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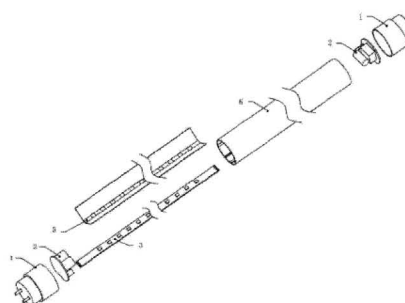
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(54) Title of Invention

LED FLUORESCENT LAMP WITH AN LED SUBSTRATE AT THE
BOTTOM OF A PC TUBE

(57) Abstract

The invention relates to the technical field of LED lamp manufacturing, particularly to an LED fluorescent lamp with an LED substrate at the bottom of a PC tube. The LED fluorescent lamp comprises an LED substrate, a reflective film, a plurality of LED beads arranged on the LED substrate, a plastic tube, end caps and power panels, wherein an LED substrate fixing slot is opened at the bottom of the plastic tube, an LED substrate is arranged inside the LED substrate fixing slot, the left and right sides of the LED substrate are fixed with convex LED substrate pressing pieces, respectively, the two LED substrate pressing pieces are arranged at the inner bottom of the plastic tube, and reflective film fixing slots are arranged in the middle parts of the left and right sides of the plastic tube. Compared with the prior art, the present invention has the following advantages: A plastic tube and an aluminum structure plate are used comprehensively, which are characterized by low cost, simple assembly, effective heat dissipation and uniform luminance; the reflective film is pasted on the surfaces of the substrate and the plastic plate to avoid light strip distribution of LED point light sources, which causes uneven light mixing.



1. An LED fluorescent lamp with an LED substrate at the bottom of a PC tube, comprising an LED substrate, a reflective film, a plurality of LED beads arranged on the LED substrate, a plastic tube, end caps and power panels, wherein an LED substrate fixing slot is opened at the bottom of the plastic tube, an LED substrate being arranged inside the LED substrate fixing slot, the left and right sides of the LED substrate being fixed with convex LED substrate pressing pieces, respectively, the LED substrate clinging to the bottom of the plastic tube, the two LED substrate pressing pieces being arranged at the inner bottom of the plastic tube, reflective film fixing slots being arranged in the middle parts of the left and right sides of the plastic tube, a plurality of through holes matched with the LED beads being opened in the middle part of the reflective film, two bending lines being arranged on the two sides of the through holes, the middle part of the reflective film clinging to the LED substrate, the plurality of LED beads being exposed through the plurality of through holes, the left part and the right part of the reflective film being folded along the bending lines into V-shaped structures, the left end of the reflective film being arranged inside the reflective film fixing slot on the left side of the plastic tube, and the right end of the reflective film being arranged inside the reflective film fixing slot on the right side of the plastic tube.
2. The LED fluorescent lamp with an LED substrate at the bottom of a PC tube according to claim 1, wherein each of the two ends of the LED substrate is provided with a plurality of rectangular solder joints, the bottom of the side of each power panel adjacent to the end cap being provided with a plurality of rectangular solder joints, and the LED substrate being connected to the power panels by means of the solder joints.
3. The LED fluorescent lamp with an LED substrate at the bottom of a PC tube according to claim 1, wherein solder faces are arranged on the upper surfaces of the two ends of the LED substrate, a solder face being arranged on the side of each power panel adjacent to the end cap, a groove being opened on each power panel, the LED substrate passing through the groove, the LED substrate solder face intersecting with the power panel solder face at an angle of 90° , and the intersection surface being soldered to achieve quick electrical connection between the LED substrate and the power panel.
4. The LED fluorescent lamp with an LED substrate at the bottom of a PC tube according to claim 1, wherein the top of the plastic tube is made of atomized transparent PC material,

and the bottom being made of opaque PC material.

5. A method for installing the LED fluorescent lamp with an LED substrate at the bottom of a PC tube according to claim 1, wherein the method comprises the following steps:
 - a. assembly of the LED tube and the reflective film: a plurality of through holes matched with the LED beads being opened in the middle part of the reflective film at an equal distance, two bending lines being arranged on the left and right sides of the plurality of through holes, gluing areas being arranged on the back of the reflective film, the middle part of the reflective film being pasted to the LED substrate, then the reflective film being bent along the bending lines, and the two sides of the reflective film being bent to an angle with the horizontal plane to facilitate the assembly of the reflective film, the LED substrate and the plastic tube;
 - b. assembly of the LED substrate and the plastic tube: the LED substrate being inserted into the plastic tube along the LED substrate fixing slot on the plastic tube, the reflective film being inserted into the plastic tube along the reflective film fixing slots on the plastic tube, and the LED substrate pressing pieces on the plastic tube generating an elastic deformation to tightly press the LED substrate into the LED substrate fixing slot;
 - c. connection of the power panels: solder faces being soldered on the upper surfaces of the two ends of the LED substrate, a solder face being soldered on the side of each power panel adjacent to the end cap, a groove being opened on each power panel, the LED substrate passing through the groove, the LED substrate solder face intersecting with the power panel solder face at an angle of 90° , the intersection surface being soldered to achieve quick electrical connection between the LED substrate and the power panel, and the two end caps being glued to the two ends of the plastic tube.

LED FLUORESCENT LAMP WITH AN LED SUBSTRATE AT THE BOTTOM OF A PC TUBE

[TECHNICAL FIELD]

[0001] The present invention relates to the technical field of LED lamp manufacturing, particularly to an LED fluorescent lamp with an LED substrate at the bottom of a PC tube.

[BACKGROUND ART]

[0002] LED fluorescent lamps typically use CREE and AOD ultra-bright LED white light as a light source, the housings are typically made of acrylic/aluminum alloy, and the lamp shades are made of PC tubes, which are resistant to high temperatures up to 135°C. LED fluorescent lamps are the same as conventional fluorescent lamps in terms of overall dimensions, with the length being 60 cm, 120 cm or 150 cm. Compared with incandescent lamps, LED fluorescent lamps have the advantages of having high color rendering and a long life and being safe, reliable, environmentally friendly, durable and versatile, but they universally have the defects such as a large gap between the actually achievable luminous efficiency and the theoretical luminous efficiency, a large gap between the actually achievable life and the theoretical life, and a large gap between the actually achievable luminous attenuation and the theoretical luminous attenuation and are expensive, not conducive to market promotion.

[0003] A Chinese patent with an application number of 200920133423.5 discloses an LED fluorescent lamp with a high luminous efficiency, comprising an LED light source, a light transmitting piece arranged on the periphery of the LED light source, and an LED lamp panel for mounting the LED light source. The LED lamp panel is fixedly mounted inside the light transmitting piece, a reflective layer of the lamp panel is arranged on the surface of the LED lamp panel, on which an LED light source is mounted, most of the light emitted from the LED light source is uniformly emitted out from the light transmitting film of the light transmitting piece, while part of the light is reflected back into the light transmitting piece, and then reflected by the reflective layer of the LED lamp panel and emitted out through the light transmitting piece, thereby improving the luminous efficiency of the entire fluorescent lamp, but there is still a large room for improvement, and the lamp panel is mounted in the middle, resulting in a poor

atomization effect and not considering the problem of poor heat dissipation.

[0004] The patent with an application number of 200920295940.2 discloses an LED fluorescent lamp with a high luminous efficiency, comprising a lamp shed, and an aluminum radiating pipe, at two ends of which light reflecting surfaces are provided and above which a PCB substrate with an LED chip is provided. Two sets of light reflecting surfaces are added on the two sides of the light-emitting surface of the LED chip radiating pipe. The light emitted from the LED chip is partially refracted by the lamp shed, then is reflected by the light reflecting surfaces and then radiates externally to improve the luminous efficiency of the lamp, but the aluminum radiating pipe is expensive, the insulation requirements in the safety regulations are low, the design position of the PCB substrate results in a poor atomization effect and there is also the problem of diffuse reflection of a point light source.

[0005] The patent with an application number of 201210013164.9 previously applied for by our company discloses an LED fluorescent lamp, comprising a lamp shed, LEDs, a reflective film, a printed circuit board and a lamp holder. The plurality of LEDs are arranged on the printed circuit board. The reflective film is distributed on the entire light-emitting surface of the LEDs except the light-emitting points of the LEDs, or a highly reflective material is sprayed or printed on the surfaces of the LEDs, and the insulating layer and the circuit layer of the aluminum substrate are directly laminated on the aluminum radiating lamp holder to form an integral structure of the printed circuit board and the lamp holder. This patent solves the problems of low light transmittance of the PC lamp shed of the LED tube, uneven brightness and poor heat dissipation, but there are many LED beads, the cost is high and the atomization effect can be further improved. This product is the first-generation product of our company.

[SUMMARY OF THE INVENTION]

[0006] The objective of the present invention is to overcome the defects of the prior art, solve the problems of high cost, difficult heat dissipation, uneven light mixing and a poor atomization effect, and provide an LED fluorescent lamp with an LED substrate at the bottom of a PC tube.

[0007] In order to achieve the foregoing objective, an LED fluorescent lamp with an LED substrate at the bottom of a PC tube is designed, comprising an LED substrate, a reflective film, a plurality of LED beads arranged on the LED substrate, a plastic tube, end caps and power

panels, wherein an LED substrate fixing slot is opened at the bottom of the plastic tube, an LED substrate is arranged inside the LED substrate fixing slot, the left and right sides of the LED substrate are fixed with convex LED substrate pressing pieces, respectively, the LED substrate clings to the bottom of the plastic tube, the two LED substrate pressing pieces are arranged at the inner bottom of the plastic tube, reflective film fixing slots are arranged in the middle parts of the left and right sides of the plastic tube, a plurality of through holes matched with the LED beads are opened in the middle part of the reflective film, two bending lines are arranged on the two sides of the through holes, the middle part of the reflective film clings to the LED substrate, the plurality of LED beads are exposed through the plurality of through holes, the left part and the right part of the reflective film are folded along the bending lines into V-shaped structures, the left end of the reflective film is arranged inside the reflective film fixing slot on the left side of the plastic tube, and the right end of the reflective film is arranged inside the reflective film fixing slot on the right side of the plastic tube.

[0008] Each of the two ends of the LED substrate is provided with a plurality of rectangular solder joints, the bottom of the side of each power panel adjacent to the end cap is provided with a plurality of rectangular solder joints, and the LED substrate is connected to the power panels by means of the solder joints.

[0009] Solder faces are arranged on the upper surfaces of the two ends of the LED substrate, a solder face is arranged on the side of each power panel adjacent to the end cap, a groove is opened on each power panel, the LED substrate passes through the groove, the LED substrate solder face intersects with the power panel solder face at an angle of 90° , and the intersection surface is soldered to achieve quick electrical connection between the LED substrate and the power panel.

[0010] The top of the plastic tube is made of atomized transparent PC material, and the bottom is made of opaque PC material.

[0011] A method for installing the foregoing LED fluorescent lamp with an LED substrate at the bottom of a PC tube, wherein the method comprises the following steps:

[0012] a. assembly of the LED tube and the reflective film: a plurality of through holes matched with the LED beads are opened in the middle part of the reflective film at an equal distance, two bending lines are arranged on the left and right sides of the through holes, gluing areas are arranged on the back of the reflective film, the middle part of the reflective film is

pasted to the LED substrate, then the reflective film is bent along the bending lines, and the two sides of the reflective film are bent to an angle with the horizontal plane to facilitate the assembly of the reflective film, the LED substrate and the plastic tube;

[0013] b. assembly of the LED substrate and the plastic tube: the LED substrate is inserted into the plastic tube along the LED substrate fixing slot on the plastic tube, the reflective film is inserted into the plastic tube along the reflective film fixing slots on the plastic tube, and the LED substrate pressing pieces on the plastic tube generate an elastic deformation to tightly press the LED substrate into the LED substrate fixing slot;

[0014] c. connection of the power panels: solder faces are soldered on the upper surfaces of the two ends of the LED substrate, a solder face is soldered on the side of each power panel adjacent to the end cap, a groove is opened on each power panel, the LED substrate passes through the groove, the LED substrate solder face intersects with the power panel solder face at an angle of 90° , the intersection surface is soldered to achieve quick electrical connection between the LED substrate and the power panel, and the two end caps are glued to the two ends of the plastic tube.

[0015] Compared with the prior art, the present invention has the following advantages: A plastic tube and an aluminum structure plate are used comprehensively, which are characterized by low cost and simple assembly and meet the insulation requirements of the safety regulations compared with an aluminum radiating structure, and are characterized by effective heat dissipation and uniform luminance compared with a conventional totally-plastic tube; the design of a reflective film pasted on the surfaces of the substrate and the plastic plate avoids light strip distribution of LED point light sources, which causes uneven light mixing; the LED substrate sinks and clings to the bottom of the plastic tube and can transfer the heat of the LED substrate to the plastic housing, the width of the LED substrate can be reduced, too, and the sinking reduces the distance between the light-emitting point and the PC lamp shade on the top, solves the problem of poor atomization effect, increases the distance between the LED beads, reduces the quantity of the beads and the area of the PCB and significantly reduces the cost; the solder faces of the LED substrate and the power panels are directly soldered, and the adoption of this quick electrical connection method features low cost and convenient and simple assembly and is conducive to market promotion.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0016] Fig. 1 is a structural view of an LED fluorescent lamp with an LED substrate at the bottom of a PC tube provided by the present invention;

[0017] Fig. 2 is a schematic structural view of an LED substrate and a reflective film in the present invention;

[0018] Fig. 3 is a schematic view of the assembly of an LED substrate and a reflective film in the present invention;

[0019] Fig. 4 is a structural view of an LED substrate and a plastic tube in the present invention;

[0020] Fig. 5 is a schematic view of the assembly of an LED substrate and a plastic tube in the present invention;

[0021] Fig. 6 is a structural view of power panels in the present invention;

[0022] Fig. 7 is a schematic view of the assembly of power panels in the present invention;

[0023] In the figures: 1. end caps 2. power panel 3. LED substrate 4. LED bead 5. reflective film 6. plastic tube 7. through hole 8. bending line 9. gluing area on the back of the reflective film 10. reflective film fixing slot 11. LED substrate fixing slot 12. LED substrate pressing piece 13. solder joint;

[0024] Fig. 1 is designated as a drawing of abstract of the present invention.

[DETAILED DESCRIPTION]

[0025] Below the present invention will be further described by referring to the accompanying drawings. The structure and principle of this device are obvious to those skilled in the art. It should be understood that the embodiments described herein are intended to explain the present invention only and not to limit the present invention.

[0026] Embodiment 1

[0027] As shown in Fig. 1, an LED fluorescent lamp with an LED substrate at the bottom of a PC tube, comprising an LED substrate, a reflective film, a plurality of LED beads arranged on the LED substrate, a plastic tube, end caps and power panels, wherein an LED substrate fixing

slot is opened at the bottom of the plastic tube, an LED substrate is arranged inside the LED substrate fixing slot, the left and right sides of the LED substrate are fixed with convex LED substrate pressing pieces, respectively, the LED substrate clings to the bottom of the plastic tube, the two LED substrate pressing pieces are arranged at the inner bottom of the plastic tube, reflective film fixing slots are arranged in the middle parts of the left and right sides of the plastic tube, a plurality of through holes matched with the LED beads are opened in the middle part of the reflective film, two bending lines are arranged on the two sides of the through holes, the middle part of the reflective film clings to the LED substrate, the plurality of LED beads are exposed through the plurality of through holes, the left part and the right part of the reflective film are folded along the bending lines into V-shaped structures, the left end of the reflective film is arranged inside the reflective film fixing slot on the left side of the plastic tube, and the right end of the reflective film is arranged inside the reflective film fixing slot on the right side of the plastic tube.

[0028] As shown in Fig. 6, each of the two ends of the LED substrate is provided with a plurality of rectangular solder joints, the bottom of the side of each power panel adjacent to the end cap is provided with a plurality of rectangular solder joints, and the LED substrate is connected to the power panels by means of solder joints. Solder faces are arranged on the upper surfaces of the two ends of the LED substrate, a solder face is arranged on the side of each power panel adjacent to the end cap, a groove is opened on each power panel, the LED substrate passes through the groove, the LED substrate solder face intersects with the power panel solder face at an angle of 90° , and the intersection surface is soldered to achieve quick electrical connection between the LED substrate and the power panel.

[0029] The top of the plastic tube is made of atomized transparent PC material, and the bottom is made of opaque PC material.

[0030] Embodiment 2

[0031] A method for installing the LED fluorescent lamp with an LED substrate at the bottom of a PC tube, wherein the method comprises the following steps:

[0032] a. assembly of the LED tube and the reflective film as shown in Fig. 3: a plurality of through holes matched with the LED beads are opened in the middle part of the reflective film at an equal distance, two bending lines are arranged on the left and right sides of the plurality of through holes, gluing areas are arranged on the back of the reflective film, the middle part of

the reflective film is pasted to the LED substrate, then the reflective film is bent along the bending lines, and the two sides of the reflective film are bent to an angle with the horizontal plane to facilitate the assembly of the reflective film, the LED substrate and the plastic tube;

[0033] b. assembly of the LED substrate and the plastic tube as shown in Fig. 5: the LED substrate is inserted into the plastic tube along the LED substrate fixing slot on the plastic tube, the reflective film is inserted into the plastic tube along the reflective film fixing slots on the plastic tube, and the LED substrate pressing pieces on the plastic tube generate an elastic deformation to tightly press the LED substrate into the LED substrate fixing slot;

[0034] c. connection of the power panels as shown in Fig. 6: solder faces are soldered on the upper surfaces of the two ends of the LED substrate, a solder face is soldered on the side of each power panel adjacent to the end cap, a groove is opened on each power panel, the LED substrate passes through the groove, the LED substrate solder face intersects with the power panel solder face at an angle of 90° , the intersection surface is soldered to achieve quick electrical connection between the LED substrate and the power panel, and as shown in Fig. 7, the two end caps are glued to the two ends of the plastic tube after the soldering.

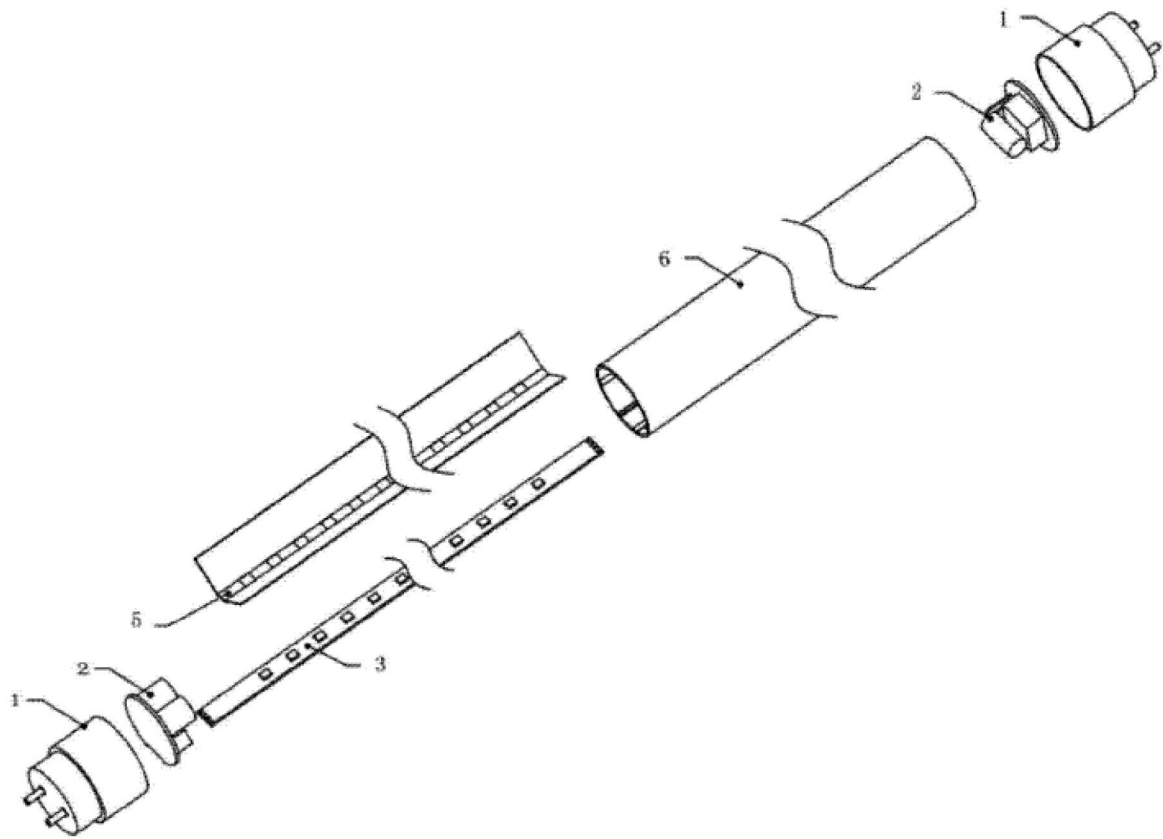


Fig. 1

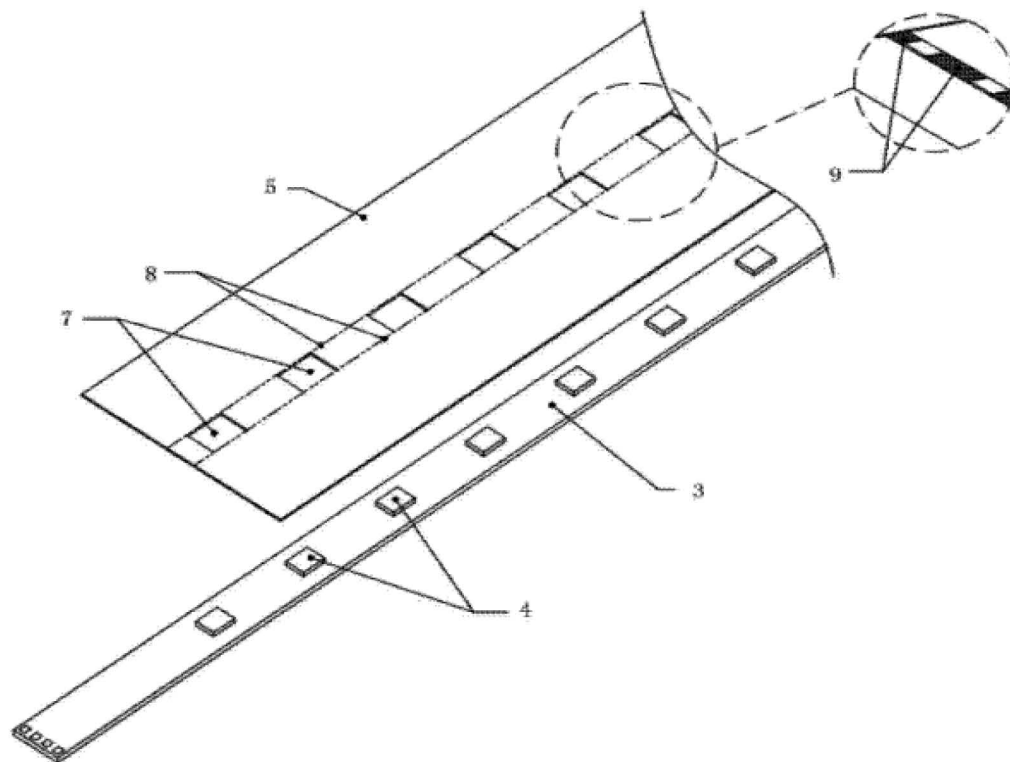


Fig. 2

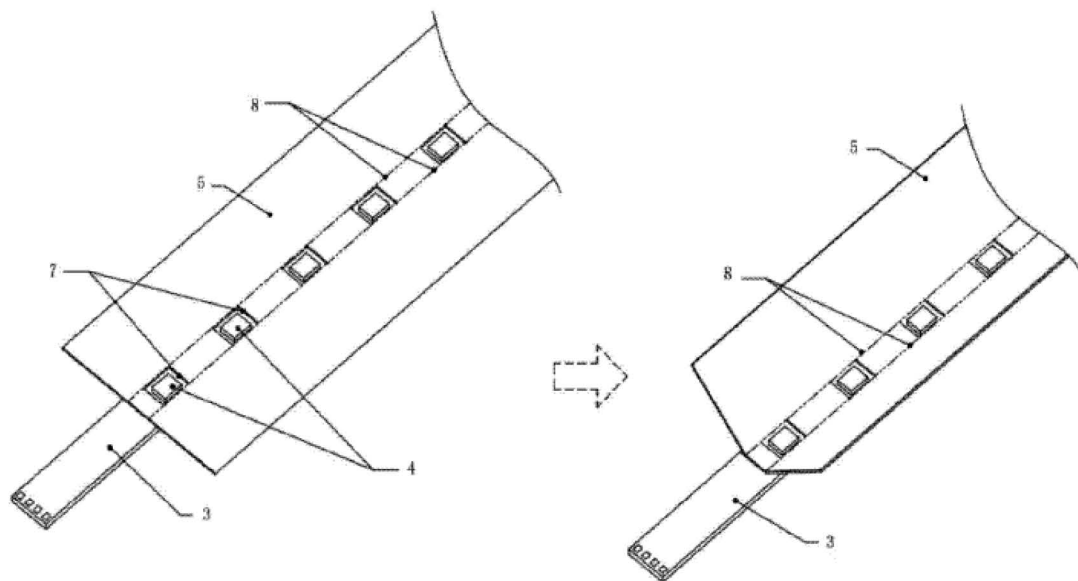


Fig. 3

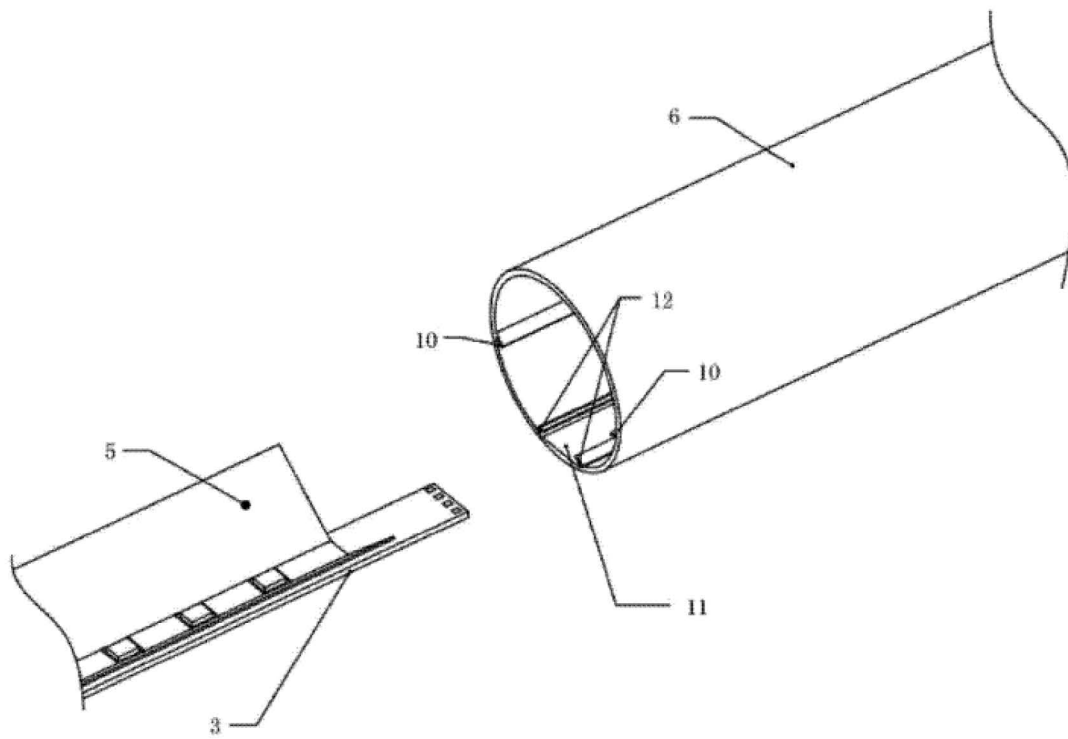


Fig. 4

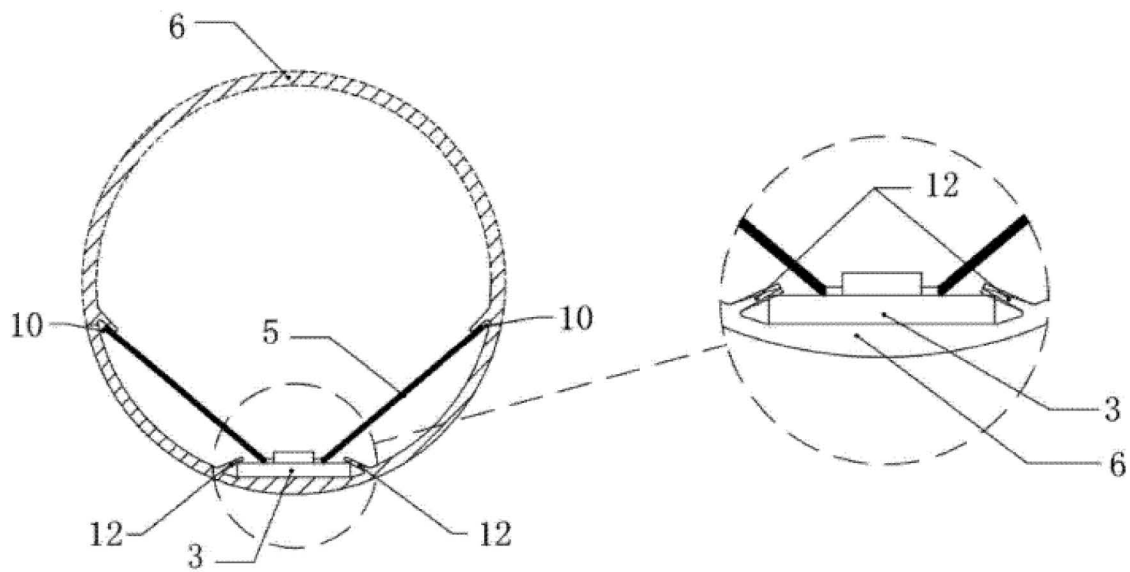


Fig. 5

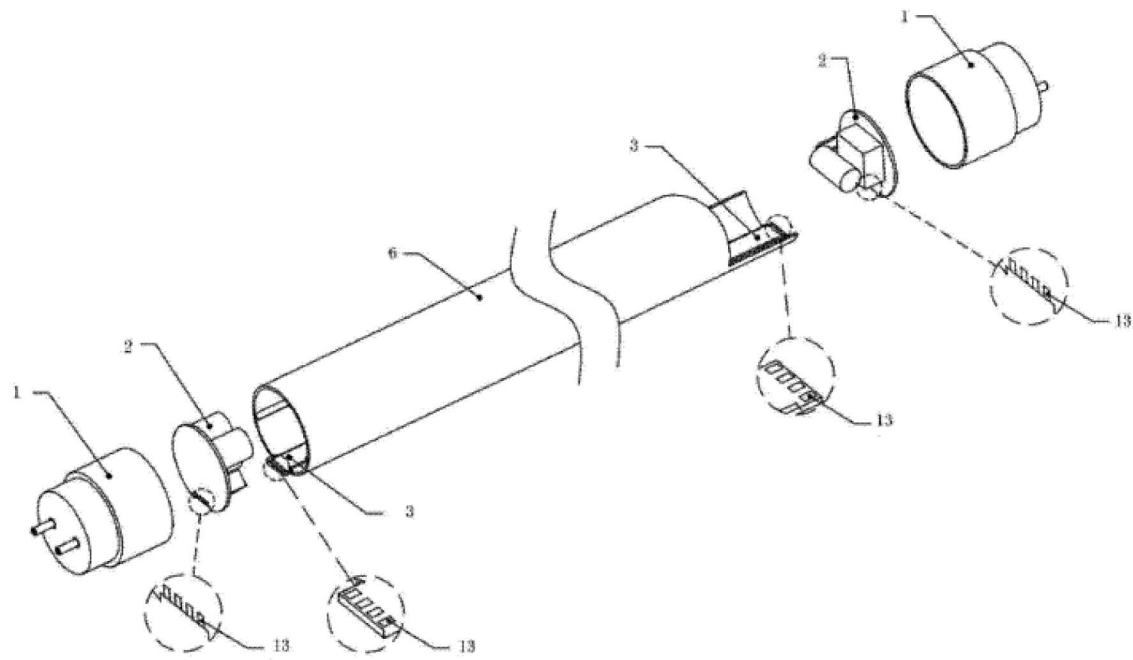


Fig. 6

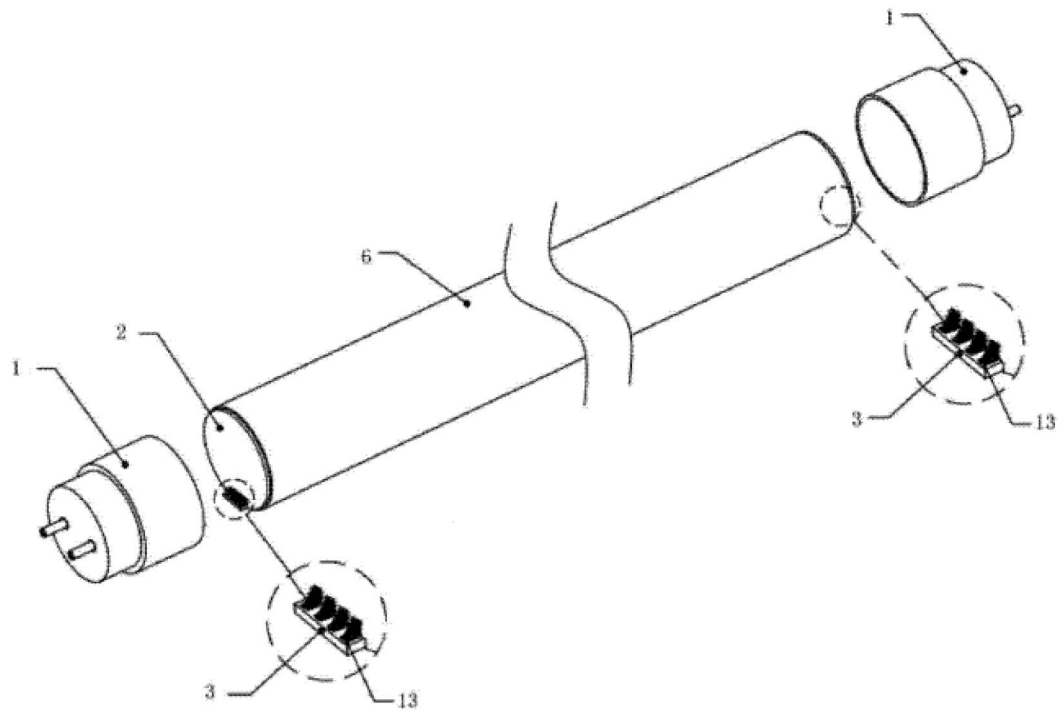


Fig. 7



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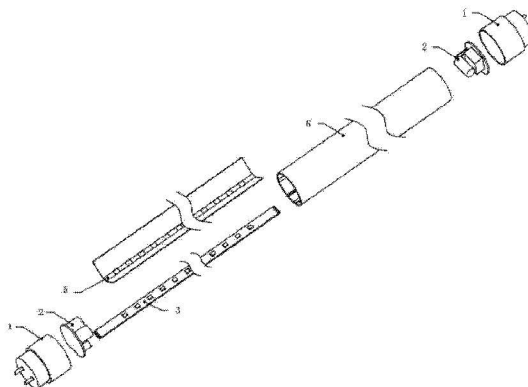
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(54) 发明名称

一种LED基板低置于PC灯管底部的LED日光灯

(57) 摘要

本发明涉及LED灯具制造技术领域,具体地说是一种LED基板低置于PC灯管底部的LED日光灯,包括LED基板、反射膜、LED灯珠、塑料管、堵头和电源板,LED基板上设有若干LED灯珠,其特征在于所述的塑料管底部开设有LED基板固定槽,LED基板固定槽内设有LED基板,LED基板左右两侧分别由凸起的LED基板压片固定,两个LED基板压片设置于塑料管内侧底部,塑料管左右两侧中部分别设有反射膜固定槽。本发明同现有技术相比,其优点在于:综合使用塑料管和铝结构板,成本低廉,组装简单,散热良好,发光均匀;基板和塑料板表面贴有反射膜避免了LED点光源发光产生光线条状分布,造成混光不均的现象。



1. 一种 LED 基板低置于 PC 灯管底部的 LED 日光灯, 包括 LED 基板、反射膜、LED 灯珠、塑料管、堵头和电源板, LED 基板上设有若干 LED 灯珠, 其特征在于所述的塑料管底部开设有 LED 基板固定槽, LED 基板固定槽内设有 LED 基板, LED 基板左右两侧分别由凸起的 LED 基板压片固定, LED 基板低置并紧贴于塑料管底部, 两个 LED 基板压片设置于塑料管内侧底部, 塑料管左右两侧中部分别设有反射膜固定槽, 所述的反射膜中部开设有若干与 LED 灯珠相配合的通孔, 通孔两侧分别设有两条弯折线, 所述的反射膜中部紧贴在 LED 基板上, 若干 LED 灯珠通过若干通孔露出, 反射膜左部和右部分别通过弯折线折叠呈 V 形结构, 反射膜左部一端设置于塑料管左侧反射膜固定槽内, 反射膜右部一端设置于塑料管右侧反射膜固定槽内。

2. 如权利要求 1 所述的一种 LED 基板低置于 PC 灯管底部的 LED 日光灯, 其特征在于所述的 LED 基板两端分别设有若干长方形焊点, 所述的电源板靠近堵头的一侧的底部设有若干长方形焊点, LED 基板和电源板通过焊点连接。

3. 如权利要求 1 所述的一种 LED 基板低置于 PC 灯管底部的 LED 日光灯, 其特征在于所述的 LED 基板两端上表面设有焊接面, 所述的电源板靠近堵头的一侧设有焊接面, 所述的电源板上开设有一凹槽, LED 基板穿过所述的凹槽, LED 基板焊接面与电源板焊接面形成 90° 交接, 焊接这个交接面达成 LED 基板和电源板的电气快速连接。

4. 如权利要求 1 所述的一种 LED 基板低置于 PC 灯管底部的 LED 日光灯, 其特征在于所述的塑料管顶部是雾化透明 PC 材质, 底部为不透明 PC 材质。

5. 一种如权利要求 1 所述的 LED 基板低置于 PC 灯管底部的 LED 日光灯的安装方法, 其特征在于所述的方法步骤具体如下:

a. LED 灯管及反射膜装配, 反射膜中部等距离开设有若干与 LED 灯珠相配合的通孔, 若干通过左右两边设有两条弯折线, 反射膜背面设有涂胶区域, 反射膜中部与 LED 基板粘贴, 再将反射膜沿弯折线弯折, 将反射膜两侧折弯与水平面呈倾角, 以便反射膜、LED 基板与塑料管之间的装配;

b. LED 基板与塑料管装配, LED 基板沿塑料管上的 LED 基板固定槽, 反射膜沿塑料管上的反射膜固定槽, 将 LED 基板和反射膜组件插入塑料管, 塑料管上的 LED 基板压片产生弹性形变, 将 LED 基板紧紧压合在 LED 基板固定槽内;

c. 电源板连接, LED 基板两端上表面焊有焊接面, 两端电源板靠近堵头的一侧焊有焊接面, 两端电源板上开设有一凹槽, LED 基板穿过所述的凹槽, LED 基板焊接面与电源板焊接面形成 90° 交接, 焊接这个交接面达成 LED 基板和电源板的电气快速连接, 两侧的堵头分别用胶水粘接在塑料管的两端。

一种 LED 基板低置于 PC 灯管底部的 LED 日光灯

[技术领域]

[0001] 本发明涉及 LED 灯具制造技术领域,具体地说是一种 LED 基板低置于 PC 灯管底部的 LED 日光灯。

[背景技术]

[0002] LED 日光灯一般是采用 CREE 与 AOD 超高亮 LED 白光作为发光光源,外壳一般为亚克力/铝合金,外罩用 PC 管制作,耐高温达 135 度。LED 日光灯与传统的日光灯在外型尺寸口径上都一样,长度有 60cm 和 120cm、150cm 三种,与白炽灯相比 LED 日光灯有高显色、长寿命、安全可靠、绿色环保、持久耐用、通用性强等优点,但普遍存在可以做到的实际光效率和理论光效率还有很大差距,可以生产的实际寿命和理论寿命还有很大差距,可以缩小的实际光衰幅度和理论光衰还有很大差距等缺点,并且价格昂贵,不利于市场推广。

[0003] 目前国内专利申请号为 200920133423.5 公开了一种高效出光 LED 日光灯,包括 LED 光源,设在 LED 光源外围的透光件以及安装 LED 光源的 LED 灯板,LED 灯板固定安装在透光件内,LED 灯板安装 LED 光源一侧的表面设有灯板反光层,LED 光源发出的光大部分通过透光件的透光膜均匀发出,而部分光线反射回透光件内侧,经过 LED 灯板上的灯板反射层,再次反射射出,从而将发射回来的光线再次透过透光件射出,从而提高整个日光灯的出光效率,但是提高的效果仍有很大进步空间,灯板安装在中间的位置会使雾化效果不佳,没有考虑散热不良的问题。

[0004] 申请号为 200920295940.2 的专利公开了一种高光效 LED 日光灯,两端设有导光反射面及上方设有带有 LED 芯片的 PCB 基板的铝散热管和灯罩组成的 LED 日光灯,通过 LED 芯片散热管的发光面的两边增加两组导光反射面,由 LED 芯片发出的光线经灯罩部分折射后再经导光反射面的反射,再向外照射,提高灯具的出光效率,但铝散热管成本高,安规绝缘要求低,PCB 基板位置的设计导致雾化效果不佳,同时存在点光源散射问题。

[0005] 本公司之前申请的专利申请号为 201210013164.9 公开了一种 LED 日光灯,包括灯罩、LED、反射膜、印制电路板、灯座,印制电路板上设有若干 LED,LED 发光表面除 LED 发光点外布满高反射膜,或在其表面喷涂印刷高反射材料,铝基板中的绝缘层和线路层直接贴合在铝散热灯座上,组成印刷线路板和灯座为一体式结构。该手段比较好的解决了 LED 灯管 PC 灯罩光透过率低,明暗不均以及散热不良的问题,但 LED 灯珠数量较多,成本较大,雾化效果可进一步提高,该产品为本公司第一代产品。

[发明内容]

[0006] 本发明的目的在于克服现有技术的不足,解决成本高、散热难、混光不均以及雾化效果不佳的问题,提供一种 LED 基板低置于 PC 灯管底部的 LED 日光灯。

[0007] 为了实现上述目的,设计一种 LED 基板低置于 PC 灯管底部的 LED 日光灯,包括 LED 基板、反射膜、LED 灯珠、塑料管、堵头和电源板,LED 基板上设有若干 LED 灯珠,其特征在于所述的塑料管底部开设有 LED 基板固定槽,LED 基板固定槽内设有 LED 基板,LED 基板

左右两侧分别由凸起的 LED 基板压片固定,LED 基板低置并紧贴于塑料管底部,两个 LED 基板压片设置于塑料管内侧底部,塑料管左右两侧中部分别设有反射膜固定槽,所述的反射膜中部开设有若干与 LED 灯珠相配合的通孔,通孔两侧分别设有两条弯折线,所述的反射膜中部紧贴在 LED 基板上,若干 LED 灯珠通过若干通孔露出,反射膜左部和右部分别通过弯折线折叠呈 V 形结构,反射膜左部一端设置于塑料管左侧反射膜固定槽内,反射膜右部一端设置于塑料管右侧反射膜固定槽内。

[0008] 所述的 LED 基板两端分别设有若干长方形焊点,所述的电源板靠近堵头的一侧的底部设有若干长方形焊点,LED 基板和电源板通过焊点连接。

[0009] 所述的 LED 基板两端上表面设有焊接面,所述的电源板靠近堵头的一侧设有焊接面,所述的电源板上开设有一凹槽,LED 基板穿过所述的凹槽,LED 基板焊接面与电源板焊接面形成 90° 交接,焊接这个交接面达成 LED 基板和电源板的电气快速连接。

[0010] 所述的塑料管顶部是雾化透明 PC 材质,底部为不透明 PC 材质。

[0011] 上述的 LED 基板低置于 PC 灯管底部的 LED 日光灯的安装方法,其特征在于所述的方法步骤具体如下:

[0012] a. LED 灯管及反射膜装配,反射膜中部等距离开设有若干与 LED 灯珠相配合的通孔,若干通过左右两边设有两条弯折线,反射膜背面设有涂胶区域,反射膜中部与 LED 基板粘贴,再将反射膜沿弯折线弯折,将反射膜两侧折弯与水平面呈倾角,以便反射膜、LED 基板与塑料管之间的装配;

[0013] b. LED 基板与塑料管装配,LED 基板沿塑料管上的 LED 基板固定槽,反射膜沿塑料管上的反射膜固定槽,将 LED 基板和反射膜组件插入塑料管,塑料管上的 LED 基板压片产生弹性形变,将 LED 基板紧紧压合在 LED 基板固定槽内;

[0014] c. 电源板连接,LED 基板两端上表面焊有焊接面,两端电源板靠近堵头的一侧焊有焊接面,两端电源板上开设有一凹槽,LED 基板穿过所述的凹槽,LED 基板焊接面与电源板焊接面形成 90° 交接,焊接这个交接面达成 LED 基板和电源板的电气快速连接,两侧的堵头分别用胶水粘接在塑料管的两端。

[0015] 本发明同现有技术相比,其优点在于:综合使用了塑料管和铝结构板,与铝散热结构相比,成本低廉,组装简单,符合安规绝缘要求,与传统全塑料管相比,散热良好,发光均匀;基板和塑料板表面贴有反射膜的设计避免了 LED 点光源发光产生光线条状分布,造成混光不均的现象;LED 基板下沉紧贴塑料管底部,可将 LED 基板的热量传递到塑料外壳上,LED 基板宽度也可以减小,下沉拉低发光点与顶部 PC 罩距离,解决了雾化效果不佳的问题,增大 LED 灯珠间距,减少灯珠数量,减小 PCB 板面积,成本大大降低;直接焊接 LED 基板和电源板的焊接面,采用这种电气快速连接方式,成本低且组装方便简单,利于市场推广。

[附图说明]

[0016] 图 1 为本发明结构图;

[0017] 图 2 为本发明 LED 基板与反射膜结构示意图;

[0018] 图 3 为本发明 LED 基板与反射膜装配示意图;

[0019] 图 4 为本发明 LED 基板与塑料管结构图;

[0020] 图 5 为本发明 LED 基板与塑料管装配示意图;

[0021] 图 6 为本发明电源板结构图；

[0022] 图 7 为本发明电源板装配示意图；

[0023] 如图所示,图中:1. 堵头 2. 电源板 3. LED 基板 4. LED 灯珠 5. 反射膜 6. 塑料管 7. 通孔 8. 弯折线 9. 反射膜背面涂胶区域 10. 反射膜固定槽 11. LED 基板固定槽 12. LED 基板压片 13. 焊点；

[0024] 指定图 1 为本发明的摘要附图。

[具体实施方式]

[0025] 下面结合附图对本发明作进一步说明,这种装置的结构和原理对本专业的人来说是非常清楚的。应当理解,此处所描述的具体实施例仅仅用以解释本发明,并不用于限定本发明。

[0026] 实施例 1

[0027] 如图 1 所示,一种 LED 基板低置于 PC 灯管底部的 LED 日光灯,包括 LED 基板、反射膜、LED 灯珠、塑料管、堵头和电源板,LED 基板上设有若干 LED 灯珠,塑料管底部开设有 LED 基板固定槽,LED 基板固定槽内设有 LED 基板,LED 基板左右两侧分别由凸起的 LED 基板压片固定,LED 基板低置并紧贴于塑料管底部,两个 LED 基板压片设置于塑料管内侧底部,塑料管左右两侧中部分别设有反射膜固定槽,反射膜中部开设有若干与 LED 灯珠相配合的通孔,通孔两侧分别设有两条弯折线,反射膜中部紧贴在 LED 基板上,若干 LED 灯珠通过若干通孔露出,反射膜左部和右部分别通过弯折线折叠呈 V 形结构,反射膜左部一端设置于塑料管左侧反射膜固定槽内,反射膜右部一端设置于塑料管右侧反射膜固定槽内。

[0028] 如图 6 所示,LED 基板两端分别设有若干长方形焊点,电源板靠近堵头的一侧的底部设有若干长方形焊点,LED 基板和电源板通过焊点连接。LED 基板两端上表面设有焊接面,电源板靠近堵头的一侧设有焊接面,电源板上开设有一凹槽,LED 基板穿过所述的凹槽,LED 基板焊接面与电源板焊接面形成 90° 交接,焊接这个交接面达成 LED 基板和电源板的电气快速连接。

[0029] 塑料管顶部是雾化透明 PC 材质,底部为不透明 PC 材质。

[0030] 实施例 2

[0031] LED 基板低置于 PC 灯管底部的 LED 日光灯的安装方法,具体步骤如下：

[0032] a. LED 灯管及反射膜装配如图 3 所示,反射膜中部等距离开设有若干与 LED 灯珠相配合的通孔,若干通过左右两边设有两条弯折线,反射膜背面设有涂胶区域,反射膜中部与 LED 基板粘贴,再将反射膜沿弯折线弯折,将反射膜两侧折弯与水平面呈倾角,以便反射膜、LED 基板与塑料管之间的装配；

[0033] b. LED 基板与塑料管装配如图 5 所示,LED 基板沿塑料管上的 LED 基板固定槽,反射膜沿塑料管上的反射膜固定槽,将 LED 基板和反射膜组件插入塑料管,塑料管上的 LED 基板压片产生弹性形变,将 LED 基板紧紧压合在 LED 基板固定槽内；

[0034] c. 电源板连接如图 6 所示,LED 基板两端上表面焊有焊接面,两端电源板靠近堵头的一侧焊有焊接面,两端电源板上开设有一凹槽,LED 基板穿过所述的凹槽,LED 基板焊接面与电源板焊接面形成 90° 交接,焊接这个交接面达成 LED 基板和电源板的电气快速连接,焊接后如图 7 所示,两侧的堵头分别用胶水粘接在塑料管的两端。

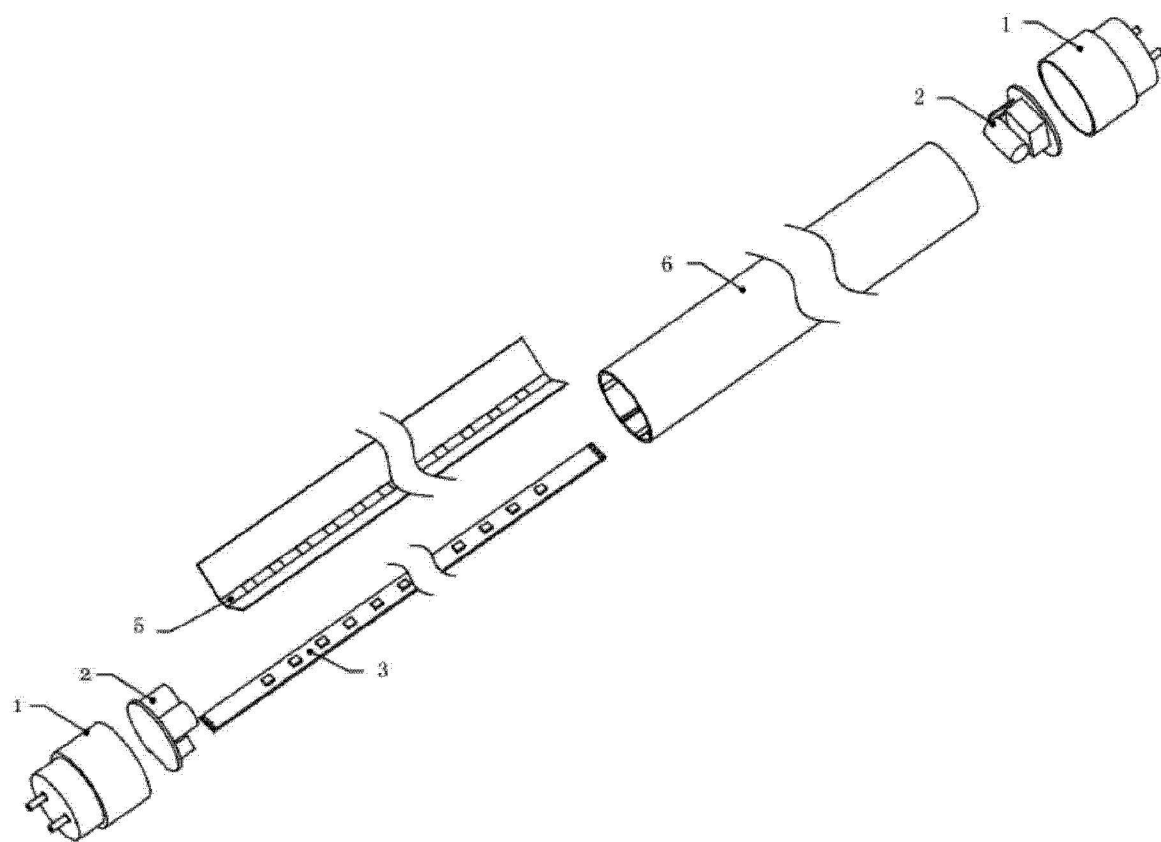


图 1

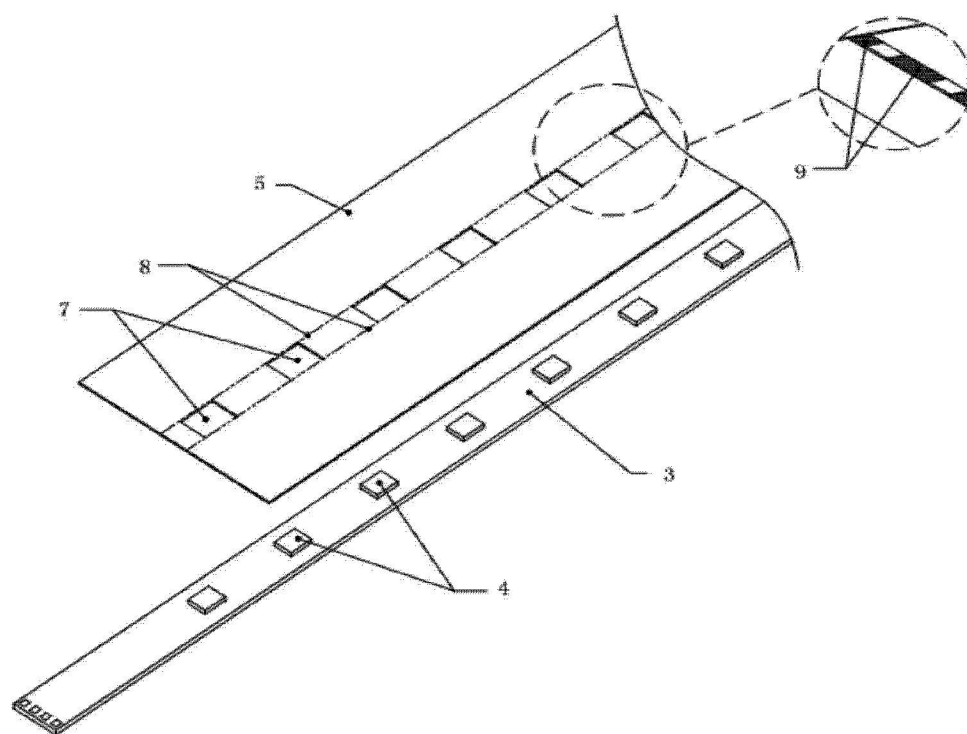


图 2

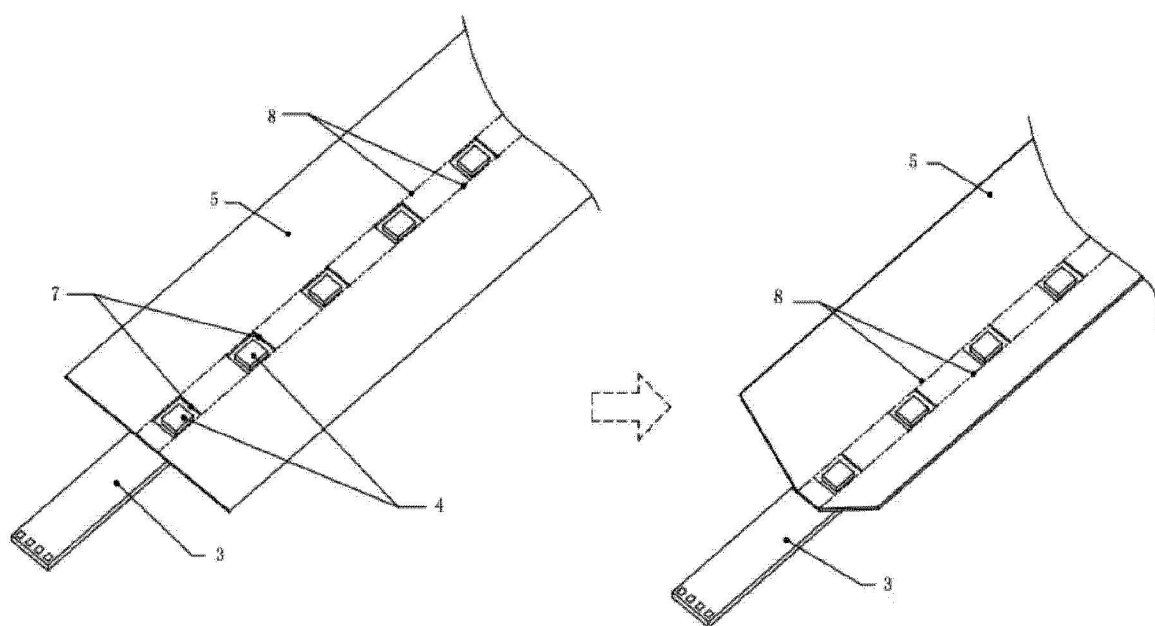


图 3

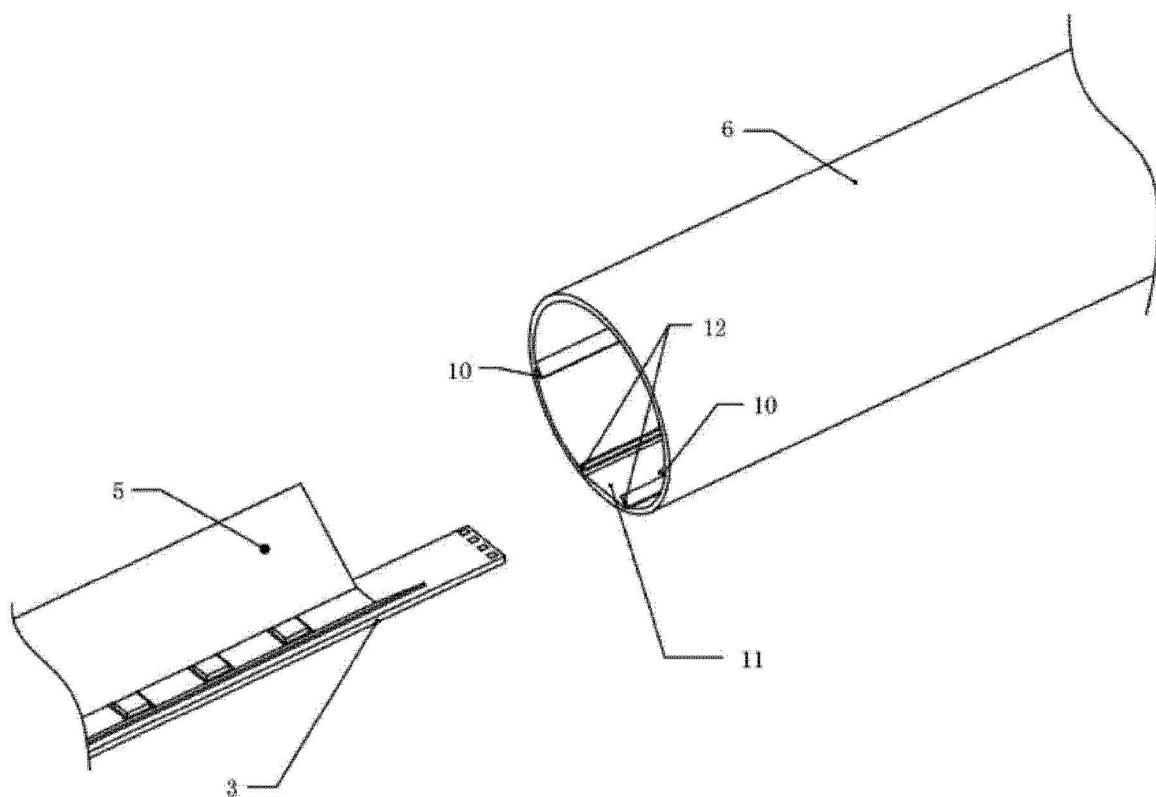


图 4

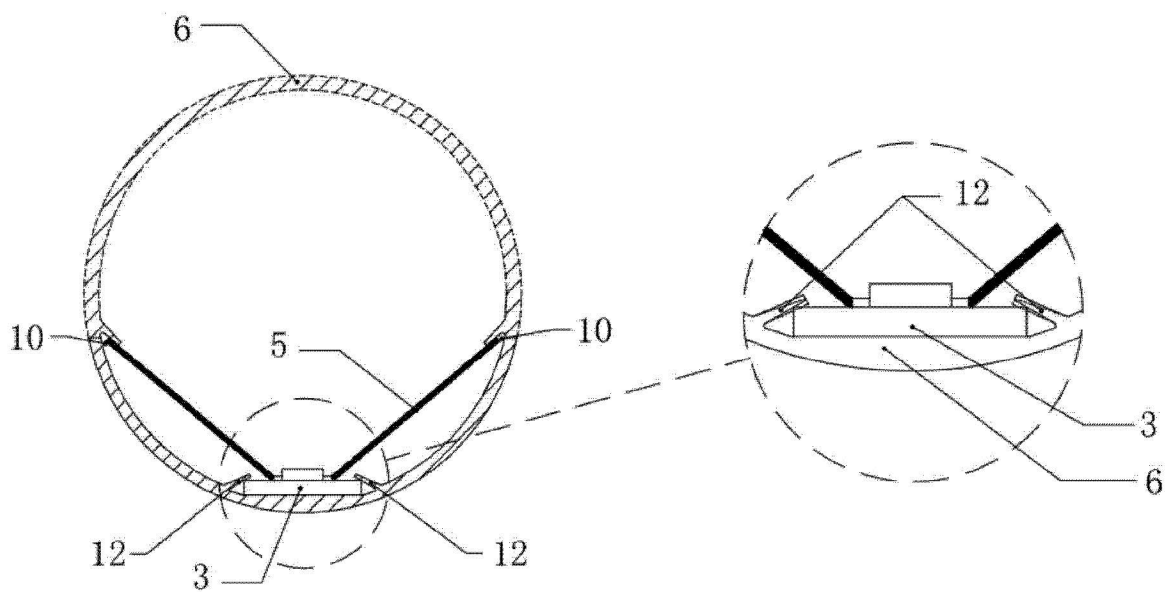


图 5

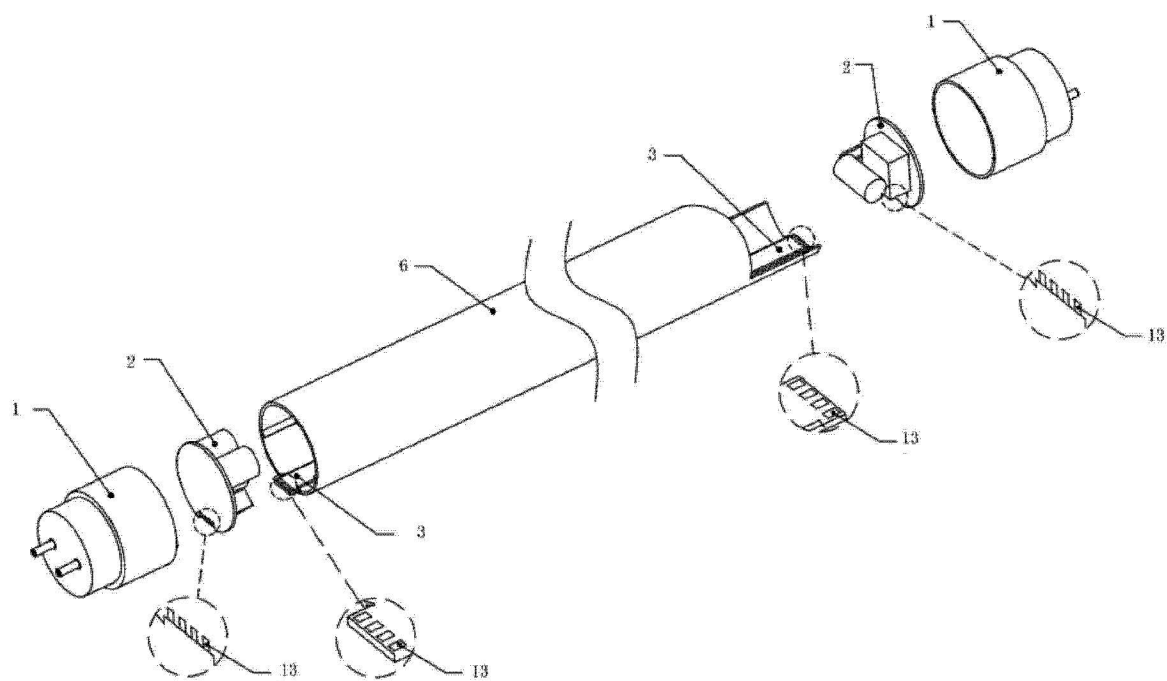


图 6

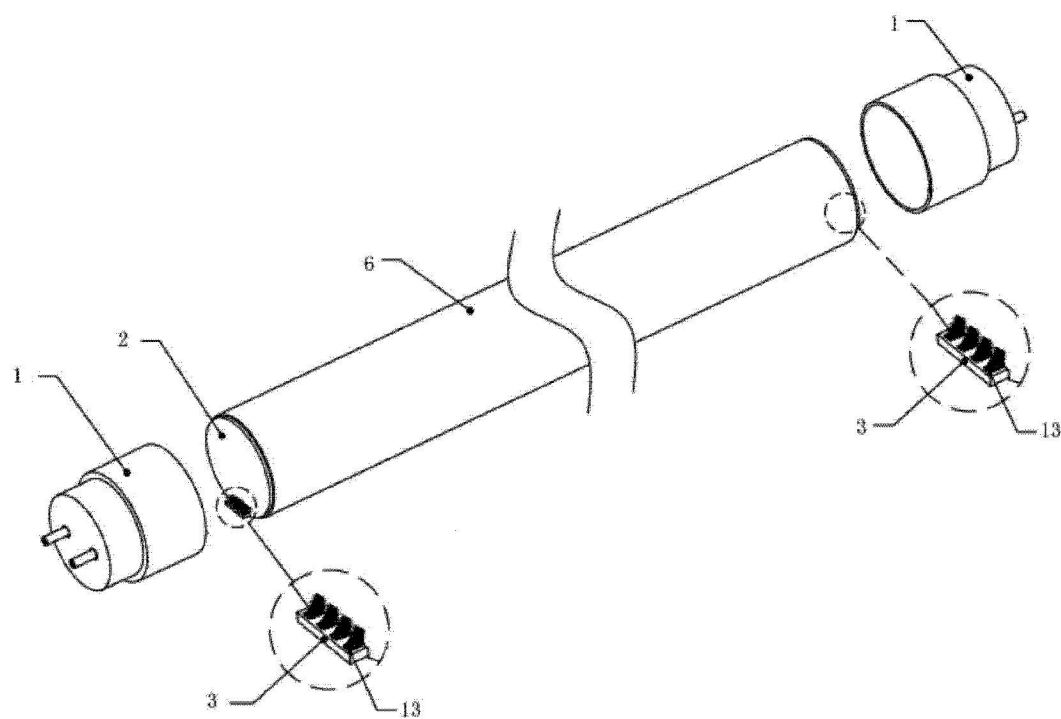


图 7