

Oct. 20, 1942.

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2,299,256

LIGHTING FIXTURE

Filed May 25, 1940

3 Sheets-Sheet 1

Fig.-1

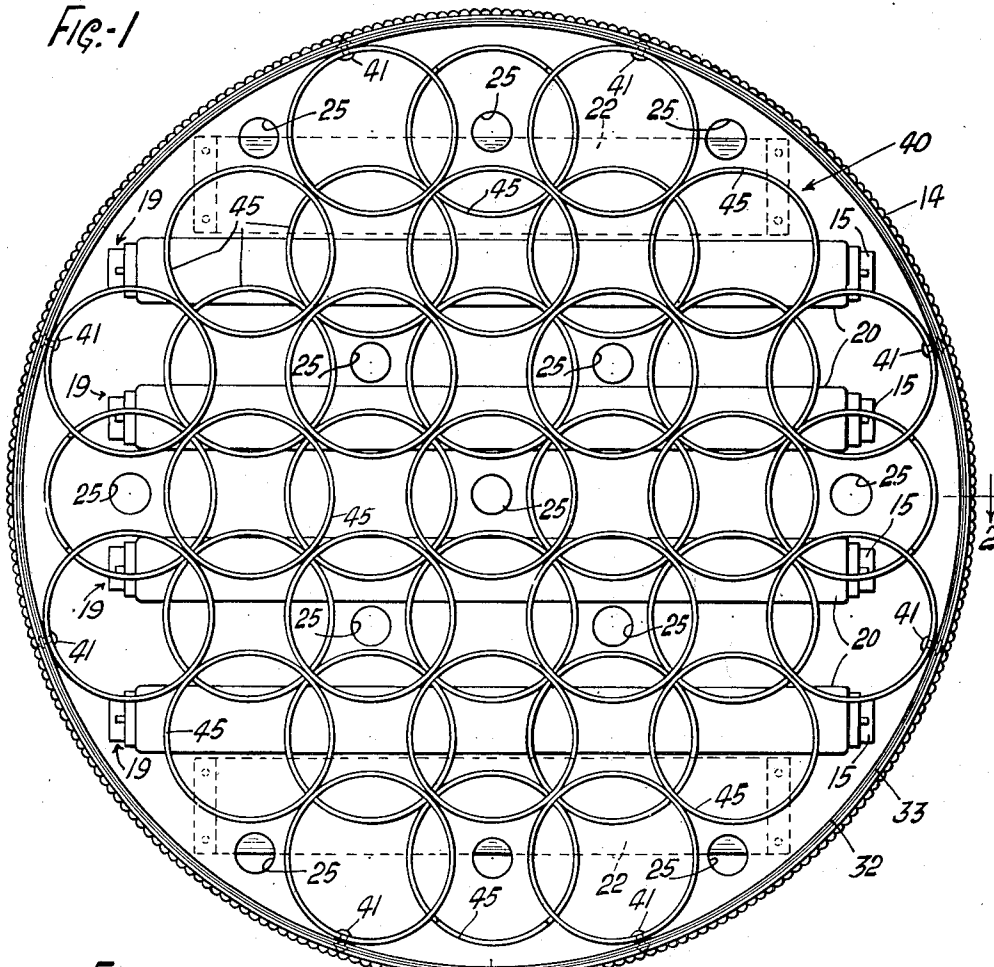
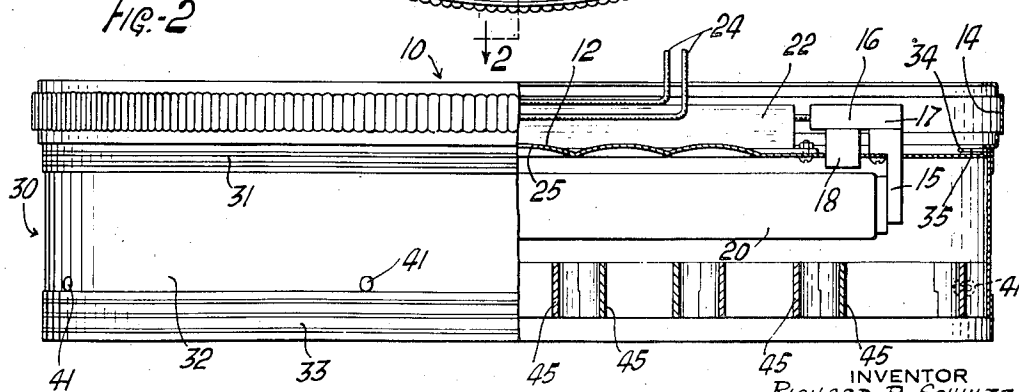


Fig.-2



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Fig.-3

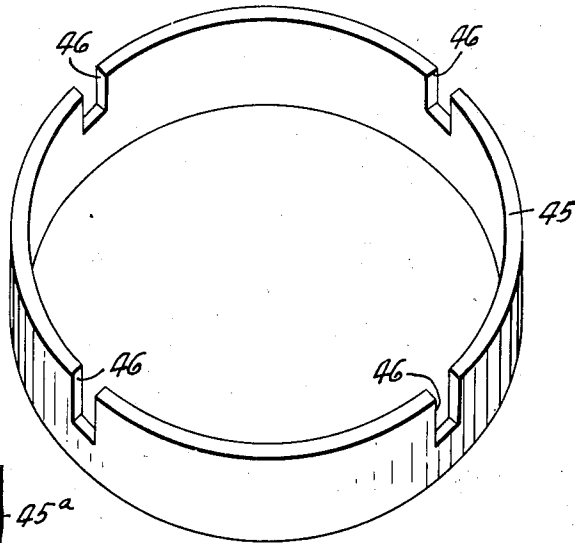


Fig.-5

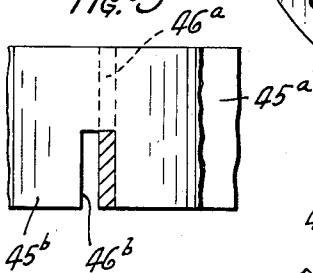
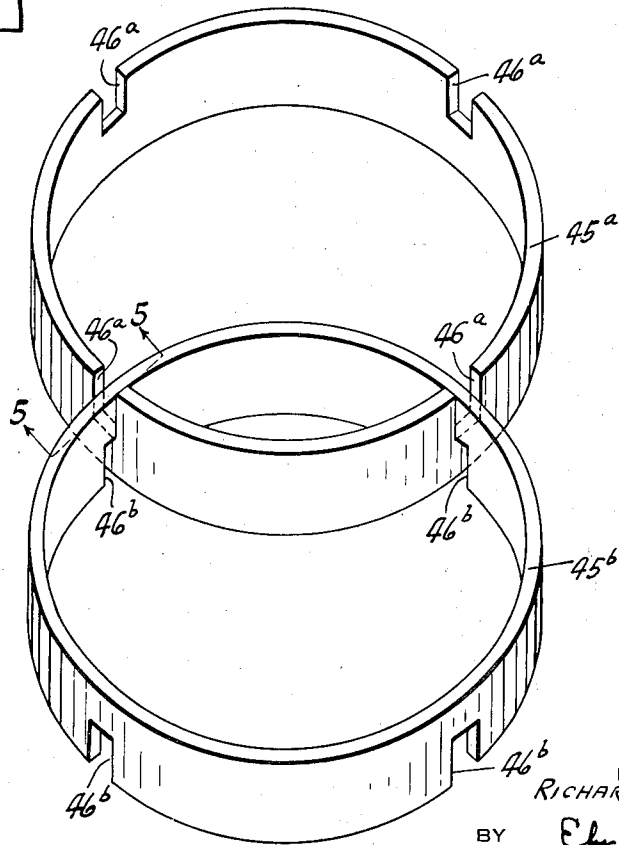


Fig.-4



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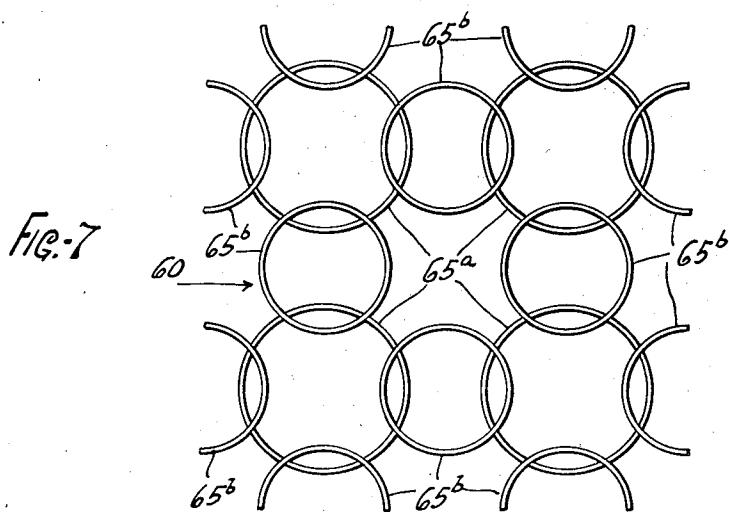
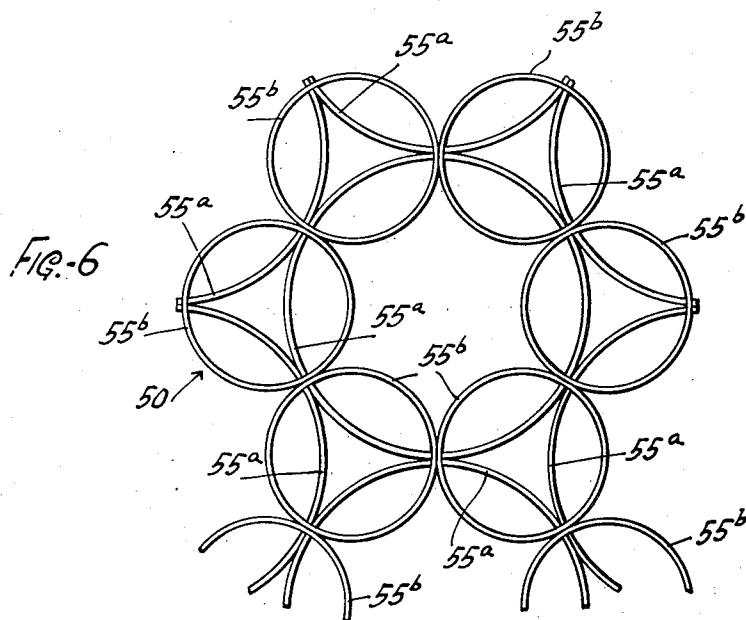
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2,299,256

LIGHTING FIXTURE

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Application May 25, 1940, Serial No. 337,293

8 Claims. (Cl. 240-78)

This invention relates to a lighting fixture, and, more particularly, to a lighting fixture especially adapted to screen and diffuse the light of tubular fluorescent lamps effectively and efficiently with a minimum loss of light through absorption.

Although the light of a tubular fluorescent lamp, which is developed by the action of the ultra-visible radiations of the gases within the tube upon the porous fluorescent coating on the inner walls of the tube, is generally of less local intensity than the light of an incandescent filament of equal candle power, the brilliance of a tubular fluorescent lamp necessitates the use of fixtures having louvers or baffles when such lamps are employed for interior lighting. Because of the elongated shape of fluorescent lamps and brilliant luminosity throughout their total area, the louvers or baffles employed heretofore in fixtures for incandescent lamps are not satisfactory. The louvers employed heretofore do not baffle the light of a fluorescent lamp properly and are difficult to repair.

It is an object of this invention, therefore, to provide a lighting fixture which will baffle satisfactorily the light of an elongated light source. It is another object of this invention to provide a light baffle through which the lighting source may be viewed directly only through a small angle to the perpendicular to the baffle but from which light is diffused through a wide angle to the perpendicular to the baffle.

A further object of this invention is to provide a lighting baffle or grille which may be made up of a plurality of similar intersecting tubular units adapted to interlock to form a grille which will conform to the general outline of the fixture in which the grille is mounted and to the configuration of the lighting source mounted within the fixture. A still further object of this invention is to provide a lighting baffle of a construction which will permit any damaged unit of the grille to be replaced by a similar unit without necessitating the removal of the entire grille from the fixtures. Another advantage of this invention is that the general design of the grille may be widely varied and modified by employing a few basic units.

Other objects and advantages of this invention will be apparent from the following specification, claims and drawings, in which

Fig. 1 is a plan view of a lighting fixture made according to this invention;

Fig. 2 is an elevation of the fixture shown in

Fig. 1 partly in section along the line 2-2 of Fig. 1;

Fig. 3 is an isometric detail of a grille unit shown in Fig. 1;

Fig. 4 is an isometric detail showing the manner of interlocking the grille units;

Fig. 5 is a detailed elevation taken along the line 5-5 of Fig. 4;

Fig. 6 is a modified detail design of a grille; and

Fig. 7 is another modified detail design of a grille.

In the drawings, in which like reference characters refer to like parts, 10 represents the base of a fixture for fluorescent tubular lamps. In the embodiment shown, the base 10 is a thin sheet metal spinning comprising a floor 12, suitably corrugated to prevent warping and dishing, and an upstanding rim 14 which is preferably provided with beading to strengthen the rim. A suitable securing means, not shown, may be conveniently located in the center of the floor 12 to permit the base 10 to be removably secured to a conventional outlet box in the ceiling or like surface. If the fixture is intended to be suspended, the usual suspending chains or the like may be secured directly to the floor 12. The rim 14 will effectively conceal the supporting means for the base 10 whether the fixture is suspended from a ceiling or is secured directly to a supporting surface.

The floor 12 is provided with suitable openings adapted to receive the socket arms 15 of the No. 1 lamp sockets 16 which extend below the floor 12, the base 17 of the No. 1 lamp sockets 16 being mounted above the floor 12 by suitable securing means. Another opening is provided in the floor 12 adjacent the opening for the socket arms 15 to permit the starting compensators 18, connected in shunt across the fluorescent lamps, to be inserted in the No. 1 sockets 16 through the floor 12. The No. 2 sockets 19 are secured to the floor 12 in the same manner as, and in alignment with, the No. 1 sockets, the socket arms thereof extending through the floor 12 in the same manner as the socket arms 15 so that each tubular fluorescent lamp 20 may be supported below the floor 12 in the arms of the sockets 16 and 19. The undersurface of the floor 12 is preferably polished to serve as a reflector for the lamps 20.

To be operated by conventional alternating current, fluorescent lamps are connected in series with a suitable ballast. To improve the power factor of the fluorescent lamps and to overcome the stroboscopic effect of the individual

lamps, fluorescent lamps are preferably employed in parallel pairs connected in split phase to a ballast which may be of a series reactor-capacitor design or of an autotransformer reactor-capacitor design. In the embodiment shown in Figs. 1 and 2, the ballasts 22 are suitably connected to the No. 1 and No. 2 sockets of the adjacent pairs of lamps 20 and to a line 24. Each ballast 22 is mounted, preferably on a pad of rubber or similarly resilient material, within the base 10. In order to ventilate the base 10 to reduce the temperature of the atmosphere about the ballasts 22, ventilating openings 25 are provided in the base floor 12.

Depending from the base 10 is the cylindrical grille frame 30 comprised of a supporting band 31, a curtain 32, preferably of translucent and opalescent plastic, frosted glass, or the like, secured in the band 31, and a decorative gallery 33 mounted on the curtain 32.

The grille frame 30 is removably secured to the base 10 by means of a bayonet pin 34 carried by the band 31 and adapted to be received in the bayonet slot 35 in the rim 14. Of course, any other type of removable fasteners, such as threaded fasteners, clips, or the like, may be used to secure the frame 30 to the base 10. The frame 30 serves no other function than to support the grille 40 and, therefore, is constructed as lightly as is suitable.

As shown in Figs. 1 and 2, the grille 40 is secured by the rivets 41 or other fastening means to the curtain 32 and consists of a plurality of interlocked intersecting units 45. The units 45 are short lengths of comparatively thin walled tubes which are preferably circular in section, though the section of the tubes may be of any geometric figure. The units 45 are also preferably of a molded translucent plastic material such as, for example, cellulose ethers or cellulose esters, polyvinyl resins, methacrylate resins, or translucent phenolic resins, from which the units may be molded. The units 45 may be made of materials other than plastic compositions, however, such as tubing of metal, paper stock, and the like. The surfaces of the units 45 are preferably polished or glazed in order to reduce the absorption of light by the grille.

As is further illustrated in Figs. 3 to 5, each of the grille units 45 are provided with four mortises 46 equally spaced about the periphery of the grille unit. Each mortise 46 extends for half the depth of the unit 45 and is twice the thickness of the unit in width. By interfitting the mortises 46b of reversed grille unit 45b as shown in Figs. 4 and 5 in the mortises 46a of an obverse unit 45a so that the arcs of the obverse and reverse units intersect, and then interfitting tangent obverse units into the mortises of the intersecting reverse units, intersecting obverse and reverse units may be built up into a grille of the pattern shown in Fig. 1. Because the inner surfaces of the portions of the tangent units 45a engaged in each mortise 46b are spaced from each other, due to the arcuate configurations of the tangent units, a distance slightly greater than twice the thickness of each unit, the intersecting obverse and reverse units are interfitted by force fitting which tends to "spring" each unit very slightly. It is believed that it is the resiliency of each unit which served to lock the joints between the interfitted intersecting obverse and reverse units. Although the actual mechanics of the interlocking action between the interfitted intersecting units may be other than that set forth above, it is believed that

the above theory is correct. It has been found preferable to make the grille frame 30 slightly larger in diameter than the circle which would circumscribe the grille 40. Then the tension applied to the grille by the fastening means 41 serves to increase the interlocking action between the several units.

In the event that the mortises 46 are too large to permit satisfactory interlocking of the units 45, a small amount of cement, or other means, may be employed to secure the joints between the units.

To install the fixture as shown by the embodiment illustrated in Figs. 1 and 2, the base 10, in which the ballasts 22 are mounted and concealed, is suitably secured to a supporting wall or ceiling and the line wires 24 are connected to the wiring system. Since the ballasts 22, sockets 16 and 19 and the wiring therefor may be expected to be substantially permanent elements, no means affording access thereto for inspection and repair are essential. The polished undersurface of the floor 12 protects these permanent elements of the fixture from the small amount of radiant heat developed of the lamps 20 and the ventilating openings prevent the temperatures of the ambient atmosphere from becoming excessive. After the base 10 is installed, the starting compensators 18 are inserted in the No. 1 sockets 16 through the floor 12 and the fluorescent lamps 20 are then mounted in the downwardly extending arms of the sockets 16 and 19. The grille frame 30 in which the grille 40 is mounted is then removably secured to the base 10 and installation of the fixture is completed. In the event a lamp 20 or starting compensator 18 burns out, a replacement may be installed by removing from the base 10 the grille frame 30, which, with the grille 40, is light in weight and conveniently handled. In the event that the grille 40 is damaged, it may be repaired readily by removing the grille frame 30 from the base 10, removing the damaged grille units 45, and then forcing into position new interlocking grille units 45 in the grille 40. Thus, a fixture made according to this invention may be maintained and repaired readily and inexpensively.

In use, the greater percentage of light from the lamps 20 is directed through the grille 40, the remainder being diffused through the translucent curtain 32. Due to the compact reticulated pattern of the grille 40, the lamps 20 may be viewed only from points within a small angle to a perpendicular to the grille. The multitude of arcuate vertical surfaces in the grille, however, effectively reflect and diffuse a substantial quantity of light over a large area, the points of which lie within a wide angle to a perpendicular to the grille. The corrugated reflecting under surface of the floor 12 directs most of the light reflected thereby against the vertical surfaces of the grille 40 rather than directly through the spaces between the grille units.

From the arrangement of the units 45 in the grille 40 as shown in Fig. 1, it is apparent that a grille, made of the units 45, may be square or rectangular in its general outline, as well as approximately circular. This flexibility of pattern of the grille 40 permits its use in fixtures which are rectangular. Such rectangular fixtures are suitably employed when it is desirable to arrange the tubular fluorescent lamps end to end, rather than side by side, as in the fixture shown in Fig. 1.

It is also apparent that the general lines of the pattern of the grille 40 are rectilinear. This gen-

eral rectilinear pattern of a grille comprised of the units 45 renders such a grille especially suitable for elongated lighting sources, such as the lamps 20, which have a characteristic even luminosity throughout their length.

If a curved fluorescent tube, rather than a rod-shaped tube 20, is employed in a fixture, it is preferable to employ grille units which will arrange into patterns in which the general lines are approximately circular. A detail of a grille 50 having a general curvilinear pattern is shown in Fig. 6. In the grille 50, obverse units 55a are provided with six evenly spaced mortises. Adjacent tangent units are then interlocked by interfitting and intersecting reverse units 55b which are each provided with three evenly spaced mortises to form the grille pattern shown, in which the general lines are approximately curvilinear.

For economy in manufacture and ease of assembly, it is preferable to employ grille units which are identical. However, it is apparent that by employing a few basic sizes of grille units, a wide variety of grille patterns may be secured. Thus, as shown in Fig. 7, by employing large obverse units 65a having eight evenly spaced mortises, small reverse units 65b having four evenly spaced mortises may be employed to intersect and interlock the larger spaced adjacent obverse units 65a to form the pattern 60 in which the general lines are rectilinear. Still different grille patterns may be developed by using units having different geometric sections, such as triangular, square, hexagonal, and like sections. Although units having a circular section are preferable, all such grilles of intersecting and interlocking units are adapted to be arranged to conform to the general outline of the supporting grille frame and fixture base and to the configuration of the light source.

It is apparent, therefore, that this invention is not limited to the specific embodiments disclosed, either in whole or in part, but is limited only by the following claims.

What is claimed is:

1. In a lighting fixture for fluorescent lamps, a grille frame, and a grille secured to said grille frame, the normal outer periphery of said grille being less than the inner periphery of said grille frame so that said grille is under tension when secured in said frame, said grille comprising a plurality of intersecting interfitted obverse and reverse grille units interlocked by the tension on said grille.

2. In a lighting fixture, a grille comprising a plurality of mortised units, each unit comprising a length of thin wall tubing, said units being ar-

ranged in obverse and reverse relationship, said obverse and reverse units intersecting and interfitted to interlock with each other to form a grille.

3. In a lighting fixture, a grille comprising a plurality of obverse and reverse units, each of said units comprising a length of thin wall tubing having a plurality of mortises cut therein, said obverse and reverse units intersecting each other and being interfitted at the mortises therein.

4. In a lighting fixture, a grille comprising a plurality of obverse and reverse units, each of said reverse units comprising a length of thin wall circular tubing having four mortises cut therein at equally spaced intervals about the periphery of the unit and each of said mortises being equal to half the length of the tubing in depth, said obverse and reverse units being interfitted at their mortises so that the arcuate portions of the obverse and reverse unit intersect and interlock.

5. In a lighting fixture, a grille comprising a plurality of obverse and reverse units, each of said units comprising a length of thin wall circular tubing having four mortises cut therein at equally spaced intervals about the periphery of the unit and each of said mortises being equal to twice the thickness of the wall of the tubing in width and half the length of the tubing in depth, said obverse and reverse units being interfitted at their mortises so that the arcuate portions of the obverse and reverse units intersect and interlock.

6. In a lighting fixture, a grille comprising a plurality of obverse and reverse units, each of said units comprising a length of thin wall tubing having mortises equally spaced about the periphery thereof, said obverse units being larger in diameter than said reverse units, and said obverse and reverse units being interfitted and interlocked at their mortises in such relationship that arcuate portions of obverse units intersect arcuate portions of reverse units.

7. In a lighting fixture, a grille as defined in claim 6 in which the obverse units are provided with six equally spaced mortises about the periphery thereof and the reverse units are provided with three mortises equally spaced about the periphery thereof.

8. In a lighting fixture, a grille as defined in claim 6 in which the obverse units are provided with eight equally spaced mortises about the periphery thereof and the reverse units are provided with four mortises equally spaced about the periphery thereof.

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