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L. C. DOANE
SHOCK RESISTANT LUMINAIRE FOR USE WITH
FLUORESCENT TUBES

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2 Sheets-Sheet 1

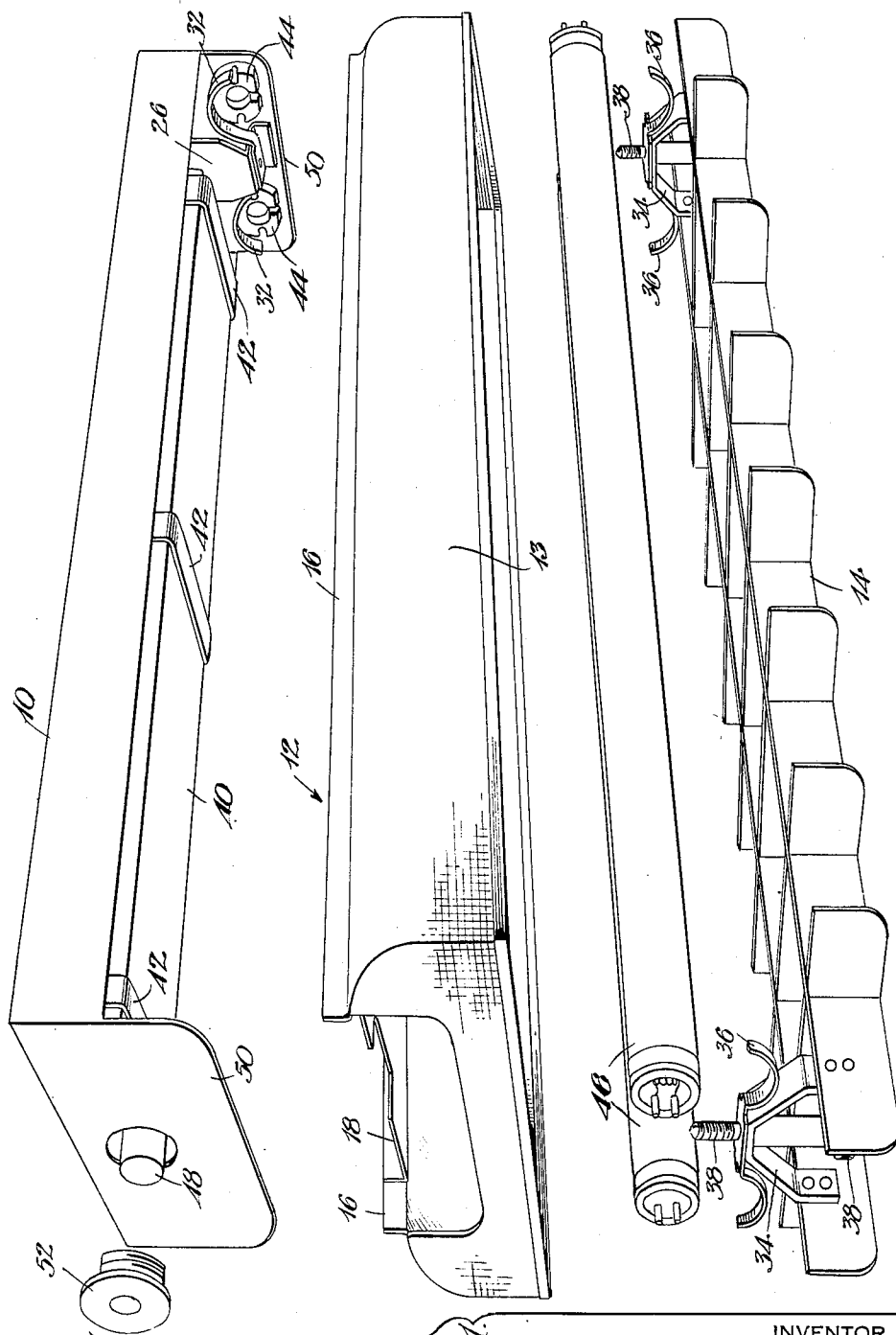


Fig. 1

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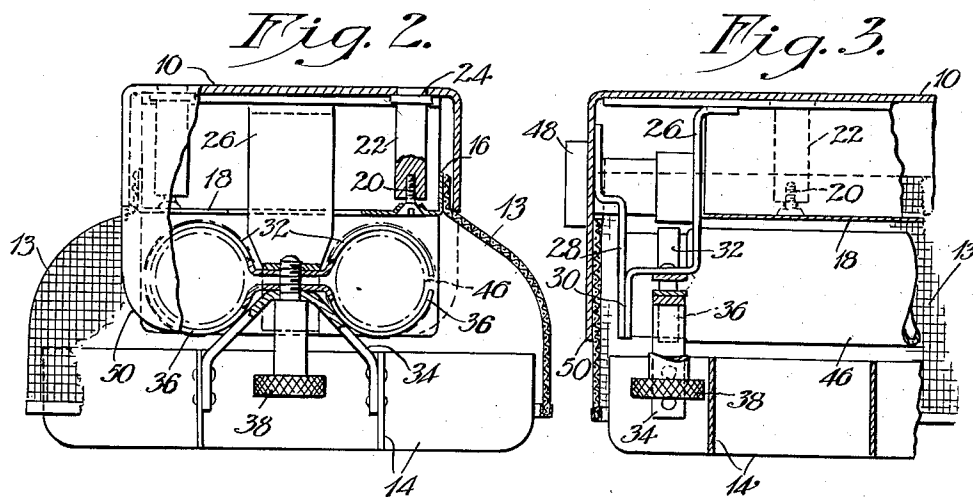
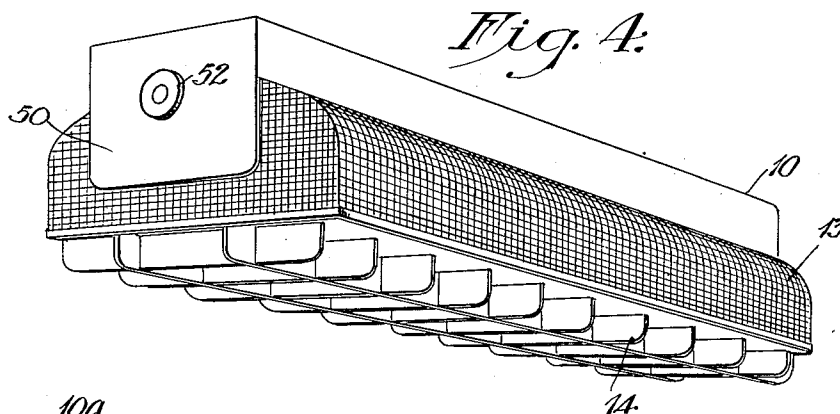
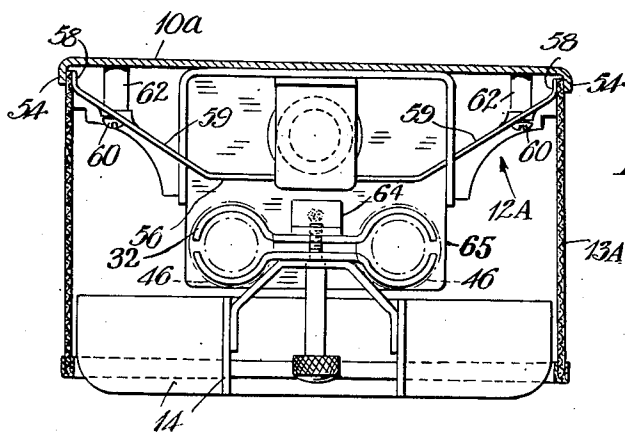
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SHOCK RESISTANT LUMINAIRE FOR USE
WITH FLUORESCENT TUBES

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This invention relates to luminaires and particularly to luminaires designed for use under conditions where the ability to withstand vibration and shock is of importance, such as for use on warships, land and air vehicles, and in structures containing machinery and the like. The luminaire of the present invention is particularly designed for use with one or more fluorescent tubes as the source of light, although any other elongated source of light may be employed.

At the present time fluorescent tubes are usually mounted between terminal sockets which provide mechanical support for the tubes, as well as establishing electrical contact therewith. This method of support is adequate for use in offices, stores and homes, but luminaires so constructed are not able to withstand vibrations and shock under conditions of severe service such as occur for instance during the firing of guns on battleships. Therefore, it is the primary object of this invention to provide a luminaire constructed in such manner as to withstand severe vibration and shock. In accordance with the present invention, the fluorescent tubes are mounted between tube terminals in the usual manner and are also securely anchored by safety clamps which prevent the tubes from shattering or being displaced from their terminals.

It is a further object of this invention to provide a luminaire that may be readily and conveniently dismantled for the purpose of replacing tubes or for cleaning. The present invention provides a luminaire having a reflector unit and louver unit or light-directing shield which may be removed without disturbance of the electrical connections in the base of the luminaire. The tubes can be replaced by merely removing the louver unit from the base without disturbing either the electrical connections or the reflector unit. Preferably the safety clamps comprise separable elements, the upper clamp elements being contained in the base while the lower clamp elements are contained in the louver unit. Thus removal of the louver unit to permit access to the tube also unclamps the tube. Replacement of the louver unit re-establishes the clamping relationship thus rendering it impossible to assemble the luminaire without clamping the tube or tubes in place.

In the accompanying drawings which show certain preferred embodiments of the invention, Fig. 1 is an exploded view in perspective of one form of the luminaire;

Fig. 2 is a transverse sectional view of the luminaire shown in Fig. 1;

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Fig. 3 is a longitudinal central sectional view of one end portion of the luminaire shown in Figs. 1 and 2;

Fig. 4 is a perspective view of the luminaire assembled; and

Fig. 5 is a transverse sectional view of a modified form of the luminaire.

Referring to the drawings in detail:

Fig. 1 shows a luminaire comprising a base 10, a reflector unit 12, and a light-directing grid or louver unit 14. The base 10, which may be attached to the ceiling or in any suitable place, is a completely wired unit containing ballast coils 40 securely held in place by the metal straps 42, terminal sockets 44 and other electrical equipment used in connection with the fluorescent tubes 46 or other elongated source of light. The starter switch 48 housed in one of the flanges 50 which form the ends of base 10 is provided with a starter cap 52 which screws into the flange 50 holding the starter switch 48 firmly in place against vibration and shock, such as occur during the firing of guns on battleships.

The reflector unit 12 and louver unit 14 are attached to the base 10 in such a manner as to be easily removable to permit maintenance and cleaning without disturbance of the electrical connections. For instance, the reflector unit 12 is shown as comprising a wall member 13 having a flange 16 spot welded or otherwise attached to a metal reflector sheet indicated at 18 in Fig. 1, the sheet 18 forming the top of the reflector unit 12 and held securely to the base 10 by means of the screws 20 screwing into the studs 22 suitably secured to the base 10 at 24. The reflector unit may be readily and conveniently removed for the purpose of cleaning by removing the screws 20. The reflector sheet 18 may be painted with flat white paint or be otherwise finished to act as a reflecting agent.

The wall 13 of the reflector unit in this embodiment of the invention has a curved shape but obviously may be formed in any suitable manner and may be made of any suitable material. A preferred material, illustrated, is fine wire mesh, this permitting a lateral diffusion of light as well as providing protection to the source of light. The mesh may be painted or otherwise treated on its inner surface so as to reflect the light downwardly.

The use of wire mesh provides for ventilation and escape of heat from the luminaire. The size of the wire mesh used is optional. However, it has been found that a mesh made of wire of approximately $\frac{1}{8}$ inch diameter with spaces of

approximately $\frac{1}{2}$ inch between the wires is very satisfactory.

The fluorescent tubes 46 are mounted between tube terminals 44 on the end walls of base 10. To enable the tubes to stand shock, safety clamps are provided. In the construction shown, bracket members 26 depend from the top of the base 10 and are bent in such a manner as to be joined at 30 to the bracket members 28 secured to the flanges 50 as shown in Fig. 3. Secured to the brackets 26, by spot welding or otherwise, are the upper elements 32 of the safety clamps, the lower elements 36 of the clamps being mounted in the louver unit 14. By forming the tube clamps as a part of the louver unit, the luminaire cannot be assembled without clamping the tubes in place.

The louver unit 14 may be of any suitable form, being shown as including crossed vertical plates of metal or other suitable material having bracket members 34 attached thereto as shown in Fig. 1. The brackets 34 have clamps 36 secured thereto by spot welding or in any other suitable manner, said clamps being the lower elements of the safety clamps for the tubes. The louver unit 14 with the clamps 36 attached is held in place by the knurled screws 38 which may be readily removed to allow tube replacement and cleaning.

Because of the pressure applied to the safety clamps 32 and 36 by the knurled screws 38 in securing the louver 14 to the bracket members 26, the safety clamps assure absolute protection to the tubes 46 against displacement due to vibration and shock.

Fig. 5 is a transverse sectional view of a modified form of the luminaire comprising a base 10A, a reflector unit 12A, and a louver or grid unit 14. The base 10A is a completely wired unit containing ballast coils, terminal sockets and other equipment used in connection with fluorescent tubes or other elongated sources of light. The sidewall 13A of wire mesh or the like is attached to the metal reflector sheet 56 at its margin as indicated at 58. This reflector sheet is secured to the base 10A by means of screws 60 screwing into the studs 62 which are anchored to the base 10A in any suitable manner.

The sheet 56 forming the top of the reflector unit 12A is shown as having its side portions bent or formed at an angle to act as a reflecting agent. For instance, the central part of sheet 56 is horizontal above the fluorescent tubes 46 and its side portions 59 slope upwardly to the base flanges 54 and are attached to the wire mesh at 58. These portions 59 tend to diffuse the light rays outwardly, thus producing a lateral distribution of illumination immediately under the ceiling. The construction shown in this figure is provided with safety clamps similar to those shown in Figs. 1, 2, and 3. The upper safety clamps 32 are attached to brackets 64 on end plates 65.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not, therefore, desire to limit myself to the specific construction illustrated, but intend to cover my invention broadly in whatever form its principles may be utilized.

Having described my invention, what I claim is:

1. In a luminaire for mounting fluorescent tubes in locations subject to vibration, a base, terminals thereon for engagement with the ends of the tube, a light-directing member removably

mounted on the base below the fluorescent tube, detachable means for connecting said light directing member to said base and safety clamps, each comprising a plurality of parts which when brought together coact to clamp the tube, one part of each safety clamp being mounted on the base and the complementary safety clamp part being mounted on the removable light-directing member.

2. In a luminaire for mounting fluorescent tubes in locations subject to vibration, a base, terminals thereon for engagement with the ends of the tube, all of the electrical connections for operating said fluorescent tube being mounted on said base, a reflector housing mounted on said base, a light-directing member removably mounted below said reflector housing, detachable means for connecting said light directing member to said base and safety clamps each comprising a downwardly facing half clamp part on the base and an upwardly facing half clamp part on the light directing member which cooperate to engage and clamp the tube between them when the light directing member is attached to the base.

3. A luminaire for use with fluorescent tubes comprising a base for mounting under a ceiling carrying terminals for a fluorescent tube and all the electrical connections necessary for operating said tube, a reflector housing removably attached to the base and comprising a reflector plate and sidewalls, a light-directing louver member mounted at the lower end of said reflector housing beneath a fluorescent tube mounted therein, means for removably securing said louver member to said base, and safety clamps for engaging the fluorescent tube, said clamps comprising downwardly facing half clamp parts on the base and upwardly facing half clamp parts on the louver member.

4. A luminaire for use with fluorescent tubes comprising a base having end flanges, tube-engaging terminals carried by said end flanges, brackets adjacent to said end flanges, half clamp members carried by said brackets and adapted to engage a fluorescent tube carried by said terminals, a reflector housing member removably mounted on said base and a light-directing louver member removably mounted on said base below a fluorescent tube carried thereby, said louver member carrying half clamp members adapted to cooperate with the half clamp members carried by said base brackets to clamp a fluorescent tube between said half clamp members.

5. A luminaire for use with fluorescent tubes comprising a base for mounting under a ceiling carrying terminals for a fluorescent tube, a reflector housing removably attached to the base and comprising a reflector plate mounted over a fluorescent tube carried by the terminals on the base, said reflector plate having upwardly-inclined reflector portions parallel to the axis of the tube, and wire mesh sidewalls connected to the margins of said reflector plate.

6. A luminaire for use with fluorescent tubes comprising a base carrying terminals for a fluorescent tube and the electrical connections necessary for operating said tube, a reflector housing removably attached to the base and comprising a reflector plate located above a fluorescent tube carried by said tube terminals, and wire mesh sidewalls attached to said reflector plate and depending downwardly therefrom, and a light-directing louver member removably mounted adjacent to the lower edges of said

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sidewalls, said louver member comprising crossed light-deflecting plates extending under the fluorescent tube.

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