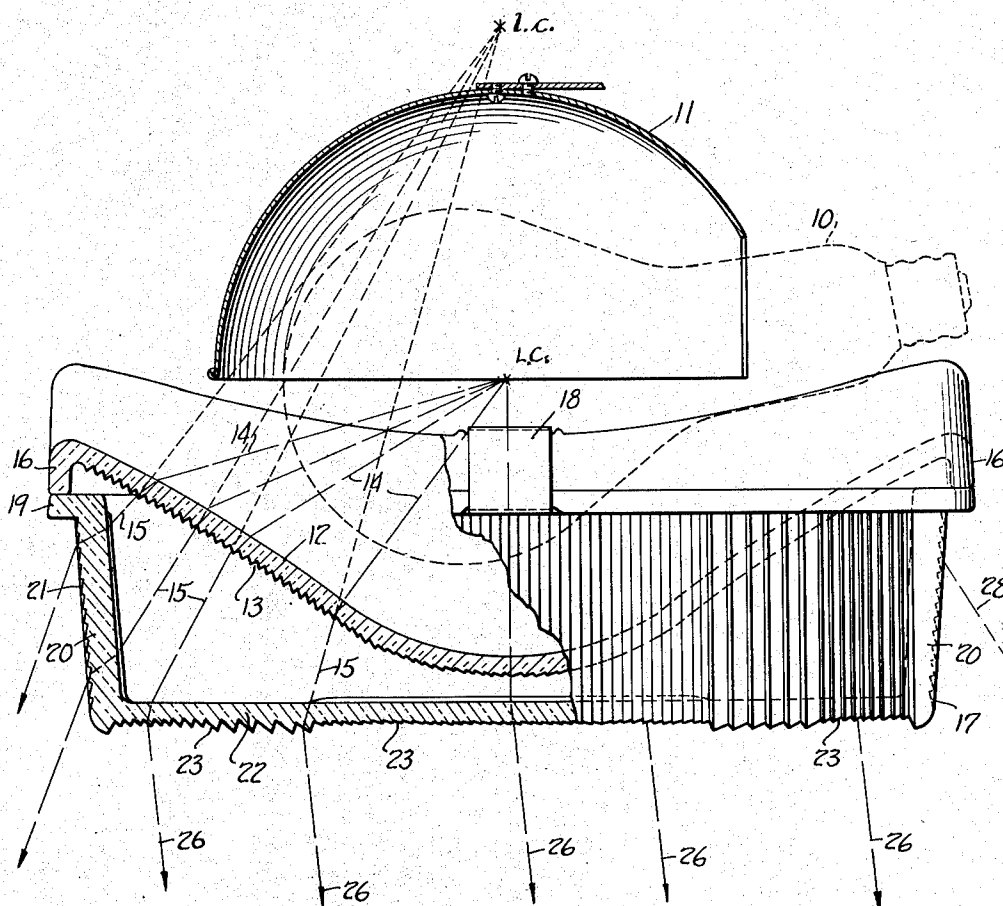
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Fig. 3.



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Fig. 4.

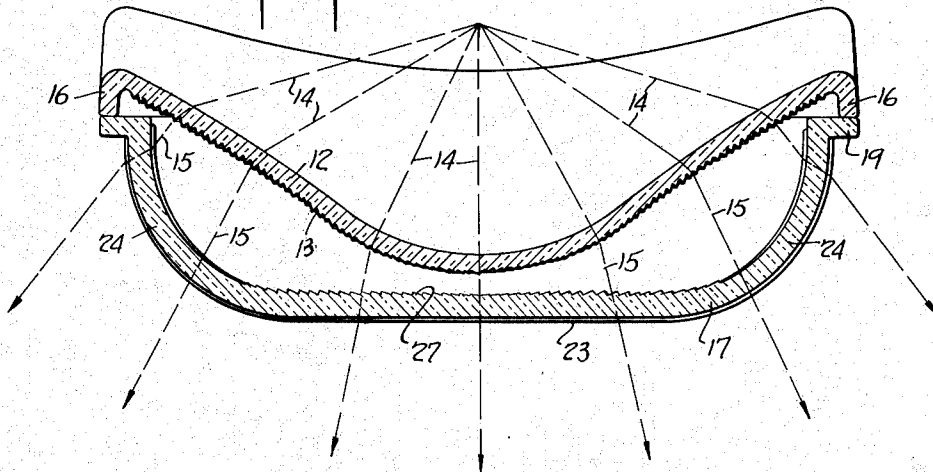
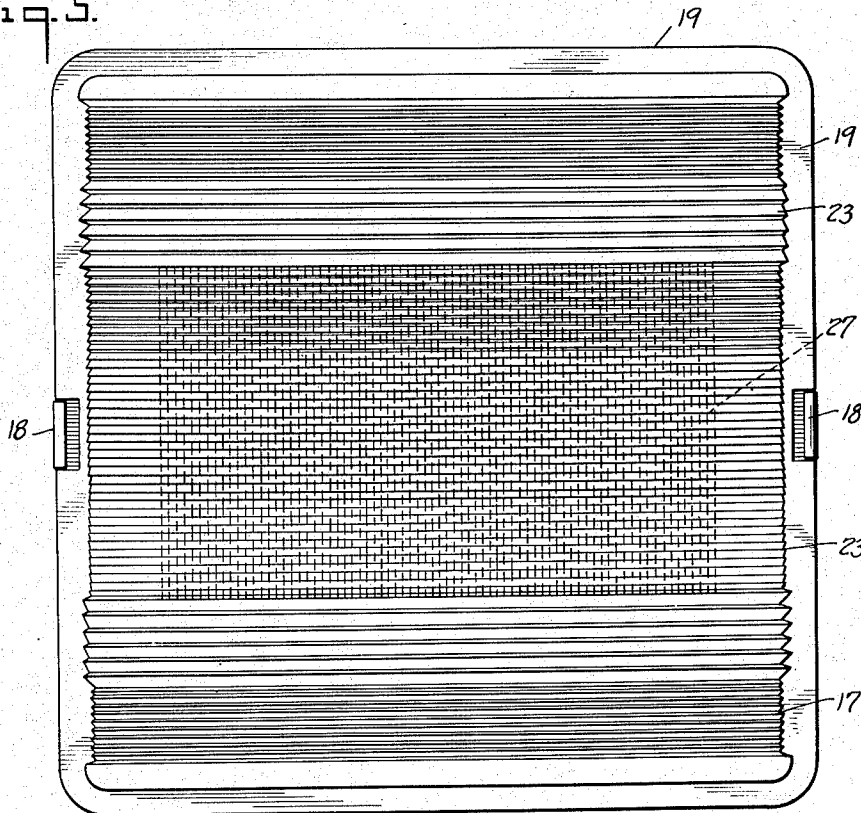


Fig. 5.



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LUMINAIRE

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Application October 10, 1940, Serial No. 360,535

8 Claims. (Cl. 240—106)

The present invention relates to luminaires and is more particularly directed toward luminaires adapted for lighting displays occupying elongated areas, such as counters in stores and for lighting shelving back of the counter.

The present invention contemplates a direct lighting unit adapted to be mounted adjacent the ceiling over, and slightly in front of, the display area, such as the counter to be lighted, and according to the present invention the luminaire is designed so as to produce illumination of very high intensity over such a rectangular area. In order that the light may be more effectively utilized in illuminating the counter and the shelving and to reduce glare from the customer's side of the counter, the light beam is projected rearwardly at a slight angle to the vertical.

In accordance with the present invention the luminaire provides a fairly wide distribution lengthwise of the working area, or counter, so that the luminaires may be spaced along the ceiling over the working area to be lighted; and avoid the spotlight effect obtained when the beams from adjacent units do not overlap.

According to the present invention this lighting result is obtained by employing the concentrated light source such as an incandescent lamp, and a two part lens systems, wherein the upper part is adapted to receive widely divergent rays from the source and converge them into a moderately divergent beam, and the lower part of the lens system is provided with prisms parallel with the area to be lighted and adapted to receive the moderately divergent light and refract it so that it is transmitted downwardly at a slight angle from the vertical, in planes across the prisms and without substantially affecting its divergence in directions lengthwise of the prisms.

The accompanying drawings show, for purposes of illustrating the present invention, one of the embodiments in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a perspective view showing the luminaire from underneath;

Figure 2 is a perspective view showing a number of luminaires employed for lighting a row of counters and shelving;

Figure 3 is a transverse vertical sectional view through the luminaire, parts being in elevation;

Figure 4 is a longitudinal sectional view through the luminaire, the light source and refractor being omitted;

Figure 5 is an inverted plan view of the luminaire; and

Figure 6 is a chart showing light distributions along and across the working area.

In the drawings, a light source in the form of a concentrated filament incandescent lamp is illustrated at 10, the light center being at L. C. A spherical reflector 11 is placed above the lamp. The output of the lamp is received by an upper dish lens 12, having annular prisms 13 adapted to receive the widely divergent light rays 14 and reduce their convergence, as indicated at 15, so that they appear to come from a virtual light source l. c. a substantial distance above the real light source L. C.

The lens 12 is normally in the form of a piece of pressed glass and has downwardly extending flanges 16, which may conveniently provide a square contour. The upper lens part 12 is secured to a lower lens part 17 by clips 18. This lower lens part has an upper peripheral flange 19 adapted to fit against the depending flanges 16 of the upper lens part and to support the lens system in a box or housing. The lower lens part 17 has two downwardly extending side walls 20, 20 provided with light depressing prisms 21 and these side walls are interconnected by a flat, or substantially flat, bottom portion 22 having parallel prisms 23. The ends of the lower refractor, or lens part, are curved upwardly as indicated at 24, Figure 4, and the parallel prisms 23 extend up along these ends, as will be apparent from Figures 1 and 3.

The luminaire may be mounted in an exposed box, such as indicated at 25 of Figure 1, or the luminaire, except for the lower lens part, may be recessed in the ceiling, as indicated in Figure 2.

The prism system on the flat portion and ends of the lower refractor part is designed to accept the moderately divergent light rays 15 and transmit them at slight angles to the vertical, as indicated at 26 in Figures 2 and 3. These rays diverge in longitudinal planes, as shown in Figures 2 and 4, continue in the same, or nearly the same, direction, depending upon whether or not the central area of the bottom refractor is provided with shallow prisms 27. These act to slightly diverge the rays which would normally be emitted more nearly vertical. These prisms 27 reduce the maximum beam candlepower but are effective to alter the light distribution so that a wider spacing of the light units may be had with reasonably uniform distribution of light between the units than where they are omitted.

When the units are installed, as indicated in

Figure 2, above a row of counters, it is possible to project a very intense beam at slight angles to the vertical, so as to illuminate the counter, and the higher angled spilled light 28 on the inner side of the unit will be directed toward the shelving.

In Figure 6 the full line curves 30 and 31 show the distribution along the counter in the plane of maximum candlepower and the distribution across the counter for a unit such as above illustrated employing a 200 watt lamp and wherein the light spreading prisms 27 are omitted. The curves 32 and 33, shown in broken lines, illustrate the distribution of the same equipment, except that the prisms 27 are present.

It will be apparent that as far as light control and distribution is concerned, the lower refractor acts on the divergent light rays 15 as though they came from a source at the elevation 1. c. Similar distribution of light (but at less intensity) could therefore be obtained if the light source (with or without a spherical reflector) were mounted at the height corresponding to the virtual light source, and in this case the dished lens 12 could be omitted. Such a system would of course not be as efficient in the utilization of the output of the lamp for counter illumination as the compact arrangement illustrated, but would make it possible to employ the lower lens part in a unit designed to utilize the light not controllable by the reflector and lower lens part as, for example, in an exposed unit having illuminated side walls or where the upper component was used for indirect lighting.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, we wish it to be understood that the particular form shown is but one of these forms, and various modifications and changes being possible, we do not otherwise limit ourselves in any way with respect thereto.

We claim:

1. In a luminaire, means for acting on a downwardly divergent cone of light whose axis is vertical to convert it into a beam wherein the rays have substantially unchanged divergence in one direction and a substantially uniform inclination to the vertical in transverse planes, comprising a horizontal lens intercepting said conical beam and having parallel prisms disposed in the direction of unchanged divergence, all the prisms to one side of a vertical plane through the apex of the cone and parallel with the prisms having a refracting power uniformly greater than that of those on the other side and such that the emitted light is directed across the said vertical plane at an angle to said plane equal to the angle the light emitted by the prisms of the said other side makes with said vertical plane.

2. A luminaire such as claimed in claim 1, wherein the said lens forms the bottom of a substantially square bowl, and the bowl has two substantially vertical side walls parallel with the prisms and end walls extending up to the same level as the side walls and along which the prisms extend.

3. A refracting bowl for direct lighting luminaires, the bowl having a rectangular configuration in horizontal planes, and being of channel shaped configuration in transverse vertical planes, and of a shallow U-shaped configuration

in longitudinal, vertical planes and having a flat bottom, the bowl being provided with means for producing a generally rectangular area of intense illumination in a region under the bowl and slightly displaced from said vertical axis, said means comprising external parallel prisms extending lengthwise of the channel bottom and up the ends of the U, the prisms having a configuration to direct a moderately divergent beam symmetrical about a vertical axis into an emergent beam in which the rays have substantially uniform inclinations in planes transverse of the prisms and diverge in lateral planes.

4. A luminaire comprising a light source, and a two part lens system below the source, the upper part including a dished central portion adapted to accommodate the source and having annular prisms about the vertical axis through the source for converging the light from said source into a beam diverging about said vertical axis, the lower part being provided with a system of parallel prisms to one side of a vertical plane through the source and of a refracting power to direct the emitted light across said vertical plane at a slight angle, and with a system of parallel prisms on the other side of said vertical plane and of lesser refracting power to direct the light emitted thereby at the same angle of inclination to the vertical plane, so as to produce a generally rectangular area of intense illumination in a region under the luminaire and slightly displaced from said vertical axis.

5. A luminaire such as claimed in claim 4, wherein the lower part has two parallel, substantially vertical walls provided with horizontal light depressing prisms.

6. A luminaire such as claimed in claim 4, wherein the lower part has two vertical walls parallel with the lower prisms, and a flat bottom and upwardly sweeping end walls between the side walls and traversed by the parallel prisms.

7. A luminaire such as claimed in claim 4, wherein the bottom part has shallow prisms transverse of the first mentioned prisms to slightly alter the divergence of the rays in said lateral planes.

8. A luminaire comprising a light source and a two part lens system underneath the source, the upper part including a dished central portion adapted to accommodate the source and provided with prisms to concentrate light received thereby into a beam diverging about a vertical axis, and peripheral downwardly extending flanges terminating a substantial distance above the bottom of the central portion and of substantially square contour, the lower part including two parallel side walls extending downwardly from two opposite flanges of the upper part, and a bottom, interconnecting the side walls and the other two flanges, and having prisms parallel with the said side walls to accept divergent rays from the central portion of the upper part and refract them into a beam in which the rays have substantially uniform inclinations in transverse planes across said second mentioned prisms, the side walls receiving light transmitted through the opposed outer parts of the dished upper part and having light depressing prisms to lower said light rays.

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