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[54] COVER PLATE FOR A LAMP

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 38,702, May 19, 1970, abandoned.

[52] U.S. Cl. ...... 240/106 R, 240/78 LD, 240/106.1
[51] Int. Cl. F21v 5/04
[58] Field of Search .... 240/106 R, 106.1, 240/78 R, 78 LD

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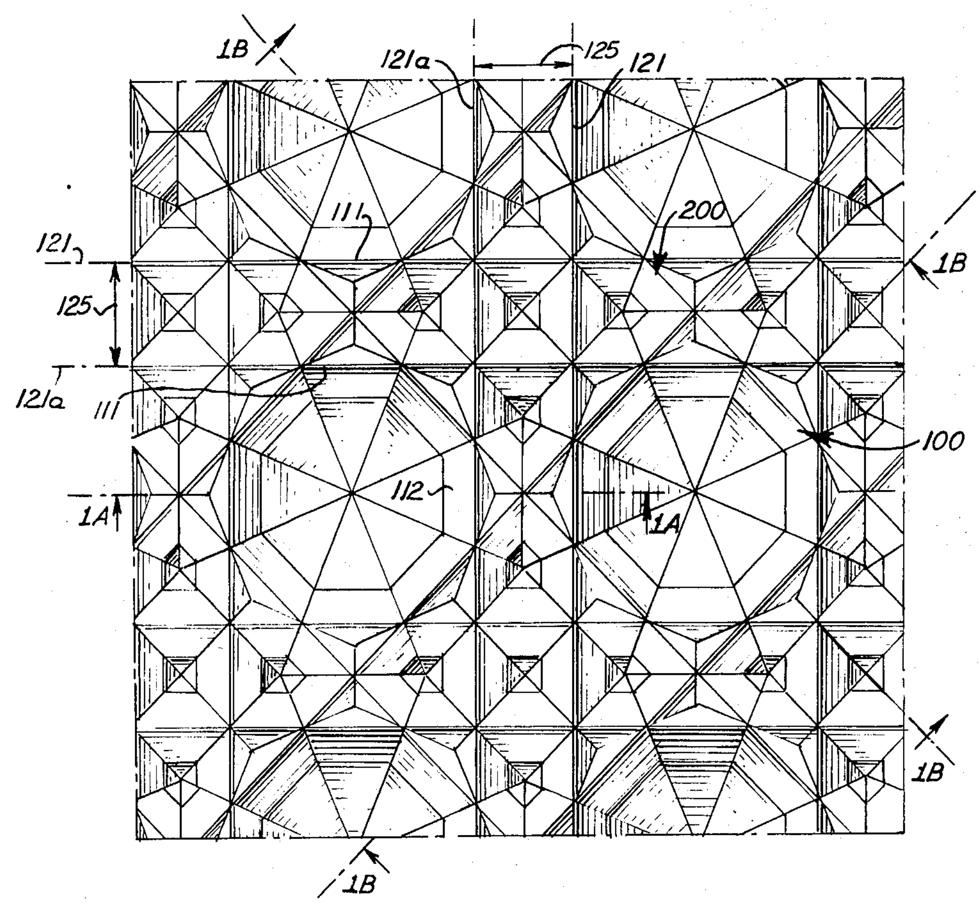
[57] **ABSTRACT**

A cover plate for a lamp, formed on its surface with centrically symmetrical light-refractory configurations. The entire surface of the plate is traversed in at least three different angular directions by straight, parallel ribs of simple or modified V-section, of which the vertex lines defining the crests of the ribs divide the plate, when viewed in plan, into principal divisions in the form of hexagon, octagon or decagon depressions with intervening secondary divisions in the form of smaller triangular depressions and possibly polygon depressions, and the cross-sectional shape of the ribs gives rise to the formation of prismatic depressions in the form of inverted principal and secondary pyramids in the principal and secondary divisions which form their bases.

5 Claims, 8 Drawing Figures



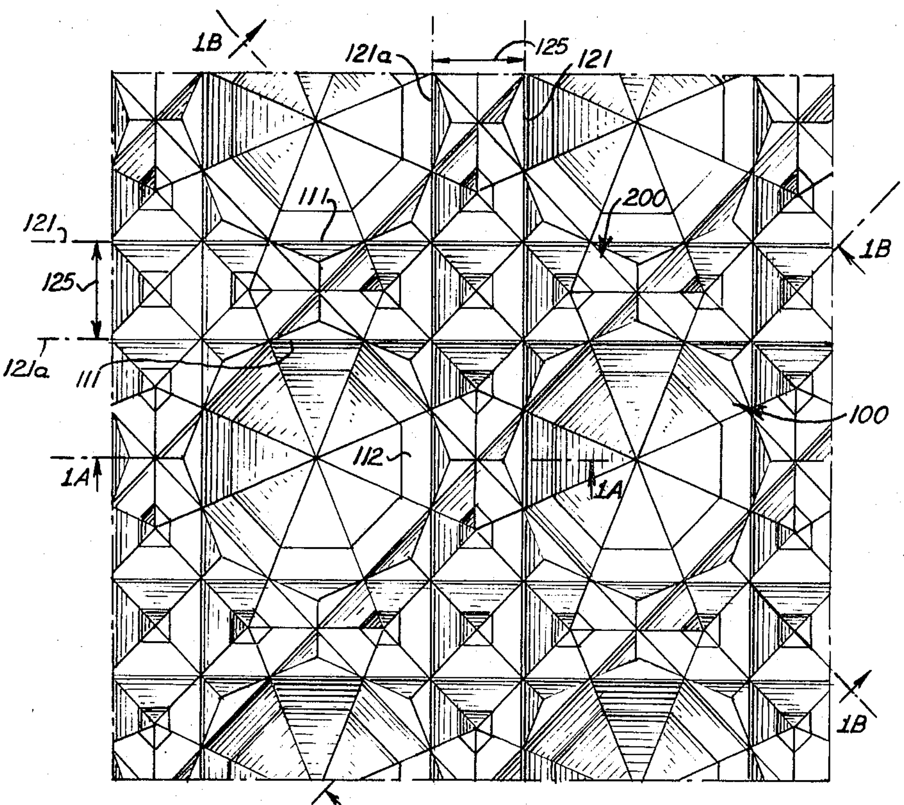


FIG.1

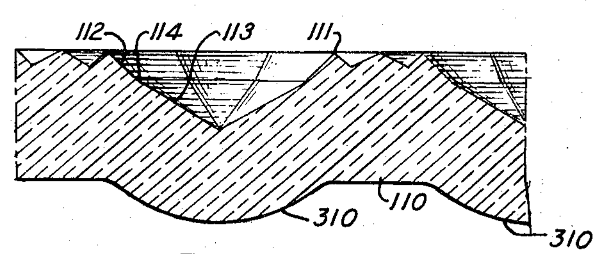


FIG. 1A

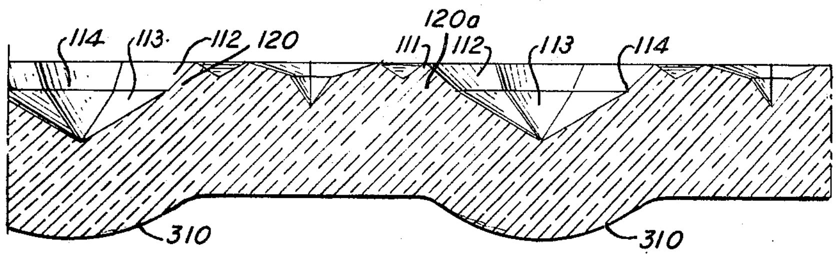


FIG.1B

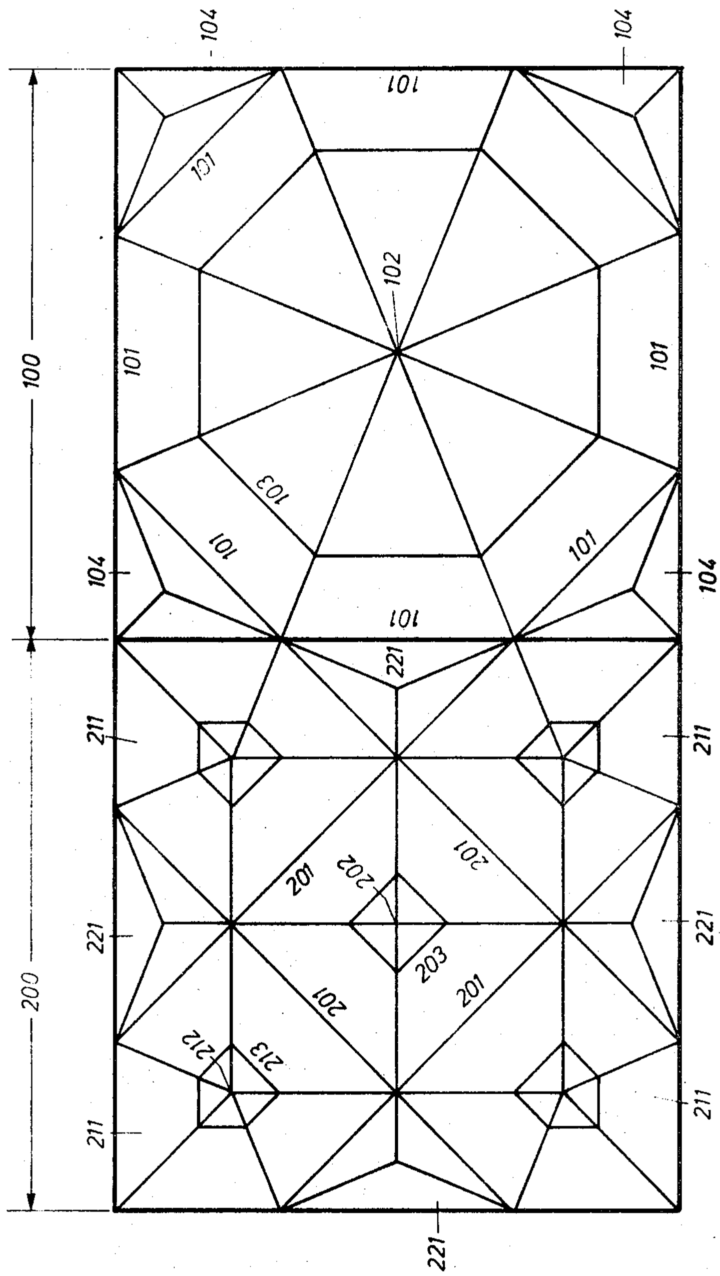


Fig. 2

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Fig. 3

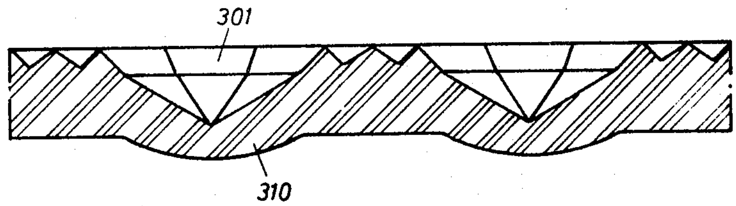


Fig. 4

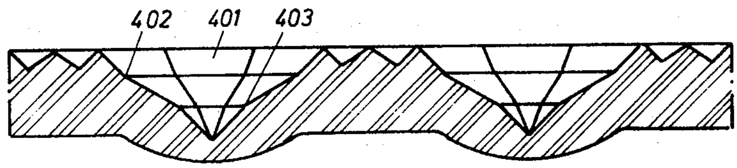


Fig. 5

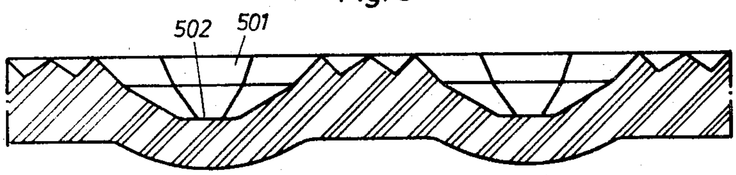
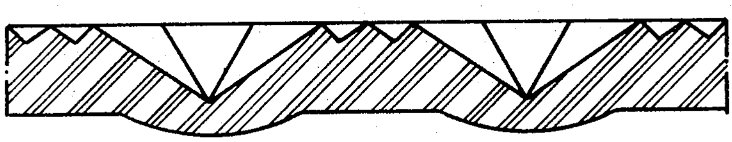


Fig. 6



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COVER PLATE FOR A LAMP

This is a continuation-in-part of my copending application Ser. No. 38,702 filed May 19, 1970, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to a cover plate for a lamp formed on its surface with centrically symmetrical, light-refractory configurations.

In illumination technology lamps containing light sources of any kind are frequently covered with transparent plates provided on their surfaces with depressions in the form of lenticular, conical or pyramidal configurations. These configurations are on circular, square or hexagonal bases. Each of these centrically symmetrical configurations is intended radially to distribute light uniformly at theoretically calculable transmission angles.

A tool for the production of such a cover plate must contain an elevated configuration corresponding with each such depression. The production of these elevated configurations in the tool involves a considerable amount of working time.

One problem that arises in the provision of transparent flat covers or trough-shaped shades for lamps containing fluorescent light sources is how to obscure a clear view of the light source through the shade, more particularly how to prevent the elements including lamps, lamp sockets, and trigger units from being seen. This is not satisfactorily achieved by using conventional cover plates containing cone-shaped or lenticular configurations.

The problems contemplated in the present invention arise from this state of the art.

The tools for the production of the cover plate should be capable of being mechanically economically produced in such a way that the elevated configurations corresponding to the required depressions are all simultaneously formed on the operative side of the tool by grinding, milling or planing.

SUMMARY OF THE INVENTION

It is, therefore the object of the invention to combine the centrically symmetrical configurations with other depressions such that the lamp interior cannot be seen. Generally speaking, it is intended that it should be possible to direct and distribute the light flux in vertical planes.

To attain this object the present invention provides a cover plate for a lamp, formed on its surface with centrically symmetrical light-refractory configurations, wherein the entire surface of the plate is traversed in at least three different angular directions by straight, parallel ribs of simple or modified V-section, of which the vertex lines defining the crests of the ribs divide the plate, when viewed in plan, into principal divisions in the form of hexagon, octagon or decagon depressions with intervening secondary divisions in the form of smaller triangular depressions and possibly polygon depressions, and the cross-sectional shape of the ribs gives rise to the formation of prismatic depressions in the form of inverted principal and secondary pyramids in the principal and secondary divisions which form their bases.

The invention also relates to all the features that are herein claimed, illustrated and described.

When the invention is applied the centrically symmetrical configuration appears in the form of generally regular polygon-based inverted pyramids having an even number of corners with bases in the form of hexagons, octagons, decagons or polygons having even more corners. The greater the number of corners, the more will the base in character approach a circle and the more will the inverted pyramids in the principal divisions assume the optical properties of inverted cones (conical pyramids).

Nevertheless, it is not necessary to work an elevation separately for each light refracting configuration into the tools for the production of the proposed cover plates. The desired configurations result from the directions and cross-sectional shapes of the ribs which traverse the entire plate surface, and which can therefore be produced by grinding, milling or planing. The tools can thus be economically produced by mechanical means.

The interior of the lamp cannot be seen through the multiplicity of faceted surfaces (cut-diamond effect). On the one hand the several inverted pyramidal faces are relatively inclined. In addition, each side of each inverted pyramid may be broken by one or more discontinuity lines where the pitch of the side changes. More particularly the smaller inverted pyramids in the secondary divisions contribute towards the production of the cut-diamond effect.

The possibilities of controlled refraction of the light are inherent in the variability of the parameters of the hexagon, octagon or decagon based inverted pyramids, i.e. of the refracting configurations in the principal divisions, such as the size, pitch and subdivision by discontinuities in pitch of the inverted pyramid faces.

BRIEF DESCRIPTION OF THE DRAWINGS

Several embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. **1** is a plan view of a proposed cover plate comprising inverted octagon in the principal divisions;

FIG. **1A** is a cross-sectional view taken along the lines **1A—1A** of FIG. **1**;

FIG. **1B** is a cross-sectional view taken along the lines **1B—1B** of FIG. **1**;

FIG. **2** is a plan view, on a larger scale, of a principal and a secondary square of FIG. **1**;

FIG. **3** is a cross-section of a plate according to FIG. **1**; and

FIGS. **4 – 6** are further embodiments of inverted pyramids.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. **1** shows a cover plate for a lamp according to the invention, the entire surface of which is traversed by ribs in four directions, namely, longitudinally, transversely perpendicular to the longitudinal ribs, and diagonally at a 45° angle to both the longitudinal and transverse ribs.

The shape of the cross-section of the longitudinal and transverse ribs can be seen in FIG. **1A**. **114** is a discontinuity line parallel to the general plane of the plate dividing the side of each rib into a lower more steeply pitched part **112** and an upper less steeply pitched part **113**, **111** being the vertex lines defining the crests of the ribs. This cross-section holds for the ribs extending in both diagonal directions.

The cross-section shown in FIG. 1B is that of the diagonal ribs. Pairs of ribs **120** and **120*a*** are provided which partly overlap. **121** and **121*a*** are vertical lines or ridges defining the crests **111** of the ribs which are spaced a distance **125** apart. **112** and **113** indicate the bottom and upper parts of the sides of the ribs that are separated by a discontinuity line **114** running parallel to the plane of the plate.

The ribs are so drawn that in plan a checkboard configuration comprising squares is formed, namely, principal squares marked **100** and secondary squares marked **200.** The distance **125** between neighboring vertex lines is equal to about ($\sqrt{2} - 1$) or 0.4142 times the length of the side of a square.

FIG. **2** illustrates a principal square **100** and a secondary square **200** side by side.

The principal square **100** contains a regular octagon **101** which forms the base of a regular inverted pyramid with its apex at **102. 103** is a discontinuity line parallel to the plane of the plate dividing each side of the inverted pyramid into an upper and a lower face of different pitch. Four triangles on the octagonal circumference complete the square. Corner inverted pyramids **104** are depressed.

The secondary square **200** contains a central inverted pyramid **201** on a square base. **202** is the apex of the inverted pyramid, **203** is a discontinuity line corresponding to the discontinuity line **103** on the octagonal inverted pyramid.

In the secondary square **200** the four sides of the central inverted pyramid **201** are each adjoined by a pentagon **211** having an apex marked **212** and a discontinuity line **213.**

Four triangles **221** which also form the bases of inverted pyramids complete the secondary square **200.**

FIG. **3** is a cross-section of a plate according to FIG. **1.** When such a plate is produced by the blowing or vacuum process boss-shaped elevations **310** appear on the back of the plate opposite the depressions **101.** In their totality these elevations by virtue of their light-scattering effect contribute towards solving the problem contemplated by the invention, to the extent this relates to making the interior of the lamp invisible from the outside.

FIG. **4** is a cross-section of another embodiment. **401** are depressions of pyramids on octagonal bases. **402** and **403** are discontinuity lines, one forming a salient and the other a reentrant angle.

In the embodiment according to FIG. **5** the pyramidal depressions **501** are truncated. The surface formed by the truncation is marked **502.**

FIG. **6** is a cross-section of a plate according to still another embodiment.

The embodiments according to the invention can be modified inter alia as follows:

By the provision of additional discontinuity lines, forming salient or reentrant angles in the rib cross-sections, the side faces of the inverted pyramids can be arbitrarily increased in number and the cut-diamond effect correspondingly enhanced. Instead of providing flat pyramid faces these may also be slightly curved.

In the illustrated embodiments, the inverted hexagons and octagons are all regular. However, as an alternative, polygons could be divided out in which only opposite sides are equal.

The inverted pyramids are so contrived that the apices are located in the centers of the hexagons or octagons; these may also be decagons or duodecagons. By suitably varying the cross-sections of the ribs, inverted pyramids that have eccentric apices can also be cut out above these polygonal bases.

A cover plate as proposed by the invention may also form part of a differently designed lamp shade, for instance a dish or trough-shaped shade.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiments are therefore to be considered in all respects as illustrative and not restrictive.

I claim:

1. A cover plate for a lamp having centrically symmetrical light refractory configurations on one surface thereof wherein said one surface of the plate is traversed by parallel ribs of V-section, a first set of a plurality of said ribs running in each of a longitudinal direction and a direction transverse thereto, and a second set of said ribs running in two diagonal directions transverse with respect to each other, said diagonal ribs being equally spaced whereby the vertex lines defined by the crests of said second set of ribs divide the plate, when viewed in plan, into principal and secondary square divisions in a checkerboard pattern, said first set of ribs being formed in pairs of parallel ridges having overlapping cross-sections, the cross-sectional shape of the ribs being extended forming prismatic depressions in the form of inverted pyramidal depressions between the ribs in both the principal and secondary square divisions, the inverted pyramidal depressions in each principal square division comprising a centrally located octagon with four triangles contiguous to four sides of the octagon forming a complete principal square, and the inverted pyramidal depressions in each secondary square comprising a centrally located square with four pentagons and four triangles alternately positioned contiguous to the perimeter of the square forming a complete secondary square; and the opposite surface of said plate has a boss-like elevation opposite each of said inverted pyramidal depressions whereby an improved light-scattering effect is obtained and a lamp located adjacent said opposite surface of said plate is not visible from the one surface thereof.

2. A cover plate for a lamp according to claim **1** wherein the distance between the crests of each pair of parallel ridges is about 0.4142 times the length of a side of a principal square.

3. A cover plate for a lamp according to claim **1** wherein the side faces of the depressed pyramids are repeatedly broken by pitch discontinuity lines parallel to the plane of the plate to form salient and/or reentrant angles.

4. A cover plate for a lamp according to claim **3** wherein the cross-section of the ribs contains a discontinuity forming a salient angle, the angle at which the vertex defining the crest of the ribs being between 80° and 100° and the lower parts of the sides of the ribs meet at an angle between 110° and 130°.

5. A cover plate for a lamp according to claim **1** wherein the centrally located octagon and square inverted pyramids are truncated.

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