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3,104,834

PLASTIC GRID

Original Filed Jan. 14, 1958

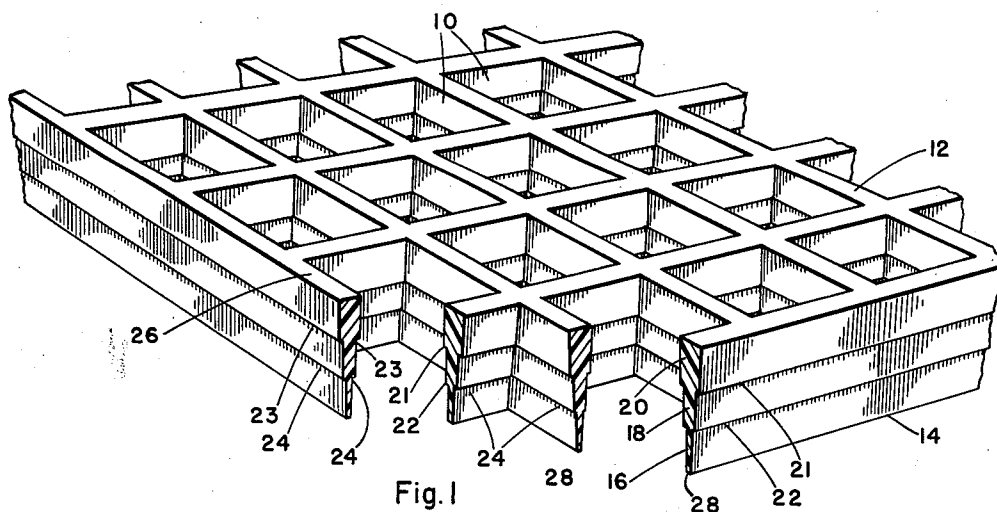


Fig. 1

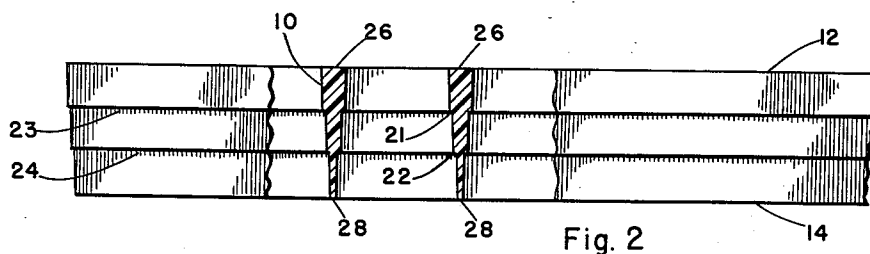


Fig. 2

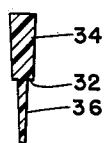


Fig. 3

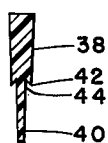


Fig. 4

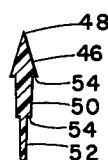


Fig. 5

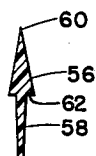


Fig. 6

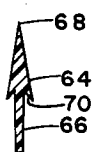


Fig. 7

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PLASTIC GRID

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Continuation of application Ser. No. 708,894, Jan. 14, 1958. This application Jan. 9, 1961, Ser. No. 81,643
8 Claims. (Cl. 240-78)

This application is a continuation of Serial No. 708,894, now abandoned, filed by the same applicant on January 14, 1958.

This invention relates generally to light control means and more particularly to a plastic grid. In this disclosure the term grid will be used in a somewhat restricted sense to denote a cellular eggcrate panel in which the cells extend completely through the panel, the cells being ordinarily all uniform, and the panel having a very considerable depth. The term grid is, therefore, used herein to connote a structure which is suitable for manufacture from translucent plastic and for use in light control, in contradistinction to metal grids, plates or panels.

The primary or general object of this invention is to provide such a lighting control grid, constructed of metal or translucent material such as commonly employed thermoplastics, the cell walls being of a novel configuration assuring the reduction of apparent brightness of the grid as viewed from the side thereof remote from the light source associated therewith.

A more specific object of this invention is to provide a cell wall of such a cross-sectional shape that those sections of the cell walls remote from the light source are, in part at least, definitely shaded, this being effected by tapering the cell walls transversely of the grid with the minimum thickness of the cell walls at the face of the grid to be disposed toward the viewer.

Still another object of this invention is to provide a light control grid which, in use, is characterized by critically positioned and controlled shade lines to enhance the aesthetic value since the overall appearance is improved, as well as to minimize any tendency toward glare. In this respect it is also noteworthy that the invention includes the concept of varying the dimensions and angular relationship of the shoulders defining the steps in the cell walls. When these shoulders are inclined in one direction or negatively chamfered, the shaded areas will be more extensive with slightly deeper shadow effects. It will be understood, of course, that the visual impression, except when actually analyzed by the viewer, will be merely a reduction in the brightness of the grid, accompanied by an enhancement of the general appearance of the grid.

Still another object of this invention is to provide a grid having the foregoing valuable features without introduction of any deleterious features such as loss of rigidity. In fact, it is believed that a lesser quantity of material will achieve greater and more efficient light control when the grids are formed according to this invention. It is also believed that the necessary maintenance of the grids will be slightly decreased, particularly in view of the fact that dust will not tend to gather upon the sides of the tapered cell walls, at least when the grid is disposed in horizontal position. It will be at once evident to those skilled in the art that the configuration of the cell walls is such that the casting thereof is facilitated.

With these objects definitely in view, together with other objects which will become apparent, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure, and in which:

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FIGURE 1 is a three dimensional, fragmentary view of a grid fashioned according to this invention, a corner of the grid being shown broken away and the underlying parts shown in cross section for better illustration of the preferred configuration of the cell walls;

FIGURE 2 is a fragmentary elevational view of one side of the grid, a portion being broken away as in FIGURE 1 and for the same purpose;

FIGURE 3 shows a modified embodiment of this invention wherein the cell wall has only a single shoulder defined on each side thereof;

FIGURE 4 is another embodiment of this invention wherein the shoulder is achieved by negatively chamfering the cell wall;

FIGURE 5 is another embodiment of the invention, similar to the above preferred form but with the added feature of the part hereinafter referred to as the thicker section being sharpened to a knife edge at one face of the grid;

FIGURE 6 is another embodiment of this invention wherein the cell wall is brought to a knife edge at one face of the grid, as in FIGURE 5, and only a single shoulder is provided on each side of the cell wall; and

FIGURE 7 is yet another modified embodiment of this invention wherein both the negative chamfering feature of the shoulder and the knife edge at one face of the grid are both incorporated in the cell wall configuration.

Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

Referring now to the drawing in detail, the grid is essentially a cellular panel wherein the cells extend transversely completely through the grid or panel, so that these cells open at both faces of the grid, it being obvious that the grid has a very considerable depth or transverse dimension. It should also be noted at the outset of this detailed description, that the grid is not necessarily employed in the horizontal position, there being a great many instances, in the practical application of this invention, where the grid will be inclined or used in vertical disposition. However, since the patent monopoly now sought cannot extend to the various combinations of structure wherein this grid will be used as an element, this disclosure will be directed primarily to the features of the grid per se, rather than considerations reflecting the manner of use of the grid, with the one significant exception that it is inherent in this invention for the light source to be located at that side of the grid remote from the viewer. Simply for convenience in the following discussion it will be presumed or stipulated that the light source is located above the grid shown in FIGURES 1 and 2 and that it is desired to limit the apparent brightness of the underside of the panel, or the total visual impression upon the eye of a viewer beneath the panel.

Each cell wall 10 extends from the upper face, it being recalled that this term implies the face disposed toward the light source, to the lower face 14, that face disposed toward the viewer. Each cell wall has a minimum thickness at the face 14 and has a maximum thickness in a section of the wall remote from the face 14. In the embodiments shown in FIGURES 1 and 2 the cell wall comprises a thinner section 16, a section of intermediate thickness 18 and a thicker section 20. As illustrated, each of these sections is bounded by parallel sides which are vertical when the grid is disposed horizontally. The cell wall may be thought of as generally tapered toward the face 14 and each side of the cell wall is stepped, the steps being defined by shoulders 21 and 22 which extend throughout the entire inner periphery of each cell and along the lengths of the outer walls of the grid. These

shoulders are distinct and of significant proportions so that definite shaded areas 23 and 24 are produced on the portions of the cell walls adjacent to the shoulders and on the side thereof remote from the light source. It will be obvious that the shoulders 21 result in the production of the shaded areas 23 and that the shoulders 22 result in the shaded areas 24. These shaded areas are also co-extensive in length with the shoulders. As already mentioned, the production of the shaded areas 23 and 24 considerably lessens the apparent brightness of the grid when viewed from the side thereof remote from the light source.

The specific configuration of the cell walls can be changed somewhat without departing from the general concept of this invention. In the form shown in FIGURES 1 and 2, the greatest thickness of the cell wall is at 26 and the least thickness indicated at 28 is at the face 14. In this form, the surface of each cell wall at the face 12 is flat. It will also be noted, in this form, that the shoulders are defined by flat horizontal surfaces.

In the embodiment of the invention shown in FIGURE 3 a single shoulder 32 is defined on each side of each cell wall, but this configuration differs in two respects from the cross-sectional configuration of the cell wall in FIGURES 1 and 2. In the first place, each cell wall has only two sections of differential thickness and both the thicker section 34 and the thinner section 36 are slightly cuneiform. The inclination of the sides of the cuneiform sections 34 and 36 makes these sides function somewhat after the same manner as the shoulders 21 and 22 although the shading effect is of lessened degree. It is important to note at this point that one implementation of this invention is illustrated by this inclination of the sides as divorced from the shadow of the shoulders, and that the basic concept of this invention extends to the provision of a cuneiform cell wall such as illustrated in either of the upper or lower sections of the cell wall in FIGURE 3.

In the form shown in FIGURE 4 the cuneiform sections 38 and 40 are retained and the shoulders 42 are achieved by negative chamfering so that the resultant shaded areas 44 will be more extensive and probably of deeper shadow than the shaded areas 23 and 24 caused by horizontal shoulders of like dimension. In other words, control of brightness of the grid as viewed from the side adjacent the face 14 can be controlled by choosing the inclination as well as the number of the shoulders defining the steps on the sides of the cell walls.

In the form shown in FIGURE 5 the thicker section 46 tapers to a knife edge 48 at the face 12 of a panel wherein this section would be used and this cell wall is shown as having a section of intermediate thickness 50 and a thinner section 52. The shoulders 54 are shown as horizontal or normal to the center line of the cell wall. Tapering the thicker section 46 to a knife edge as at 48 reduces the amount of light reflected directly upwardly from the grid and somewhat decreases the amount of light which passes through the cell wall, it being recalled that when the cell wall is of translucent plastic it causes diffusion of such light. As a result, the operating characteristics of this grid as a light control panel will be quite different from the characteristics of a panel employing cell walls of the prior described configuration. In this regard, it might be noted that I prefer that all cell wall configurations developed according to this invention should be symmetrical about a vertical center plane although even this principle can be departed from without going beyond the scope of this invention. FIGURES 6 and 7 show two further cross-sectional shapes which may be resorted to for particular uses. The functioning of the tapered thicker section 56 with the thinner section 58, knife edge 60 and shoulders 62 will be substantially as already described in the prior forms. Similarly, in regard to FIGURE 7, the functioning of the thicker section 64 and thinner section 66, as well as the provision of the knife edge 68 and reversed chamfered shoulders 70 will also be substantially that of the correspondingly shaped portions in the other

figures. However, it will be obvious that all these shapes and possibly several other somewhat similar shapes may be resorted to in providing for brightness control of the grid according to this invention.

Even though several forms of this invention have been illustrated, it should be understood that the drawing and specification are essentially illustrative rather than limiting and that still further minor variation may be necessary to adapt the invention to particular uses, and what I desire to secure by Letters Patent is:

1. A cellular grid having means for controlling the apparent brightness thereof as viewed from the side of the panel remote from a light source, said grid comprising:

cell walls being of lattice type and defining cells extending entirely through the panel and opening at both faces thereof;

said cell walls having their maximum thickness dimension quite small as compared to the corresponding transverse dimension of the cells;

the thickness of said cell walls decreasing transversely of the grid and in the direction axial to the cells from one face to the other face and the variation in thickness being many times that required as draw taper and said cell walls having distinct shoulders defined, as a result of said variation, in a portion of said grid intermediate the faces thereof and spaced well away from both said faces; said walls being of generally lesser thickness in that portion of the grid to be disposed, in use, remote from said light source.

2. A cellular grid having means for controlling the apparent brightness thereof as viewed from the side of the panel remote from a light source, said grid comprising:

cell walls being of lattice type and defining cells extending entirely through the panel and opening at both faces thereof;

said cell walls having their maximum thickness dimension quite small as compared to the corresponding transverse dimension of the cells;

the thickness of said cell walls decreasing transversely of the grid and in the direction axial to the cells from one face to the other face and the variation in thickness being many times that required as draw taper and said cell walls having distinct shoulders defined, as a result of said variation, in a portion of said grid intermediate between the faces, thereof; said walls having shaded areas adjacent said shoulders and at the sides of said shoulders remote from a light source used with the grid; said walls being of generally lesser thickness in that half of the grid to be disposed, in use, remote from said light source.

3. A grid according to claim 1 and wherein the variation in thickness of the cell walls is stepped, with said distinct shoulders defining the steps and shading areas of the cell walls from light originating at one side of the grid.

4. A grid according to claim 1 and wherein said cell walls are symmetrical about planes normal to said faces and extending centrally of the walls.

5. A grid according to claim 1 and wherein the portion of said shoulders distal from said light source are defined by surfaces substantially parallel to the planes of said faces.

6. A grid according to claim 1 wherein the portion of said shoulders distal from said light source are defined by surfaces that meet the cell walls at an acute angle.

7. A grid according to claim 1 and wherein certain of said shoulders are disposed adjacent to one face of the grid, and said cell walls having a minimum thickness at the opposite face of the grid.

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8. A cellular grid having means for controlling the apparent brightness thereof as viewed from the side of the grid remote from a light source, said grid comprising:

cell walls being of lattice type and defining cells extending entirely through the grid and opening at both faces thereof;

said cell walls having their maximum thickness dimension quite small as compared to the corresponding transverse dimension of the cells;

the thickness of said cell walls varying transversely of the grid and in the direction axial to the cells from one face to the other face and the variation in

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thickness being many times that required as draw taper and said cell walls having a shadow-casting shoulder defined, as a result of said variation, in a portion of said grid intermediate the faces thereof, said shoulder being positioned closer to the face of the grid adjacent the light source than the other face thereof.

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