Feb. 15, 1944. M. B. BECK 2,341,895

FLUORESCENT TUBE LIGHTING FIXTURE

Filed July 12, 1940 2 Sheets-Sheet 1

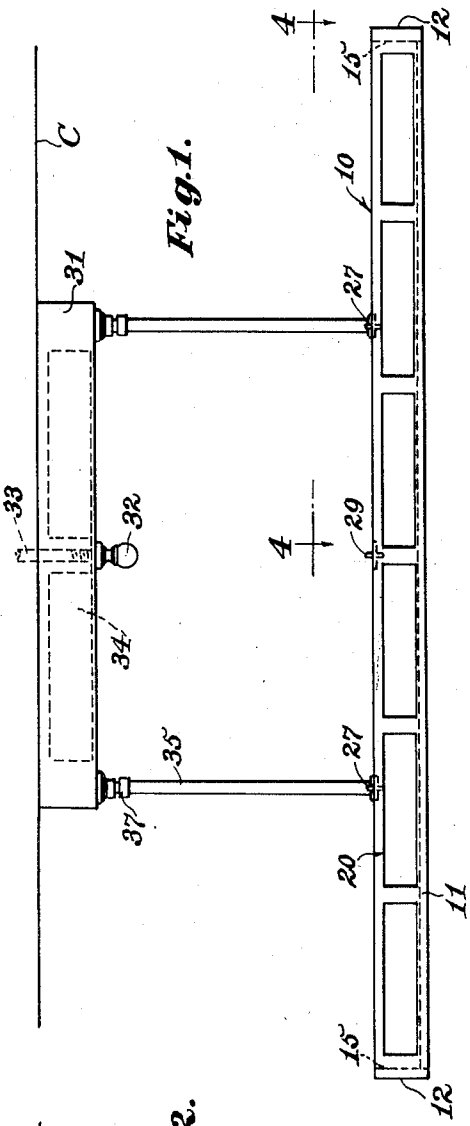


Fig. 1.

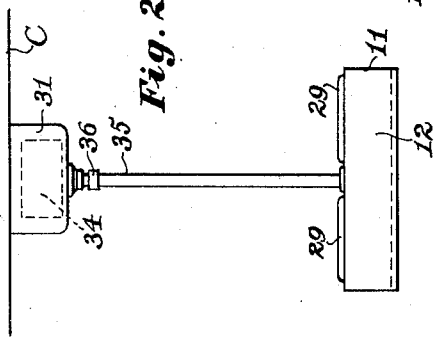


Fig. 2.

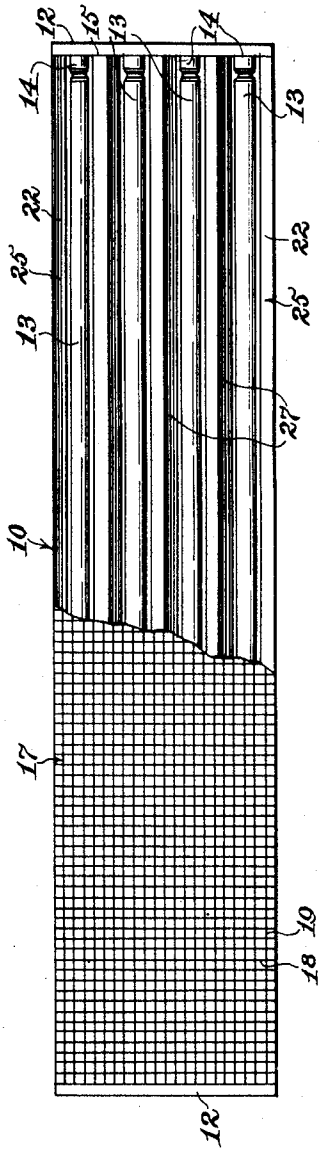


Fig. 3.

INVENTOR.
Morris B. Beck.
BY Glueck & Breitfeld
ATTORNEYS

Feb. 15, 1944. M. B. BECK 2,341,895

FLUORESCENT TUBE LIGHTING FIXTURE

Filed July 12, 1940 2 Sheets-Sheet 2

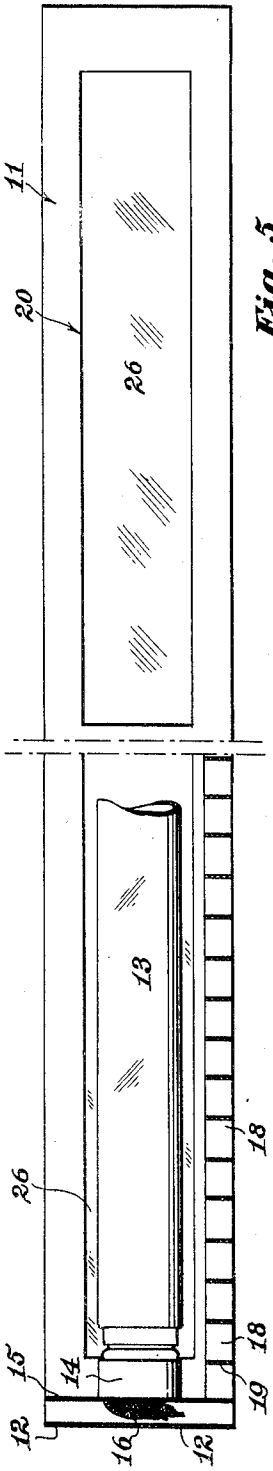


Fig. 5.

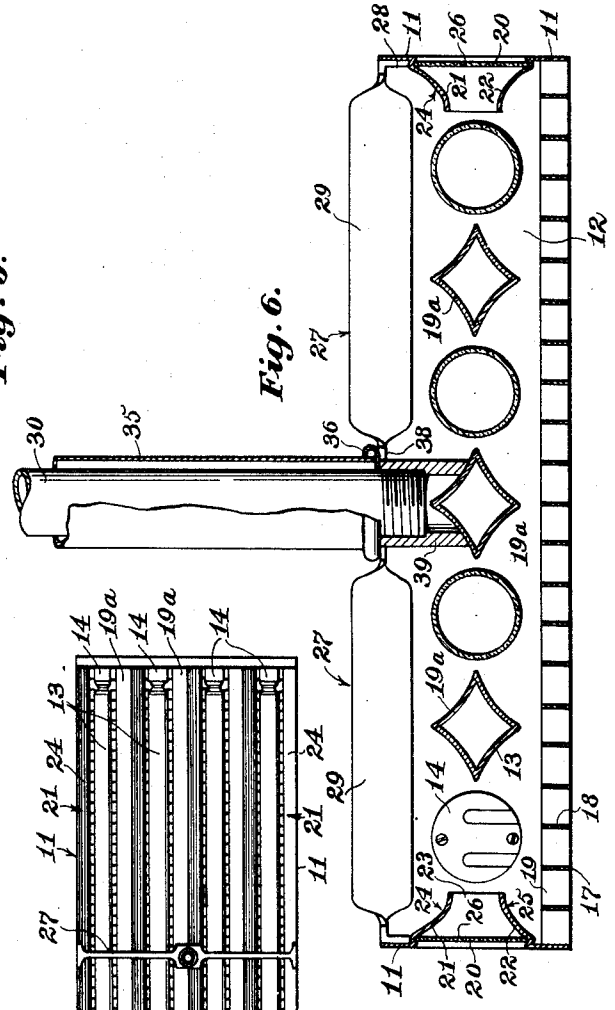


Fig. 6.

Fig. 4.

INVENTOR.
Morris B. Beck.
BY
ATTORNEYS

Patented Feb. 15, 1944

2,341,895

UNITED STATES PATENT OFFICE

2,341,895

FLUORESCENT TUBE LIGHTING FIXTURE

Morris B. Beck, Lawrence, N. Y.

Application July 12, 1940, Serial No. 345,022

3 Claims. (Cl. 240—78)

This invention relates generally to lighting fixtures, and more particularly it relates to lighting fixtures in which the illuminant is of the fluorescent tube type.

The general object of my invention is the provision in a lighting fixture of the character mentioned of a simple effective and inexpensive construction.

A further object of my invention is the provision in a lighting fixture of the fluorescent tube type of means for preventing the action of one tube on other tubes and thereby reducing their efficiency.

A further object of my invention is the provision in a lighting fixture of the fluorescent tube type of a construction whereby a high degree of compactness without loss of efficiency may be attained.

Among the more particular objects of my invention is the provision in a lighting fixture of the fluorescent tube type of a construction adapted for the attainment of efficient and uniform illumination and the elimination of glare.

Among the more particular objects of my invention is further the provision in a lighting fixture of the fluorescent tube type of a construction for obtaining indirect as well as direct illumination.

These objects and such other objects as will hereinafter appear or be pointed out are attained in the illustrative embodiment of my invention shown in the drawings, in which:

Figure 1 is a side elevational view of a fluorescent tube lighting fixture constituting one illustrative embodiment of my invention;

Figure 2 is an end elevational view thereof;

Figure 3 is a bottom plan view thereof with a portion broken away to expose the underlying structure;

Figure 4 is a fragmentary sectional view substantially on the line 4—4 of Figure 1, looking in the direction of the arrows;

Figure 5 is a fragmentary side elevational view on an enlarged scale, portions being broken away to disclose the interior construction; and

Figure 6 is a transverse sectional view, substantially on the line 6—6 of Figure 4, looking in the direction of the arrows, the upper portion of the fixture being omitted.

Fixtures using a plurality of fluorescent tubes as heretofore constructed have failed to attain the optimum because of the reduction in efficiency, due to the absorption by one tube of light from another tube. Where it has been attempted to reduce this absorption by spacing the tubes farther apart, the result has been an objectionable increase in the size of the fixture. This latter objection also exists where each of the tubes is mounted in a casing or reflector open only at the bottom, because the reflector walls must be sufficiently spaced from the tube it encloses and have sufficient surface area to prevent overheating.

I overcome these defects and attain the objects of my invention by mounting a plurality of fluorescent tubes side by side so that light therefrom may pass both upwards and downwards and so that air may circulate around the tube and pass upward and downwards, whereby direct as well as indirect illumination and adequate ventilation are provided. Between each pair of tubes I position a shield to prevent light from one tube reaching any other tube. By using such a shield a relatively close spacing of the tubes is possible without the objectionable absorption of light from a given tube by adjacent tubes, hereinabove mentioned. By using shields that are in the form of peculiarly contoured reflectors I obtain improved light distribution. To provide against glare I have provided a system of shields or louvers at the bottom of the fixture.

The construction hereinabove described generally and its function in efficiently providing pleasing illumination of high effectiveness will be better understood during the course of the detailed description of the illustrative embodiment of my invention shown in the drawings, which will now follow.

At 10 I have shown a frame or casing comprising side walls 11 and end walls 12 within which are supported in parallel relation a plurality of fluorescent tubes 13 of conventional type. The tubes 13 have their ends mounted in sockets 14 of conventional type, which sockets in turn are mounted on an inner wall 15 which is spaced from each end wall 12 so as to accommodate the electric wiring 16.

The frame 10 is open at the top and open at the bottom. However in order to avoid glare which may be objectionable where a person is situated in such a portion of the room where the fixture is located that he is apt frequently to look into the tubes carried by the fixture, I have provided a system of louvers 17 in the form of a network of plates that cross each other, the longitudinally extending plates being shown at 18 and the transversely extending plates at 19. Preferably the plates are made thin so as not to obstruct light proceeding downward from

the tubes or from the ceiling above the tubes and they are spaced sufficiently closely and are of such vertical extent as to perform their desired shielding function.

I have found that if a plurality of luminous tubes are mounted in parallel relation that the light given off by the tube system is not equal in amount to the sum of the quantities of light given off by the individual tubes. This is due to the absorption of light by any given tube. In order to prevent this absorption I have provided intermediate each pair of tubes shielding means that will prevent the passage of light from one tube into the other tube. Such shielding means I have further found may be advantageously combined with reflecting means, and still further, where a casing such as the casing 10 is used, with means for rigidifying said casing. Such combined means is shown in the form of tubes 19a having four walls, and each tube 19a is positioned so that its section is diagonally related to the adjacent fluorescent tubes 13 as shown in Figure 6 and also symmetrically relatively to the fluorescent tubes 13, that is to say the cross section of the tube will appear substantially as a diamond on a level with the fluorescent tube 13.

Consequently it will be observed that each fluorescent tube 13 throws a portion of its light upwardly and another portion of its light downwardly while rays proceeding laterally from the upper half of each tube 13 strikes one of the faces of one of the tubes 19a on each side of any given tube 13, and from these surfaces of the tube 19a it is reflected in an upward direction. Similarly light thrown off laterally from the lower half of each tube 13 strikes another surface of a tube 19a on each side thereof from which surface it is reflected downwardly.

It will be understood, of course, that the surfaces of the tubes 19a are of a character to perform effectively their reflecting function. They may also have their walls slightly concaved in transverse section, whereby parabolic reflection may be approximated.

The tubes are shown as having their ends secured to the inner walls 15.

Due to their being mounted in the walls 15 the tubes also serve to rigidify the casing and for this purpose their walls are made sufficiently heavy to perform this desired function.

The side walls 11 are shown provided with a plurality of openings 20 bounded by shielding walls 21 and 22 the former running along the upper edge of each opening 20 and the latter running along the lower edge and these walls are spaced from each other at their inner sides so as to provide an opening 23 through which light from a tube 13 can pass out laterally. The outer surfaces 24 and 25 of the walls 21 and 22 respectively are made reflective and they are slightly concaved similarly to the walls of the tubes 19a whereby they perform a similar function.

It will be observed that the surfaces of the tubes 19a as shown in Figure 6 provide in effect parabolic reflection because of their peculiar contour and disposition and in the case of the tubes 13 that are located nearest the walls 11 the reflecting surfaces 24 and 25 just described cooperate with the reflecting surfaces of the tubes 19a to produce the same effect.

It is to be understood that while the side openings 23 are of advantage for particular purposes as tending to reduce objectionable contrasts between illuminated and unilluminated surfaces, that for other purposes it may be found preferable not to use them. It will further be understood that for particular purposes the sides 11 of the casing may be omitted entirely.

In order to prevent glare due to light proceeding laterally through the openings 23 and 20 I may provide a translucent plate 26 closing each opening 20. These plates may be of any suitable or preferred material. I have found the material known as "Lumarith" particularly suitable for my purposes. However it will be understood that for particular purposes other materials may be found more desirable.

The casing 10 may be further strengthened by straps 27 disposed transversely thereto and having end portions 28 secured to one of the walls 11 and vertically disposed portions 29 the latter serving to give rigidity in a vertical plane without obstructing substantially the passage of light in a vertical direction. The straps 27 serve to afford anchorage for the tubes or pipes 30 by means of which the casing 10 is hung from the ceiling. In the drawings the pipes 30 are connected to a canopy 31 which is suitably secured to the ceiling C, as by means of the arrangement indicated at 32 by which the canopy is secured to a conduit 33 projecting from or suitably secured to the ceiling. The canopy 31 if desired serve as a casing or compartment to enclose the auxiliaries 34 which are required for the operation of the tubes 13. In order to add an ornamental touch each pipe 30 may be enclosed by a tube 35 mounted over the pipe in the customary conventional manner as by having its ends seated in the seating ring 36 and any suitable or preferred forms of fittings 37. For certain purposes it may be found desirable to make the fittings 37 of jointed construction so that adjustment of the fixture is thereby made possible.

Each pipe 30 may pass through the horizontally disposed portion 38 of one of the straps 37 and be anchored in a bushing 39 suitably secured to one of the tubes 19a while the seating ring 36 will seat over the said horizontally disposed portion 38, whereby a secure and rigid construction is obtained.

It will now be understood that the fixture hereinabove described is highly effective in securing efficient and uniform illumination and that the illumination is both direct and indirect and is free from an objectionable glare.

While I have herein disclosed one illustrative embodiment of my invention it will be understood that the same may be embodied in many other forms as will be obvious to those skilled in the art. It will further be understood that the disclosure herein is by way of illustration merely and is not to be interpreted in a limiting sense and that I do not limit myself other than as called for by the prior art and the scope of the claims.

Having thus described my invention and illustrated its use, what I claim and desire to secure by Letters Patent is:

1. A fluorescent tube lighting fixture consisting of a casing, means for supporting said casing below a ceiling, said casing consisting of side walls and end walls but being open at the top and the bottom so as not to impede the passage of light and air in a vertical direction, a plurality of fluorescent luminous gaseous discharge tubes mounted in said casing parallel to each other, shielding means between each pair of adjacent tubes for preventing the passage of light from one tube into the other, said shielding means being provided with reflecting sur-

faces so positioned as to reflect a portion of the light from each tube upward and another portion downward, windows of translucent material in those walls of the casing that run parallel to the tubes, and a combined shield and reflector respectively above said windows and below said windows for reflecting light from the adjacent tube respectively upwardly through the open top of the casing and downwardly through the open bottom of the casing, said reflectors being positioned between the windows of each side and the adjacent tube.

2. A fluorescent tube lighting fixture comprising a canopy adapted for attachment to a ceiling, auxiliaries for a fluorescent tube installation mounted in said canopy, a casing provided with side walls and end walls, said casing being open at the top and at the bottom, sockets mounted on the respective end walls of said casing, each socket being adapted to receive one end of a fluorescent tube therein, reflecting surfaces positioned on each side of the space adapted to receive a tub and said surfaces being adapted to reflect light from a tube in said space both upwardly and downwardly, said reflecting surfaces between each pair of tubes being of such size and so positioned that light from one tube of a pair is prevented from passing into the other tube of the pair, at least one longitudinally extending opening in each side wall, said reflecting surfaces between each outer tube and the adjacent side wall of the casing being mounted in spaced relation, one to each side of said opening, whereby light can pass between said reflecting surfaces and through the opening in said side wall.

3. A fluorescent tube lighting fixture comprising a canopy adapted for attachment to a ceiling, auxiliaries for a fluorescent tube installation mounted in said canopy, a casing provided with side walls and end walls, said casing being open at the top and at the bottom, sockets mounted on the respective end walls of said casing, each socket being adapted to receive one end of a fluorescent tube therein, reflecting surfaces positioned on each side of the space adapted to receive a tube and said surfaces being adapted to reflect light from a tube in said space both upwardly and downwardly, said reflecting surfaces between each pair of tubes being of such size and so positioned that light from one tube of a pair is prevented from passing into the other tube of the pair, at least one longitudinally extending opening in each side wall, said reflecting surfaces between each outer tube and the adjacent side wall of the casing being mounted in spaced relation, one to each side of said opening, whereby light can pass between said reflecting surfaces and through the opening in said side wall, transverse braces connected at their ends to the side walls of said casing and serving to reinforce said casing, said braces offering little obstruction to light in a vertical direction, and means for supporting the casing from the ceiling secured to said braces.

MORRIS B. BECK.