

Sept. 28, 1965

W. NIEDER-WESTERMANN ETAL

3,209,140

LUMINAIRE

Original Filed Jan. 27, 1960

5 Sheets-Sheet 1

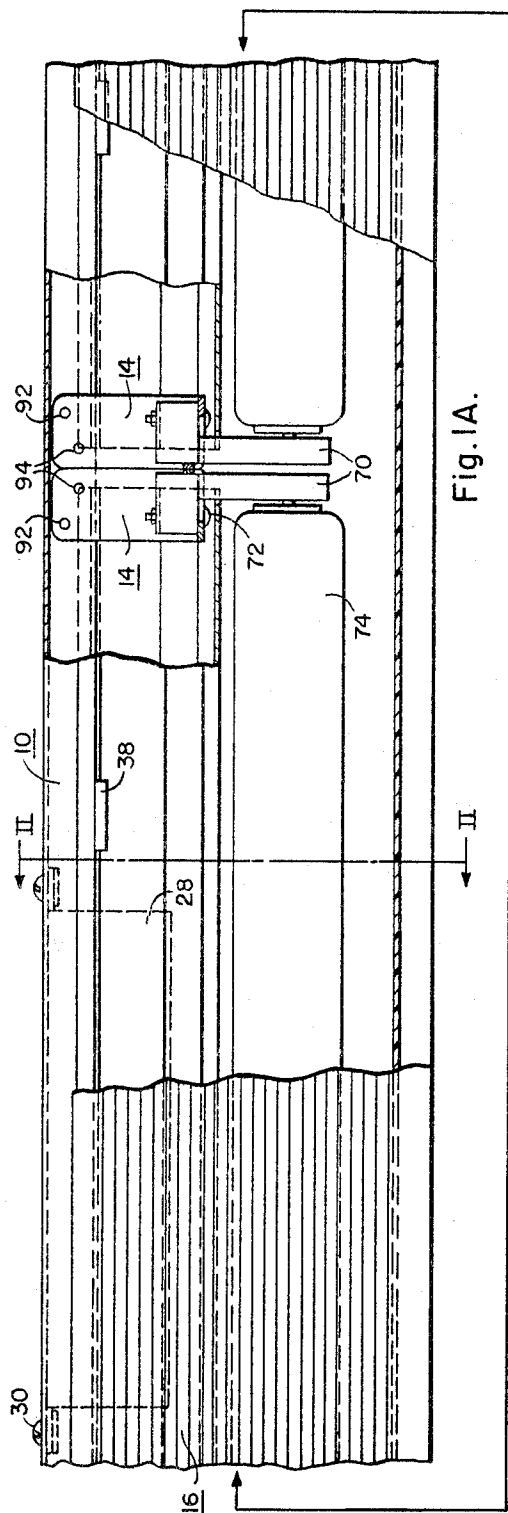


Fig. 1A.

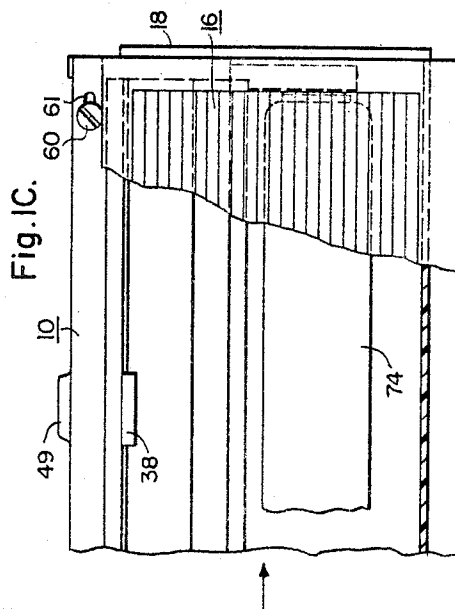


Fig. 1B.

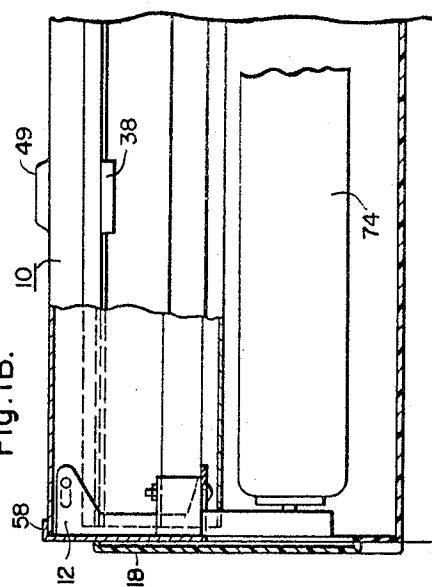


Fig. 1C.

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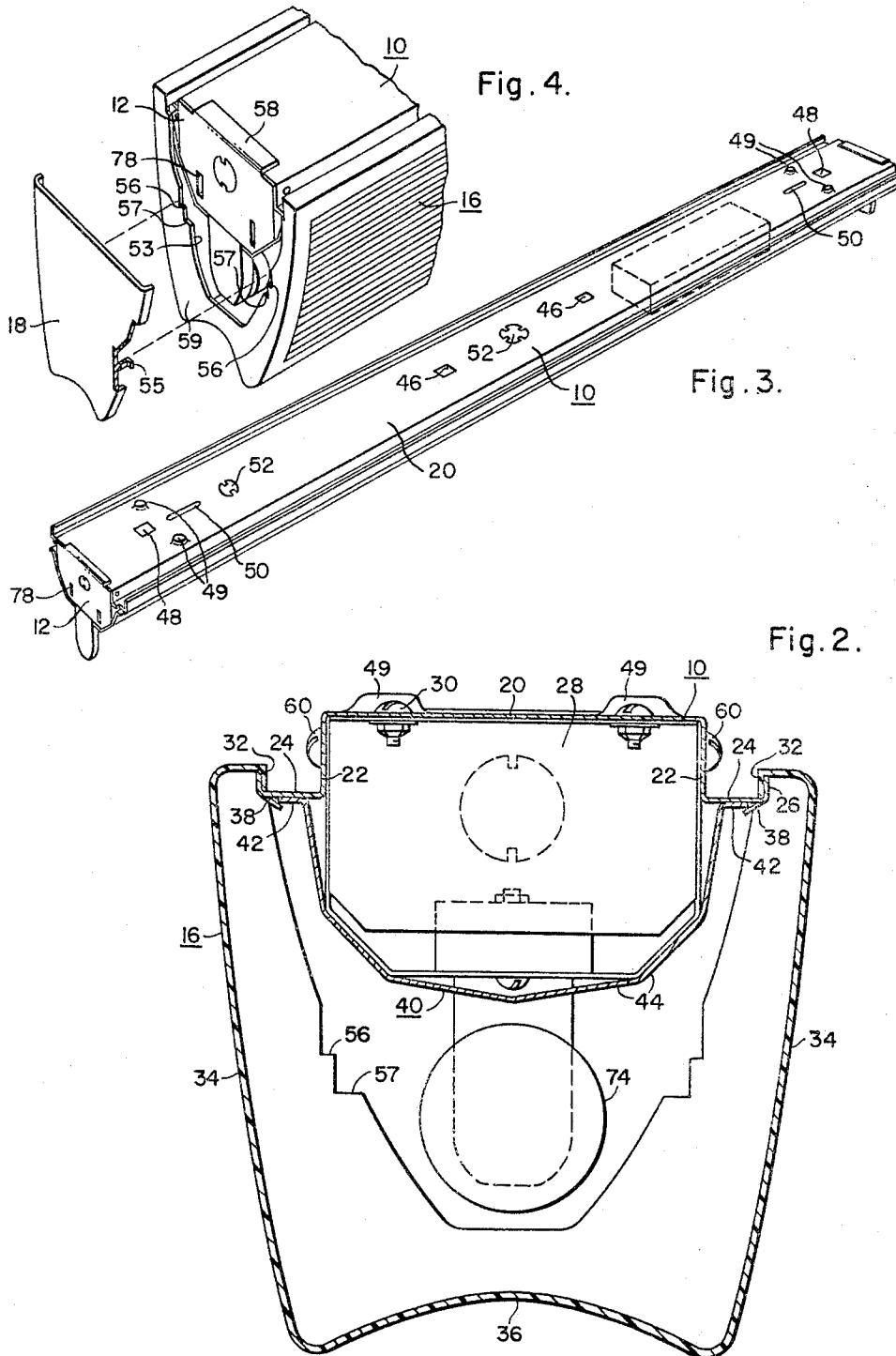
W. NIEDER-WESTERMANN ETAL

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LUMINAIRE

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5 Sheets-Sheet 2



Sept. 28, 1965

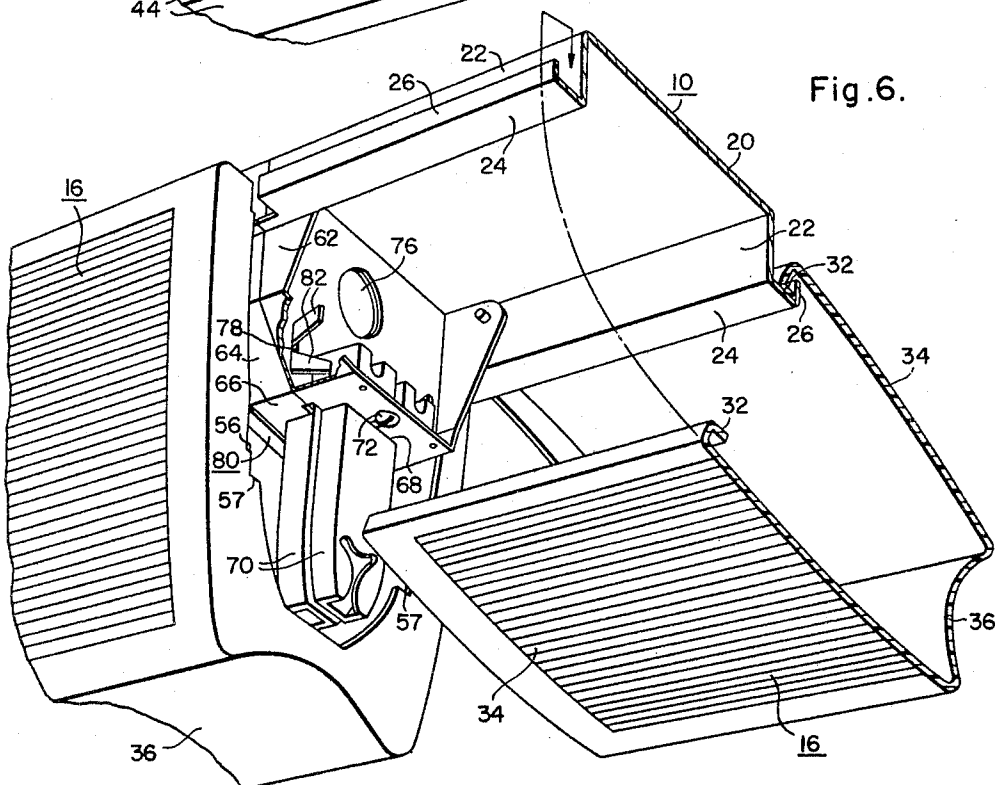
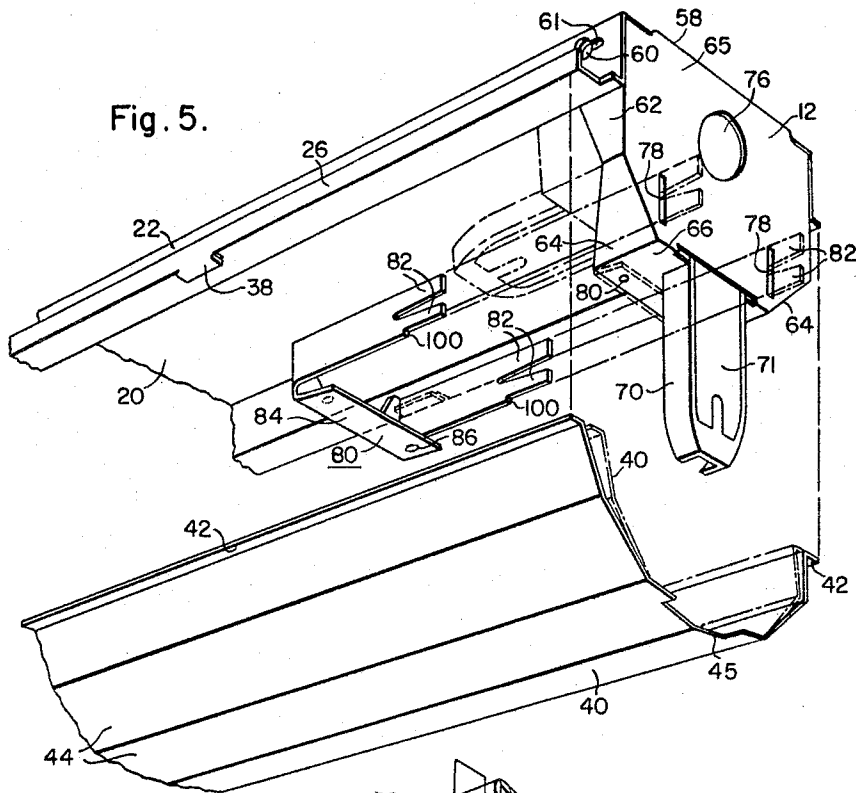
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LUMINAIRE

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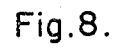
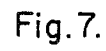
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W. NIEDER-WESTERMANN ET AL

LUMINAIRE

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Sept. 28, 1965

W. NIEDER-WESTERMANN ETAL

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LUMINAIRE

Original Filed Jan. 27, 1960

5 Sheets-Sheet 5

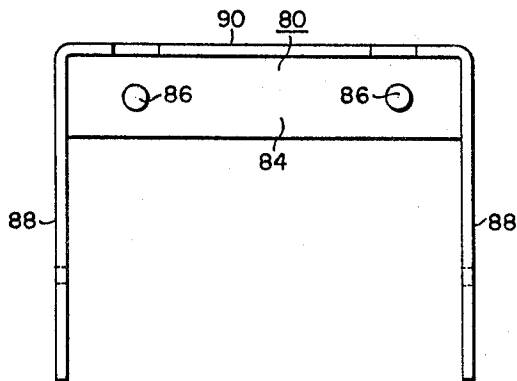


Fig. 10.

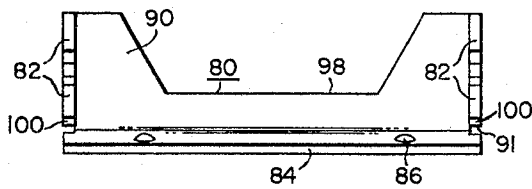


Fig. 9.

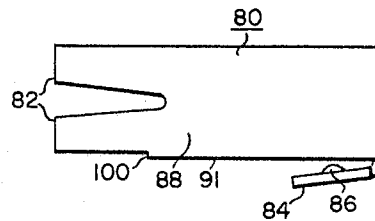


Fig. 11.

1

3,209,140

LUMINAIRE

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Continuation of application Ser. No. 5,064, Jan. 27, 1960.

This application Jan. 14, 1963, Ser. No. 251,441

5 Claims. (Cl. 240—51.11)

This application is a continuation of copending application Serial No. 5,064, now abandoned, entitled "Luminaire," filed January 27, 1960, by W. Nieder-Westermann, E. L. Izzi and J. Moro, and assigned to the present assignee.

The present invention relates to a novel luminaire structure and has particular reference to an improved structure of a fluorescent fixture housing and to devices for connecting together continuous rows of luminaires.

In the past, many disadvantages have been readily apparent in corridor luminaires of a type similar to that herein disclosed. Some of these disadvantages were that the ballast channels were visible and cast dark shadows on the ceilings; the tops of the fixtures were open for admission of dust and bugs; dark areas were present between fixtures when mounted in continuous rows; the ends of the fixtures were dark; the fixtures presented a flimsy appearance and yielded poor light distribution; the fixtures required time-consuming methods for mounting the reflectors in the luminaires; and assembly and mounting of the luminaire was rendered difficult by the inclusion of numerous components which are obviated by the present invention.

The present invention is directed to a luminaire that eliminates these disadvantages and provides an attractive, simply constructed, and practically useful apparatus.

An object of the invention, therefore, is the provision of a novel and efficient luminaire structure.

A further object of the invention is the provision of a novel and efficient device for joining such luminaires in end-to-end relation.

Another object of this invention is to provide a luminaire construction which minimizes dark areas between adjacent fixtures when mounted in continuous rows.

A further object is to provide a luminaire construction having means associated therewith for emphasizing continuous and uninterrupted ribbons of light when mounted in end-to-end relation.

Another object of the invention is the provision of a luminaire having a novel arrangement for furnishing a good brightness distribution all around the luminaire.

Still another object is to provide a fixture with novel means for hiding the ballast or wiring from direct view and for reducing or eliminating ceiling dark spots caused thereby.

Another object of the invention is to provide a fixture which is closed in a novel manner to prevent dust and bugs from entering the fixture.

Further objects are to provide a plastic shield which prevents bowing inward or outward, which provides hinging along its entire length, and which allows for easy mounting and relamping.

Another object of the invention is to design a fluorescent type luminaire which has a reflector and a light transmitting shield that aids in directing more light downward.

Still another object of the invention is to provide a

2

reflector which has a snap-in design, eliminates the need for screws in mounting, and is shaped to provide the best possible reflection.

Another object of the invention is to provide a fixture which is suitable both for ceiling mounting and suspension mounting.

Yet another object of the invention is to provide a luminaire with end plates which serve also as lampholder supports and which provide means for attaching a novel connector for mounting continuous rows of fixtures.

Still another object of the invention is to provide a luminaire structure which has lampholder supports that fold into the channel for shipping or storage and thus provide protection for the lampholder.

On the other hand, an objective of the invention is the provision of means associated with a detachable reflector arrangement for assuring the retention of a foldable lampholder in its operating position, when desired.

A further object of this invention is to provide a novel connector used in conjunction with the adjacent units of low-mounted luminaires such as those described in this application, with the connector being of a one-piece design requiring no preassembly in the shop and no screws to tighten in the field, that is to say, a connector which simply snaps into position.

More specifically, it is an object of this invention to provide a connector which forms tight connections between adjacent luminaires when mounted and which can be secured simply by twisting the connector ends with a screw driver or similar tool.

Before giving a detailed description of the precise configuration and cooperation of the components of the fluorescent luminaire, a short enumeration of the major components and the novel method of their assembly shall be described.

The luminaire structure consists primarily of a channel-shaped housing having lampholders at each end and having means for holding a reflector and light-transmitting shield thereto. The housing also serves as a means to mount the ballast. The luminaire fixture generally is supported from the ceiling either by directly mounting it thereon or by suspending it therefrom by means of stems attached to the housing. The lampholder supports, in this arrangement, are hingedly connected to side walls of the housing so that they can be collapsed for shipping purposes. Slots are provided in the lampholder supports for receiving novel connectors, provided by the invention, so that luminaire housings may be joined end-to-end to form ganged sections of fixture housings. The shield or closure is so made that its flanges fit over edges of the housing in order to eliminate any need for the conventional nut-bolt connections or other fasteners. Additionally, the shield is shaped to provide an improved light-distribution and to conceal ceiling dark spots caused by the ballast or other opaque components of the luminaire. The present invention also provides plastic end covers which can be either light transmitting or opaque, or partially opaque and light transmitting so that the desired degree of light can be obtained at the ends of the luminaire to present a desirable appearance.

These and other objects, features and advantages of the invention will become more apparent upon consideration of the following detailed description of illustrative embodiments thereof when taken in conjunction with the attached drawings, in which:

FIGS. 1A, 1B, 1C constitute a tripartite side eleva-

3

tional view of a luminaire constructed according to the invention, with parts in section and other parts broken away in order to illustrate the invention more clearly;

FIG. 2 is a transverse sectional view of the luminaire taken along reference line II—II of FIG. 1A;

FIG. 3 is a perspective view of the luminaire including the lampholder supports and lampholders;

FIG. 4 is a partial perspective view of an end of the luminaire with the light-transmitting shield mounted on the housing and with the end cover ready to be assembled to the shield;

FIG. 5 is a partial perspective view of the luminaire with a connector of the invention and reflector shown in a ready-to-be-assembled relationship and with the lampholder shown in its shipping (dotted lines) and operative positions;

FIG. 6 is a partial perspective view with parts removed and broken away of two adjacent luminaires mounted end-to-end and secured together by the connector and with the shield or closure members of one of the luminaires being partially assembled;

FIG. 7 is a perspective view of the central portion of the luminaire showing one center lampholder support in a shipping position and another center lampholder support in its operative position;

FIG. 8 is a perspective view with parts broken away of the central portion of a luminaire as shown in FIG. 7, but with the reflectors and shields being assembled;

FIG. 9 is a front elevational view of the connector of the invention;

FIG. 10 is a plan view of the connector of the invention; and

FIG. 11 is a side elevational view of the connector of the invention.

Referring more particularly to FIGS. 1A, 1B, and 1C, it can be seen that the luminaire of this invention has a generally rectangular form. Housing 10 is an inverted channel-shaped member from which are suspended inwardly connected lampholder supports 12 and 14 which in turn support the lampholders 70 and the fluorescent lamps 74 as described hereinafter in greater detail.

The lampholder supports 12 are mounted on the opposite ends of the luminaire, as shown in FIGS. 1B and 1C. In the more lengthy luminaires, additional lampholder supports 14 are mounted in a back-to-back relationship in the middle of the housing 10. The details of the structure of these elements are described later. Both the housing 10 and the lampholder supports 12 can be made of any suitable material, such as sheet steel. Supported also from this housing 10 is a plastic shield or closure member 16. This shield 16 is attached to the housing without the use of screws, bolts, or the like. FIGS. 1A, 1B, and 1C form what is known in the art as a tandem rapid-start luminaire. The luminaire illustrated by these figures contains two lamps 74 supported in tandem and includes the back-to-back lampholder supports 14 as shown. FIGS. 1B and 1C, the opposite end portions of the luminaire, also illustrate decorative end covers 18, preferably made of a plastic material and which are described in more detail later.

The housing 10, as clearly illustrated in FIG. 2, is of a generally inverted U-shaped configuration having a bight portion 20 and side walls 22. Extending along the entire length of the side walls 22 and outwardly therefrom are flanges 24 which in turn have upwardly directed edges 26 extending therefrom, the purpose of which is described below. This housing 10 is preferably of a one piece construction, with flanges 24 and edges 26 thereof formed by bending the material used to the desired shape.

Fitting in the inverted U-portion of the housing is a ballast assembly 28 which is secured to the bight portion 20 of the housing by any conventional means such as nuts and bolts 30.

The plastic shield 16 is fashioned of any desired light-transmitting resilient plastic material, such as polystyrene

4

and the like, and is adapted to fit over the upturned edges 26 of the housing 10. To accomplish this, the shield 16 has downturned flanges 32 in registration with the edges 26 of the housing in the operative position of the shield. These flanges 32 extend from side walls 34 of the shield 16. Connecting these side walls 34 is a concave bight portion 36. This bight portion 36 serves to concentrate the rays of light so as to direct more light downwardly.

The mounting of the shield 16 is clearly shown in FIG. 6. To attach the plastic shield 16, the flange 32 of the far side of the refractor is hooked over the corresponding edge 26 of the housing 10. The shield 16 is then swung upward until it covers the inner part of the housing 10 completely, and with a slight horizontal push on the free side wall 34 toward the far side of the housing the free flange 32 of the plastic shield 16 can be dropped into engagement with the edge 26 on the near side of the housing 10. This can be accomplished because when the flange 32 of the far side is pushed flush against the far side wall 22 of the housing 10 the spacing is such that the flange 32 on the near side just clears the edge 26 of the housing 10. The above mentioned horizontal push then engages the free flange 32 over the near edge 26 and moves the far flange 32 towards the far edge 26. Thus, when in its operative position, the flanges 32 are each seated in the space on each side of the housing 10 formed by each housing side wall 22 and each edge 26.

The resiliency of the shield 16 will allow for some flexing of the side walls 34 if needed to engage or disengage the shield 16 and the housing 10, but the present luminaire is so designed that such flexing will not normally be necessary. For servicing the units, the shield will hang safely from either side in the relationship illustrated in FIG. 6. The reflectors 40 of the adjacent luminaires shown in FIG. 6 have been removed to more clearly illustrate the remaining parts. However, the reflectors 40 when mounted in this arrangement appear substantially the same as that shown in FIG. 8, which illustrates adjacent reflectors in the central portion of longer luminaires.

The outwardly extending flanges 24 of the housing 10 have lanced tabs 38 as best shown in FIGS. 2 and 5. A reflector 40 is again generally of U-shaped configuration and at its upper extremities has outwardly extending edges 42 which are engaged with the inwardly directed lanced tabs 38 of the housing 10. The reflector 40, in this example, is formed of successive flat portions 44 each bend with respect to the other so as to form the aforementioned U-shaped configuration. The reflector 40 is so shaped as to provide a more efficient and desirable illumination effect and also to make the reflector 40, which is desirably made of a resilient metal, more firmly secured to the housing 10 due to the sides of the U of the reflector 40 being bent so as to be urged outwardly.

The resiliency of the reflector 40 is shown in FIG. 5 wherein the solid lines of reflector 40 indicate its free position while the dotted lines of reflector 40 indicate a compressed position. Each end of the reflector 40 has a cut-out 45 which fits around the central stem-like portion 71 (FIGS. 5 and 8) of a lampholder 70 so as to aid in maintaining the lampholder 70 and lampholder support 12 or 14 in their operative positions. The reflector 40 is of a length so as to span the distance or space between cooperating pairs of lampholders 70 and their supports 12 and 14. When tandem pairs of lampholders and their supports are mounted in a housing, two tandem reflectors are employed, one reflector between each pair of lampholders and supports, respectively.

The reflector 40 fits over and hides the ballast 28 and associated wiring so as to eliminate any possibility of their casting dark shadows on the ceilings. In addition, the sides 34 of the shield 16 extend almost to the top of the housing 10 so that any dark areas on the ceiling directly above the luminaire are not readily apparent.

5

The housing 10 serves not only the function of supporting the lampholder supports 12 and 14, ballast 28, reflector 40, and shield 16, but also as the means for suspending the luminaire from a ceiling or mounting it directly to a ceiling. Square knockouts 46 and 48, as shown in FIG. 3, are a means for rod or stem mounting in the suspension system. The stems are not shown in the drawings. The two outside holes 48 are for single stem mounting and the two inside holes 46 are for twin stem mounting. That is, when only a single luminaire is being mounted twin stems, which consists of two identical stems, are secured to the center knockouts 46. However, when a plurality of luminaires are mounted end-to-end, two single stems are secured to the first luminaire at the knockouts 48 and a single stem is mounted on the subsequent luminaires at the knockout 48 furthest from the first luminaire. The end connection between adjacent luminaires provides the support for the end of a luminaire not supported by a stem. Two long thin rectangular knockouts or slots 50 are provided for direct ceiling mounting. Bosses 49 space the housing 10 from the ceiling when mounted directly thereto. Other knockouts, such as 52 in the bight portion 20 of the housing 10, are for line leads and the like.

An end portion of the luminaire showing the combination and assembly of the reflector 16, lampholder support 12, and end cover 18 with the housing 10 is shown in FIG. 4. The end cover 18 is provided with hooked fingers 55 which engage the edges of an opening 53 in end wall 59 and which seat on shoulders 57, respectively, of the opening 53. Portion 56 has been cut-out of the wall just above the shoulder 57. This cut-out 56 makes it easier to insert the fingers 55 behind the end wall 59. The shape of the end cover is made so as to conform to the end wall 59 of the shield and to provide a decorative and functional closure therefor. The plastic end cover 18 can be made of a light transmitting or opaque plastic depending on the results desired. It is more desirable, however, to make the end covers 18 light transmitting for they then will provide for illumination of the otherwise dark ends of the fixture. The end cover 18 is provided with a peripheral flange tightly abutting the end wall 59. If desired, the width of the flange can be varied to attain a more luminous appearance, but in any case, the cover will not have any distinct shadows from the opaque elements in the luminaire. To mount an end cover it is first centered against the unit end and slightly above its normal position and then thrust downwardly to slide it into a secure attachment with the end wall 59.

The side walls 22 of the housing member 10 are provided with elongated slots 61 which receive hinging screws 60, as best shown in FIG. 5. The lampholder supports 12 have flanges or wings 62 by which the hinging screws connect the lampholder supports to the housing. The lampholder supports also have inclined flanges or wings 64, so shaped as not to interfere with the mounting of the reflector 40. Connected to the lower end of each of the wings 64 is a base portion 66 which has a T-shaped cut-out 68 for receiving a lampholder 70. The lampholders 70 are secured to the supports 12 by means of bolts 72 extending through a leg of the cut-out 68 and engaging the lampholder. Fluorescent lamps 74 are, of course, supported by opposing pairs of the lampholders 70. The lampholder supports 12 are further provided with knockouts 76 in their end walls 65, which serve to allow wiring 77 to pass through ganged sections of the luminaires.

When received in the shipping carton, the lampholder supports 12 are pivoted about their hinging screws 60 to lie flush against the bight portion 20 of the housing 10. To place a lamp holder support in an operative position, it must first be rotated from its shipping position to a vertical position, as shown in FIG. 5. While in the shipping position the hinging screws 60 need be only loosely connected. An overlapping flange 58 (FIG. 4) extends from the top edge of each lampholder support 12 and

6

rests over the bight portion 20 of the housing 10 when a lampholder support 12 is in the operative position. When rotated to its vertical position, the lampholder support 12, is then slid centerward as far as possible, by means of the hinging screws 60 sliding in the elongated slots 61, the hinging screws are then tightened so that the flange 58 engages the end of the housing 10 as noted above.

For continuous rows of fixtures, the end of a lampholder support 12 of one luminaire is placed adjacent to a lampholder support 12 of another. A connector 80, which will be described in more detail later, is then slipped into engagement with the lampholder supports so that connector tabs 82 extend outwardly through the end of one lampholder support by means of elongated rectangular slots or apertures 78. When the tabs 82 of the connector are inserted in the slots, a flange 84 of the connector 80 snaps into position over the outside of the base 66 of the lampholder support by means of dimples 86, which engage apertures 87 in base 66 and provides for a snug friction fit. The first unit A should be installed with the connector tabs 86 pointed in a longitudinal direction as seen in FIG. 6. A succeeding unit B is then raised into its position and mounted with the ends of adjacent units about it, and the connector tabs 82 in the slots 78. With a turn of a screw driver or the like, the tabs 82 are bent and the units locked together. Accordingly, when a number of luminaires are mounted in tandem in end-to-end abutting relation, the array of luminaires presents the appearance of a continuous ribbon of light extending longitudinally along the total length thereof.

In certain luminaires, employing a single lamp 74, there are only two lampholder supports 12. But, in longer luminaires there are, for example, center lampholder supports 14 as illustrated in FIGS. 1A and FIG. 7. It will be appreciated, however, that lamps may also be mounted in parallel, employing appropriate lampholders of course, in both the shorter and longer luminaires. FIG. 7 shows two center lampholder supports 14, one in a shipping position and another in an installed position. While being shipped, the center lampholder support 14 likewise are pivoted upon the hinged screw connection 92 so that they remain flush with the bight portion 20 of the housing member. When swung down to a vertical, or installed position, they are prevented from further rotation by means of detents 94 on the sides of the U-shaped bracket portion of the lampholder support 14 which engage apertures 93 or similar indent means the side walls 22 of the housing member.

The central lampholder supports 14 are generally similar to the lampholder supports 12 employed at the ends of the luminaires, with like portions having like reference numerals. The central lampholder supports have eliminated the end wall 65 found in the end lampholder supports 12 and have substituted a return flange 96 which serves as a brace and guide for the inserted lampholders 70.

In the longer luminaires two of the shields 16 employed in the shorter luminaires are required since the longer ones are generally just twice the size of the shorter luminaires. The two shields are placed end-to-end (FIG. 8) and meet where the backs of the center lampholder supports 14 abut one another. This is where light leakage, if any, would be at a minimum because no part of the lamps 74 is in this immediate area, the ends of the lamps 74 leaving a blank area.

FIGS. 9, 10 and 11 illustrate the details of the connector 80 of this invention. FIG. 10 shows the connector 80 to be of generally U-shaped configuration with the bottom flange 84 co-extending with bight portion 90 to side members or walls 88 of the connector. The bottom flange 84 is inclined at an angle to the lower edges 91 of the side walls 80 to give a pinching fit and has two dimples or detents 86 which serve to lock the connector 80 to the apertures 87 of the corresponding lampholder sup-

port 12, as explained earlier, and as illustrated in FIGS. 5 and 9. The bight portion 90 of the connector is cut out at 98 so as to facilitate access to the lampholder 70 and provide space for the necessary wiring 77 again as seen in FIG. 9. The legs or side walls 88 of the connector 80 form tabs 82 which serve as the locking portions of the connector 80. The side walls 88 are also notched so as to have shoulders 100 which act as stops to limit the insertion of the side walls into the slots 78 of the lampholder supports. The bight portion 90 of connector 80 will abut against the edge 65 of lampholder support 12 if the connector is not provided with shoulders 100, so as to limit movement of the tabs 82 of the connector 80 into the slots 78. This connector 80 is made of bendable metal so that the tabs can be bent with ease by a screw driver or the like. However, the connector is strong enough to hold the end-to-end mounted luminaires in a stable, operating position. Thus, there is illustrated a snap-on connector which is of a one-piece design requiring no pre-assembly in the shop and no screws to tighten in the field since the connector simply snaps into position.

This invention therefore, provides for a corridor type or similar elongated fixture which is inexpensive to produce and which provides an up-to-date appearance and which eliminates many of the disadvantages common up to this time. The reflector and luminous ends serve as an all enclosed, extended lighting fixture which minimizes dark areas between adjacent luminaires in continuous rows give an uninterrupted ribbon of light in a much stronger construction than that used previously. Since the shield extends up to the ceiling it provides a good brightness distribution all around the luminaires and hides the ballast channel from direct view. Because of the way the plastic shield is supported by the housing, there not only is provided a device which allows for easy mounting and relamping, but one that prevents dust and bugs from entering the fixture and prevents the plastic from bowing inward or outward.

Since it is obvious that the invention can be embodied in other forms and constructions within the spirit and scope of the invention, as would be apparent to one skilled in the art, it is to be understood that the particular form shown is but one of such embodiments and with various modifications and changes being possible, the invention is not limited in any way with respect thereto. Moreover, it is to be understood that certain features of the invention can be employed without a corresponding use of other features thereof.

We claim as our invention:

1. In a luminaire, the combination comprising an elongated housing with an open bottom, lampholder supports mounted adjacent opposite ends of the housing, reflector means secured to said housing and covering the open bottom thereof so as to enclose a ballast and wiring space between the reflector and housing, a generally U-shaped light-transmitting shield hingedly and releasably mounted on said housing, said shield having light-transmitting end walls integral therewith, said end walls having a cut-out portion, the edges of said cut-out portion defining opposing aligned stepped upper and lower shoulders, at least one end cover engaging one of said end walls, said end cover having hook means, said hook means being of sufficient dimension to be insertable within said cut-out portion above said upper shoulder and engageable with said end wall when resting on said lower shoulder.

2. In a luminaire, the combination comprising an elongated inverted channel-shaped housing, outwardly and upwardly directed flanges extending from opposite side walls of said housing, a reflector extending the length of said housing secured to and generally coextensive with the outer periphery of said flanges to cover the open bottom of said housing, means carried by said housing for supporting at least one light source, a generally U-shaped light-transmitting shield enclosing at least the major part of said housing, said shield having opposed portions at the free ends thereof directed inwardly toward each other a

substantial distance, means on the terminal ends of said inwardly directed shield portions releasably engaging the upwardly directed flanges of said housing, said means abutting against said outwardly directed housing flange and resting thereon, whereby a pivotal relationship exists between one of said housing flanges and its corresponding shield means when the other shield means is detached from its corresponding housing flange, whereby said inwardly directed shield portions provide for upwardly directed light therethrough and prevent the casting of objectionable shadows on the mounting surface, said shield having light-transmitting end walls integral therewith, said end walls having a cut out portion, the edges of said cut out portion defining opposing aligned stepped upper and lower shoulders, at least one end cover engaging one of said end walls, said end cover having hook means, said hook means being of sufficient dimension to be insertable within said cut out portion above said upper shoulder and engageable with said end wall when resting on said lower shoulder.

3. In a luminaire, the combination comprising an elongated housing having an open bottom, lampholder supports mounted adjacent opposite ends of said housing, reflector means secured to said housing and covering the open bottom thereof, a generally U-shaped light-transmitting shield hingedly and releasably mounted on said housing, said shield having light-transmitting end walls integral therewith, said end walls having a cut away portion exposing the end of said housing and said lampholder support, the edges of said cut away portion defining opposing aligned stepped upper and lower shoulders, at least one end cover engaging one of said end walls to enclose said cut away portion, said end cover having hook means, said hook means being of sufficient dimension to be insertable within said cut out portion above said upper shoulder and engageable with said end wall when resting on said lower shoulder, whereby said end cover conceals the opaque elements at the end of said housing.

4. In a luminaire, the combination comprising an elongated housing with an open bottom, lampholder supports mounted adjacent opposite ends of the housing, reflector means secured to said housing and covering the open bottom thereof so as to enclose a ballast and wiring space between the reflector and housing, a generally U-shaped light-transmitting shield hingedly and releasably mounted on said housing, said shield having light-transmitting end walls integral therewith, said end walls having a portion cut away to conform generally to the contour of the cross-section of the edge of said cut away portion defining the opaque elements in said luminaire, opposing aligned stepped upper and lower shoulders, at least one end cover engaging one of said end walls, said end cover being large enough to cover said cut away portion but smaller than said end wall, said end cover having hook means, said hook means being of sufficient dimension to be insertable within said cut away portion above said upper shoulder and engageable with said end wall when resting on said lower shoulder.

5. In a luminaire, the combination comprising an elongated housing with an open bottom, lampholder supports mounted adjacent opposite ends of the housing, reflector means secured to said housing and covering the open bottom thereof so as to enclose a ballast and wiring space between the reflector and housing, a generally U-shaped light-transmitting shield hingedly and releasably mounted on said housing, said shield having light-transmitting end walls integral therewith, said end walls having a cut out portion, the edges of said cut out portion defining opposing aligned stepped upper and lower shoulders, at least one light-transmitting end cover engaging one of said end walls, said end cover having hook means, said hook means being of sufficient dimension to be insertable within said cut out portion above said upper shoulder and engageable with said end wall when resting on said lower shoulder, said end cover having a peripheral flange portion abutting said end wall to provide spacing therefrom, whereby said

light-transmitting end cover presents a luminous appearance during operation of said luminaire.

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