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(54) **Recessed lighting device**

(57) The invention relates to a recessed light fitting (1) which comprises a frame (2) for receiving one or more light sources. In order to provide a light fitting that is simply and flexibly installable in various installations the light fitting (1) comprises, in addition to the frame (2), a connection device box (7) through which power supply is arranged to said one or more light sources in the frame (2), and to adapt the appearance of the light fitting (1) to meet the requirements of the installation the connection device box (7) and the frame (2) may be mutually arranged in alternative positions.

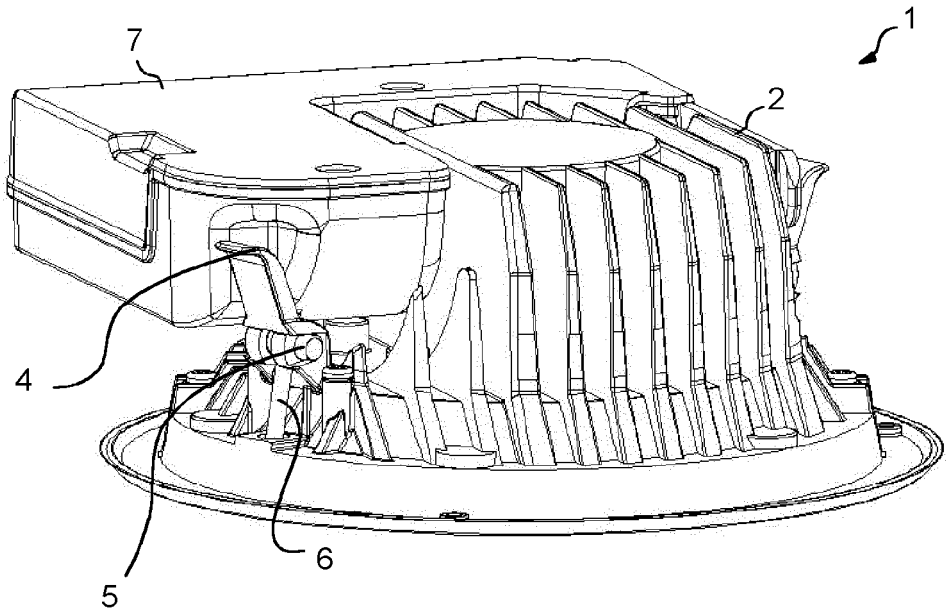

FIG. 1

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Description

Field of the invention

[0001] This invention relates to a light fitting, and in particular to a recessed light fitting.

Description of prior art

[0002] To enable recessed installation for a light fitting in as simple and flexible manner as possible, the dimensions of the light fitting to be recessed are to be suitable for the installation place in question.

[0003] For instance, in connection with ceilings, there are typically variations in the thickness of the actual ceiling and also in dimensions of a space above the ceiling. In order to take these variations into account, there is previously known a solution, in which several variations having different dimensions have been manufactured of the same light fitting. Thus, there is a specific, individual light fitting for different ceiling thicknesses and recess installation depths, the light fitting being designed to fit the particular installation place in question.

[0004] A drawback with the above solution is that a plurality of variations need to be manufactured of the same light fitting.

Summary of the invention

[0005] The object of the present invention is to solve the above-described problem and to provide a light fitting which may be installed in a simple and flexible manner in places whose measurements differ from one another. This is achieved with a light fitting in accordance with the attached independent claim 1.

[0006] When a connection device box is arranged in connection with the frame of the light fitting, some of the parts belonging to the light fitting may be arranged apart from the actual light fitting frame, whereby the shaping of the light fitting frame becomes more flexible such that it will be utilizable in a variety of installations. Moreover, when the light fitting frame and the connection device box are manufactured such that in connection with installation they may be arranged in alternative positions in relation to one another, it is possible to provide a light fitting that is adaptable to use more flexibly than before. Thus, depending on the installation place, the mutual position of the connection device box and the frame may be arranged such that the light fitting is suitable for installation in that particular installation place.

[0007] Preferred embodiments of the light fitting in accordance with the invention are disclosed in the attached dependent claims.

Brief description of the figures

[0008] The invention will be described in the following in greater detail by way of example and with reference to the accompanying figures, in which:

Figure 1 shows a first embodiment of a light fitting seen obliquely from above;
Figure 2 shows the first embodiment of the light fitting seen obliquely from below;
Figures 3 to 5 illustrate the installation of the light fitting of Figures 1 and 2 in various locations; and
Figures 6 to 7 illustrate the installation of the light fitting of Figures 1 and 2 in a fixture housing.

Description of at least one embodiment

[0009] Figures 1 and 2 show a first embodiment of a light fitting 1 seen obliquely from above and obliquely from below. The light fitting 1 comprises a frame 2, which may be made of a suitable plastic or metal material and which is embedded at least partly in a surrounding structure in connection with installation.

[0010] The frame 2 of the light fitting 1 may accommodate one or more light sources 10. For instance, the question may be of high-power light emitting diodes, i.e. so-called high-power leds, whose power may be 1 to 3 W/piece, for instance. The light sources 10 are arranged in the light fitting frame 2 such that the light produced thereby is able to propagate to the space under the light fitting through an open lower part of the frame 2.

[0011] In order to secure the recessed light fitting 1 to the structure that at least partly surrounds the frame 2, such as the ceiling, the example of Figures 1 and 2 employs fasteners 4 arranged on the outer surface of the frame 1. The distance which these fasteners 4 project from the frame 2 is adjustable, so that the light fitting 1 can be secured into place in the surrounding structure by means of the fasteners which are pressed against the surrounding structure. The fasteners may be, for instance, metal wire loops or plastic pins, which press outwardly from the frame due to an intermediary piece 5, which intermediary piece 5 moves along a screw 6, when the screw head is turned from inside the light fitting frame 2 with a screw driver, for instance.

[0012] In the case of Figures 1 and 2, a connection device box 7 is secured to the frame 2 through a securing member 8. The securing member 8 may be, for instance, a screw or a rivet, through which the connection device box 7 is pivoted to the frame 2 such that their mutual positions may be changed by pivoting the connection device box about the securing member 8. Alternatively, a plurality of securing members 8 may be employed, for instance, a plurality of screws and holes provided for them, whereby the connection device box 7 is securable to the frame 2 by means of these securing members in any one of the plurality of alternative positions in relation to the frame. Further, it is conceivable that the frame 2 and the connection device box 7 are provided with bulges and recesses which enable the securing of the connection device box 7 to the frame 2 by using so-called click-into-place connection, in which the reliefs are pressed in

the recesses. In this case there are also several alternative, cooperating bulges and recesses so that the connection device box may be secured in a desired position in relation to the frame.

[0013] Figures 3 to 5 illustrate the installation of the light fitting 1 of Figures 1 and 2 in various locations.

[0014] In the example of Figure 3, the light fitting 1 is shown embedded in a ceiling 15. In that case the light fitting frame 2 penetrates partly inside the structure of the ceiling 15 until a collar in its lower part will be against the lower surface of the ceiling 15.

[0015] In the case of Figure 3, the connection device box 7 is arranged in such a position in relation to the frame 2 that it projects to the left from the frame 2, in parallel with the ceiling 15. In that case the recess installation depth D1 of the light fitting 1 is at its smallest. In this position the light fitting 1 is utilizable, for instance, for a ceiling structure, where the thickness D2 of the ceiling is relatively small. Thanks to the location of the connection device box 7 a conductor connected to the power supply network may be readily coupled in a space above the ceiling 15 to a connector 9 locating in the connection device box. Thus, it is possible to arrange power supply through the connection device box to the light source 10 or light sources, which are also coupled to the connector 9. In practice, the connector 9 may be designed to receive individual electric conductors. Alternatively, it may be a connector that receives a plug.

[0016] Depending on the type of the light source 10, it is also possible to arrange a power source 11 or an inverter in the connection device box 7 between the connector 9 and the light source, when necessary.

[0017] The example of Figure 4 corresponds to that of Figure 3 in all other respects but in the case of Figure 4 the connection device box 7 is pivoted about the pivot point provided by the securing member 8 to the right in relation to the frame 2. It appears from Figure 2 that the securing member 8 constituting the pivot point is arranged eccentrically to the connection device box 7, i.e. offset from the centre line 12 of its side part. Consequently, the recess installation depth D1 of the light fitting 1 is larger in the case of Figure 4 in comparison to Figure 3. The thickness D2 of the ceiling may also be larger in the case of Figure 4 in comparison to Figure 3. Consequently, thanks to the eccentricity, it is possible to provide three different depths for recess installation, depending on the position (Figure 3, Figure 4 or Figure 5) to which the connection device box is pivoted.

[0018] The example of Figure 5 corresponds to that of Figures 4 and 5 in all other respects but in the case of Figure 5 the connection device box 7 is pivoted about the pivot point provided by the securing element 8 almost to an upright position in relation to the frame 2, to be above said frame. When the connection device box is in a completely upright position, the recess installation depth D1 of the light fitting 1 is at its largest. In that case also the thickness D2 of the ceiling may be considerably larger than in the cases of Figures 3 and 4.

[0019] It appears from Figures 3 to 5 that thanks to changes in mutual positions of the connecting frame box 7 and the frame 2, performed in connection with installation, the one and the same individual light fitting 1 is applicable to a variety of mounting sites. In order to achieve this, use of a securing member to serve as a pivot point is not absolutely necessary, but instead of the pivoting there may be employed a securing member or members, implemented in another manner, which enable securing of the connection device box to the frame in any one of the several alternative positions.

[0020] Figures 6 to 7 illustrate the installation of the light fitting 1 of Figures 1 and 2 in a fixture housing 14.

[0021] In the example shown in Figures 6 and 7 the fixture housing 14 consists of a hollow, cylindrical part inside which the light fitting is recessed. Depending on the dimensions of the fixture housing 14, the connection device box 7 may be arranged in the upright position, as shown in Figures 6 and 7, or alternatively, it may be turned to a horizontal position, as shown in Figures 3 and 4.

[0022] Figure 6, where the light fitting 1 is shown partly cut open, shows in addition to the light sources 10 a movement sensor 13, which is not necessary in all implementations. When the movement sensor 13 is employed, it may control supply of electricity to the light sources 10 such that they are only supplied when the movement sensor 13 has detected a person moving in a dark space beneath the light fitting, for instance. The movement sensor 13 may be a PIR (Passive Infrared) movement sensor, for instance, which allows detection of a person in the space on the basis of thermal radiation, a movement sensor based on radar technology, which includes a microwave transmitter and a microwave receiver, or an ultrasound receiver, which allows detection of motion in a space.

[0023] It is to be understood that the above description and the relating figures are only intended to illustrate the present invention. It will be obvious to a person skilled in the art that the invention may also be varied and modified in other ways without departing from the scope of the invention.

Claims

1. A recessed light fitting (1) comprising a frame (2) to receive one or more light sources (10), **characterized in**
   that the light fitting (1) comprises, in addition to the frame (2), a connection device box (7), through which power supply is arranged for the one or more light sources (10) in the frame (2),
   that the light fitting (1) includes a securing member (8), by which the connection device box (7) is eccentrically pivoted to the frame (2) such that the securing member (8) is offset from a centre line (12) of a side part of the connection device box, and
   that to adapt the shape of the light fitting (1) to meet

the requirements of the installation location, the connection device box (7) is pivotable by means of the securing member (8) in relation to the frame (2) so as to change the mutual position of the connection device box (7) and the frame (2).

2. The light fitting of claim 1, **characterized in that** on the outer surface of the frame (2) of the light fitting (1) there are arranged fasteners (4) whose lateral projection from the frame (2) is adjustable so as to secure the recessed frame (2) to a structure (15) surrounding the frame.

3. The light fitting of any one of claims 1 to 2, **characterized in that** in the connection device box (7) there is arranged a connector (9), coupled to at least said one or more light sources (10), to receive a conductor connected to a power supply network.

4. The light fitting of any one of claims 1 to 3, **characterized in that** a power source (11) or an inverter is arranged in the connection device box (7) for providing electric supply to said one or more light sources (10).

5. The light fitting of any one of claims 1 to 4, **characterized in that** said one or more light sources (10) is a high-power light emitting diode.

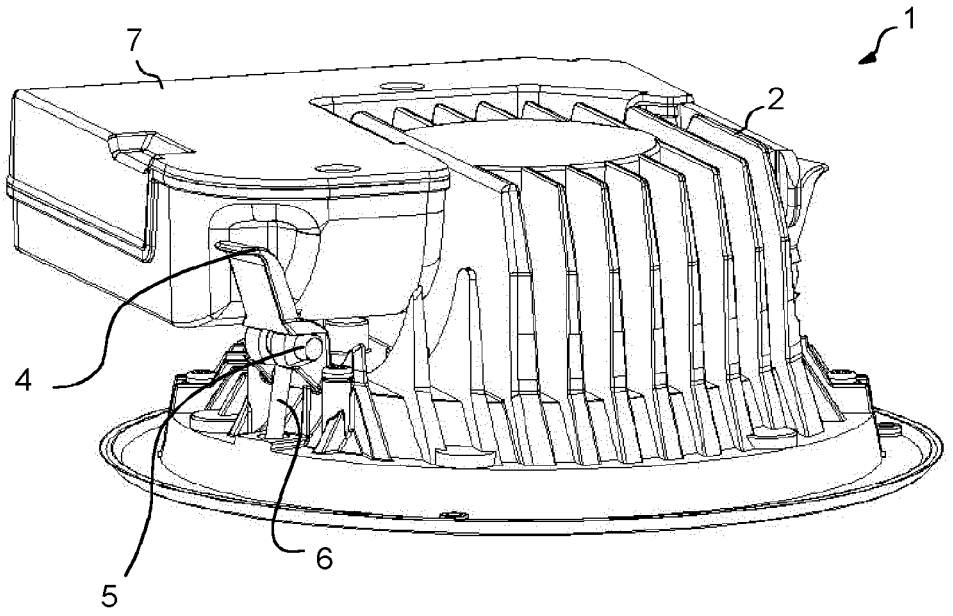

FIG. 1

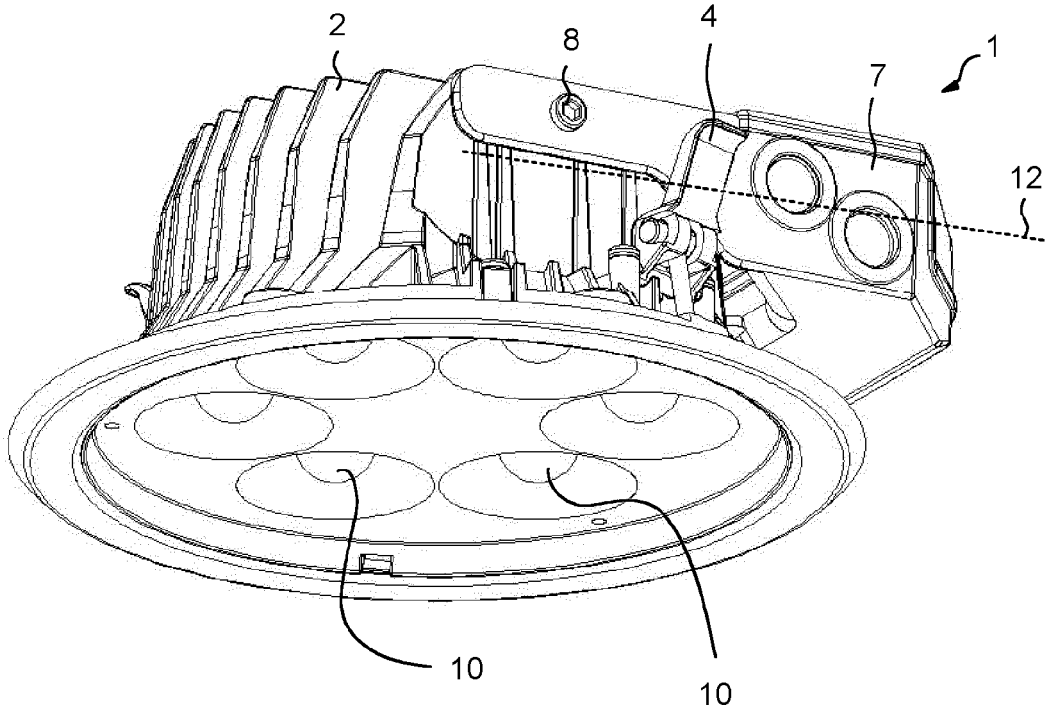

FIG. 2

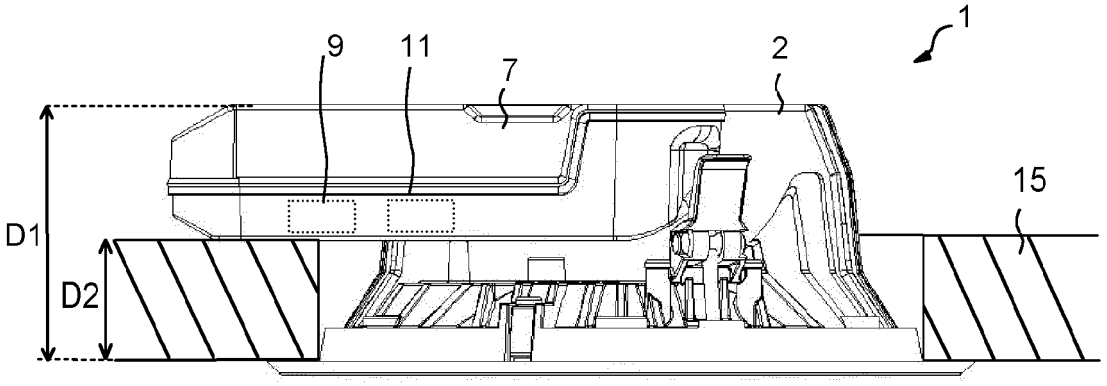

FIG. 3

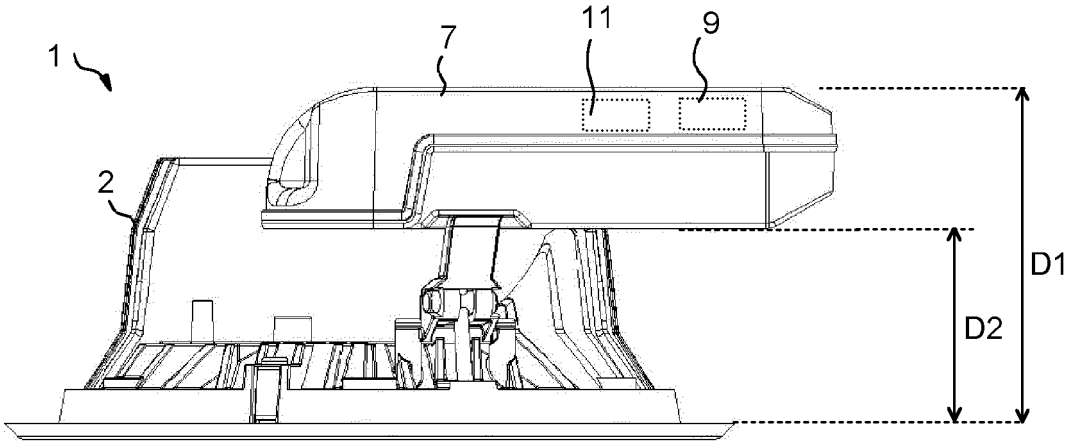

FIG. 4

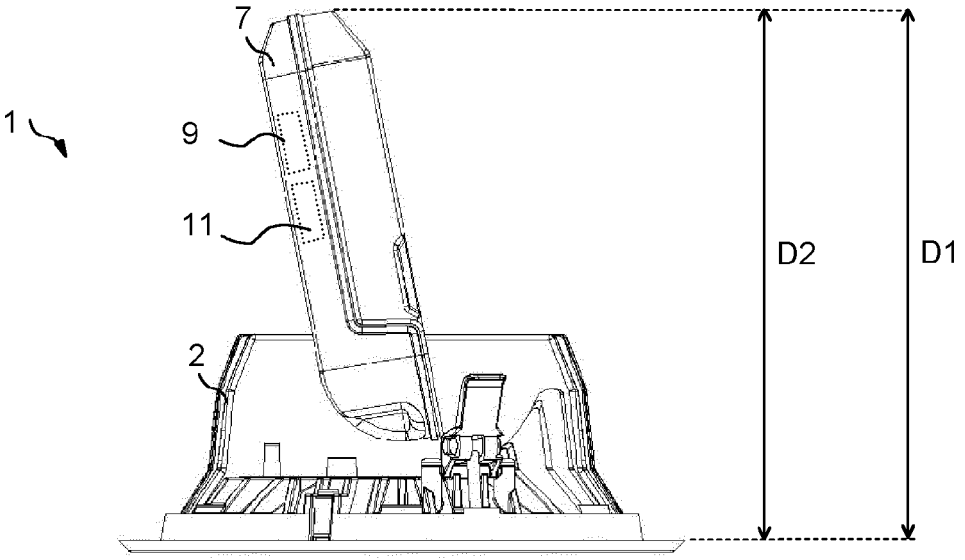

FIG. 5

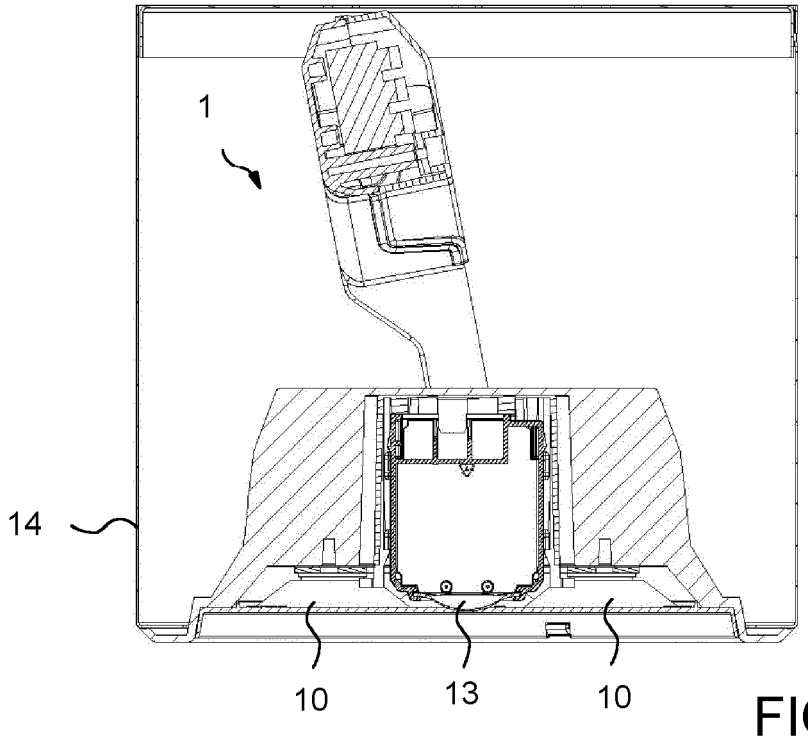

FIG. 6

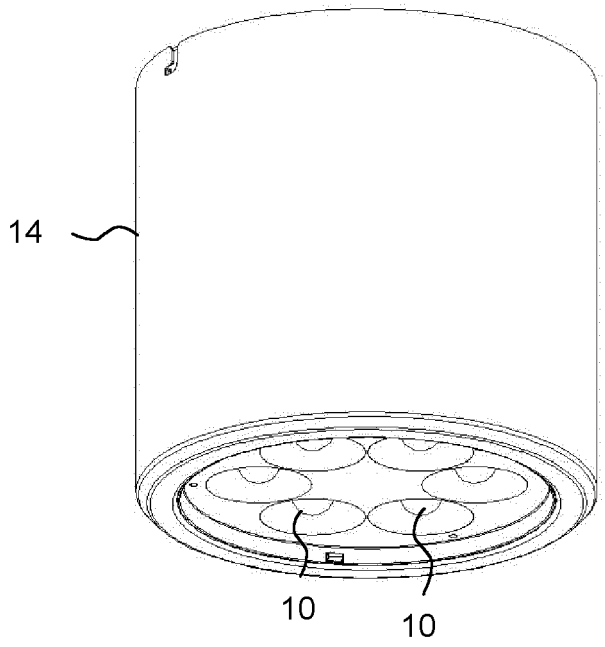

FIG. 7