Aug. 9, 1966 J. W. WIGERT 3,265,886

FLUORESCENT LUMINAIRE

Filed Dec. 30, 1963

4 Sheets-Sheet 1

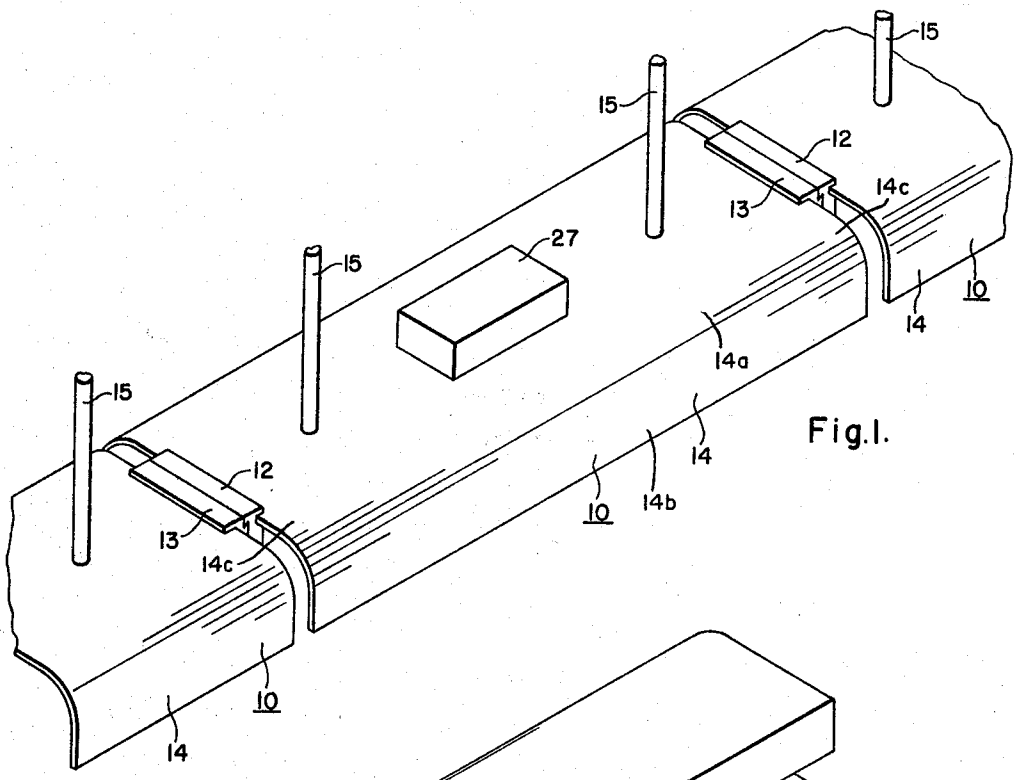


Fig.1.

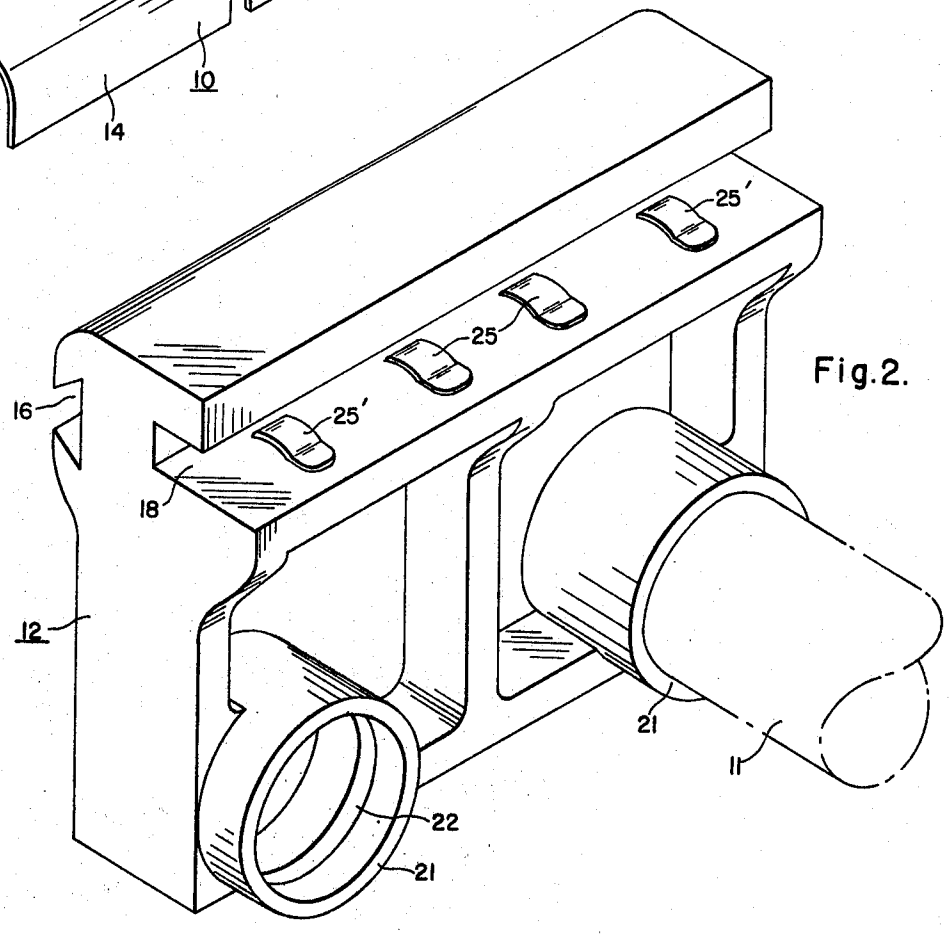


Fig.2.

Aug. 9, 1966 J. W. WIGERT 3,265,886

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4 Sheets-Sheet 2

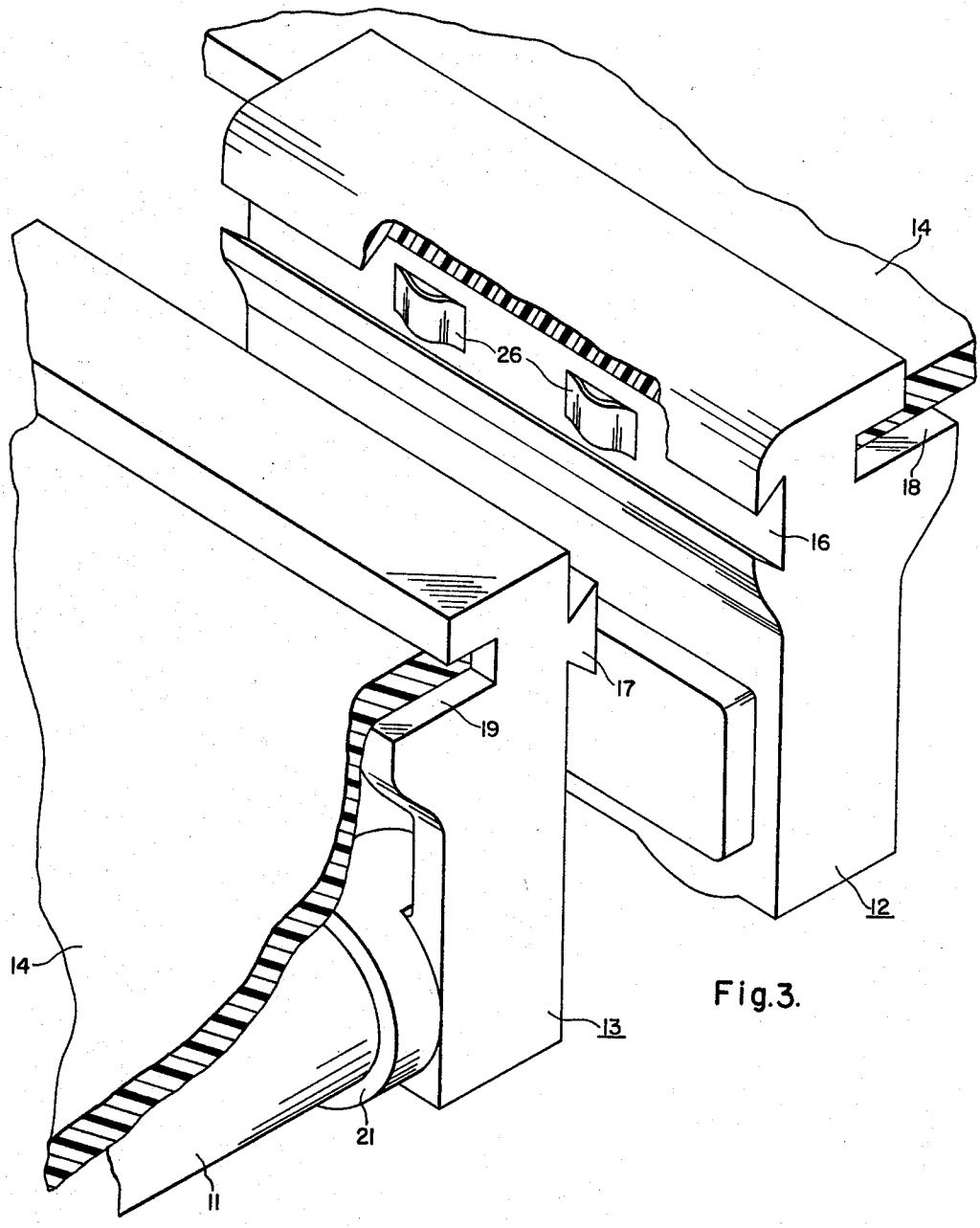


Fig.3.

WITNESSES

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Aug. 9, 1966 J. W. WIGERT 3,265,886

FLUORESCENT LUMINAIRE

Filed Dec. 30, 1963 4 Sheets-Sheet 3

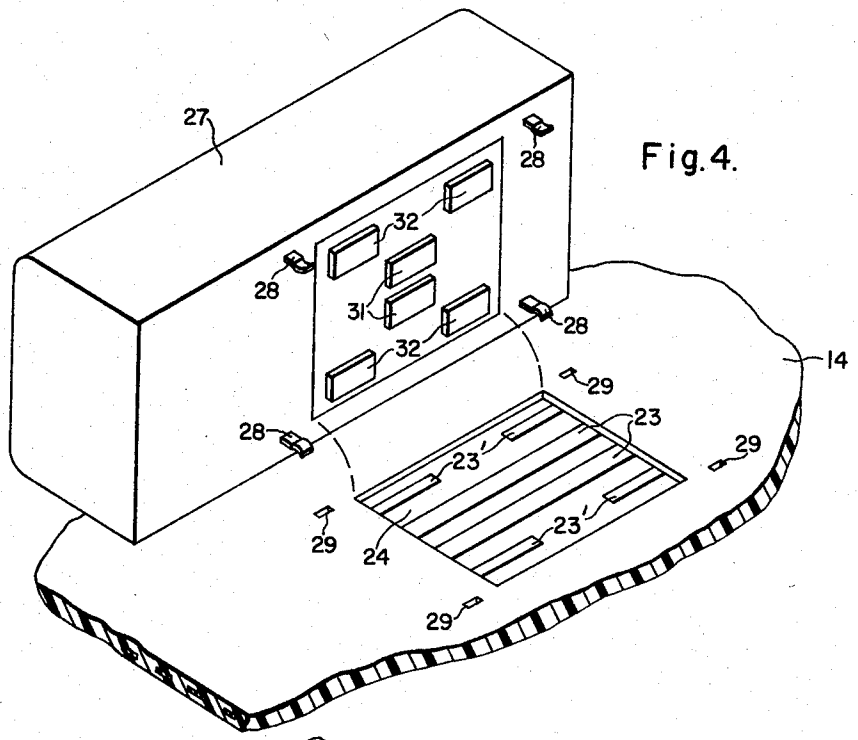


Fig.4.

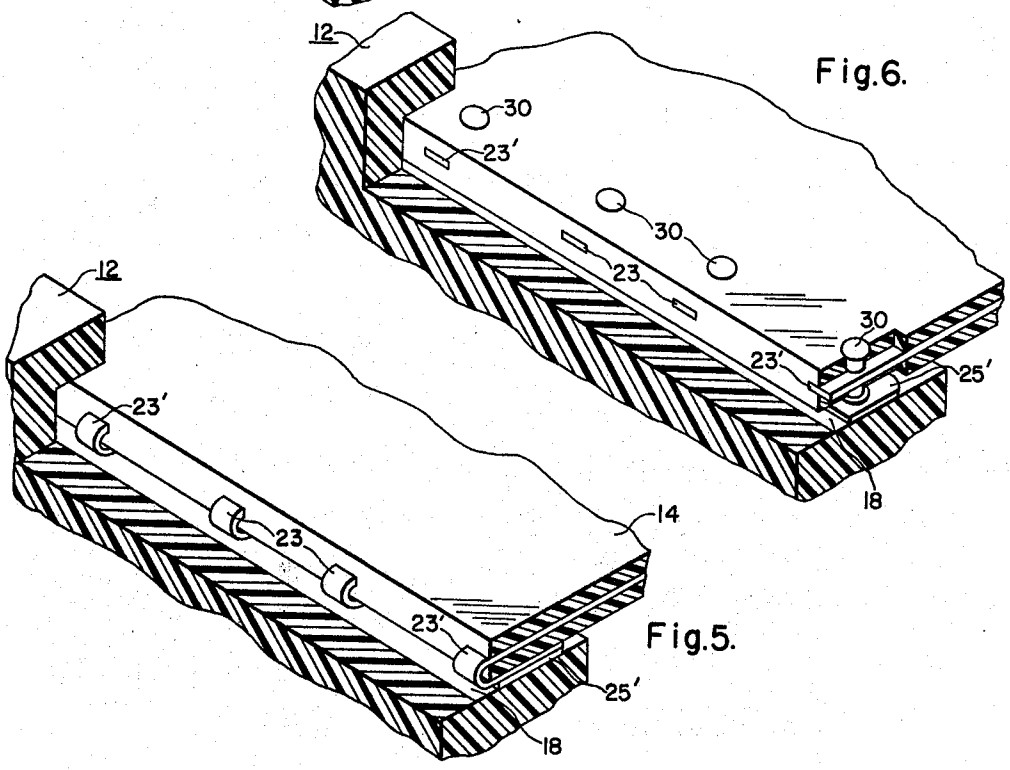


Fig.6.

Fig.5.

Aug. 9, 1966 J. W. WIGERT 3,265,886

FLUORESCENT LUMINAIRE

Filed Dec. 30, 1963 4 Sheets-Sheet 4

Fig.9.

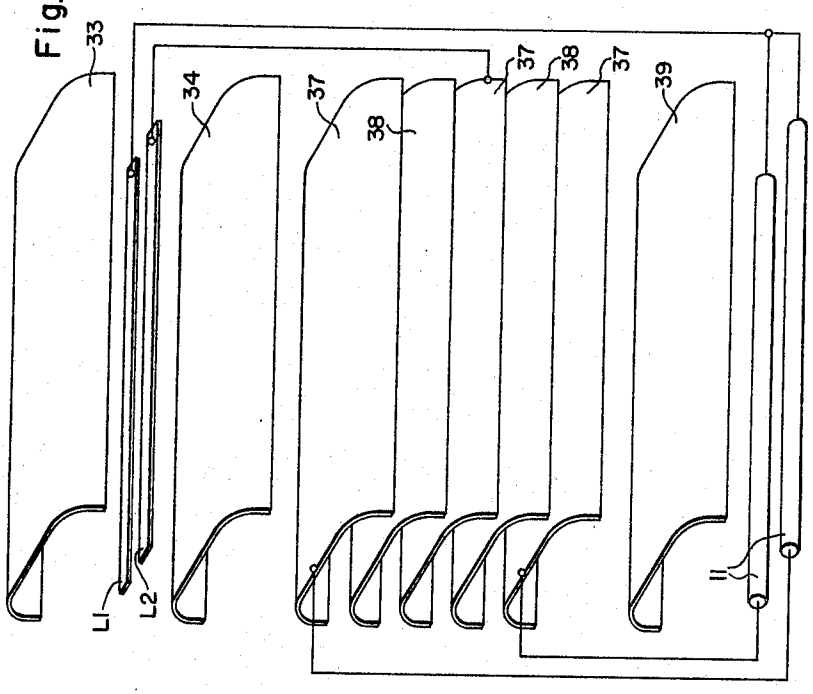
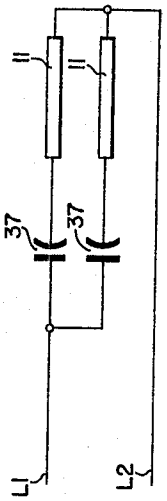


Fig.10.



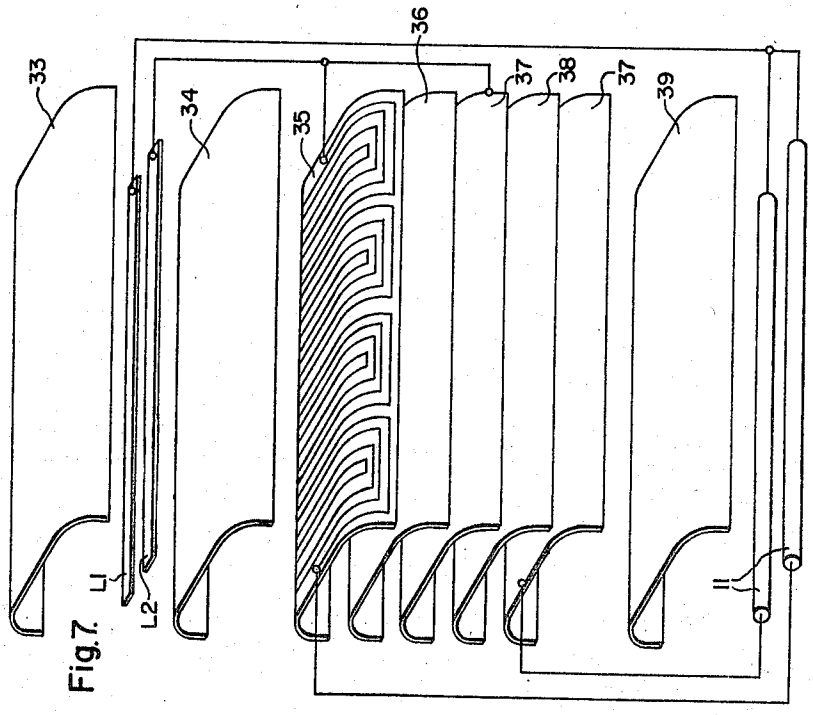


Fig.7.

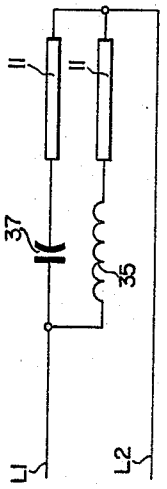


Fig.8.

United States Patent Office 3,265,886 Patented August 9, 1966

3,265,886

FLUORESCENT LUMINAIRE

John W. Wigert, Berea, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Dec. 30, 1963, Ser. No. 334,237
9 Claims. (Cl. 240—51.11)

This invention relates, generally, to luminaires and, more particularly, to luminaires for fluorescent lamps.

Heretofore, fluorescent luminaires have generally been composed of metal which required painting or enamelling on the inside to provide a reflecting surface and on the outside for protection against corrosion. Furthermore, external wiring and hardware or special fittings are required to install and connect the luminaires and lamps.

An object of this invention is to provide a luminaire which is corrosion resistant and which does not require painting.

Another object of the invention is to provide a luminaire which can be assembled with similar luminaires without requiring external wiring and metal hardware or fittings.

A further object of the invention is to provide a luminaire which is substantially moisture proof, acid proof and alkali proof.

Still another object of the invention is to provide a fluorescent luminaire which does not require external ballast equipment.

A still further object of the invention is to provide a luminaire having the foregoing features and which can be manufactured at a cost comparable to the cost of prior luminaires.

Other objects of the invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of the invention, the reflector for a luminaire is molded or formed from a white glass polyester with conductors, either printed circuits or copper foil, embedded in the reflector. The reflector is suspended by glass polyester rods, having the means of attachment molded into the reflector. Interlocking lamp sockets having contact members molded therein are provided at the ends of each reflector for assembling a plurality of reflectors in end-to-end relation. Ballast components may be removably attached to the reflector or molded into the reflector.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is an isometric view of a plurality of assembled luminaires embodying principal features of the invention;

FIG. 2 is an enlarged isometric view of one of the lamp sockets for a luminaire;

FIG. 3 is an exploded view of two interlocking lamp sockets;

FIG. 4 is an exploded view of a portion of a reflector and a detachable ballast unit;

FIG. 5 is an enlarged isometric view of a portion of a reflector showing one method of making contact with conductors embedded in the reflector;

FIG. 6 is a view, similar to FIG. 5, showing another method of making contact with embedded conductors;

FIG. 7 is an exploded view showing inductive and capacitive ballast components embedded in a reflector;

FIG. 8 is a diagram of simplified circuit connections for the lamps and the ballast components of FIG. 7;

FIG. 9 is an exploded view showing capacitive ballast components embedded in a reflector, and

FIG. 10 is a diagram of simplified circuit connections for the lamps and ballast of FIG. 9.

Referring to the drawings, and particularly to FIG. 1, the lighting installation shown therein comprises three luminaires **10** disposed in end-to-end relation. The luminaires are preferably of a type suitable for supporting fluorescent lamps **11** (FIG. 2) in lamp holders **12** and **13** which are removably attached to the ends of a reflector **14** for each luminaire **10**. Each reflector **14** may be suspended from a supporting structure (not shown) by two rods **15**. As shown, each reflector **14** comprises a unitary body member adapted to be supported in a generally horizontal disposition and substantially comprising electrically non-conducting material. Each reflector or body member **14** comprises a top wall **14***a* and depending side walls **14***b* which comprise a troffer for the plurality of elongated fluorescent lamps **11** adapted to be retained therein in spaced and generally parallel relationship. The top member **14***a* and depending side walls **14***b* terminate in troffer end portions **14***c*.

Each reflector **14** is formed or molded from a suitable glass-polyester material which is pigmented to provide a white reflecting surface on the inside of the reflector. The rods **15** are also formed from glass polyester or fiber glass and one end of each rod may be attached to the reflector **14**. The other end may be attached to the supporting structure in any suitable manner. As is evident from FIGS. 1, 2, 3, 7 and 9, the inner reflecting surface of the troffer formed by the reflector or body member **14** is spaced a substantial distance from the plurality of fluorescent lamps **11** adapted to be retained in the luminaire **10**.

The lamp holders **12** and **13** are preferably molded from a glass-polyester material, although other materials are satisfactory. As shown in FIG. 3, the holders **12** and **13** are similar in structure except that the holder **12** has a groove portion **16** and the holder **13** has a projection portion **17** of a dove-tail joint which interlocks the two holders together when the holders **12** and **13** and the reflectors **14** are assembled in the manner shown in FIG. 1. The holders are frictionally retained on each reflector **14** by inserting one end of the reflector in a groove **18** in the holder **12** and the other end of the reflector in a groove **19** in the holder **13**.

As shown most clearly in FIG. 2, each holder is provided with two sockets **21** for receiving the ends of fluorescent lamps **11**. A circular groove **22** may be provided in each socket for receiving an O-ring gasket to exclude moisture from the sockets after the lamps **11** are installed.

In order to simplify the making of electrical connections when the luminaires are installed, electrical conductors **23** (FIGS. 4, 5 and 6) are embedded in each reflector **14**. The conductors **23** may be printed circuits on paper, cloth or glass cloth **24**. The conductors **23** could be solid copper or tinned copper in the form of foil or wire which is molded into the reflector **14**. Also, circuits could be applied to coil stock by roller coating, spraying or silk screening. The coil stock would then be embedded in the reflector during molding of the reflector.

As shown in FIG. 5, ends of the conductors **23** may be exposed by turning them downwardly at the end of the reflector. Thus, the conductors are engaged by contact members **25**, provided in the grooves **18** and **19** in the lamp holders (see FIGS. 2 and 3) when the holders are pressed onto the ends of the reflector. The two intermediate conductors **23** and contact members **25** may be utilized for the line or power conductors. These are carried through from one luminaire to the next by contact members **26** (FIG. 3) provided in the groove **16** of each holder **12** and similar contact members (not shown) provided on the projection **17** of each holder **13**. The

two outer conductors 23' and contact members 25' may be utilized for making ballast connections to the lamps 11. The contact members are connected to the lamp sockets by conductors embedded in the lamp holders. In this manner external wiring and hardware are practically eliminated from the luminaires.

When the conductors 23 are wire or foil the exposed ends of the conductors may be dip soldered instead of being turned underneath the end of the reflector. Thus, they may be engaged by contact members, similar to the members 26, which would be provided in the groove 18 in place of the contact members 25.

In the structure shown in FIG. 6 rivets 30 are inserted through the reflector 14 into the conductors 23 near the end of the reflector. In this case the rivets or screws 30 will engage contact members 25 in the lamp holder 12.

As shown in FIGS. 1 and 4, ballast components may be encased in a plastic container 27 to provide a unit which may be removably attached to the reflector 14 by spring clips 28 inserted into openings 29 in the reflector. Contact members 31 may be provided on the ballast unit to engage exposed portions of the power conductors 23. Likewise, contact members 32 may be provided to engage the ballast conductors 23'. Thus the ballast components may be connected to function in the circuit for the fluorescent lamps in the usual manner.

Instead of mounting the ballast components externally of the reflector they may be embedded in the plastic reflector along with power conductors or lead members L1 and L2 in the manner shown in FIGS. 7 and 9. Thus, the conductors L1 and L2 may be disposed between layers of cloth or paper 33 and 34. A printed inductance 35 may be disposed between the layer 34 and another layer of insulation 36 to provide an inductive ballast component. A capacitive component comprising two layers of foil 37 with a layer of dielectric material 38 between the layers of foil may be disposed between the layer 36 and another layer of insulation 39. The dielectric material may be a plastic film, such as Mylar or cyanoethylcellulose. Thus, the power conductors, the inductive ballast component and the capacitive ballast component may all be embedded in the plastic reflector and connected to the lamps 11 as shown in the simplified circuit in FIG. 8. It will be understood that additional circuitry of the usual type would be required for starters or for filament windings for either preheat or rapid start lamps.

If desired, the reactance for ballasting may be made all capacitive as shown in FIG. 9 in which additional layers of foil 37 and dielectric material 38 are provided in place of the inductive component. Otherwise, the arrangement shown in FIG. 9 is similar to that shown in FIG. 7. Likewise, the circuitry of FIG. 10 is similar to that of FIG. 8.

The arrangements shown in FIGS. 7 and 9 are suitable for operating lamps at a frequency of 10,000 c.p.s., for example. The impedances of the inductance and capacitance can readily be varied to provide proper ballasting for fluorescent lamps desired to be operated at various high frequencies, and the proper values of impedances as required for operating at any predetermined high frequency can readily be calculated, as is known in the art.

From the foregoing description it is apparent that the invention provides a luminaire which is substantially moisture proof, acid proof and alkali proof and which does not require painting or enamelling. Furthermore, practically no wiring and hardware, other than power circuit connections, are required to install a single luminaire or several luminaires. The cost of manufacturing the disclosed luminaire is in line with prior luminaires of the same type.

Since numerous changes may be made in the above described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all the matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. A luminaire adapted to retain in spaced and generally parallel relationship a plurality of elongated fluorescent lamps and to direct and distribute the light generated by such lamps, said luminaire comprising:

a unitary body member adapted to be supported in a generally horizontal disposition and substantially comprising electrically non-conducting material, said body member comprising a top wall and depending side walls which comprise a troffer for the plurality of fluorescent lamps to be retained, said top wall and said depending side walls terminating in troffer end portions, the inner surface of said troffer spaced a substantial distance from the plurality of fluorescent lamps to be retained, and the inner surface of said troffer being light reflecting;

electrically conducting lead members embedded in said body member and extending substantially the length thereof;

electrical contact members positioned on said body member proximate the ends thereof and electrically connecting to said electrically conducting lead members;

a plurality of lampholder members supported on said body member proximate the ends thereof, electrical contact members on each of said lampholder members, said contact members on said lampholder members electrically connected to said contact members positioned on said body member;

ballast means associated with said body member intermediate the ends thereof, said ballast means electrically connecting to said embedded lead conductors to ballast the plurality of lamps to be retained in said luminaire; and

said embedded lead conductors adapted to be connected to an energizing potential source.

2. The luminaire as specified in claim 1, wherein said lead members have exposed portions proximate the top surface of said body member intermediate the ends thereof, and said ballast means is mounted on the top surface of said body member in electrical contacting relationship with said exposed portions of said lead members for ballasting the lamps to be retained by said luminaire.

3. The luminaire as specified in claim 2, wherein said ballast means comprises a case member having ballast components therein, and exposed contact members are mounted on the bottom of said case member and electrically contact the exposed portions of said lead members when said ballast member is mounted on the top surface of said body member.

4. The luminaire as specified in claim 1, wherein the outside surface of said lampholder members are provided with interlocking portions, said lampholder members interlock with corresponding interlocking members disposed on lampholder members of additional luminaires to form a luminaire alignment, and interlocking lampholder members are electrically connected.

5. The luminaire as specified in claim 1, wherein said body member has reactive ballast means embedded therein which is operable to ballast the lamps to be retained in said luminaire.

6. The luminaire as specified in claim 5, wherein said reactive ballast means is capacitive ballast means.

7. The luminaire as specified in claim 5, wherein said reactive ballast means is inductive ballast means.

8. The luminaire as specified in claim 5, wherein a portion of said ballast means is inductive reactance ballast means, and another portion of said ballast means is capacitive reactance ballast means.

9. In a lighting installation, in combination, a plurality of luminaires positioned adjacently in end-to-end relation, each said luminaire comprising:

an electrically non-conductive light-reflective body

member with lampholder means disposed proximate the ends thereof;

interlocking portions formed on the end surfaces of said luminaire for abutting and joining adjacent luminaires;

plug-in ballast means positioned on said luminaire intermediate the ends thereof, the components of said ballast means being enclosed in a case and removably mounted on said luminaire as a unit; and

electrical lead members embedded within said body member and having exposed portions on each end surface of said luminaire which electrically contact corresponding end exposed portions on adjacent luminaires, said lead members having intermediate

exposed portions for electrically contacting said ballast.

References Cited by the Examiner

UNITED STATES PATENTS

2,405,987	8/1946	Arnold.	
2,818,497	12/1957	Alden	240—51.11 X
2,874,270	2/1959	Douglass et al.	240—11.4
3,027,668	4/1962	Hardesty	240—8.16 X
3,040,170	6/1962	Chwan	240—51.11

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