Feb. 18, 1969 HY HILZEN 3,428,798

ELECTRICAL LIGHTING FIXTURES WITH HEAT-COLLECTING AND HEAT-DISSIPATING MEANS

Filed March 13, 1967

FIG.2

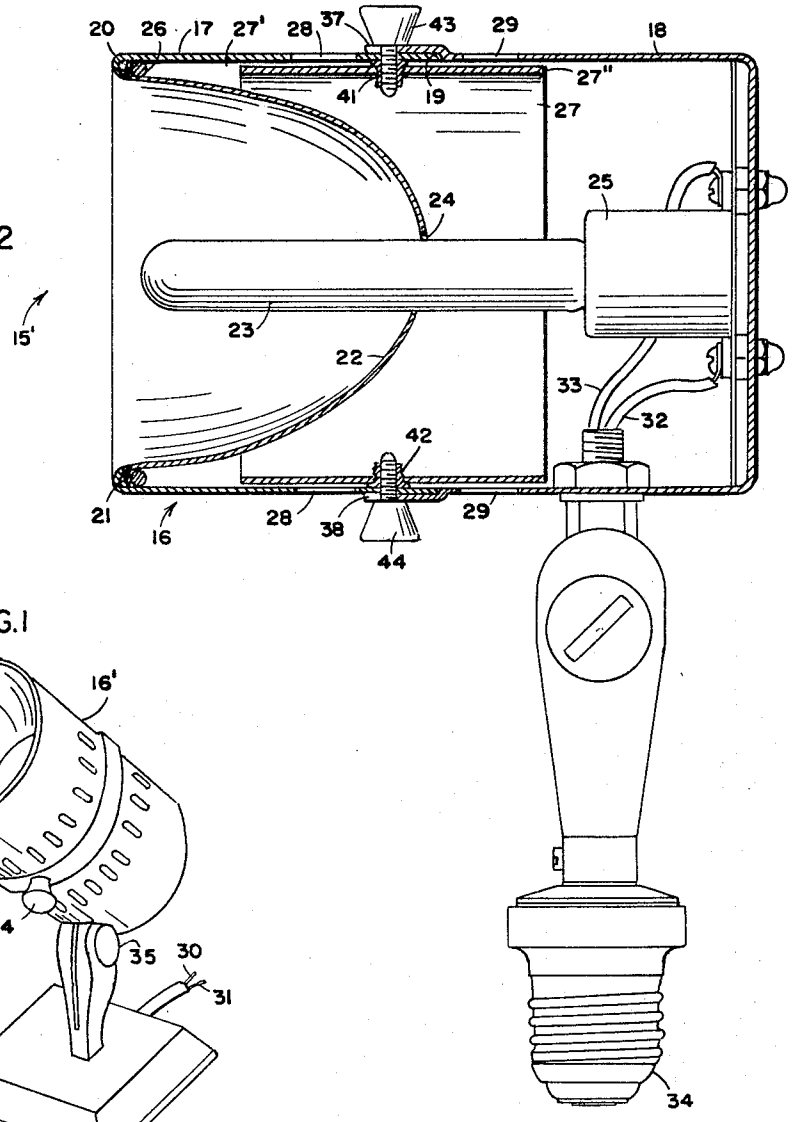

FIG.1

FIG.6

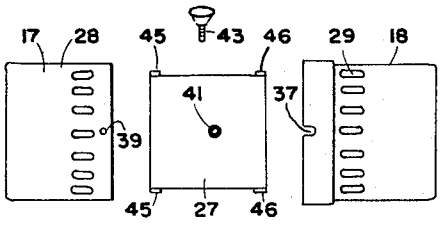

FIG.3 FIG.4 FIG.5

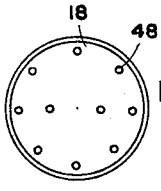

FIG.7

INVENTOR,
Hy Hilzen,

BY

ATTORNEY.

United States Patent Office 3,428,798
Patented Feb. 18, 1969

3,428,798

ELECTRICAL LIGHTING FIXTURES WITH HEAT-COLLECTING AND HEAT-DISSIPATING MEANS

Hy Hilzen, 40 Gateway Road, Yonkers, N.Y. 10703

Filed Mar. 13, 1967, Ser. No. 622,619
U.S. Cl. 240—3 8 Claims
Int. Cl. F21p 5/00

ABSTRACT OF THE DISCLOSURE

A supporting casing has a dished reflector closing its front end. From near its rear wall, the casing has mounting means therein from which a lamp extends forwardly through a suitable opening in the reflector. A tubular member is positioned concentrically within the casing, slightly spaced therefrom so it is enveloped by a very thin annular layer of air. The rim ends in this inner tubular member are free in space within the casing. The inner member surrounds most of the reflector. The casing has a plurality of openings intermediate the ends of the inner tubular member. The casing is preferably made of a front tube and a rear shell in telescopic relation. A headed screw fitted in a notch and hole in the respective casing parts, is threadedly engaged in a nut secured on the inner tubular member, to maintain the assembly; the nut also serving as the spacer for the inner tubular member. Contact of the spaced members is away from the end regions of the tubular member, and preferably at about mid region of the tubular member.

The present invention relates to electrical lighting apparatus employing incandescent halogen quartz lamps and more particularly to flood lamp and spotlight constructions for use in public buildings, auditoriums, display areas, show windows, lawns, arenas, show rooms, expositions, lobbies, photography and television studios, art galleries and the like.

An object of this invention is to provide a novel and improved eletcrical lighting fixture made of simple parts which are easily assembled and disassembled, and in particular to structure specially designed to dissipate heat in this type of apparatus using a quartz lamp.

A further object thereof is to provide novel and improved illuminating apparatus of the character described, which is reasonable in cost to manufacture and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

A detailed description of the construction and new mode of operation of a lighting fixture embodying this invention will now be set forth, for which I shall refer to the accompanying drawing forming part of this specification, in which drawing, similar characters of reference indicate corresponding parts in all the views.

FIG. 1 is a perspective view of a lighting fixture embodying the teachings of this invention. Here, the fixture is shown mounted on a base.

FIG. 2 is an enlarged central longitudinal section of FIG. 1, of a slightly modified construction, in that the fixture is provided with a screw shell terminal for mounting into a socket.

FIG. 3 is an elevation of the front part of the outer casing which holds the reflector.

FIG. 4 is an elevation of an inner tubular member which serves as a heat gatherer and dissipator, which keeps the outer casing comparatively cool.

FIG. 5 is an elevation of the other part of the outer casing, which mounts the socket for the quartz lamp.

FIG. 6 is a perspective view of one of the knobbed screws, two of which are used in this specific embodiment to maintain the assembly.

FIG. 7 is an end view of FIG. 5.

In the drawing showing a preferred form of this invention, the lighting fixture designated generally by the numeral **15**, and its modification denoted generally as **15'**, each include an outer casing generally indicated as **16**, and **16'** which is composed of a front tubular member **17** and a rear shell **18** which are telescopically associated by having the mouth of the shell slightly enlarged a short distance along the shell, to offer an inner annular shoulder **19** which serves as a stop to limit the entrance of the rear portion of the front tubular member **17**. The front rim of said tubular member is turned inwardly to form the annular flange **20**, to receive the outward front flange **21** of the parabolic shell **22** which is the reflector for the halogen quartz lamp **23** positioned through the central opening **24** of said reflector, and mounted in the socket **25** which is fixed on the floor wall of the shell member **18** inside the casing. The reflector **22** is held in place by the split springy retainer ring **26** which bears against the back surface of the rim flange **21** of said reflector. The tubular member **27**, positioned within the casing **16**, is very close to the casing wall, but slightly spaced therefrom, and it is to be noted that the rim edges **27'**, **27''** thereof are free, contact nothing, and said member **27** is spaced from the reflector **22**, encompasses most of it, and extends part way into both components **17** and **18** of the outer casing. Circumferentially around the casing, near the juncture of its parts, each part has a series of openings which are indicated as **28** and **29**, opposite the inner tubular member **27**, whose rims **27'**, **27''** are beyond such openings, one purpose of which is to confine stray light rays within the casing **16**. Conductors **30**, **31**, connect the terminals of the socket of the fixture with a plug not shown, for connection to an electrical outlet. In the fixture **15'**, conductors **32** and **33** connect the terminals of its socket **25** to the terminals of the screw shell **34**, which is to be screwed into an electrical socket outlet. These fixtures may include a swivel joint **35** which is well known in the art.

The rim of the shell **18** is provided with diametrically opposite notches **37**, **38** which are to be in register respectively with the hole **39** in the member **17**, and with the interiorly and exteriorly threaded bushings or eyelets **41** and **42** held fixed through the wall of said tubular member **27**, and which serve as the nuts for the knobbed or headed screws **43** and **44**, and whose outer flanges serve as spacers to hold the inner tubular member **27** concentric with the outer casing **16**. This concentricity is preferably aided by the pairs of diametrically opposite very small asbestos spacers **45** and **46** cemented near the rims on the outer surface of said inner tubular member **27**. Inclusion of such spacer washers shall not be deemed to destroy the description in the appended claims that the rim edges of the tubular member are free in air.

The air in the casing **16** receives heat from the heat thrown off by the lamp **23** to the reflector **22**, which is radiated into the casing, and by the heat from the lamp **23** reaching the air in the casing directly. In use, the casing is horizontal or somewhat tilted in relation to horizontal. In all instances, the tendency of heated air to rise, will cause it to flow upwardly around both sides of the thin-walled inner tubular member **27**, and out to atmosphere through the upper openings of the series **28**, **29**. This will cause an inrush of outside air through the lower openings of said series, and upwards around both sides of the inner tubular member **27** in the thin annular space thereabout, thereby dissipating the heat of said member and causing it to cool. The thin rim edges **27'**, **27''** of said member **27**, act as the edges of fins to draw heat from the air within the casing **16**. Said member acts to collect and dissipate most of the heat the interior of the casing is subjected to.

The result is, that the casing **16** remains comparatively cool, in comparison to what its temperature would be if the inner tubular member **27** was absent. The transfer of any heat to the casing from the extremely small elements **42**, is negligible.

The back wall of the casing **16** is provided with a series of holes **48**, for further ventilation, to permit the escape of inrushing air which is heated in the casing, but which is outside the confines of the thin annular air layer around the tubular member **27**.

The simplicity of the parts and the simple provision for their proper assembly, affords economical manufacture and proper functioning of the fixture as to heat dissipation, and a substantially total lack of heat conduction from the main heat collector **27**, to the outer casing **16**.

It is to be noted that the efficient functioning of the inner tubular member as a heat collector and dissipator, requires that it shall be closely spaced from the casing **16**, so it is enveloped by a thin annular layer of air. The heat of said tubular member is thus imposed upon a very small quantity of air around it, to which there is a quick heat transfer, akin to the action in a flash boiler where a small quantity of water is imposed on a hot plate and so there is rapid heating of the water mass. This air layer is in circulation due to hot air escape through the casing's openings **28**, **29**, and thickness of such air layer being so small, it does not have space or time to mingle with the large air in the spaces to the side of said tubular member, in the casing. Further the rim ends of said member **27** shall be free in space so they act as heat-collecting fins for said member **27**, so most of the heat generated by the lamp **23**, and that thrown off by the reflector, are collected by said tubular member **27**, for also one of the requirements is that said tubular member shall surround most of the said reflector **22**. Further, the support of said inner tubular member shall be distant from its ends, so the circulating air around said tubular member shall effect the heat passing to said member, before it has a chance to travel from said tubular member to the outer casing.

This invention is capable of numerous forms and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiments shown herein shall be deemed merely illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claims rather than to the specific description and showing herein, to indicate the scope of this invention.

I claim:

1. In an electrical lighting fixture of the character described, a supporting casing having an open front end and a wall at its rear end, a dished reflector within the casing, closing said front end; the inner surface of said reflector being exposed at said front end, a lamp-mounting means fixed in the casing behind the reflector, holding a lamp which extends into the reflector through a suitable opening in said reflector; a thin-walled heat-conductive tubular member within the casing and extending lengthwise therealong, slightly spaced therefrom whereby said inner tubular member is surrounded annular layer of air; said inner

member encompassing most of the reflector and spaced therefrom, and spacer means between said inner tubular member and the casing at the mid region of said tubular member; each rim end of said inner tubular member being free in the space within the casing; said casing having a plurality of openings intermediate the ends of said tubular member.

2. An electrical lighting fixture as defined in claim **1**, wherein the casing comprises a front tubular part and a rear part which is a shell; said casing parts being in telescopic engagement by having the end portion of one part overlapping the end portion of the other part; said inner tubular member extending into both said casing parts; said spacer means being at least one nut positioned intermediate the ends of and secure to said inner tubular member intermediate said overlapping casing portions; the rim edge of the outer overlapping portion of the casing, being provided with a notch; the other casing part having a hole; said notch, hole and nut being in alignment, and a headed screw positioned fitted through said notch and hole and releasably threadedly engaged in said nut; said screw being tightened for its head to press on the casing to maintain the assembly.

3. An electrical lighting fixture as defined in claim **2**, wherein the overlapping portion of the casing is enlarged whereby an annular inner shoulder is formed therein; the end of the overlapped casing portion, bearing against said shoulder.

4. An electrical lighting fixture as defined in claim **2**, wherein the front rim of the casing is bent inwardly and the mouth rim of the reflector is bent outwardly and bearing against said inward bend, and a ring having resilient quality, positioned within the casing and bearing against the outward bend of the reflector to maintain the assembly of the reflector with the casing.

5. An electrical lighting fixture as defined in claim **2**, wherein said plurality of openings is through each casing part.

6. An electrical lighting fixture as defined in claim **1**, wherein at least the end portions of the inner tubular member are comparatively thin-walled.

7. An electrical lighting fixture as defined in claim **1**, wherein the casing and the inner tubular member are of relatively thin sheet metal.

8. An electrical lighting fixture as defined in claim **1** wherein the lamp is of elongated straight form and of the halogen quartz type.

References Cited

UNITED STATES PATENTS

1,963,279	6/1934	Pieper	240—47
2,878,371	3/1959	Hanlin	240—47
3,119,567	1/1964	Schwartz	240—47

NORTON ANSHER, *Primary Examiner.*

D. S. STALLARD, *Assistant Examiner.*

U.S. Cl. X.R.

240—47, 41.55