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(71) Applicant (for all designated States except US): **OSRAM GMBH** [DE/DE]; Marcel-Breuer-Strasse 6, 80807 Munchen (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CHEN, You** [CN/CN]; 5F, Hantang Building, OCT Oversea Chinese Town, Shenzhen, Guangdong 518053 (CN). **LU, Huanghui** [CN/CN]; 5F, Hantang Building, OCT Oversea Chinese Town, Shenzhen, Guangdong 518053 (CN). **MING, Yusheng** [CN/CN]; 5F, Hantang Building, OCT Oversea Chinese Town, Shenzhen, Guangdong 518053 (CN). **WU, Kongyi** [CN/CN]; 5F, Hantang Building, OCT

Oversea Chinese Town, Shenzhen, Guangdong 518053 (CN).

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(54) Title: FIXTURE DEVICE AND DOWNLIGHT HAVING THE FIXTURE DEVICE

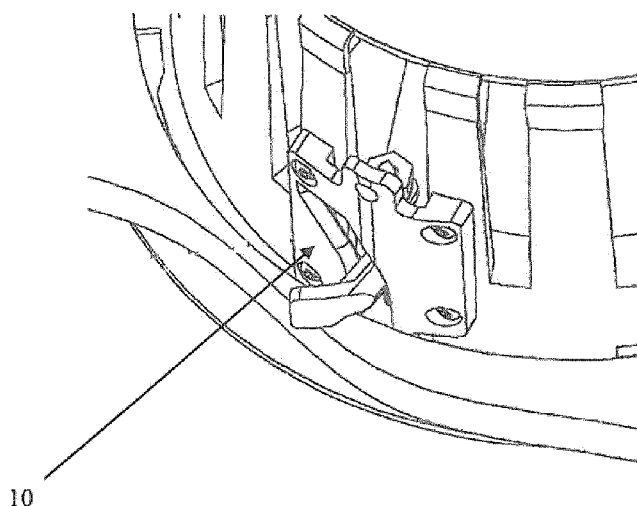


Figure 6b

(57) Abstract: The present invention relates to a fixture device (10) for a downlight (100), characterized in that the fixture device (10) comprises a support frame (2) connected to a downlight body (1) and a fastening mechanism (3) mounted on the support frame (2), and the fastening mechanism (3) is moveable with respect to the support frame (2) between a mounting position where the fastening mechanism (3) is taken back with respect to the support frame (2) and a fastening position where the fastening mechanism (3) is stretched out with respect to the support frame (2) and is capable of tightly pressing a ceiling (5). The fixture device (10) of the present application can bear heavy downlights.

Description

Fixture Device and Downlight Having the Fixture Device

Technical Field

The present invention relates to a fixture device and a downlight having the fixture device.

Background Prior Art

The downlight is a common illuminating device and widely used in offices, halls and malls. The downlight is embedded in the roofs or walls so as to ensure a decorative effect.

In recent years, with the wide applications of LED lamps, LED lamp light sources also start to be used more and more in downlights. As a heat sink is needed for heat dissipation of the LED, an LED downlight will use aluminum alloy as the heat sink, then the LED downlight is heavier than a traditional downlight due to such heat sink. Therefore, a reliable structure is demanded to fix the downlight in a mounting hole of the ceiling so that it will not fall off.

There are two prior art fixture devices for fixing the downlight, wherein a downlight body and the fixture device are made into one piece and fastened by using an elastic force. A plate spring is used to fix the whole downlight as shown in Fig. 1, and a snap spring is used to fix the whole downlight as shown in Fig. 2. The common ground of the two methods above lies in using the elastic force to fix the downlight on the ceiling, while one disadvantage is that the downlight will easily fall off when it is heavy since it de-

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depends upon the elastic force to fix the downlight on the ceiling .

Summary of the Invention

The object of the present invention lies in providing a fixture device that can support a relatively heavy downlight, will not easily damage the ceiling, and can be widely adapted to ceilings of different thicknesses.

A fixture device for a downlight is provided according to the present invention, characterized in that the fixture device comprises a support frame connected to a downlight body and a fastening mechanism mounted on the support frame, and the fastening mechanism is moveable with respect to the support frame between a mounting position where the fastening mechanism is taken back with respect to the support frame and a fastening position where the fastening mechanism is stretched out with respect to the support frame and is capable of tightly pressing a ceiling.

The present invention provides a fixture device that replaces an elastic force to fix a downlight on a ceiling. The fixture device comprises a support frame connected with the downlight body integrally or separately and a fastening mechanism mounted on the support frame, and the downlight is fixed by means of the fastening mechanism. In the present invention, as the fastening mechanism is removable with respect to the support frame, it can move to the mounting position and the fastening position. In the mounting position, the fastening mechanism is adjusted to be adapted to pass through a mounting hole in the ceiling, i.e., the fastening mechanism is adjusted to be taken back with respect to the

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support frame. After the downlight is mounted in the mounting hole of the ceiling, the fastening mechanism can be moved from the mounting position to the fastening position, that is, the fastening mechanism is stretched out with respect to the support frame to tightly press the downlight on the ceiling. That is to say, the fastening mechanism has different positions and/or orientations with respect to the support frame in the mounting position and the fastening position, which facilitates to meet different requirements, *i.e.*, mounting requirement and fastening requirement, via the positions and/or orientations. Compared with the prior art that the downlight is fixed on the ceiling by using an elastic force, in the present invention, a bigger bearing force is generated and a heavier downlight can be supported.

In one preferred solution of the present invention, the support frame comprises a first guide portion and the fastening mechanism comprises a second guide portion, and the first guide portion guides the second guide portion between the mounting position and the fastening position. As a result of the cooperation of the first guide portion and the second guide portion with each other, a relative movement between the fastening mechanism and the support frame is easily realized and it is easily realized that the fastening mechanism has different positions and/or orientations with respect to the support frame.

In one preferred solution of the present invention, the fastening mechanism comprises an adjusting unit and a pressing unit configured as the second guide portion, and the adjusting unit is engaged with and drives the second guide portion. The adjusting unit drives the second guide portion to force the second guide portion to be guided, for instance, the sec-

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ond guide portion is stretched out in the fastening position to apply a pressure.

Preferably, the second guide portion comprises a first portion and a second portion, the first portion is engaged with the first guide portion, and the second portion is engaged with the adjusting unit. Thus, the structure design is simplified, and connecting structures between the second guide portion, the first guide portion and the adjusting unit are simplified, and movements are effectively transferred.

Preferably, the adjusting unit comprises an adjusting screw and a screw hole is opened in the second portion to cooperate with the adjusting screw. Thus, the structure design is simplified, and the adjustment is facilitated. By means of a mutual action of the adjusting screw and the screw hole, a movement of the adjusting screw is transferred to the second guide portion opened with the screw hole, for example, by guiding the second guide portion downwardly, the first portion of the second guide portion is used finally to be pressed on an inner surface of the ceiling.

Preferably, the adjusting unit further comprises a stop nut, and the adjusting screw passes through the screw hole to be engaged with the stop nut. The stop nut can prevent disengagement of the adjusting screw and the screw hole when the adjusting screw and the screw hole go beyond an adjusting route caused by over-adjustment of the adjusting screw and the screw hole.

Preferably, the second guide portion is an L-shape slide block. A minor shaft portion of the L-shape slide block, e.g., as the first portion of the second guide portion, has a

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portion thereof configured as a pressing end that can tightly press the ceiling, so that a bigger pressing force is applied on the ceiling. A major shaft portion of the L-shape slide block, as the second portion of the second guide portion, has a portion thereof that can be opened with the screw hole.

Preferably, the support frame is a guide plate, and the first guide portion is a slide slot opened on the guide plate. As the L-shape slide block slides in the slide slot, it is convenient to mount the downlight into the mounting hole in the ceiling in the mounting position, and a transfer from the mounting position to the fastening position can be easily realized when fastening is needed.

Preferably, the slide slot has a bent slide slot portion and a vertical slide slot portion in sequence from top to bottom. By configuring the slide slot portion to have such two portions, when guided in the bent slide slot portion, the fastening mechanism is located in the mounting position where the fastening mechanism is taken back with respect to the support frame, and when guided in the vertical slide slot portion, the fastening mechanism is located in the fastening position where the fastening mechanism is stretched out with respect to the support frame and tightly presses an inner surface of the ceiling.

Preferably, the guide plate and the downlight body are removably connected, which thus improves the universality of the fixture device cooperating with different types of downlights. At least one fastening groove is opened on the guide plate, and the guide plate can be fixed on the downlight body by using at least one fastening piece passing

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through the at least one fastening groove.

The present invention further relates to a downlight comprising a downlight body and the fixture device with the above characteristics. Preferably, the downlight is an LED downlight. Preferably, the downlight body and the fixture device are removably connected.

The fixture device of the present invention can support a relatively heavy downlight, make it not easy for the downlight to fall off, will not easily damage the ceiling, and can be widely adapted to ceilings of different thicknesses, and therefore has prominent advantages.

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It shall be understood that both the above general description and the following detailed description are for illustrative and explanative purposes in order to provide further description of the claimed present invention.

5 Brief Description of the Drawings

Next, preferred embodiments according to the present utility model will be illustratively described hereinafter with reference to the figures. As shown in the drawings:

Fig. 1 shows a prior art fixture device used in a downlight;

10 Fig. 2 is another prior art fixture device used in a downlight ;

Figs. 3a-3b are 3D views of assembling a downlight of one embodiment of the present application in a mounting position and a fastening position, respectively;

15 Figs. 4a-4e show a fixture device of one embodiment of the present invention, wherein an exploded diagram of the fixture device, a support frame of the fixture device, a front view and a rear view of the mounted fixture device, and a schematic diagram of different positions of the fixture device
20 are shown, respectively;

Figs. 5a-5b show an overall diagram and a local diagram of a downlight of an embodiment of the present invention when a fixture device is located in a mounting position;

Figs. 6a-6b show an overall diagram and a local diagram of a
25 downlight of an embodiment of the present invention when a fixture device is located in a fastening position; and

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Fig. 7 shows a schematic diagram of further mounting a downlight when a fixture device is located in a fastening position .

Detailed Description of the Embodiments

5 Figs. 3a-3b are 3D views of assembling a downlight 100 of one embodiment of the present application in a mounting position and a fastening position, respectively. The downlight 100 comprises two portions, i.e., a downlight body 11 and a fixture device 10. The downlight body 1 and the fixture device
10 10 are removably connected and can be connected with simple fastening screws 2.3 (see Fig. 4a) . According to the present invention, the fixture device 10, different from the prior art fixture devices, comprises a support frame 2 mounted on the downlight body 1 and a fastening mechanism 3 mounted on
15 the support frame 2 (see Figs. 4a-4e for details) . In a mounting position as shown in Fig. 3a, the fastening mechanism 3 is located in the mounting position where it is taken back with respect to the support frame 2; and in a fastening position as shown in Fig. 3b, the fastening mechanism 3 is
20 stretched out with respect to the support frame 2 .

Figs. 4a-4e show a fixture device 10 of one embodiment of the present invention. Fig. 4a is an exploded diagram of the fixture device 10. The fixture device 10 comprises a support frame 2 (see the enlarged view of Fig. 4b) connected to a
25 downlight body 1 and a fastening mechanism 3 mounted on the support frame 2. The support frame 2 comprises a first guide portion 2.1. Correspondingly, the fastening mechanism 3 comprises a second guide portion 3.1. In the present embodiment, the first guide portion 2.1 is a slide slot, and the
30 second guide portion 3.1 is a guide rod or slide block that

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can slide in the slide slot. The fastening mechanism 3 is further divided into two portions in function, namely, an adjusting unit 3.2 that makes adjustments by transferring an external movement and an executing unit that is operated as
5 driven by the adjusting unit 3.2, i.e., a pressing unit for pressing, wherein the second guide portion 3.1 may be regarded as the pressing unit for pressing.

Specifically, the adjusting unit 3.2 comprises an adjusting screw 3.2.1, a stop nut 3.2.2 and a washer 3.2.3.

- 10 The pressing unit or second guide portion 3.1 is an L-shape slide block and comprises a first portion 3.1.1 and a second portion 3.1.2. A screw hole 3.1.3 is opened in the second portion 3.1.2 of the L-shape slide block to cooperate with the adjusting screw 3.2.1 for transferring a movement.
- 15 In order to drive the L-shape slide block to move in the slide slot from top to bottom or from bottom to top between the mounting position and the fastening position, the adjusting screw 3.2.1 is adjusted and transfers a movement to the L-shape slide block via the screw hole 3.1.3 in the second
20 portion 3.1.2 of the L-shape slide block, and the first portion 3.1.1 of the L-shape slide block directly slides in the slide slot and guides a direction between the mounting position and the fastening position. The stop nut 3.2.2 and the washer 3.2.3 are provided for preventing the adjusting screw
25 3.2.1 from escaping from the screw hole 3.1.3.

Fig. 4b shows the support frame 2 of the fixture device 10 of one embodiment of the present invention. The support frame 2 is mounted on the downlight body 1, for instance, the support frame 2 may be considered to be mounted on outermost fins.

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An overall shape of the support frame 2 is configured to be adapted to be mounted on the fins. Besides, the support frame 2 has at least one fastening groove 2.2 to cooperate with at least one fastening piece 2.3 for mounting the support frame 2 on, for instance, the fins. In addition, the slide slot is an important functional part, and a compulsive guidance can be realized with such configuration of the slide slot. Thus, the slide slot has a bent slide slot portion 2.1.1 and a vertical slide slot portion 2.1.2 in sequence from top to bottom, so as to facilitate installation as the L-shape slide block is located in a take-back position with respect to the support frame 2 when it is near to the top, and to further press a part of the L-shape slide block on the ceiling 5 for fastening after the installation as the L-shape slide block is located in a stretching position with respect to the support frame 2 when it is near to the bottom, thus the whole weight of the downlight 100 is supported on the ceiling 5. Of course, other suitable shapes of the slide slot also can be taken into consideration.

Fig. 4c and Fig. 4d show a front view and a rear view of the mounted fixture device 10. It can be seen from Fig. 4c that the first portion 3.1.1 of the pressing unit is located in the mounting position in the slide slot, at which time, as the first portion 3.1.1 guides a direction in the bent slide slot portion 2.1.1, the L-shape slide block has a small part stretched out from the slide slot due to a compulsive guidance, thus the L-shape slide block is regarded as being located in the take-back position with respect to the support frame 2, that is, the fastening mechanism 3 is located in the take-back position with respect to the support frame 2. The guiding relation of the bent slide slot portion 2.1.1 with the first portion 3.1.1 of the pressing unit can be seen

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clearly from Fig. 4d.

Fig. 4e is a schematic diagram of different positions of the fixture device 10. The mounting position is near to the top, and the fastening position is near to the bottom. In the mounting position, the first portion 3.1.1 of the pressing unit is guided in the bent slide slot portion 2.1.1, and in the mounting position, the first portion 3.1.1 of the L-shape slide block exposes a small part from the slide slot, that is, the L-shape slide block is located in the take-back position with respect to the support frame 2. In the fastening position, the first portion 3.1.1 of the L-shape slide block is guided in the vertical slide slot portion 2.1.2, and the first portion 3.1.1 exposes more from the slide slot, that is, the L-shape slide block is located in a stretching location with respect to the support frame 2.

Figs. 5a-5b are an overall diagram and a local diagram of the downlight 100 of an embodiment of the present invention when the fixture device 10 is located in the mounting position. At this time, the fastening mechanism 3 is located in the take-back position with respect to the support frame 2, thus, the whole downlight 100 can smoothly run through a mounting hole on the ceiling 5 and goes deep into the ceiling 5. At this time, the first portion 3.1.1 of the second guide portion 3.1 of the fastening mechanism 3 is located in the take-back position with respect to the support frame 2.

Figs. 6a-6b are an overall diagram and a local diagram of the downlight 100 of an embodiment of the present invention when the fixture device 10 is located in the fastening position. After the downlight 100 has been located in the mounting position, a tool 6 is used to adjust the adjusting screw 3.2.1

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(see Fig. 4a) to move the first portion 3.1.1 of the second guide portion 3.1 of the fastening mechanism 3 to a lower stretching position with respect to the support frame 2, and the ceiling 5 is tightly pressed with a hook provided at the end of the first portion 3.1.1.

Fig. 7 is a schematic diagram of further mounting the downlight 100 when the fixture device 10 is located in the fastening position. After the fixture device 10 is located in the fastening position, a decorative ring 7 is mounted on the mounting hole, thus, the downlight 100 is assembled.

It should be indicated that in embodiments that are not shown, other adjusting units capable of driving the pressing unit also can be taken into consideration. Correspondingly, other guide parts opened with screw holes also can be used as the second guide portion.

The above is merely preferred embodiments of the present invention but not to limit the present invention. For the person skilled in the art, the present invention may have various alterations and changes. Any alterations, equivalent substitutions, improvements, within the spirit and principle of the present invention, should be covered in the protection scope of the present invention.

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List of reference signs

	100	downlight
	10	fixture device
5	1	downlight body
	2	support frame
	2.1	first guide portion
	2.1.1	bent slide slot portion
	2.1.2	vertical slide slot portion
10	2.2	fastening groove
	2.3	fastening piece
	3	fastening mechanism
	3.1	second guide portion
	3.1.1	first portion
15	3.1.2	second portion
	3.1.3	screw hole
	3.2	adjusting unit

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3.2.1 adjusting screw

3.2.2 stop nut

3.2.3 washer

5 ceiling

5 6 tool

7 decorative ring

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Patent claims

1. A fixture device (10) for a downlight (100), characterized in that the fixture device (10) comprises a support frame (2) connected to a downlight body (1) and a fastening mechanism (3) mounted on the support frame (2), and the fastening mechanism (3) is moveable with respect to the support frame (2) between a mounting position where the fastening mechanism (3) is taken back with respect to the support frame (2) and a fastening position where the fastening mechanism (3) is stretched out with respect to the support frame (2) and is capable of tightly pressing a ceiling (5) .

2. The fixture device (10) according to Claim 1, characterized in that the support frame (2) comprises a first guide portion (2.1) and the fastening mechanism (3) comprises a second guide portion (3.1), and the first guide portion (2.1) guides the second guide portion (3.1) between the mounting position and the fastening position.

3. The fixture device (10) according to Claim 2, characterized in that the fastening mechanism (3) comprises an adjusting unit (3.2) and a pressing unit configured as the second guide portion (3.1), and the adjusting unit (3.2) drives the pressing unit.

4. The fixture device (10) according to Claim 3, characterized in that the second guide portion (3.1) comprises a first portion (3.1.1) and a second portion (3.1.2), the first portion (3.1.1) is engaged with the first guide portion (2.1), and the second portion (3.1.2) is engaged with the adjusting unit (3.2) .

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5. The fixture device (10) according to Claim 4, characterized in that the adjusting unit (3.2) comprises an adjusting screw (3.2.1) and a screw hole (3.1.3) is opened in the second portion (3.1.2) of the second guide portion (3.1) to cooperate with the adjusting screw (3.2.1) .

6. The fixture device (10) according to Claim 5, characterized in that the adjusting unit (3.2) further comprises a stop nut (3.2.2), and the adjusting screw (3.2.1) passes through the screw hole (3.1.3) to be engaged with the stop nut (3.2.2) .

7. The fixture device (10) according to Claim 4, characterized in that the second guide portion (3.1) is an L-shape slide block.

8. The fixture device (10) according to Claim 7, characterized in that the support frame (2) is a guide plate, and the first guide portion (2.1) is a slide slot opened on the guide plate .

9. The fixture device (10) according to Claim 8, characterized in that the slide slot has a bent slide slot portion (2.1.1) and a vertical slide slot portion (2.1.2) in sequence from top to bottom.

10. The fixture device (10) according to Claim 9, characterized in that the guide plate and the downlight body (1) are removably connected.

11. The fixture device (10) according to Claim 10, characterized in that at least one fastening groove (2.2) is opened on the guide plate, and the guide plate can be fixed on the

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downlight body (1) by using at least one fastening piece (2.3) passing through the at least one fastening groove (2.2) .

12. A downlight (100) comprising a downlight body (1) and the fixture device (10) according to any one of Claims 1-12.

13. The downlight (100) according to Claim 12, characterized in that the downlight body (1) and the fixture device (10) are removably connected.

14. The downlight (100) according to Claim 13, characterized in that the downlight (100) is an LED downlight.

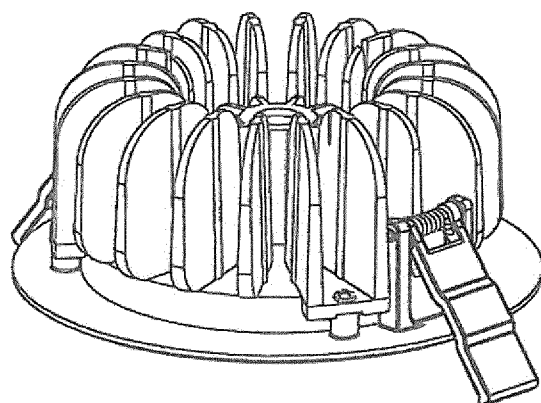


Figure 1

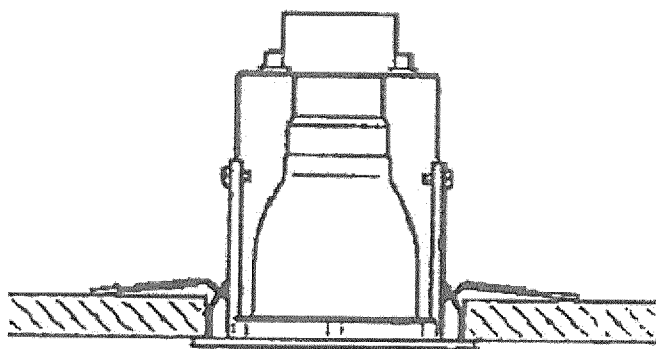


Figure 2

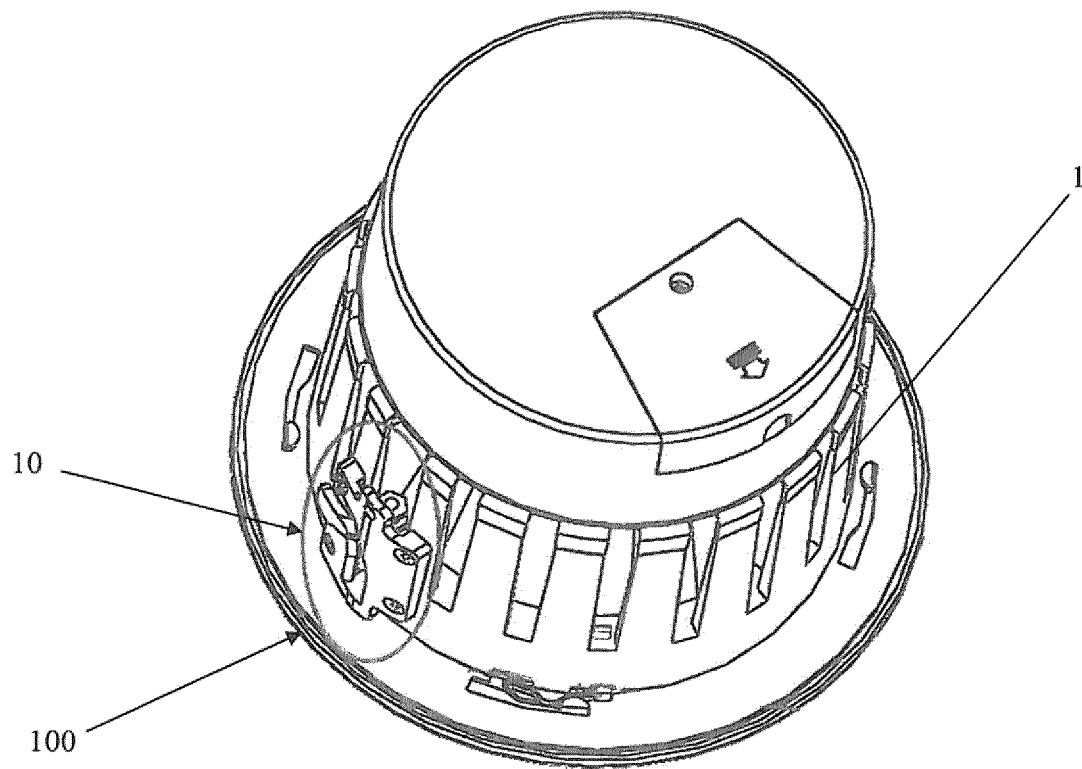


Figure 3a

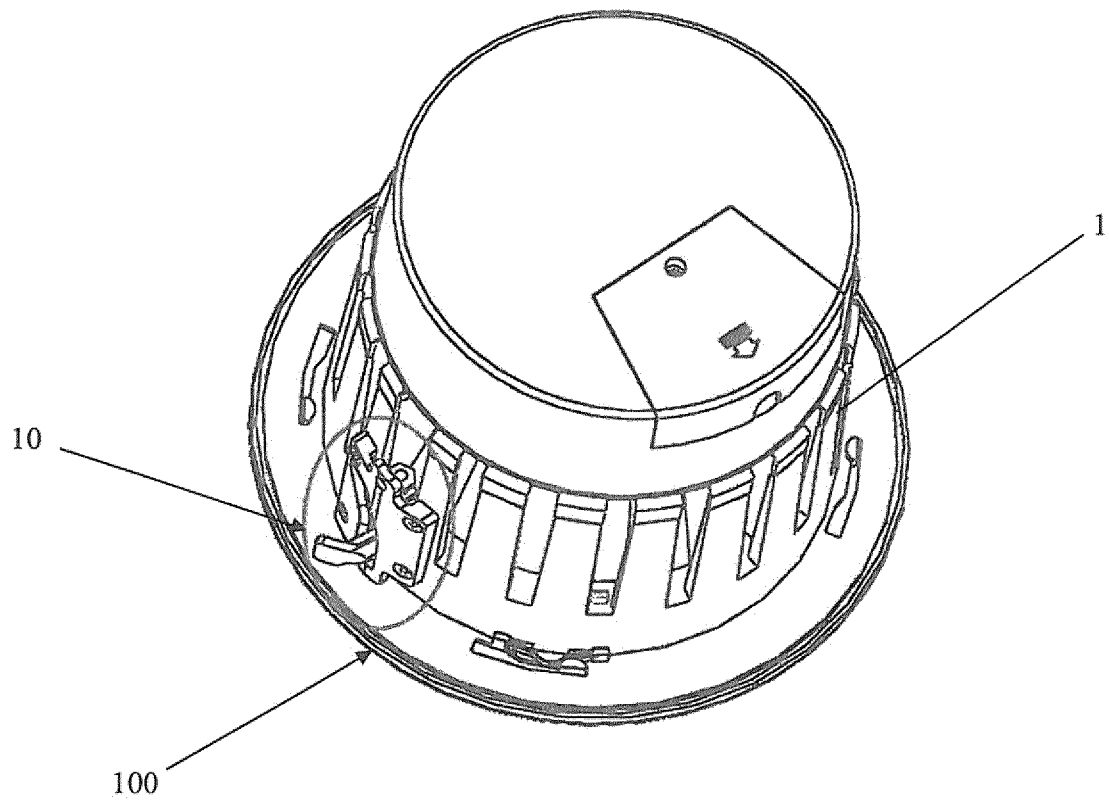


Figure 3b

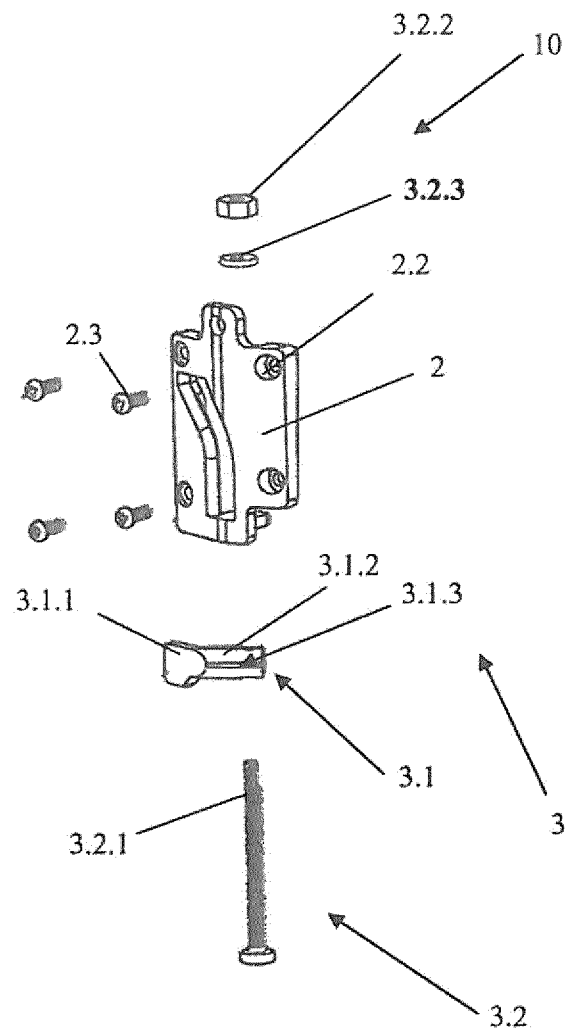


Figure 4a

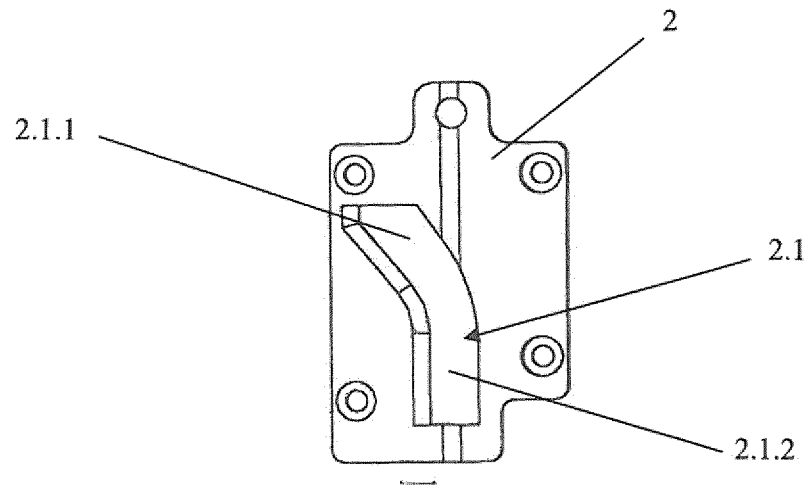


Figure 4b

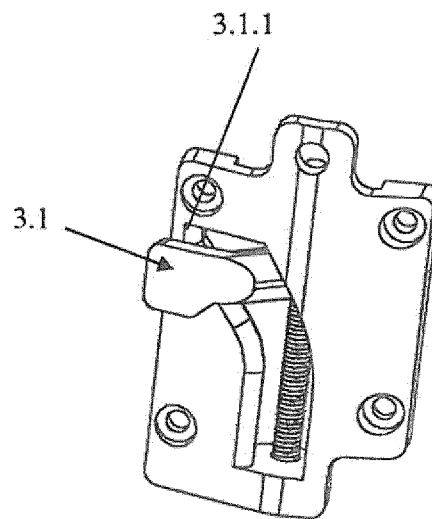


Figure 4c

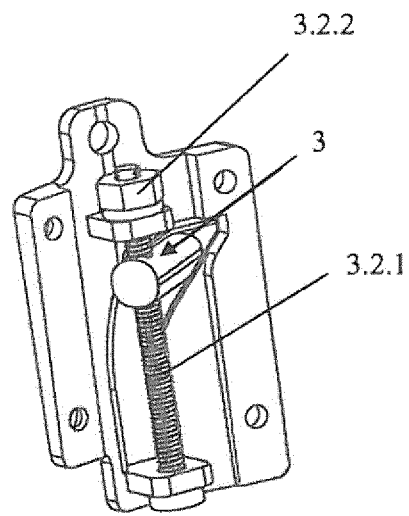


Figure 4d

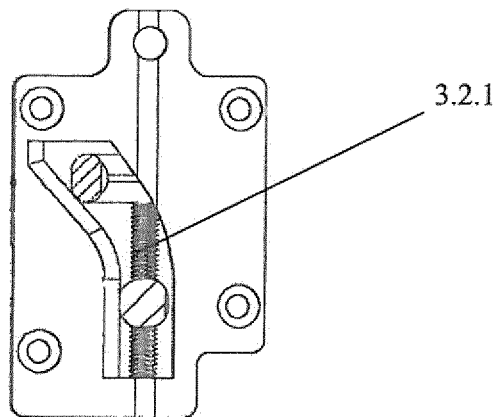


Figure 4e

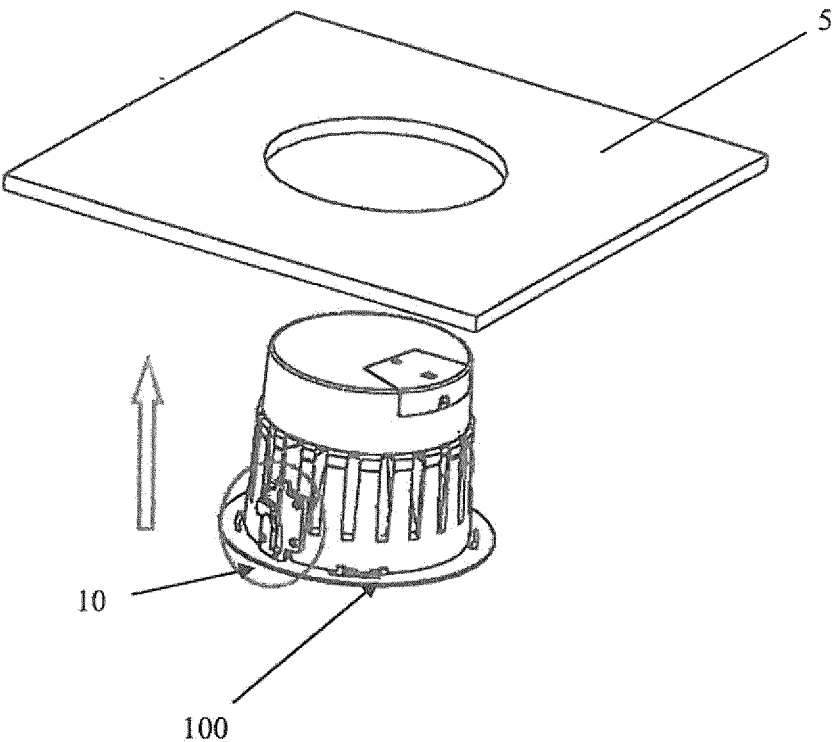


Figure 5a

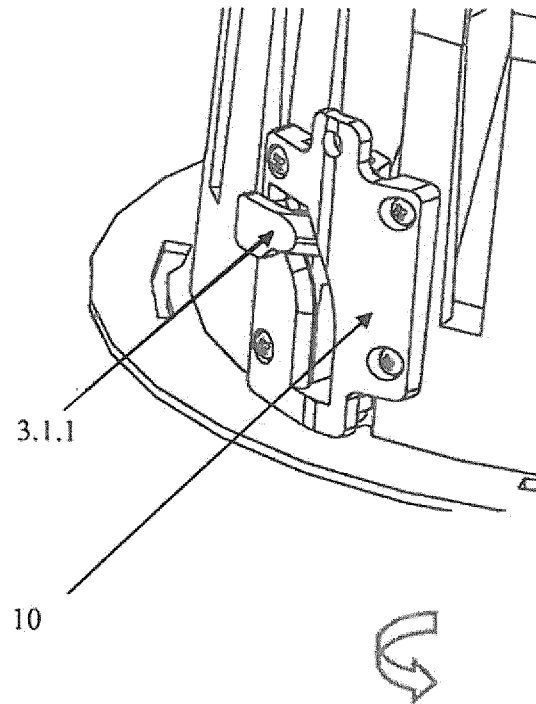


Figure 5b

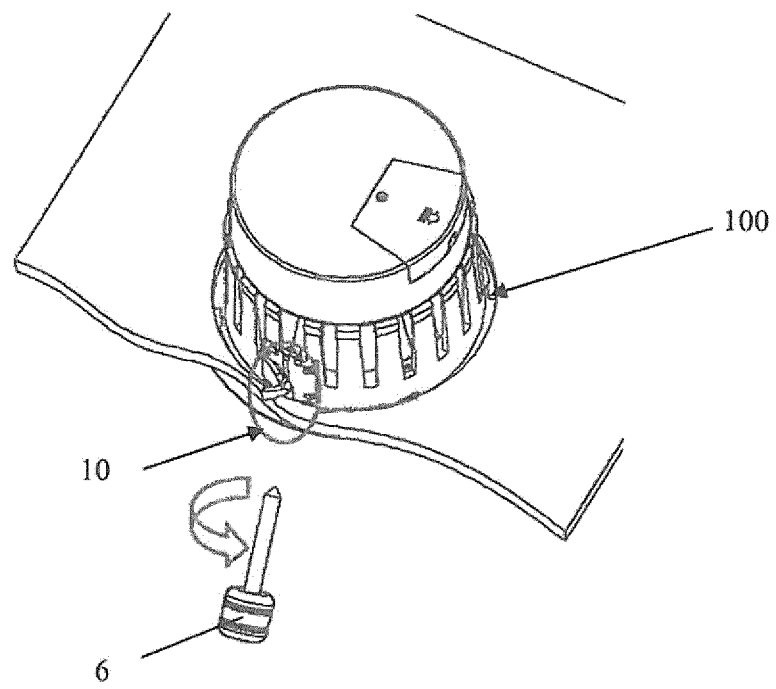


Figure 6a

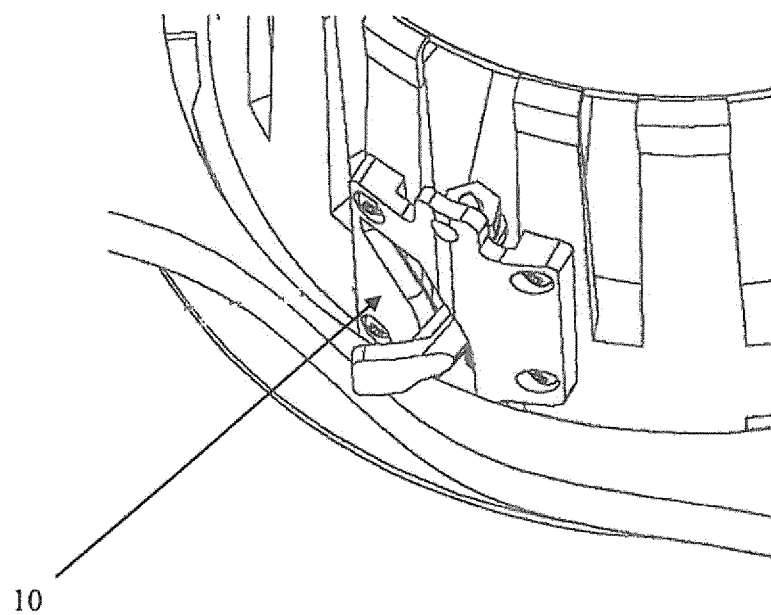
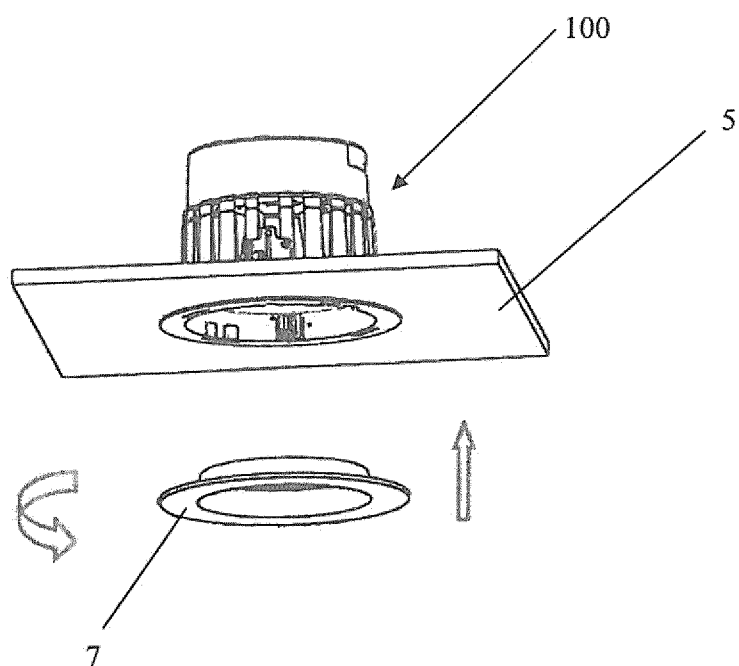


Figure 6b

**Figure 7**

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/064399

A. CLASSIFICATION OF SUBJECT MATTER
INV. F21V21/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F21V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 870 982 A2 (ERCO LEUCHTEN [DE]) 14 October 1998 (1998-10-14) paragraph [0023] - paragraph [0038] ; figures 1-3 -----	1-8, 12-14
X	US 3 319 919 A (MAURICE EISENBERG) 16 May 1967 (1967-05-16) claim 1; figures 1,3 -----	1-5 ,7-14
X	EP 1 813 861 A1 (LAMP S A [ES]) 1 August 2007 (2007-08-01) claim 1; figures 1,2 -----	1-5 , 7 , 12



Further documents are listed in the continuation of Box C.



See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

31 January 2013

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Kri kori an , Ol i vi er

INTERNATIONAL SEARCH REPORT

Information on patent family members

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