Aug. 12, 1952 F. C. WINKLER ET AL 2,606,998

LUMINAIRE FOR ELONGATED TUBULAR LAMPS

Filed July 31, 1947 2 SHEETS—SHEET 1

Fig. 1.

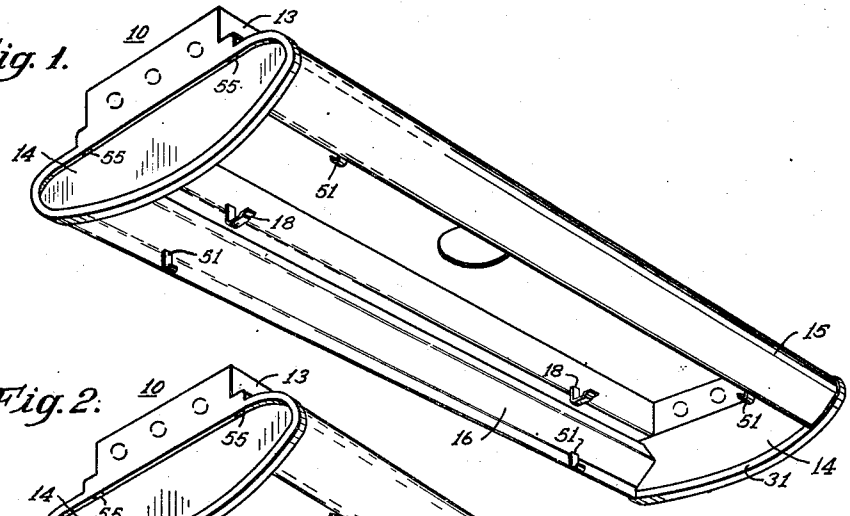



Fig. 2.

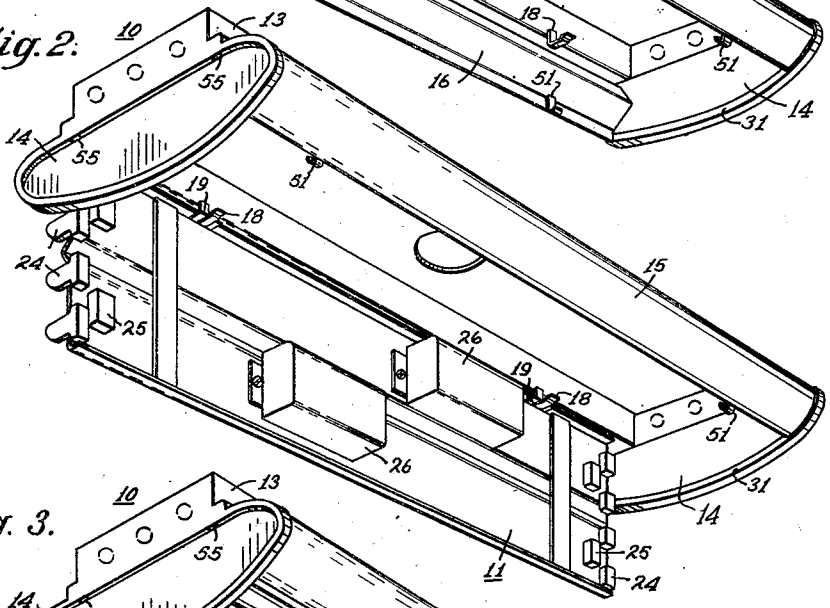
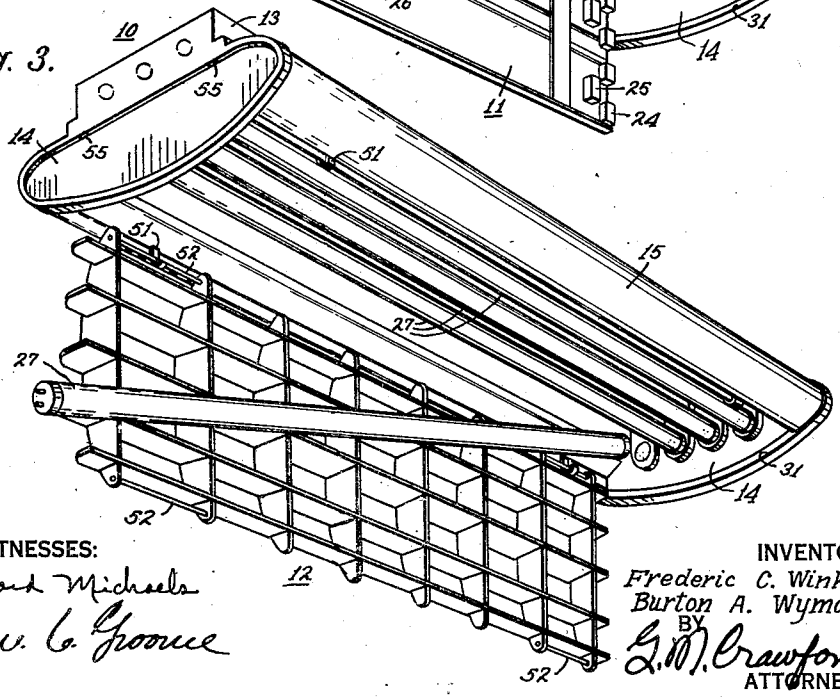



Fig. 3.




WITNESSES:

Edward Michaels

Mw. C. Groome

INVENTORS

Frederic C. Winkler &

Burton A. Wyman.

BY

G. M. Crawford

ATTORNEY

Aug. 12, 1952 F. C. WINKLER ET AL 2,606,998

LUMINAIRE FOR ELONGATED TUBULAR LAMPS

Filed July 31, 1947 2 SHEETS—SHEET 2

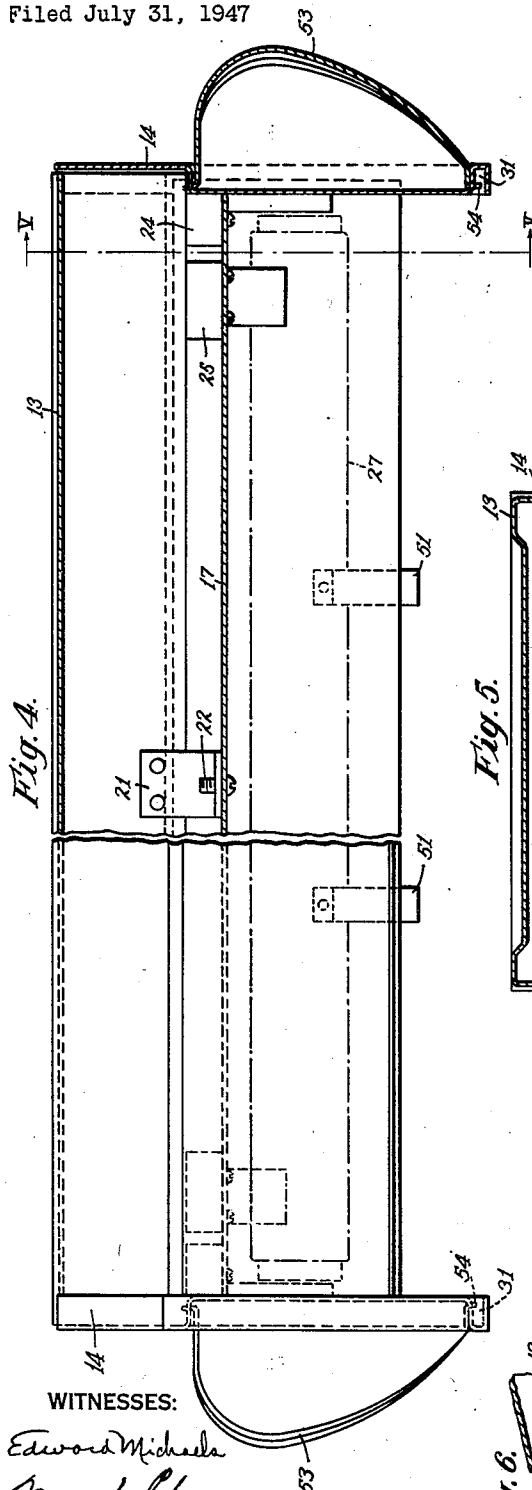


Fig. 4.

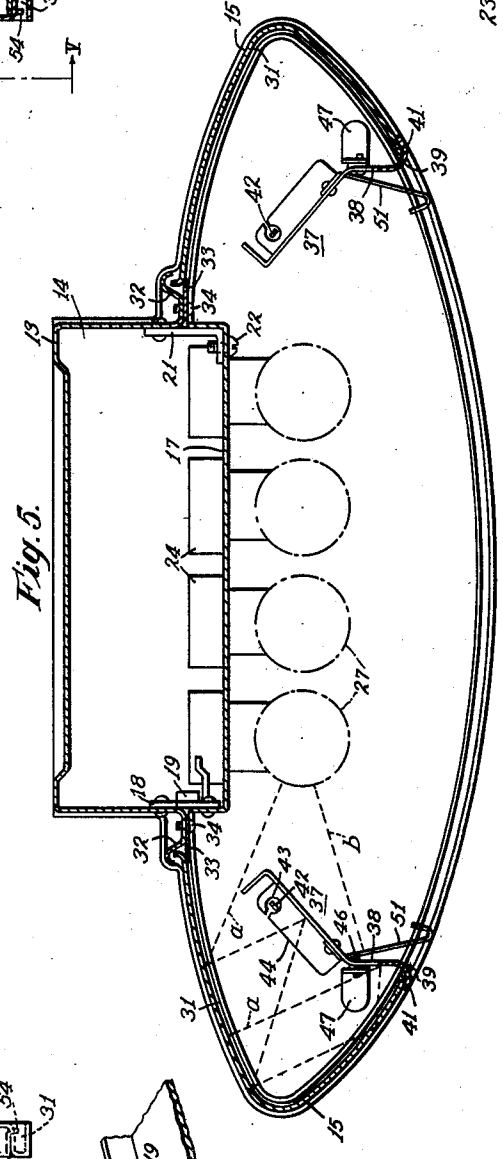


Fig. 5.

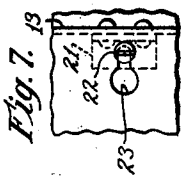


Fig. 7.

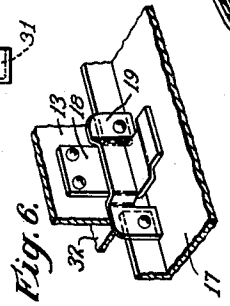


Fig. 6.

WITNESSES:

Edward Michaels

Rev. L. Groome

INVENTORS

Frederic C. Winkler &

Burton A. Wyman.

BY

G. M. Crawford

ATTORNEY

Patented Aug. 12, 1952

2,606,998

# UNITED STATES PATENT OFFICE

2,606,998

## LUMINAIRE FOR ELONGATED TUBULAR LAMPS

Frederic C. Winkler and Burton A. Wyman, Cleveland, Ohio, assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application July 31, 1947, Serial No. 764,936

9 Claims. (Cl. 240—51.11)

1

Our invention relates, generally, to luminaires and, more particularly, to fluorescent luminaires of the direct lightly type primarily adapted for ceiling mounting as individual units or in continuous rows for direct lighting purposes.

The object of our invention, generally stated, is to provide a fluorescent luminaire which is of simple and economical construction, which may be readily and easily installed and serviced, which has a pleasing and ornamental appearance, and which has a relatively high efficiency.

A more specific object of our invention is to provide a luminaire of the character described for use with fluorescent lamps and the like which is particularly adapted for direct lighting where controlled high intensity illumination is desired, such as in stores and other establishments where it is desirable to properly illuminate displays of merchandise.

Another object of our invention is to provide in a luminaire of the character described for utilizing the light which is normally trapped within the body member or housing portion of the luminaire means to improve its efficiency and improve its appearance when lighted.

A further object of our invention is to provide, in a luminaire of the character described, for utilizing curved side walls of translucent or light emitting material and for illuminating these side walls by utilizing the light which is normally trapped within the body member by the use of side reflectors so mounted and of such construction as to direct or transmit a portion or all of this trapped light onto the inner surfaces of the side walls.

A still further object of our invention is to provide, in a luminaire of this type, for supporting the lamps and lamp accessories on the main reflector which is hinged to the body member and for also mounting the side reflectors by means of hinge arrangements so as to provide ready access to the interior of the luminaire for cleaning and maintenance purposes.

Another object of our invention is to provide a construction for a luminaire of the character described wherein the body member is in the form of a lightweight unit or assembly which may be readily attached to the ceiling or other supporting surface and to which the main reflector assembly, side reflectors and louver are hingedly mounted in a readily detachable manner.

A still further object of our invention is to provide a luminaire of the character described, wherein an elongated reflector is mounted between each side wall of the body member and the lamps with the upper edges of these reflectors in spaced relation with the upper portions of the side walls to provide for so controlling the leakage of light normally trapped within the body member so to effectively illuminate the side walls to the desired degree of brightness.

2

Another object of our invention is to provide, in a luminaire of this type, for so mounting the side reflectors within the body member that they may be readily moved to and from their normal operating position by a hinging action or readily detached from the body member.

These and other objects of our invention will become more apparent from the following detailed description of a preferred embodiment thereof when read in conjunction with the drawings, in which:

Figure 1 is a perspective view of the body member or portion of a luminaire embodying the principal features of our invention,

Fig. 2 is a similar view of the body member with the reflector assembly attached thereto and shown in the open or down position,

Fig. 3 is also a similar view of the complete luminaire showing the reflector assembly in the closed position with the lamps in position and the hinged louver in the open position.

Fig. 4 is a side elevational view partly in section of the luminaire showing structural details and arrangement of parts,

Fig. 5 is a sectional view taken along lines V—V of Fig. 4 showing details and arrangement of the parts,

Fig. 6 is a partial view in perspective of the hinge mounting for the reflector assembly, and

Fig. 7 is a partial view in plan of the latching arrangement for the reflector assembly.

Referring to Figs. 1, 2 and 3, it will be seen that a luminaire constructed in accordance with one embodiment of our invention comprises, generally, a body member or assembly 10 which is in the form of a unitary housing, a reflector assembly 11 and a louver or other light controlling element 12.

The view of Figs. 1, 2 and 3 are for the purpose of showing the general make-up or arrangement of the luminaire and are not intended to show all of the structural details. The luminaire shown in this instance is of the ceiling mounting type adapted for installation as a single unit or in rows to form a continuous luminaire. In other words, a number of these luminaires may be mounted in direct end-to-end relation to form a continuous row or they may be mounted

with other forms of light producing units interposed therebetween.

The body member 10 is in the form of an elongated housing substantially closed at the top and having a relatively large rectangular bottom opening. It may comprise a channel-shaped canopy or runner 13 with separate end pieces 14 attached thereto and side panels or walls 15 forming an elongated bottom opening 16. The canopy 13 is adapted for direct ceiling mounting and is provided with the usual openings and knockouts as shown.

The body member 10 is of lightweight construction and is adapted for installation without the reflector assembly and louver attached. The arrangement is such that these elements of the complete luminaire may be readily attached to the body member after it is installed on the ceiling or other supporting surface.

The reflector assembly 11 comprises an elongated reflector panel 17 detachably hinged at one side to the canopy 13 by means of L-shaped hinge brackets 18 which engage bracket supports 19 on the panel 17, as shown in detail in Fig. 6, and detachably secured at its opposite side by means of L-shaped latch brackets 21 and screws 22 disposed in key-hole shaped slots 23 in the reflector, as shown in detail in Fig. 7.

All of the necessary lamp holders 24, starter blocks or bases 25, ballasts 26, wiring, etc. (not shown), are mounted on the top or upper surface of the reflector panel, as shown. It will be apparent that all of these elements are concealed within the body member or housing when the reflector assembly is attached in its normal operating position and are fully exposed for cleaning and maintenance work when the reflector assembly is open, as shown in Fig. 2.

The lamp holders 24 are mounted at the ends of the reflector panel for supporting the lamps 27 directly beneath the panel and in a generally horizontal plane in parallel relation. The bases of the lamp holders, the starter blocks, ballasts and wiring are all on the upper side of the panel. It will be apparent that by means of this arrangement, the entire reflector assembly may be assembled, wired and mounted in the body member after it has been mounted upon the ceiling. The hinge mounting of the reflector assembly permits ready access to the electrical elements at any time without removal of the assembly or otherwise disturbing the body member.

When it is desired to lower the reflector assembly to the open position, as shown in Fig. 2, the holding screws 22 in the L-shaped latch brackets 21 are loosened to afford sufficient sidewise movement of the assembly to permit the heads of these screws to disengage their associated key-hole shaped slots. This movement is permitted by the nature of the L-shaped hinge brackets 18 which permits the reflector assembly to slide sidewise direction.

In the open position, the reflector assembly hangs from the body member from the hinge brackets 18, as clearly shown in Fig. 2. These hinge brackets are of such shape as to hold the reflector assembly and still permit it to be readily unhooked and removed from the body member.

An important aspect of our invention is in the use of the translucent or illuminated side walls and the manner in which the lighting thereof is effected. In this instance, the stray or trapped light which is normally wasted is utilized to light or illuminate the side walls to greatly improve the appearance and efficiency of the luminaire.

For this purpose, it is preferred to utilize a white translucent plastic or glass material for the side walls or panels 15 and provide for directing a predetermined amount of light on the interior thereof by means of side reflectors. The panels 15 may be formed from sheets of material into the shape shown in Fig. 5 and attached to the body member in any suitable manner. In this instance, the end pieces 14 which are attached directly to the ends of the canopy are provided with opposed or facing channels 31 in their rim portion which are adapted to receive the opposite ends of the side panels to not only support these panels but to help maintain their desired contour. The canopy is provided with outwardly extending and upwardly curved side flanges 32 which receive the upper longitudinal edges of the side panels, the latter being held therein by holding straps 33 attached to the flanges by means of screws 34. This is shown in detail in Fig. 5.

In order to provide for effectively controlling the amount of light that is directed upon the interior surfaces of the side panels 15, a pair of side reflectors 37 individually mounted on opposite sides of the lamps 27 and between the lamps and side panels are utilized. These side reflectors 37 are preferably formed of rectangular pieces of opaque material and extend the entire length of the body member between the end pieces as shown.

While it is preferred to use metal for forming the side reflectors, it is to be understood that they may be formed of any suitable material, such as glass or plastic, so long as the proper light controlling function are accomplished. When they are formed of metal or some other opaque material, they also may be perforated if desired, in order to transmit more light to the side panels. The amount of light which is to be transmitted to the side panels depends somewhat upon the degree of illumination or brightness desired, and the material from which these side panels are formed. Therefore, it may be desirable to use varying degrees of light intensity depending upon the brightness desired.

In this instance, the side reflectors are bent transversely into an open V-shape, the shorter leg 38 of which is rounded at its end to provide a longitudinal channel 39 to receive the lower edge 41 of the side panel. The panels are thus rigidly supported at their ends as well as at their top and bottom edges. These channel portions 39 of the side reflectors define the sides of the lower rectangular opening of the body member.

The side reflectors 37 may be detachably supported within the body member in any suitable manner. In this instance, they are supported from the end pieces 14 which are provided with inwardly facing tabs 42 which engage slotted openings 43 in bent-over portions 44 at the ends of the reflector, as clearly shown in Fig. 5. This not only provides a rotatable mounting for the side reflectors but also makes it possible to readily remove them entirely from the body member for cleaning and other purposes. The reflectors may be installed by holding them in such position that the slotted opening 43 will engage the supporting tabs 42 and then rotating them to their normal operating position. They may be held in their normal operating position by screws 46 extending therethrough into engagement with

brackets 47 attached to the inner walls of the end pieces, as shown in Fig. 5.

By means of this arrangement, the side reflectors may be readily attached and detached or merely loosened and permitted to swing on their mounting when it is desired to clean the reflectors or the inner surface of the side panels.

It will be observed that the lower edges of the side reflectors are in closed relation with the lower edge of the side panels but that the upper edges of the side reflectors are in spaced relation with the upper edges of the side panels to provide an elongated opening. In this instance, where the side reflectors are made of an opaque material, this spacing permits the light which is normally trapped and wasted to escape through the opening and thus be utilized for illuminating the interior of the side panels. The degree to which the side panels are illuminated depends upon the width of this opening and may be adjusted to obtain the desired degree of brightness depending upon the material from which the side panels are made. It will be apparent that the side panels transmit some of the light, reflect some and finally become filled with light, as clearly indicated by the dash-dot lines *a* in Fig. 5.

In addition to this function, the side reflectors 37 direct a certain amount of light from the lamps downwardly out of the bottom opening of the body member, also as shown in Fig. 5 by the dash-dot line *b*. This increases the efficiency of the luminaire as a whole and renders it a more effective unit for producing direct light.

In this instance, the louver or other light controlling element 12 shown in Fig. 3 is supported within the bottom opening 16 of the body member from the side reflectors by means of hook members 51 at the opposite ends thereof. This arrangement is shown, in general, in Fig. 3 and in detail in Fig. 5, except that the louver is not shown in Fig. 5. Cross bars 52 are provided between adjacent louver members at the opposite sides of the louver assembly and these simply hook over the hook members 51 to support the louver in its proper position within the bottom opening 16.

As shown in Fig. 4, the body member is provided with detachable end caps or covers 53 having the same general shape as the flat oval portions of the end pieces 14. These caps are held in position on the end pieces by a plurality of spaced tabs 54 on their periphery which snap into correspondingly positioned slots 55 in the end pieces, as shown in Fig. 3 for example. In this view only the upper slots are visible, but it is to be understood that there is at least one additional slot at the bottom of the end pieces.

These detachable end caps 53 improve the appearance of the luminaire when used as a single unit and are readily detachable when it is desired to mount a plurality of luminaires in end-to-end relation in a continuous row.

In view of the foregoing detailed description of the preferred embodiment of our invention, it will be apparent that we have provided a luminaire which is especially adapted for producing direct lighting and a luminaire which has a maximum efficiency. We have also produced a luminaire which has a desirable apearance not only from the standpoint of its physical make-up, but also when lighted and in use. The use of the translucent or light-emitting side panels in the body member and the control of the brightness thereof afforded by the side reflectors



produces a luminaire having a pleasing appearance with graduated brightness. The side walls or panels function primarily in an ornamental capacity and the light transmitted therethrough does not materially add to the illumination produced by the luminaire.

In addition, the luminaire of our invention is extremely simple to install and maintain. This results from the fact that it is composed primarily of the three assemblies, namely, the body member, the reflector assembly and the louver or light controlling element.

While we have described a specific embodiment of our invention, it is to be understood that the principles thereof may be utilized in other specific embodiments without departing from the spirit of our invention.

We claim as our invention:

1. A luminaire for use with elongated electric discharge lamps comprising, an inverted trough-shaped canopy, downwardly depending end pieces attached to the ends of the canopy, outwardly curved translucent side panels supported on opposite sides of the canopy, said canopy, end pieces and side panels forming an elongated body member having an elongated bottom opening, means mounted within the body member for supporting a plurality of elongated lamps lengthwise thereof in side-by-side relation in generally the same horizontal plane, and an elongated side reflector detachably mounted within the body member on each side of the lamps and in spaced relation to the translucent side panels, said reflectors being generally inwardly concave in transverse section and having their lower edges in closed relation with the lower edges of the side panels and their upper edges in spaced relation to the upper edges of the side panels, thereby to provide for the leakage of light past the upper edges of the side reflectors to illuminate the side panels of the body member.

2. A luminaire for use with elongated lamps comprising, an elongated body member of shallow construction having an elongated bottom opening, said body member having opaque end portions and outwardly curved translucent side portions, means mounted within the body member for supporting a plurality of lamps therein extending lengthwise thereof in side-by-side relation in generally the same horizontal plane between the translucent side portions, and an elongated side reflector mounted within the body member on each side of the lamps in spaced relation to the translucent side portions, said reflectors being inwardly concave in transverse section and having their upper edge portions spaced from the top walls of the translucent side portions and inclined inwardly but located above the center line of the lamps, thereby to permit a small portion of the light produced by said lamps to leak past the reflector to illuminate said translucent side walls of the body member.

3. A luminaire for use with elongated tubular lamps comprising, an elongated body member having end portions and an elongated bottom opening, said body member having outwardly curved translucent side walls with their lower longitudinal edges terminating at the bottom opening, a main reflector plate mounted within the body member at substantially the same level as the upper longitudinal edges of the side walls, lamp holders mounted at the ends of said main reflector for supporting a plurality of elongated lamps in generally the same horizontal plane lengthwise of the body member between the

translucent side walls and below said main reflector, an elongated side reflector mounted within the body member with its ends secured to the end portions of the body member and positioned between the lamps and each side wall, said reflectors having their upper edges spaced from the upper edges of the side walls but above the horizontal center line of the lamps so as to permit the passage of a predetermined small amount of light from the lamps onto the side walls to effect the illumination thereof.

4. A luminaire for use with elongated electric discharge lamps comprising, an elongated body member having end walls and side walls of translucent material which are outwardly curved in cross section, said body member having an elongated bottom opening, means mounted within the body member for supporting a plurality of lamps in side-by-side relation in generally the same horizontal plane lengthwise thereof, an elongated side reflector mounted within the body member between each side wall and the lamps, the lower edges of said reflectors being coextensive with the lower edges of the side walls and defining the sides of said elongated bottom opening and the upper edges of the reflectors being spaced from the upper edges of the side walls above the horizontal center line of the lamps to provide an elongated opening above each reflector for the leakage of light onto the inner surfaces of the side walls, and means at each end of the side reflectors for hingedly and detachably securing said reflectors to the end walls.

5. In a luminaire for use with elongated electric lamps comprising, an inverted trough-shaped canopy, said canopy having outwardly extending side flanges curved at their outer ends to provide downwardly facing side channels, end pieces attached to the opposite ends of the canopy and extending therebelow, the lower portions of said end pieces which extend below the lower edges of the canopy being flat-oval shaped and having facing peripheral channels throughout the oval portion, side panels of translucent material mounted on opposite sides of the canopy with their ends positioned in the peripheral channels and their upper side edges in the side channels of the canopy, an elongated reflector assembly mounted within the enclosure thus formed by the canopy and side panels, said reflector assembly being detachably secured to the canopy, a plurality of lamp holders mounted at each end of the reflector assembly for supporting a plurality of elongated lamps therebelow and within said enclosure, and an elongated side reflector mounted within said enclosure between each outside lamp and the adjacent side panel, said reflectors having curved lower edge portions receiving the lower edge portions of the side panels and upper edge portions spaced from the upper portions of the side panels, thereby to provide an elongated opening for the leakage of light onto the inner surface of the side panels.

6. In a luminaire for use with elongated electric lamps comprising, an inverted trough-shaped canopy, end pieces attached to the opposite ends of the canopy with their bottom edges extending therebelow, outwardly curved side panels of translucent material mounted upon opposite sides of the canopy and supported at their ends by said end pieces with their upper edges disposed in closed relation with the respective side edges of the canopy to form an enclosure, the lower side edges of the side panels



and lower edges of the end pieces forming an elongated rectangular bottom opening, means including an elongated rectangular and plate-like reflector attached in closing relation to the bottom of the canopy for supporting a plurality of said lamps between the side panels of the enclosure, and an elongated side reflector of generally rectangular shape in elevation mounted within the enclosure between each side panel and the lamps, said side reflectors having their lower edges disposed in closed relation with the bottom edges of the side panels and their upper edges in predetermined spaced relation with respect to the top wall of the curved side panels, thereby to provide an elongated opening for the leakage of light directly upon the inner surface of the side panels.

7. In a luminaire for use with elongated electric lamps comprising, an inverted trough-shaped canopy, end pieces attached to the opposite ends of the canopy with their bottom edges extending therebelow, outwardly curved side panels of translucent material mounted upon opposite sides of the canopy and supported at their ends by said end pieces with their upper edges disposed in closed relation with the respective side edges of the canopy to form an enclosure, the lower side edges of the side panels and lower edges of the end pieces forming an elongated rectangular bottom opening, means including an elongated reflector attached to the bottom of the canopy for supporting a plurality of said lamps within the enclosure in side-by-side relation between the opposed side panels, and an elongated side reflector mounted within the enclosure between each side panel and the lamps disposed to direct a portion of the light downwardly through the bottom opening and permit a portion thereof to leak directly onto the side panels, said side reflectors being detachably secured at their opposite ends to the end pieces and having a normal position in which their lower edges are in closed relation with the lower edges of the side panels.

8. In a luminaire for use with elongated electric lamps comprising, an inverted trough-shaped canopy, end pieces attached to the opposite ends of the canopy with their bottom edges extending therebelow, outwardly curved side panels of translucent material mounted upon opposite sides of the canopy and supported at their ends by said end pieces with their upper edges disposed in closed relation with the respective side edges of the canopy to form an enclosure, the lower side edges of the side panels and lower edges of the end pieces forming an elongated rectangular bottom opening, means including an elongated reflector hingedly secured to the bottom of the canopy for supporting a plurality of said lamps within the enclosure in side-by-side relation between the side panels, and an elongated light controlling member mounted within the enclosure between each side panel and the lamps disposed to reflect a portion of the light downwardly through the bottom opening and a portion of the light onto the inner surfaces of the side panels.

9. A luminaire for use with elongated electric discharge lamps comprising, an elongated body member having end walls and side walls of translucent material, said body member having an elongated bottom opening, means mounted within the body member for supporting a plurality of lamps in side-by-side relation in generally the same horizontal pane lengthwise thereof, an elongated side reflector mounted within the body member between each side wall

and the lamps, each side reflector being spaced from its adjacent side wall except at its lower edge which is coextensive with the lower edges of the side walls and defines therewith the sides of said elongated bottom opening, the upper edges of the reflectors being spaced from the upper edges of the side walls above the horizontal center line of the lamps to provide an elongated opening above each reflector for the leakage of light onto the inner surfaces of the side walls, and means at each end of the side reflectors for hingedly and detachably securing said reflectors to the end walls.

FREDERIC C. WINKLER.
BURTON A. WYMAN.



## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS


| Number | Name | Date |
|---|---|---|
| 2,290,301 | Stair | July 21, 1942 |
| 2,309,059 | Friend | Jan. 19, 1943 |
| 2,321,099 | Naysmith | June 8, 1943 |
| 2,364,992 | Maurette | Dec. 12, 1944 |
| 2,431,656 | Barker | Nov. 25, 1947 |
| 2,432,392 | DeMerritt | Dec. 9, 1947 |
| 2,436,635 | DeBishop | Feb. 24, 1948 |
| 2,440,603 | Guth | Apr. 27, 1948 |
| 2,564,328 | Farrington et al. | Aug. 14, 1951 |