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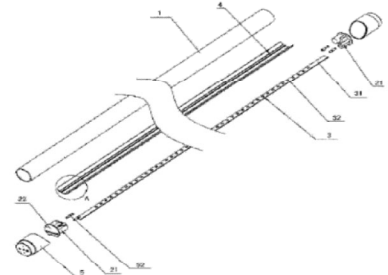
Claims 2 pages, Specifications 5 pages, Figures 6 page

(54) **Utility Model Name**

LED tubular lamp

(57) **Summary**

This Utility Model provides an LED tubular lamp, which comprises a glass tube, a power supply, an LED light source module arranged in the glass tube, an aluminum heat strip and lamp caps connected to both ends of the glass tube. The LED light source module is composed of an aluminum substrate and many LED lamp beads arranged on the front of the aluminum substrate. The power supply is divided into two sub power supplies. These two sub power supplies are distributed at both ends of the glass tube. On the front of the aluminum substrate, wiring connecting all LED lamp beads is arranged. The wiring terminals are directly connected with the PCB boards of two sub power supplies. The back of the aluminum heat strip sticks to the inner wall of the glass tube. The aluminum substrate is connected to the front of the aluminum heat strip. The advantage is that by dividing the power supply into two sub power supplies and printing wiring on the front of the aluminum substrate, the space in the glass tube can be saved, so that the back of the aluminum heat strip installed with the aluminum substrate can be close to the inner wall of the glass tube, which improves the softness of the light emitted by the LED lamp beads, expands the luminous angle of the LED tubular lamp, and improves the light efficiency.



1. An LED tubular lamp, which comprises a glass tube, a power supply, an LED light source module arranged in the glass tube, an aluminum heat strip and lamp caps connected to both ends of the glass tube. The LED light source module is composed of an aluminum substrate and many LED lamp beads arranged on the front of the aluminum substrate. It is characterized in that the power supply is divided into two sub power supplies. These two sub power supplies are distributed at both ends of the glass tube. On the front of the aluminum substrate, wiring connecting all LED lamp beads is arranged. The wiring terminals are directly connected with the PCB boards of two sub power supplies. The back of the aluminum heat strip sticks to the inner wall of the glass tube. The aluminum substrate is connected to the front of the aluminum heat strip.
2. The LED tubular lamp according to Claim 1 is characterized in that the aluminum heat strip is composed of a long curved main heat strip and two long arc-shaped auxiliary heat strips. The two auxiliary heat strips are symmetrically arranged on both sides of the main heat strip. On the plane of the main heat strip, there is a mounting groove for installing the aluminum substrate along the axial direction.
3. The LED tubular lamp according to Claim 2 is characterized in that the two sides of the notch of the mounting groove are symmetrically extended inwards and set with a clamping slot. The distance between the inner side of the bottom of the mounting groove and the opposite side of the clamping slot is consistent with the thickness of the aluminum substrate.
4. The LED tubular lamp according to Claim 3 is characterized in that the two sides of the plane of the main heat strip are symmetrically extended outwards and set with connecting strips. The main heat strip is connected with the auxiliary heat strips through the connecting strips.
5. The LED tubular lamp according to Claim 4 is characterized in that several cooling channels are arranged on the curved surface of the main heat strip along the axial direction.
6. The LED tubular lamp according to Claim 5 is characterized in that the curved surface of the main heat strip and the outer arc-shaped surface of the auxiliary heat strips respectively coincide with the inner wall of the glass tube. The curved surface of the main heat strip and the outer arc-shaped surface of the auxiliary heat strips are respectively pasted and connected with the inner wall of the glass tube through the thermally conductive double-sided tape.
7. The LED tubular lamp according to Claim 1-6 is characterized in that welding spots are arranged on the terminals of the wiring. The welding spots are directly welded with the pads on the PCB boards of the sub power supplies. The two sub power supplies are electrically connected through the pads on the PCB boards of the sub power supplies, the welding spots and the wiring.
8. The LED tubular lamp according to Claim 7 is characterized in that a holder is arranged in the lamp cap for clamping the end of the aluminum substrate. When the end of the aluminum substrate is clamped in the holder, the lamp cap is positioned in the circumference direction.

9. The LED tubular lamp according to Claim 8 is characterized in that the lamp cap is sleeved outside the end of the glass tube, and the PCB board of the sub power supply is located in the lamp cap. The components of the sub power supply are located in the end of the glass tube; Each lamp cap is connected with a pair of lamp cap copper pins, and one end of the lamp cap copper pins is electrically connected with the PCB board of the sub power supply.
10. The LED tubular lamp according to Claim 9 is characterized in that the power supply uses non-isolated power supply.

LED Tubular Lamp

Technical Field

[0001] This Utility Model covers an LED lamp, in particular to an LED tubular lamp.

Background Technology

[0002] With the rapid development of LED lighting technology, LED tubular lamps have been gradually popularized as lighting sources. The traditional LED tubular lamp generally comprises a housing, an LED light source module and a power supply component arranged in the housing, and the plastic lamp caps arranged at both ends of the housing. The housing is usually composed of an aluminum cooling base with a semicircular cross section and a transparent PC (polycarbonate vinegar) plastic cover with a semicircular cross section. Because the aluminum cooling base of this traditional LED tubular lamp is exposed, in order to meet the requirements of safety regulations, the power supply cannot be made into a high-efficiency non-isolated power supply in general. However, this will affect the overall lighting effect of the LED tubular lamp.

[0003] Today, many LED lamp manufacturers on the market have introduced LED tubular lamps with common glass tubes. This LED tubular lamp includes a glass tube, in which an aluminum cooling base, an LED light source module, a power supply component and wires connecting two ends of the plastic lamp cap are arranged. However, the LED tubular lamp with this structure has the following problems: On the one hand, in order to set the power supply component and connect the wires at both ends of the plastic lamp cap between the aluminum cooling base and the glass tube, the entire aluminum cooling base cannot be closely attached to the inner wall of the glass tube, which will make the LED lamp beads closer to the light-emitting surface of the glass tube. It will not only affect the softness of the light emitted by the LED lamp beads, but also cause the LED lamp beads to heat rapidly; On the other hand, as the overall cooling can only rely on the aluminum cooling base, the width requirements of the aluminum cooling base cannot be very narrow. However, if the width of the aluminum cooling base is wide, it will affect the luminous angle of the LED tubular lamp; In addition, because the power supply component is arranged between the aluminum cooling base and the glass tube, it will cause the power supply component to heat rapidly.

Invention Content

[0004] The technical problem to be solved by this Utility Model is to provide an LED tubular lamp with simple and compact structure, safe and reliable operation, soft light, large luminous angle and high luminous efficiency.

[0005] The technical solution used by the Utility Model to solve the above technical problem is as follows: An LED tubular lamp, which comprises a glass tube, a power supply, an LED light source module arranged in the glass tube, an aluminum heat strip and lamp caps connected to both ends of the glass tube. The LED light source module is composed of an aluminum substrate and many LED lamp beads arranged on the front of the aluminum substrate. It is characterized in that the power supply is divided into two sub power supplies. These two sub power supplies are distributed at both ends of the glass tube. On the front of the aluminum

substrate, wiring connecting all LED lamp beads is arranged. The wiring terminals are directly connected with the PCB boards of two sub power supplies. The back of the aluminum heat strip sticks to the inner wall of the glass tube. The aluminum substrate is connected to the front of the aluminum heat strip.

[0006] The aluminum heat strip is composed of a long curved main heat strip and two long arc-shaped auxiliary heat strips. The two auxiliary heat strips are symmetrically arranged on both sides of the main heat strip. On the plane of the main heat strip, there is a mounting groove for installing the aluminum substrate along the axial direction.

[0007] The two sides of the notch of the mounting groove are symmetrically extended inwards and set with a clamping slot. The distance between the inner side of the bottom of the mounting groove and the opposite side of the clamping slot is consistent with the thickness of the aluminum substrate.

[0008] The two sides of the plane of the main heat strip are symmetrically extended outwards and set with connecting strips. The main heat strip is connected with the auxiliary heat strips through the connecting strips.

[0009] Several cooling channels are arranged on the curved surface of the main heat strip along the axial direction.

[0010] The curved surface of the main heat strip and the outer arc-shaped surface of the auxiliary heat strips respectively coincide with the inner wall of the glass tube. The curved surface of the main heat strip and the outer arc-shaped surface of the auxiliary heat strips are respectively pasted and connected with the inner wall of the glass tube through the thermally conductive double-sided tape.

[0011] Welding spots are arranged on the terminals of the wiring. The welding spots are directly welded with the pads on the PCB boards of the sub power supplies. The two sub power supplies are electrically connected through the pads on the PCB boards of the sub power supplies, the welding spots and the wiring.

[0012] A holder is arranged in the lamp cap for clamping the end of the aluminum substrate. When the end of the aluminum substrate is clamped in the holder, the lamp cap is positioned in the circumference direction.

[0013] The lamp cap is sleeved outside the end of the glass tube, and the PCB board of the sub power supply is located in the lamp cap. The components of the sub power supply are located in the end of the glass tube; Each lamp cap is connected with a pair of lamp cap copper pins, and one end of the lamp cap copper pins is electrically connected with the PCB board of the sub power supply.

[0014] The power supply uses non-isolated power supply.

[0015] Compared with the prior art, this Utility Model has the following advantages:

[0016] 1) On the one hand, because the power supply is divided into two sub power supplies (the original power supply is divided into two parts), and the volume of a sub power supply is greatly reduced compared with the original power supply, so that the sub power supplies can be distributed at the ends of the glass tube. The sub power supply can be directly placed in the lamp cap instead of between the aluminum heat strip and the glass tube, which solves the heating problem of the power supply and the space occupation problem inside the glass tube;

On the other hand, the electrical connection of the two sub power supplies is directly completed through the wiring printed on the front of the aluminum substrate and the welding spots set on the wiring terminals and the pads on the PCB boards of the two sub power supplies, without the need to use wires. This structure saves space in the glass tube, so that the back of the aluminum heat strip installed with the aluminum substrate can be close to the inner wall of the glass tube. It not only extends the distance between the LED lamp beads and the light-emitting surface of the glass tube, improves the softness of the light emitted by the LED lamp beads, reduces the heating speed of the LED lamp beads, but also because the aluminum heat strip only needs to cooling the LED lamp beads, so the width of the aluminum heat strip can be designed to be relatively narrow under the condition that the LED lamp beads can be fully cooled, which can expand the luminous angle of the LED tube lamp and improve the light efficiency.

[0017] 2) By dividing the power supply into two sub power supplies, and printing wiring on the front of the aluminum substrate, it solves the cooling, light softness, luminous angle, light efficiency and other issues. This structure is relatively simple and compact, safe and reliable.

Figures Description

[0018] Figure 1 is the overall outline structure diagram of the LED tubular lamp of the Utility Model;

[0019] Figure 2 is the overall structure explosion diagram of the LED tubular lamp of the Utility Model;

[0020] Figure 3 is an enlarged diagram of Part A in Figure 2;

[0021] Figure 4 is the sectional diagram of Figure 1;

[0022] Figure 5 is the right section sectional diagram of the LED tubular lamp of the Utility Model;

[0023] Figure 6 is the left section sectional diagram of the LED tubular lamp of the Utility Model;

[0024] Figure 7 is the axial diagram of the lamp cap of the LED tubular lamp of the Utility Model.

Specific Enforcement Mode

[0025] The Utility Model will be further described below with the figures and specific examples.

[0026] As shown in the figures, this Utility Model provides an LED tubular lamp, which comprises a glass tube 1, a power supply, an LED light source module 3 arranged in the glass tube 1, an aluminum heat strip 4 and lamp caps 5 connected to both ends of the glass tube 1. The LED light source module 3 is composed of an aluminum substrate 31 and many LED lamp beads 32 arranged on the front of the aluminum substrate 31. The power supply is divided into two sub power supplies 21. These two sub power supplies 21 are horizontally distributed at both ends of the glass tube 1. On the front of the aluminum substrate 31, wiring (not shown in the figures) connecting all LED lamp beads 32 is arranged (that is printing). The wiring is arranged on both sides of several rows of LED lamp beads 32. It replaces the wires

connecting the power supply. The welding spots (not shown in the figure) are arranged on the wiring terminals. The wiring terminals are directly welded with the pads of the PCB boards 22 of the sub power supplies 21 through the welding spots. The two sub power supplies 21 are electrically connected through the pads, welding spots and wiring on the PCB boards 22 of the sub power supplies 21. The back of the aluminum heat strip 4 sticks to the inner wall of the glass tube 1. The aluminum substrate 31 is connected to the front of the aluminum heat strip 4. For the LED tubular lamp with this structure, on the one hand, because the power supply is divided into two sub power supplies 21 (the original power supply is divided into two parts), and the volume of a sub power supply 21 is greatly reduced compared with the original power supply, so that the sub power supplies 21 can be distributed at the ends of the glass tube 1. The sub power supply can be directly placed in the lamp cap 5 instead of between the aluminum heat strip 4 and the glass tube 1, which solves the heating problem of the power supply and the space occupation problem inside the glass tube 1; On the other hand, the electrical connection of the two sub power supplies 21 is directly completed through the wiring printed on the front of the aluminum substrate 31 and the welding spots set on the wiring terminals and the pads on the PCB boards 22 of the two sub power supplies 21, without the need to use wires. This structure saves space in the glass tube 1, so that the back of the aluminum heat strip 4 installed with the aluminum substrate 31 can be close to the inner wall of the glass tube 1. It not only extends the distance between the LED lamp beads 32 and the light-emitting surface of the glass tube 1, improves the softness of the light emitted by the LED lamp beads 32, reduces the heating speed of the LED lamp beads 32, but also because the aluminum heat strip 4 only needs to cooling the LED lamp beads 32, so the width of the aluminum heat strip 4 can be designed to be relatively narrow under the condition that the LED lamp beads 32 can be fully cooled, which can expand the luminous angle of the LED tube lamp and improve the light efficiency.

[0027] In this example, the aluminum heat strip 4 is composed of a long curved main heat strip 41 and two long arc-shaped auxiliary heat strips 42. The two sides of the plane of the main heat strip 41 are symmetrically extended outwards and set with connecting strips 43. One auxiliary heat strip 42 is connected with one side of the main heat strip 41 through one of the connecting strips 43, and the other auxiliary heat strip 42 is connected with the other side of the main heat strip 41 through the other connecting strip 43. Two auxiliary heat strips 42 are arranged symmetrically. On the plane of the main heat strip 41, there is a mounting groove 44 for installing the aluminum substrate 31 along the axial direction. The aluminum substrate 31 is installed on the middle position of the aluminum heat strip 4 through the mounting groove 44. The curved surface of the main heat strip 41 and the outer arc-shaped surface of the auxiliary heat strips 42 respectively coincide with the inner wall of the glass tube 1. The curved surface of the main heat strip 41 and the outer arc-shaped surface of the auxiliary heat strips 42 are respectively pasted and connected with the inner wall of the glass tube 1 through the thermally conductive double-sided tape. For installing the aluminum substrate 31 more easier, the two sides of the notch of the mounting groove 44 can symmetrically extended inwards and set with a clamping slot 45, and the distance d between the inner side of the bottom of the mounting groove 44 and the opposite side of the clamping

slot 45 is consistent with the thickness of the aluminum substrate 31. In the actual design process, the vertical distance between the inner side of the bottom of the mounting groove 44 and the opposite side of the clamping slot 45 can be slightly greater than the thickness of the aluminum substrate 31. When installing the aluminum substrate 31, directly insert the aluminum substrate 31 into the mounting groove 44 through the groove end of the mounting groove 44. In this way, the aluminum substrate 31 is firmly clamped in the mounting groove 44 through the clamping slot 45, which is very convenient for installation.

[0028] In this example, several cooling channels 46 can be arranged on the curved surface of the main heat strip 41 along the axial direction. The cooling channels 46 can further improve the cooling performance of the aluminum heat strip 4.

[0029] In this example, a holder 51 is arranged in the inner wall of the lamp cap 5 for clamping the end of the aluminum substrate 31. During installation, directly insert the end of the aluminum substrate 31 into the holder 51, so that the end of the aluminum substrate 31 is clamped into the holder 51. Through the cooperation of the end of the aluminum substrate 31 and the holder 51, not only the lamp cap 5 is connected with the glass tube 1, but also the lamp cap 5 is positioned in the circumference direction.

[0030] In this example, the lamp cap 5 is sleeved outside the end of glass tube 1. In the actual processing, the inner wall of lamp cap 5 and the outer wall of end of the glass tube 1 can be bonded and fixed together through the existing thermally conductive adhesive. The PCB board 22 of the sub power supply 21 is located in the lamp cap 5. The components of the sub power supply 21 are located in the end of the glass tube 1; Each lamp cap 5 is connected with a pair of lamp cap copper pins 52, and one end of the lamp cap copper pins 52 is electrically connected with the PCB board 22 of the sub power supply 21.

[0031] In this example, the glass tube 1 directly uses the common glass tube sold in the market; The power supply can be either isolated or non-isolated power supply.

[0032] We have carried out application experiment for the LED tubular lamp (22W) with this structure. The experimental results are as follows: good cooling effects, light quantity $\geq$ 2000lm, with an average life of 25000 hours. The LED tubular lamp with this structure can be used for LED tubular lamps with higher wattage.

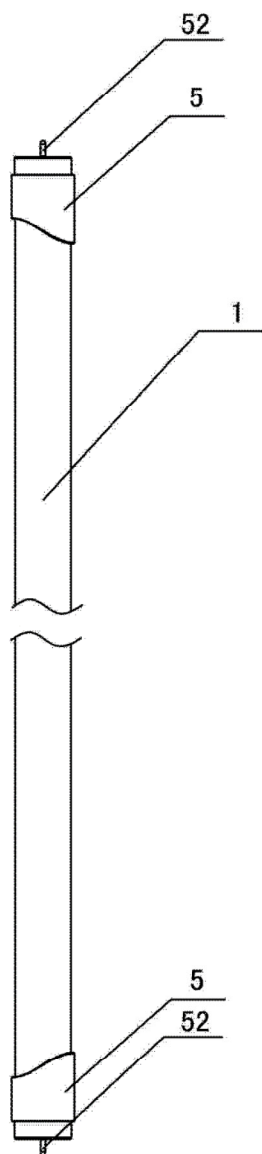


Figure 1

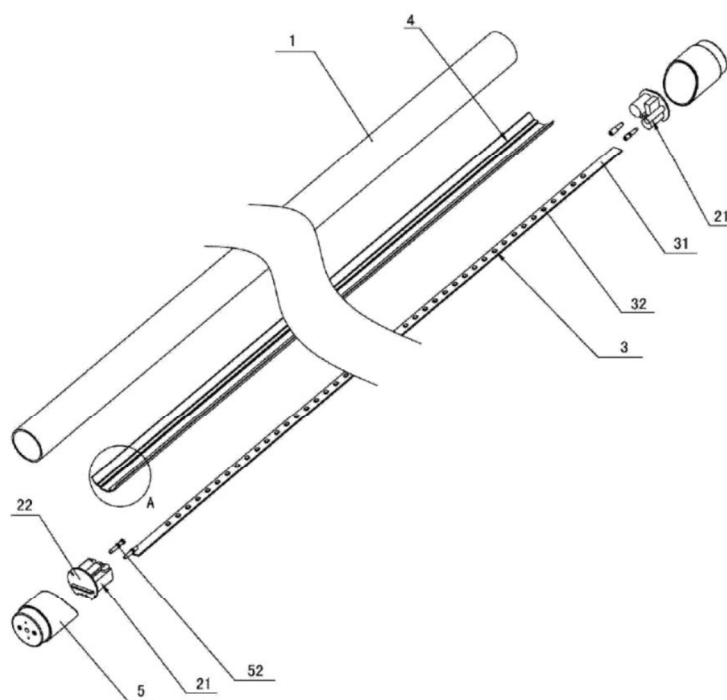


Figure 2

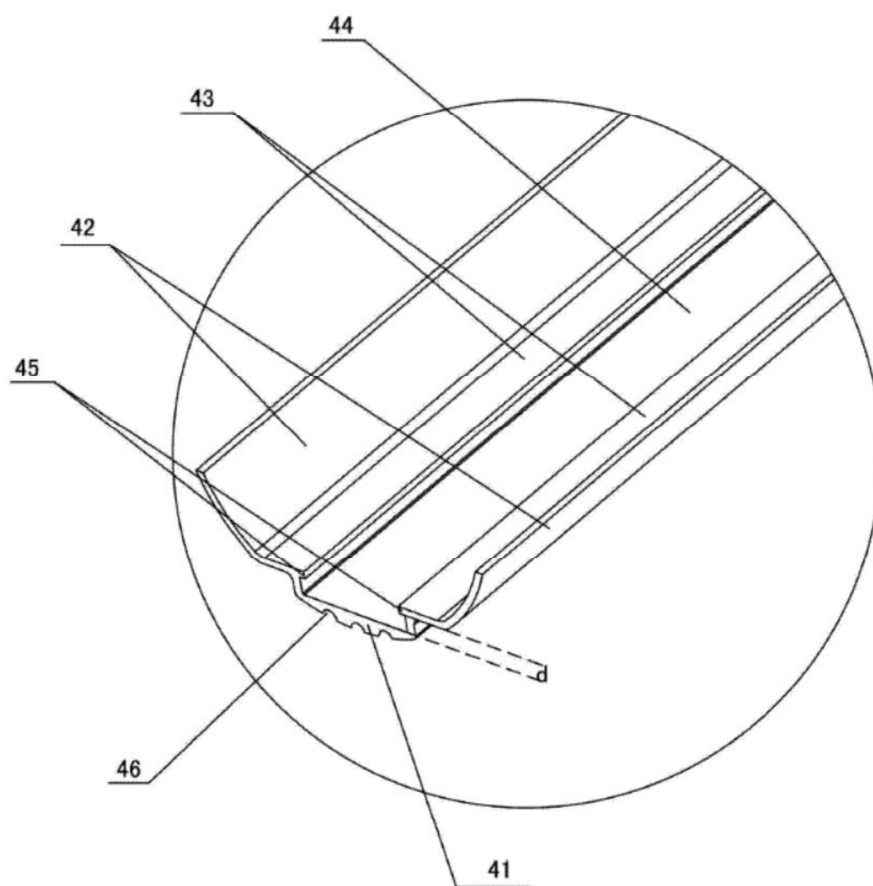


Figure 3

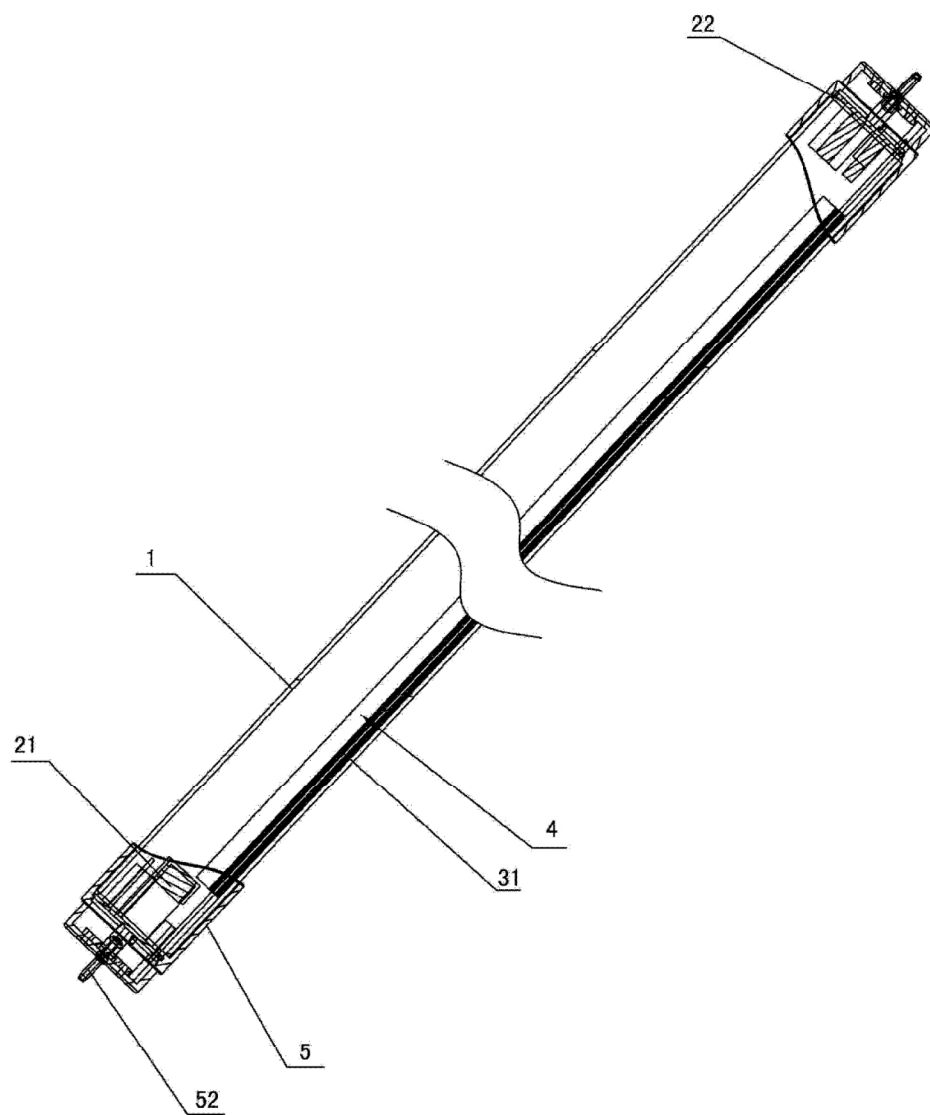


Figure 4

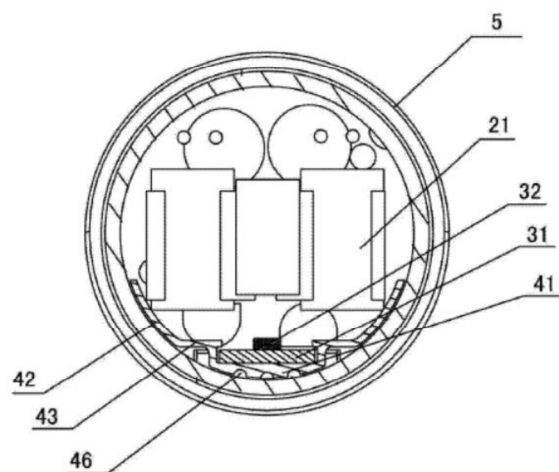


Figure 5

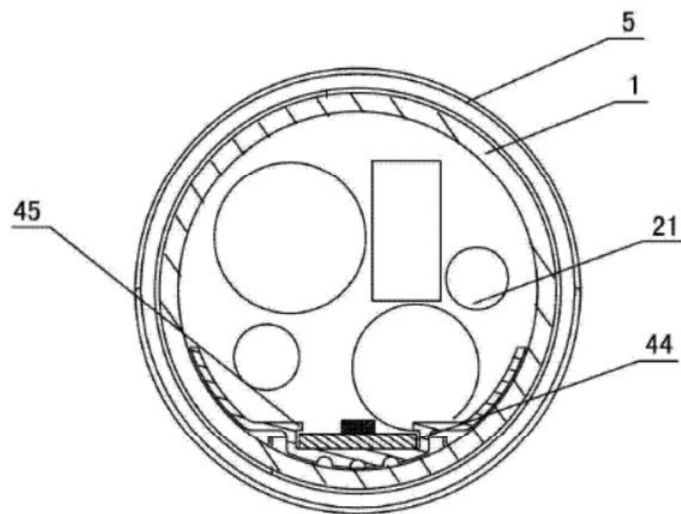


Figure 6

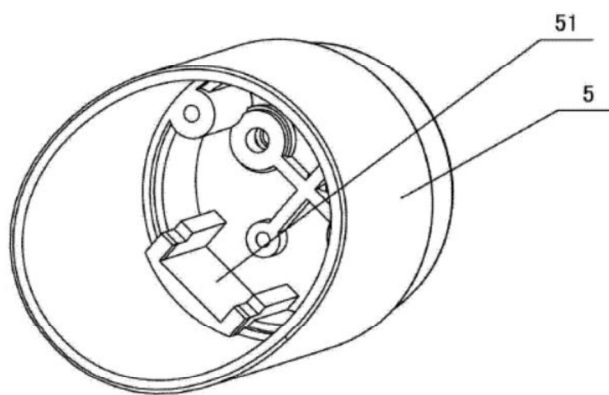


Figure 7

TRANSLATOR CERTIFICATION

Date: May 30, 2023

To whom it may concern:

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Signature

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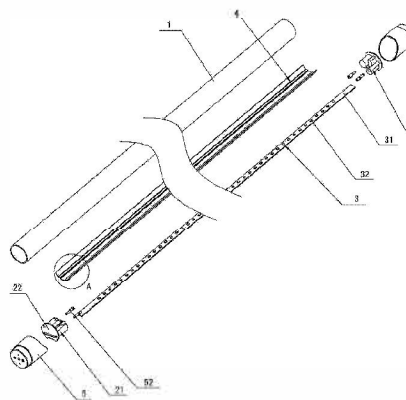
权利要求书1页 说明书4页 附图6页

(54) 实用新型名称

一种 LED 管形灯

(57) 摘要

本实用新型公开了一种 LED 管形灯,包括玻璃管、电源、设置于玻璃管内的 LED 光源模组和铝散热条以及连接于玻璃管的两端的灯头,LED 光源模组由铝基板及设置于铝基板的正面上的多颗 LED 灯珠组成,电源分解为两分子电源,两分子电源分布于玻璃管的两端,铝基板的正面上排布有串接所有 LED 灯珠的布线,布线的端头分别与两分子电源的 PCB 板直接连接,铝散热条的背面与玻璃管的内壁贴合,铝基板连接于铝散热条的正面上,优点是通过将电源分解成两个子电源,并在铝基板的正面上印刷布线,节省了玻璃管内的空间,使得安装铝基板的铝散热条的背面可以紧贴玻璃管的内壁,提高了 LED 灯珠发出的光线的柔和度,扩大了 LED 管形灯的发光角度,提高了光效。



1. 一种 LED 管形灯,包括玻璃管、电源、设置于所述的玻璃管内的 LED 光源模组和铝散热条以及连接于所述的玻璃管的两端的灯头,所述的 LED 光源模组由铝基板及设置于所述的铝基板的正面上的多颗 LED 灯珠组成,其特征在于所述的电源分解为两分子电源,两部分所述的子电源分布于所述的玻璃管的两端,所述的铝基板的正面上排布有串接所有所述的 LED 灯珠的布线,所述的布线的端头分别与两部分所述的子电源的 PCB 板直接连接,所述的铝散热条的背面与所述的玻璃管的内壁贴合,所述的铝基板连接于所述的铝散热条的正面上。

2. 根据权利要求 1 所述的一种 LED 管形灯,其特征在于所述的铝散热条由长条曲面体状的主散热条和两个长条弧形体状的辅散热条组成,两个所述的辅散热条对称设置于所述的主散热条的两侧,所述的主散热条的平面上沿轴向开设有用于安装所述的铝基板的安装槽。

3. 根据权利要求 2 所述的一种 LED 管形灯,其特征在于所述的安装槽的槽口的两侧对称向内延伸设置有卡条,所述的安装槽的槽底内侧面与所述的卡条的相对的一侧面之间的距离与所述的铝基板的厚度一致。

4. 根据权利要求 3 所述的一种 LED 管形灯,其特征在于所述的主散热条的平面的两侧对称向外延伸设置有连接条,所述的主散热条通过所述的连接条与所述的辅散热条连接。

5. 根据权利要求 4 所述的一种 LED 管形灯,其特征在于所述的主散热条的曲面上沿轴向开设有若干个散热通道。

6. 根据权利要求 5 所述的一种 LED 管形灯,其特征在于所述的主散热条的曲面和所述的辅散热条的外弧形面分别与所述的玻璃管的内壁相吻合,且所述的主散热条的曲面和所述的辅散热条的外弧形面分别通过导热双面胶与所述的玻璃管的内壁粘贴连接。

7. 根据权利要求 1 至 6 中任一项所述的一种 LED 管形灯,其特征在于所述的布线的端头上设置有焊点,所述的焊点与所述的子电源的 PCB 板上的焊盘直接焊接,两部分所述的子电源通过所述的子电源的 PCB 板上的焊盘、所述的焊点及所述的布线电连接。

8. 根据权利要求 7 所述的一种 LED 管形灯,其特征在于所述的灯头内设置有用卡住所述的铝基板的端头的卡座,所述的铝基板的端头卡接于所述的卡座内时所述的灯头在圆周方向上实现定位。

9. 根据权利要求 8 所述的一种 LED 管形灯,其特征在于所述的灯头套接于所述的玻璃管的端头外,且所述的子电源的 PCB 板位于所述的灯头内,所述的子电源的元器件位于所述的玻璃管的端头内;每个所述的灯头上连接有一对灯头铜针,所述的灯头铜针的一端与所述的子电源的 PCB 板电连接。

10. 根据权利要求 9 所述的一种 LED 管形灯,其特征在于所述的电源采用非隔离电源。

一种 LED 管形灯

技术领域

[0001] 本实用新型涉及一种 LED 灯具,尤其是涉及一种 LED 管形灯。

背景技术

[0002] 随着 LED 照明技术的高速发展,LED 管形灯作为照明光源已经逐渐普及。传统的 LED 管形灯一般包括壳体、设置于壳体内的 LED 光源模组和电源组件、设置于壳体两端的塑料灯头,壳体通常由一个横截面为半圆形的铝散热底座和一个横截面为半圆形的透明 PC (聚碳酸酯)塑料罩相配合组成。这种传统的 LED 管形灯由于铝散热底座外露,因此为满足安规要求,一般情况下电源不能做成高效率的非隔离电源,但这样会影响 LED 管形灯的整灯光效。

[0003] 目前,市面上也有不少 LED 灯具厂商相继推出壳体采用常规玻璃管的 LED 管形灯。这种 LED 管形灯包括玻璃管,玻璃管内设置有铝散热底座、LED 光源模组、电源组件和连接塑料灯头两端的导线。然而,这种结构的 LED 管形灯存在以下问题:一方面,为了在铝散热底座与玻璃管之间容设电源组件和连接塑料灯头两端的导线,就不能使整条铝散热底座与玻璃管的内壁紧贴,而这样会使得 LED 灯珠相对玻璃管的发光面距离较近,不仅会影响 LED 灯珠发出的光线的柔和度,而且会导致 LED 灯珠快速发热;另一方面,由于整体散热只能靠铝散热底座,因此铝散热底座的宽度尺寸要求不能做得很窄,但是如果铝散热底座的宽度较宽,则将影响 LED 管形灯的发光角度;此外,由于电源组件设置于铝散热底座与玻璃管之间,因此会导致电源组件快速发热。

发明内容

[0004] 本实用新型所要解决的技术问题是提供一种结构简单紧凑、工作安全可靠,且光线柔和、发光角度大、光效高的 LED 管形灯。

[0005] 本实用新型解决上述技术问题所采用的技术方案为:一种 LED 管形灯,包括玻璃管、电源、设置于所述的玻璃管内的 LED 光源模组和铝散热条以及连接于所述的玻璃管的两端的灯头,所述的 LED 光源模组由铝基板及设置于所述的铝基板的正面上的多颗 LED 灯珠组成,其特征在于所述的电源分解为两分子电源,两部分所述的子电源分布于所述的玻璃管的两端,所述的铝基板的正面上排布有串接所有所述的 LED 灯珠的布线,所述的布线的端头分别与两部分所述的子电源的 PCB 板直接连接,所述的铝散热条的背面与所述的玻璃管的内壁贴合,所述的铝基板连接于所述的铝散热条的正面上。

[0006] 所述的铝散热条由长条曲面体状的主散热条和两个长条弧形体状的辅散热条组成,两个所述的辅散热条对称设置于所述的主散热条的两侧,所述的主散热条的平面上沿轴向开设有用于安装所述的铝基板的安装槽。

[0007] 所述的安装槽的槽口的两侧对称向内延伸设置有卡条,所述的安装槽的槽底内侧面与所述的卡条的相对的一侧面之间的距离与所述的铝基板的厚度一致。

[0008] 所述的主散热条的平面的两侧对称向外延伸设置有连接条,所述的主散热条通过

所述的连接条与所述的辅散热条连接。

[0009] 所述的主散热条的曲面上沿轴向开设有若干个散热通道。

[0010] 所述的主散热条的曲面和所述的辅散热条的外弧形面分别与所述的玻璃管的内壁相吻合,且所述的主散热条的曲面和所述的辅散热条的外弧形面分别通过导热双面胶与所述的玻璃管的内壁粘贴连接。

[0011] 所述的布线的端头上设置有焊点,所述的焊点与所述的子电源的 PCB 板上的焊盘直接焊接,两部分所述的子电源通过所述的子电源的 PCB 板上的焊盘、所述的焊点及所述的布线电连接。

[0012] 所述的灯头内设置有用卡住所述的铝基板的端头的卡座,所述的铝基板的端头卡接于所述的卡座内时所述的灯头在圆周方向上实现定位。

[0013] 所述的灯头套接于所述的玻璃管的端头外,且所述的子电源的 PCB 板位于所述的灯头内,所述的子电源的元器件位于所述的玻璃管的端头内;每个所述的灯头上连接有一对灯头铜针,所述的灯头铜针的一端与所述的子电源的 PCB 板电连接。

[0014] 所述的电源采用非隔离电源。

[0015] 与现有技术相比,本实用新型的优点在于:

[0016] 1)一方面,由于将电源分解成两部分子电源,即将原电源一分为二,而一个子电源的体积相对于原电源体积大大缩小,这样子电源就可以分布于玻璃管的端侧,可以直接将子电源安放于灯头内,而不用安放于铝散热条与玻璃管之间,解决了电源的发热问题,也解决了玻璃管内部空间占用问题;另一方面,两部分子电源的电连接通过铝基板的正面上印刷的布线以及设置于布线的端头的焊点与两部分子电源的 PCB 板上的焊盘直接焊接完成,而无需布设导线,这种结构节省了玻璃管内的空间,使得安装铝基板的铝散热条的背面可以紧贴玻璃管的内壁,不仅拉开了 LED 灯珠与玻璃管的发光面之间的距离,提高了 LED 灯珠发出的光线的柔和度,降低了 LED 灯珠的发热速度,而且由于铝散热条只需为 LED 灯珠散热,因此在保证 LED 灯珠得到充分的散热情况下铝散热条的宽度尺寸可以设计的比较窄,这样可扩大 LED 管形灯的发光角度,提高光效。

[0017] 2)通过将电源分解成两个子电源,并在铝基板的正面上印刷布线,不仅解决了散热、光线柔和度、发光角度、光效等问题,而且结构较为简单紧凑,工作安全可靠。

附图说明

[0018] 图 1 为本实用新型的 LED 管形灯的整体外形结构示意图;

[0019] 图 2 为本实用新型的 LED 管形灯的整体结构爆炸示意图;

[0020] 图 3 为图 2 中 A 部分的放大示意图;

[0021] 图 4 为图 1 的剖视示意图;

[0022] 图 5 为本实用新型的 LED 管形灯的右视截面剖视示意图;

[0023] 图 6 为本实用新型的 LED 管形灯的左视截面剖视示意图;

[0024] 图 7 为本实用新型的 LED 管形灯的灯头的轴侧示意图。

具体实施方式

[0025] 以下结合附图实施例对本实用新型作进一步详细描述。

[0026] 本实用新型提出的一种 LED 管形灯, 如图所示, 其包括玻璃管 1、电源、设置于玻璃管 1 内的 LED 光源模组 3 和铝散热条 4 以及连接于玻璃管 1 的两端的灯头 5, LED 光源模组 3 由铝基板 31 及设置于铝基板 31 的正面上的多颗 LED 灯珠 32 组成, 电源分解为两分子子电源 21, 两分子子电源 21 横向分布于玻璃管 1 的两端, 铝基板 31 的正面上排布有(即印刷有)串接所有 LED 灯珠 32 的布线(图中未示出), 布线排布于若干排 LED 灯珠 32 的两侧, 布线替代了连接电源的导线, 布线的端头上设置有焊点(图中未示出), 布线的端头通过焊点与子电源 21 的 PCB 板 22 上的焊盘直接焊接, 两分子子电源 21 通过子电源 21 的 PCB 板 22 上的焊盘、焊点及布线电连接, 铝散热条 4 的背面与玻璃管 1 的内壁贴合, 铝基板 31 连接于铝散热条 4 的正面上。这种结构的 LED 管形灯, 一方面, 由于将电源分解成两分子子电源 21, 即将原电源一分为二, 而一个子电源 21 的体积相对于原电源体积大大缩小, 这样子电源 21 就可以分布于玻璃管 1 的端侧, 可以直接将子电源 21 安放于灯头 5 内, 而不用安放于铝散热条 4 与玻璃管 1 之间, 解决了电源的发热问题, 也解决了玻璃管 1 内部空间占用问题; 另一方面, 两分子子电源 21 的电连接通过铝基板 31 的正面上印刷的布线以及设置于布线的端头的焊点与两分子子电源 21 的 PCB 板 22 上的焊盘直接焊接完成, 而无需布设导线, 这种结构节省了玻璃管 1 内的空间, 使得安装铝基板 31 的铝散热条 4 的背面可以紧贴玻璃管 1 的内壁, 不仅拉开了 LED 灯珠 32 与玻璃管 1 的发光面之间的距离, 提高了 LED 灯珠 32 发出的光线的柔和度, 降低了 LED 灯珠 32 的发热速度, 而且由于铝散热条 4 只需为 LED 灯珠 32 散热, 因此在保证 LED 灯珠 32 得到充分的散热情况下铝散热条 4 的宽度尺寸可以设计的比较窄, 这样可扩大 LED 管形灯的发光角度, 提高光效。

[0027] 在本实施例中, 铝散热条 4 由长条曲面体状的主散热条 41 和两个长条弧形体状的辅散热条 42 组成, 主散热条 41 的平面的两侧对称向外延伸设置有连接条 43, 一个辅散热条 42 通过其中一个连接条 43 与主散热条 41 的一侧连接, 另一个辅散热条 42 通过另一个连接条 43 与主散热条 41 的另一侧连接, 两个辅散热条 42 对称设置, 主散热条 41 的平面上沿轴向开设有用于安装铝基板 31 的安装槽 44, 铝基板 31 通过安装槽 44 安装于铝散热条 4 的中间位置上, 主散热条 41 的曲面和辅散热条 42 的外弧形面分别与玻璃管 1 的内壁相吻合, 且主散热条 41 的曲面和辅散热条 42 的外弧形面分别通过现有的导热双面胶与玻璃管 1 的内壁粘贴连接。为使铝基板 31 安装更为方便, 可在安装槽 44 的槽口的两侧对称向内延伸设置有卡条 45, 并使安装槽 44 的槽底内侧面与卡条 45 的相对的一侧面之间的距离 d 与铝基板 31 的厚度一致, 在实际设计过程中一般可使安装槽 44 的槽底内侧面与卡条 45 的相对的一侧面之间的垂直距离略大于铝基板 31 的厚度, 安装铝基板 31 时直接将铝基板 31 通过安装槽 44 的槽端侧插入安装槽 44 内即可, 这样铝基板 31 通过卡条 45 稳固地被卡在安装槽 44 内, 安装非常方便。

[0028] 在本实施例中, 可在主散热条 41 的曲面上沿轴向开设多个散热通道 46, 散热通道 46 的设置可进一步提高铝散热条 4 的散热性能。

[0029] 在本实施例中, 灯头 5 的内壁上设置有用卡住铝基板 31 的端头的卡座 51, 安装时直接将铝基板 31 的端头插入卡座 51 内使铝基板 31 的端头卡接于卡座 51 内, 通过铝基板 31 的端头与卡座 51 的配合, 不仅实现了连接灯头 5 与玻璃管 1 的作用, 而且使得灯头 5 在圆周方向上实现了定位。

[0030] 在本实施例中, 灯头 5 套接于玻璃管 1 的端头外, 在实际处理过程中可通过现有的

导热粘接胶将灯头 5 的内壁与玻璃管 1 的端头外壁粘接固定在一起,且子电源 21 的 PCB 板 22 位于灯头 5 内,子电源 21 的元器件位于玻璃管 1 的端头内;每个灯头 5 上连接有一对灯头铜针 52,灯头铜针 52 的一端与子电源 21 的 PCB 板 22 电连接。

[0031] 在本实施例中,玻璃管 1 直接采用市售的常规的玻璃管;电源可采用隔离电源,也可以采用非隔离电源。

[0032] 对这种结构的 LED 管形灯(22W)进行应用实验,实验结果:散热良好,光通量 $\geq 2000\text{lm}$,平均寿命达 25000 小时以上。这种结构的 LED 管形灯可应用于更高瓦数的 LED 管形灯。

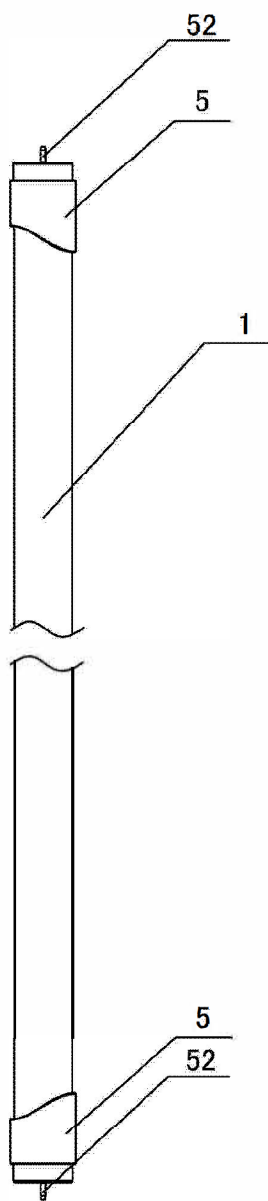


图 1

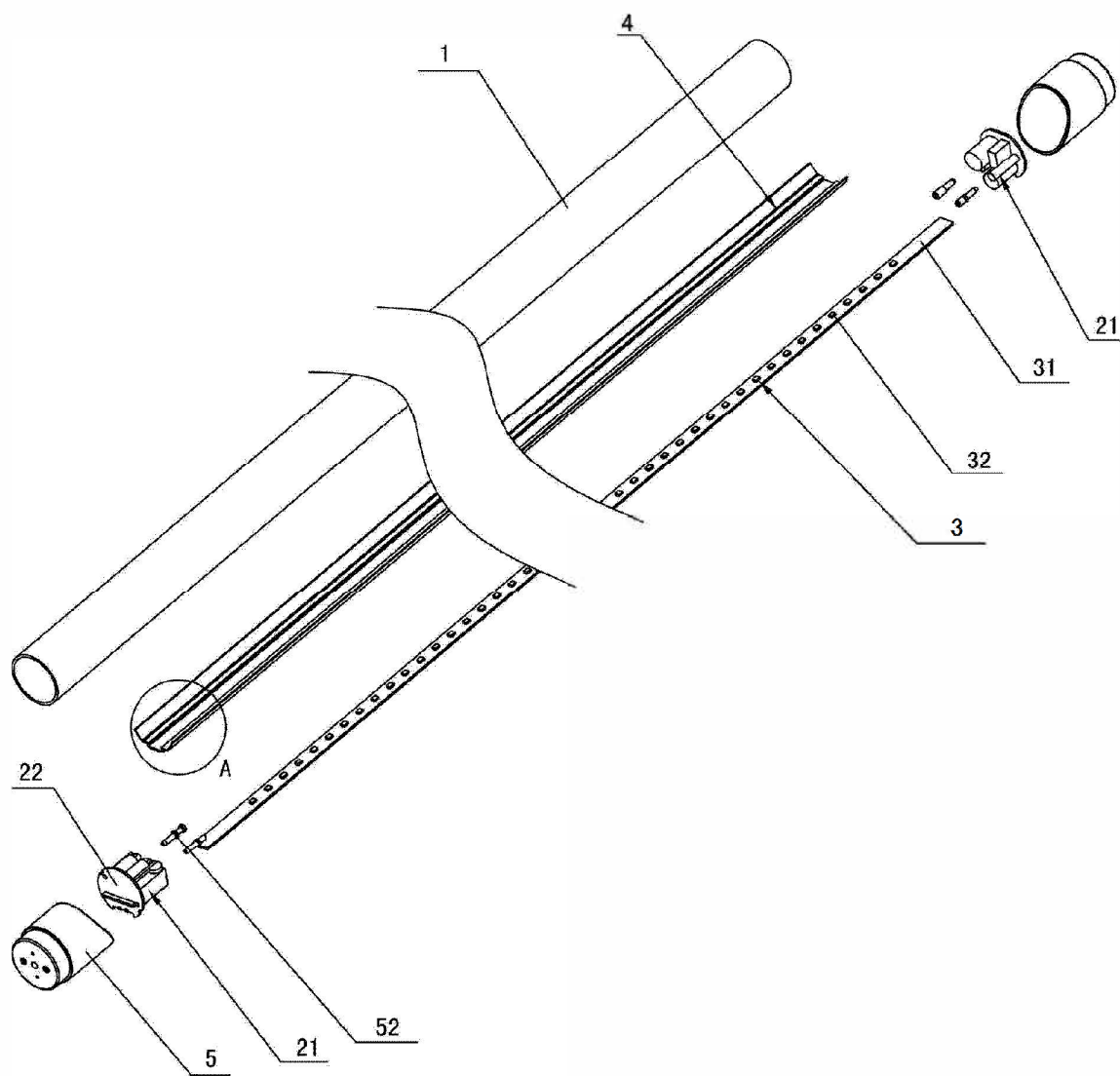


图 2

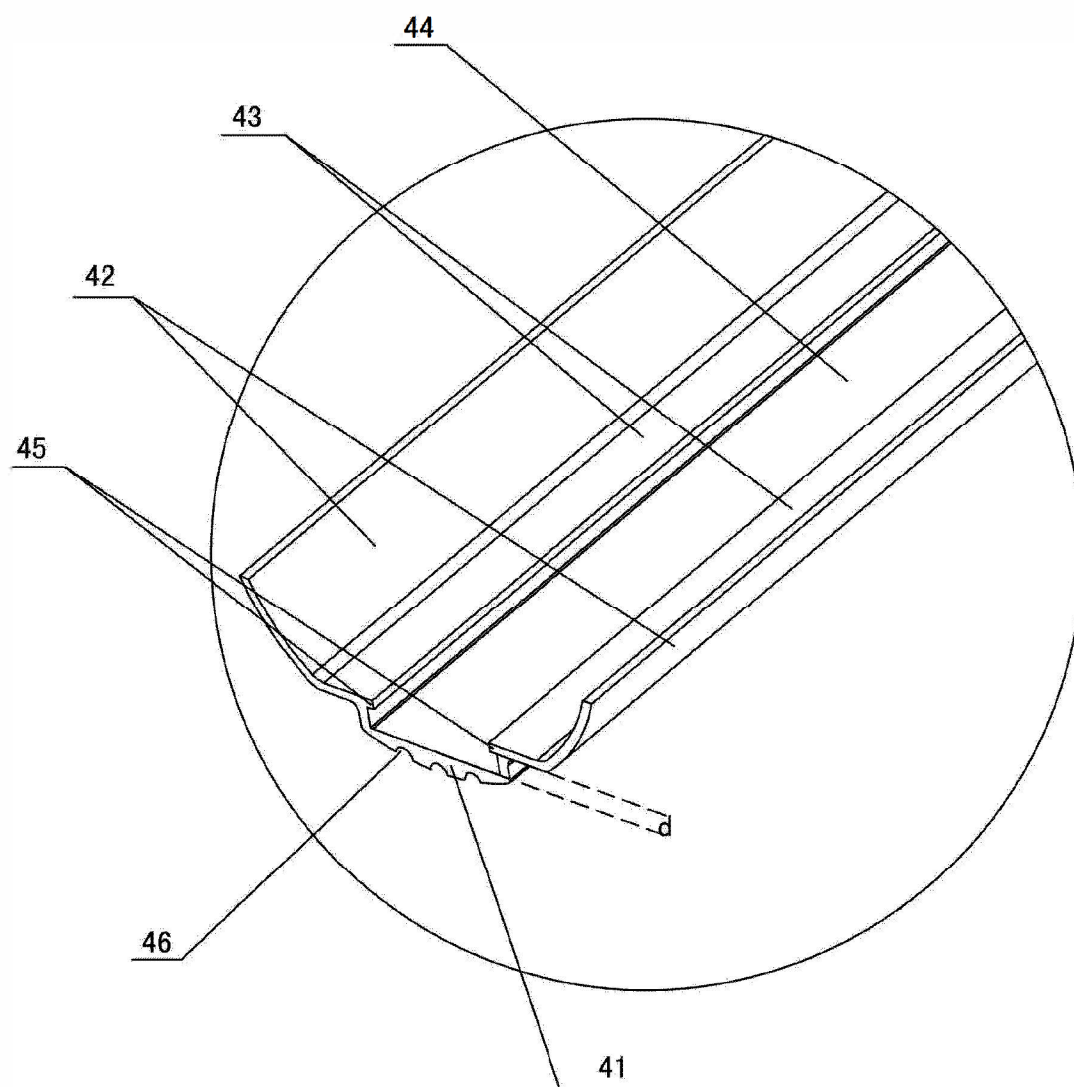


图 3

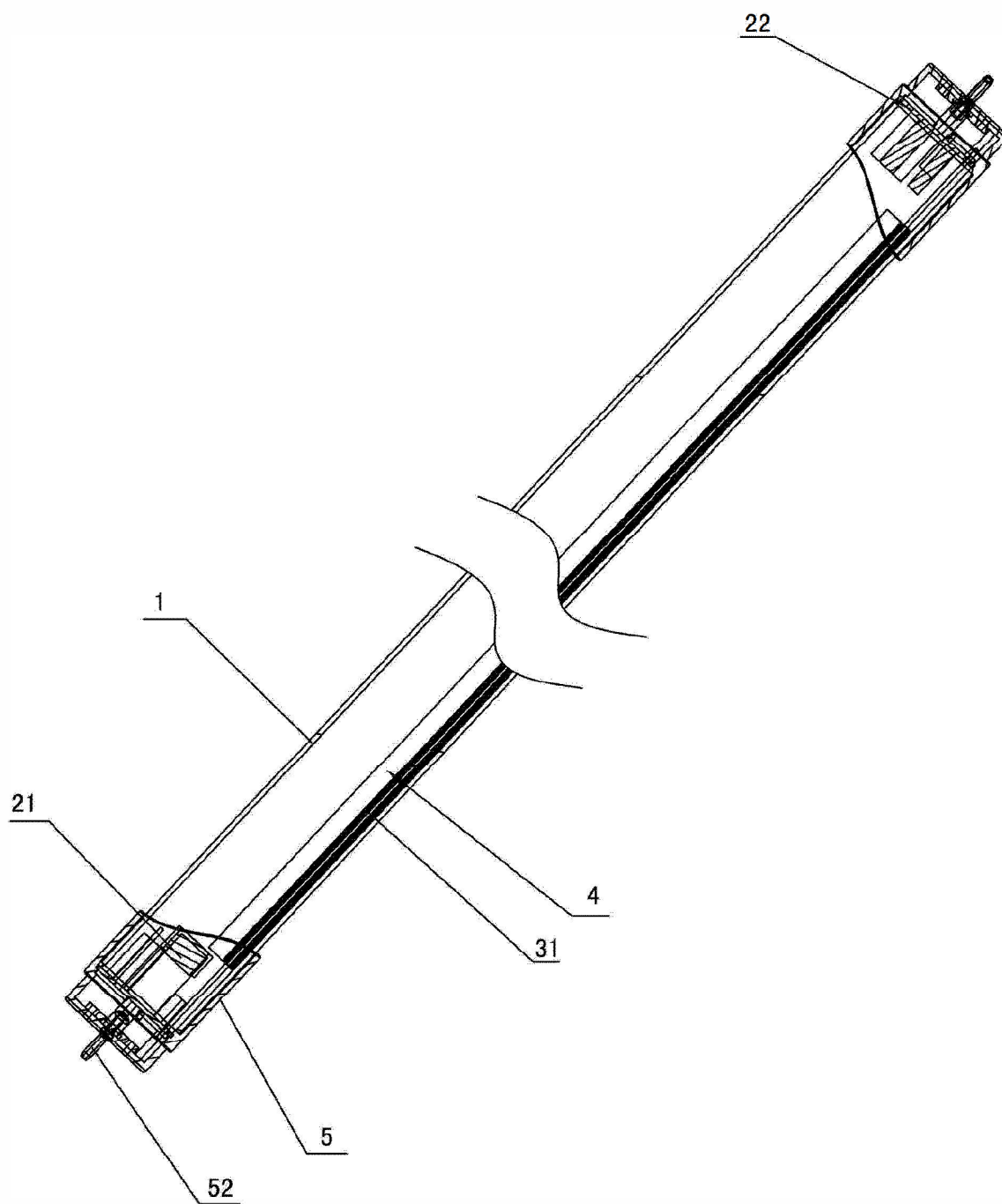


图 4

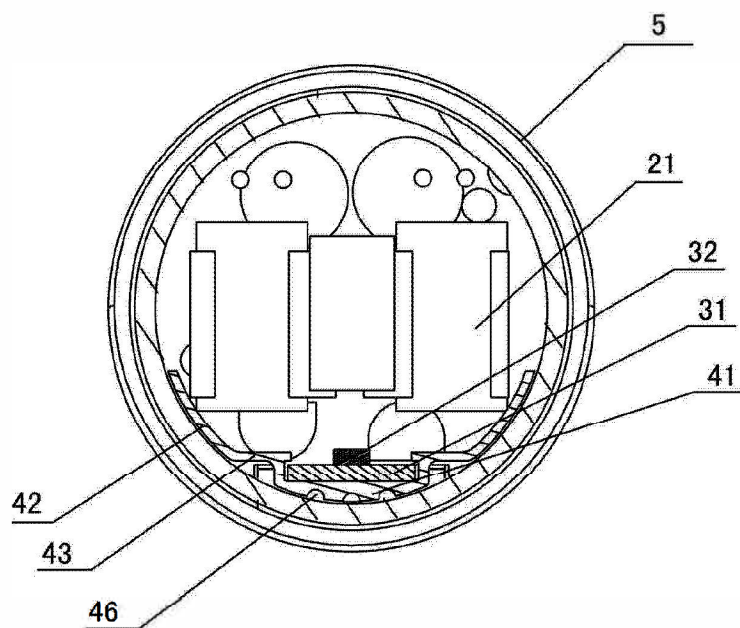


图 5

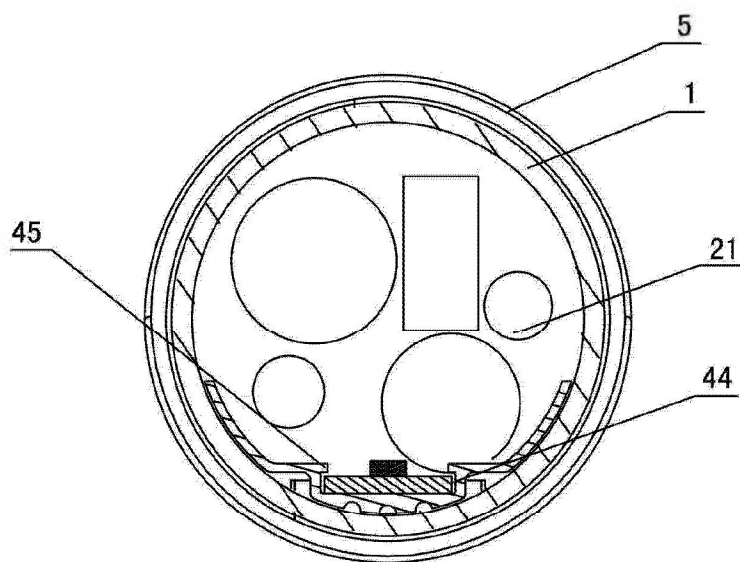


图 6

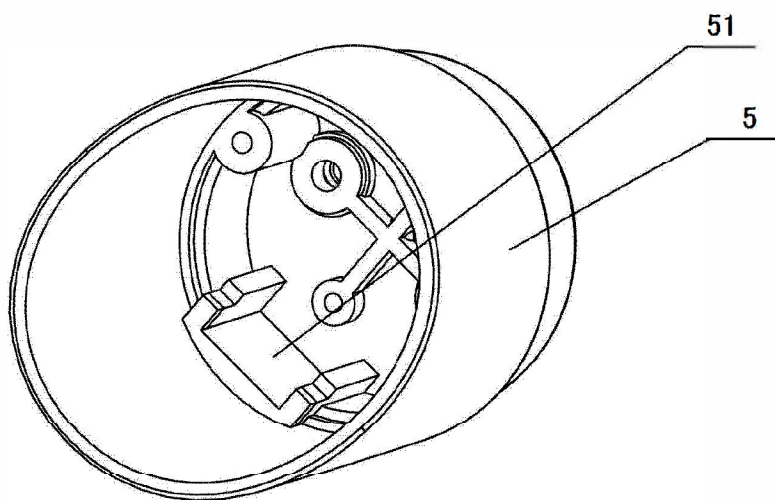


图 7