

July 4, 1944.

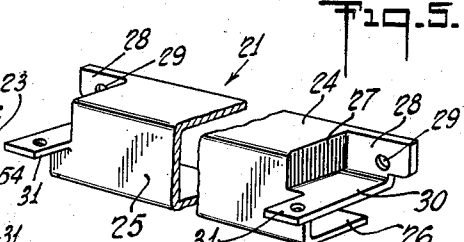
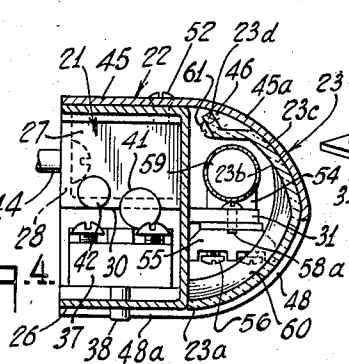
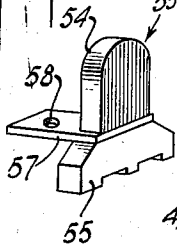
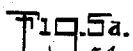
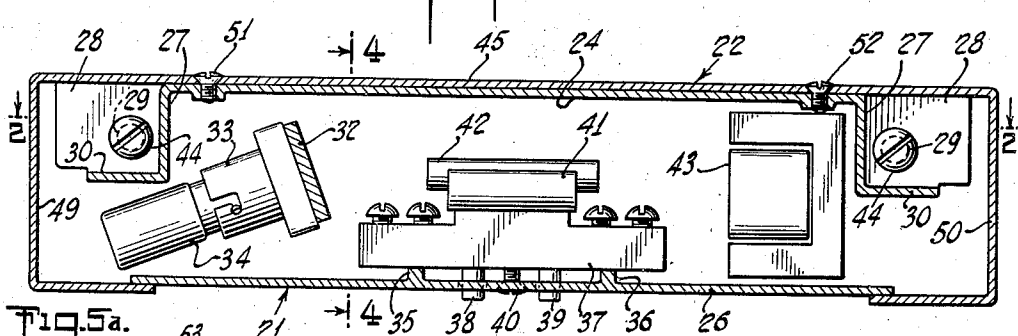
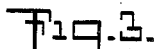
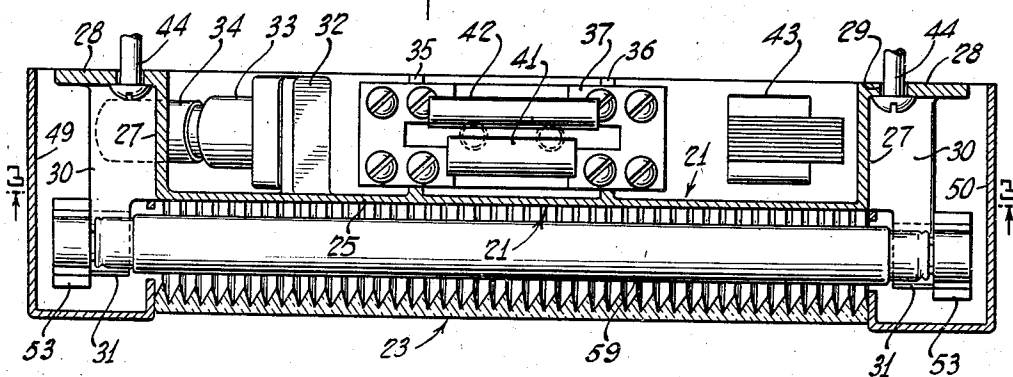
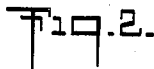
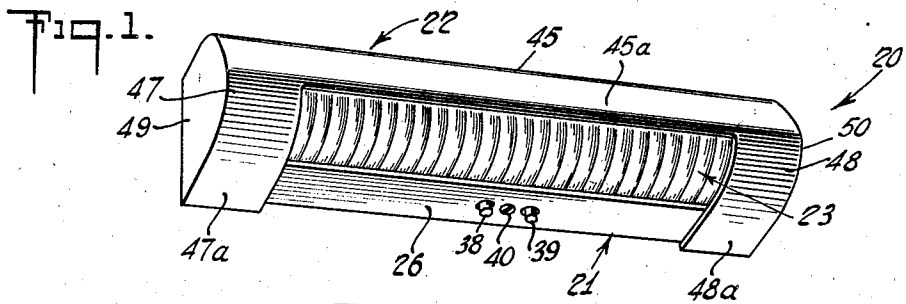
L. SCHEPMOES

2,352,804

FLUORESCENT LIGHTING FIXTURE

Filed June 24, 1942

3 Sheets-Sheet 1



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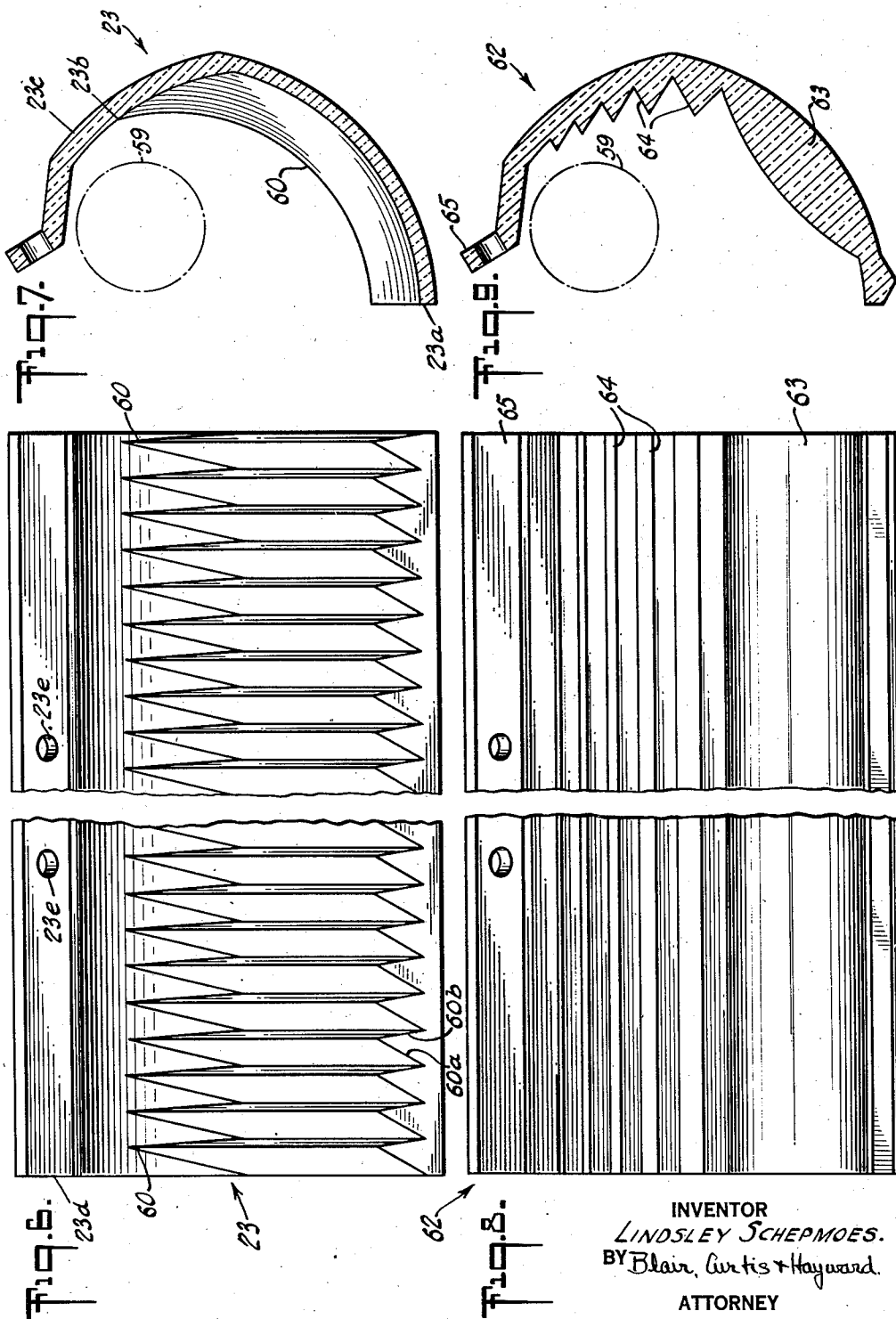
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Fig. 10.

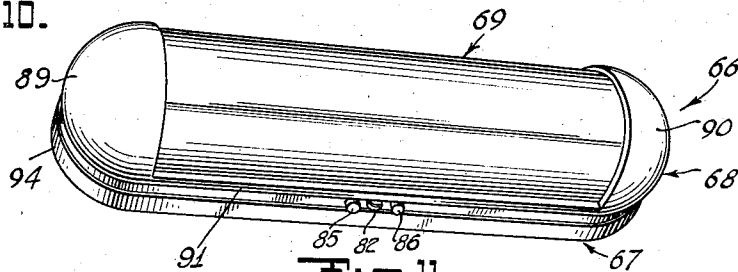


Fig. 11.

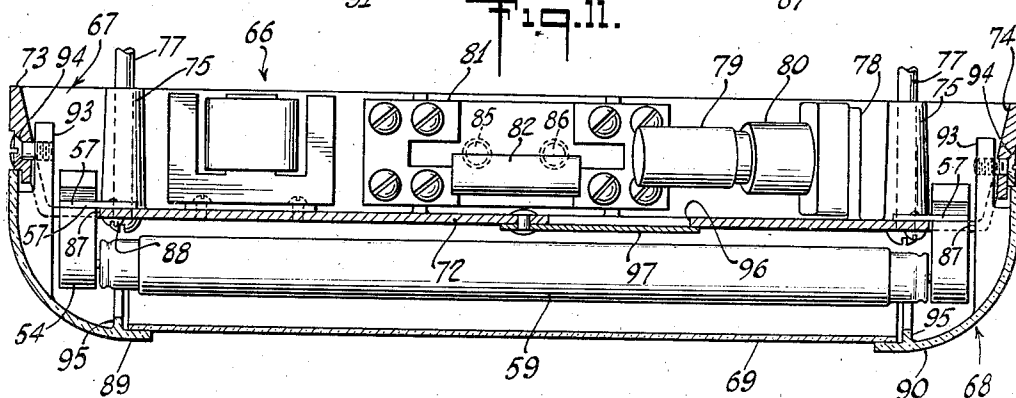


Fig. 12.

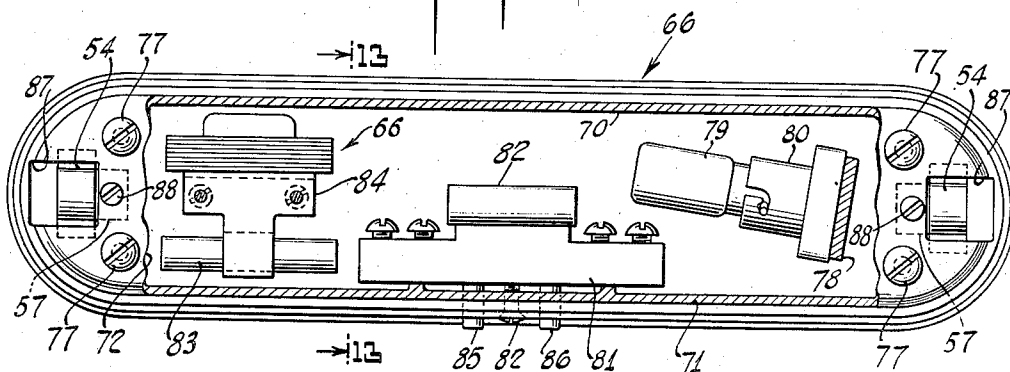
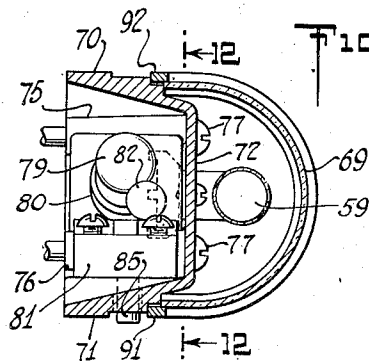


Fig. 13.



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2,352,804

FLUORESCENT LIGHTING FIXTURE

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Application June 24, 1942, Serial No. 448,313

5 Claims. (Cl. 240—78)

This invention relates to lighting fixtures and more particularly to a fluorescent lighting fixture characterized by a lens particularly adapted thereto.

One of the objects of this invention is to provide a fixture for fluorescent lighting characterized by simplicity and sturdiness and which is compact so as to be capable of installation in restricted spaces. Another object is to provide a fixture of the above nature capable of providing maximum light distribution from a fluorescent lamp, regardless of the position of installation of the fixture. Another object is to provide a fixture of the above nature in which glare is reduced to a minimum when the fixture is observed in the normal range of vision. Another object is to combine a fluorescent lamp with its various operating electrical auxiliaries together with its light control lens within a compact housing of pleasing external appearance which may be mounted directly on a wall surface with no part of it penetrating the wall. A still further object is to provide a light controlling lens particularly adapted for use with a fluorescent lamp. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts, as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the drawings, wherein I have shown two embodiments of my fixture, and also two different forms of lenses adapted for use therewith,

Figure 1 is a perspective view of the fixture;

Figure 2 is an enlarged section taken generally along the line 2—2 of Figure 3;

Figure 3 is an enlarged section taken generally along the line 3—3 of Figure 2;

Figure 4 is an enlarged sectional elevation taken along the line 4—4 of Figure 3;

Figure 5 is a fragmentary perspective view, on the same scale as Figure 1, of the fixture housing and lamp support;

Figure 5A is an enlarged perspective view of one of the fluorescent lamp supporting sockets;

Figure 6 is a greatly enlarged fragmentary side view of one form of lens adapted for use with the fixture shown in Figure 1, this view being taken looking into the lens;

Figure 7 is a sectional elevation of the lens shown in Figure 6;

Figure 8 is a greatly enlarged side view of another form of lens adapted for use with the fixture of Figure 1, this view being taken looking into the lens;

Figure 9 is a sectional elevation of the lens shown in Figure 8;

Figure 10 is a perspective view of a modified form of my fixture;

Figure 11 is an enlarged horizontal section of the fixture shown in Figure 10;

Figure 12 is a section taken along the line 12—12 of Figure 13; and,

Figure 13 is a section taken along the line 13—13 of Figure 12.

Similar reference characters refer to similar parts throughout the various views of the drawings.

The ever-increasing development and use of fluorescent lighting has given rise to a number of problems and difficulties in the provision of suitable fixtures for fluorescent lamps, and suitable housings for the electrical apparatus necessary to the operation of the fluorescent lamp. Even when this necessary electrical equipment is provided in compact form, it is still difficult to house and conceal in such a manner as to prevent unsightly bulkiness. Further complications arise due to the length of the fluorescent lamp itself which, of course, necessitates a fixture of still greater over-all dimensions. Also, when it is desired to use fluorescent lighting in particular installations, such as in railroad cars, Pullman berths, mirrors, over beds in homes or on ships, and similar places where space is relatively confined, additional difficult problems arise in providing a fixture suitable for such installations. Space limitations are confined not only to wall surface area or mirror frame surface, but also the thickness of partitions adds further complications in that, in many cases, penetration of the partition is not allowed, thus necessitating the provision of a fixture which is completely self-contained and which must therefore be capable of direct attachment to the partition.

It is well known, of course, that a fluorescent lamp permits much better light distribution and utilization than does the spherical light source of an incandescent lamp. However, in order to control properly this light distribution, to prevent annoying glare in the range of normal vision, the light rays emanating from the fluorescent lamp should be controlled so as to illuminate that which it is desired to illuminate, while at the same time confining the illumination to avoid glare. Thus, there arises still further problems in the provision of proper lenses in fluorescent lighting fixtures which are able to take full advantage of the superior illumination, while at the same time properly controlling it.

It is accordingly a further object of my invention to provide a fluorescent lighting fixture capable of solving the above-mentioned problems and obviating the noted difficulties in an efficient and practical manner.

With reference to Figure 1, one form of my fixture is generally indicated at 20, comprising in

general a housing generally indicated at 21 which supports the fluorescent lamp and houses the lamp's electrical equipment; a preferably integral lens support or canopy generally indicated at 22; and a lens generally indicated at 23. As will be noted in detail below, lens 23 is directly secured to canopy 22 which is in turn secured to housing 21 so that fixture 20 comprises a unitary assembly which may be directly attached to a wall or other surface without the necessity of penetrating the surface.

As is more clearly shown in Figure 5, housing 21 is generally channel-shaped and accordingly includes a top wall 24, a front wall 25, and a bottom wall 26. At each end of top wall 24 is an integral depending partition 27 which is also preferably integral with front wall 25 and with a flange 28 which lies in a plane preferably perpendicular to the plane of top wall 24 and which has a hole 29 extending therethrough. At each end of housing 21 is a platform 30 which is integrally formed with partition 27 and flange 28, and which has a lug 31 or the like which extends outwardly from front wall 25 of the housing to provide a support for one of the sockets of the fluorescent lamp, as will be described.

As shown in Figure 2, a platform 32 is integrally formed with front wall 25 of housing 21, and extends rearwardly thereof to provide a support for a socket 33 adapted to receive a ballast lamp 34 (see also Figure 3). Socket 33 and lamp 34 are provided only when the fixture is to be used with direct current. Formed on and extending upwardly from the bottom wall 26 of housing 21 (Figure 3) are a pair of bosses 35 and 36 on the ends of which are supported a manually operated starter and off switch 37 provided with on and off buttons 38 and 39 which extend through holes drilled in the housing wall 26. Switch 37 is held on bosses 35 and 36 by a screw 40 which extends through the housing wall into the switch. Switch 37 may also be conveniently utilized as a support for a condenser 41 and a resistance 42 which are provided when the fixture is to be attached to a source of direct current. Housing 21 also encloses and has attached thereto in any convenient fashion a reactor 43.

It will now appear, with reference to Figures 2 and 3, that housing 21 compactly accommodates ballast lamp 34 and its socket, starter switch 37, condenser 41, resistance 42, and reactor 43 in such a manner that this necessary electrical equipment is securely, compactly and accessibly disposed so as to be completely out of sight when the fixture is installed on a wall or other surface. It should also be noted that none of this electrical equipment extends beyond the outer surface of flanges 28 (Figure 2), thus precluding the necessity of penetrating any partition to which the fixture is secured as would otherwise be necessary to accommodate the electrical equipment. Thus, housing 21 may be secured directly to the supporting surface on which the fixture is to be mounted by any suitable means, as by screws 44, which extend through flanges 28 and accordingly attach housing 21 to the supporting surface (see also Figure 4).

Canopy 22 may be formed from sheet metal or may be a molded plastic, but in either event includes a top wall 45, the front portion 45a of which preferably curves over substantially half of lens 23 (see Figure 4) and is provided with a pair of spaced bosses 46 to which the lens may be secured, as will be later described. Canopy 22 (Figure 1) includes at its ends generally U-

shaped shields or aprons 47 and 48 which are preferably integral with the top wall 45 and portion 45a thereof. The space between shields 47 and 48 is less than the length of lens 23 so that the ends of the lens are overlapped and accordingly concealed by the shields, which accordingly assist in supporting the lens. Top wall portion 45 provides an effective shield to avoid glare.

The otherwise open ends of shields 47 and 48 are conveniently closed by end plates, such as end plate 49, which may be, in the case of sheet metal welded to shield 47, or, in the case of a plastic, molded integrally therewith. Shield 48 is similarly closed by an end plate 50 (Figure 3). As shown in Figure 1, the lower ends 47a and 48a of shields 47 and 48 underlie bottom wall 26 of housing 21 and lie flush against the surface to which the fixture is secured (see Figure 4). As shown in Figure 3, canopy 22 may conveniently be directly mounted on and secured to housing 21 as by screws 51 and 52 which extend through the canopy top 45 and are threaded into suitable bosses formed on housing top wall 24. It will now appear that lens 23 may first be secured to canopy 22, and the canopy may then be attached to the housing. Thus, the fixture is completely assembled on its supporting surface, but in such a manner as to be readily removable therefrom for lamp replacement, cleaning, repair, or for any other purpose.

As noted above, housing 21 is provided with lamp socket supporting lugs 31 which, as shown in Figure 2, each support a socket 53. As is more clearly shown in Figure 5A, socket 53 includes a lamp supporting portion 54 and a base 55 which carries suitable terminal screws 56 (Figure 4). Lamp supporting portion 54 and base 55 are disposed on opposite sides of a strap 57 provided with a hole 58 which, when socket 53 is mounted on its supporting lug 31 (Figure 4) registers with a hole bored in the lug, which hole receives a suitable securing screw 58a by which the socket is secured to its lug 31. Thus, sockets 53 are secured at the opposite ends of housing 21 so as to detachably receive a fluorescent lamp tube 59.

As noted above, fluorescent lighting has a number of advantages, one of the most important of which lies in the elongated source of illumination. Also, as noted, it is necessary to control this illumination so as properly to illuminate the area desired, while at the same time preventing annoying glare. Where it is desired, as in the case of a Pullman berth, to locate the lighting fixture to the side and above the reading plane, the lens shown in Figure 6 may advantageously be used. For illustrative purposes, this lens is the one shown mounted in fixture 20 in Figures 2 and 4, and accordingly will be described in connection with those figures.

In order to refract light rays emanating from lamp 59 away from the lines of vision when the fixture is to be applied to the side of and above the reading plane, lens 23 is provided, as shown in Figures 6 and 7, with a series of closely spaced prisms 60. These prisms are arcuate in form, as shown in Figure 7, and extend from the lower edge 23a of lens 23 preferably to a point 23b thereon, to provide a lens portion 23 of lesser over-all thickness at the level of the axis of fluorescent lamp 59, so as more readily to accommodate the asymmetrical disposition of lamp 59 with relation to lens 23, as shown in Figure 4. The upper end of lens 23 terminates in a flange 23d provided, as shown in Figure 6, with spaced

holes 23e through which screws 61 (Figure 4) extend to be threaded into bosses 46 on canopy 22 to secure the lens to the canopy.

Referring back to Figure 6, it may be seen that the inclination from the vertical of one side of each of prisms 60 (side 60a, for example) is greater than the inclination of the other side 60b of the prism so that when the fixture is mounted on its supporting surface with its axis vertical, the light rays emanating from the fluorescent lamp will be directed axially and downwardly of the lens, and accordingly toward the reading plane and not at right angles to the axis of the fixture. Wall portion 45a of canopy 22 acts both as a shield and a reflector, respectively, to prevent light emanation from that portion of the fixture adjacent the lamp 59 and to concentrate the light at the unshielded portion of lens 23. Hence, annoying glare is precluded in the normal range of vision of the fixture. This refraction of light rays is effected throughout what might be called the prismatic area of the lens so that ample illumination of the reading plane is provided. As shown in Figure 4, the lower end 23a of lens 23 rests against the bottom edge of front wall 25 of housing 21 when the lens is installed, and is accordingly supported thereby when the fixture is mounted with its axis horizontal. Hence, any tendency of the lens to sag and warp the front portion 45a of the canopy's top wall 45 is precluded. When fixture 20 is to be installed in more modern Pullman cars wherein the partition between adjacent sections is permanent, the fixture is mounted centrally on the partition with its axis horizontal and at the proper height so that the light rays are directed downwardly and to one side so as to fall on the reading plane.

The lens, generally indicated at 62 in Figures 8 and 9, might be termed a parallel condenser lens and is particularly well adapted for use in a fixture to be applied to the head of a bed, or over a mirror or wash basin or sofa, i. e. when the axis of the fixture is horizontal. Thus, where the axis of the fixture is horizontal and lens 62 is used, a downward asymmetrical distribution of light is provided, and, as will later appear, annoying glare in the normal range of vision is precluded.

Thus, lens 62 includes an elongated double convex or condenser portion 63 which, as shown in Figures 8 and 9, forms the lower portion of the lens, and accordingly underlies the asymmetrical disposed fluorescent lamp 59. The upper, inner portion of lens 62 is provided with elongated parallel graduated prisms 64, the spacing between which diminishes upwardly so that light rays from lamp 59 striking these prisms are refracted away from the normal range of vision, thus precluding annoying glare. Lens 62 is also provided with an attaching flange 65 and thus may readily be applied to canopy 22 (Figure 4) as described above in connection with lens 23. It will, accordingly, appear that regardless of whether lens 23 or lens 62 is used in fixture 20 (Figure 1), light distribution is so controlled that the rays are refracted away from the lines of vision, and thus glare in the normal range of vision is effectively avoided. At the same time, ample lighting is provided in the desired area, and, in the case of lens 62, refracted rays are utilized for general illumination.

However, when lens 62 is used, it is desirable that canopy wall portion 45a be substantially narrower than shown in Figures 1 and 4, as it is not

desired to shield the prismatic portions of lens 62.

To increase the efficiency of fixture 20, the front wall 25 (Figure 5) of housing 21 is preferably coated with suitable material so that this portion of the housing acts as a reflector for fluorescent lamp 59 (see Figure 4).

Installation of fixture 20 is easily and quickly effected by first attaching housing 21 to the supporting surface by screws 44 (Figure 2). These screws are readily accessible prior to the installation of lamp 59 in its sockets 53. After the housing has been mounted on its supporting surface, lamp 59 may be installed in the sockets in the customary manner, after which canopy 22 (Figure 3) with lens 23 already attached thereto may be secured to housing wall 24 by screws 51 and 52. Thus, installation of the fixture may readily be effected without any portion thereof penetrating the surface to which the fixture is attached.

It is often desirable, or necessary, to install a lighting fixture where general illumination is required rather than concentrated, asymmetrical light distribution, and particularly where symmetry is desired to meet prescribed decorative conditions. The fixture, generally indicated at 66 in Figure 10, is particularly well adapted to such use. Broadly speaking, fixture 66 resembles fixture 20 in that it includes a housing, generally indicated at 67, a metal or plastic canopy, generally indicated at 68, and a translucent plastic shade, generally indicated at 69. As will be described in detail below, shade 69 is disposed within canopy 68 and is accordingly securely held in the fixture when the canopy is secured to housing 67. Housing 67 may in turn be directly attached to the desired supporting surface.

As shown in Figure 13, housing 67 is generally dish-shaped, having top, bottom and front walls 70, 71, 72, and curved end walls 73 and 74 (Figure 11). At each end of housing 67 are a pair of hollow posts 75 and 76 (Figure 13) through which screws 77 extend so that their threaded ends may be attached to the supporting surface on which the fixture is to be applied, thus to hold the housing securely in its installed position. Housing 67, (Figure 11) also has a platform 78 formed integrally therewith to support a ballast lamp 79 and its socket 80. When fixture 66 is to be energized from a source of direct current, it is provided with electrical equipment similar to that described in connection with Figure 2. Thus, fixture 66 may have disposed in the housing 67 thereof not only ballast lamp 79, but also starter switch 81 (Figure 12), condenser 82, resistor 83, and reactor 84. Starter 81 is secured to bottom wall 71 of the housing by a screw 82. Starter 81 is, of course, provided with on and off buttons 85 and 86 which accessibly extend through holes drilled in the housing wall. It will accordingly appear that in general housing 66 resembles housing 21 of fixture 20 in that it supports and, when installed, conceals the various electrical equipment for fluorescent lighting.

As shown in Figure 12, an opening 87 is formed in each end of housing 66 through which the base of socket 54 may be placed, the socket being secured to the housing by a screw 88 which extends through front wall 72 of the housing and is threaded into strap 67. Thus, when the sockets are installed at the opposite ends of the housing, they are in position to detachably support the fluorescent lamp 59.

Canopy 68 may be molded from a plastic material, or die cast from a suitable metal. In either event, however, it is preferable that all portions

of the canopy be integral both for decorative purposes and to strengthen the fixture. Thus, canopy 68 comprises hollow hemispherical ends 89 and 90 (Figure 10) the distance between which is less than the axial length of shade 69 so that when the shade is installed within the canopy and connected to housing 67, the shade is securely held within the fixture. Canopy ends 89 and 90 are connected by narrow rails 91 and 92 (see also Figure 13) and integrally formed with each of the ends 89 and 90 is an attaching post 93 (Figure 11). When canopy 68 is installed on housing 67 these posts 93 project through the openings 87 in the housing in a position to receive screws 94 which extend through holes drilled in housing end walls 73 and 74, the screws thus securely attaching the canopy to the housing. Preferably each of canopy ends 89 and 90 is provided with an angular ridge 95 (Figure 11) which limits endwise movement of shade 69 and accordingly prevents either end of the shade from becoming exposed.

Preferably housing wall 72 (Figure 11) has an opening 96 which may be closed by a pivoted door 97. This opening is provided to permit ready access to ballast lamp 79 when the occasion arises. Preferably front wall 72 of housing 66 is suitably polished or coated with a reflecting material so that this part of the housing comprises a reflector for the fluorescent lamp.

It may thus be seen that in each of fixtures 20 and 66 full advantage has been taken of the benefits of fluorescent lighting, and that a neat, compact, and decorative fixture has been provided to fulfill the several objects hereinbefore mentioned.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A fixture for fluorescent lighting, in combination, a housing having flat top, front and bottom walls and open at the rear, means forming integral attaching flanges on said housing at the rear thereof and lying in a plane parallel to said front wall for detachably securing the housing to a wall or the like, means forming integral socket supporting flanges extending outwardly of the plane of said front wall, integral supporting members within said housing for supporting electric devices for operating a fluorescent lamp, said members being wholly contained between the planes of said front wall and said first-mentioned flanges, a socket on each of said second-mentioned flanges, a fluorescent lamp detachably mounted in said sockets adjacent said front wall, an arcuate canopy detachably and telescopically secured to said housing, and an arcuate lens secured to and within said canopy and enclosing said lamp.

2. A fixture for fluorescent lighting, in combination, a housing having flat top, front and bottom walls and open at the rear, means forming attaching flanges on said housing at the rear thereof and lying in a plane parallel to said front wall for detachably securing the housing to a wall or the like, means forming socket support-

ing flanges extending outwardly of the plane of said front wall, integral supporting members within said housing for supporting electric devices for operating a fluorescent lamp, said members being wholly contained between the planes of said front wall and said first-mentioned flanges, a socket on each of said second-mentioned flanges, a fluorescent lamp detachably mounted in said sockets adjacent said front wall, a canopy detachably secured to said housing, said canopy having a top wall which lies flat on the top wall of said housing and is supported thereby and a curved portion extending over a portion of said front wall, and a lens secured to said canopy and enclosing said lamp.

3. A fixture for fluorescent lighting, in combination, a housing having top, front and bottom walls and open at the rear, means forming attaching flanges on said housing at the rear thereof and lying in a plane parallel to said front wall for detachably securing the housing to a wall or the like, means forming socket supporting flanges extending outwardly of the plane of said front wall, integral supporting members within said housing for supporting electric devices for operating a fluorescent lamp, said members being wholly contained between the planes of said front wall and said first-mentioned flanges, a socket on each of said second-mentioned flanges, a fluorescent lamp detachably mounted in said sockets adjacent said front wall, a canopy detachably secured to said housing, a lens disposed between said canopy and the front wall of said housing, and means securing the upper portion of said lens to said canopy, the lower edge of said lens resting against and being supported by the front wall of said housing.

4. A fixture for fluorescent lighting, in combination, a longitudinal housing having a front wall, an elongated fluorescent lamp detachably mounted on the front wall of said housing, electrical devices in said housing to operate said lamp, an elongated arcuate lens supporting canopy secured to said housing and covering a portion of said front wall, a curved elongated lens having a single flange formed on its upper longitudinal edge, and means for securing said lens flange to the inner portion of said canopy, the lower longitudinal edge of said lens resting against the front wall of said housing, said canopy when secured to the housing forcing the lower edge of the lens into tight engagement with the front wall of the housing.

5. A fixture for fluorescent lighting, in combination, a housing adapted to be secured to a vertical wall, a socket secured to each end of said housing, a fluorescent lamp detachably mounted in said sockets, a canopy secured to said housing and extending outwardly therefrom, said canopy including shield members at its opposite ends adapted to enclose said sockets, when secured to said housing, and a lens mounted within said canopy and secured thereto between said shields so as to enclose said fluorescent lamp, said canopy having an outwardly extending top wall provided with bosses, and said lens having a flange adapted to be secured to said canopy bosses.

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