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(54) **ILLUMINATING DEVICE**

BELEUCHTUNGSVORRICHTUNG

DISPOSITIF D'ÉCLAIRAGE

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## Description

### Technical Field

**[0001]** The present invention relates to an illuminating device.

### Background Art

**[0002]** Because of relative high efficiency, long service life and low power consumption, LED light sources are more and more welcomed by the people. There are a large number of LED retrofit lamps in the current market. A LED retrofit lamp generally has a heat sink, a circuit board arranged in the heat sink and a lens arranged at the light emergent opening of the heat sink, wherein a LED chip is arranged on the circuit board, and the lens is capable of processing light rays of the LED chip, to fulfill different illuminating effects. However, in the prior art, there is generally need to fix the circuit board on the heat sink through bolts, and to fix the lens at the light emergent opening of the heat sink by means of additional bolts and possible accessories or by means of UV glue, double sided adhesive. It is obvious that the operation of the above mentioned method is relative complex and has relative high cost. Moreover, the connection reliability between the lens and the heat sink is also relative low. An earlier patent application FR2962783A1 discloses an illuminating device comprising a heat sink and a lens connected with the heat sink to provide a pressure to a circuit board placed on the heat sink.

### Summary of the Invention

**[0003]** In order to solve the above mentioned problem, the present invention provides an illuminating device, which has a few components, low cost and is easy to be assembled. Furthermore, after a long running time of the illuminating device according to the present invention, each component of the illuminating device still has relative high connection reliability.

**[0004]** The object of the present invention is achieved through an illuminating device in such a manner, viz. the illuminating device comprises a heat sink having a bottom wall and a circumferential wall extending from the bottom wall, defining an accommodating cavity; a lens arranged at an opening of the accommodating cavity; and a circuit board having a light source and being arranged on the bottom wall, wherein the lens includes at least one snap-fit structure and at least one pressing portion, and the snap-fit structure snaps into the circumferential wall to fix the lens to the heat sink and the lens presses the circuit board against the bottom wall through the pressing portion. In an embodiment of the present invention, the lens can be directly snapped at the heat sink through the snap-fit structure, without additional mechanical structures, such as bolt and hold shield etc. It significantly reduces the amount of components of the illuminating device and decreases assembly difficulty. Moreover, the pressing portion formed on the lens simultaneously presses the circuit board against the heat sink, while the lens is snapped at the heat sink. Thus, there is no need to separately fix the circuit board on the heat sink, which has special significance for the circuit board configured as ceramic circuit board. The reason lies in: ceramic circuit boards are friable, because of their material characteristics; when fixing the same on the heat sink through bolts, there is a chance to damage them, while the concept of the present invention abandons mechanical structures easily damaging circuit boards. The illuminating device further comprises a biasing device arranged between the lens and the circuit board, which is used to provide a bias force between the lens and the circuit board. After mounting the lens on the heat sink, the spring is extruded and is in a forced state. After a long running time of the illuminating device, the lens or the heat sink might be deformed because of aging. However, the lens is supported on the heat sink in the form of a prestress. Thus, even if the components are deformed, the lens would also be reliably fixed on the heat sink without loosening.

**[0005]** The biasing device includes at least one spring and at least one insulation washer, wherein one end of the spring bears against the lens, and the other end bears against the circuit board through the insulation washer. The insulation washer is insulated from the spring and the circuit board, which avoids short circuit of the circuit board.

**[0006]** It is preferable that the lens comprises a baseplate and at least one micro-lens structure formed on the baseplate. The micro-lens structure is more suitable for matching with a light source. Furthermore, in a situation that the illuminating device has a plurality of light sources, a micro-lens structure is individually equipped for each light source, which is advantageous for individually adjusting light rays of a light source.

**[0007]** According to a preferable embodiment of the present invention, it is provided that there is no need to additionally arrange an individual component, when configuring the micro-lens structure as the pressing portion. It reduces to a large extent the structural complexity of the lens and decreases the production cost.

**[0008]** According to another preferable embodiment of the present invention, it is provided that the lens further includes at least one positioning column formed on the baseplate, and the positioning column is configured as the pressing portion. It is advantageous that at least one through hole for insertion of the positioning column is formed on the circuit board. The positioning column can help with accurate alignment of the lens and a light source on the circuit board. It has practical significance particularly for the situation that the illuminating device has a plurality of light sources and a plurality of micro-lens structures. Furthermore, instead of micro-lens structure, the positioning column is used as the pressing portion, which reduces to a large extent design difficulty of the

micro-lens structure.

**[0009]** It is further preferable that the positioning column includes a first section capable of being inserted into the through hole and a second section, wherein a connecting part of the first section and the second section forms a stop step, which presses against the circuit board. In an assembled state of the illuminating device, said stop step reliably presses the circuit board against the heat sink.

**[0010]** It is advantageous that the spring is nested onto the pressing portion. The pressing portion is capable of being used as guiding element of the spring, so as to avoid undesired displacement of the spring.

**[0011]** It is further advantageous that the spring is a spiral spring. Certainly, the spring can also be a spring of another type, for example plate spring.

**[0012]** According to a preferable embodiment of the present invention, it is provided that the snap-fit structure is configured as elastic hook. Preferably, a projection is formed on the circumferential wall, and the elastic hook engages with the projection. The snap-fit structure of such type has a simple structure and easy manufacture. During practical assembly process, it only needs to insert the lens into the opening of the accommodating cavity, while the elastic hook is easy to engage with the projection, wherein the operation is simple and the connection is very tight.

**[0013]** It is advantageous that the heat sink further includes at least one fin, which radially extends on outer side of the circumferential wall. The fin significantly increases contact area of the heat sink with air of the environment, which improves radiating property of the heat sink.

**[0014]** It is preferable that an embedding groove is formed in the bottom wall, and the circuit board is arranged in the embedding groove in a form fitting manner. The circuit board is therefore firmly held in the embedding groove, which prevents undesired movement of the circuit board.

**[0015]** If a thermal interface material is arranged between the circuit board and the bottom surface of the embedding groove, it would be very advantageous for the cooling of the circuit board.

**[0016]** It is preferable that the circuit board is a ceramic circuit board, which has good thermal conductivity. Certainly, the circuit board can also be a circuit board of another type, metal core circuit board for instance.

**[0017]** It is preferable that the light source is a LED light source, which has advantages of long service lift, high luminous efficiency and environmental protection.

**[0018]** It is to be understood that the features of the various exemplary embodiments described herein might be combined with each other, unless specifically noted otherwise.

## Brief Description of the Drawings

**[0019]** The accompanying drawings constitute a part of the present Description and are used to provide further understanding of the present invention. Such accompanying drawings illustrate the embodiments of the present invention and are used to describe the principles of the present invention together with the Description. In the accompanying drawings the same components are represented by the same reference numbers. As shown in the drawings:

Fig. 1 composed schematic diagram of a first example of the illuminating device according to the present invention;

Fig. 2 composed schematic diagram of a second example of the illuminating device according to the present invention; and

Fig. 3 sectional view of the illuminating device in an assembled state according to the first example as shown in Fig. 1.

## Detailed Description of the Embodiments

**[0020]** In the following detailed description, reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention might be practiced. In this regard, directional terminology, such as "top", "bottom", "upper", "lower", is used in reference to the orientation of the figures being described. Because components of embodiments of the present invention can be positioned in a number of different orientations, the directional terminology is used for purposes of illustration and is in no way limiting. It is to be understood that other embodiments might be utilized and structural or logical changes might be made without departing from the scope of the present invention. The following detailed description, therefore, is not to be taken in a limiting sense, and the scope of the present invention is defined by the appended claims.

**[0021]** Fig. 1 shows a composed schematic diagram of the first example of the illuminating device 100 according to the present invention. As shown in the figure, the illuminating device 100 according to the present invention comprises: a heat sink 1 having a bottom wall 111 and a circumferential wall 112 extending from the bottom wall 111, defining an accommodating cavity 11; a lens 2 arranged at an opening of the accommodating cavity 11 in the assembled state of the illuminating device 100 (see Fig. 3); and a circuit board 3 having a light source, wherein the circuit board 3 is arranged on the bottom wall 111 in the assembled state of the illuminating device 100. In the embodiment of the present invention, the circuit board 3 is a ceramic circuit board, and it can also be a circuit board of another type, such as metal core circuit board etc. In addition, the light source arranged on the circuit board 3 is a LED light source 7. Furthermore, the heat sink 1 further includes at least one fin 12, which radially

extends on outer side of the circumferential wall 112. In the present example, an embedding groove 114 is formed in the bottom wall 111, and the circuit board 3 is arranged in the embedding groove 114 in a form fitting manner. In a preferable example, a thermal interface material 6 is arranged between the circuit board 3 and the bottom surface of the embedding groove 114 (see Fig. 3).

**[0022]** Moreover, it can further be seen from the figure that the lens 2 includes a baseplate 21 and a micro-lens structure 22 formed on the baseplate 21. In the present example, only one LED light source 7 is arranged on the circuit board 3. Thus, only one micro-lens structure 22 is formed on the baseplate 21, wherein the micro-lens structure 22 is configured as pressing portion, which presses against the circuit board 3 by means of its free end. Furthermore, the lens 2 further includes at least one elastic hook 24 configured as snap-fit structure. In the assembled state of the illuminating device 100, the elastic hook 24 snaps into a projection 113 formed on the circumferential wall 112 to fix the lens 2 to the heat sink 1 , and the micro-lens structure 22 presses the circuit board 3 against the bottom surface of the embedding groove 114.

**[0023]** In addition, it can be observed from Fig. 1 that the illuminating device 100 further comprises a biasing device between the lens 2 and the circuit board 3, which is used to provide a bias force between the lens 2 and the circuit board 3. In the present example, the biasing structure includes a spring 4 configured as spiral spring and an insulation washer 5. The spring 4 is nested onto the micro-lens structure 22, wherein one end of the spring 4 bears against the baseplate 21 of the lens 2, while the other end bears against the circuit board 3 through the insulation washer 5.

**[0024]** Fig. 2 shows a composed schematic diagram of the second example of the illuminating device 100 according to the present invention. The heat sink 1 of the illuminating device 100 in the second example has the same structure as that of the illuminating device 100 in the first example, thus, it is not described here. The differences between the illuminating devices of the two examples lie in the amount of the LED light sources 7 on the circuit board 3 and the structure of the lens 2.

**[0025]** It can be seen from Fig. 2 that a plurality of LED light sources 7 are arranged on the circuit board 3; in the present example, 4 LED light sources 7 are arranged. Thus, the structure of the lens 2 is correspondingly adjusted. It can be seen from the figure that 4 micro-lens structures 22 are formed on the baseplate 21 of the lens 2, viz. each LED light source 7 is equipped with one micro-lens structure 22. However, another important difference between the illuminating device 100 in the second example and that in the first example lies in that the micro-lens structures 22 are not used as pressing portion any more. Instead of that, a plurality of positioning columns 23 are formed on the baseplate 21 of the lens 2, which are used as pressing portion. For this purpose, through holes 31 for insertion of the positioning columns are also formed on the circuit board 3. In the present example, two positioning columns 23 are arranged and two through holes 31 are therefore opened on the circuit board 23.

**[0026]** Furthermore, it can further be seen from Fig. 2 that the positioning column 23 includes a first section 231 capable of being inserted into the through hole 31 and a second section 232, wherein a connecting part of the first section 231 and the second section 232 forms a stop step 233, which presses against the circuit board 3.

**[0027]** In addition, in the second example as shown in Fig. 2, the illuminating device 100 also has a biasing device arranged between the lens 2 and the circuit board 3. In the present example, the biasing device includes tow springs 4, which are nested onto the positioning columns 23, instead of being nested onto the micro-lens structures 22. Moreover, the biasing device in the second example fails to include an insulation washer 5. However, an insulation washer 5 can also be additionally arranged between the spring 4 and the circuit board 3.

**[0028]** Fig. 3 shows a sectional view of the illuminating device 100 in an assembled state in accordance with the first example as shown in Fig. 1. It can be seen from the figure that the elastic hook 24 of the lens 2 engages with the projection 113 formed on the circumferential wall 112 of the accommodating cavity 11 of the heat sink 1, and the micro-lens structure 22 of the lens 2 presses the circuit board 3 against the bottom surface of the embedding groove 114. The spring 4 nested onto the micro-lens structure 22 is compressed between the baseplate 21 and the insulation washer 5 arranged on the circuit board 3, so that the spring 4 is in a forced state. After a long running time of the illuminating device 100, the lens 2 or the heat sink 1 might be deformed because of aging. However, the lens 2 is supported on the heat sink 1 in the form of a prestress. Thus, even if the components are deformed, the lens 2 would also be reliably fixed on the heat sink without loosening.

**[0029]** 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 might have various alterations and changes. Any alterations, equivalent substitutions, improvements, within the scope of the appended claims, should be covered in the protection scope of the present invention.

List of reference signs

**[0030]**

| | |
|---|---|
| 1 | heat sink |
| 11 | accommodating cavity |
| 111 | bottom wall |
| 112 | circumferential wall |
| 113 | projection |
| 114 | embedding groove |
| 12 | fin |
| 2 | lens |
| 21 | baseplate |

22 micro-lens structure
23 positioning column
231 first section
232 second section
233 stop step
24 elastic hook
3 circuit board
31 through hole
4 spring
5 insulation washer
6 thermal interface material
7 LED light source
100 illuminating device

## Claims

1. An illuminating device (100) comprising: a heat sink (1) having a bottom wall (111) and a circumferential wall (112) extending from the bottom wall (111), defining an accommodating cavity (11); a lens (2) arranged at an opening of the accommodating cavity (11); and a circuit board (3) having a light source and being arranged on the bottom wall (111), the lens (2) includes at least one snap-fit structure and at least one pressing portion, and the snap-fit structure snaps into the circumferential wall to fix the lens (2) to the heat sink (1) and the lens (1) presses the circuit board (3) against the bottom wall through the pressing portion, **characterized in that** the illuminating device (100) further comprises a biasing device arranged between the lens (2) and the circuit board (3), which is used to provide a bias force between the lens (2) and the circuit board (3), and the biasing device includes at least one spring (4) and at least one insulation washer (5), wherein one end of the spring (4) bears against the lens (2), and the other end bears against the circuit board (3) through the insulation washer (5).

2. The illuminating device (100) according to Claim 1, **characterized in that** the lens (2) includes a baseplate (21) and at least one micro-lens structure (22) formed on the baseplate (21).

3. The illuminating device (100) according to Claim 2, **characterized in that** the micro-lens structure (22) is configured as the pressing portion.

4. The illuminating device (100) according to Claim 2, **characterized in that** the lens (2) further includes at least one positioning column (23) formed on the baseplate (21), wherein the positioning column (23) is configured as the pressing portion.

5. The illuminating device (100) according to Claim 4, **characterized in that** at least one through hole (31) for insertion of the positioning column (23) is formed on the circuit board (3).

6. The illuminating device (100) according to Claim 5, **characterized in that** the positioning column (23) includes a first section (231) capable of being inserted into the through hole (31) and a second section (232), and a connecting part of the first section (231) and the second section (232) forms a stop step (233), which presses against the circuit board (3).

7. The illuminating device (100) according to Claim 1, **characterized in that** the spring (4) is nested onto the pressing portion.

8. The illuminating device (100) according to Claim 1, **characterized in that** the spring (4) is a spiral spring.

9. The illuminating device (100) according to any one of Claims 1 to 6, **characterized in that** the snap-fit structure is configured as elastic hook (24).

10. The illuminating device (100) according to Claim 9, **characterized in that** a projection (113) is formed on the circumferential wall (112), and the elastic hook (24) engages with the projection (113).

11. The illuminating device (100) according to any one of Claims 1 to 6, **characterized in that** the heat sink (1) further includes at least one fin (12), which radially extends on outer side of the circumferential wall (112).

12. The illuminating device (100) according to any one of Claims 1 to 6, **characterized in that** an embedding groove (114) is formed in the bottom wall (111), and the circuit board (3) is arranged in the embedding groove (114) in a form fitting manner.

13. The illuminating device (100) according to Claim 12, **characterized in that** a thermal interface material (6) is arranged between the circuit board (3) and the bottom surface of the embedding groove (114).

14. The illuminating device (100) according to any one of Claims 1 to 6, **characterized in that** the circuit board (3) is a ceramic circuit board.

15. The illuminating device (100) according to any one of Claims 1 to 6, **characterized in that** the light source is a LED light source (7).

## Patentansprüche

1. Beleuchtungsvorrichtung (100), umfassend: eine Wärmesenke (1), die eine Bodenwand (111) und eine von der Bodenwand (111) aus verlaufende umlaufende Wand (112) aufweist und einen Aufnahme-

hohlraum (11) definiert; eine Linse (2), die an einer Öffnung des Aufnahmehohlraums (11) angeordnet ist; und eine Leiterplatte (3), die eine Lichtquelle aufweist und an der Bodenwand (111) angeordnet ist, wobei die Linse (2) mindestens eine Rastkonstruktion und mindestens ein Pressteil enthält und die Rastkonstruktion in die umlaufende Wand einrastet, um die Linse (2) an der Wärmesenke (1) zu befestigen, und die Linse (2) die Leiterplatte (3) über das Pressteil gegen die Bodenwand drückt, **gekennzeichnet dadurch, dass** die Beleuchtungsvorrichtung (100) weiterhin eine zwischen der Linse (2) und der Leiterplatte (3) angeordnete Vorspannungsvorrichtung umfasst, die dazu dient, eine Vorspannkraft zwischen der Linse (2) und der Leiterplatte (3) bereitzustellen, und die Vorspannvorrichtung mindestens eine Feder (4) und mindestens eine Isolierscheibe (5) umfasst, wobei ein Ende der Feder (4) an der Linse (2) und das andere Ende über die Isolierscheibe (5) an der Leiterplatte (3) anliegt.

**2.** Beleuchtungsvorrichtung (100) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Linse (2) eine Grundplatte (21) und mindestens eine an der Grundplatte (21) ausgebildete Mikrolinsenstruktur (22) umfasst.

**3.** Beleuchtungsvorrichtung (100) nach Anspruch 2, **gekennzeichnet dadurch, dass** die Mikrolinsenkonstruktion (22) als Pressteil konfiguriert ist.

**4.** Beleuchtungsvorrichtung (100) nach Anspruch 2, **gekennzeichnet dadurch, dass** die Linse (2) weiterhin mindestens eine an der Grundplatte (21) ausgebildete Positioniersäule (23) umfasst, wobei die Positioniersäule (23) als Pressteil konfiguriert ist.

**5.** Beleuchtungsvorrichtung (100) nach Anspruch 4, **gekennzeichnet dadurch, dass** an der Leiterplatte (3) mindestens eine Durchgangsbohrung (31) zum Einsetzen der Positioniersäule (23) ausgebildet ist.

**6.** Beleuchtungsvorrichtung (100) nach Anspruch 5, **gekennzeichnet dadurch, dass** die Positioniersäule (23) einen ersten Abschnitt (231), der in eine Durchgangsbohrung (31) eingesetzt werden kann, und einen zweiten Abschnitt (232) umfasst, und ein Verbindungsteil des ersten Abschnitts (231) und des zweiten Abschnitts (232) eine Anschlagstufe (233) bildet, die gegen die Leiterplatte (3) drückt.

**7.** Beleuchtungsvorrichtung (100) nach Anspruch 1, **gekennzeichnet dadurch, dass** die Feder (4) auf das Pressteil gesteckt ist.

**8.** Beleuchtungsvorrichtung (100) nach Anspruch 1, **gekennzeichnet dadurch, dass** es sich bei der Feder (4) um eine Spiralfeder handelt.

**9.** Beleuchtungsvorrichtung (100) nach einem der Ansprüche 1 bis 6, **gekennzeichnet dadurch, dass** die Rastkonstruktion als elastischer Haken (24) konfiguriert ist.

**10.** Beleuchtungsvorrichtung (100) nach Anspruch 9, **gekennzeichnet dadurch, dass** ein Vorsprung (113) an der umlaufenden Wand (112) ausgebildet ist und der elastische Haken (24) in den Vorsprung (113) eingreift.

**11.** Beleuchtungsvorrichtung (100) nach einem der Ansprüche 1 bis 6, **gekennzeichnet dadurch, dass** die Wärmesenke (1) weiterhin mindestens eine Rippe (12) umfasst, die radial an der Außenseite der umlaufenden Wand (112) verläuft.

**12.** Beleuchtungsvorrichtung (100) nach einem der Ansprüche 1 bis 6, **gekennzeichnet dadurch, dass** eine Aufnahmenut (114) in der Bodenwand (111) ausgebildet ist und die Leiterplatte (3) formschlüssig in der Aufnahmenut (114) angeordnet ist.

**13.** Beleuchtungsvorrichtung (100) nach Anspruch 12, **gekennzeichnet dadurch, dass** ein thermisches Schnittstellenmaterial (6) zwischen der Leiterplatte (3) und der Unterseite der Einpressnut (114) angeordnet ist.

**14.** Beleuchtungsvorrichtung (100) nach einem der Ansprüche 1 bis 6, **gekennzeichnet dadurch, dass** es sich bei der Leiterplatte (3) um eine keramische Leiterplatte handelt.

**15.** Beleuchtungsvorrichtung (100) nach einem der Ansprüche 1 bis 6, **gekennzeichnet dadurch, dass** es sich bei der Lichtquelle um eine LED-Lichtquelle (7) handelt.

**Revendications**

**1.** Dispositif d'éclairage (100) comprenant un dissipateur thermique (1) ayant une paroi inférieure (111) et une paroi circonférentielle (112) s'étendant depuis la paroi inférieure (111), définissant une cavité de logement (11); une lentille (2) agencée au niveau d'une ouverture de la cavité de logement (11) ; et une carte de circuit (3) ayant une source de lumière et étant agencée sur la paroi inférieure (111), la lentille (2) comprend au moins une structure à enclenchement et au moins une partie de pression et la structure d'enclenchement s'enclenche dans la paroi circonférentielle pour fixer la lentille (2) au dissipateur thermique (1) et la lentille (2) presse la carte de circuit (3) contre la paroi inférieure par le biais de la partie de pression, caractérisé en ce le dispositif d'éclairage (100) comprend en outre un dispositif de

sollicitation agencé entre la lentille (2) et la carte de circuit (3), qui est utilisé pour fournir une force de sollicitation entre la lentille (2) et la carte de circuit (3) et le dispositif de sollicitation comprend au moins un ressort (4) et au moins une rondelle d'isolation (5), dans lequel une extrémité du ressort (4) repose contre la lentille (2) et l'autre extrémité repose contre la carte de circuit (3) par le biais de la rondelle d'isolation (5).

**2.** Dispositif d'éclairage (100) selon la revendication 1, **caractérisé en ce que** la lentille (2) comprend une plaque de base (21) et au moins une structure de micro-lentille (22) formée sur la plaque de base (21).

**3.** Dispositif d'éclairage (100) selon la revendication 2, **caractérisé en ce que** la structure de micro-lentille (22) est conçue comme la partie de pression.

**4.** Dispositif d'éclairage (100) selon la revendication 2, **caractérisé en ce que** la lentille (2) comprend en outre au moins une colonne de positionnement (23) formée sur la plaque de base (21), dans lequel la colonne de positionnement (23) est conçue comme la partie de pression.

**5.** Dispositif d'éclairage (100) selon la revendication 4, **caractérisé en ce qu'**au moins un trou traversant (31) pour l'insertion de la colonne de positionnement (23) est formé sur la carte de circuit (3).

**6.** Dispositif d'éclairage (100) selon la revendication 5, **caractérisé en ce que** la colonne de positionnement (23) comprend une première section (231) apte à être insérée dans le trou traversant (31) et une seconde section (232) et une partie de raccordement de la première section (231) et la seconde section (232) forme une marche de butée (233), qui presse contre la carte de circuit (3).

**7.** Dispositif d'éclairage (100) selon la revendication 1, **caractérisé en ce que** le ressort (4) est niché sur la partie de pression.

**8.** Dispositif d'éclairage (100) selon la revendication 1, **caractérisé en ce que** le ressort (4) est un ressort en spirale.

**9.** Dispositif d'éclairage (100) selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la structure d'enclenchement est conçue comme un crochet élastique (24).

**10.** Dispositif d'éclairage (100) selon la revendication 9, **caractérisé en ce qu'**une saillie (113) est formée sur la paroi circonférentielle (112) et le crochet élastique (24) se met en prise avec la saillie (113).

**11.** Dispositif d'éclairage (100) selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** le dissipateur thermique (1) comprend en outre au moins une ailette (12), qui s'étend radialement sur le côté externe de la paroi circonférentielle (112).

**12.** Dispositif d'éclairage (100) selon l'une quelconque des revendications 1 à 6, **caractérisé en ce qu'**une rainure d'incorporation (114) est formée dans la paroi inférieure (111) et la carte de circuit (3) est agencée dans la rainure d'incorporation (114) par ajustement de forme.

**13.** Dispositif d'éclairage (100) selon la revendication 12, **caractérisé en ce qu'**un matériau d'interface thermique (6) est agencé entre la carte de circuit (3) et la surface inférieure de la rainure d'incorporation (114).

**14.** Dispositif d'éclairage (100) selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la carte de circuit (3) est une carte de circuit en céramique.

**15.** Dispositif d'éclairage (100) selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la source de lumière est une source de lumière à DEL (7).

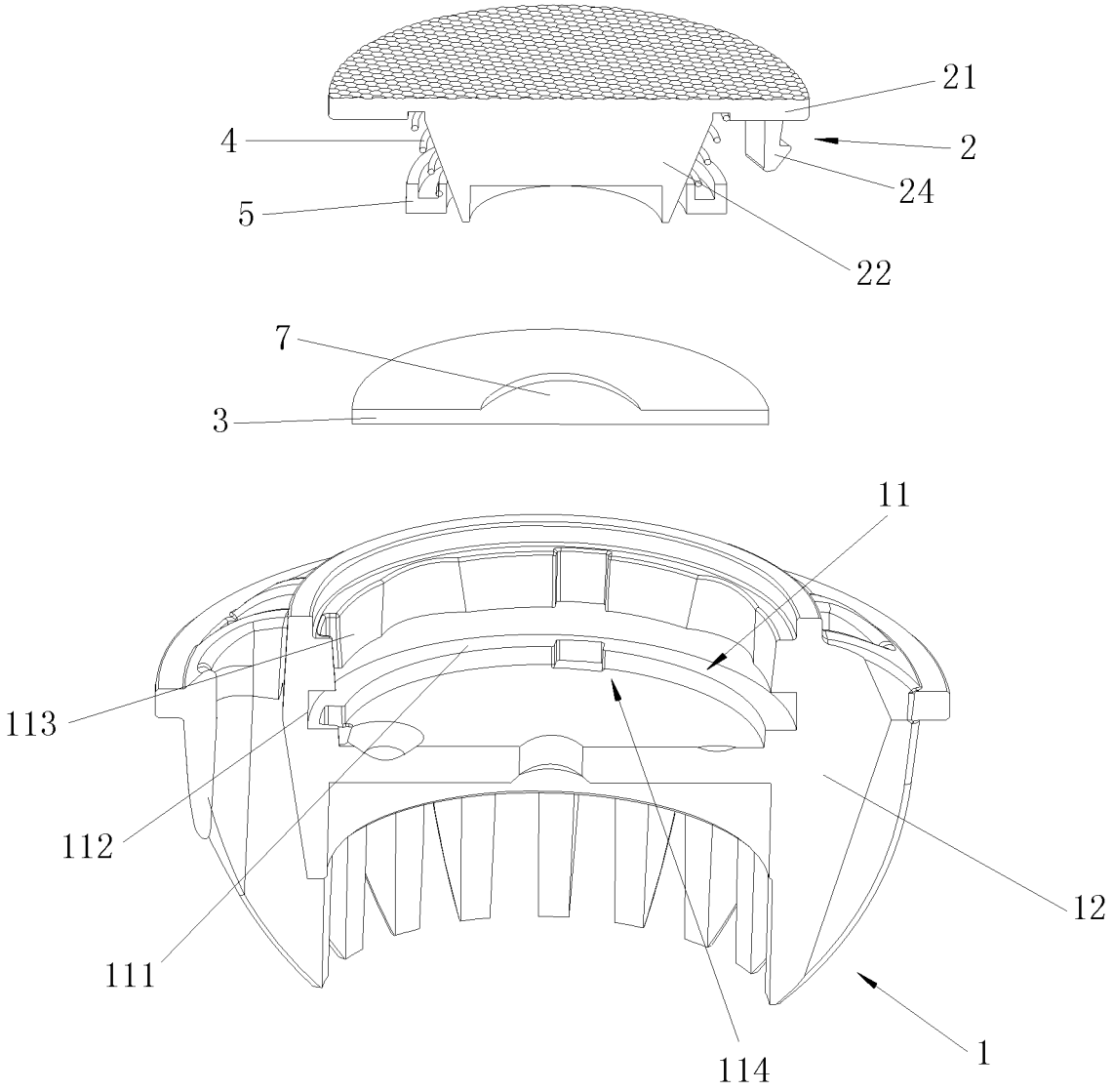


**Figure 1**

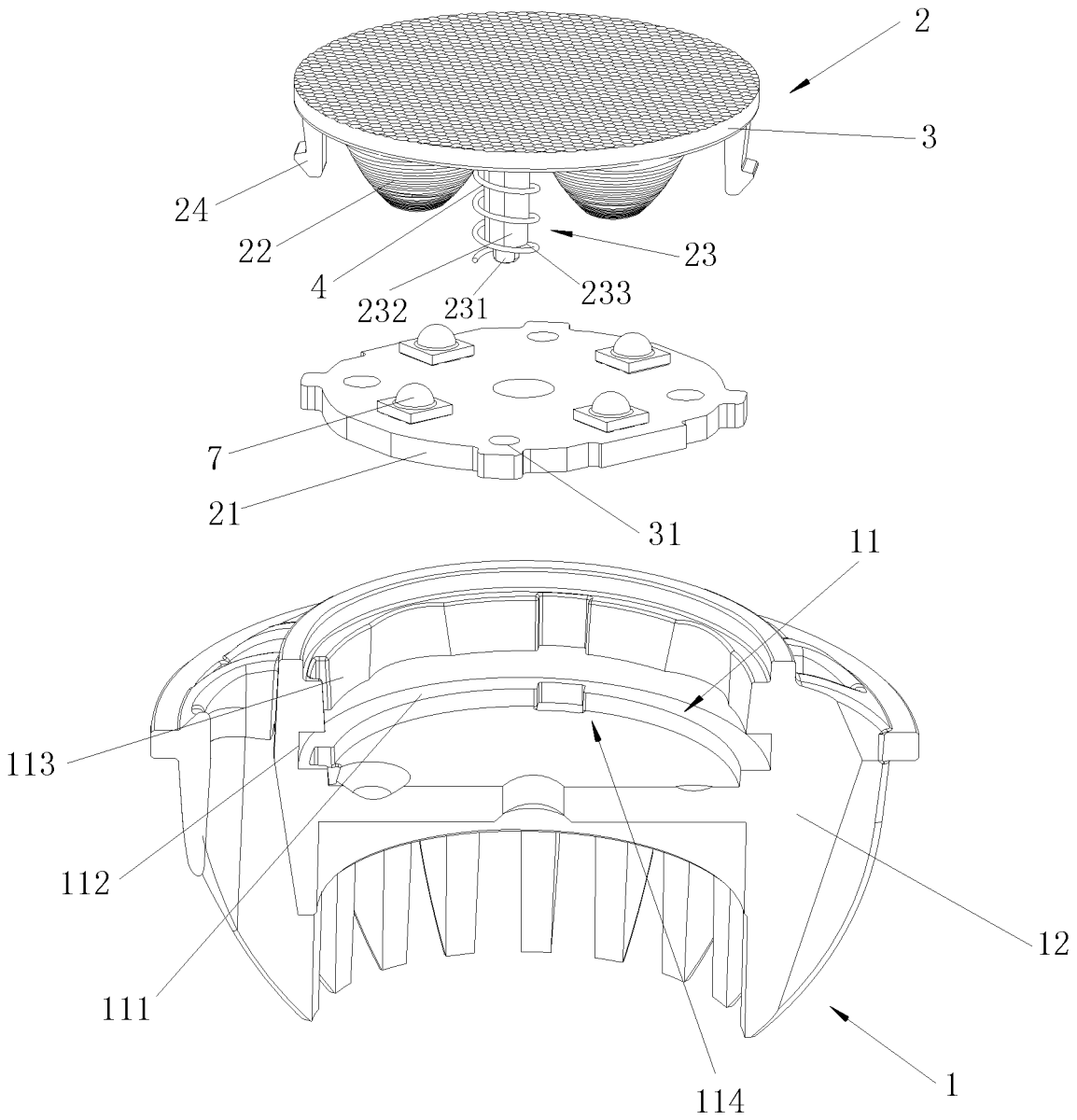


**Figure 2**

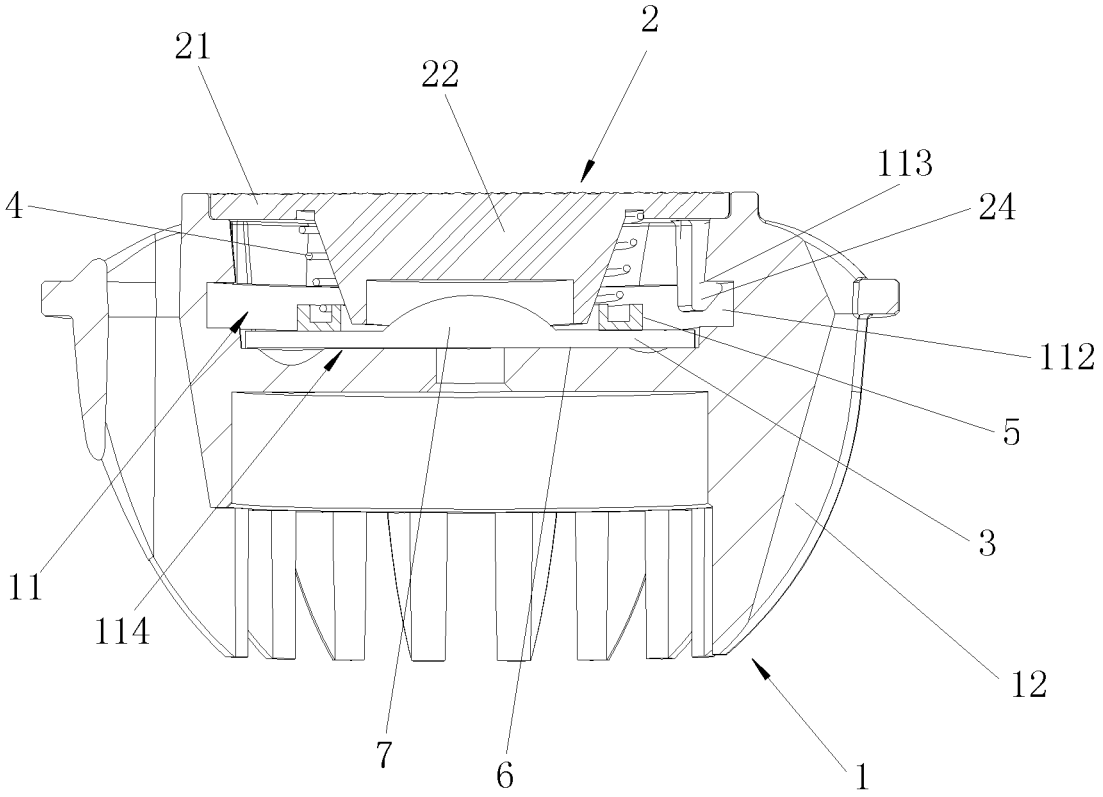


**Figure 3**

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- FR 2962783 A1 **[0002]**