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(54) **Casing**

(57) A casing (1) for a light fitting having two angled retention springs (4) to hold the light fitting in place in, say, an aperture in a ceiling. The angled resilient retention

springs (4) allow the fitting to be rotated into and out of secure engagement with the edges of an aperture in which it is held or to be held.

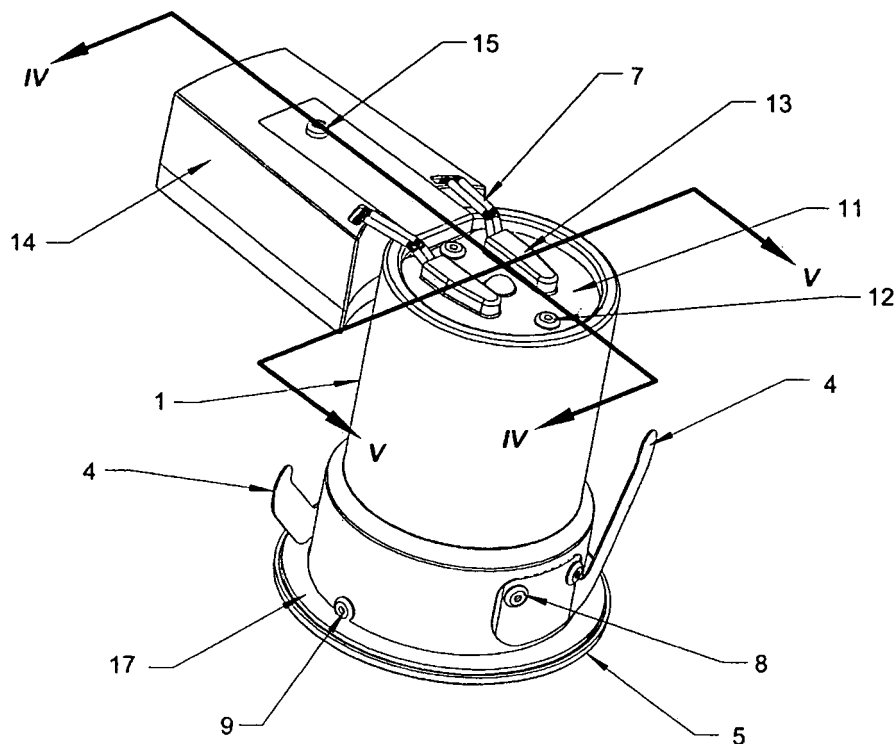


Figure 1

Description

[0001] The present invention is concerned with casings for light fittings. In particular it is concerned with draught-sealed fittings having a lamp-holder within a draught-proof or draught-sealed housing.

[0002] There is a demand for a compact energy efficient recessed down-lighter that complies with the latest Building Regulations in the United Kingdom (and elsewhere) in relation to energy conservation.

[0003] Traditionally, to install such a fitting to the required energy conservation, safety and electrical standards, would require several separate components. The installation would normally include a separate sealed draught-proof cover of some description, and control gear, enclosed and terminated in such a way to comply with the electrical safety standards.

[0004] The present invention provides a casing as defined in claim 1, and a light fitting as defined in claim 14, to which reference should now be made. Preferred features of the invention are set out in the dependent claims to which reference should now be made.

[0005] Known light fitting arrangements for location in a hole or aperture in, say, a ceiling (known as down lighters in at least the United Kingdom) typically have springs (see, for example, GB 2,415,245) which project downwards from the top of a casing and project in a direction having a purely axial component relative to the casing. Such arrangements require the springs to be physically held back until the whole fitting is in place in, say, a hole in a ceiling and then released to project beyond the edges of the ceiling aperture within the ceiling void and thereby hold the fitting in place. Such fittings cannot be removed without access to the ceiling void to physically hold back the springs to allow their passage back through the holes, or without damage to the ceiling.

[0006] An advantage of embodiments of the present invention is that they allow for an easy insertion and removal of a fitting, in or from, a hole in a surface such as a ceiling and yet also hold the fitting securely and tightly in such a hole. Embodiments of the present invention make use of the reactive forces between the angled resilient retention element and the edges of an aperture through which the fitting passes to pull or force the fitting into position and/or compress the retention elements for removal of the fitting.

[0007] A preferred embodiment of the invention will now be described, by way of example only, with reference to the attached figures in which:

Figure 1 is a top perspective view of a light fitting embodying the invention;

Figure 2 is a bottom perspective view of the fitting of figure 1;

Figure 3 is an exploded bottom perspective view;

Figure 4 is a cross-section along line IV-IV of figure 1;

Figure 5 is a cross-section along line V-V of figure 1;

Figure 6 illustrates the action of the retention springs of the fitting; and

Figures 7 to 9 illustrate the fitting located in a ceiling cut-out or hole.

[0008] The fitting (see figure 1) includes a housing formed from a draught-proof can (1). The can has a flange around its open end. Its closed end has apertures to allow passing of connection wires through the housing, and holes for fixing elements.

[0009] The down-lighter comprises an open-ended deep-drawn steel can (1), which has a flange at its open end, four apertures and three holes at its closed end to allow connection wires to pass through and to fix the lamp-holder (2), a reflector spring (3) and a sealing plate/control gear bracket (11), two pairs of holes in the side wall of the can to attach two retention springs (4), and two more holes, one on each side, to fix the die-cast aluminium decorative bezel (5).

[0010] A lamp-holder and reflector retaining spring are attached to the inner surface of the closed end of the can using a single screw (6), with four secondary silicon-impregnated glass sleeved lamp-holder wires (7) passing through the wiring apertures at the top of the can.

[0011] Two flat retention springs (4), manufactured from stainless spring steel, are fitted to the outside of the can, each fixed with two sealed, steel 'pop' rivets (8). These springs retain the down-lighter within the ceiling by a combination of a force fit against the inside walls of the cut-out, and a wedge clamping action between the spring and the internal surface of the ceiling.

[0012] Each retention spring is wedge-shaped to define a bottom edge at an angle to the flange. The lower edge of the spring is at an angle of 45° to the flange. The springs are biased outwards from the housing. The tension placed on the spring, when it is deformed to fit into the ceiling cut-out, exerts pressure on the internal face of the cut-out, and provides a force directed along the lower sloped edge of the spring. The combination of the two forces work together to hold the fitting firmly against the ceiling.

[0013] In order to place the fitting within a cut-out or hole in a ceiling or other surface, the springs are pushed back flush with the housing, using the thumb and forefinger placed on the springs below the upper spring tabs. The housing is then inserted into the cut-out or hole, so that the upper spring tabs are within the ceiling cut-out. The springs are then released, and the housing is then pushed and rotated clockwise firmly into position, with the flange upper surface flush with the outside of the surface surrounding the cut-out or hole.

[0014] As the housing is rotated into position (clockwise in the illustrated embodiment - see, for example,

figures 6 and 7), the angled bottom of each spring (4) pushes down on the upper edge of the aperture and thereby effectively pulls the housing through the aperture as it is rotated until the angled springs tightly clamp the edge of the aperture against the upper surface of the flange around its open end.

[0015] An advantage of the angled leaf spring arrangement is that it allows for the rotation of the fitting into position. Rotation is an easy operation. A further advantage is that the fitting can be removed without the need to access the top of the fitting which is behind the ceiling. Removal can be effected by rotation of the fitting in a direction opposite to the direction of rotation necessary for insertion. In the illustrated embodiment, rotation anti-clockwise compresses the spring tabs against the edges of the aperture and thereby allows for the removal of the casing without access to the ceiling void above the light fitting.

[0016] When the fitting has been placed in a cut-out (see figures 6 to 9) and the retention springs released, an end portion of the springs project beyond the inside surface of the cut-out or hole. The under side of the outwardly biased retention springs therefore push down on the area surrounding the inner end of the cut-out or hole and pull the flange up against the surface surrounding the outer end of the cut-out. This helps seal the area between the bottom of the housing and the surface in which it is located.

[0017] A die-cast aluminium decorative bezel (5) is fitted within the open end of the can using two sealed, steel 'pop' rivets (9). A spun anodised aluminium reflector (10) is then inserted through the decorative bezel, which is then located in the correct position by the reflector spring (3). The reflector needs to be removed and subsequently re-fitted to install the lamp (18). This is necessary to maximise the performance of the reflector system.

[0018] A sealing plate/control gear bracket (11) is fitted to the top of the can using two sealed, steel 'pop' rivets (12). When fitting the sealing plate/control gear bracket, the two pairs of sleeved lamp-holder leads (7) are passed through the two formed wiring cavities (13) within the bracket, before the rivets are set. The tight fit of the lamp-holder leads/secondary sleeving within the formed wiring cavities (13), provides an adequate seal to the wiring apertures at the top of the can.

[0019] An injection moulded housing (14), containing the control gear necessary to drive the lamp, is attached to the bracket using one screw (15). The sleeved wires (7) from the lamp-holder are connected directly to the control gear printed circuit board (16) contained within it.

[0020] An annular gasket seal (17), die-cut from a closed cell silicon rubber foam sheet, is fitted to the upper side of the can flange. This forms an effective seal between the ceiling surface and the down-lighter flange when it is installed.

Claims

1. A casing for a light fitting comprising:

a substantially circular housing having an open first end and a second end,
a flange projecting outwards from and surrounding the housing adjacent to the first end, and
an elongate resilient retention element attached to the housing at or near the flange and biased away from the outside surface of the housing;

wherein at least a portion of the elongate resilient retention element projects towards the second end and outwards from the housing at an acute angle to the flange in a direction that has both an axial and a circumferential component relative to the housing.

2. A casing according to claim 1 wherein the elongate resilient retention element is a leaf spring element.

3. A casing according to claim 1 or 2 wherein the casing, other than the first open end, is substantially sealed against the ingress or exit of air.

4. A casing according to any preceding claim wherein the housing is made from fire resistant material.

5. A casing according to any of claims 2 to 4 wherein the leaf spring element is biased so that, in use, the angled portion of the leaf spring element engages the edge of an aperture in a supporting structure in which the casing is to be mounted to retain the flange against a surface surrounding the aperture.

6. A casing according to claim 5 wherein the leaf spring element is biased so that, in use, a force is directed along an edge of the angled portion of the leaf spring element to urge the flange into contact with the surface surrounding the aperture.

7. A casing according to claim 6 wherein the leaf spring element is biased so that, in use, it exerts a pressure on an internal face of the aperture to retain the casing within the aperture.

8. A casing according to claim 6 or 7 wherein the arrangement of the leaf spring element is such that during insertion, rotation of the housing in the direction of the circumferential component of the leaf spring element urges the edge of the angled portion of the leaf spring element against the edge of the aperture to urge the flange into contact with the surface surrounding the aperture.

9. A casing according to claim 8 wherein the arrangement of the leaf spring element is such that rotating the casing in the opposite direction and urging the

flange away from the surface, urges the leaf spring element towards the casing, thereby enabling withdrawal of the casing from the aperture.

10. A casing according to any of claims 2 to 9 wherein the leaf element is at an angle of between 30° and 60 ° to the flange surface. 5
11. A casing according to claim 10 wherein the leaf spring element is at an angle of between 40° and 50° to the flange surface. 10
12. A casing according to claim 11 wherein the leaf spring element is at an angle of about 45 ° to the flange surface. 15
13. A casing according to any of claims 2 to 12 wherein the leaf spring element is a strip of stainless spring steel. 20
14. A light fitting including the casing of any of claims 1 to 13 and a lamp-holder. 25
15. A light fitting according to claim 14 also including a reflector and integrated control gear. 25

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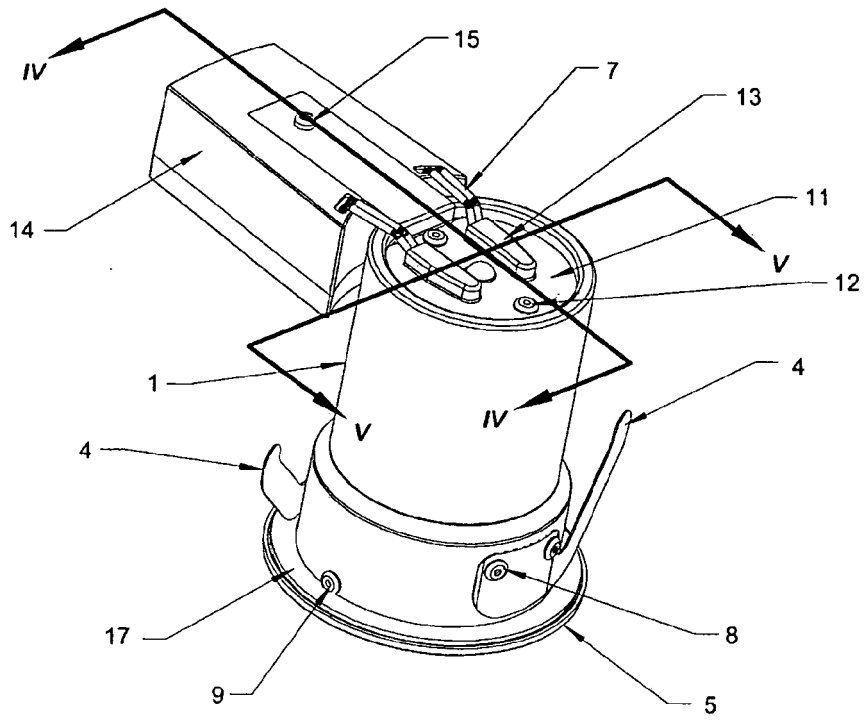


Figure 1

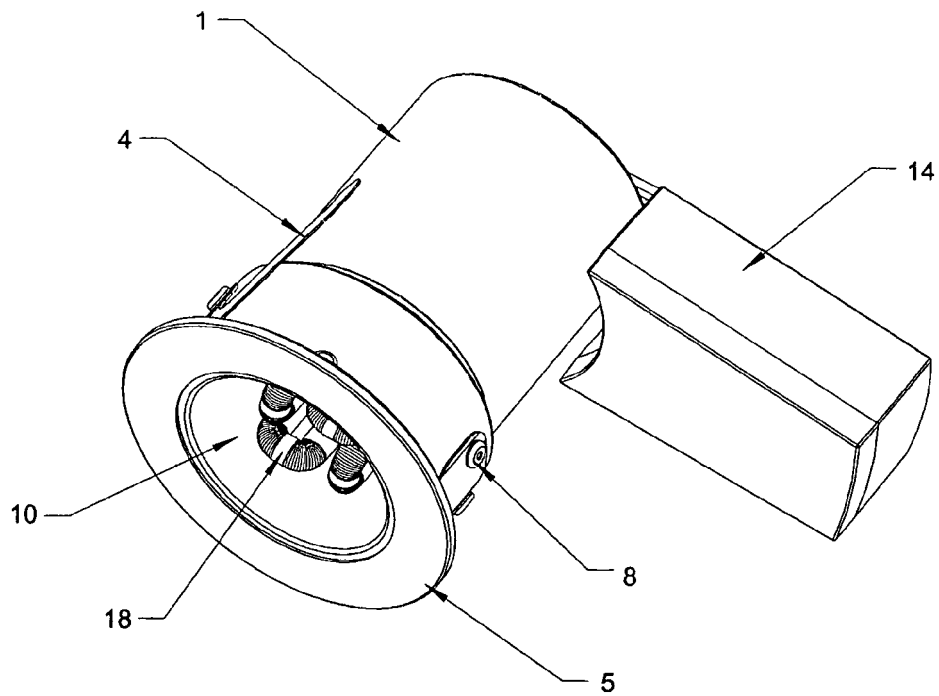


Figure 2

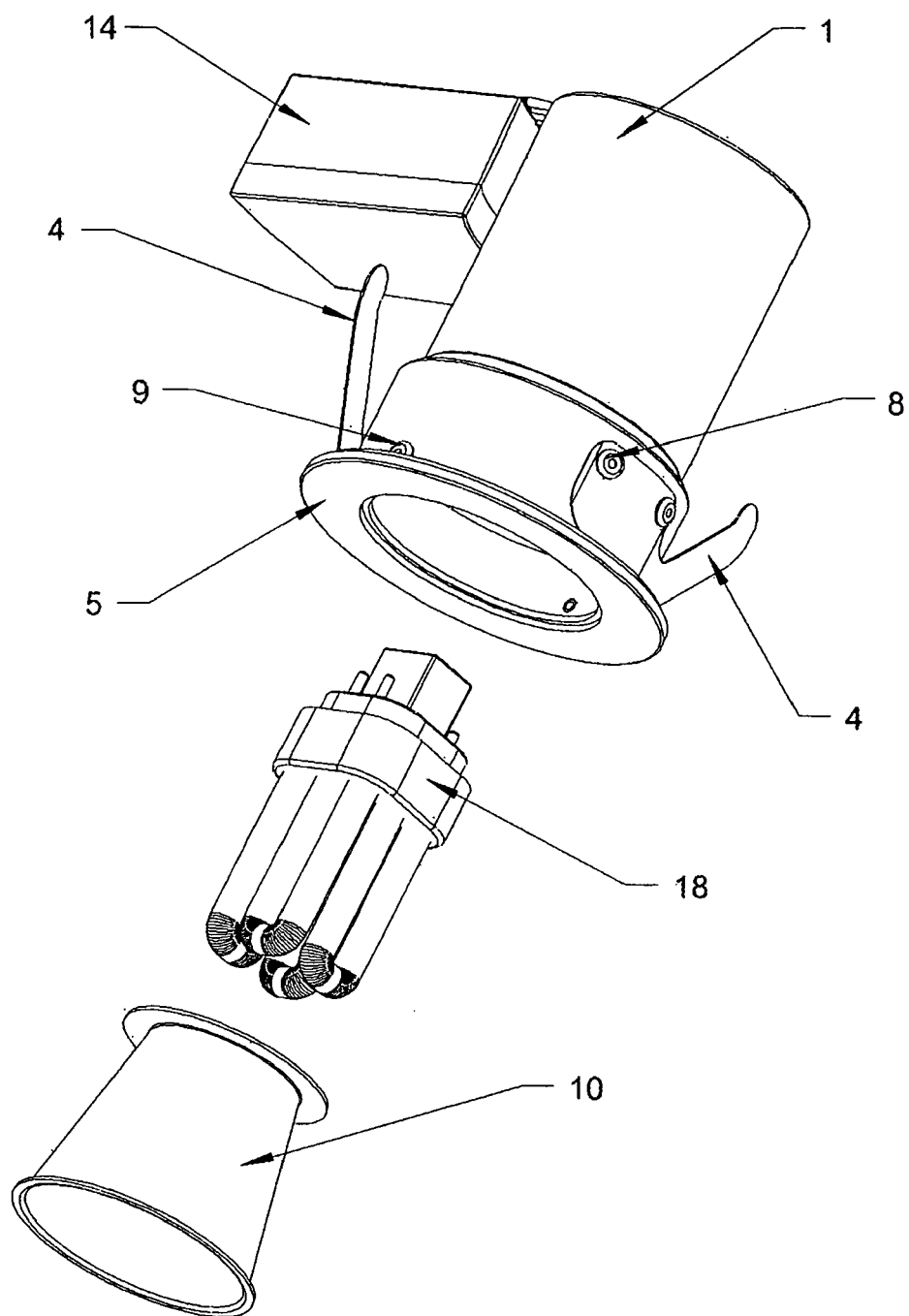


Figure 3

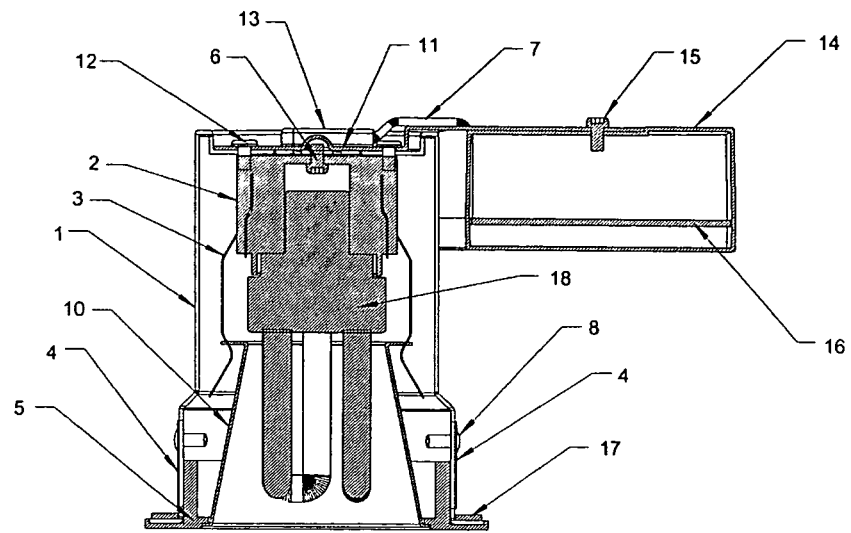


Figure 4

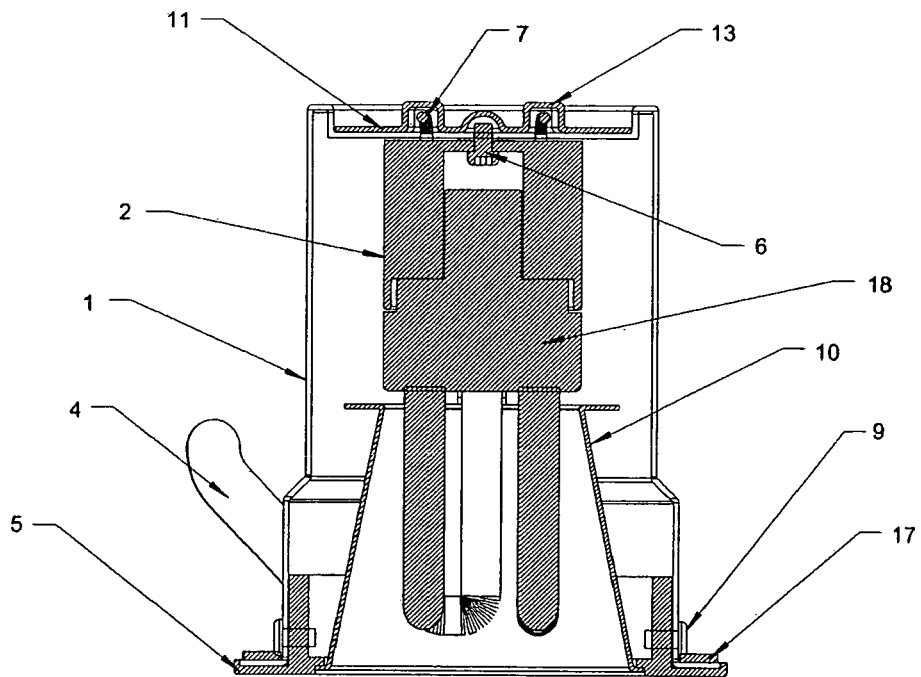


Figure 5

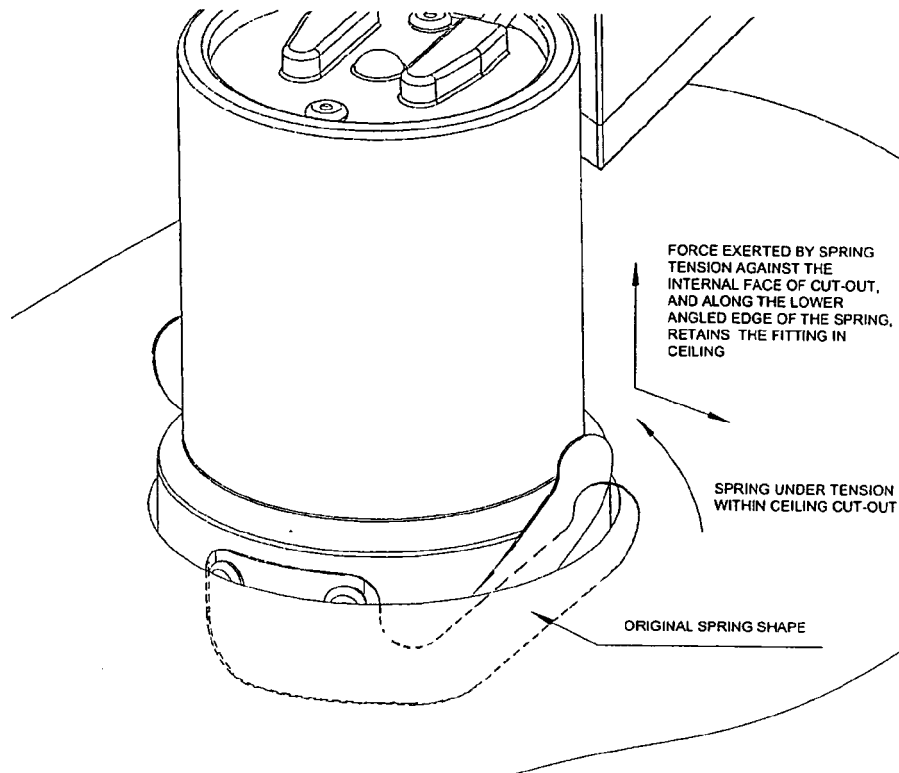


FIGURE 6

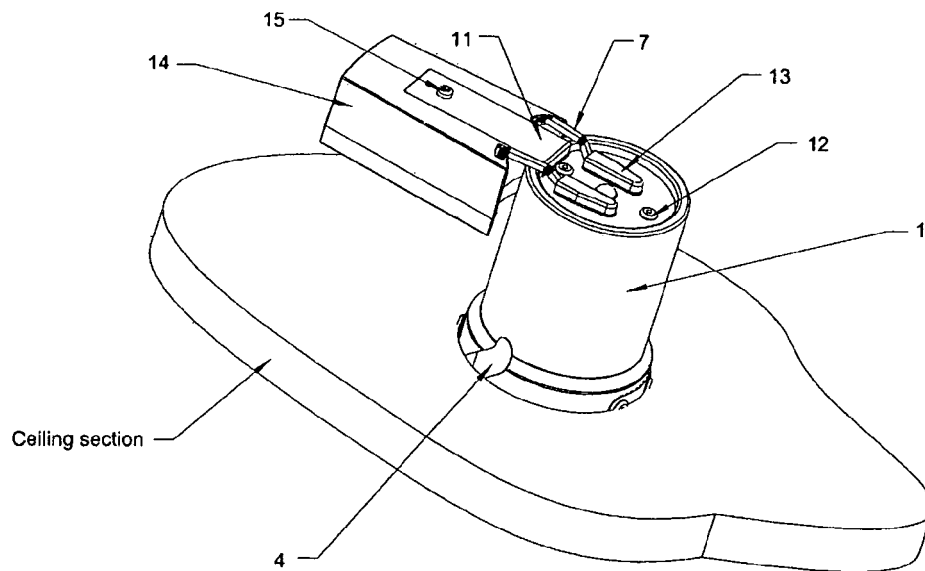


Figure 7

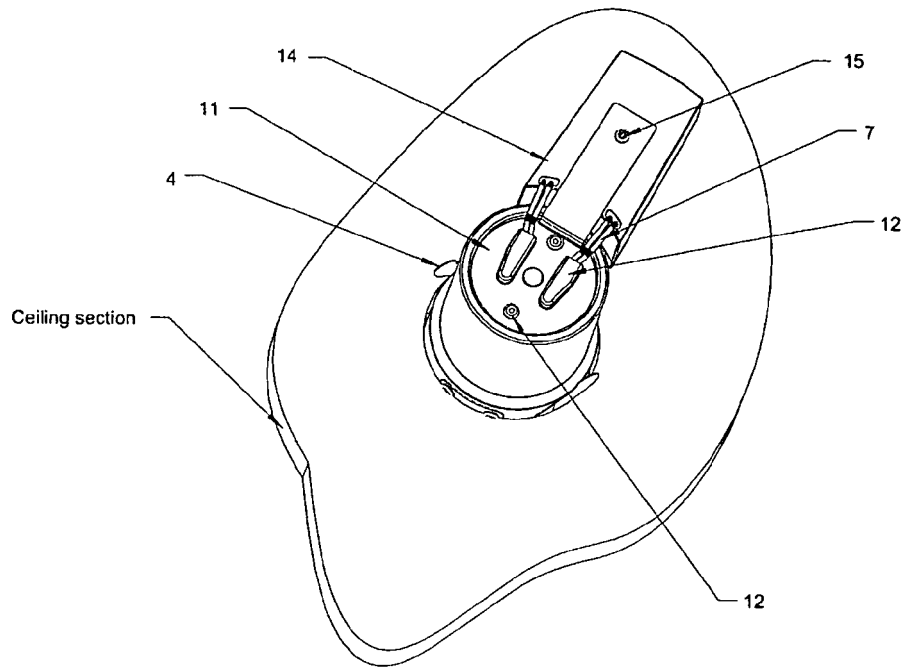


Figure 8

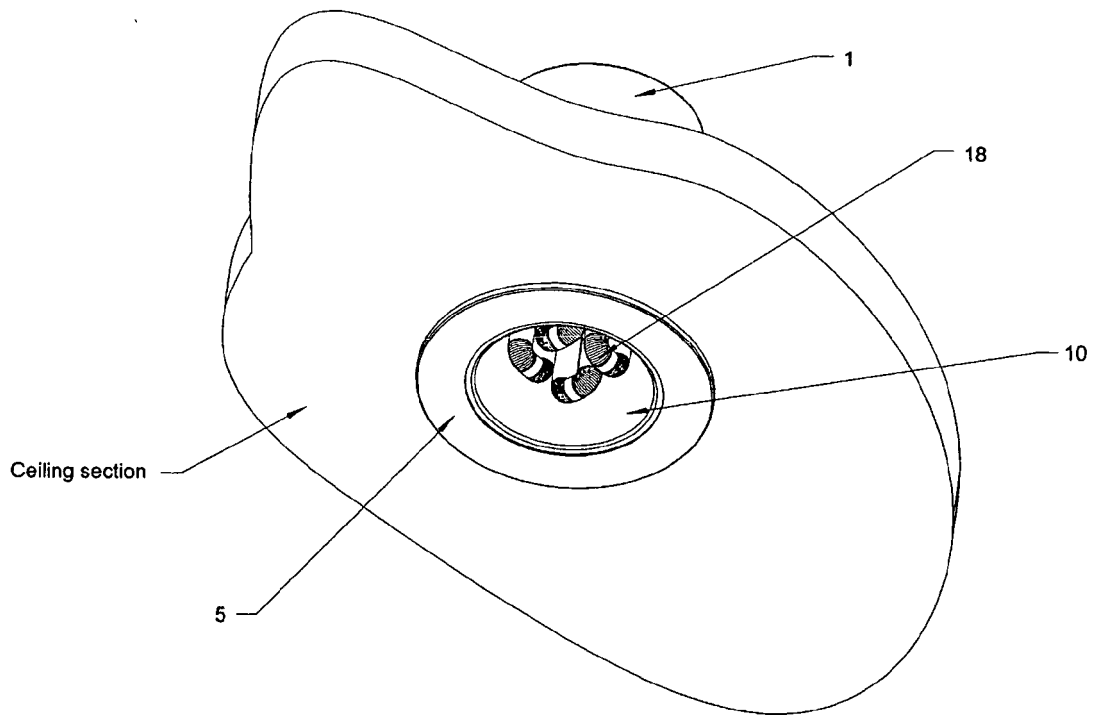


Figure 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2415245 A [0005]