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3,377,480

LUMINAIRE

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2 Sheets-Sheet 1

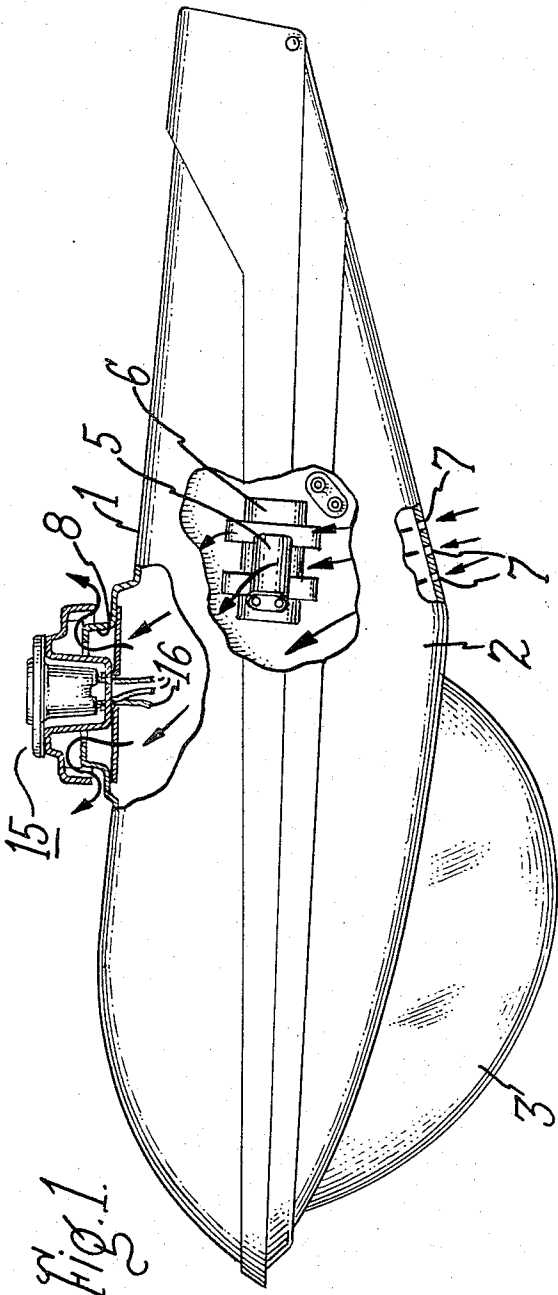


Fig. 1.

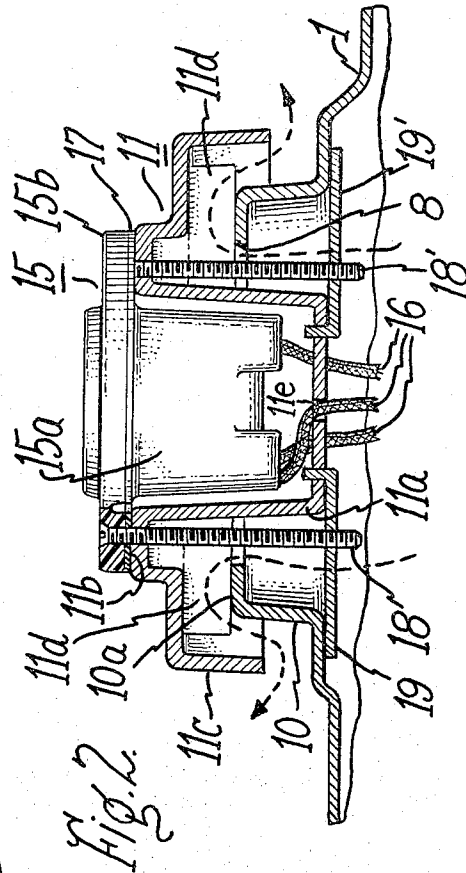


Fig. 2.

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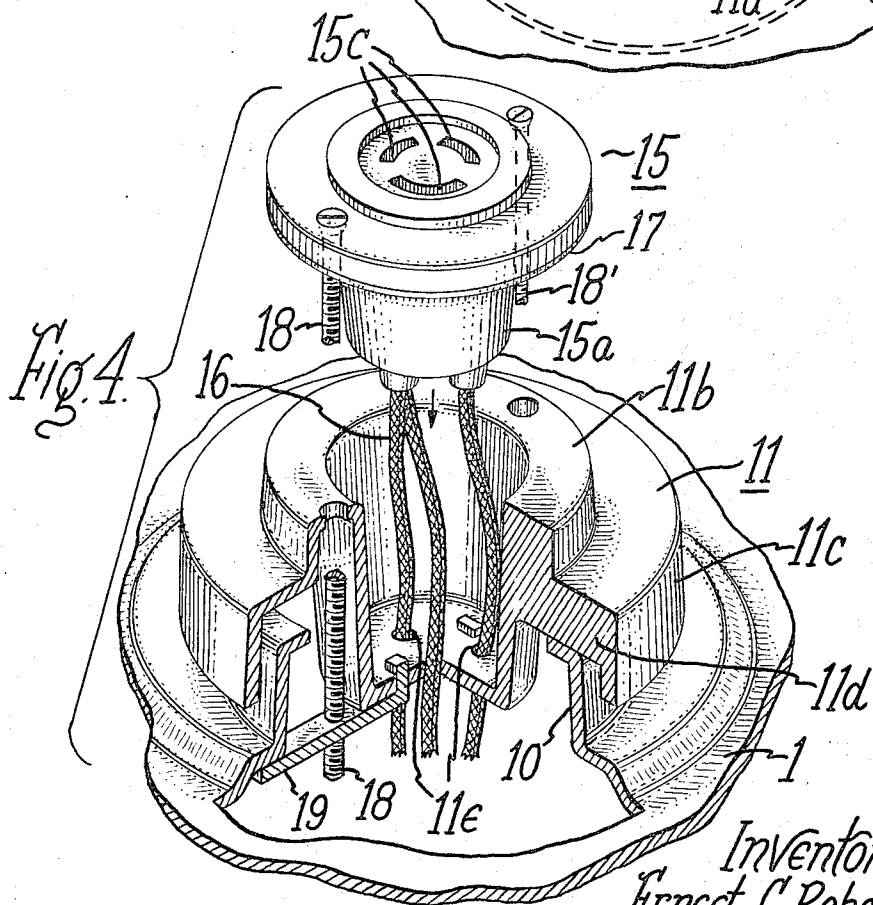
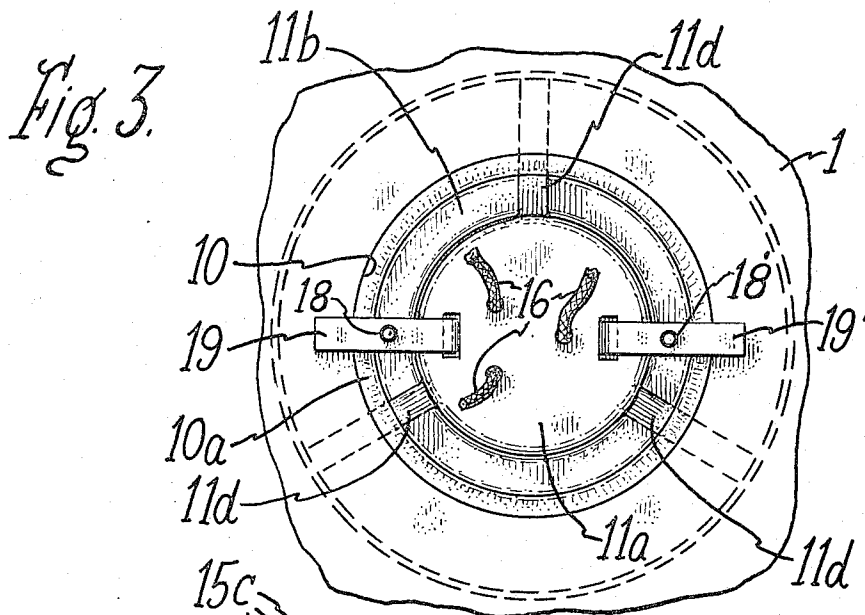
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LUMINAIRE

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### ABSTRACT OF THE DISCLOSURE

Luminaire housing is provided with an adapter cap fitting into a flanged opening in the top of the housing for receiving a photoelectric control unit to provide for mounting the control unit, ventilate the housing and prevent entry of rain.

The present invention relates to luminaires, and more particularly concerns luminaires having an improved ventilating and cooling arrangement, and to a multi-purpose adapted device for providing ventilative, protective, and other functions in luminaires.

In present day luminaires, especially those utilizing gaseous discharge lamps, a substantial amount of heat is generated within the luminaires by the lamps and the ballast components used in conjunction therewith. The excess heat thus produced, especially in luminaires of the higher wattage types, can adversely affect the electrical operating components, particularly capacitors of liquid-filled type, and substantially shorten their useful life. In the past, attempts have been made to avoid this problem by mounting the capacitors, for example, on the outside of the luminaire housing, but this arrangement resulted in undesirable appearance of the luminaire, complex wiring, and other disadvantages.

It is an object of the invention to provide a luminaire having enclosed electrical components and an improved ventilating and cooling arrangement therefor.

It is a particular object of the invention to provide a luminaire of the above type wherein the ventilating and cooling arrangement is combined with the mounting means for a photo-electric control unit.

Another object of the invention is to provide in a luminaire a ventilating and cooling arrangement of the above type which protects the photoelectric control unit from excess heat emanating from the interior of the luminaire.

It is still another object of the invention to provide a ventilating and cooling arrangement of the above type which prevents the entry of rain and other undesired elements into the interior of the luminaire, whether a photoelectric control unit is mounted thereon or not.

Still another object of the invention is to provide an adapter device which may be applied to luminaire housings of known type for providing the ventilating, cooling and other functions mentioned above.

Other objects and advantages will become apparent from the following description and the appended claims.

With the above objects in view, the present invention relates to a luminaire comprising a housing having top and bottom walls and enclosing electrical operating components therein which generate heat during operation, the walls having aperture means therein for passage of air upwardly through the housing and in contact with the electrical operating components for convection cooling of the latter, the aperture means in the top wall comprising

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an opening defined by an annular flange projecting upwardly from the top wall, cover means for protecting the opening from entry of rain while permitting outward flow of air from the housing interior, the cover means having a cup-shaped central portion extending into said opening spaced from the flange and a circumferential skirt portion surrounding the flange in overlapping spaced relation thereto, the cover means having spaced downwardly projecting portions on the underside thereof seated on the upper edge of the flange for spacing the underside of the cover means from the top of the flange, so as to provide a substantially unobstructed passage for air flowing upwardly and outwardly through the opening from the housing interior, receptacle means comprising a lower housing portion received in the cup-shaped portion of the cover means and an upper radially projecting support portion resting on top of the cover means and adapted to operatively mount thereon a photoelectric control unit, and means securing the assembly of the cover means and the receptacle means to the luminaire housing.

The invention will be better understood from the following description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a view in elevation, partly broken away, of a luminaire embodying the ventilating and cooling arrangement of the invention;

FIGURE 2 is an enlarged detail view, partly in section, of the ventilating device of the invention shown in the top wall of the FIGURE 1 luminaire;

FIGURE 3 is a bottom plan view of the FIGURE 2 device; and

FIGURE 4 is a perspective view, partly in section, of the FIGURE 2 assembly shown in exploded form.

Referring now to the drawings, and particularly to FIGURE 1, there is shown a street lighting luminaire in which the invention is embodied, comprising an upper housing 1 closed at its bottom by a closure 2 which is hinged at its rear end to housing 1 and in which is supported a globe or refractor 3 for transmitting outwardly light directed there-through from a lamp and a reflector (not shown) mounted within the housing in accordance with known luminaire arrangements. Secured within the rear portion of housing 1 are electrical operating components including capacitor 5 and transformer 6 constituting a ballasting unit for controlling the operation of the gaseous discharge (e.g., mercury vapor) lamp frequently used in this type of luminaire. In the operation of the luminaire, particularly those using lamps of 700-1000 watts and higher, a considerable amount of heat is developed in the interior of the housing, and unless the excessive heat is removed there is a risk of degradation of the electrical components contained therein, especially the capacitors, leading to unduly shortened life. This problem is overcome by providing apertures 7 in the bottom closure 2, which, in conjunction with the circular opening 8 in the top wall of housing 1 which has heretofore conventionally been provided in known luminaires for mounting a photoelectric control unit, permits a current of cooling air to pass upwardly by convection through the housing interior in contact with capacitor 5, transformer 6 and other ballast components for cooling the same and then flow outwardly through opening 8.

In accordance with the present invention, a cover means is provided for opening 8 which serves a number of functions while permitting the cooling air to pass free-

ly out of the housing. As shown more clearly in FIGURE 2, opening 8 is defined in the top wall of housing 1 by an annular flange 10 projecting upwardly from the top wall and having an inwardly directed annular rim 10a. The cover means provided by the invention comprises a circular adaptor cap 11 formed with a central cup-shaped portion 11a, an upper flat rim portion 11b, and an outer circumferential skirt portion 11c. The underside of cap 11, as seen best in FIGURE 3, is formed with three downwardly projecting spaced ribs 11d. As shown in FIGURE 2, the bottoms of ribs 11d are spaced substantially above the bottom edge of skirt portion 11c. In the assembly, cap 11 is arranged with its cup-shaped portion 11a projecting into opening 8 and spaced inwardly from flange 10 and its rim 10a, and with its spaced ribs 11d resting on the top of rim 10a. The parts of cap 11 are so dimensioned and arranged that in the assembled position shown, skirt portion 11c surrounds flange 10 in overlapping spaced relation and the underside of cap 11 under rim portion 11b is spaced a substantial distance above the top of flange 10. Clearance is thereby provided for free, substantially unobstructed flow of air from the interior of housing 1 upwardly through opening 8 between cup-shaped portion 11a and flange 10, then between the underside of cap 11 and the top of flange 10, and then between skirt portion 11c and the outside of flange 10 to the atmosphere, as indicated by the arrows shown in FIGURE 2. As will be seen, the substantial overhang of skirt portion 11c below the top of flange 10 serves to prevent entry of rain, dust and other foreign matter into the housing interior through the described ventilating air passages.

Seated on the upper side of cap 11 is an electrical connector receptacle base 15 which may be of conventional form comprising a lower housing portion 15a through which electrical conducting leads 16 pass, and an upper radially projecting disc-shaped support portion 15b, the top central portion of which is formed with socket openings 15c (see FIGURE 4) for receiving and operatively mounting a photoelectric control unit (not shown) which may be of standard type. Receptacle base 15 is arranged with its lower portion 15a nested within cup-shaped portion 11a of vent cap 11 and with its upper disc portion 15b resting on the top of flat rim portion 11b, preferably with an interposed annular gasket 17 for sealing the joint. Leads 16 pass through holes 11e in the bottom of cap 11 for connection with the electrical operating circuit in the interior of the housing.

Vent cap 11 and receptacle base 15 are held in assembly with each other and luminaire housing 1 by means of screws 18, 18' which pass through diametrically opposite apertures in the disc portion of receptacle base 15 and the adjacent portions of the upper rim 11b of cap 11. At their bottom ends, screws 18, 18' threadably engage rigid strip-shaped bar members 19, 19' which project radially in opposite directions and bridge the space between the bottom of cup-shaped portion 11a and the horizontal interior surface of the housing wall adjacent flange 10. To retain bars 19, 19' in proper position during turning of screws 18, 18', the bars are formed with an upstanding projection at their inner ends which fit within slots formed in the bottom of cup-shaped portion 11a. As will be seen, with the bars 19, 19' in the positions shown in FIGURE 2, tightening of screws 18, 18' will result in clamping the assembly of receptacle base 15 and vent cap 11 to the top wall of housing 1.

In the described assembly, cap 11 thus serves, in addition to its functions as a vent cap and rain shield, as a mount for the photoelectric control receptacle 15 and as a heat barrier to protect the photoelectric control unit and keep it from exceeding its maximum temperature rating. Such protection is provided by virtue of the cup-shaped portion 11a enclosing the underside of receptacle base 15 and thus isolating it from contact with the upwardly flowing hot air and thereby preventing transfer of heat into the photoelectric control unit mounted thereon.

The relatively few rib projections 11d (three) and clamping bars 18, 18' and the narrow dimensions of these parts in the described structure result in the provision of ventilating passages which offer very little obstruction to the free flow of air out of the luminaire, and which extend practically continuously around the entire periphery of cap 11, so that wind from any direction can assist the outward convection flow of the heated air.

The described arrangement has the further advantage that the photoelectric control unit mounted on the receptacle base 15 may be oriented to any desired rotational position simply by loosening screws 18, 18', rotating the entire assembly relative to the luminaire housing to the desired position, and re-tightening the screws.

While the present invention has been described with reference to particular embodiments thereof, it will be understood that numerous modifications may be made by those skilled in the art without actually departing from the scope of the invention. Therefore, the appended claims are intended to cover all such equivalent variations as come within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A luminaire comprising, in combination, a housing having top and bottom walls and enclosing electrical operating components therein which generate heat during operation, said walls having aperture means therein for passage of air upwardly through said housing and in contact with said electrical operating components for convection cooling of the latter, the aperture means in said top wall comprising an opening defined by an annular flange projecting upwardly from said top wall, cover means for protecting said opening from entry of rain while permitting outward flow of air from the housing interior, said cover means having a cup-shaped central portion extending into said opening spaced from said flange and a circumferential skirt portion surrounding said flange in overlapping spaced relation thereto, said cover means having spaced downwardly projecting portions on the underside thereof seated on the upper edge of said flange for spacing the underside of said cover means between said central and skirt portions thereof from the top of said flange, so as to provide a substantially unobstructed passage for air flowing upwardly and outwardly through said opening from the housing interior, receptacle means comprising a lower housing portion received in said cup-shaped portion of said cover means and an upper radially projecting support portion resting on top of said cover means and adapted to operatively mount thereon a photoelectric control unit, and means securing the assembly of said cover means and said receptacle means to said luminaire housing.

2. A device as defined in claim 1, said downwardly projecting portions comprising radial rib members having bottom surfaces spaced a substantial distance above the bottom edge of said skirt portion.

3. A device as defined in claim 2, said securing means comprising elongated means extending between the bottom of said cup-shaped portion and the underside of the housing top wall, and screw means engaging said elongated means and said receptacle means.

4. A device as defined in claim 3, said elongated means including a pair of spaced rigid bar members arranged in substantial alignment on diametrically opposite sides of said cup-shaped portion, said bar members being formed with flanged ends adjacent said cup-shaped portion, said latter portion being formed with openings for receiving said flanged ends for positioning said bar members.

5. An adaptor device for venting luminaires of the type having an opening in the top housing wall defined by an up-turned flange, said device comprising a unitary member having a central cup-shaped portion having an upper rim and an outer skirt portion depending from said rim and surrounding said central portion, and spaced

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rib members formed on the underside of said rim above the bottom edge of said skirt portion, said unitary member being insertable in the luminaire housing wall opening with the spaced rib members seated on top of the flange, and said central portion and said skirt portion arranged respectively on the inside and outside of the flange and spaced therefrom, an electrical connector receptacle base having a lower housing portion received in said cup-shaped portion and an upper radially projecting support portion resting on said rim, and means releasably securing said unitary member and said electrical connector receptacle base in assembly.

6. A device as defined in claim 5, said securing means including radially projecting elongated clamping means

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adjustably secured to the assembly of said unitary member and said electrical connector receptacle base and adapted to engage the underside of the top housing wall.

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W. A. SIVERTSON, *Assistant Examiner*.