Aug. 20, 1968 R. W. ZERFOSS 3,398,291

LUMINAIRE WITH HEAT SHIELD AND SUPPORT MEANS FOR THE PHOTOELECTRIC CONTROL DEVICE

Filed March 24, 1966 2 Sheets-Sheet 1

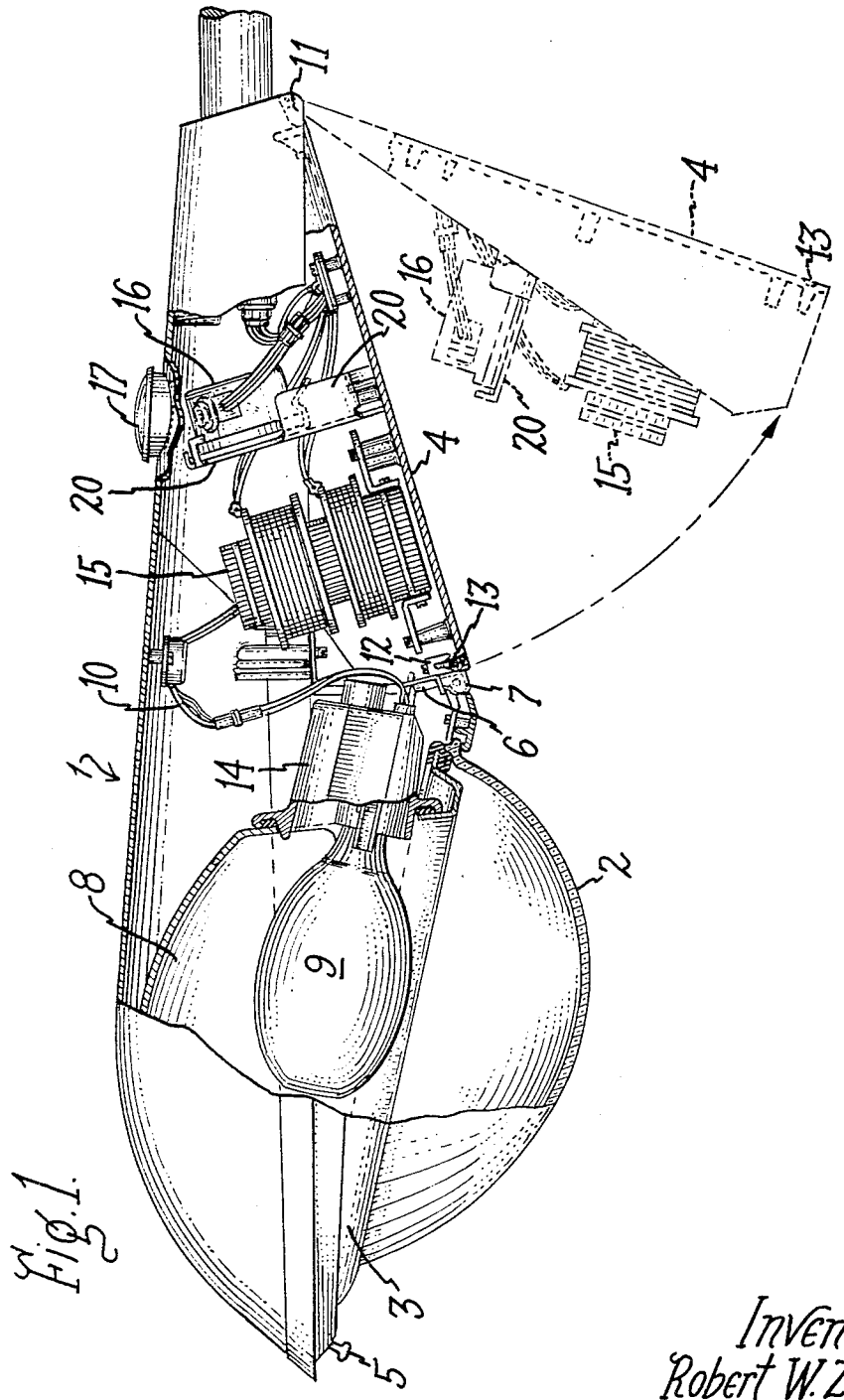


Fig. 1.

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Fig. 2.

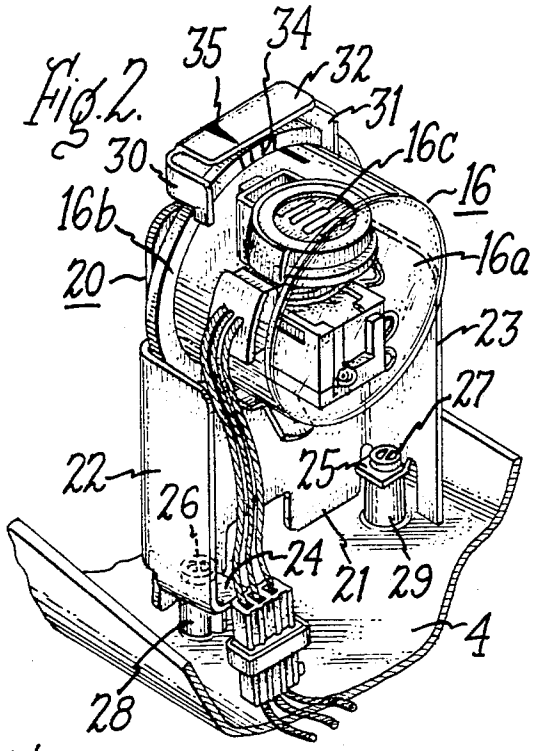


Fig. 3.

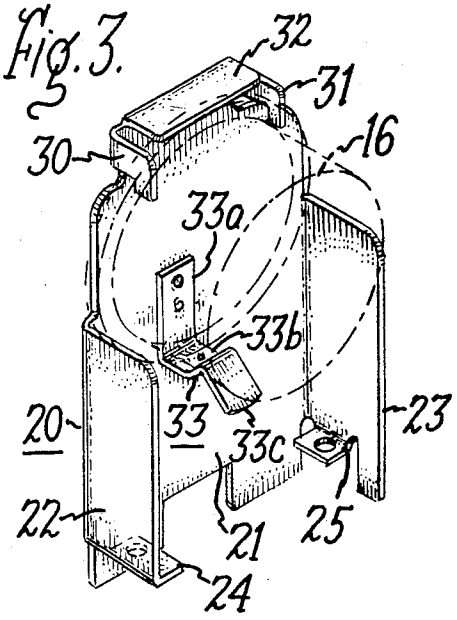


Fig. 5.

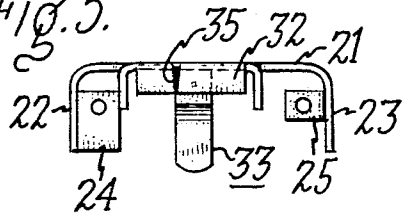


Fig. 6.

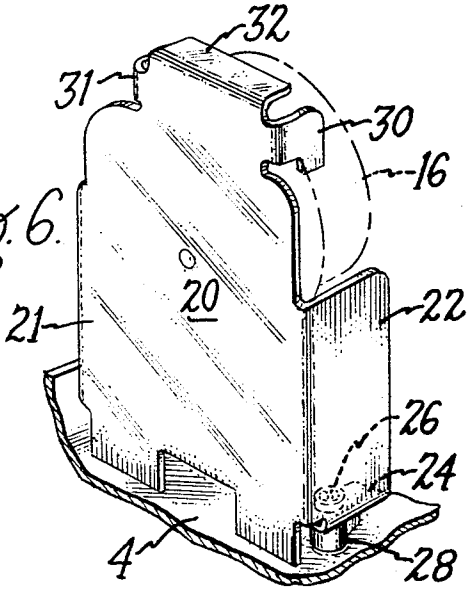
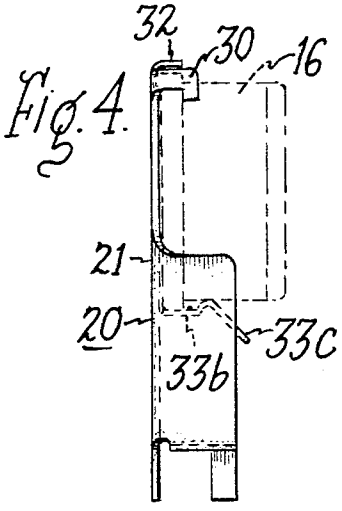


Fig. 4.



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LUMINAIRE WITH HEAT SHIELD AND SUPPORT MEANS FOR THE PHOTOELECTRIC CONTROL DEVICE

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11 Claims. (Cl. 250—239)

The present invention relates to luminaires, and more particularly concerns a support arrangement in a luminaire housing for mounting and protecting a photoelectric control device which controls the operation of the luminaire.

In conventional constructions of street lighting and other outdoor lighting luminaires, photoelectric control devices employed for turning the luminaire on and off in accordance with ambient light conditions have often been mounted on the outside of the luminaire housing, usually on its top surface. Such external mounting arrangements, however, are subject to certain drawbacks. For example, the photocontrol unit is exposed to severe and widely varying weather conditions, a special socket mounting must be provided in the housing wall to receive the photocontrol unit and electrically connect it to the operating circuit, and the streamlined appearance of luminaires in many cases may be impaired by the projecting photocontrol unit. On the other hand, mounting the photocontrol unit inside the luminaire housing presents a number of difficulties, such as lack of adequate space, the adverse effects on the photocontrol unit of elevated temperatures generated within the housing by operation of the luminaire ballast equipment, the difficulty in properly exposing the enclosed photocontrol unit to ambient light, and inconvenient access to an internally mounted component for servicing operations.

It is an object of the invention to provide a luminaire with an internally mounted photocontrol unit which avoids the above mentioned and other disadvantages which characterize prior art arrangements.

It is a particular object of the invention to provide within the housing of a luminaire a photocontrol unit which is protected from the heat generated by adjacent electrical components, which is adjustably mounted within the luminaire and readily installed and removed from the luminaire, which is readily accessible for servicing, and which in operative position within the luminaire is adequately exposed to ambient light.

It is another particular object of the invention to provide an improved mounting device for luminaire photocontrol units which serves both as a thermal barrier and a support means therefor.

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 open at its bottom and having an aperture in the upper portion thereof through which ambient light passes into the housing interior, a door separably connected to the housing closing the bottom opening thereof, operating means in the interior of the housing which generates heat during operation thereof, and a combined heat shield and support means having a photoelectric control device mounted thereon and being interposed between the heat generating operating means and the photoelectric control device for protecting the latter from the elevated temperatures generated by the operating means and for mounting the same in operative position relative to the aperture in the housing.

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

FIGURE 1 is a side view in elevation of a street lighting luminaire embodying the invention;

FIGURE 2 is a fragmentary rear view in perspective of a portion of the FIGURE 1 luminaire showing the assembly of photoelectric control unit and the combined heat shield and support means of the invention;

FIGURE 3 is a perspective view of the combined heat shield and support means with the photoelectric control unit removed;

FIGURE 4 is a side view of the combined heat shield and support means;

FIGURE 5 is a top plan view of the combined heat shield and support means; and

FIGURE 6 is a perspective view of the front side of the combined heat shield and support means.

Referring now to the drawings, and particularly to FIGURE 1, there is shown a street lighting luminaire in which the invention may be embodied comprising an upper elongated housing **1** closed at its bottom in the front portion by a transparent globe or refractor **2** held by a frame **3**, and in the rear portion by a door **4**. Frame **3** is releasably attached at its front end to housing **1** by latch **5** and is swingably connected at its rear end to housing **1** by hinge means **7** connected to internal support member **6** which is fixed to housing **1**. Mounted within the enclosed front portion of housing **1** is reflector **8** secured at its front end to housing **1** and supported at its rear end by internal support member **6**. Lamp **9** is arranged within reflector **8** and is electrically connected by conductors **10** to electrical components in the rear portion of housing **1**, which are more fully disclosed below.

Rear door **4** is hingedly connected at its rear end to housing **1** by hinge means **11** and when in closed position is releasably secured at its front end to housing **1** by means of captive screw **13** threadably received in a threaded aperture in latch plate **12**. Details of these and other components of the luminaire, which do not form a part of the present invention, are disclosed more fully in co-pending application of Franklin et al. Ser. No. 533,054, filed Mar. 9, 1966 and which is now U.S. Patent No. 3,353,015, issued Nov. 14, 1967, and assigned to the same assignee as the present invention. Mounted on the interior surface of rear door **4** adjacent the rear of lampholder housing **14** is ballast transformer **15** and, to the rear of the latter photoelectric control unit **16**, these components being connected in electrical circuit with lamp **9** for controlling the operation of the lamp, is well understood by those versed in the luminaire art.

The upper portion of housing **1** above photoelectric control unit **16** is formed with an opening covered by a transparent closure or window **17**, through which external (ambient) light may enter and strike the light sensitive element **16***c* (see FIGURE 2) for actuating the latter in accordance with the light level.

In accordance with the present invention, an elongated support member **20** is provided on which photoelectric control unit **16** is mounted, and which serves to protect the latter unit from elevated temperatures generated by lamp **9** and ballast transformer **15** and to adjustably mount the photoelectric control unit **16** in operative position adjacent window **17**. As seen in FIGURE 1, these components (and others not shown) mounted on the inner side of rear door **4** become readily accessible for servicing operations by swinging rear door **4** downwardly to the open position shown in interrupted lines.

As shown in FIGURES 2 and 3, support **20** comprises an upright member formed preferably of sheet metal such as aluminum and having a main panel **21** having rearwardly directed lateral flanges **22**, **23** from which tabs **24**, **25** are struck out horizontally. Tabs **24**, **25** are formed with apertures through which screws **26**, **27** pass for threaded engagement in bosses **28**, **29** on door **4** whereby

support **20** is fixed in upright position with its bottom edges resting on the surface of door **4**. The width of panel **21** approximates the diameter of photoelectric control unit **16** which is mounted on the rear surface of that panel at the top end thereof. In the embodiment shown, photoelectric control unit **16** typically comprises a transparent housing or casing **16***a*, such as a clear plastic, having a radially projecting annular rim **16***b* at its base and enclosing light sensitive element **16***c* and other operating components, in accordance with known constructions. The mounting means on support **20** for releasably and adjustably securing photoelectric control unit **16** thereon comprises spaced retaining hook portions **30, 31** struck out from panel **21** and engaging annular rim **16***b* of photoelectric control unit **16**, a bent-over horizontal top portion **32** against which the upper side of rim **16***b* abuts, and a spring clip **33** secured to panel **21** adjacent the lower side of photoelectric control unit **16**. Spring clip **33** has an upright portion **33***a* secured by rivets or other suitable means to the rear face of panel **21**, an intermediate horizontal supporting portion **33***b* in which rim **16***b* of photoelectric control unit **16** seats for supporting the control unit, and a finger tab **33***c* by means of which clip **33** may be manually operated to release control unit **16**. The arrangement is such that spring clip **33** resiliently urges control unit **16** upwardly into engagement with hook portions **30, 31** and top portion **32** for firmly holding control unit **16** in operative position on support **20**. Control unit **16** is mounted so that its light sensitive element **16***c* faces upwardly toward window **17** in housing **1** so as to receive ambient light entering through the window. By pressing downwardly on finger tab **33***c*, photoelectric control unit **16** may be sufficiently released to enable it to be rotated about its horizontal axis and thereby position light sensitive element **16B** at different angles relative to the axis of window **17**. In this way, the response of photoelectric control unit **16** to any particular ambient light level may be varied as desired, as more fully disclosed in co-pending application Ser. No. 316,579, W. D. Bacon, filed Oct. 16, 1963 and which is now U.S. Patent No. 3,264,466, issued Aug. 2, 1966, and assigned to the same assignee as the present application. To facilitate calibration of the unit for such purpose, rim **16***b* is preferably provided with spaced index markings **34** representing different footcandle levels, and top flange **32** is provided with an indicator marking **35** to indicate the particular footcandle level to which the photoelectric control unit **16** is made responsive by virtue of its rotational position relative to window **17**.

Complete removal of photoelectric control unit **16** from its mounting may be effected by depressing finger tab **33***c* sufficiently to permit control unit **16** to drop out of engagement with hook portions **30, 31**. Installation of the control unit may be made by similarly depressing spring clip **33**, inserting the control unit with its rim **16***b* in engagement with hook portions **30, 31** while properly orienting its light sensitive element **16***c* relative to window **17**, and allowing spring clip **16** to resiliently engage the lower portion of the control unit. As seen in the side view of FIGURE 4 showing the assembly, the ridge portion of spring clip **33** formed between portions **33***b* and **33***c* extends upwardly beyond the lowermost portion of rim **16***b* and thereby prevents the control unit from accidentally slipping off spring clip **33**, due to vibration or other causes.

In addition to its function as a supporting means for photoelectric control unit **16**, support member **20** also serves as a thermal barrier or heat baffle protecting the control unit from elevated tempertures generated within the luminaire by lamp **9** and ballast transformer **15**. As seen in the luminaire assembly of FIGURE 1, support member **20** intervenes between the heat-producing components **9** and **15** and photoelectric control unit **16**. By virtue of the substantially specular reflecting surface constituted by the smooth front side of the sheet metal support member **20** (see FIGURE 6), the heat radiated rearwardly from lamp **9** and ballast transformer **15** is reflected by the front surface of member **20** forwardly away from photoelectric control unit **16**, and the temperature of the latter is accordingly maintained at a substantially lower level than would otherwise prevail. Excessively high temperatures tend to adversely affect the characteristics of the light sensitive material and other components of photoelectric control units, and the response or sensitivity of the latter to changes in light level is accordingly made unreliable or is otherwise unfavorable due to elevated temperatures.

There is thus provided in accordance with the invention a multi-purpose combined heat baffle and support device which serves to support the photoelectric control unit in proper position relative to the housing window, to permit ready installation and removal of the control unit, to provide for adjustment of the sensitivity of the control unit relative to particular ambient light levels, and to shield the control unit from the high operating temperatures of other components in the luminaire.

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. In a luminaire, housing means having a wall portion formed with a window opening, operating means within said housing means which generate elevated temperatures during operation, a photoelectric control device in said housing means for controlling the operation of the luminaire in accordance with light received through said window opening and being subject to adverse effects from elevated temperatures, and combined heat shield and support means interposed between said heat generating operating means and said photoelectric control device for protecting the latter from the elevated temperatures generated by said operating means and for mounting the same in operative position relative to said window opening.

2. A device as defined in claim **1**, said housing means having an upper wall portion in which said window opening is formed and having a bottom wall portion below said window opening, said combined heat shield and support means being mounted on said bottom wall portion and extending toward said window opening.

3. A device as defined in claim **2**, said combined heat shield and support means comprising a sheet member having upper and lower portions and opposite sides respectively facing toward and away from said operating means, said sheet member having securing means at its lower portion for securing said sheet member to said bottom housing wall portion and having mounting means at its upper portion for releasably mounting said photoelectric control device on the side thereof facing away from said operating means and adjacent said window opening, the opposite side of said sheet member reflecting the heat from said operating means away from said photoelectric control device.

4. A device as defined in claim **3**, said photoelectric control device having projecting support means, said mounting means of said sheet member having fixed retaining means for engaging said projecting support means at one side of said photoelectric control device and having resilient support means at the opposite side of said photoelectric control device yieldably holding the latter in engagement with said fixed retaining means.

5. A device as defined in claim **4**, said photoelectric control device having a light sensitive element arranged adjacent said housing window opening, said photoelectric control device upon release from said resilient support means being turnable relative to said window opening for

arranging said light sensitive element thereof at different angles to the axis of said window opening to vary the sensitivity of the light sensitive element to light entering the interior of said housing means through said window opening.

6. A device as defined in claim 5, said photoelectric control device having a casing which is transparent at least in a portion adjacent said light sensitive element, said projecting support means comprising an annular rim on said casing, said photoelectric control device being arranged on said sheet member with said annular rim adjacent the surface of said sheet member, said fixed retaining means comprising hook means engaging said annular rim at its upper side, and said resilient supporting means comprising spring clip means engaging said annular rim at its lower side.

7. A device as defined in claim 6, said spring clip means having a manually operable portion for readily releasing the same from engagement with said photoelectric control device.

8. A device as defined in claim 1, said housing means having a longitudinal axis, said operating means and said combined heat shield and support means being spaced along said longitudinal axis, said combined heat shield and support means comprising an elongated heat reflecting sheet metal member having a mounting panel arranged in a plane transverse said longitudinal axis, said panel having a front heat reflecting side facing said operating means and having a rear mounting side on which said photoelectric control device is mounted.

9. A device as defined in claim 5, said photoelectric control device being rotatable about an axis transverse said axis of said window opening, and indicating means on said photoelectric control device and said sheet member for indicating the position of said photoelectric control device relative to said sheet member, whereby the sensitivity of said light sensitive element to the entering light may be calibrated.

10. A device as defined in claim 2, said bottom wall portion being hingedly secured to said housing upper wall portion for opening the same and providing ready access to said combined heat shield and support means and said photoelectric control device mounted thereon.

11. A device as defined in claim 10, said operating means including ballast means mounted on the inner side of said bottom wall portion at the front portion thereof, said combined heat shield and support means with said photoelectric control device mounted thereon being arranged on said bottom wall portion rearwardly adjacent said ballast means, said hinged bottom wall portion being swingable on said housing upper wall portion between an open position wherein said ballast means, said combined heat shield and support means, and said photoelectric control device are readily accessible, and a closed position wherein said photoelectric control device is arranged beneath and closely adjacent said window opening.

No references cited.

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