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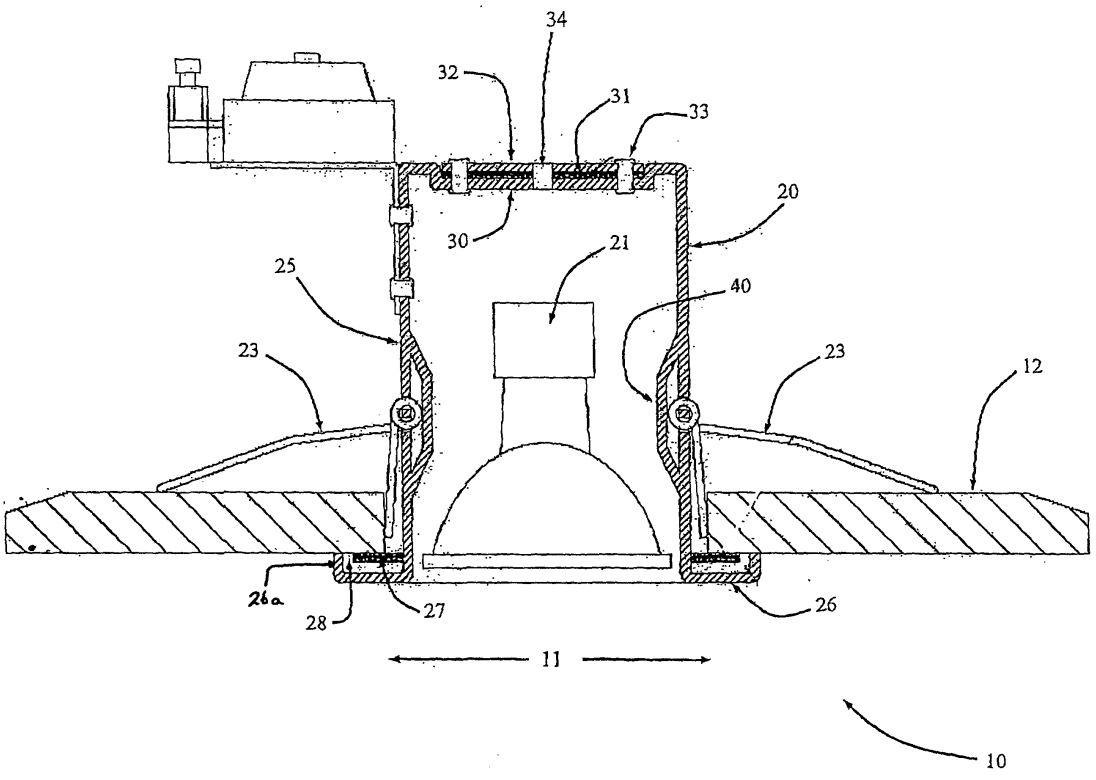
(54) Fire-resistant lighting fitting

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



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Description

[0001] This invention relates to lighting fittings. More specifically, it relates to lighting fittings which inhibit the passage of fire.

[0002] 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).

[0003] 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.

[0004] 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.

[0005] 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.

[0006] The present invention has been conceived with the above issues in mind.

[0007] 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, the body comprising a continuous, rigid sidewall, and a flange which extends at least partially around the sidewall, 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, the body further comprising at least one ventilation hole and 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.

[0008] 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.

[0009] 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, various metals, especially steel.

[0010] 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.

[0011] 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.

[0012] In a preferred embodiment, the first body of material and the second body of material have the same properties.

[0013] 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.

[0014] 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.

[0015] 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 correspond-

ing 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.

[0016] 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.

[0017] 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.

[0018] 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.

[0019] 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.

[0020] The body 20 of the lighting fitting comprises a substantially cylindrical, continuous, rigid sidewall 25 which extends to form an annular flange 26 projecting from the sidewall at an open end of the cylindrical body. The sidewall material further extends to form a lip 26a around the peripheral edge of the flange 26. The rigid sidewall 25, flange 26 and lip 26a 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. Mounted on the surface of flange 26 directed towards the remainder of the body (i.e. the surface which in use will lie adjacent to the panel 12) is an annular silicone rubber gasket 28 which extends around the entire circumference of the rigid sidewall 25 and substantially fills the region between the sidewall 25 and the lip 26a. Any other suitable resilient material could be used for the gasket.

[0021] The silicone rubber gasket 28 is stepped with a thicker region at its outer edge and a thinner region at it inner edge. The thicker region is slightly thicker than the height the lip 26a extends from the surface of the flange on which the gasket 28 is mounted. On the thinner region of the gasket there is mounted an annular gasket 27 of intumescent material. This gasket is a little thinner than the height of the thicker portion of the silicone rubber gasket 28, so that the thicker portion of the silicone rubber gasket protrudes above the intumescent gasket 27.

[0022] For the instumescent gasket 27, 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.

[0023] The silicone rubber 28 gasket serves a number of functions. It 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. As the thicker portion of the gasket 28 will contact a ceiling panel in which the fitting is installed it will form an at least partial seal with the ceiling panel reducing drafts and passage of dust and debris between the flange 26 and panel and its resilient nature will also inhibit 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. Further, the silicone rubber 28 gasket can form a seal between the intumescent material 27 and the outer lip 26a of flange 26, and serves to locate the intumescent gasket 27 on the flange 26.

[0024] In the event of a substantial increase in the temperature (*e.g.* in the event of a fire), the silicone gasket 28 will melt or otherwise deteriorate allowing heat to reach the intumescent material 27, which will then expand to provide a fire-proof seal between the flange 26 and the panel 12.

[0025] The spring clips 23 are mounted in recesses 40 in the sidewall 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. It is preferable that the spring clips 23 are of high quality steel, such as tempered steel, which can withstand temperatures of at least 400-500 °C without significant loss of their mechanical properties. It is known that conventional spring clips in conventional lighting fittings may fail during a fire, at which point the entire fitting may break away from the ceiling panel.

[0026] The cylindrical sidewall 25 of the lighting fitting is closed at the opposite end to the flange 26 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 appre-

ciate 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.

[0027] 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.

[0028] The embodiment is described by way of example only, and many variations are possible without departing from the invention as defined by the appended claims.

Claims

1. A lighting fitting (10) intended to be mounted in a panel (12), comprising a body (20) in which a lamp (21) may be mounted, the body comprising a continuous, rigid sidewall (25), and a flange (26) which extends at least partially around the sidewall, 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 (27) of material which is arranged in use to inhibit the transmission of fire in a region between the flange and an adjacent panel, the body further comprising at least one ventilation hole (34) and a second body of material (31) 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 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 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 (32) 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.

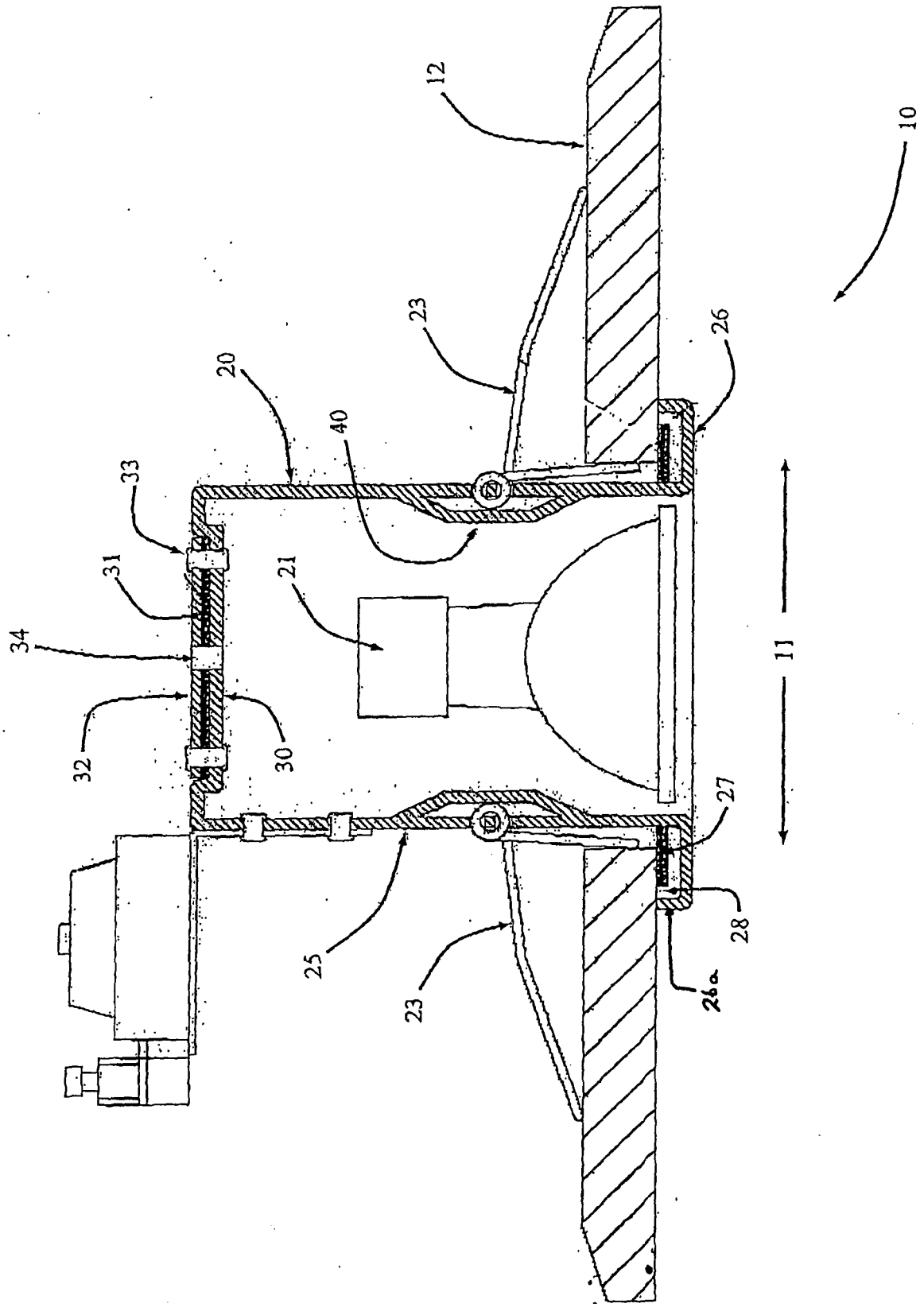
15. The lighting fitting of any preceding claim, comprising a resiliently deformable means (23) which acts, in use, to urge the flange against the panel in which the fitting is mounted.

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 mounted at 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.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