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(54) **Led light bulb**

(57) An LED light bulb (10), comprising: a head portion (14); an insulation tube (16), with its bottom end screw-locked onto the head portion, and with its inside provided with a driver-circuit-board component (20) having its one end connected electrically to said head portion; a heat dissipation cup (22), disposed on said insulation tube, inner and outer surfaces of said heat dissipation cup are provided with indent-protrusion texture structures (21), and its bottom surface is provided with two conduction-wire through-holes (24); an LED circuit board (27), and at least a Hi-Power LED (26) is provided thereon, and said LED circuit board is disposed on said bottom surface of said heat dissipation cup (22), said LED circuit board (27) is connected electrically to an other end of said driver-circuit-board component (20); and a hood (30), provided on a top end of said heat dissipation cup. The indent-protrusion texture structures on said heat dissipation cup are capable of dissipating speedily heat generated by the LED.

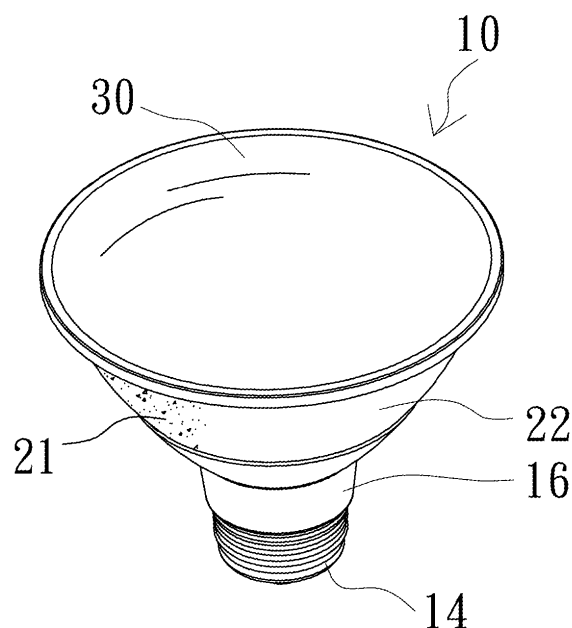


Fig. 1

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a lighting device, and in particular to an LED light bulb.

THE PRIOR ARTS

[0002] In recent years, LED has been widely utilized as a light source in various sectors of our daily life, due to its low energy consumption and long service life. As an example, LED light bulb that can be placed directly on an ordinary light bulb socket is developed to replace the conventional light bulb, such as a tungsten filament light bulb.

[0003] Presently, a Hi-Power LED (hereinafter referred to as a HP LED) light bulb available on the market includes: a copper head, a hood, an aluminum substrate, and a HP LED installed thereon. The bottom of the aluminum substrate is fixed onto an aluminum alloy heat dissipation device, the copper head is fixed onto the bottom of aluminum alloy heat dissipation device, and the copper head is connected electrically to the HP LED. The hood is installed and fixed onto the top end of the aluminum substrate to cover over the HP LED. When the HP LED is activated for illumination, light produced by HP LED can be emitted to outside through the hood, in achieving the purpose of illumination. However, in the operation of the HP LED light bulb, the HP LED generates large amount of heat, and that can only be dissipated through the aluminum alloy heat dissipation device provided at the bottom of the aluminum substrate, so as to maintain the normal operation of HP LED; otherwise, the heat thus generated could result in shortening the service life of HP LED, or even burn-out of the HP LED light bulb. Therefore, presently, for the HP LED light bulb, the HP LED is installed and fixed onto an aluminum substrate, and a fin-shaped aluminum alloy heat dissipation device is provided to dissipate heat. However, the weights of aluminum substrate and the fin-shaped aluminum alloy heat dissipation device are rather heavy, and it occupies a certain volume of the HP LED light bulb, thus making the existing HP LED light bulb to have the shortcomings of heavy weight, large volume, and high production cost. Furthermore, when utilized outdoors, it has the problems that the fin-shaped aluminum alloy heat dissipation device can not be fitted tightly with the copper head, thus it can not provide waterproof function.

[0004] Therefore, presently, the design and performance of the LED light bulb of the prior art is not quite satisfactory, and it has much room for improvement.

SUMMARY OF THE INVENTION

[0005] In view of the problems and shortcomings of

the prior art, the present invention provides an LED light bulb, so as to overcome the problems of the prior art.

[0006] A major objective of the present invention is to provide an LED light bulb, wherein, tiny and minute indent-protrusion texture structures are formed on the inner and outer surfaces of a heat dissipation cup through sand-blasting and anodic treatments, thus increasing the surface area of the cup to dissipate speedily the heat generated by the LED, without the need to use an additional heat dissipation fin device of the prior art.

[0007] Another objective of the present invention is to provide an LED light bulb, having the advantages of small volume, light weight, simple structure, and low production cost.

[0008] A yet another objective of the present invention is to provide an LED light bulb, wherein, inner and outer surfaces of the heat dissipation cup are processed by anodic treatment, thus being able to withstand the erosion of weather.

[0009] A further objective of the present invention is to provide an LED light bulb, such that there is no need to provide a reflective element in the rear of LED circuit board, hereby preventing the occurrence of halo.

[0010] A yet another objective of the present invention is to provide an LED light bulb, having the advantages of good heat dissipation, water proof, aesthetical appearance, and its cup glass will not break even when in contact with water at high temperature.

[0011] In order to achieve the above-mentioned objective, the present invention provides an LED light bulb, comprising: a head portion; an insulation tube, with its bottom screw-locked onto the head portion, and its inside is provided with a driver-circuit-board component, one end of this component is connected electrically to the head portion; a heat dissipation cup, disposed on said insulation tube, the inner and outer surfaces of the heat dissipation cup are provided with indent-protrusion texture structures, and its bottom is provided with at least two conduction-wire through-holes, on the bottom surface of the cup is provided with an LED circuit board, and at least an HP LED is provided thereon, the LED circuit board is connected electrically to the other end of the driver-circuit-board component through the conduction-wire through-holes; and a hood, provided on the top end of the heat dissipation cup.

[0012] Further scope of the applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the present invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The related drawings in connection with the de-

tailed description of the present invention to be made later are described briefly as follows, in which:

[0014] Fig. 1 is a perspective view of the LED light bulb according to an embodiment of the present invention;

[0015] Fig. 2 is a perspective view of the LED light bulb according to an embodiment of the present invention after the convex lens is removed;

[0016] Fig. 3 is an exploded view of elements of the LED light bulb according to an embodiment of the present invention as viewed from top;

[0017] Fig. 4 is an exploded view of elements of the LED light bulb according to an embodiment of the present invention as viewed from bottom;

[0018] Fig. 5 is a cross section view of the LED light bulb according to an embodiment of the present invention;

[0019] Fig. 6 is a perspective view of the LED light bulb according to another embodiment of the present invention;

[0020] Fig. 7 is a side view of the LED light bulb according to another embodiment of the present invention; and

[0021] Fig. 8 is an exploded view of elements of the LED light bulb according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0022] The purpose, construction, features, functions and advantages of the present invention can be appreciated and understood more thoroughly through the following detailed descriptions with reference to the attached drawings.

[0023] Refer respectively to Fig. 1 for a perspective view of the LED light bulb according to an embodiment of the present invention; Fig. 2 for a perspective view of the LED light bulb according to an embodiment of the present invention after the convex lens is removed; Fig. 3 for an exploded view of elements of the LED light bulb according to an embodiment of the present invention as viewed from top; Fig. 4 for an exploded view of elements of the LED light bulb according to an embodiment of the present invention as viewed from bottom; and Fig. 5 for a cross section view of the LED light bulb according to an embodiment of the present invention.

[0024] As shown in Figs. 1 to 5, the LED light bulb 10 includes: a head portion 14, which is made of copper and is provided with the first screw thread 12 on its inner surface; an insulation tube 16, with its bottom end formed with the second screw thread 18 corresponding to the first screw thread 12, so that the insulation tube 16 can be screw-locked onto the head portion 14, and two lock-and-fix holes 19 are formed on the top end of the insulation tube 16; a driver-circuit-board component 20 disposed inside the insulation tube 16 and with its one end connected electrically to the head portion 14; a heat dissipation cup 22, provided on the top end of the insulation

tube 16, the inner and outer surfaces of the cup are provided with indent-protrusion texture structures 21 formed through sand-blasting and anodic treatments, and the bottom surface 23 of the heat dissipation cup 22 is provided with at least two conduction-wire through-holes 24 and two positioning holes 25; an LED circuit board 27, having at least a Hi-power LED 26 disposed thereon, and it is glued on the bottom surface 23 of the heat dissipation cup 22, with its size smaller than that of the bottom surface 23 of the cup 22, the conduction wires 28 connects the LED circuit board 27 electrically to the other end of driver-circuit-board component 20 through the conduction-wire through-holes 24, two opposite side rims of LED circuit board 27 are provided with two positioning slots 29, such that two lock-and-fix pieces 31 can pass through the positioning slots 29 and positioning holes 25 and are locked and fixed onto the lock-and-fix holes 19, so as to position the LED circuit board 27 onto the bottom surface 23 of the cup 22, and lock and fix the heat dissipation cup 22 onto the insulation tube 16; and a convex lens 30 placed on the top end of the heat dissipation cup 22.

[0025] The LED light bulb of the present invention further includes a ring-shape decoration plate 32, having its bottom surface provided with two positioning columns 33. The decoration plate positioning holes 34 corresponding to the positioning columns 33 are formed on the bottom surface 23 of the heat dissipation cup 22, for allowing the ring-shape decoration plates 32 to be placed onto the LED circuit board 27, and then being pressed to fasten and fix onto the bottom surface 23 of the cup 22 through the positioning columns 33, hereby shielding the lock-and-fix piece 31 and the circuits connected electrically to LED circuit board 27, and giving an aesthetical appearance.

[0026] Moreover, a first heat resistance water-proof plastic ring 36 is disposed between the insulation tube 16 and the heat dissipation cup 22, and a second heat resistance water-proof plastic ring 38 is disposed between the convex lens 30 and the heat dissipation cup 2, hereby preventing moisture from seeping into inside the LED light bulb 10.

[0027] In the present invention, tiny and minute indent-protrusion texture structures are formed on the inner and outer surfaces of a heat dissipation cup through sand-blasting and anodic treatments, thus increasing the surface area of the cup to dissipate speedily the heat generated by the HP-LED, without the need to use an additional heat dissipation fin device of the prior art, thus reducing the overall volume, weight, and production cost of the LED light bulb. In addition, the inner and outer surfaces of the heat dissipation cup are processed by anodic treatment, so it can withstand the erosion of weather. Furthermore, since the inner and outer surfaces of the heat dissipation cup are processed by anodic treatment, so there is no need to provide a reflective element in the rear of LED circuit board, hereby preventing the occurrence of halo.

[0028] Summing up the above, the present invention

provides an LED light bulb, having the advantages of light weight, water proof, good heat dissipation, aesthetical appearance, no halo in the emitted light, and its cup glass will not break when in contact with water at high temperature.

[0029] Moreover, refer to Fig. 6 for a perspective view of the LED light bulb according to another embodiment of the present invention; Fig. 7 for a side view of the LED light bulb according to another embodiment of the present invention; and Fig. 8 for an exploded view of elements of the LED light bulb according to another embodiment of the present invention respectively. The difference of this embodiment and the previous embodiment is that, in the present embodiment, a semi-hemispherical hood 40 is used to replace the convex lens, thus changing the illumination shape of the LED light bulb.

[0030] The above detailed description of the preferred embodiment is intended to describe more clearly the characteristics and spirit of the present invention. However, the preferred embodiments disclosed above are not intended to be any restrictions to the scope of the present invention. Conversely, its purpose is to include the various changes and equivalent arrangements which are within the scope of the appended claims.

Claims

1. An LED light bulb, comprising:

a head portion;
 an insulation tube, with its bottom end screw-locked onto said head portion;
 a driver-circuit-board component, provided in said insulation tube, one end of said driver-circuit-board component is connected electrically to said head portion;
 a heat dissipation cup, disposed on said insulation tube, inner and outer surfaces of said heat dissipation cup are provided with indent-protrusion texture structures, and a bottom surface of said heat dissipation cup is provided with at least two conduction-wire through-holes;
 an LED circuit board, on its surface is provided with at least a Hi-Power LED,
 said LED circuit board is provided on said bottom surface of said heat dissipation cup, and it is connected electrically to an other end of said driver-circuit-board component through said conduction-wire through-holes; and
 a hood, provided on top end of said heat dissipation cup.

2. The LED light bulb as claimed in claim 1, wherein said head portion is made of copper.

3. The LED light bulb as claimed in claim 1, further com-

prising:

a decoration plate, having its bottom surface provided with two positioning columns, and decoration plate positioning holes corresponding to said positioning columns are formed on said bottom surface of said heat dissipation cup, for placing said decoration plate onto said LED circuit board, and then pressing to fasten and fix it onto said bottom surface of said heat dissipation cup through said positioning columns.

4. The LED light bulb as claimed in claim 1, wherein two lock-and-fix holes are provided on a front end of said insulation tube, two positioning holes are provided on said bottom surface of said heat dissipation cup, and two positioning slots are provided on said LED circuit board, such that two lock-and-fix pieces can pass through said positioning slots and said positioning holes to lock and fix onto said lock-and-fix holes, so as to position said LED circuit board onto said bottom surface of said heat dissipation cup, and lock and fix said heat dissipation cup onto said insulation tube.

5. The LED light bulb as claimed in claim 1, further comprising:

a first heat resistance water-proof plastic ring is disposed between said insulation tube and said heat dissipation cup, hereby preventing moisture from seeping into inside said LED light bulb.

6. The LED light bulb as claimed in claims 1 or 5, further comprising:

a second heat resistance water-proof plastic ring is disposed between said hood and the heat dissipation cup, hereby preventing moisture from seeping into inside said LED light bulb.

7. The LED light bulb as claimed in claim 1, wherein said hood is a convex lens.

8. The LED light bulb as claimed in claim 1, wherein said hood is of a semi-hemisphere shape.

9. The LED light bulb as claimed in claim 1, wherein said indent-protrusion texture structures are formed through sand-blasting and anodic treatments.

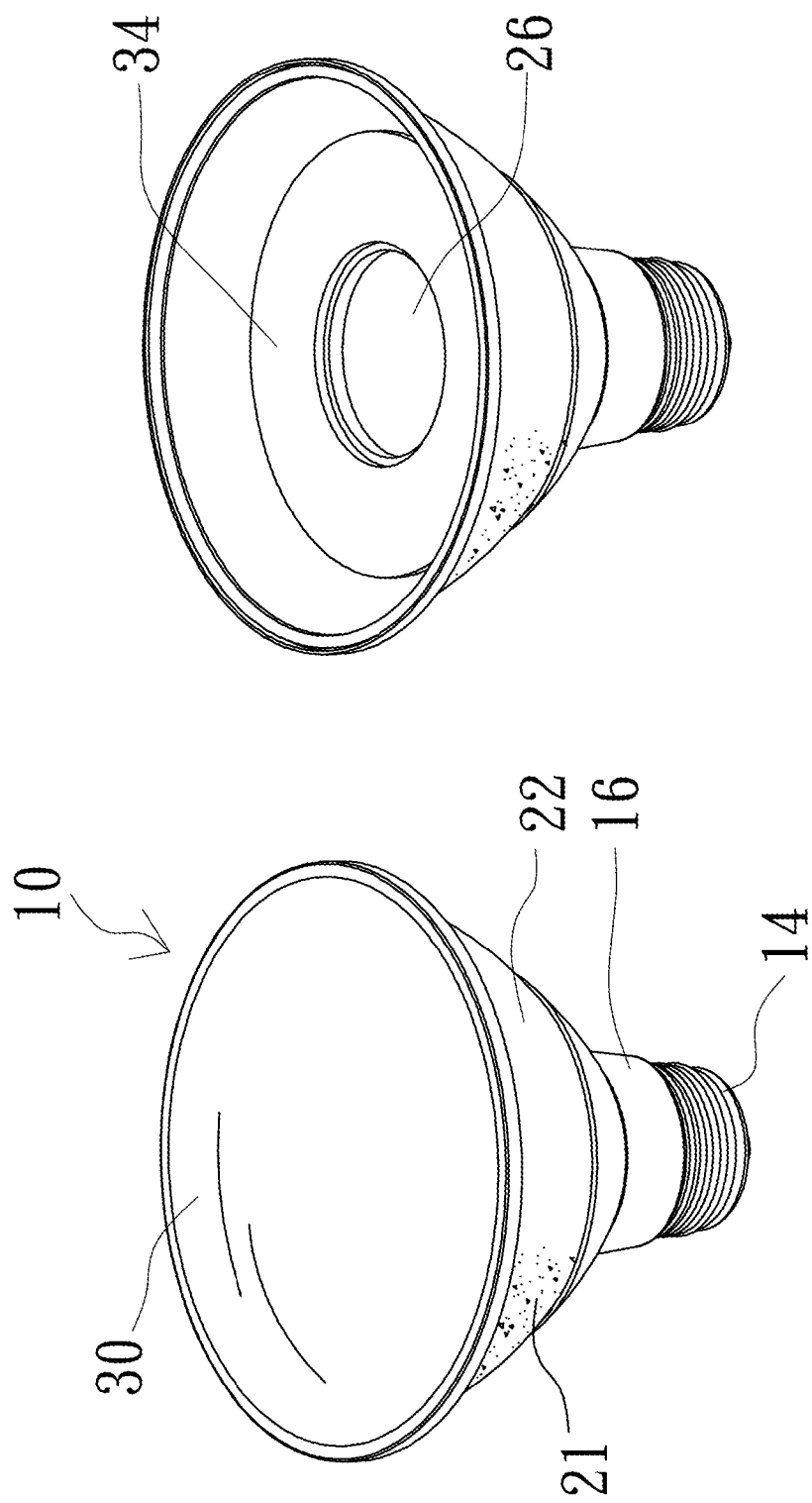


Fig. 2

Fig. 1

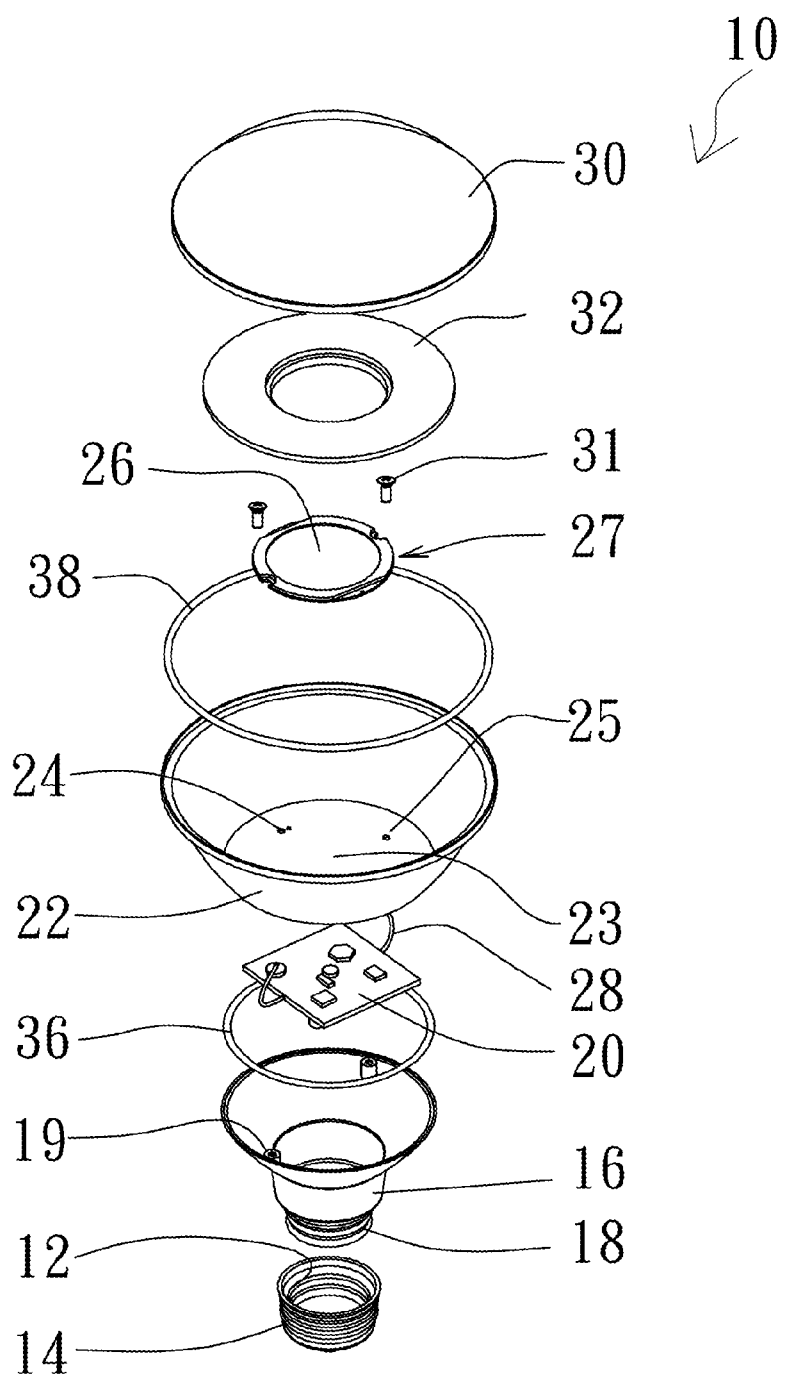


Fig. 3

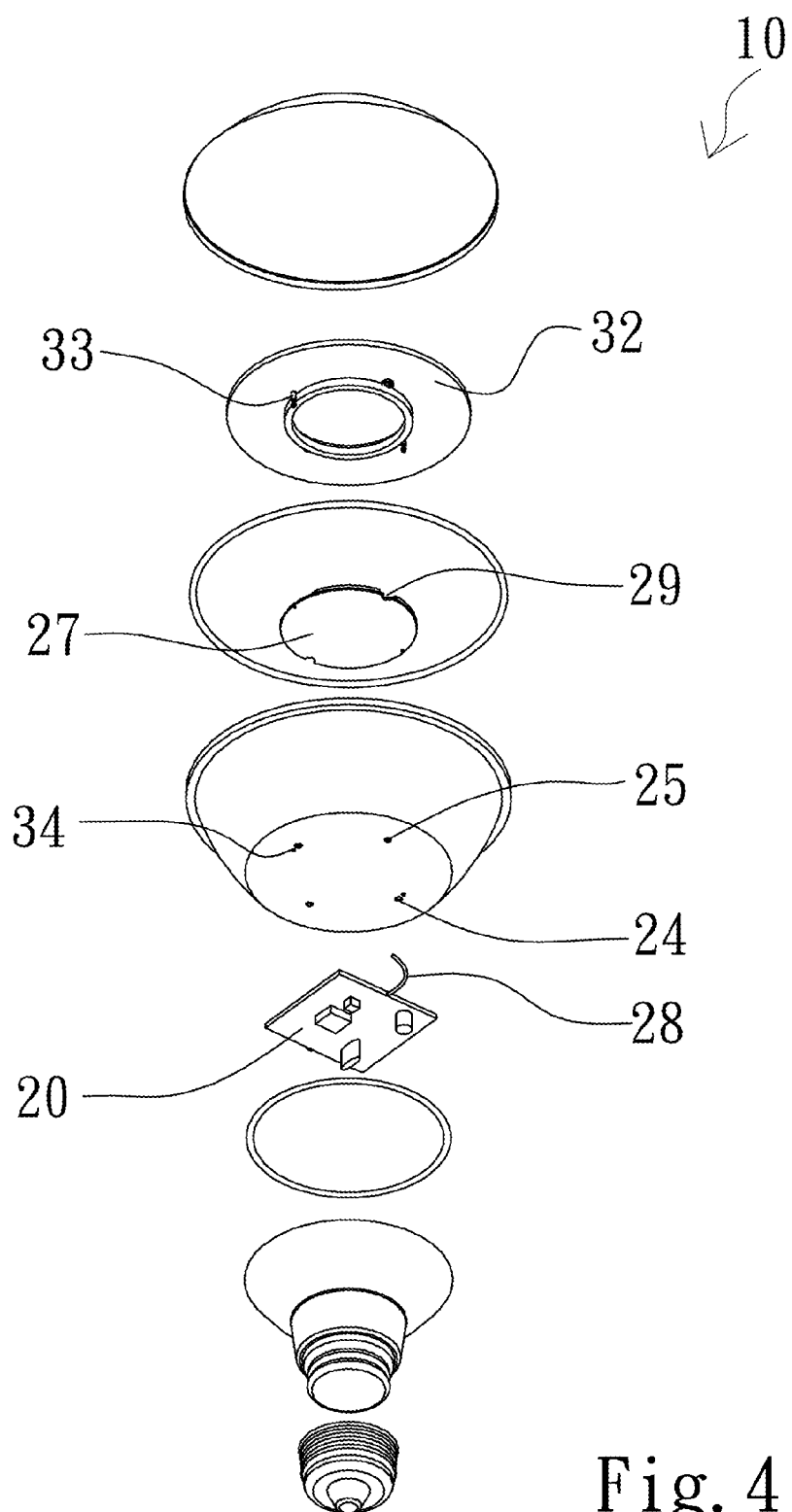


Fig. 4

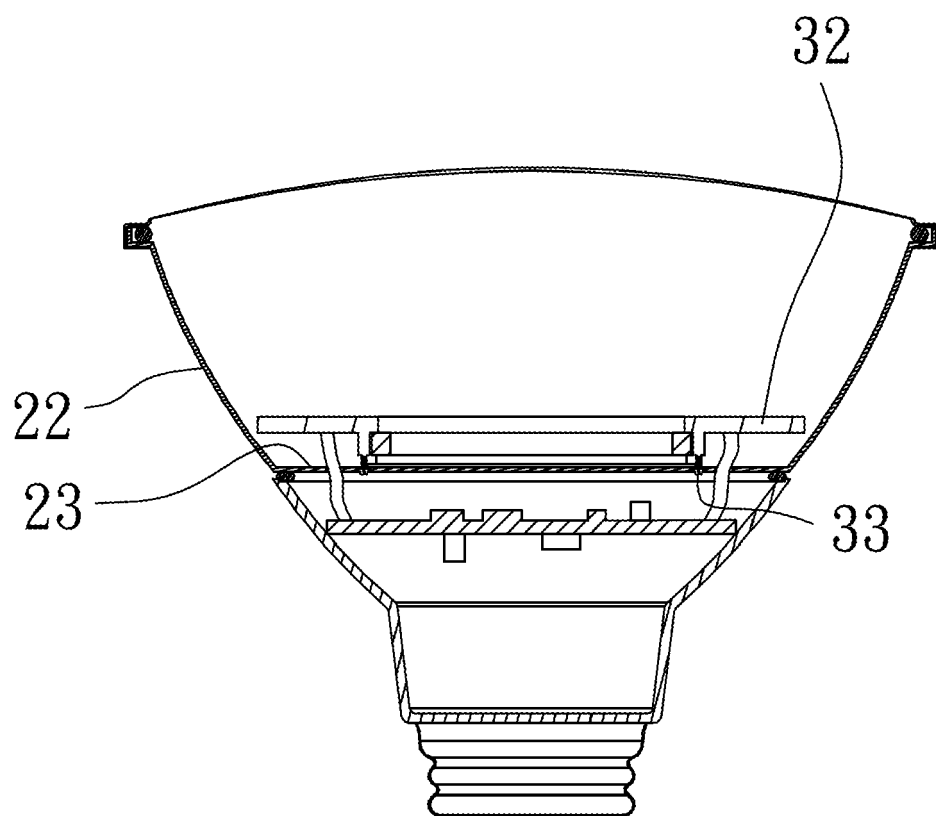


Fig. 5

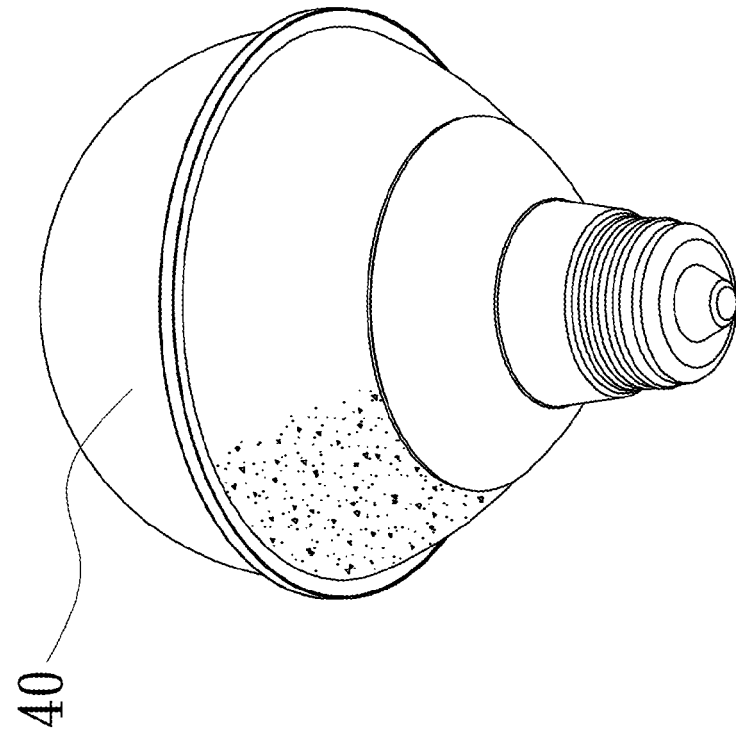


Fig. 6

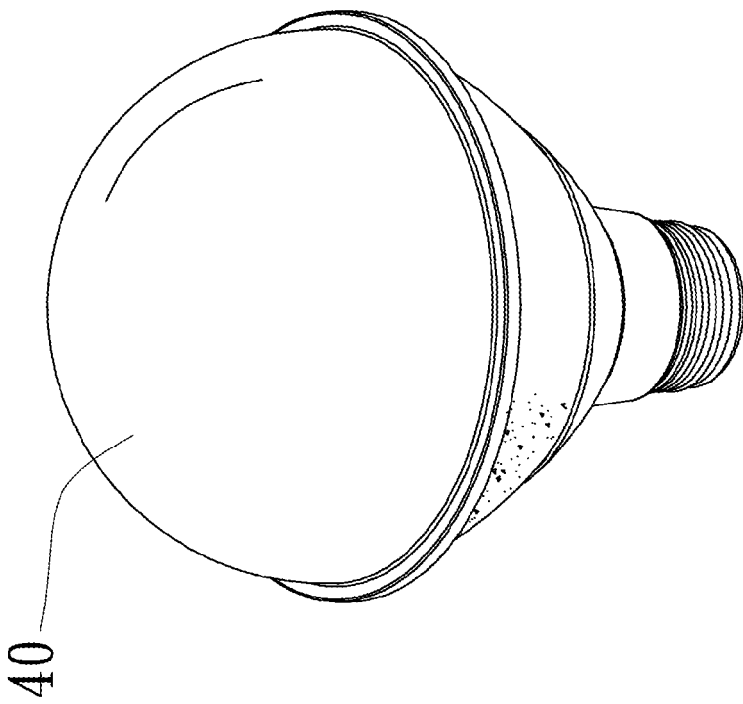


Fig. 7

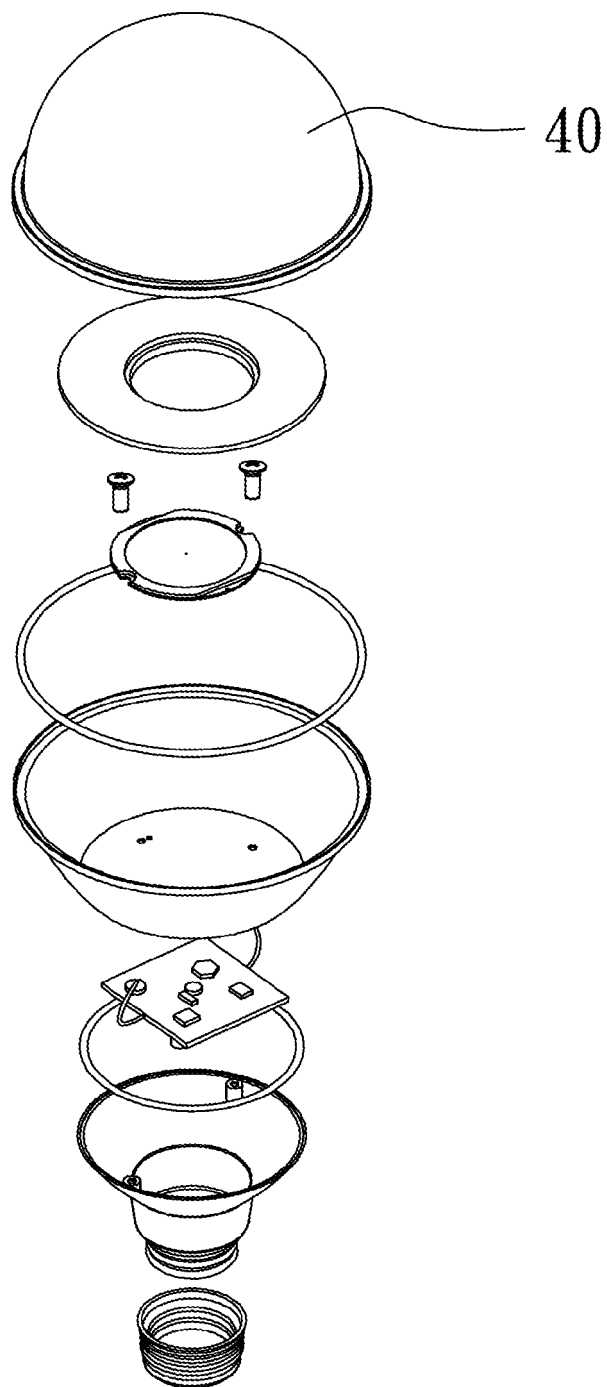


Fig. 8