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# (54) DOWNLIGHT CASING UNIT

(57) A downlight casing unit (1) has a casing (2) for housing a lamp. The casing (2) has a flanged outer end (3). A pair of spring-loaded clips (4) are mounted on opposite sides of the casing (2) for securing the casing (2) in an associated opening in a ceiling panel to mount the downlight casing unit (1) on the ceiling panel in use. An intumescent element (5) is mounted within the casing (2) at the outer end (3) of the casing (2). The intumescent element (5) is a cylindrical ring of intumescent material.

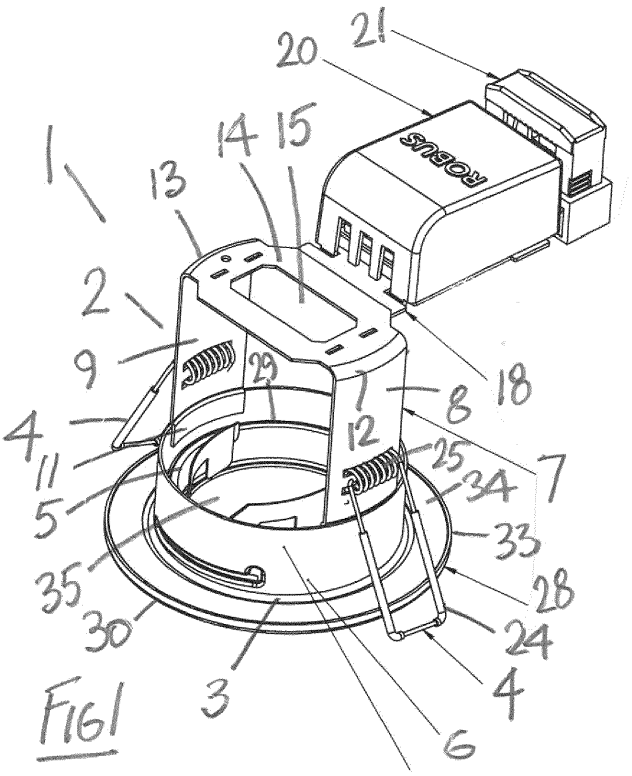


Fig1

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## Description

### Introduction

**[0001]** The present invention relates to fire-rated downlights, in particular those suitable for LED lamps, and improvements in and to said downlights.

### Background to the Invention

**[0002]** There are two types of fire-rated downlight fitting. One is an integrated downlight, and the other is a light fitting into which an LED lamp (or lightbulb), can be fitted and replaced if need be. The subject of the present invention primarily relates to the light fitting type of fire-rated downlight fitting.

**[0003]** Fire-rated downlights are designed to recess into a 30, 60 or 90 minute fire-rated ceiling, such that their construction maintains the fire-rating of the existing ceiling, resisting the ingress of fire into the ceiling void for 30, 60 or 90 minutes.

**[0004]** Not all fire-rated downlights use intumescent seals. Some use a closed fire can around the light fitting instead. This is not ideal for LED lights, which need to dissipate as much heat as possible relying on convection as the main heat loss mechanism in order to run efficiently for long lifetimes.

**[0005]** GB 2557957 A (Integral Memory Plc) describes a fire-rated downlight having an upstanding ring and ventilated lamp accommodating means with a sealing member and window/glass pane. As the purpose of this downlight is to avoid overheating of LED lamps no active fire barrier (e.g. intumescent material) is present. To achieve the fire-rating this downlight is made from materials resistant to high temperatures. The downlight itself can be considered to be a passive fire barrier.

**[0006]** EP 1686315 A1 (RD Europe Limited) describes a fire-rated downlight having a cover with flange, light transmitting part and active fire barrier (e.g. intumescent material). A double-walled body is described, but is shown as abutting against each other leaving no gap thereinbetween. The intumescent material is mounted at a flanged lower end of the body.

**[0007]** EP 1726873 A1 (Aurora Limited) describes a fire-rated downlight having an enclosed or partially open body with a flange, a window and active fire barrier (e.g. intumescent material). An inner end of the internal walls of the body are lined with a continuous or discontinuous sleeve of intumescent material. Optionally, an outer sleeve of intumescent material may be mounted outside the body at an outer end of the body to fill the ceiling hole in which the downlight is mounted outside the downlight in the event of a fire.

**[0008]** It is an object of the present invention to provide an improved downlight casing unit.

### Summary of the Invention

**[0009]** According to the invention there is provided a downlight casing unit, including:

a casing for housing a lamp,
the casing having a flanged outer end,
retaining means for securing the casing in an opening in a ceiling in use with the flanged outer end engaged with an outer face of the ceiling, and
an intumescent element mounted on the casing,
characterised in that the intumescent element is mounted within the casing at the outer end of the casing.

**[0010]** In one embodiment of the invention the intumescent element is a ring of intumescent material mounted within the outer end of the casing.

**[0011]** In another embodiment the intumescent element comprises a cylindrical ring of intumescent material mounted within the outer end of the casing.

**[0012]** In another embodiment a glass window is mounted at the outer end of the casing.

**[0013]** In another embodiment the glass window comprises soda-lime glass.

**[0014]** In another embodiment the casing has a tubular outer end and an inner end of the casing is formed by a U-shaped bracket, the U-shaped bracket having a spaced-apart pair of side struts having outer ends attached to the tubular outer end of the casing and the struts having inner ends interconnected by a crossbar extending therebetween.

**[0015]** In another embodiment a terminal block support plate extends outwardly from the crossbar.

**[0016]** In another embodiment the terminal block support plate is substantially perpendicular to the crossbar.

**[0017]** In another embodiment the crossbar has a through hole for through passage of wiring.

**[0018]** In another embodiment the retaining means comprises a pair of spring-loaded clips mounted at opposite sides of the casing and biased towards the flanged outer end of the casing.

**[0019]** In another embodiment the spring-loaded clips are mounted on the side struts.

**[0020]** In another embodiment a fixed bezel is mounted at the outer end of the casing, the fixed bezel having a tubular sleeve which engages within the outer end of the casing, an annular flange at an outer end of the sleeve having an inner portion projecting inwardly of the sleeve and an outer portion projecting outwardly of the sleeve.

**[0021]** In another embodiment the glass window is mounted on the inner portion of the flange.

**[0022]** In another embodiment a tilt bezel assembly is mounted at the outer end of the casing, the tilt bezel assembly comprising an outer bezel and an associated inner bezel mounted within the outer bezel, the outer bezel having a tubular sleeve which engages within the outer end of the casing, an annular flange projecting outwardly

at an outer end of the sleeve, the inner bezel pivotally mounted within the sleeve of the outer bezel.

**[0023]** In another embodiment the glass window is mounted at an outer end of the inner bezel.

## Brief Description of the Drawings

**[0024]** The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a downlight casing unit according to the invention:

Fig. 2 is an elevational view of the downlight casing unit;

Fig. 3 is a side elevational view of the downlight casing unit;

Fig. 4 is an underneath plan view of the downlight casing unit;

Fig. 5 is a perspective view of another downlight casing unit according to the invention:

Fig. 6 is an elevational view of the downlight casing unit shown in Fig. 5;

Fig. 7 is a side elevational view of the downlight casing unit shown in Fig. 5;

Fig. 8 is an underneath plan view of the downlight casing unit shown in Fig. 5;

Fig. 9 is an exploded perspective view of another downlight casing unit according to the invention; and

Fig. 10 is an exploded perspective view of another downlight casing unit according to the invention:

## Detailed Description of the Preferred Embodiments

**[0025]** Referring to the drawings, and initially to Fig. 1 - Fig. 4 thereof, there is illustrated a downlight casing unit according to the invention indicated generally by the reference numeral 1. The downlight casing unit 1 has a casing for housing a lamp (not shown). The casing 2 has a flanged outer end 3. A pair of spring-loaded clips 4 are mounted on opposite sides of the casing 2 for securing the casing 2 in an associated opening in a ceiling panel to mount the downlight casing unit 1 on the ceiling panel in use. An intumescent element 5 is mounted within the casing 2 at the outer end 3 of the casing 2. The intumescent element 5 is a cylindrical ring of intumescent material.

**[0026]** The casing 2 is of painted mild steel material and has a cylindrical outer end 6. An inner end 7 of the casing 2 is formed by a U-shaped bracket having a pair of spaced-apart diametrically opposed side struts 8, 9. An outer end 10, 11 of each strut 8, 9 is attached to the outer end 6 of the casing 2 and may be welded or otherwise secured thereto. Inner ends 12, 13 of the struts 8, 9 are interconnected by a crossbar 14 extending therebetween and substantially perpendicular to the struts 8, 9. A central opening 15 in the crossbar 14 provides a through hole for through passage of wiring.

**[0027]** A terminal block support plate 18 of painted mild steel material projects outwardly at one side of the crossbar and is substantially perpendicular to the crossbar 14. The terminal block support plate 18 may be attached to the crossbar 14 in any suitable fashion, such as by fasteners or by welding for example. It could alternatively be integrally formed with the crossbar 14 if desired.

**[0028]** A polycarbonate terminal cover 20 and cable strain relief block 21 mount on the terminal block support plate 18 and can be mounted either above or below the plate 18.

**[0029]** The spring-loaded clips 4 are mounted on the side struts 8, 9. Each spring-loaded clip 4 has an outwardly extending arm 24 with a spring 25 at an inner end of the arm 24 to urge the arm 24 outwardly towards the outer end 3 of the casing 2. Thus, upon insertion of the casing 2 into an opening in a ceiling panel the arms 24 are urged outwardly against an inner face of the ceiling panel to hold the flanged lower end 3 of the casing 2 firmly against an outer face of the ceiling panel and secure the downlight casing unit 1 on the ceiling panel.

**[0030]** A fixed bezel 28 is mounted at the outer end 6 of the casing 2. The fixed bezel has a cylindrical sleeve 29 which engages within the outer end 6 of the casing 2. An annular flange 30 at an outer end of the sleeve 29 has an inner portion 31 projecting inwardly of the sleeve 28 and an outer portion 32 projecting outwardly of the sleeve 29. The outer portion 32 has an in-turned peripheral lip 33. An annular sealing ring 34 is mounted on the inner face of the flange 30 and secured thereto by adhesive. A glass lens or window 35 of soda lime glass is mounted on an inner face of the inner portion 31 of the flange 30. The fixed bezel 28 engages the outer end 6 of the casing 2 by a twist and lock mechanism.

**[0031]** Referring to Fig. 5 to Fig. 8 there is shown another downlight casing unit according to a second embodiment of the invention indicated generally by the reference numeral 40. Parts similar to those described previously are assigned the same reference numerals. In this case a tilt bezel assembly 41 is mounted at the outer end 6 of the casing 2. The tilt bezel assembly 41 has an outer bezel 42 with an associated inner tilt bezel 43 pivotally mounted within the outer bezel 42. The window 35 is mounted on the inner tilt bezel 43.

**[0032]** Referring to Fig. 9 there is shown another downlight casing unit according to a third embodiment of the invention indicated generally by the reference numeral 50. Parts similar to those described previously are as-

signed the same reference numerals. In this case the terminal block support plate 18 is attached to the crossbar 14 by pop rivets 51. Also shown is an insulation stand-off bracket 52 mounted on top of the crossbar 14.

**[0033]** Referring to Fig. 10 there is shown another downlight casing unit according to a fourth embodiment of the invention indicated generally by the reference numeral 60. Parts similar to those described previously are assigned the same reference numerals. This is similar to the downlight casing unit shown in Fig. 9 but in this case a tilt bezel assembly is provided.

**[0034]** In this specification the terms "comprise, comprises, comprised and comprising" or any variation thereof and the terms "include, includes, included and including" or any variation thereof are considered to be totally interchangeable and they should all be afforded the widest possible interpretation and vice versa.

**[0035]** The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail within the scope of the appended claims.

## Claims

1. A downlight casing unit, including:

   a casing for housing a lamp,
   the casing having a flanged outer end,
   retaining means for securing the casing in an opening in a ceiling in use with the flanged outer end engaged with an outer face of the ceiling, and
   an intumescent element mounted on the casing, **characterised in that** the intumescent element is mounted within the casing at the outer end of the casing.

2. The downlight casing unit as claimed in claim 1, wherein the intumescent element is a ring of intumescent material mounted within the outer end of the casing.

3. The downlight casing unit as claimed in claim 2, wherein the intumescent element comprises a cylindrical ring of intumescent material mounted within the outer end of the casing.

4. The downlight casing unit as claimed in any one of the preceding claims, wherein a glass window is mounted at the outer end of the casing.

5. The downlight casing unit as claimed in claim 4, wherein the glass window comprises soda-lime glass.

6. The downlight casing unit as claimed in any one of the preceding claims, wherein the casing has a tubular outer end and an inner end of the casing is formed by a U-shaped bracket, the U-shaped bracket having a spaced-apart pair of side struts having outer ends attached to the tubular outer end of the casing and the struts having inner ends interconnected by a crossbar extending therebetween.

7. The downlight casing unit as claimed in claim 6, wherein a terminal block support plate extends outwardly from the crossbar.

8. The downlight casing unit as claimed in claim 7, wherein the terminal block support plate is substantially perpendicular to the crossbar.

9. The downlight casing unit as claimed in claim7 or claim 8, wherein the crossbar has a through hole for through passage of wiring.

10. The downlight casing unit as claimed in any one of the preceding claims, wherein the retaining means comprises a pair of spring-loaded clips mounted at opposite sides of the casing and biased towards the flanged outer end of the casing.

11. The downlight casing unit as claimed in claim 10, wherein the spring-loaded clips are mounted on the side struts.

12. The downlight casing unit as claimed in any one of the preceding claims, wherein a fixed bezel is mounted at the outer end of the casing, the fixed bezel having a tubular sleeve which engages within the outer end of the casing, an annular flange at an outer end of the sleeve having an inner portion projecting inwardly of the sleeve and an outer portion projecting outwardly of the sleeve.

13. The downlight casing unit as claimed in claim 12, wherein the glass window is mounted on the inner portion of the flange.

14. The downlight casing unit as claimed in any one of claims 1 to 11, wherein a tilt bezel assembly is mounted at the outer end of the casing, the tilt bezel assembly comprising an outer bezel and an associated inner bezel mounted within the outer bezel, the outer bezel having a tubular sleeve which engages within the outer end of the casing, an annular flange projecting outwardly at an outer end of the sleeve, the inner bezel pivotally mounted within the sleeve of the outer bezel.

15. The downlight casing unit as claimed in claim 14, wherein the glass window is mounted at an outer end of the inner bezel.

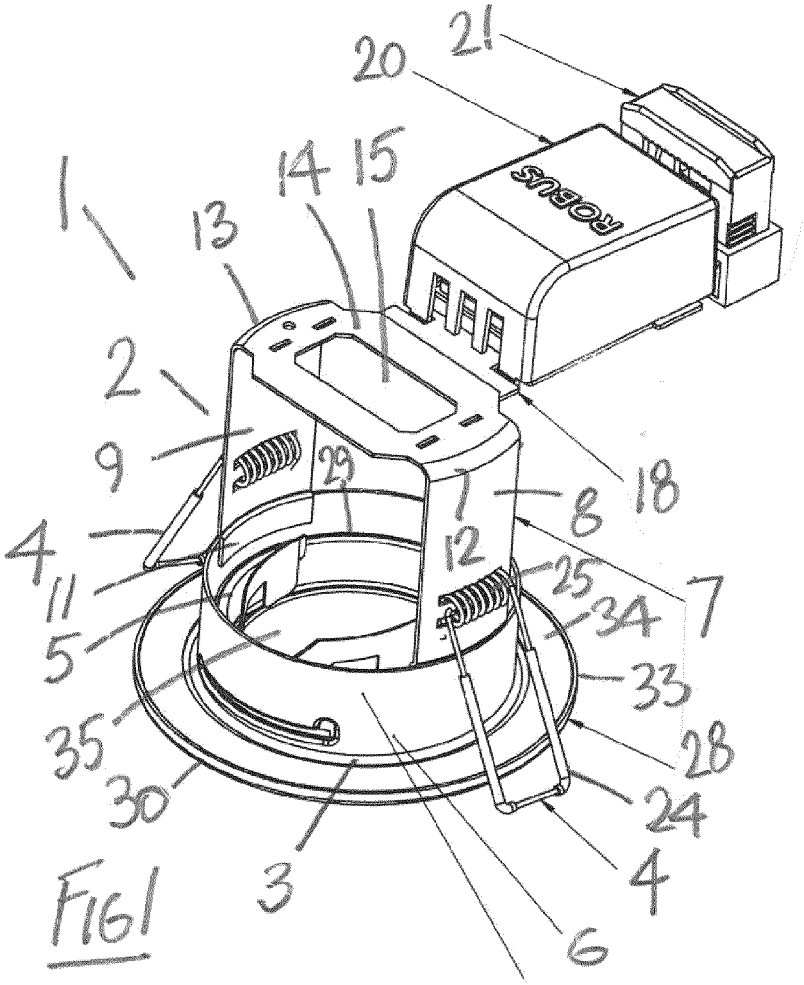
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FIG1

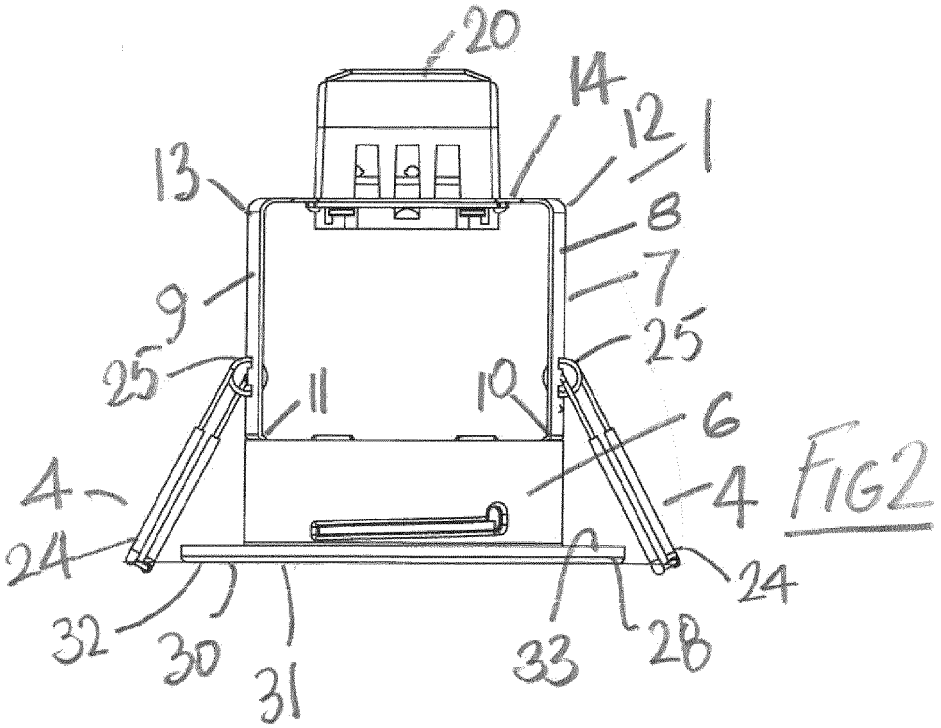
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FIG2

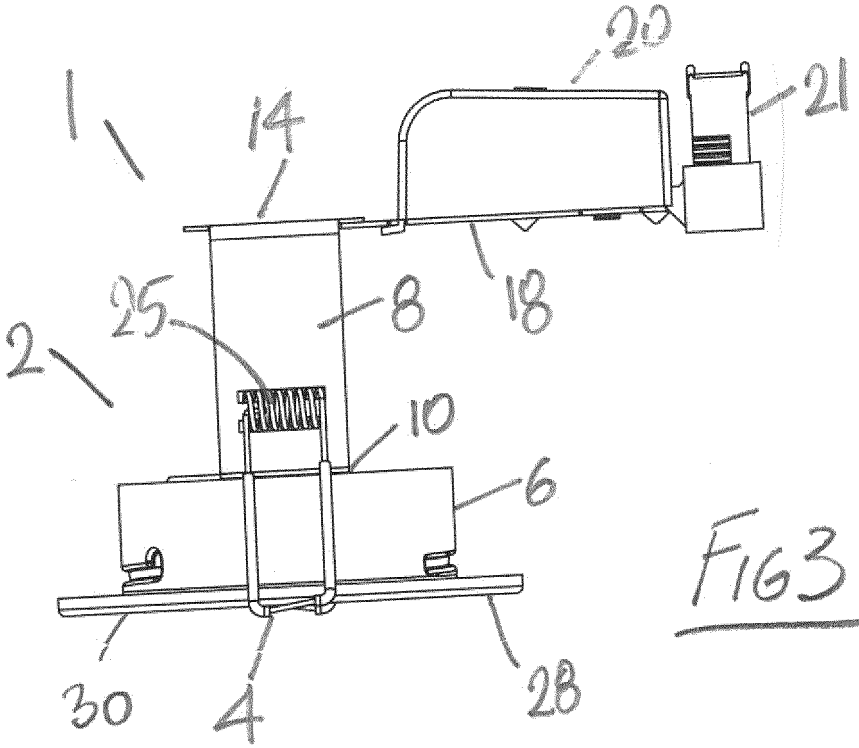


FIG3

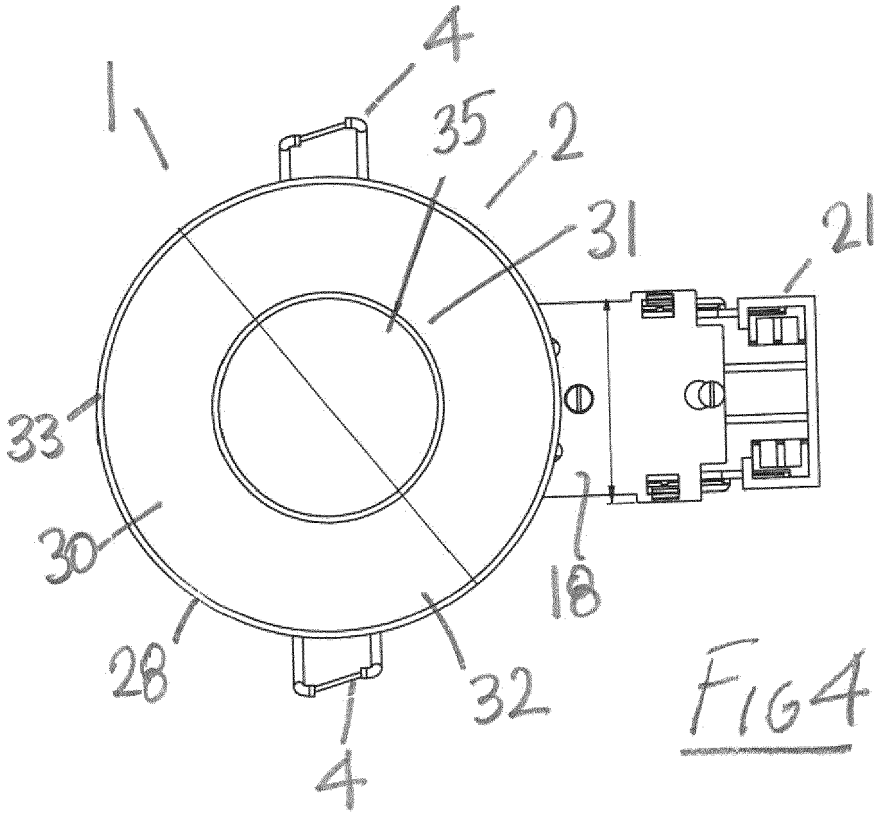


FIG4

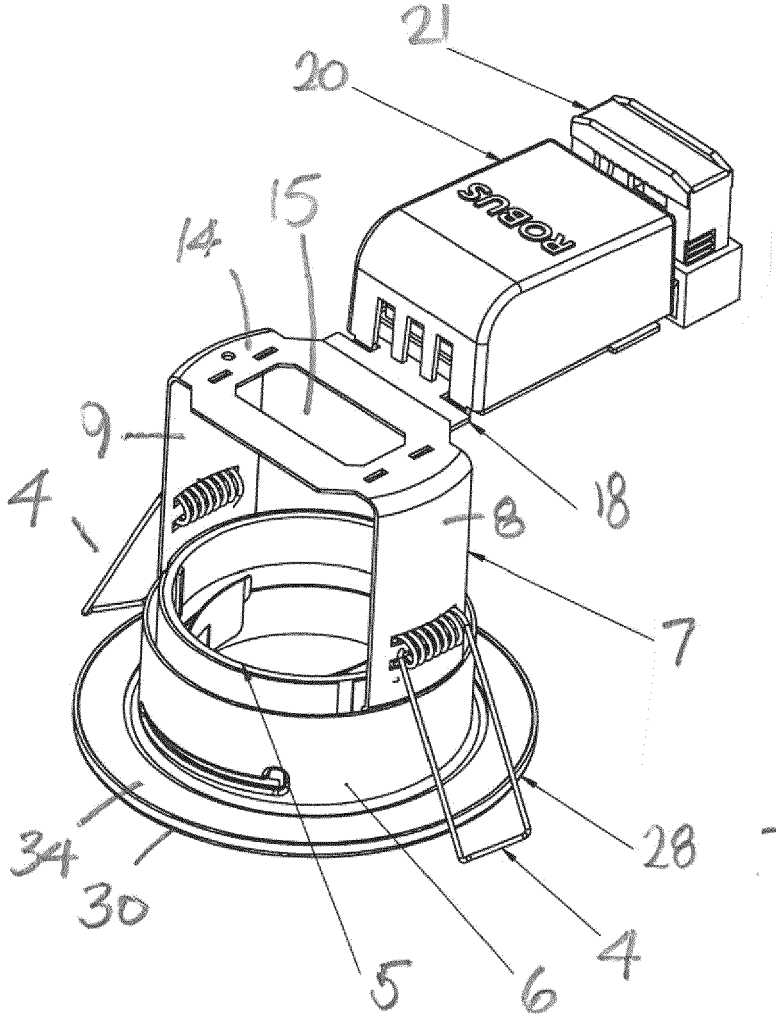


FIG5

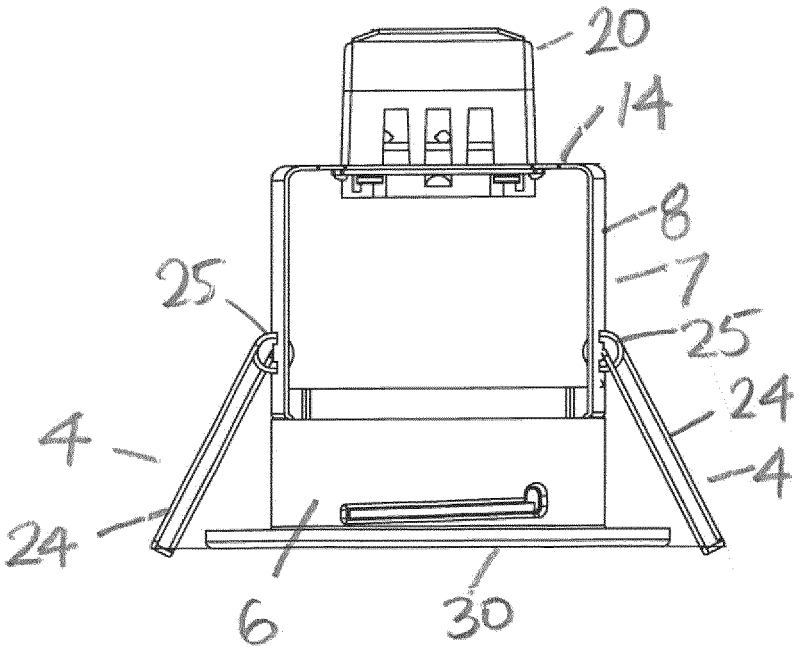


FIG6

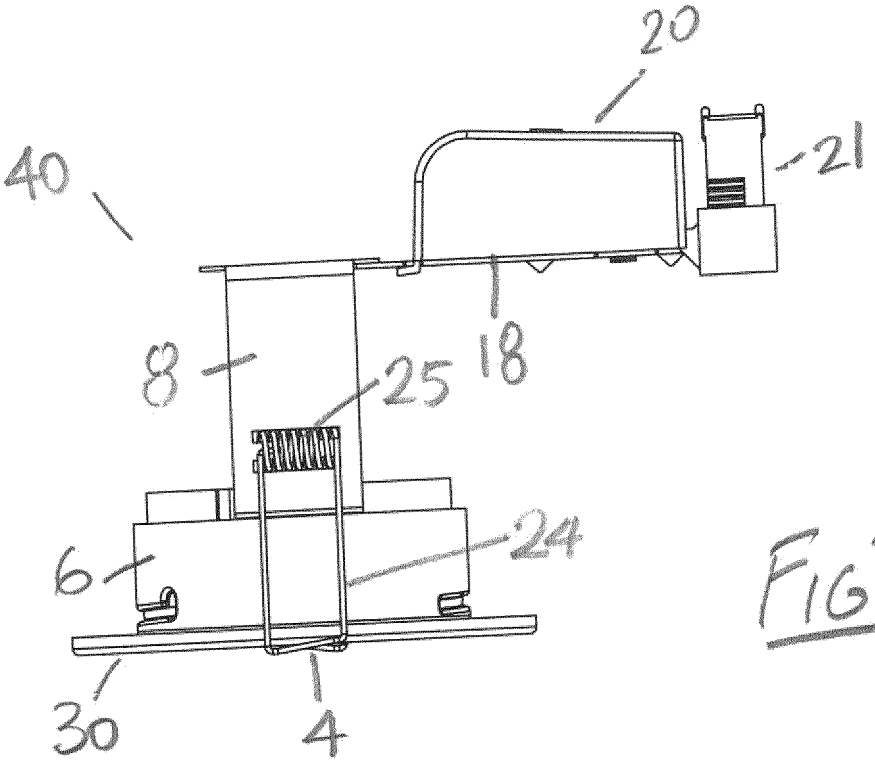


FIG7

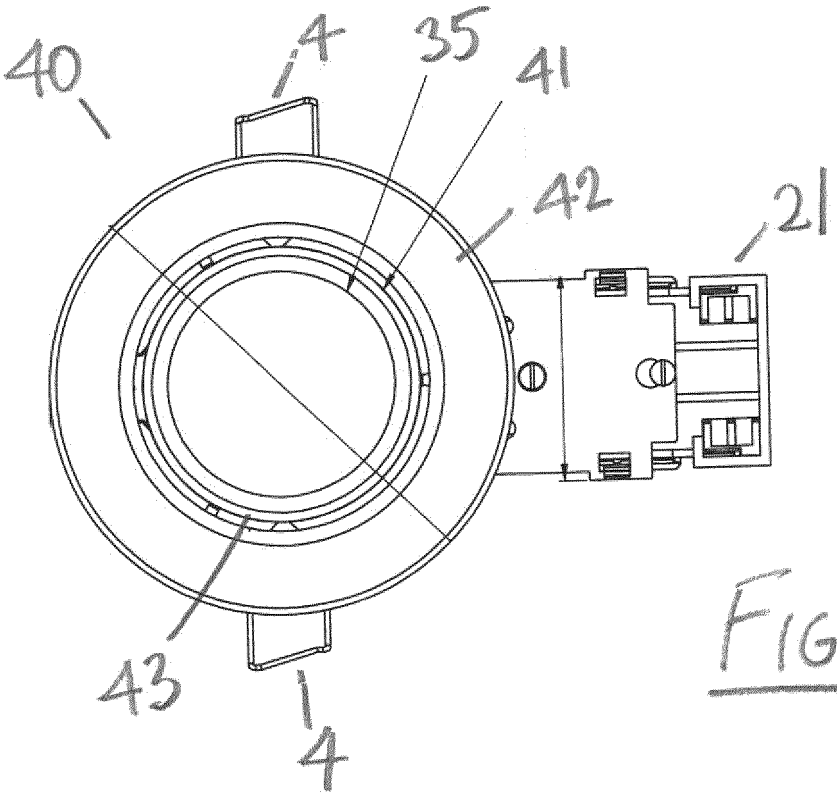


FIG8

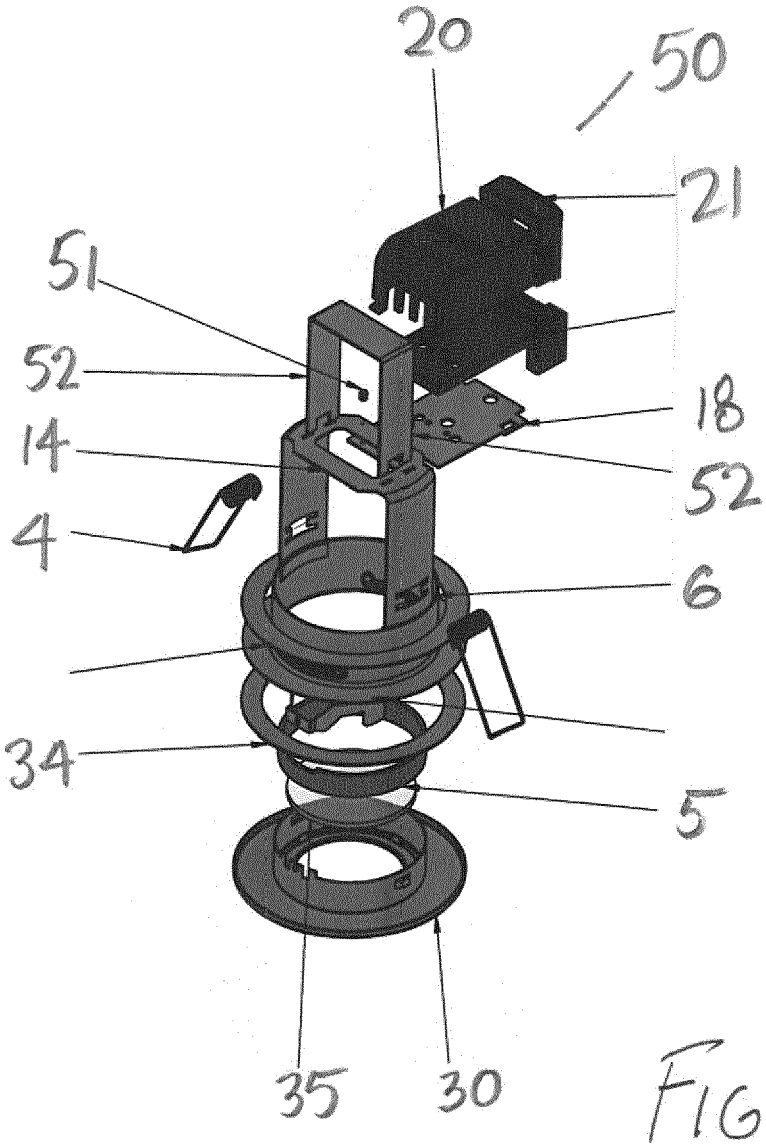


FIG 9

FXD

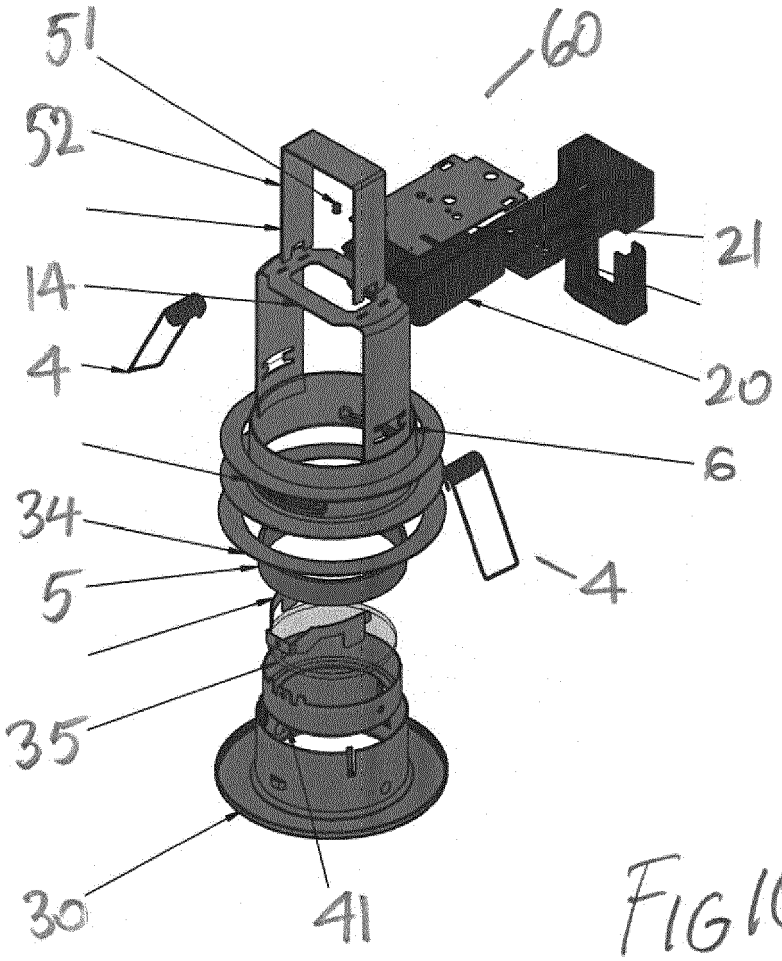


FIG 10

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# EUROPEAN SEARCH REPORT

Application Number
EP 20 21 8020

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | EP 3 049 717 A1 (AURORA LTD [GB])<br>3 August 2016 (2016-08-03)<br>* paragraphs [0028], [0035], [0039] *<br>* figures 1,2 *<br>----- | 1-15 | INV.<br>F21S8/02<br>F21V21/04<br>F21V25/12 |
| X | GB 2 552 937 A (ALL LED LTD [GB])<br>21 February 2018 (2018-02-21)<br>* figures 1-7 *<br>* claim 1 *<br>----- | 1-5,<br>12-15 | |

TECHNICAL FIELDS SEARCHED (IPC)

F21S
F21V

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 19 May 2021 | Dinkla, Remko |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 21 8020

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19-05-2021

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| EP 3049717 A1 | 03-08-2016 | AU 2014322639 A1 | 12-05-2016 |
| | | CN 105765302 A | 13-07-2016 |
| | | EP 3049717 A1 | 03-08-2016 |
| | | GB 2518534 A | 25-03-2015 |
| | | US 2016209018 A1 | 21-07-2016 |
| | | WO 2015040603 A1 | 26-03-2015 |
| GB 2552937 A | 21-02-2018 | NONE | |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- GB 2557957 A **[0005]**
- EP 1686315 A1 **[0006]**
- EP 1726873 A1 **[0007]**