Abstract Title: Fire Resistant Light Fitting

A recessed lighting fitting (10) intended to be mounted in a panel includes a body (20) for lamp (21) and a flange (26) which extends at least partially around the body (20). The flange (26) lies adjacent to the panel (12). The flange (26) includes a first body of material (27) (which may be intumescent) which inhibits the transmission of fire in a region between the flange (26) and an adjacent panel (12). The body (20) is equipped with a ventilation hole (34) and includes a second body of material (31) inhibits the transmission of fire between the interior and exterior of the lighting fitting (10) via a ventilation hole (34). A lighting fitting according to the invention obviates the need for a separate fire hood or equivalent whilst meeting fire regulations.

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

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995.
Fire-resistant lighting fitting

This invention relates to lighting fittings. More specifically, it relates to lighting fittings which inhibit the passage of fire.

5

Lighting fittings are well known in the art. In general, lighting fittings may be classified into three types: freestanding (such as standard lamps), those mounted on a panel (such as wall mounted fittings, or those attached to the ceiling), and those mounted in a panel (such as downlighters typically mounted in a ceiling panel).

The latter type of fitting requires the creation of a sizeable aperture in the panel, through which the body of the lighting fitting is mounted. These are particularly popular because the lighting fitting can be flush or almost flush with the panel in which it is mounted, thereby providing illumination without visually obtrusive fittings.

However, one significant concern relates to the issue of fire safety. It is advisable, and in many situations may be required by health and safety or building regulations, to inhibit the spread of fire between different levels of a multi-storey building, and between different rooms within a building. This is assisted by the provision of a fire-resistant ceiling structure, which inhibits the spread of fire from a burning room below to the rooms above. For example, British Standard BS476 part 21 makes certain requirements about the construction and fire-resistance of a ceiling.

The ability of a ceiling to contain a fire is significantly eroded by the creation of apertures therein for the installation of lighting fittings. This is further
compounded by the requirements of such lighting fittings for adequate ventilation to exhaust the heat produced by the lamp, and so further steps are required to ensure that the resistance to fire is maintained. Commonly the lighting fitting is equipped with a ‘fire hood’ such as that described in UK Patent No GB 2297609, which is fitted over the top of the lighting fitting and provides a suitably fire-resistant barrier over the aperture in which the fitting is mounted. However, this significantly increases the cost of the lighting fitting, as well as the labour costs of installation.

The present invention has been conceived with the above issues in mind.

According to the present invention, there is provided a lighting fitting intended to be mounted in a panel, comprising a body in which a lamp may be mounted and a flange which extends at least partially around the body, the lighting fitting being arranged to be installed in a panel so that the flange lies adjacent to the panel, wherein the flange comprises a first body of material which is arranged in use to inhibit the transmission of fire in a region between the flange and an adjacent panel, and the body is equipped with at least one ventilation hole and comprises a second body of material which is arranged in use to inhibit the transmission of fire between the interior and exterior of the lighting fitting via the at least one ventilation hole.

In normal use, the ventilation holes allow operation of the lamp without the risk of overheating. In the case of a fire on either side of the panel, then the first body of material will inhibit transmission of fire through the aperture between the lighting fitting and the panel in which the lighting fitting is mounted. The second body of material will inhibit the transmission of fire through the at least one ventilation hole.
The body of the light fitting may comprise any rigid, heat resistant material as will be apparent to the man skilled in the art. Suitable materials include, but are not limited to, 1mm thick steel.

In a preferred embodiment, the first body of material is activated by heat to form an arrangement in which it inhibits the transmission of fire in a region between the flange and an adjacent panel. Preferably the first body of material expands on heating. Most preferably the first body of material is intumescent. Thus the lighting fitting can be supplied with the first body of material in a convenient and/or compact form for ease of installation. In the case of fire, the first body of material will be activated to form an arrangement which is effective in inhibiting the transmission of fire.

In a preferred embodiment, the second body of material is activated by heat to form an arrangement in which it inhibits the transmission of fire via the at least one ventilation hole. Preferably the second body of material expands on heating. Most preferably the second body of material is intumescent. Thus the cover can be supplied with the second body of material in a convenient and/or compact form for ease of installation. In the case of fire, the second body of material will be activated to form an arrangement which is effective in inhibiting the transmission of fire.

In a preferred embodiment, the first body of material and the second body of material have the same properties.

Suitable intumescent materials include, but are not limited to, expandable granule or powder graphite, or carbon granules, used with rockwool fibre,
thermoset epoxy, polymer base materials and glass fibre amongst others, as will be readily apparent to the man skilled in the art.

In a preferred embodiment, the lighting fitting is equipped with a cover to prevent ingress of moisture from the room into the interior of the lighting fitting, said cover containing an at least partially transparent part to enable illumination of the room in which the lighting fitting is mounted. The cover enables the lighting fitting to be used in an environment of relatively high atmospheric moisture, such as in a bathroom or kitchen, without the risk of moisture affecting the electrical connections of the lamp.

In a preferred embodiment, the body of the lighting fitting comprises a rigid thermally conductive substance, and the second body of material is attached to an external surface thereof. Preferably, the second body of material is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting. Preferably, a further layer of a thermally conductive substance is attached to the external surface of the second body of material. More preferably, the further layer of a thermally conductive substance is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting and the second body of material. Thus the second body of material is protected from damage by sandwiching between the two thermally conductive layers. Furthermore, the layers on either side of the second body of material prevent localised build-up of heat (e.g. from the lamp) which might activate the second body of material unnecessarily. Thus, the second body of material will be activated to block the ventilation holes only when the ambient temperature reaches the required level, as would be the case in a fire.
In a preferred embodiment, the lighting fitting is secured against the panel in which it is mounted by means of a resiliently deformable means which acts to urge the flange against the panel. Preferably, the resiliently deformable means comprise spring clips attached to either side of the body of the lighting fitting. More preferably, the points of attachment of the spring clips are recessed into the side of the body of the lighting fitting. This minimises the size of the aperture that is needed for installation, thereby reducing the loss of fire-resistance caused by installation of the lighting fitting and hence reducing the dependence on the fire-resisting features of the lighting fitting itself.

In a preferred embodiment, the body of the lighting fitting has a double-walled construction with a layer of thermal insulation between the two walls. Preferably, the thermal insulation is air. This minimises the transfer of heat through the lighting fitting from the burning room below, thereby reducing the likelihood of ignition above the panel.

A specific embodiment of the present invention will now be described with reference to the accompanying drawing, which is a section through a lighting fitting according to the present invention.

A lighting fitting 10 is mounted in an aperture 11 of a ceiling panel 12. The lighting fitting comprises a body 20, a lamp 21, and spring clips 23.

The body 20 of the lighting fitting comprises a substantially cylindrical rigid wall 25 which extends to form an annular flange 26. The rigid wall 25 and flange 26 of the body 20 may be constructed from any suitably heat-tolerant material apparent to the man skilled in the art, such as for example 1mm thick steel. Attached to the internal surface of flange 26 (i.e. the surface adjacent
to the panel 12) is a layer of intumescent material 27 mounted on silicone rubber 28, which extends around the entire circumference of the rigid wall 25.

Any suitable intumescent material may be used as will be readily apparent to the man skilled in the art, including but not limited to, expandable granule or powder graphite, or carbon granules, used with rockwool fibre, thermoset epoxy, polymer base materials and glass fibre amongst others, as will be readily apparent to the man skilled in the art. In the event of a substantial increase in the temperature (e.g. in the event of a fire), the intumescent material 27 will expand to provide a fire-proof seal between the flange 26 and the panel 12.

The silicone rubber 28 inhibits the transmission of heat from the lighting fitting 10 to the ceiling panel 12 during normal use, thereby protecting the ceiling panel 12 from heat damage. Furthermore, the silicone rubber 28 also inhibits the transmission of vibrations between the lighting fitting 10 and the ceiling panel 12, thereby helping to minimise the transmission of noise within the building.

The spring clips 23 are mounted in recesses 40 in the wall 25 of the lighting fitting, and urge the lighting fitting against the ceiling panel 12 in order to securely mount the lighting fitting in place.

The cylindrical wall 25 of the lighting fitting is closed at one end to form a top surface 30. A second layer of intumescent material 31 is attached to the exterior of top surface 30 and held in place by a steel plate 32. The skilled man will appreciate that any rigid thermally conductive material could be used in place of the steel. Steel plate 32 is shown attached to top surface 30 of
the lighting fitting by means of rivets 33, but the skilled man will appreciate that any suitable fire-resistant fastening means could be used. A series of ventilation holes 34 pass through the top surface 30, intumescent material 31 and steel plate 32.

In the event of a substantial increase in the temperature (e.g. in the event of a fire), the intumescent material 31 will expand to provide a fire-proof seal across the ventilation holes 34.

The embodiment is described by way of example only, and many variations are possible.
CLAIMS:

1. A lighting fitting intended to be mounted in a panel, comprising a body in which a lamp may be mounted and a flange which extends at least partially around the body, the lighting fitting being arranged to be installed in a panel so that the flange lies adjacent to the panel, wherein the flange comprises a first body of material which is arranged in use to inhibit the transmission of fire in a region between the flange and an adjacent panel, and the body is equipped with at least one ventilation hole and comprises a second body of material which is arranged in use to inhibit the transmission of fire between the interior and exterior of the lighting fitting via the at least one ventilation hole.

2. The lighting fitting of claim 1, wherein the body of the light fitting comprises a rigid, heat resistant material.

3. The lighting fitting of claim 1 or 2, wherein the first body of material is activated by heat.

4. The lighting fitting of claim 3, wherein the first body of material expands on heating.
5. The lighting fitting of claim 4 or 5 wherein the first body of material is intumescent.

6. The lighting fitting of any preceding claim, wherein the second body of material is activated by heat.

7. The lighting fitting of claim 6, wherein the second body of material expands on heating.

8. The lighting fitting of claim 6 or 7, wherein the second body of material is intumescent.

9. The lighting fitting of any preceding claim, wherein the first body of material and the second body of material have the same properties.

10. The lighting fitting of any preceding claim, wherein the lighting fitting is equipped with a cover to prevent ingress of moisture from the room into the interior of the lighting fitting, said cover containing an at least partially transparent part to enable illumination of the room in which the lighting fitting is mounted.
11. The lighting fitting of any preceding claim, wherein the body of the lighting fitting comprises a rigid thermally conductive substance, and the second body of material is attached to an external surface thereof.

12. The lighting fitting of claim 11, wherein the second body of material is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting.

13. The lighting fitting of claim 11 or 12, wherein a further layer of a thermally conductive substance is attached to the external surface of the second body of material.

14. The lighting fitting of claim 13, wherein the further layer of a thermally conductive substance is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting and the second body of material.

15. The lighting fitting of any preceding claim, comprising a resiliently deformable means which acts, in use, to urge the flange against the panel in which the fitting is mounted.

16. The lighting fitting of claim 15, wherein the resiliently deformable means comprises spring clips attached to the body of the lighting fitting.
17. The lighting fitting of claim 16, wherein the spring clips are points on the side of the body, which points are recessed into the side of the body of the lighting fitting.

18. The lighting fitting of any preceding claim, wherein the body of the lighting fitting has a double-walled construction with a layer of thermal insulation between the two walls.

19. The lighting fitting of claim 18, wherein the thermal insulation is air.

20. A lighting fitting substantially as herein described with reference to the accompanying drawing.
Amendments to the claims have been filed as follows

1. A lighting fitting intended to be mounted in a panel, comprising a body in which a lamp may be mounted, the body comprising a continuous, rigid sidewall, a flange which extends at least partially around the sidewall, and a first body of material, the lighting fitting being arranged to be installed in a panel so that the flange lies adjacent to the panel, wherein the first body of material arranged in use, such that, it inhibits the transmission of fire in a region between the flange and an adjacent panel, the body further comprising at least one ventilation hole and a second body of material arranged such that, in use, it inhibits the transmission of fire between the interior and exterior of the lighting fitting via the at least one ventilation hole.

2. The lighting fitting of claim 1, wherein the body of the light fitting comprises a heat resistant material.

3. The lighting fitting of claim 1 or 2, wherein the first body of material is activated by heat.

4. The lighting fitting of claim 3, wherein the first body of material expands on heating.
11. The lighting fitting of any preceding claim, wherein the body of the lighting fitting comprises a thermally conductive substance, and the second body of material is attached to an external surface thereof.

12. The lighting fitting of claim 11, wherein the second body of material is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting.

13. The lighting fitting of claim 11 or 12, wherein a further layer of a thermally conductive substance is attached to the external surface of the second body of material.

14. The lighting fitting of claim 13, wherein the further layer of a thermally conductive substance is equipped with a ventilation hole corresponding to each of the at least one ventilation holes in the body of the lighting fitting and the second body of material.

15. The lighting fitting of any preceding claim, comprising a resiliently deformable means which acts, in use, to urge the flange against the panel in which the fitting is mounted.

16. The lighting fitting of claim 15, wherein the resiliently deformable means comprises spring clips attached to the body of the lighting fitting.
17. The lighting fitting of claim 16, wherein the spring clips are attached to points on the side of the body, which points are recessed into the side of the body of the lighting fitting.

18. The lighting fitting of any preceding claim, wherein the body of the lighting fitting has a double-walled construction with a layer of thermal insulation between the two walls.

19. The lighting fitting of claim 18, wherein the thermal insulation is air.

20. The lighting fitting of any preceding claim wherein the flange comprises the first body of material

21. A lighting fitting substantially as herein described with reference to the accompanying drawing.
Application No: GB0501607.6
Claims searched: 1-20
Examiner: D. P. Harness
Date of search: 21 December 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1-19</td>
<td>GB2326467 A (ENVIRONMENTAL SEALS ) See figure 1, first paragraph on page 4.</td>
</tr>
<tr>
<td>X</td>
<td>1-17</td>
<td>GB2325728 A (EURO PASSIVE FIRE PROTECTION LTD) See figure 8 and first paragraph on page 3.</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>GB2297609 A (ENVIROMENTAL SEALS LIMITED) See figure 6 and first paragraph on page 1.</td>
</tr>
</tbody>
</table>

Categories:

| X | Document indicating lack of novelty or inventive step |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category |
| & | Member of the same patent family |

A | Document indicating technological background and/or state of the art |

P | Document published on or after the declared priority date but before the filing date of this invention |

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:

F4R

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

A62C; F21S; F21V

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

WPI, EPODOC, PAJ, OPTICS