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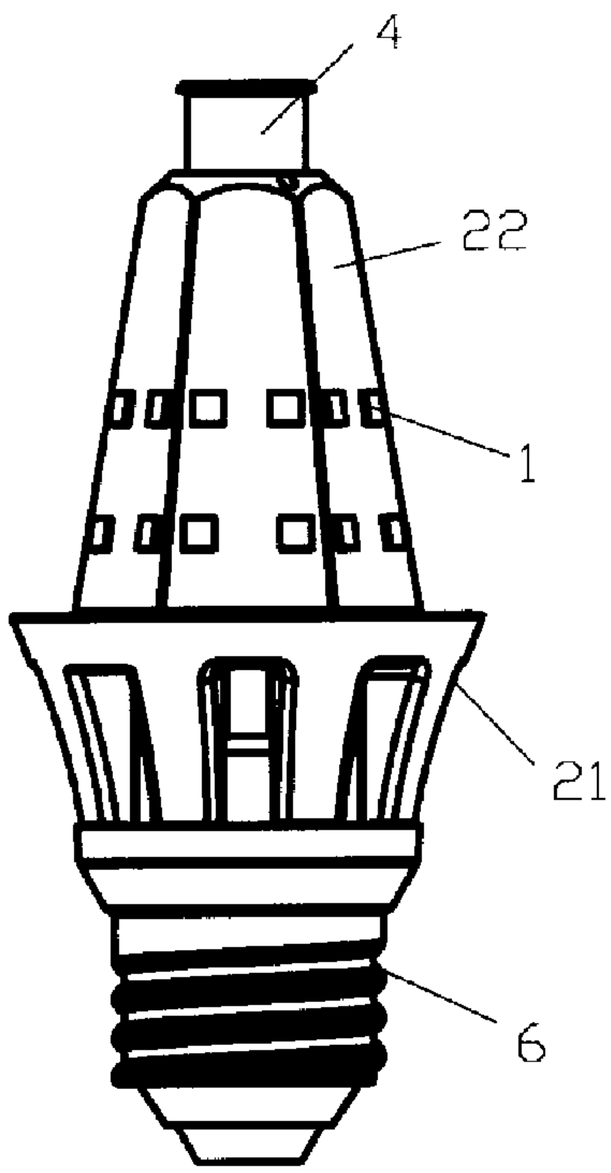
(72) **Inventeurs/Inventors:**
WANG, HUAFENG, CN;
WANG, PENG, CN;
XU, LI, CN;
CHEN, MIN, CN

(73) **Propriétaires/Owners:**
SHANGHAI SANSI ELECTRONIC ENGINEERING CO., LTD, CN;
SHANGHAI SANSI SCIENCE AND TECHNOLOGY DEVELOPMENT CO., LTD., CN; ...

(54) **Titre : LAMPE A AMPOULE A DEL APTE A UNE EMISSION DE LUMIERE A GRAND ANGLE**
(54) **Title: LED BULB LAMP CAPABLE OF REALIZING WIDE-ANGLE LUMINESCENCE**



(57) **Abrégé/Abstract:**
The present invention discloses an LED (Light-Emitting Diode) bulb lamp capable of realizing wide-angle luminescence. The LED bulb lamp comprises LEDs, a heat sink and a lampshade, wherein the heat sink is divided into two parts, the lower part of the heat sink is connected with a lamp cap of a lighting fixture, the upper part of the heat sink takes the shape of a small-top big-bottom multi-surface prismoid, an included angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture is greater than or equal to 10 degrees and less than or equal to 25 degrees, the upper part and the lower part of the heat sink are communicated to each other, at least one LED is arranged on each ridge surface, and the upper part of the heat sink is arranged in the lampshade in a covering manner. The LED bulb lamp has the advantages of being capable of enlarging light rays in a small-angle irradiation range to the most of region of a bulb, achieving an entire light distribution effect and giving consideration to requirements on characteristics of luminescence and heat dissipation efficiency.

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(73) **Propriétaires(suite)/Owners(continued):**JIASHAN SANSI PHOTOELECTRIC TECHNOLOGY CO., LTD., CN

(74) **Agent:** PERRY + CURRIER

Abstract

The present invention discloses an LED (Light-Emitting Diode) bulb lamp capable of realizing wide-angle luminescence. The LED bulb lamp comprises LEDs, a heat sink and a lampshade, wherein the heat sink is divided into two parts, the lower part of the heat sink is connected with a lamp cap of a lighting fixture, the upper part of the heat sink takes the shape of a small-top big-bottom multi-surface prismoid, an included angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture is greater than or equal to 10 degrees and less than or equal to 25 degrees, the upper part and the lower part of the heat sink are communicated to each other, at least one LED is arranged on each ridge surface, and the upper part of the heat sink is arranged in the lampshade in a covering manner. The LED bulb lamp has the advantages of being capable of enlarging light rays in a small-angle irradiation range to the most of region of a bulb, achieving an entire light distribution effect and giving consideration to requirements on characteristics of luminescence and heat dissipation efficiency.

LED BULB LAMP CAPABLE OF REALIZING WIDE-ANGLE LUMINESCENCE

Technical Field

This present invention relates to the LED lighting field and more specifically, to a kind of LED bulb lamp realizing wide-angle luminescence.

Background Of The Invention

With LED being applied increasingly in the lighting field, the bulb lamp taking LED as the light source is gradually replacing the traditional tungsten filament lighting lamp. However, due to the features of LED, the light-emitting angle is limited to certain range. Therefore, the application of the luminaire taking LED as the light source is greatly restricted and it is necessary to do light distribution again with other optical components before daily lighting need can be met. As a LED bulb lamp, it is usually required that the wider the angle range of illumination is, the better it will be. At the same time, the higher that uniformity of illuminating light is, the better it will be. Therefore, it is imperative to design the LED bulb lamp in respect of structure and optical side to expand the angle and range of illumination and satisfy the need of people for illumination.

Energy Star (ES) in USA raised a standard, that is, for class A bulbs (i.e. standard incandescent lamp shape bulb), the following requirements are also available for the light-emitting properties in addition to such basic photoelectric property requirements as light flux output, light effect, etc.: the light intensity change in γ0-135° cannot exceed 20% of the average light intensity in that range and the light flux in γ135-180° cannot be lower than 5% of the total light flux. Very few of the Class A LED bulb products available on market currently can meet the ES standard. The most principal reason is that the light-emitting property with the above light-emitting angle cannot be met.

Summary of the Invention

For the problems presented in the prior art, the present invention provides an LED bulb lamp which has the advantages of being capable of enlarging light rays in a small-angle irradiation range to the most of region of a bulb, achieving an entire light

distribution effect and giving consideration to requirements on characteristics of luminescence and heat dissipation efficiency.

To achieve the above goal, the present invention adopts the following technical scheme:

According to an exemplary embodiment of the invention, there is provided an LED bulb lamp capable of realizing wide-angle luminescence, and the LED bulb lamp comprises LEDs, a heat sink and a lampshade, wherein the heat sink is divided into two parts, the lower part of the heat sink is connected with a lamp cap of a lighting fixture, the upper part of the heat sink takes the shape of a small-top big-bottom multi-surface prismoid, an included angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture is greater than or equal to 10 degrees and less than or equal to 25 degrees, the upper part and the lower part of the heat sink are communicated to each other, at least one LED is arranged on each ridge surface, and the upper part of the heat sink is arranged in the lampshade in a covering manner.

According to an exemplary embodiment of the invention, the multi-surface prismoid is six-sided prismoid.

According to an exemplary embodiment of the invention, the LED is arranged on ridge surface of a position near the lower part of the heat sink.

According to an exemplary embodiment of the invention, four LEDs are arranged on each ridge surface.

According to an exemplary embodiment of the invention, the included angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture is 20 degrees.

According to an exemplary embodiment of the invention, a through-hole is provided on the top of the lampshade, the top of the lampshade and the top surface of the prismoid are connected by a connection running through from top to bottom and multiple convection heat dissipation channels are formed between the lampshade, the upper part of the heat sink and hollow parts formed on the lower part of the heat sink.

According to an exemplary embodiment of the invention, the connection is a

kind of press type ring having a barb structure, after the connection is installed in place, the barb structure is ejected out and hooks the top of the upper part of the heat sink to play a role of fixing the lampshade.

According to an exemplary embodiment of the invention, the lampshade is coated with diffusion material having a fog level of 95%~99% and transmissivity over 50%.

According to an exemplary embodiment of the invention, the upper and lower parts of the heat sink are an integrated type and the lower part of the heat sink is hollow structure.

The technical scheme adopted by this present invention sets the installation surface on which a LED light source is installed to a shape of multi-surface prismoid and the number of ridge surfaces for installing LED and the included angle theta of each ridge surface are designed according to the requirement of the lamp light-emitting angle. To achieve an entire light distribution effect, the angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture greater than or equal to 10 degrees and less than or equal to 25 degrees. At the same time, with the heat dissipation problem being considered, the upper part and the lower part of the heat sink are communicated to each other to increase the heat dissipation efficiency through air convection and the location where a LED is arranged on each ridge surface is kept as close to the lower end of the prismoid as possible. The problem of power and light flux is considered to set the number of LEDs used. At the same time, diffusion material is coated on the lampshade for even and soft luminescence, and such diffusion material has a fog level of 95%~99% and transmissivity over 50%.

Brief Description of The Drawings

Figure 1 is a structural schematic diagram for one embodiment of this present invention;

Figure 2 is the cross-sectional view of Figure 1.

Detailed Description of the Embodiments

The technical scheme of the present invention will be described in further detail below in combination with figures and embodiment.

As shown in Figure 1 and Figure 2, the LED bulb lamp in one embodiment of this present invention includes LED 1, heat sink and lampshade 3. The heat sink is in ceramic material and divided into two parts as an integrated structure. The lower part 21 is hollow structure and the upper part 22 takes the shape of a small-top big-bottom multi-surface prismoid. The upper and lower parts 21, 22 of heat sink 2 connect with each other. Each ridge surface has four LEDs 1 installed thereon. The lampshade 2 is covered in the upper part 22 of the heat sink. The more ridge surfaces of the prismoid are, the easier the requirement for full light distribution requirement can be achieved. However, the more aluminum base plates required by lamp to install LED will be needed for the production process to become more complicated. Under the circumstance of considering the above factors comprehensively, this embodiment selects a prismoid shape with six surfaces, and the angle theta θ between each ridge surface of the prismoid and the vertical center line of the lighting fixture is greater than or equal to 10 degrees and less than or equal to 25 degrees. In a preferred embodiment of this present invention, the inclination angle theta θ between the ridge surface of the prismoid shape with six surfaces and the vertical center line of the lighting fixture is 20 degrees.

Through experimental test, the locations where multiple LEDs 1 are arranged on each ridge surface of prismoid do not have a great influence on light distribution. However, out of the consideration in heat dissipation, LED 1 should be arranged as close to the lower part 21 of the heat sink as possible, so that the heat produced by LEDs can be dissipated very quickly through the hollow structure in the lower part 21 of the heat sink.

In order to dissipate heat through air convection, the lampshade 3 is in a structure with a through-hole cut on the top. The top of the lampshade 3 and the top surface of the upper part 22 of the heat sink are connected by a connection 4 running through from top to bottom and multiple convection heat dissipation channels are formed

between the lampshade 3, the upper part 22 of the heat sink and the hollow parts formed on the lower part 21 of the heat sink. The connection 4 is a kind of press type ring in a barb structure. When the connection 4 is installed in place, the barb structure is ejected out and hooks the top of the upper part 22 of the heat sink to play a role of fixing the lampshade 3.

The power supply 5 is installed in the power supply installation cavity 7 provided in a lamp cap 6 of the lighting fixture .

The lampshade 3 is coated with diffusion material thereon. To avoid influence on the light effect and light distribution, there are property requirements for the diffusion material. It is required that the fog level is 95%~99% and the transmissivity is over 50%. In coating the diffusion material, one or multiple layers of coating can be applied according to the actual need.

The above embodiment should be comprehended as being used only to describe the present invention and not to limit the protection scope of the present invention. After reading the contents as recorded in the present invention, those skilled in the art can make various alterations or modifications to the present invention. These equivalent changes and decorations fall within the scope limited by the claims of the present invention.

Claims

1. An LED bulb lamp capable of realizing wide-angle luminescence, the LED bulb lamp comprising:

a heat sink divided into a lower part with a hollow structure, the lower part for connecting with a lamp cap of a lighting fixture, and an upper part communicated to the lower part, the upper part comprising a plurality of ridge surfaces forming a small-top big-bottom multi-surface prismoid such that an angle theta between each ridge surface and a vertical center line of the lighting fixture is greater than or equal to 10 degrees and less than or equal to 25 degrees;

one or more LEDs, such that at least one LED is arranged on each ridge surface;

a lampshade arranged to cover the upper part of the heat sink;

a through-hole on a top of the lampshade configured to form multiple convection heat dissipation channels between the lampshade, the upper part of the heat sink and hollow parts formed by the hollow structure of the lower part of the heat sink; and

a connection between the top of the lampshade and a top surface of the prismoid, wherein the connection is a press type ring having a barb structure, such that after the connection is in place, the barb structure may be ejected and hooks the top of the upper part of the heat sink for fixing the lampshade.

2. The LED bulb lamp of claim 1, wherein the multi-surface prismoid is six-sided prismoid.

3. The LED bulb lamp of claim 1, wherein the LED is arranged on ridge surface of a position near the lower part of the heat sink.

4. The LED bulb lamp of claim 3, wherein four LEDs are arranged on each ridge surface.

5. The LED bulb lamp of claim 1, wherein the included angle theta between each ridge surface of the prismoid and the vertical center line of the lighting fixture is 20 degrees.

6. The LED bulb lamp of claim 1, wherein the lampshade is coated with diffusion material having a fog level of 95%~99% and transmissivity over 50%.

7. The LED bulb lamp of claim 1, wherein the upper and lower parts of the heat sink are an integrated type and the lower part of the heat sink is hollow structure.

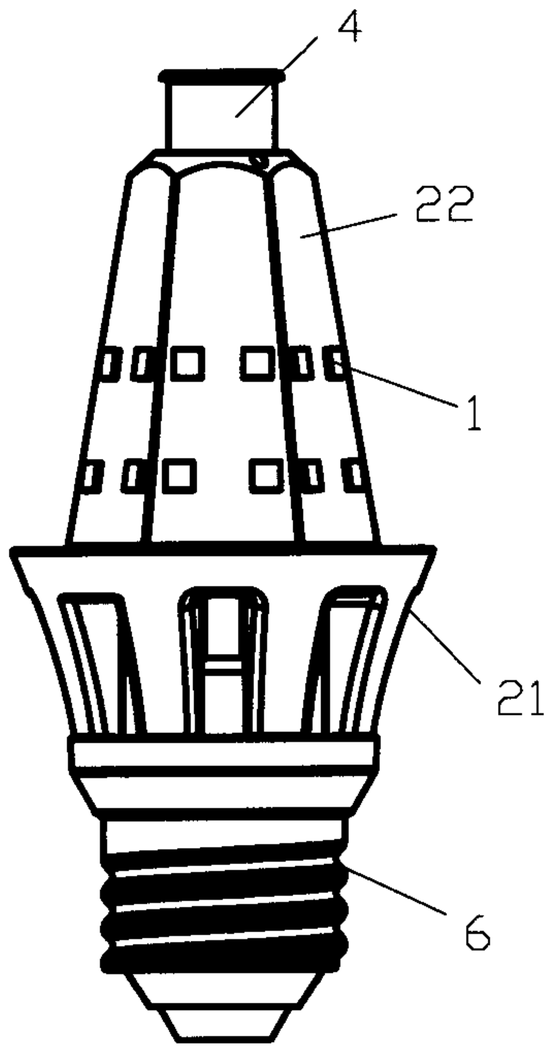

Fig.1

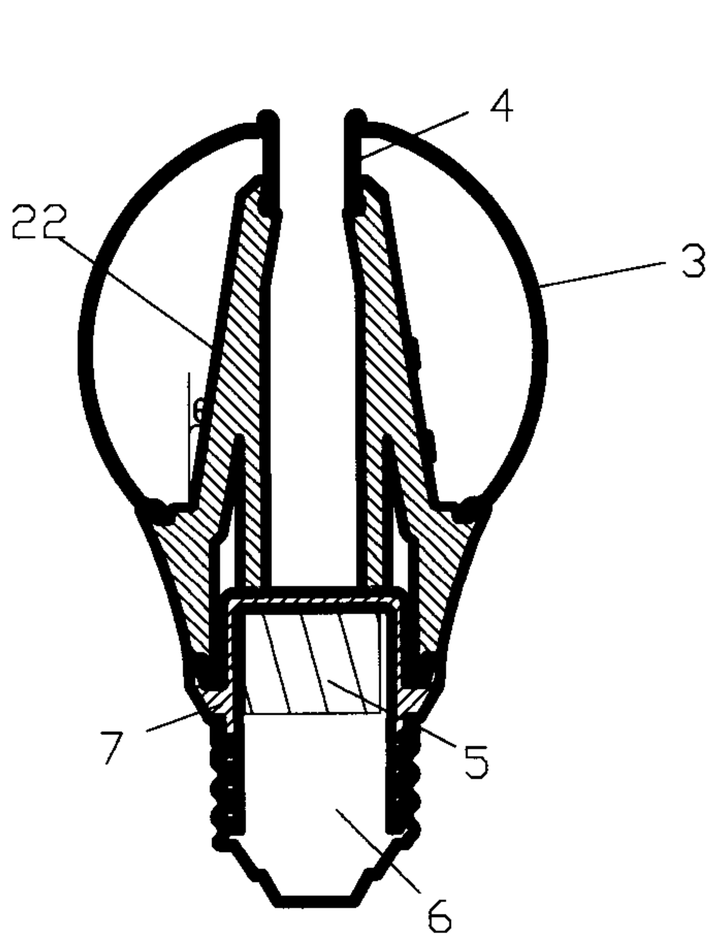

Fig.2

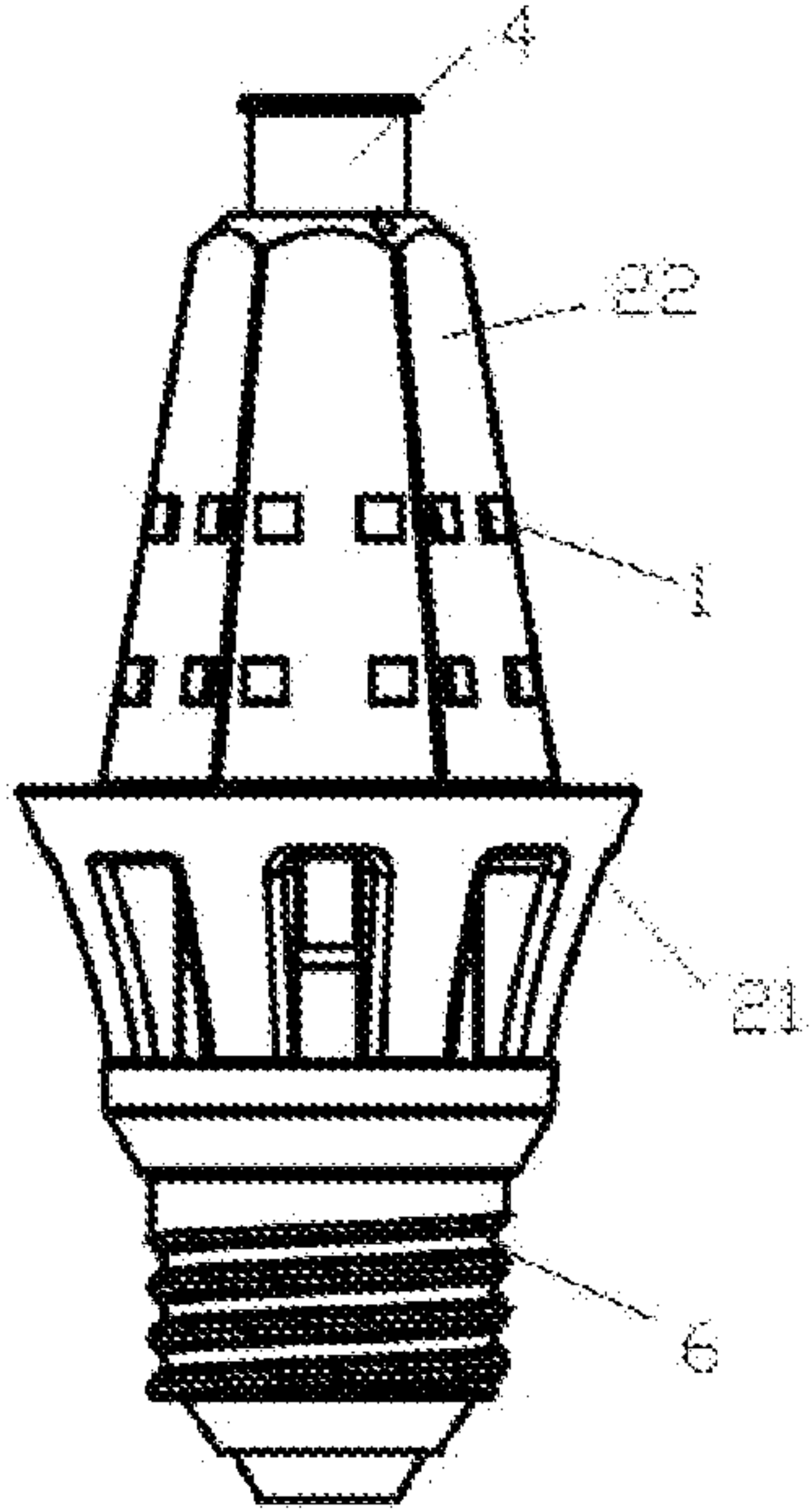

图 1 /Fig.1