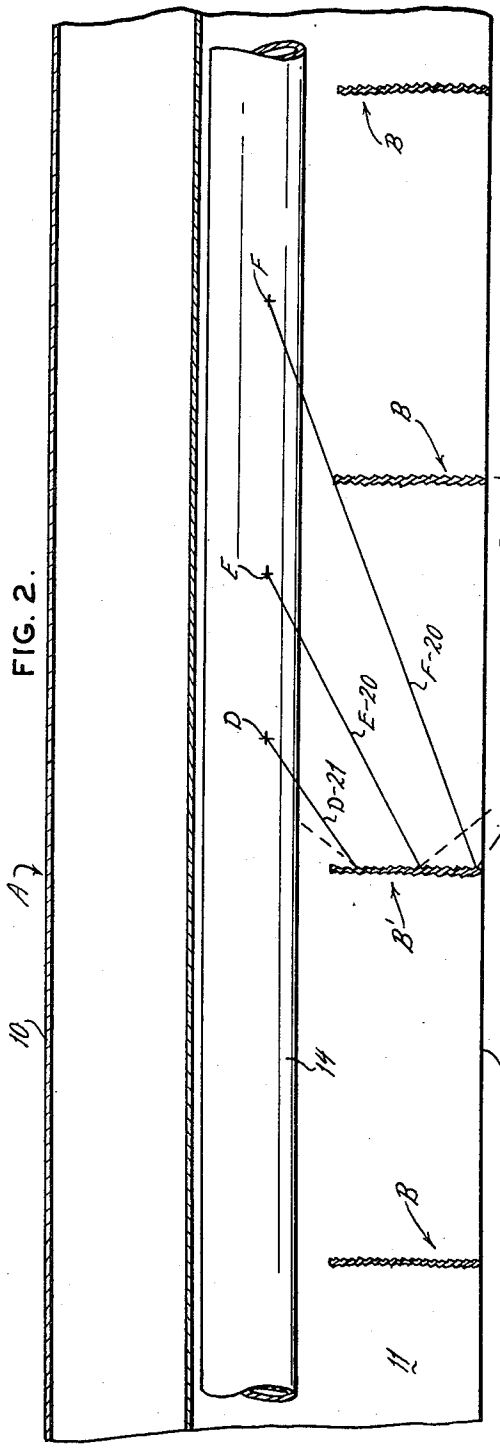
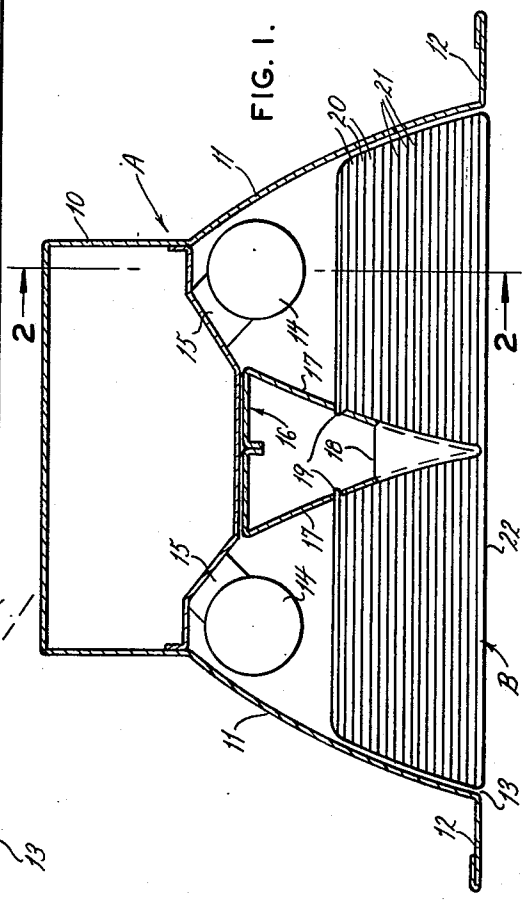
July 13, 1954 G. J. TAYLOR ET AL 2,683,799

ELECTRIC LIGHTING FIXTURE WITH LOUVER MEMBERS

Filed May 10, 1951

2 Sheets-Sheet 1





INVENTORS
GEORGE J. TAYLOR
LEO G. STAHLHUT
BY Carr & Carr & Gravely
ATTORNEYS

July 13, 1954 G. J. TAYLOR ET AL 2,683,799

ELECTRIC LIGHTING FIXTURE WITH LOUVER MEMBERS

Filed May 10, 1951 2 Sheets-Sheet 2

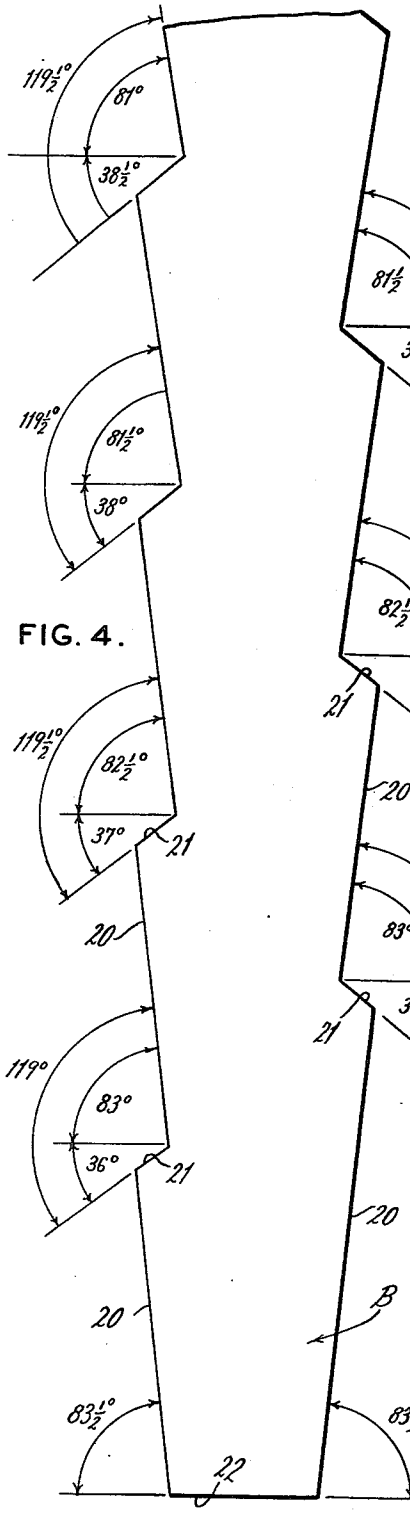


FIG. 4.

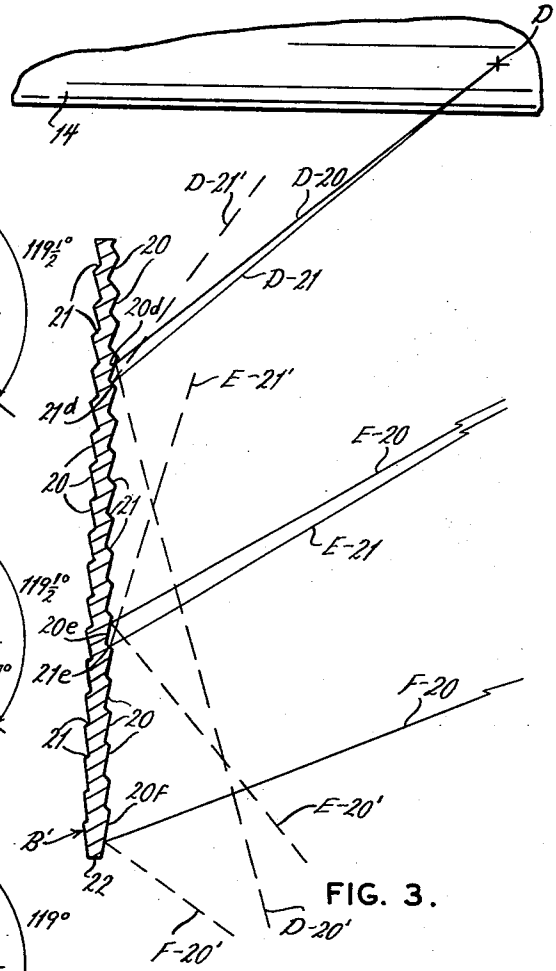


FIG. 3.

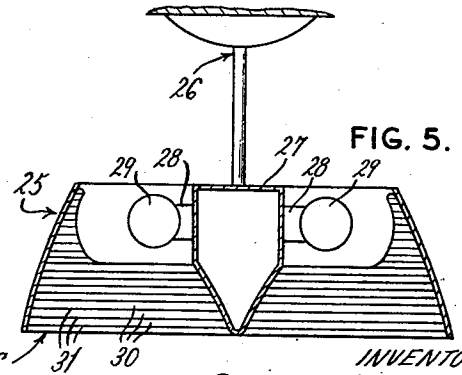


FIG. 5.

INVENTORS
GEORGE J. TAYLOR
LEO G. STAHLHUT
BY Carr & Carr & Gravely
ATTORNEYS

Patented July 13, 1954

2,683,799

UNITED STATES PATENT OFFICE

2,683,799

ELECTRIC LIGHTING FIXTURE WITH LOUVER MEMBERS

George J. Taylor, West Orange, N. J., and Leo G. Stahlhut, St. Louis, Mo., assignors to Day-Brite Lighting, Inc., St. Louis, Mo., a corporation of Missouri

Application May 10, 1951, Serial No. 225,556

8 Claims. (Cl. 240—51.11)

1

This invention relates to louvers or reflecting baffle means for electric lighting fixtures, and has particular utility in connection with lighting fixtures of the overhead type for modifying the intensity of reflected light normally viewed from below the light fixture,

A principal object of the present invention is to provide a louver or baffle member for a lighting installation or light fixture which will effectively control the direction and modify the brightness or intensity of reflected light coming from a lighting fixture located overhead.

It is also an object of this invention to provide a louver member of the above character having a plurality of light reflecting surfaces disposed across the plane of the louver and directed at varying angles so that each of the light reflecting surfaces produces a variation in the direction of the reflected light, thereby eliminating zones of high intensity light within the position at which the louver or baffle in a lighting installation or fixture is normally viewed.

It is also an object of this invention to provide a light reflecting louver or baffle member with a series of angularly related light reflecting surfaces, wherein the angle imparted to each of the reflecting surfaces is predetermined by projecting segments of a curved parabolical surface.

The invention consists in a lighting installation or in a fixture having a frame provided with a light opening, a lamp or other source of illumination, and a light reflecting louver or baffle member carried by the frame in or adjacent the light source or lamps and acting to reflect light from the lamp in modified directions, whereby to control the brightness or intensity of the reflected light and thereby eliminate objectionable zones of high brightness.

The invention also consists in the provision of a light reflecting louver, particularly useful in connection with elongated fluorescent lighting fixtures, in which one or a plurality of such louvers may be disposed within the fixture transversely of the lengthwise axis, for softening or modifying objectionable brightness or high intensity reflected light developed by such lighting fixtures, when arranged in continuous rows or in spaced relation within ceiling recesses or suspended from a ceiling and arranged in longitudinal relation.

The invention further consists in the parts and in the form and assembly of such parts as will hereinafter be described in connection with the accompanying drawings, wherein:

Fig. 1 is a transverse sectional elevational view

2

of a fluorescent lighting fixture embodying the improved light reflecting louver member,

Fig. 2 is a fragmentary longitudinal sectional elevation taken at line 2—2 of Fig. 1,

Fig. 3 is an enlarged fragmentary sectional elevation of a typical light reflecting louver member shown in relation to a fluorescent lighting tube, the view constituting a fragmentary enlargement of the central portion of the disclosure of Fig. 2;

Fig. 4 is a greatly enlarged sectional elevation of a light reflecting louver member disclosing the arrangement and angular relation of the plurality of light reflecting surfaces formed in the member; and

Fig. 5 is a transverse sectional elevation of a modified lighting fixture.

On reference to Figs. 1 and 2, the lighting fixture, which has been shown for purposes of disclosing the characteristics and features of the present invention, embodies a frame assembly A comprising a rectilinear head structure 10 for enclosing the circuit wiring and an attached housing in the form of a parabolic light reflector 11 provided with a lower flanged margin 12 in the plane of the light emitting opening 13. The light reflector housing 11 encloses a spaced set of lamps 14 of the fluorescent tube type, these lamps being supported at their opposite ends by suitable brackets 15 mounted on the adjacent wall of the upper housing 10.

The electric lighting fixture disclosed by Fig. 1 is provided with a central longitudinal partition 16 of sheet material which has has been formed to provide the opposite light reflecting walls 17. The walls 17 constitute the inner parabolic light reflecting surface for cooperation with the housing walls 11. The partition 16 is attached to the adjacent walls of the housing 10.

The light emanating from the opening 13 of the fixture A is subject to the modifying effect of one or more louver members B secured in the frame transversely of the lengthwise axis thereof. Each louver has a central notch 18 with inwardly projecting lugs 19, all of which serves to releasably secure the louver in the partition 16 upon sliding the louver into a transverse slot in the partition so that the lugs 19 fit into openings therefor above the slot. In Fig. 2, a plurality of louver members B have been shown in sectional elevation to illustrate the relation of such louvers to the elongated fluorescent lamp or light source 14.

Each of the louver members B consists in an initially flat plate which is formed of opaque material so as to reflect the light coming from

lamps 14. The light reflecting louver members B, each have a plurality of similar light reflecting surfaces 20 on both flat faces. Each of the light reflecting faces 20 constitutes a segment of the louver face directed or formed at an angle to the plane of the louver, so as to produce a series of elongated surfaces from which the reflected light may travel in predetermined paths. The light reflecting surfaces 20 are arranged in a variable or progressive angular relation so that the face of the louver is broken down into small light reflecting surfaces which diffuse the light and thereby avoid objectionable glare caused by concentration of reflected light. Between each of these light reflecting surfaces 20 there is located a relatively narrow connecting light reflecting surface 21 having a different angular progression on inter-angular relation. The second series of surfaces 21 are disposed in angular positions opposite to that of the first described light reflecting surfaces 20.

With reference to Figs. 2 and 3 a light reflecting member B' has been selected at random along the length of the lamp 14, and the right hand face thereof will be referred to in describing the light reflecting action thereof. It will be observed that each of the first mentioned series of light reflecting surfaces 20 has an angular position effective for directing light reflected therefrom downwardly through the lamp opening 13. The light reaching the reflecting surfaces is obtained from the light source 14, substantially throughout that portion of its length presented to the light reflecting member B', being considered. In connection with Fig. 2, a number of points have been selected along the length of lamp 14 for the purpose of further description. Such points are referred to hereinafter as light source points, from which all of the light is, for the purpose of this discussion, considered to emanate.

If the light to be reflected by the louver member B' is considered to emanate from light source point D, the filament of light D–20 impinging on any surface 20, as 20*d*, has an angle of reflection which directs the light sharply downwardly along the line D–20'. Different surfaces will, of course, result in different directions of reflection. Light filament D–21 striking any of the surfaces 21, as 21*d*, will reflect upwardly along the path designated by the line D–21'. Light filament E–20 from point E striking any surface 20, as 20*e*, reflects along the line E–20', and light filament E–21 striking surface 21*e* reflects along the line E–21'. Light from point F is directed in a like manner, following line F–20 and reflecting along line F–20'. The action of the alternate, angular surfaces 20 and 21 is to reflect light downwardly for direct illumination and upwardly for indirect illumination. It is also apparent that as the light source point in the lamp 14 moves farther away from the louver B', or any other louver B, the reflected light moves in paths which tend to approach the horizontal. This component of the total reflected light is that which falls in the zone or area in which the fixture is normally viewed. However, only a small quantity of light comes within this zone so that the intensity of the light does not reach objectionable values. In like manner, the selection of a light point source closer to the louver B' can be shown to reflect light more into the areas which are overhead and not productive of objectionable glare or high intensity light. The beneficial result obtained from this form of light reflector louver is one of modified or dispersed reflected light, thereby eliminating the objectionable zones of brightness or high intensity light zones, heretofore found in connection with specular surface louver members employed in a similar manner.

The foregoing objects and advantages are obtained by the use of a louver member having a plurality of light reflecting surfaces 20 plotted as segments of a parabolic curved surface. Therefore, the light reflecting surfaces 20, formed as segments of a parabolic curved surface, have a variable angular relation across the face of the member for directing the light through opening 13. In a similar manner, surfaces 21 are segments of a parabolic curved surface, but the angular relation is opposite so that the light is directed away from opening 13.

This angular relation of surfaces 20 and 21 has been more particularly shown in connection with Fig. 4 which illustrates a greatly enlarged fragmentary sectional elevation of a typical louver member B. Beginning at the lowermost edge 22 of the louver, it will be noted that the light reflecting surfaces 20 at the right hand face of the member have an acute angular relation with the horizontal which progressively decreases from the largest angle of 83½ degrees at the lower margin 22 to the smallest angular relation. The opposite face of the same louver member is provided also with a similar series of light reflecting surfaces having a similar progressively variable angular relation.

As has been heretofore pointed out, the second series of light reflecting surfaces 21 formed on the louver members B are disposed in an oppositely directed angular relation with the first mentioned surfaces. The surfaces 21 are given progressively increasing angles, beginning with the lowermost surface which makes an angle of 36 degrees with the horizontal. The second series of light reflecting surfaces 21 are alternately positioned with the first series 20 thereof, whereby light striking such surfaces will be directed upwardly or away from the opening 13. In this manner, high intensity reflected light is further dispersed or broken up, but without affecting the desired degree of light delivered from the fixture. Considering Fig. 2, it will be observed that light emanating from point D along line D–21 and striking one of the light reflecting surfaces 21 has an upwardly directed component of light reflection which follows the line D–21', as previously explained.

The example described in connection with Fig. 4 discloses specific angular relations for reflecting surfaces 20 and 21, but the form and construction of the louver B is not to be limited to the angles stated, as other angluar relations may be employed to accomplish a similar purpose, so long as the combined surfaces 20 or the combined surfaces 21 fall on or approximate a parabolic curve.

In forming the presently improved light reflecting louver members B, a stiff or rigid louver can be obtained from material of minimum thickness, by staggering or alternating the position of the light reflecting surfaces 20 and 21. This alternating or staggering of the location of light reflecting surfaces avoids the formation of local zones of minimum thickness, thereby avoiding the danger of creating well defined zones of minimum thickness along which a fracture would be likely to occur, should it be hit or subject to sudden shock.

While the present invention has been described in connection with a two lamp fluorescent lighting fixture, it should be understood that the same may be employed in connection with a single lamp fixture formed by one-half of the structure disclosed in Fig. 1, or in connection with other types of single or multi-lamp electric fixtures.

The advantages for the use of the presently described light reflecting louver members may best be appreciated in connection with overhead fixture installations which, in large offices, engineering rooms, and factory spaces are ordinarily disposed in continuous or closely spaced rows or lines, thereby creating objectionable streaks or bands of reflected light which causes eye strain and work fatigue. The eye strain is produced by high intensity reflected light visible from below the light fixture and in a zone to either side of the position substantially perpendicular to the surfaces of the transverse louvers. Accordingly, the presently improved louver members B disperse high intensity reflected light concentrations by varying the angles of reflection of the light coming from the lamp 14. How this is accomplished has been described in connection with the disclosure of the light source points D, E and F in Figs. 2 and 3, by way of example only. The effect of varying the angle of reflected light which issues through the opening 13 is to soften the reflected light throughout the length of the rows of light fixtures so that there are no objectionable high intensity light spots or regions within the normal range of vision of persons viewing the light fixtures from below and in working areas in and to each side of a position normal to the plane of the transverse louvers B.

The lighting fixture A (Fig. 1), shown by way of illustration, is of a type designed for mounting in a ceiling recess. The invention is not limited thereto, as it is obviously possible to have a fixture, incorporating the louvers B, suspended below a ceiling to obtain increased illumination by light reflected from the louvers upwardly through openings in the head structure 10. Such a fixture is shown in Fig. 5, wherein the frame 25 of the fixture is attached to a bracket 26 suspending the fixture below the ceiling or other overhead surface. The fixture is provided with a longitudinal head structure 27 enclosing the necessary wires and supporting brackets 28 which carry the lamps or fluorescent tubes 29. The lower portion of head 27 is used to support one or more louvers C which are similar to the louvers B, in that the louvers C are provided with light reflecting surfaces 30 and 31 which are segments of a parabolic surface. Surfaces 30 are arranged to reflect light downwardly from the fixture 25, while surfaces 31 are oppositely directed to reflect light upwardly from the top of the fixture for indirect illuminating effects. In this fixture, the surfaces 31 of the louver C are segments of a parabolic surface with its axis at an angle to the plane of the louver so that reflected light will not strike the surfaces 30 and only a minimum of light will be intercepted by the louver.

The foregoing description refers to certain preferred constructions which have been found to accomplish the objects of the invention. However, it should be clear that the lighting fixtures shown in the drawing can be modified or changed according to mounting requirements and style either of the fixtures selected or for the general installation in a given room or area. It is also clear that the louvers can be made of any convenient material which will reflect light, and that the material selected may be determined by the desired light reflecting surface finish which can vary from the specular to the diffusive surfaces.

What we claim is:

1. A low brightness light reflecting louver comprising a flat plate formed to provide two series of light reflecting surfaces extending lengthwise over each of the opposite faces thereof, the surfaces of one series in each face being oppositely annularly directed relative to the surfaces of the other series in each face, and both series of surfaces in each face having angular relations with the plane of said flat plate which vary from margin to margin over the width of said plate.

2. The louver set forth in claim 1, wherein one series of light reflecting surfaces in each face has each surface thereof angularly related with the plane of said plate to direct the light to one margin of the louver and the other series in each face has each surface thereof angularly related with the plane of said plate to direct the light to the opposite margin of the louver.

3. An electric lighting fixture comprising a frame, a lamp supported in said frame, and a light reflecting member formed from a flat plate and being disposed adjacent said lamp, said member having two series of light reflecting surfaces on each face thereof extending lengthwise of the same, the surfaces of one series in each face of said member being oppositely angularly directed relative to the surfaces of the other series in each face of the member, and both series of surfaces in each face of the member having angular relations with the plane of said reflecting member which vary over the width of said member, one series of surfaces in each face of the reflecting member being angularly presented to said lamp for modifying the direction of the reflected light passing outwardly of said frame, and the other series of reflecting surfaces in each face of the reflecting member reflecting light back toward said lamp.

4. An electric lighting fixture as set forth in claim 3, wherein the light reflecting surfaces on one face of the reflecting member are staggered relative to the light reflecting surfaces on the opposite face of said reflecting member.

5. An electric lighting fixture comprising an elongated frame, a fluorescent lamp in said frame, and a plurality of light reflecting louver members vertically disposed in said frame transversely of the elongated frame, each of said members having in each face thereof two series of angularly related light reflecting surfaces extending lengthwise thereof and transversely of the frame, the surfaces of one series in each face of each of said members being oppositely angularly directed relative to the other series of surfaces in each face of the member, and both series of surfaces in each face of each member having angular relations with the plane of the reflecting member which vary over the width of the member, said reflecting surfaces constituting segments of a parabolic surface presented to said lamp for angularly varying the direction of the light reflected therefrom across the vertical width of and viewed from below said members.

6. A low brightness light reflecting louver comprising a flat plate formed to provide two series of light reflecting surfaces extending lengthwise over each of the opposite faces thereof, the surfaces of one series in each face being oppositely angularly directed relative to the surfaces of the

other series in each face, and both series of surfaces in each face having angular relations with the plane of said flat plate which vary across the width of said plate.

7. A low brightness light reflecting baffle comprising a generally flat elongated and opaque plate formed with two series of light reflecting surfaces in its opposite faces; the two series of reflecting surfaces in each face of said baffle being arranged in alternating relation across the width of said baffle and being alternately oppositely angularly directed relative to the plane of the face of the baffle, and said two series of surfaces in each face being further arranged in staggered relation with respect to the two series of surfaces in the opposite face of the plate, with all of said series of reflecting surfaces having angles which vary progressively across the width of said baffle.

8. A low brightness light reflecting louver comprising an elongated narrow flat plate formed to provide two series of light reflecting surfaces

extending uninterruptedly lengthwise of and substantially throughout the length of one face of said plate, the surfaces of one series being oppositely angularly directed relative to the surfaces of the other series, and both series of surfaces having angular relations with the plane of said face which vary across the width of said face.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,535,985	Clark	Apr. 28, 1925
2,242,872	Rolph	May 20, 1941
2,411,952	Biller	Dec. 3, 1946

FOREIGN PATENTS

Number	Country	Date
521,611	France	Oct. 27, 1921

OTHER REFERENCES

The Magazine of Light (page 8), Nov. 25, 1940.