(12) UK Patent Application (19) GB (11) 2499722 (13) A

(43) Date of A Publication 28.08.2013

(21) Application No: **1302721.4**

(22) Date of Filing: **15.02.2013**

(30) Priority Data:
(31) **1203260** (32) **24.02.2012** (33) **GB**

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(51) INT CL:
F21V 25/12 (2006.01) ***F21S 8/02*** (2006.01)

(56) Documents Cited:
WO 2005/124225 A1

(58) Field of Search:
INT CL **F21V**
Other: **Online: WPI, EPODOC**

(54) Title of the Invention: **Light fitting**
Abstract Title: **Fire resistant light fitting**

(57) A fire resistant light fitting 10 for mounting in an aperture in a fire resistant panel comprises a fire resistant body 11, a support frame 17 secured to the body and having secured thereto a heat sink 21, and a LED array 22 secured to the heat sink in thermal contact therewith. The fire resistant body 11 has apertures 23 aligned with the LEDs to allow light to travel outwards. The fire resistant body 11 provides support for a layer of intumescent material 25 which is positioned between the fire resistant body 11 and lighting element 22.

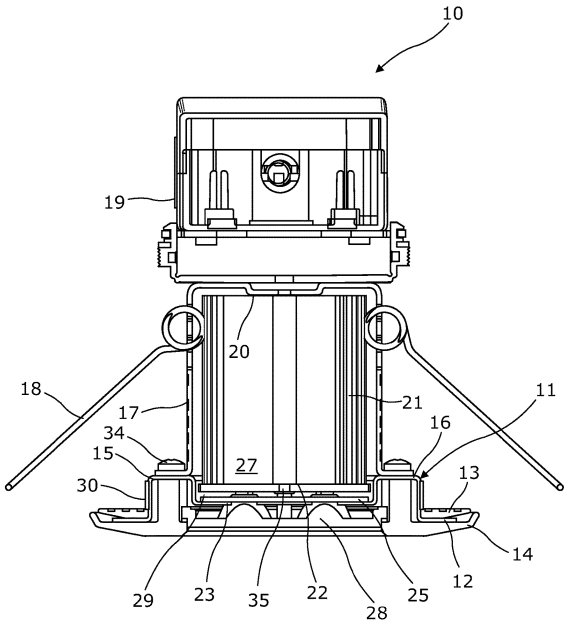

Figure 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

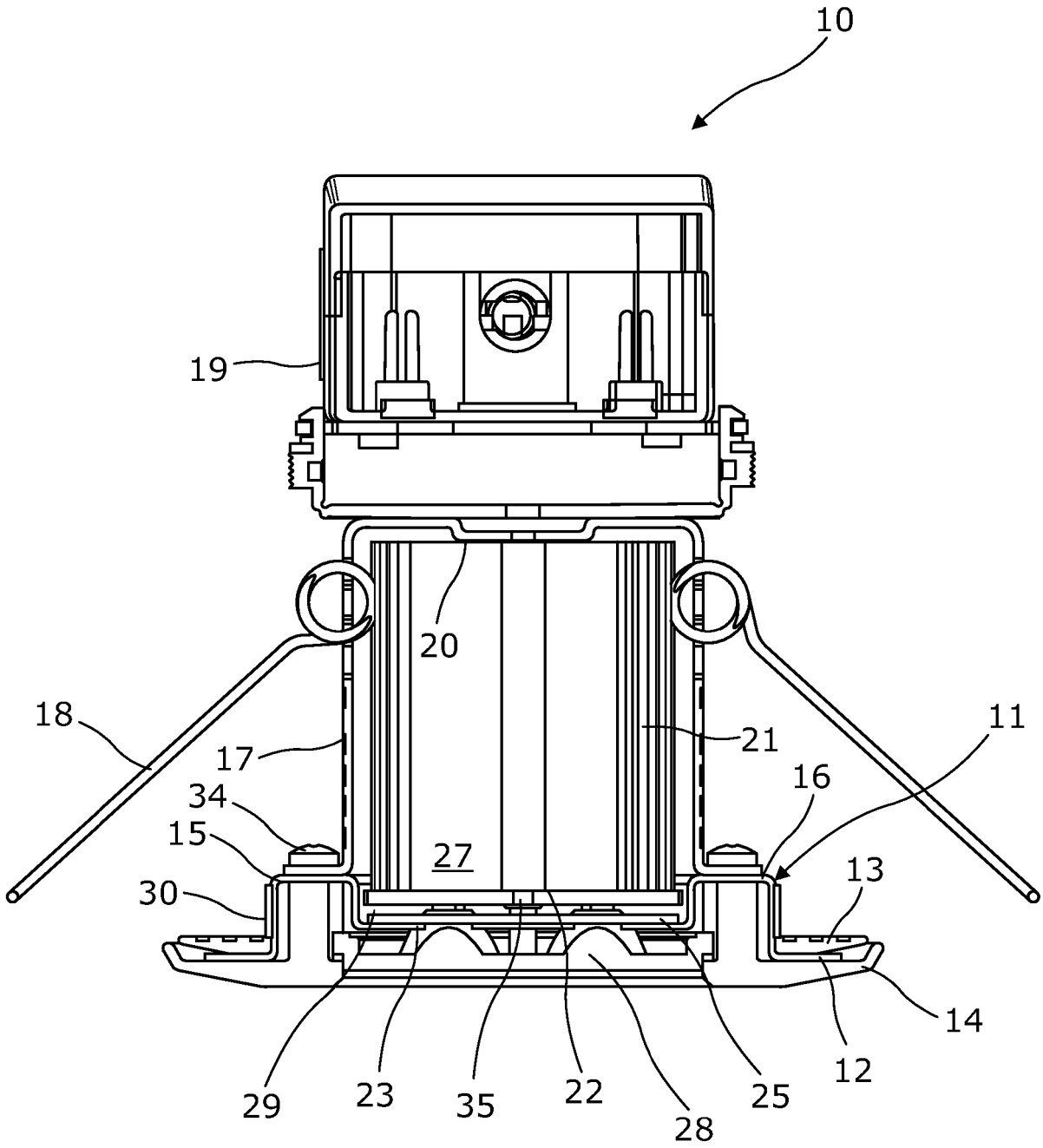

Figure 1

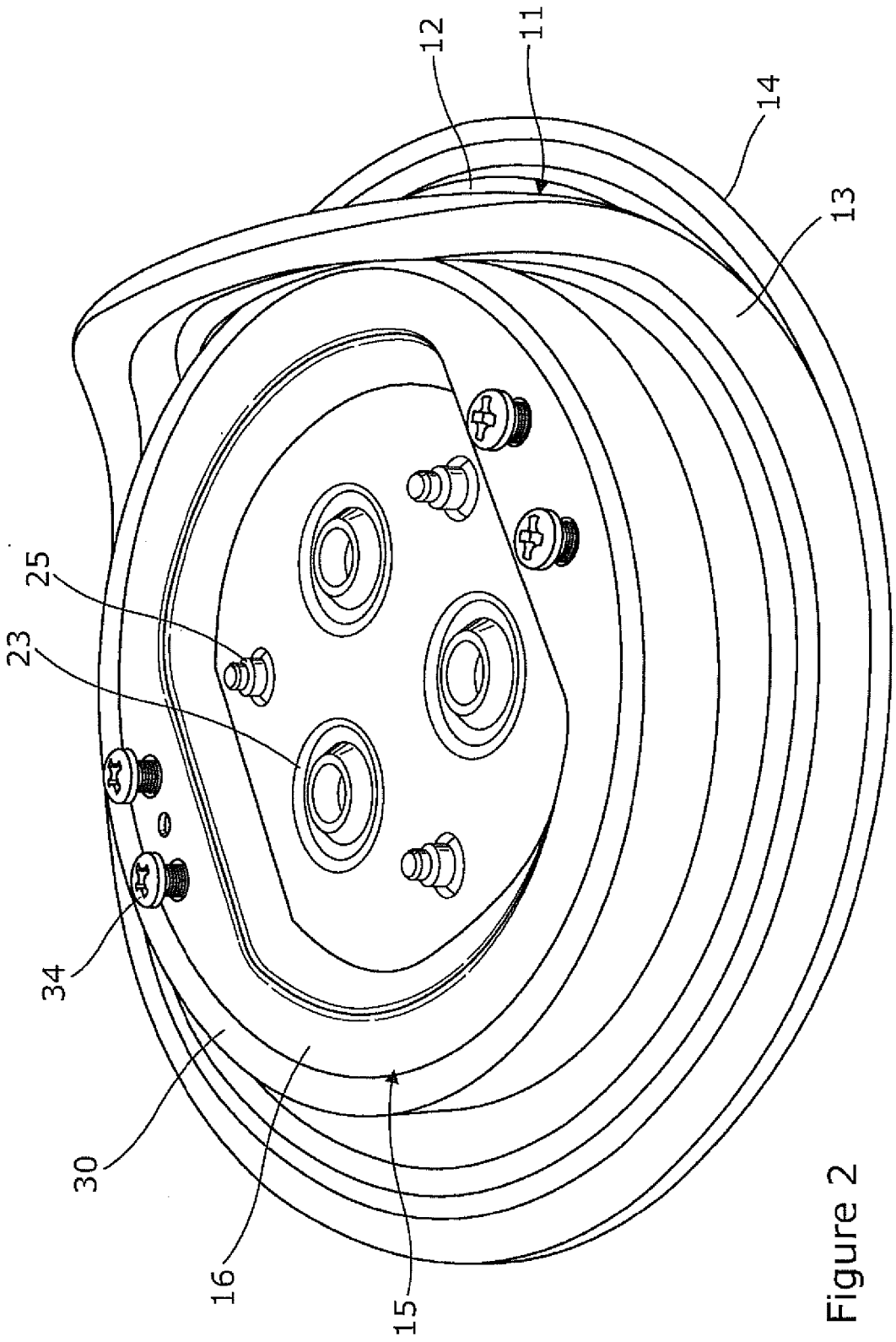

Figure 2

LIGHT FITTING

This invention relates to a light fitting and in particular, though not exclusively, to a heat/fire resistant light fitting, such as a light fitting of a solid state type in which light emitting diodes are employed as the source of illumination.

Building regulations often require that down lighters which are fitted into ceilings shall be provided with fire hoods to inhibit the spread of fire. Although many types of fire hood have been proposed and generally have performed successfully, there is a continuing aim to increase the efficiency of the built-in ventilation and fire/heat protection.

An object of the present invention is to provide a fire resistant light fitting in which disadvantages of hitherto known light fittings are mitigated or overcome.

In accordance with one aspect of the present invention there is provided a fire resistant light fitting suitable for mounting in an aperture in a fire resistant panel, said light fitting comprising

a fire resistant body;

a support frame secured to the body and having secured thereto at least a heat sink, and

a lighting element secured to the heat sink in thermal contact therewith, wherein the fire resistant body comprises at least one aperture aligned with a lighting element whereby light may travel from the lighting element outwards through said aperture, and

said fire resistant body providing support for a layer of intumescent material which is positioned between the fire resistant body and lighting element.

Preferably the layer of intumescent material closely surrounds the or each aperture in the fire resistant body. Preferably the intumescent material is fire resistant.

Preferably the intumescent layer is spaced from the lighting element thereby to provide a ventilation space and facilitate heat dissipation. Thus it will be understood that said spacing will at least in part compensate for the effect of the thermal insulation properties of the intumescent layer the presence of which, in the case of a lighting element in direct contact with the intumescent layer, would restrict the conduction of heat from the lighting element to the fire resistant body as compared with a construction in which the lighting element is in direct contact with a metallic fire resistant body.

However the invention does not exclude the provision of intumescent layer in a position sandwiched between and in contact with each of the fire resistant body and lighting element.

It is further preferred that the fire resistant body is not in direct thermal contact with the lighting element and/or heat sink.

Preferably the lighting element is secured to a heat sink which is in turn secured, at a first end region remote from the lighting element, to the support frame. The support frame may have a second end region which is remote from the first end region and said second end region may be secured to the fire resistant housing.

The support frame preferably is of an open construction whereby it does not inhibit air flow for convection cooling of the heat sink.

Said support frame may be employed in a conventional manner for providing support and location for fixing means such as springs and clasps for assisting in retention of the light fitting in a fire resistant panel, and for support of a transformer, for example a transformer in the form of a so-called driver for use with a light emitting diode.

Preferably the fire resistant body is constructed from a material, such as pressed steel, that can withstand temperatures of up to 900^0C, and more preferably up to 1000^0C.

Preferably the intumescent material is spaced from the lighting element but said spacing and the properties of the intumescent material are selected such that in the event of fire the intumescent material will expand sufficiently to substantially fully occupy the space originally present between that material and the lighting element.

Additionally fire resistant intumescent material may be positioned around the fire resistant body, in use to lie between the fire resistant body and a panel or the like to which the light fitting is secured.

One suitable fire resistant intumescent material is a graphite based material such as that supplied by Technical Fibre Products Limited under the name "Intumescent Material" and which consists of a high temperature Rockwool fibre mat containing easily dispersed foliating graphite bonded in acrylic.

One embodiment of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a part sectional view of a fire resistant light fitting, and

Figure 2 shows in perspective a lower part of the light fitting of Figure 1 and from which the support frame and items secured to the support frame have been omitted.

The fire resistant light fitting 10 comprises a fire resistant body 11 which, when the light fitting is in situ in a fire resistant panel extends substantially wholly over the aperture provided in the fire resistant panel for location of the light fitting.

As viewed in transverse cross-section in a plain perpendicular to the view of Figure 1, and as depicted in Figure 2, the light fitting is of the conventional circular shape.

The fire resistant body 11 defines an outer flange formation 12 which provides support for a moisture seal 13 which in use lies between the flange and fire resistant panel (not shown) to which the light fitting is secured. That flange also provides support for a decorative facia 14.

In Figure 2 a part of the moisture seal is shown upturned to reveal the flange formation 12 and facia 14.

Radially inwards from the flange 12 the fire resistant body comprises a substantially annular rib formation 15 the upper surface 16 of which provides support and location for a support frame 17.

The support frame 17 in turn provides support and location for a pair of spring loaded clips 18 which, in use, bear against a rear face of the fire resistant panel and thereby hold the moisture seal 13 in firm contact with the front face of the panel.

The frame 18 additionally provides support for a transformer 19 and also supports the upper end 20 of a heat sink 21. The other end of the heat sink has secured thereto, in thermal contact therewith a lighting element in the form of an LED array 22 comprising three LEDs. The array 22 is secured to the heat sink by a screw 35.

At an end 27 of the frame, opposite the end 26 which supports the transformer 19 and heat sink 21, the frame is secured to the fire resistant body by means of screws 34 which engage in screw threaded apertures in the upper face 16 of the annular rib 15.

Inwards of the annular rib 15 the fire resistant body is of a generally circular form and comprises three apertures 23 which are each aligned with and spaced from a respective one of three LEDs of the array 22.

The inner face of the fire resistant body, being the face opposite the LED array 22, provides support for a layer of intumescent material 25 which is

formed with three small apertures each aligned with a respective one of the three apertures 23 in the fire resistant body 11. A lens 28 extends over the outwardly facing surface of a central part of the fire resistant body.

Individual LEDs extend downwards through the apertures 23 of the intumescent layer and the fire resistant body to align in known manner with conventional formations in the lens 28. Although the individual LEDs extend downwards through the apertures in the intumescent layer and the fire resistant body the remainder of the LED array formation is slightly spaced from the intumescent material and is secured to and in thermal contact with the heat sink

In the event of a fire the associated heat causes expansion of the intumescent layer 25 such that it then fully occupies the space 29 that originally was present between that layer and the LED array 22.

Although not essential, optionally an intumescent band 30 may be provided around the annular rib 15 of the fire resistant body and be expandable in response to heat from a fire to assist in achieving and enhancing a seal between the fire resistant body and a fire resistant panel

Claims

1. A fire resistant light fitting suitable for mounting in an aperture in a fire resistant panel, said light fitting comprising

a fire resistant body;

a support frame secure to the body and having secured thereto at least a heat sink, and

a lighting element secured to the heat sink in thermal contact therewith, wherein the fire resistant body comprises at least one aperture aligned with a lighting element whereby light may travel from the lighting element outwards through said aperture, and

said fire resistant body providing support for a layer of intumescent material which is positioned between the fire resistant body and lighting element.

2. A light fitting according to claim 1 wherein the intumescent layer is spaced from the lighting element.

3. A light fitting according to claim 2 wherein in the event of fire the intumescent material will expand to substantially fully occupy the space originally present between the intumescent material and the lighting element.

4. A light fitting according to claim 1 wherein the intumescent layer is sandwiched between and in contact with each of the fire resistant body and the lighting element.

5. A light fitting according to any one of the preceding claims wherein the fire resistant body is not in direct thermal contact with the lighting element.

6. A light fitting according to claim 5 wherein the lighting element is secured to a heat sink and said heat sink is secured to the support frame at a position remote from the lighting element.

7. A light fitting according to claim 6 wherein an end of the support frame remote from the end to which the heat sink is secured thereto is secured to the fire resistant body.

8. A light fitting according to any one of the preceding claims wherein the fire resistant body is able to withstand temperatures of up to 900^0c.

9. A light fitting according to claim 8 wherein the fire resistant body is able to withstand temperatures of up to 1000^0c.

10. A light fitting according to any one of the preceding claims wherein the fire resistant body comprises a substantially annual rib formation between a central region of the body and an outwardly extending flange.

11. A light fitting according to claim 10 wherein said rib formation provides a mounting position for the support frame.

12. A light fitting according claim 10 or claim 11 wherein the layer of intumescent material substantially wholly occupies said central region of the fire resistant body.

13. A light fitting according to any one of the preceding claims wherein the layer of intumescent material closely surrounds the or each aperture in the fire resistant body.

14. A light fitting according to any one of the preceding claims wherein the fire resistant body comprises at least three apertures each for transmission of light outwards from the lighting element.

15. A light fitting according to any one of the preceding claims wherein the lighting element comprises an LED which extends at least in part through an aperture in the fire resistant body.

16. A light fitting according to any one of the preceding claims intumescent material extends around the fire resistant body.

17. A light fitting according to claim 16 wherein the fire resistant body comprises a substantially annular rib formation and a radially outwardly facing surface of said rib formation provides support for fire resistant intumescent material.

18. A light fitting according to any one of the preceding claims and comprising intumescent material which is fire resistant.

19. A lighting element according to claim 1 and substantially as hereinbefore described.

INTELLECTUAL PROPERTY OFFICE

Application No:	GB1302721.4	**Examiner:**	Vaughan Phillips
Claims searched:	1-18	**Date of search:**	24 March 2013

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	WO 2005/124225 A1 (SCOLMORE) see abstract

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

F21V

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
F21V	0025/12	01/01/2006
F21S	0008/02	01/01/2006