May 8, 1962 L. H. KUSHNER 3,033,981

LIGHTING FIXTURES

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FIG. 1.

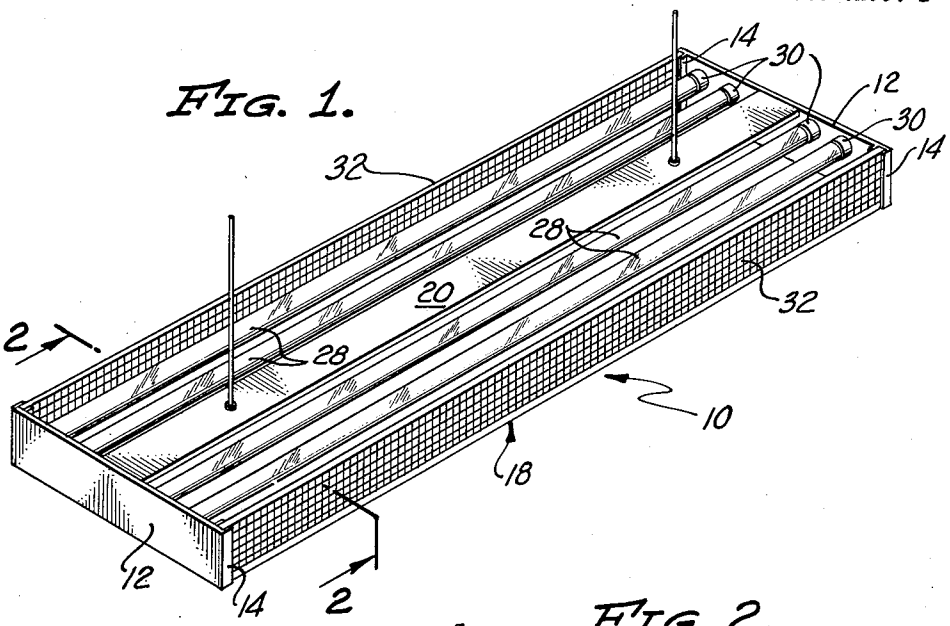


FIG. 2.

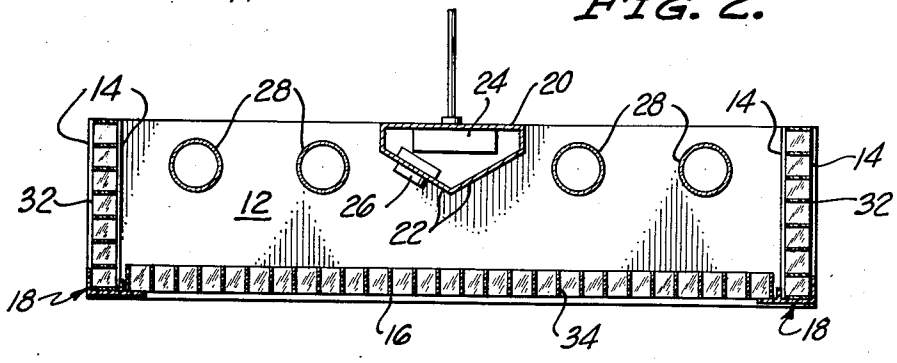


FIG. 3.

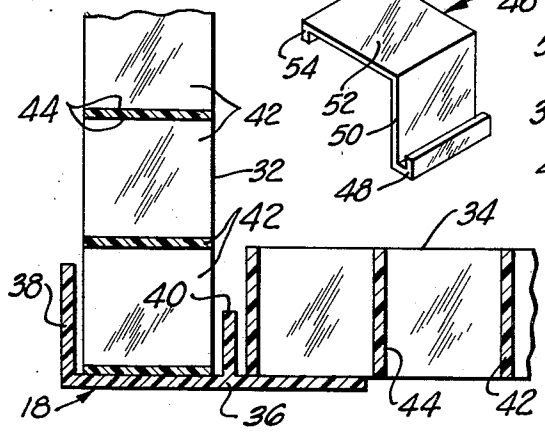
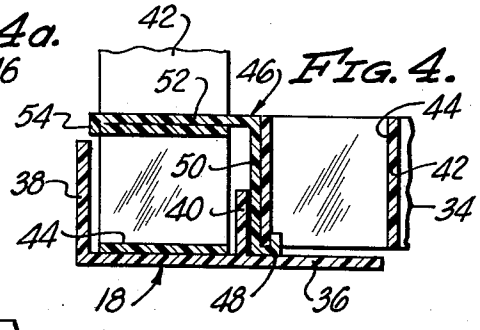


FIG. 4a.

FIG. 4.



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FIG. 5.

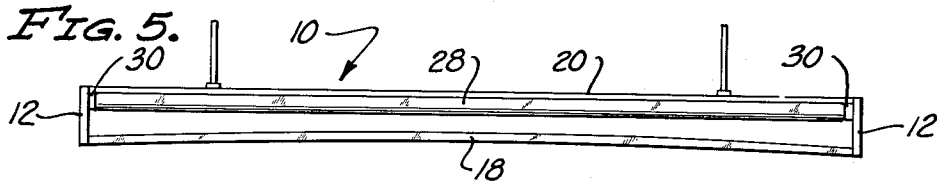


FIG. 6.

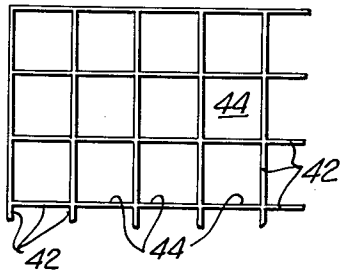


FIG. 7.

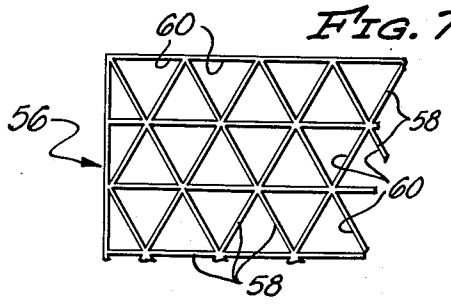


FIG. 8.

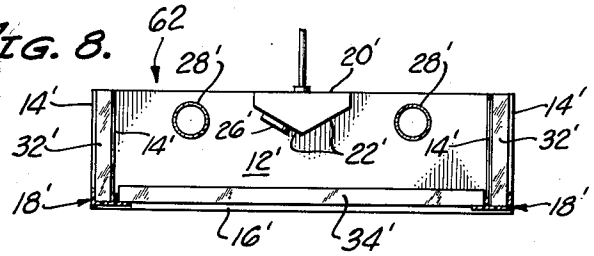


FIG. 9.

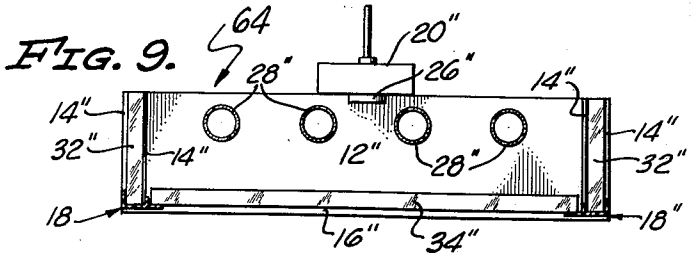
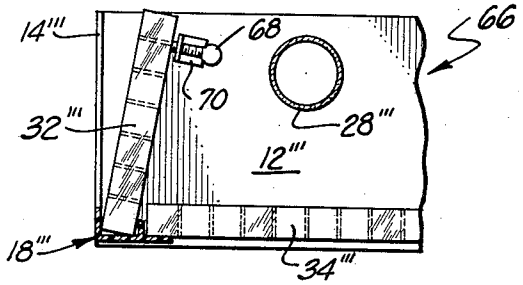


FIG. 10.



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LIGHTING FIXTURES

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1 Claim. (Cl. 240—51.11)

This invention pertains to new and improved lighting fixtures.

A large number of items enter into the commercial acceptability of lighting fixtures. One of the prime factors influencing the commercial acceptability of any such fixture is its appearance. Virtually no architect or lighting engineer will specify the use of a lamp fixture which is not pleasing to the eye when it is viewed from virtually any direction. However, appearance is not all determinative as far as the acceptability of a lighting fixture is concerned. To be commercially acceptable at this time lighting fixtures must not only present a pleasant appearance but they must also be functionally sound in a number of different ways.

As an example of this virtually no one normally purchases a lighting fixture which is built in such a manner that it is difficult to have access to the interior of such a fixture for maintenance purposes. Also the various parts of a lighting fixture should be easy to maintain and clean. The entire fixture must, of course, be also comparatively inexpensive in order to be acceptable. The factors indicated in this discussion are not in any respect of secondary importance.

A lighting fixture in order to be functionally sound must also perform the desired function of distributing light so as to achieve satisfactory illumination of the areas surrounding it. Such satisfactory illumination is only achieved if the fixture itself is constructed in such a manner that substantially the same amount of illumination is received at any point around the exterior or periphery of the fixture itself. This latter is relatively difficult to understand. Essentially it means that if light intensity readings are taken at a given distance from a fixture at points ranging from one side of the fixture to another side of the fixture, that these readings will be of substantially uniform value.

An object of the present invention is to provide new and improved lighting fixtures having the commercially and functionally desirable characteristics indicated in the preceding discussion. A related object of the present invention is to provide lighting fixtures which may be easily and conveniently constructed at a comparatively nominal cost. A more specific object of the present invention is to provide lighting fixtures which give off substantially uniform illumination in all directions. Another important object of this invention is to provide lighting fixture which may be easily and conveniently maintained.

These and various other objects of this invention as well as many specific advantages of it will be more fully apparent from a detailed consideration of the remainder of this specification including the appended claim and the accompanying drawings in which:

FIG. 1 is a top perspective view of a lighting fixture of the present invention;

FIG. 2 is a cross-sectional view taken at line 2—2 of FIG. 1;

FIG. 3 is an enlarged, cross-sectional view corresponding to FIG. 2 of part of this fixture;

FIG. 4 is a view similar to FIG. 3, illustrating the use of a clip which may be employed in this fixture if desired;

FIG. 4*a* is a perspective view of this clip;

FIG. 5 is a side elevational view of this lighting fixture with the diffusing panels removed;

FIGS. 6 and 7 are elevational views illustrating parts

of diffusing panels which may be employed with a lighting fixture of this invention;

FIGS. 8 and 9 are views similar to FIG. 2 of modified lighting fixtures of this invention; and

FIG. 10 is a partial view, similar to FIG. 2 of a further modified lighting fixture of this invention.

The accompanying drawings are primarily intended so as to clearly illustrate several presently preferred embodiments or forms of this invention. It will be realized from a consideration of these drawings and the remainder of this specification that various parts of the different forms of the invention shown are substantially similar. Because of this for convenience of illustration and explanation those parts of the various forms of lighting fixtures of this invention illustrated which are identical or substantially identical to one another are not separately described herein and are designated by the primes of the numerals used to initially describe such parts.

As an aid to understanding this invention it can be stated in essentially summary form that it concerns lighting fixtures, each of which includes parallel end plates which support beams extending between these end plates. These beams are, in accordance with this invention, formed of a light transmitting material and are used to support bottom and side diffusing means located so as to extend between the end plates. When these diffusing means are in place they enclose lamp means located so as to also extend between these end plates.

The actual nature of this invention is best more fully described by referring directly to the accompanying drawings. In the initial figures of these drawings there is shown a lighting fixture **10** of the present invention which utilizes parallel metal end plates **12**. These end plates are preferably provided with side flanges **14** which, in turn, are connected to bottom flanges **16**. The junctures of the flanges **14** and **16** on the two plates **12** are aligned with one another so that beams **18** may be supported upon the flanges **16** in order to extend between the plates **12** at right angles to these plates.

The plates **12** are connected together by means of an elongated housing **20** having tapered bottom walls **22**. This housing **20** is adapted to contain ballast units **24**, as well as starters **26** for fluorescent lamps **28**. These lamps **28** are supported upon sockets **30** mounted upon the plates **12** in a known manner. Preferably the sockets **30** are located so as to be spaced in a symmetrical manner on each side of the housing **20**.

With the fixture **10** the beams **18** employed are constructed out of a material capable of transmitting light. These beams **18** are preferably formed out of a polystyrene composition which has been stabilized by conventional known means so as to withstand illumination without deterioration of the molecular structure. Various other equivalents such as other transparent polymers may, of course, be used in forming the beams **18**.

The beams **18** are further preferably formed so that as they are installed so as to rest upon the flanges **16** they are bowed as indicated in FIG. 5 of the drawings away from the bottom of the fixture **10** toward the top of this fixture. When the beams **18** are bowed in this manner the weight of a side diffusing panel **32** and a bottom diffusing panel **34** placed upon each of them during the assembly of the fixture **10** serves to return them to a desired "square" configuration in which they extend at right angles with respect to the plates **12**.

The side panels **32** preferably fit against bottom walls **36** of the beams **18** between an outer wall **38** and an inner wall **40** of these beams. As will be seen in FIGS. 3 and 4 of the drawings the panel **34** rests upon the bottom walls where these bottom walls extend beyond the inner walls **40**. The inner walls **40** need not be as high as the outer walls **38** since they serve in the fixture **10** essential-

ly as a stabilizing and positioning function, whereas the outer walls 38 serve both the functions and the function of covering any irregularities in the edges of panels 32.

A large number of different types of diffusing panels may be used in constructing a lighting fixture, such as a fixture 10. However, it is presently preferred to form these panels 32 and 34 as indicated in FIG. 6 of the drawings so that they consist of walls 42 defining square openings 44, the widths of these openings 44 corresponding to the depths of the walls 42. Satisfactory panels of this type may be conveniently formed out of polymeric materials such as styrene as discussed above so as to be of an opaque character or so as to have any color desired. Usually it is preferred to form such panels so that they are of a white color, however.

When panels are used which are formed as indicated in FIG. 6 of the drawings, for appearance reasons it is normally preferred to lock these panels with respect to one another using a clip 46 as indicated in FIGS. 4 and 4a of the drawings. This clip is of a width corresponding to the width of one of the openings 44 and includes a hook-like end 48 designed to fit over a wall 42, which end is attached to a wall 50 designed to extend along the same wall 42. Another wall 52 is located so as to extend from the wall 50 at right angles to this wall 50. The wall 52 is adapted to extend along another wall 42 in an adjacent panel as indicated in FIG. 4. The terminus of the wall 52 carries a small bent end 54 which is also adapted to hook over a wall 42 so as to engage it, holding two panels such as the panels 32 and 34 illustrated in FIG. 4 with respect to one another so that the openings within these panels are aligned with one another.

The clips 46 should, of course, be formed out of the same type of material used in forming the beams 18 in order to prevent the formation of shadows during the use of the complete fixture 10. When formed out of such materials as polystyrene, the clips 46 are of a sufficiently resilient character that they may be snapped into and out of place with a minimum amount of difficulty.

It is not to be assumed from the above that the present invention is limited to lighting fixtures utilizing diffusing panels as shown in FIG. 6. In FIG. 7 there is shown a part of another type of diffusing panel 56 which may be employed with the present invention. This panel 56 consists of walls 58 defining triangular openings 60, the walls 58 being of approximately the same depths as the dimension along any side of each of the openings 60. A panel such as the panel 56 may be created of polystyrene or other similar materials as indicated in the discussion of the beams 18. Various other types of panels such as those having circular openings, trapezoidal openings or the like may, of course, be employed with this invention.

It is preferred to utilize with the present invention diffusing panels having relatively thin walls defining openings of one shape or another extending through these panels inasmuch as diffusing panels of this category are considered most advantageous in obtaining a satisfactory light distribution without causing an undue or undesired loss of light by reflection back to a ceiling or the like. Diffusing panels of this character are of such a nature that they tend to reduce glare to an extent which is very desirable from a utilitarian aspect. With them the illumination achieved is considered satisfactory for all practical purposes. However, if desired, it is possible to utilize other types of diffusing panels with lighting fixtures constructed as herein described.

By virtue of types of construction discussed in connection with the fixture 10 a satisfactory light distribution is achieved for virtually all purposes. Further, the light emitted from this fixture 10 is not broken up to any material extent by any means within the fixture itself. This is because the beams 18 are capable of transmitting light whereas if these beams were replaced by various other related structures, such as, for example metal beams or the like, a shadow would be cast which would be undesirable from an illumination point of view.

It will be realized from the aforegoing discussion that fixtures such as the fixture 10 may be very easily maintained. The panels 32 and 34 and the beams 18 are virtually unbreakable since they are formed out of various polymeric materials as indicated in the preceding discussion. These parts may be easily removed from between the end plates 12 by the simple expedient of lifting off of the flanges described. They may of course be replaced with similar ease. Once they have been removed there is virtually unhindered access to the lamps 28 and the housing 20 for maintenance purposes.

In FIG. 8 of the drawing there is shown a modified lighting fixture 62 of the present invention which is substantially similar to the fixture 10 previously described. This fixture 62 differs from the fixture 10 primarily by being of smaller dimension than this fixture 10 and utilizes only two lamps 28' instead of four lamps 28 used in the fixture 10. In FIG. 9 of the drawings there is shown another modified lighting fixture 64 of the present invention which differs from the fixture 10 in that the housing 20'' used in it is not located generally between the lamps 28'' employed, but instead is located on the tops of the plates 12''. When the housing 20'' is located in this position there is no tendency for even a suggestion of a shadow to be created from or by the housing 20'' during the use of this fixture.

In FIG. 10 of the drawings there is shown another modified lighting fixture 66 which differs from the fixture 10 in that the adjacent flanges 14 previously described located parallel to the flanges 14'' are not used and are replaced by small set screws 68 mounted upon brackets 70 extending toward one another from the plates 12'. These set screws are designed so that they may be adjusted in order to allow the side panels 32' utilized to be tilted or canted slightly as indicated in order to provide a so-called "cut-off" angle sufficient to block the view of the lamps 28' shown when one views this complete fixture from one side. In some circumstances this is considered desirable for esthetic reasons.

It will be realized from a consideration of the aforegoing that the present invention is intended to provide lighting fixtures which are desirable from esthetic reasons and which combine the features contributing to their esthetic acceptability with utilitarian features as indicated. Because of the nature of this invention it is to be considered as being limited only by the appended claim forming a part of this disclosure.

What is claimed is:

A lighting fixture which includes: an elongated housing having ends, said housing extending horizontally; an end plate attached at its upper extremity intermediate its ends to each of said ends of said housing, said end plates each having a horizontal bottom flange and vertically extending side flanges extending upwardly from the ends of said bottom flange; said flanges on said plates being located on the adjacent sides of said plates and being positioned opposite to one another; electrical socket means mounted on the adjacent sides of said end plates; fluorescent lamp means held by said socket means so as to extend between said socket means and so as to be electrically connected thereto; ballast means located within said housing and electrically connected to said socket means; beam means capable of transmitting light extending between the opposite extremities of and supported upon said bottom flanges on said end plates, each of said beam means having a normally upwardly bowed configuration, each of said beam means including a horizontally extending bottom wall and inner and outer walls spaced from one another and extending vertically from said bottom wall, said walls of each of said beam means extending between said end plates; and a bottom diffusing panel having edges supported by said bottom flanges and by said bottom walls of

said beam means; and side diffusing panels having edges supported by said bottom walls between said inner and said outer walls of said beam means and extending along said side flanges, said side and said bottom panels deforming said beam means to a straight configuration.

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