

(19)



(11)

EP 2 802 813 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

31.10.2018 Bulletin 2018/44

(51) Int Cl.:

F21V 29/00 ^(2015.01) **F21V 29/77** ^(2015.01)
F21V 29/83 ^(2015.01) **F21V 29/50** ^(2015.01)
F21V 29/75 ^(2015.01) **F21V 29/87** ^(2015.01)
F21V 29/89 ^(2015.01)

(21) Application number: **13723690.7**

(22) Date of filing: **29.04.2013**

(86) International application number:
PCT/EP2013/058925

(87) International publication number:
WO 2013/171062 (21.11.2013 Gazette 2013/47)

(54) **HEAT DISSIPATION DEVICE AND ILLUMINATION APPARATUS COMPRISING THE HEAT DISSIPATION DEVICE**

WÄRMEABLEITUNGSVORRICHTUNG UND BELEUCHTUNGSVORRICHTUNG MIT DER WÄRMEABLEITUNGSVORRICHTUNG

DISPOSITIF DE DISSIPATION DE CHALEUR ET APPAREIL D'ÉCLAIRAGE COMPRENANT LE DISPOSITIF DE DISSIPATION DE CHALEUR

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

- **WANG, MingTao**
Shenzhen
Guangdong 518053 (CN)
- **WANG, WanPu**
Shaoxing
Zhejiang 312071 (CN)

(30) Priority: **14.05.2012 CN 201210149646**

(43) Date of publication of application:
19.11.2014 Bulletin 2014/47

(73) Proprietor: **LEDVANCE GmbH**
85748 Garching (DE)

(74) Representative: **Nordmeyer, Philipp Werner et al**
df-mp Dörries Frank-Molnia & Pohlman
Patentanwälte Rechtsanwälte PartG mbB
Theatinerstraße 16
80333 München (DE)

(72) Inventors:

- **HE, Guoan**
214000 Wuxi,
Jiangsu (CN)

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Description

Technical Field

[0001] The present invention relates to a heat dissipation device for an illumination apparatus. In addition, the present invention also relates to an illumination apparatus comprising the heat dissipation device.

Background Art

[0002] LED retrofit lamps of the types such as MR16, PAR16, PAR20, Classic A and Classic B are seethingly finding the way of replacing other traditional illumination apparatus such as incandescent and fluorescent lamps because they can offer the benefits of energy saving, small size and long lifetime. With the technology development, LED package itself can reach high efficiency, such as 140lm/W for cold white and 90lm/W for warm white and they are supposed to have a long lifetime as to 50,000 hours, but when the LED is integrated into a retrofit lamp together with an LED driver, a thermal management device and an optical component, the efficiency and lifetime of the retrofit lamp are highly dependent upon how to design the driver, heat dissipation device and optical component. Some of the electrical power consumed in the LED converts to heat rather than light. According to statistics of U.S. Department of Energy, 75% to 85% of energy used to drive the LED is converted to heat, and the heat must be conducted from the LED chip to the underlying PCB and heat dissipation device. If the heat cannot be conducted timely, the LED's light output performance will be reduced and a color shift will be produced in the short term, and the lifetime of the LED will be shortened in the long term. And the performance of the heat dissipation device directly affects the LED illumination apparatus. A good heat dissipation device design should be capable of providing favorable local air flow conditions, good radiation between surfaces, low material cost and simpler and easier manufacturing.

[0003] In order to improve heat dissipation performance, most heat dissipation devices are designed to have an increased heat dissipation surface area by using a larger number of fins within the form factor limitation. A large number of sheet-like fins are disposed outside the base of the heat dissipation device, so as to obtain the largest possible contact area with the convectional air. However, the heat dissipation device of this type has an obvious defect, viz. having a relatively larger volume, and reducing air convection among the fins. For this, it is proposed in the prior art to place holes in the fins or design fins with various special shapes, which, however, reduces, to some extent, the contact area of the fins with the convectional air, and reduces the heat dissipation performance of the heat dissipation device. Moreover, the fins of the above type have a complicated structure, are not easy to manufacture, and increase the manufacture complexity and cost of the heat dissipation device.

[0004] In addition, the pure sheet-like heat dissipation device is easier to manufacture, and has a low cost. However, it has a serious defect, viz. when the air flows over the surfaces of the sheet-like fins, a thermal boundary layer is formed on the surface of the fins, which significantly increases the thermal resistance of the heat dissipation device and reduces the heat dissipation performance of the heat dissipation device.

[0005] An earlier patent application US 2011/204780 A1 discloses a heat dissipation device with a base having an upper section and a lower section. Fins are distributed on a circumferential surface of the lower section, and sub-fins are distributed on a circumferential surface of the upper section.

[0006] US 2011/0080096 A1 and US 2010/0259942 A1 disclose LED lamps having heat dissipation devices with first and second sections and fins distributed on these sections.

Summary of the invention

[0007] In order to solve the above technical problems, the present invention provides a heat dissipation device, which has a simple structure, is easy to manufacture, has a low cost, can effectively avoid the formation of a thermal boundary layer on the surfaces of the fins of the heat dissipation device, and has a relatively lower thermal resistance and superior heat dissipation performance.

[0008] In addition, the present invention also provides an illumination apparatus comprising such heat dissipation device. The illumination apparatus according to the present invention has a simple appearance, a low cost and superior heat dissipation performance. The first object of the present invention is accomplished via a heat dissipation device for an illumination apparatus, the heat dissipation device comprising: a base comprising a first section and a second section provided in a longitudinal direction, and a heat dissipation structure, and the heat dissipation structure comprises a plurality of first fins distributed on a circumferential surface of the first section and a plurality of second fins distributed on a circumferential surface of the second section, and an circumferential angular position of the first fin is different from an circumferential angular position of the second fin. When the convectional air flows over the surfaces of the sheet-like fins, there will be a trend of forming a thermal boundary layer on the surfaces of the fins, which will reduce the convection effect, reduce the heat exchange capacity, and increase the thermal resistance of the heat dissipation device. In the design solution of the present invention, as the circumferential angular position of the first fin is different from the circumferential angular position of the second fin, viz. the first fins and the second fins are arranged in

a staggered manner, the convectional air deflects when flowing over the surfaces of the first fins and the second fins, which thereby eliminates the possibility of forming

a thermal boundary layer on the surfaces of the fins, and improves the heat dissipation performance of the heat dissipation device.

[0009] In an embodiment, the first section and the second section are sequentially arranged in the longitudinal direction of the base. In this way, the first fins disposed in the first section and the second fins disposed in the second section are also sequentially arranged in the longitudinal direction of the base, and the first fins and the second fins can be arranged to partially overlap each other or not overlap each other.

[0010] Preferably, the first fins extend in the longitudinal direction over the first section, and the second fins extend in the longitudinal direction over the second section. In this way, the first fins and the second fins are arranged without overlapping each other, and after flowing over the fins in the first section or the second section, the convectional air changes its flowing direction by the fins in the second section or the first section, which thereby effectively reduces the risk of forming a thermal boundary layer on the fins.

[0011] According to the present invention, two adjacent first fins define a first convection region, and two adjacent second fins define a second convection region, wherein air from the first convection region or the second convection region can be separated by the second fins or the first fins. The adjacent fins form the regions in which the convectional air flows, the flowing direction of the convectional air flowing over the regions will be changed by the fins that define other convection regions, which thereby effectively reduce the risk of forming a thermal boundary layer on the fins.

[0012] Further according to the present invention, the heat dissipation structure further comprises a connection structure such that a flowing channel is defined between the first convection region and the second convection region. The connection structure partially connects free ends of the first fins in the longitudinal direction with free ends of the second fins in the longitudinal direction. The connection structure serves the function of connecting and supporting the first fins and the second fins, and improves, to some extent, the overall appearance of the heat dissipation device.

[0013] Further advantageously, the connection structure comprises a plurality of connection fins, wherein each of the first fins is connected with two adjacent second fins through connection fins. These connection fins more or less disturb the convectional air, and thereby further reduce the risk of forming a thermal boundary layer on the fins. In addition, the connection fins further enlarge the contact area between the heat dissipation device and the convectional air, and enhance, to some extent, the heat dissipation performance of the heat dissipation device.

[0014] Preferably, the connection fins are connected to a side of the free ends of the first fins and the second fins facing away from the base. In this way, a channel is formed in the region in which the first fins and the second

fins are connected with each other, and the channel is jointly defined by the first fins, the second fins, the connection fins and the base.

[0015] Further advantageously, the first fins, the second fins and the connection structure are made in one piece

with the base, which greatly reduces the manufacture difficulty of the heat dissipation device according to the present invention, and reduces the manufacture cost.

[0016] According to a preferred design solution of the present invention, the heat dissipation device is made of a metal material, and is made by a die casting process. Preferably, the heat dissipation device is made of a metal material having high thermal conductive performance, for example, aluminum.

[0017] According to another preferred design solution of the present invention, the heat dissipation device is made of a thermal conductive plastic, and is made by an injection molding process. In addition to the superior thermal conductive performance, the thermal conductive plastic is light and can be molded into various forms according to the design requirements.

[0018] The other object of the present invention is accomplished via an illumination apparatus, comprising the heat dissipation device of the above type. The illumination apparatus according to the present invention has good appearance and superior heat dissipation performance.

[0019] Preferably, the illumination apparatus according to the present invention further comprises an LED light engine and a driver for driving the LED light engine, the LED light engine and the driver being accommodated in the heat dissipation device. LED light engines are widely used in the illumination apparatus as they have the advantages of high luminous efficiency, low power consumption, long lifespan, and so on.

Brief Description of the Drawings

[0020] The drawings constitute a portion of the Description for further understanding of the present invention. These drawings illustrate the embodiments of the present invention and explain the principle of the present invention together with the Description. In the drawings, the same part is represented by the same reference sign. In the drawings,

Fig. 1 is a schematic diagram of a heat dissipation device according to the first embodiment of the present invention;

Fig. 2 is a schematic diagram of the heat dissipation device according to the second embodiment of the present invention;

Fig. 3 is a top view of the heat dissipation device shown in Fig. 2; and

Fig. 4 is a flow trend diagram of convectional air on the heat dissipation device according to the present invention.

Detailed Description of the Embodiments

[0021] 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 may be practiced. In this regard, directional terminology, such as "top", "bottom", "front", "back", "longitudinal direction", "circumferential direction" etc., is used with reference to the orientation of the Figure (s) being described. Because components of embodiments 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 may be utilized and structural or logical changes may 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.

[0022] Fig. 1 is a schematic diagram of the heat dissipation device 100 according to the first embodiment of the present invention. As can be seen from the figure, the heat dissipation device 100 according to the present invention comprises a base 1 comprising a first section A and a second section B provided in a longitudinal direction, and a heat dissipation structure 2, and the heat dissipation structure 2 comprises a plurality of first fins 21 distributed on a circumferential surface of the first section A and a plurality of second fins 22 distributed on a circumferential surface of the second section B, and an circumferential angular position of the first fin 21 is different from an circumferential angular position of the second fin 22. As can be seen from the figure, the first fins 21 and the second fins 22 extend in the longitudinal direction of the base 1. However, they are not connected with each other, but are arranged in a staggered manner, which is equivalent to rotating the first section A carrying the first fins 21 at a predetermined angle with respect to the second section B carrying the second fins 22, such that the first fins 21 and the second fins 22 are staggered with respect to each other. In the first embodiment of the heat dissipation device 100 as shown in Fig. 1, the first fins 21 extend in the longitudinal direction over the first section A, and the second fins 22 extend in the longitudinal direction over the second section B, and seen in the circumferential direction, the first fins 21 and the second fins 22 do not overlap each other. However, in other embodiments, the first fins 21 can extend over the first section A and partially enter into the second section B, and the second fins 22 can extend over the second section B and partially enter into the first section A, such that the first fins 21 and the second fins 22 partially overlap.

[0023] In addition, as can be further seen from Fig. 1, two adjacent first fins 21 define a first convection region

C, and two adjacent second fins 22 define a second convection region D, wherein air from the first convection region C or the second convection region D can be separated by the second fins 22 or the first fins 21. The adjacent fins form the regions in which the convectional air flows, the flowing direction of the convectional air flowing over the regions will be changed by the fins that define other convection regions, which thereby effectively reduce the risk of forming a thermal boundary layer on the fins.

[0024] Fig. 2 is a schematic diagram of the heat dissipation device 100 according to the second embodiment of the present invention. As can be seen from the figure, the only difference between the heat dissipation device 100 according to the second embodiment of the present invention and the heat dissipation device 100 according to the first embodiment of the present invention lies in: the heat dissipation structure 2 further comprises a connection structure such that a flowing channel is defined between the first convection region C and the second convection region D. The connection structure partially connects free ends of the first fins 21 in the longitudinal direction with free ends of the second fins 22 in the longitudinal direction. As can be seen from the figure, the connection structure comprises a plurality of connection fins 23, wherein each of the first fins 21 is connected with two adjacent second fins 22 through two connection fins 23. Moreover, the connection fins 23 are connected to a side of the free ends of the first fins 21 and the second fins 22 facing away from the base 1.

[0025] Fig. 3 is a top view of the heat dissipation device 100 shown in Fig. 2. As can be seen from the figure, a flowing channel between the first convection region C and the second convection region D is formed in the region in which the first fins 21 and the second fins 22 are connected with each other, and the flowing channel is jointly defined by the first fins 21, the second fins 22, the connection fins 23 and the base 1.

[0026] In a preferred design solution of the present invention, the first fins 21, the second fins 22 and the connection sheets 23 are made in one piece with the base 1. In a preferred embodiment of the present invention, the heat dissipation device 100 can be made of a metal material by a die casting process. In another preferred embodiment of the present invention, the heat dissipation device 100 can also be made of a thermal conductive plastic by an injection molding process.

[0027] Fig. 4 is a flow trend diagram of convectional air on the heat dissipation device 100 according to the present invention. As can be seen from the figure, the convectional air from the outside flows from the bottom of the heat dissipation device 100, viz. the second section B of the heat dissipation device 100, to the first section A. The convectional air flows over the surfaces of the second fins 22 in the second convection region D defined by two adjacent second fins 22, after the convectional air flows outside the second convection region D, the first fins 21 and the connection fins 23 disturb the convectional

air and changes the flowing direction of the convectional air. The convectional air whose flowing direction has been changed subsequently flows into the first convection region C defined by two adjacent first fins 21. As the flowing direction of the convectional air has been changed, the risk of forming a thermal boundary layer on the surfaces of the sheet-like fins is reduced, and thereby, the heat dissipation performance of the heat dissipation device 100 is enhanced.

[0028] In addition, in order to facilitate observation, the illumination apparatus comprising the heat dissipation device 100 according to the present invention is not shown in the figures. The illumination apparatus according to the present invention comprises an LED light engine and a driver for driving the LED light engine, the LED light engine and the driver being accommodated in the heat dissipation device 100. Of course, the illumination apparatus according to the present invention can also employ light sources of other types and the corresponding electrical components.

[0029] It is to be understood that the features of the various exemplary embodiments described herein may be combined with each other, unless specifically noted otherwise.

[0030] Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a variety of alternate and/or equivalent implementations may be substituted for the specific embodiments shown and described. This application is intended to cover any adaptations or variations of the specific embodiments discussed herein.

List of reference signs

[0031]

1	base
2	heat dissipation structure
21	first fins
22	second fins
23	connection fins
A	first section
B	second section
C	first convection region
D	second convection region
100	heat dissipation device

Claims

1. A heat dissipation device (100) for an illumination apparatus, comprising: a base (1) comprising a first section (A) and a second section (B) provided in a longitudinal direction, and a heat dissipation structure (2), wherein the heat dissipation structure (2) comprises a plurality of first fins (21) distributed on a circumferential surface of the first section (A) and a plurality of second fins (22) distributed on a circum-

ferential surface of the second section (B), and a circumferential angular position of the first fin (21) is different from a circumferential angular position of the second fin (22),

wherein two adjacent first fins (21) define a first convection region (C), and two adjacent second fins (22) define a second convection region (D), wherein air from the first convection region (C) or the second convection region (D) can be separated by the second fins (22) or the first fins (21), **characterized in that** the heat dissipation structure (2) further comprises a connection structure such that a flowing channel is defined between the first convection region (C) and the second convection region (D).

2. The heat dissipation device (100) according to Claim 1, **characterized in that** the first section (A) and the second section (B) are sequentially arranged in the longitudinal direction of the base (1).

3. The heat dissipation device (100) according to Claim 2, **characterized in that** the first fins (21) extend in the longitudinal direction over the first section (A), and the second fins (22) extend in the longitudinal direction over the second section (B).

4. The heat dissipation device (100) according to Claim 1, **characterized in that** the connection structure partially connects free ends of the first fins (21) in the longitudinal direction with free ends of the second fins (22) in the longitudinal direction.

5. The heat dissipation device (100) according to Claim 4, **characterized in that** the connection structure comprises a plurality of connection fins (23), wherein each of the first fins (21) is connected with two adjacent second fins (22) through connection fins (23).

6. The heat dissipation device (100) according to Claim 5, **characterized in that** the connection fins (23) are connected to a side of the free ends of the first fins (21) and the second fins (22) facing away from the base (1).

7. The heat dissipation device (100) according to Claim 1, **characterized in that** the first fins (21), the second fins (22) and the connection structure are made in one piece with the base (1).

8. The heat dissipation device (100) according to any of Claims 1-3, **characterized in that** the heat dissipation device (100) is made of a metal material.

9. The heat dissipation device (100) according to Claim 8, **characterized in that** the heat dissipation device (100) is made by a die casting process.

10. The heat dissipation device (100) according to any

of Claims 1-3, **characterized in that** the heat dissipation device (100) is made of a thermal conductive plastic.

11. The heat dissipation device (100) according to Claim 10, **characterized in that** the heat dissipation device (100) is made by an injection molding process.
12. An illumination apparatus, **characterized in that** the illumination apparatus comprises a heat dissipation device (100) according to any of Claims 1-11.
13. The illumination apparatus according to Claim 12, **characterized in that** the illumination apparatus further comprises an LED light engine and a driver for driving the LED light engine, the LED light engine and the driver being accommodated in the heat dissipation device (100).

Patentansprüche

1. Wärmeableitvorrichtung (100) für eine Beleuchtungsvorrichtung, umfassend: eine Basis (1) mit einem ersten Abschnitt (A) und einem zweiten Abschnitt (B), die in einer Längsrichtung vorgesehen sind, und einer Wärmeableitungsstruktur (2), wobei die Wärmeableitungsstruktur (2) eine Vielzahl von ersten Rippen (21), die auf einer Umfangsfläche des ersten Abschnitts (A) verteilt sind, und eine Vielzahl von zweiten Rippen (22), die auf einer Umfangsfläche des zweiten Abschnitts (B) verteilt sind, aufweist und eine Umfangswinkelposition der ersten Rippe (21) von einer Umfangswinkelposition der zweiten Rippe (22) verschieden ist, wobei zwei benachbarte erste Rippen (21) einen ersten Konvektionsbereich (C) und zwei benachbarte zweite Rippen (22) einen zweiten Konvektionsbereich (D) definieren, wobei Luft aus dem ersten Konvektionsbereich (C) oder dem zweiten Konvektionsbereich (D) durch die zweiten Rippen (22) oder die ersten Rippen (21) getrennt werden kann, **dadurch gekennzeichnet, dass** die Wärmeabfuhrstruktur (2) ferner eine Verbindungsstruktur umfasst, sodass ein Strömungskanal zwischen dem ersten Konvektionsbereich (C) und dem zweiten Konvektionsbereich (D) definiert ist.
2. Wärmeableitvorrichtung (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Abschnitt (A) und der zweite Abschnitt (B) nacheinander in Längsrichtung der Basis (1) angeordnet sind.
3. Wärmeableitvorrichtung (100) nach Anspruch 2, **dadurch gekennzeichnet, dass** sich die ersten Rippen (21) in Längsrichtung über den ersten Abschnitt (A) und die zweiten Rippen (22) in Längsrichtung über den zweiten Abschnitt (B) erstrecken.

4. Wärmeableitvorrichtung (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verbindungsstruktur die freien Enden der ersten Rippen (21) in Längsrichtung teilweise mit den freien Enden der zweiten Rippen (22) in Längsrichtung verbindet.
5. Wärmeableitvorrichtung (100) nach Anspruch 4, **dadurch gekennzeichnet, dass** die Verbindungsstruktur eine Vielzahl von Verbindungsrippen (23) umfasst, wobei jede der ersten Rippen (21) mit zwei benachbarten zweiten Rippen (22) über Verbindungsrippen (23) verbunden ist.
6. Wärmeableitvorrichtung (100) nach Anspruch 5, **dadurch gekennzeichnet, dass** die Verbindungsrippen (23) mit einer Seite der freien Enden der ersten Rippen (21) und der zweiten Rippen (22), die der Basis (1) abgewandt sind, verbunden sind.
7. Wärmeableitvorrichtung (100) nach Anspruch 1, **dadurch gekennzeichnet, dass** die ersten Rippen (21), die zweiten Rippen (22) und die Verbindungsstruktur einstückig mit der Basis (1) ausgeführt sind.
8. Wärmeableitvorrichtung (100) nach einem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** die Wärmeableitvorrichtung (100) aus einem metallischen Werkstoff besteht.
9. Wärmeableitvorrichtung (100) nach Anspruch 8, **dadurch gekennzeichnet, dass** die Wärmeableitvorrichtung (100) im Druckgussverfahren hergestellt ist.
10. Wärmeableitvorrichtung (100) nach einem der Ansprüche 1-3, **dadurch gekennzeichnet, dass** die Wärmeableitvorrichtung (100) aus einem wärmeleitenden Kunststoff besteht.
11. Wärmeableitvorrichtung (100) nach Anspruch 10, **dadurch gekennzeichnet, dass** die Wärmeableitvorrichtung (100) im Spritzgussverfahren hergestellt ist.
12. Beleuchtungsvorrichtung, **dadurch gekennzeichnet, dass** die Beleuchtungsvorrichtung eine Wärmeableitvorrichtung (100) nach einem der Ansprüche 1-11 umfasst.
13. Beleuchtungsvorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** die Beleuchtungsvorrichtung ferner eine LED-Light-Engine und einen Treiber zum Antrieb der LED-Light-Engine umfasst, wobei die LED-Light-Engine und der Treiber in der Wärmeableitvorrichtung (100) untergebracht sind.

Revendications

1. Dispositif de dissipation de chaleur (100) pour un appareil d'éclairage, comprenant : une base (1) comprenant une première section (A) et une seconde section (B) dans une direction longitudinale, et une structure de dissipation de chaleur (2), dans lequel la structure de dissipation de chaleur (2) comprend une pluralité de premières ailettes (21) réparties sur une surface circonférentielle de la première section (A) et une pluralité de secondes ailettes (22) réparties sur une surface circonférentielle de la seconde section (B), et une position angulaire circonférentielle de la première ailette (21) est différente d'une position angulaire circonférentielle de la seconde ailette (22), dans lequel deux premières ailettes (21) adjacentes définissent une première région de convexion (C), et deux secondes ailettes (22) adjacentes définissent une seconde région de convexion (D), dans lequel de l'air de la première région de convexion (C) ou de la seconde région de convexion (D) peut être séparé par les secondes ailettes (22) ou les premières ailettes (21), **caractérisé en ce que** la structure de dissipation de chaleur (2) comprend en outre une structure de connexion de sorte qu'un canal d'écoulement est défini entre la première région de convexion (C) et la seconde région de convexion (D).
2. Dispositif de dissipation de chaleur (100) selon la revendication 1, **caractérisé en ce que** la première section (A) et la seconde section (B) sont agencées successivement dans la direction longitudinale de la base (1).
3. Dispositif de dissipation de chaleur (100) selon la revendication 2, **caractérisé en ce que** les premières ailettes (21) s'étendent dans la direction longitudinale sur la première section (A), et les secondes ailettes (22) s'étendent dans la direction longitudinale sur la seconde section (B).
4. Dispositif de dissipation de chaleur (100) selon la revendication 1, **caractérisé en ce que** la structure de connexion connecte partiellement des extrémités libres des premières ailettes (21) dans la direction longitudinale avec des extrémités libres des secondes ailettes (22) dans la direction longitudinale.
5. Dispositif de dissipation de chaleur (100) selon la revendication 4, **caractérisé en ce que** la structure de connexion comprend une pluralité d'ailettes de connexion (23), dans lequel chacune des premières ailettes (21) est connectée à deux secondes ailettes (22) adjacentes à travers des ailettes de connexion (23).
6. Dispositif de dissipation de chaleur (100) selon la revendication 5, **caractérisé en ce que** les ailettes de connexion (23) sont connectées à un côté des extrémités libres des premières ailettes (21) et des secondes ailettes (22) orienté à l'opposé de la base (1).
7. Dispositif de dissipation de chaleur (100) selon la revendication 1, **caractérisé en ce que** les premières ailettes (21), les secondes ailettes (22) et la structure de connexion sont fabriquées en une pièce avec la base (1).
8. Dispositif de dissipation de chaleur (100) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le dispositif de dissipation de chaleur (100) est constitué d'un matériau métallique.
9. Dispositif de dissipation de chaleur (100) selon la revendication 8, **caractérisé en ce que** le dispositif de dissipation de chaleur (100) est fabriqué par un procédé de coulée sous pression.
10. Dispositif de dissipation de chaleur (100) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** le dispositif de dissipation de chaleur (100) est constitué d'un plastique conducteur thermique.
11. Dispositif de dissipation de chaleur (100) selon la revendication 10, **caractérisé en ce que** le dispositif de dissipation de chaleur (100) est fabriqué par un procédé de moulage par injection.
12. Appareil d'éclairage, **caractérisé en ce que** l'appareil d'éclairage comprend un dispositif de dissipation de chaleur (100) selon l'une quelconque des revendications 1 à 11.
13. Appareil d'éclairage selon la revendication 12, **caractérisé en ce que** l'appareil d'éclairage comprend en outre un module d'éclairage à LED et un pilote pour piloter le module d'éclairage à LED, le module d'éclairage à LED et le pilote étant logés dans le dispositif de dissipation de chaleur (100).

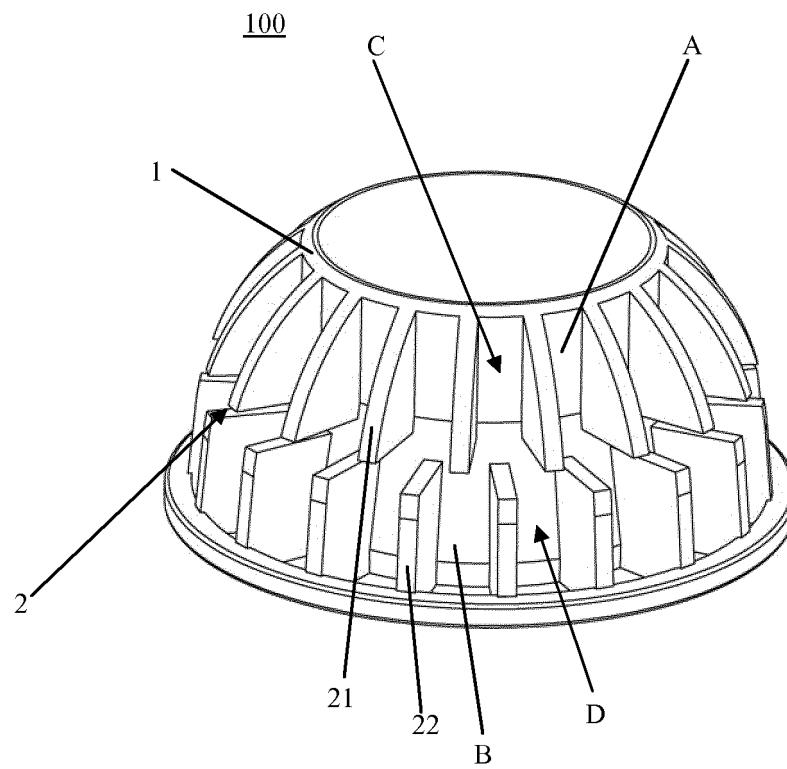


Figure 1

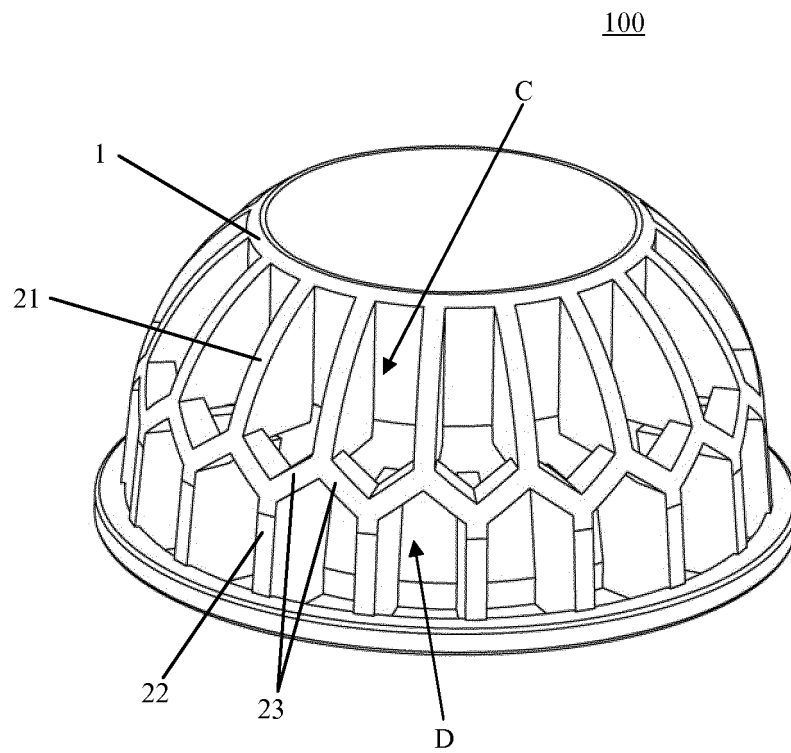


Figure 2

100

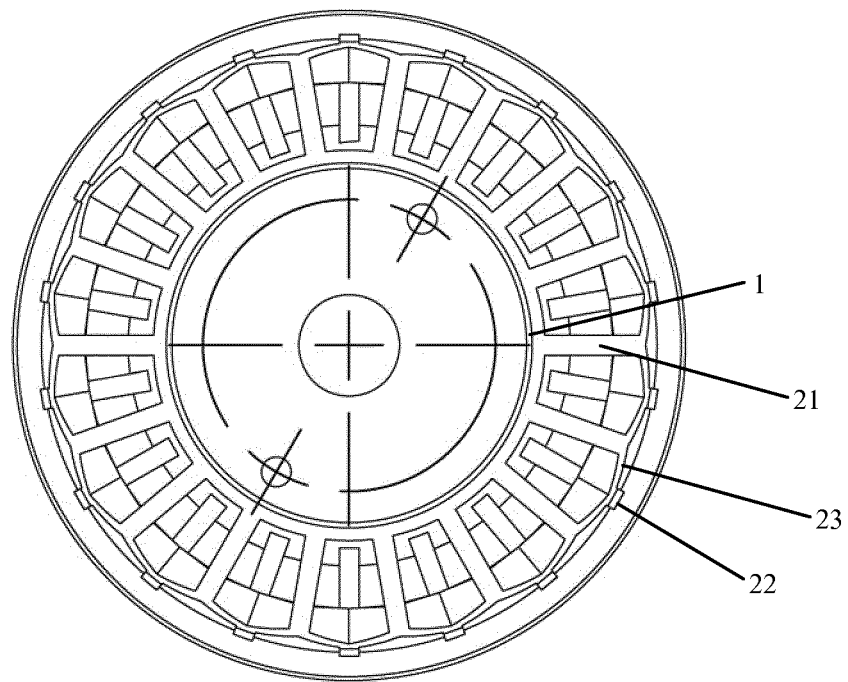


Figure 3

100

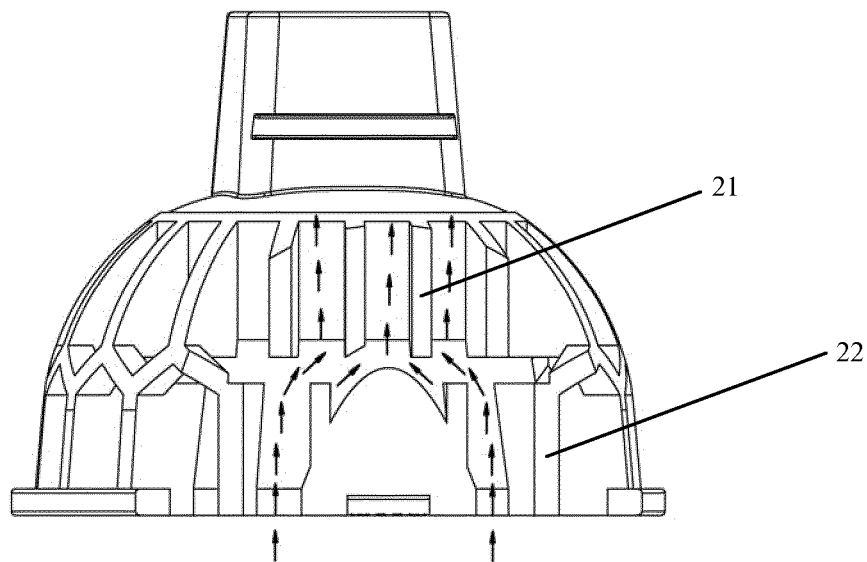


Figure 4

REFERENCES CITED IN THE DESCRIPTION

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