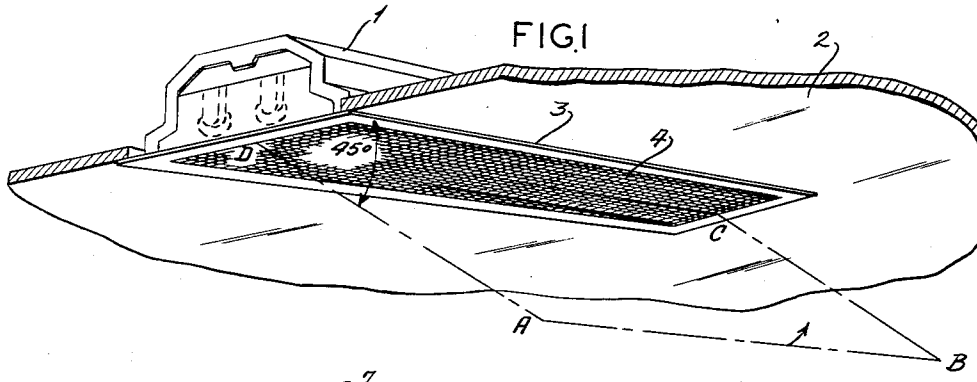
March 1, 1960 E. F. GUTH, SR 2,927,200

LIGHT CONTROLLERS FOR ILLUMINATING DEVICES

Original Filed April 12, 1957

FIG.1



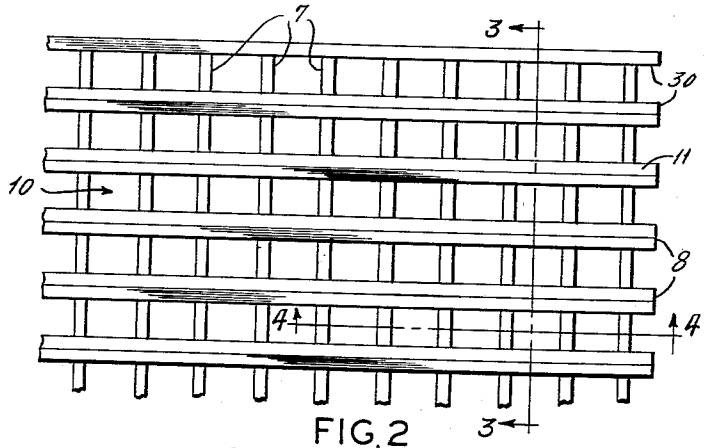


FIG.2

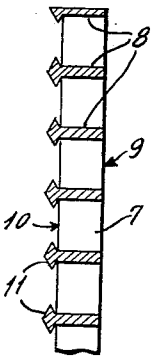


FIG.3

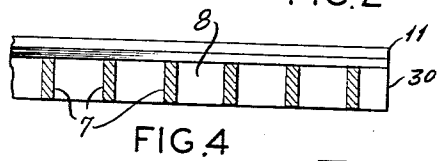


FIG.4

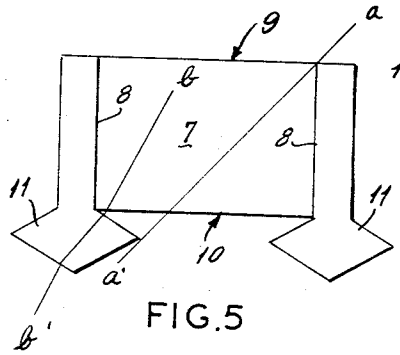


FIG.5

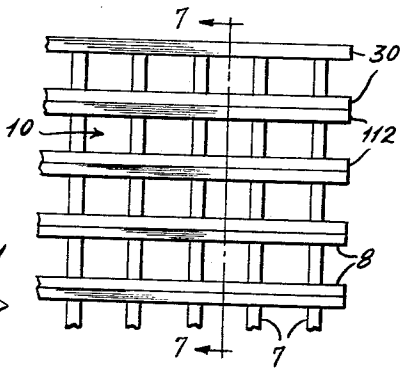


FIG.6

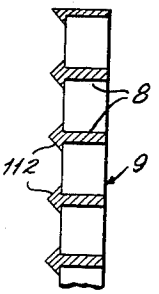


FIG.7

INVENTOR:
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United States Patent Office 2,927,200
Patented Mar. 1, 1960

2,927,200

LIGHT CONTROLLERS FOR ILLUMINATING DEVICES

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Original application April 12, 1957, Serial No. 652,582. Divided and this application May 21, 1959, Serial No. 814,715

6 Claims. (Cl. 240—78)

This invention relates generally to the control of light, and particularly to grids or lattices for use in connection with lighting fixtures and in other situations where it is desired to control light between the source thereof and the region upon which the illumination is desired. This application is a division of my co-pending application Serial No. 652,582, filed April 12, 1957.

In applicant's Patent No. 2, 745,001, granted May 8, 1956, the lattice defines between the walls thereof a multiplicity of generally rectangular apertures adapted to control the light from a suitable light source and passing through the lattice. Such lattice in the embodiments described is of a molded material. Light controllers constructed according to said patent, while tremendously improving the seeing conditions obtainable from fluorescent sources through louvers previously known, have met with objection in some quarters because of the conspicuousness of the lattice pattern created when the fixture is illuminated.

One of the objects of this invention is to provide a lattice so constructed as to cause dispersion of the light passing through the lattice at the light exits thereof.

Another object of the invention is to reduce the conspicuousness of the lattice pattern created by a louver of the character disclosed in the aforesaid patent when the fixture is illuminated.

In my co-pending application aforesaid, there is disclosed a louver having lenses associated with the aperture defining walls, said lens being located at the light exit side of the apertures. That application discloses such lens in association, in some embodiments, only with those walls of the louver which run in one direction, e.g., lengthwise, but in other embodiments, with the walls which run in both directions, e.g., both lengthwise and widthwise. It has now been discovered that, unlike the situation where the lenses are associated with walls extending in both directions, where the lenses are associated with louver walls which extend in only one direction, the conspicuousness of the louver pattern, when the fixture is illuminated, is substantially eradicated in a substantial field of view. The field of view in which the conspicuousness is eradicated is preferably that from which such fixtures are normally viewed in use and, consequently, the previous objection to the conspicuousness of the louver pattern is, in a practical sense, overcome. This is not to say that the louver pattern is completely invisible in such field of view, because even from normal viewing angels, if one studiously views an illuminated fixture, the louver pattern can be discerned but in the customary passing glance at an illuminating fixture, there is no eye-catching lattice pattern when the walls of the louver extending substantially perpendicular to the line of sight are provided with lenses of the character aforesaid.

In the accompanying drawings;

Figure 1 is a perspective view of an illuminating device provided with a light controller constructed in accordance with this invention;

Figure 2 is a face view of one embodiment of the light controller;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a section along the line 4—4 of Figure 2;

Figure 5 is an enlarged diagrammatical detail showing the optical principles involved;

Figure 6 is a view similar to Figure 2, but showing another embodiment of this invention; and

Figure 7 is a section on the line 7—7 of Figure 6.

Referring to the accompanying drawings, and more particularly to Figure 1, 1 designates the fixture which may be supported in any suitable manner as in the ceiling 2 of a room. A frame 3 supports the light controlling lattice indicated generally at 4 in any suitable manner, as in Patent No. 2,745,001. The fixture is provided with one or more lamps 5 which may be of a flourescent type or of an elongated filament type supported in receptacles 6. These lamps are, therefore, in a position to direct light on the top or entrance side of the lattice to issue at the bottom or exit side thereof. The fixture itself may be provided with reflectors (not shown) on the inside thereof to further direct the light toward the lattice.

A fixture such as 1 is usually mounted in the ceiling of a room as shown in Figure 1 in such a position that the fixture is seldom viewed by the occupants of the room in a direction parallel to the long dimension of the fixture. In the normal course of events, such fixtures are seldom viewed from any direction except at such substantial distances that the line of sight from the eye of the observer to the fixture makes an angle of less than 45° with the horizontal surface such as ceiling 2 in which the fixture is mounted. Except when a fixture is deliberately inspected, the normal viewing angle is, therefore, in a field embraced between a plane designated ABCD in Figure 1 and the plane of ceiling 2, where plane ABCD makes an angle of approximately 45° with the horizontal at longitudinal center line CD of lattice 4. The normal field of view, however, broadens as the distance of the viewer from the fixture increases and, in the art, is generally considered to extend, plus or minus, 30 to 45° from perpendicular to the long dimension of the fixture and, consequently, such will hereinafter be referred to as the "normal field of vision".

Referring now to Figures 2–5, the lattice has a series of walls 7 which extend widthwise and a series of walls 8 which extend lengthwise and which define therebetween a multiplicity of open spaces each terminating in an aperture 9 at one exterior surface (the upper face as shown) of the lattice, and an aperture 10 near the opposite surface or lower face. In this embodiment, apertures 9 and 10 are of substantially the same size and of generally rectangular form, more specifically, of square form. Outwardly of the aperture 10 or adjacent the lower face, the walls 8 are, however, enlarged as shown at 11 and in the particular embodiment shown, these enlargements are of general diamond cross-section. As previously stated, this lattice may be molded of a light-transmitting material, and particularly a transparent material, so as to have the property of refracting light incident on the lens-like enlargement in a manner well-known as characterizing transparent structures whose index of refraction differs from that of the surrounding medium. Accordingly, it will be apparent that the walls of the lattice are, in the main, of slat-like character generally perpendicular to the main plane of the lattice but walls 8 and their lower extremities formed as elongated lenses, the lens portions extending laterally outboard of the substantially parallel-sided portions of the walls which are defined.

Figure 5 illustrates the optical principles of the lattice of Figures 2–4. As an example, the walls 7 and 8 are 1/16 inch thick and 4/16 inch in depth (vertical). The enlargements 11 are of diamond cross-section and

are 3/16 inch wide and 2/16 inch in depth, so that the entire depth of the walls **7** and **8** plus enlargement **11** is 5/16 inch. The spacings of the wall are likewise 5/16 inch. In this particular embodiment, rays directed at various angles are indicated on the drawing. Beams from a lamp (not shown) located to the upper right of the two walls and enlargements, shown in Figure 5, will pass through the entrance (top) of the lattice and issue at the exits (bottom). A beam *a* will pass directly through the aperture and, clearing the right edge of the enlargement **11**, will not be refracted or dispersed. A beam *b* will strike the enlargement **11** and in passing therethrough will be refracted, issuing as a refracted beam *b'*. The beams passing through the lattice which strike the enlargements **11** are, therefore, refracted so that the issuing light will be dispersed. Such dispersion will thus present the enlargements as illuminated and avoid the glare which would otherwise result.

In the embodiment shown in Figures 2–4, the light passing through the lattice will be dispersed in a zone along one dimension of the lattice, viz., along the direction of line 3—3 of Figure 2. That is sufficient for many purposes where the illuminating device is located so that it is seldom viewed in a direction parallel with walls **8**; and has the desirable result of almost completely "washing-out" the louver pattern when viewed in the normal field of vision.

Figures 6 and 7 illustrate another embodiment of this invention. The walls **7** and **8** are again formed as in the other figures. Enlargements **112** on walls **8** are of general diamond cross-section, except that they are truncated. The principle of operation is generally that illustrated in Figure 5, except that the refraction of the entering and issuing rays of light will be modified somewhat. In Figures 6 and 7, the dispersion of the light will be as in Figure 5.

When, as is usually the case, the illuminating fixture is so mounted that it is seldom viewed from the end, i.e., in a direction substantially parallel to the length thereof the elongated lenses **11** extend in a direction parallel with the lengthwise dimension of the fixture. In unusual situations, however, where the fixture may be mounted so that it is normally viewed from the end, it is preferable that the lenses **11** be associated with walls **7** (which extend parallel to the narrow dimension of the fixture) rather than walls **8** in order to "wash out" the louver pattern when the fixture is viewed in the normal way, which in this mounting is endwise. In other words, the elongated lenses **11** should extend in the direction which is substantially perpendicular to the center of the normal field of vision for the particular installation.

The light controller may be constructed in any suitable manner, but as a practical embodiment, it is molded of a plastic light-transmitting material. The material may be glass or one of the transparent resins, such as polystyrene or methylmethacrylate, a commercial form

of which is known as Lucite. The material may, however, be a translucent synthetic resin. Such synthetic resins lend themselves readily to molding under pressure in a sectional mold in which the mold surfaces can be highly polished. Likewise, although glass is more difficult to press in large areas than synthetic resins, the lattice can be made of an area which lends itself to pressing and the glass may then be annealed in any suitable manner. The pressing may be done in sectional molds of a character used in the making of artificial cut glass trays and bowls. Likewise, a synthetic resin, such as Lucite, may be pressed in sectional molds of the character employed in making taillight reflectors for automobiles. Sections of the lattice may be placed end to end and side to side to form an area of any desired extent. In such a case, the projecting ends **30** of two lattices will form apertures.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a lighting fixture installed in a ceiling so as to have a normal field of vision, said fixture having a light controlling louver visible in said normal field of vision and shielding a source of illumination thereabove, said louver consisting of a lattice of substantially parallel-sided walls located in angular relation to intersect and bound a multiplicity of open apertures, the improvement which comprises: those of said walls which extend substantially perpendicular to the center line of the normal field of vision having an elongated lens at their lower edges, said lenses extending outboard of the parallel sides of said walls for a distance substantially less than half the space between said walls, the walls which extend substantially parallel with said center line being free of such lenses.

2. A light controller, comprising a lattice of substantially parallel-sided walls defining a plurality of open apertures bounded respectively by substantially right-angularly related ones of said walls, the walls extending in one direction only of said lattice having an elongated lens at the light exit side of said lattice, each such lens extending lengthwise of its associated wall and extending transversely outboard of the parallel sides of such wall substantially less than half the distance between adjacent parallel ones of said walls so as to reduce, but not close, said apertures at the light exit thereof.

3. The light controller of claim 2, wherein the lenses are integral with said walls.

4. The light controller of claim 2, wherein the exterior surface of each lens forms a vertex addressed outwardly from the lattice.

5. The light controller of claim 2, wherein the lenses are generally diamond shaped in cross-section.

6. The light controller of claim 2, wherein the lenses are triangular in cross-section.

No references cited.