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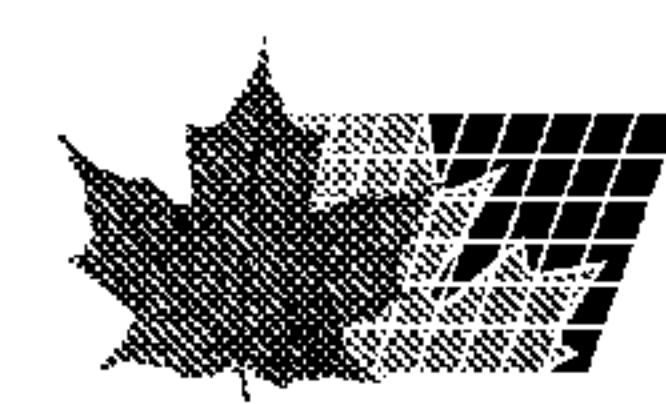
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(54) Title: POWER DEVICE OF LED LIGHTING MODULE

(57) **Abrégé/Abstract:**

A power device of an LED lighting module includes an LED lighting module and a power device. The LED lighting module includes a light-penetrable lamp and an LED lighting component disposed inside the light-penetrable lamp. The power device is connected to the light-penetrable lamp or disposed inside the light-penetrable lamp. A guide slot is disposed on the light-penetrable lamp or a casing of the power device. The power device further includes a power controller corresponding in position to the guide slot. The power controller can be inserted into the guide slot for controlling power supplied to the LED lighting module. Accordingly, the power controller can be changed independently, thereby enabling easy convenient replacement and cutting replacement costs.



## POWER DEVICE OF LED LIGHTING MODULE

## ABSTRACT OF THE DISCLOSURE

A power device of an LED lighting module includes an LED lighting module and a power device. The LED lighting module includes a light-penetrable lamp and an LED lighting component disposed inside the light-penetrable lamp. The power device is connected to the light-penetrable lamp or disposed inside the light-penetrable lamp. A guide slot is disposed on the light-penetrable lamp or a casing of the power device. The power device further includes a power controller corresponding in position to the guide slot. The power controller can be inserted into the guide slot for controlling power supplied to the LED lighting module. Accordingly, the power controller can be changed independently, thereby enabling easy convenient replacement and cutting replacement costs.

## POWER DEVICE OF LED LIGHTING MODULE

### FIELD OF THE INVENTION

The present invention relates to LED lighting modules, and more particularly, to a power device adapted for use with an LED lighting module and installed directly on a fluorescent lamp holder, such that a power controller of the power device can be changed independently.

### BACKGROUND OF THE INVENTION

Conventional lighting equipment mainly includes incandescent lamps and fluorescent tubes. However, incandescent lamps and fluorescent tubes have their own disadvantages, such as high power consumption and short service life. By contrast, nowadays, high-power light-emitting diodes (LED) have advantages, namely low power consumption, high durability, and long service life, and thus are good candidate for replacing the conventional incandescent lamps gradually. Nonetheless, existing light-emitting diodes (LED) are confronted with plenty of technical problems, one of which is about enabling a user to change an LED lamp or an LED bulb directly without the hassles of changing an LED lamp/bulb holder.

To develop a substitute for conventional fluorescent tubes, the prior art did put forth some solutions. Referring to FIG. 1, a conventional LED lamp 10 has one end coupled to a power supplying device 20. The power supplying device 20 comprises therein electronic components, such as a circuit board and a driving control IC. The LED lamp 10 has the other end coupled to a conductive terminal 30. The outer end of the power supplying device 20 is coupled to another conductive terminal 30. Both the LED lamp 10 and the power supplying device 20 together are installed on a lamp holder. The power supplying device 20 converts alternating current (AC) into direct current (DC), and rectifies the direct current (DC) to provide voltage and current required for the LED lamp 10. However, with the power supplying device 20 being directly integrated with the LED lamp 10 to form a unitary structure, if any of the electronic components inside the power supplying device 20 gets damaged or malfunctions, it will be necessary to change the LED lamp 10 and the power supplying device 20 together to the detriment of cost effectiveness.

Referring to FIG. 2 and FIG. 3, to cope with the aforesaid problem and drawback of the power supplying device 20, the prior art put forth another solution that involves designing power supplying devices 20a, 20b and the LED lamp 10 in a manner to have separable structures, and

connecting the LED lamp 10 to the power supplying devices 20a, 20b by a thread connection structure 201a and a conductive pin 201b, respectively, such that it will be necessary to change the power supplying devices 20a, 20b only when the power supplying devices 20a, 20b get damaged or malfunction. Nonetheless, the power supplying devices 20a, 20b contain multiple electronic components, among which is a power controller (an electric transducer) that is most likely to get damaged or malfunction. It is not cost-effective to the power supplying devices 20a, 20b just because the power controller gets damaged or malfunctions. Due to the aforesaid structural design, to change the power supplying devices 20a, 20b, it is necessary to remove both the LED lamp 10 and the power supplying devices 20a, 20b from the lamp holder and then mount the old LED lamp 10 and new power supplying devices 20a, 20b on the lamp holder to the detriment of user convenience.

Accordingly, it is imperative to provide a power device adapted for use with an LED lighting module and characterized by ease of replacement of a power controller and a low cost of changing the power controller.

#### SUMMARY OF THE INVENTION

In view of the aforesaid drawbacks of the prior art, the inventor of the present invention conceived room for improvement in the prior art and thus conducted extensive researches and experiments according to the inventor's years of experience in the related industry, and finally developed a power device of an LED lighting module such that a power controller thereof can be changed easily and at a low cost.

It is an objective of the present invention to provide a power device of an LED lighting module, wherein a power controller thereof is insertable into and separable from the power device such that the power controller can be changed independently, easily, and cheaply.

In order to achieve the above and other objectives, the present invention provides a power device of an LED lighting module, wherein, in the first preferred embodiment, the LED lighting module comprises a light-penetrable lamp having therein an LED lighting component, and the power device comprises a casing connected to the light-penetrable lamp. In the first preferred embodiment, the power device is characterized in that: the casing of the power device has a guide slot; and the power device further comprises a power controller corresponding in position to the guide slot and insertable thereinto for controlling power supplied to the LED lighting module.

In the first preferred embodiment, the power controller comprises a plate having an end provided with a plurality of guide terminals for electrical connection with the power device, and the plate has therein at least an LED driving control IC.

In the first preferred embodiment, the light-penetrable lamp of the LED lighting module is a slender lamp installed on a fluorescent lamp holder, and the casing of the power device is connected to the slender lamp.

In order to achieve the above and other objectives, the present invention provides an power device of an LED lighting module, wherein, in the second preferred embodiment, the LED lighting module comprises a light-penetrable lamp having therein an LED lighting component, and the power device is disposed inside the light-penetrable lamp. In the second preferred embodiment, the power device is characterized in that: the light-penetrable lamp has a guide slot in communication with the power device, and the power device further comprises a power controller corresponding in position to the guide slot and insertable thereinto for controlling power supplied to the LED lighting module.

In the second preferred embodiment, the light-penetrable lamp of the LED lighting module is a slender lamp installed on a fluorescent lamp holder, and the power device has a casing disposed inside the slender lamp.

Accordingly, a power device of an LED lighting module according to the present invention is characterized in that a power controller thereof is implemented in the form of a self-contained element that is easily and quickly inserted into a guide slot of a light-penetrable lamp or the power device rather than directly fixedly connected to the power device. Hence, if the power controller gets damaged, malfunctions, or undergoes alteration of its specifications and thus needs to be changed, it will not be necessary to change the power device in whole, nor will it be necessary to remove the LED lighting module in order to change the power controller. Hence, the power device of the present invention overcomes the drawbacks of a conventional LED lamp, renders it easy to change the power controller, and cuts replacement costs.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Objectives, features, and advantages of the present invention are hereunder illustrated with specific embodiments in conjunction with the accompanying drawings, in which:

FIG. 1 (PRIOR ART) is a schematic view of a conventional LED lamp coupled to a power

supplying device;

FIG. 2 (PRIOR ART) is a schematic view of a conventional LED lamp with a separable power supplying device;

FIG. 3 (PRIOR ART) is another schematic view of a conventional LED lamp with a separable power supplying device;

FIG. 4 is an exploded perspective view of an LED lighting module according to the first preferred embodiment of the present invention;

FIG. 5 is an assembled perspective schematic view of the LED lighting module according to the first preferred embodiment of the present invention;

FIG. 6 is an assembled partial schematic view of the LED lighting module according to the first preferred embodiment of the present invention; and

FIG. 7 is an exploded perspective view of the LED lighting module according to the second preferred embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

Referring to FIG. 4, FIG. 5 and FIG. 6, in the first preferred embodiment of the present invention, a power device of an LED lighting module comprises an LED lighting module 1 and a power device 2. The LED lighting module 1 comprises a light-penetrable lamp 11 having therein an LED lighting component (not shown). The power device 2 comprises a casing 21 connected to any end or the middle of the light-penetrable lamp 11 of the LED lighting module 1 and a required electronic component disposed inside the casing 21. The first preferred embodiment of the present invention is advantageously characterized in that: a guide slot 23 is disposed on one side of the casing 21 of the power device 2; the power device 2 further comprises a power controller 24 corresponding in position to the guide slot 23; the power controller 24 comprises a plate 241 corresponding in shape to the guide slot 23; a plurality of guide terminals 242 for electrical connection with the guide slot 23 is disposed at one end of the plate 241; and the plate 241 has therein at least an LED driving control IC. Hence, the power controller 24 can be inserted into the guide slot 23 on one side of the casing 21, so as to control the power supplied to the LED lighting module 1.

Referring to FIG. 4 through FIG. 6, in a preferred embodiment of the present invention, the light-penetrable lamp 11 of the LED lighting module 1 is a slender lamp installed on a fluorescent

lamp holder. The casing 21 of the power device 2 is fixedly connected to one end or the middle of the slender lamp 11. The guide slot 23 is concavely disposed on one side of the casing 21, such that the power controller 24 can be inserted into the guide slot 23.

Referring to FIG. 7, there is shown an exploded perspective view of the LED lighting module 1 and the power device 2 according to the second preferred embodiment of the present invention. As shown in FIG. 7, the LED lighting module 1 comprises the light-penetrable lamp 11 having therein a plurality of LED lighting components (not shown), whereas the power device 2 is disposed inside the light-penetrable lamp 11 and equipped with a required electronic component. The second preferred embodiment of the present invention is advantageously characterized in that: the light-penetrable lamp 11 is formed with a guide slot 12 in communication with the power device 2; the power device 2 further comprises the power controller 24 corresponding in position to the guide slot 12; the power controller 24 comprises the plate 241 corresponding in shape to the guide slot 12; a plurality of guide terminals 242 for electrical connection with the guide slot 12 is disposed at one end of the plate 241; and the plate 241 has therein at least an LED driving control IC. Hence, the power controller 24 can be inserted into the guide slot 12 on one side of the light-penetrable lamp 11, so as to control the power supplied to the LED lighting module 1.

Accordingly, the power device 2 of the LED lighting module 1 according to the present invention allows a user to install the LED lighting module 1 and the power device 2 concurrently on a fluorescent lamp holder for replacing a conventional fluorescent tube, wherein the LED lighting module 1 has advantages, namely low power consumption, high durability, and long service life. In particular, if the power controller 24 develops a short circuit, gets damaged, malfunctions, needs to alter its specifications, or needs to be replaced by a new product, the power controller 24 can be changed simply by being pulled outward, and it will not be necessary to change the power device 2 in whole. Hence, the power device 2 of the LED lighting module 1 according to the present invention is effective in cutting replacement costs. Furthermore, to change the power controller 24, it is not necessary to remove the LED lighting module 1 and the power device 2 from the lamp holder; instead, all the user needs to do is to pull the old power controller 24 out and then insert the new power controller 24. Hence, the present invention enables easy, quick, and convenience replacement.

Hence, the present invention meets the three requirements of patentability, namely novelty, non-obviousness, and industrial applicability. Regarding novelty and non-obviousness, the present

invention discloses structural improvement of a power device such that a structurally improved power controller can be inserted into and separated from the power device to allow the power controller to be changed independently, thereby achieving easy convenient replacement and cutting replacement costs. Regarding industrial applicability, products derived from the present invention meet market demands for LED illumination fully.

The present invention is disclosed above by preferred embodiments. However, persons skilled in the art should understand that the preferred embodiments are illustrative of the present invention only, but should not be interpreted as restrictive of the scope of the present invention. Hence, all equivalent modifications and replacements made to the aforesaid embodiments should fall within the scope of the present invention. Accordingly, the legal protection for the present invention should be defined by the appended claims.

## CLAIMS

What is claimed is:

1. A power device of an LED lighting module, the LED lighting module comprising a light-penetrable lamp having therein an LED lighting component, and the power device comprising a casing connected to the light-penetrable lamp, the power device being characterized in that: the casing of the power device has a guide slot; and the power device further comprises a power controller corresponding in position to the guide slot and insertable thereinto for controlling power supplied to the LED lighting module.
2. The power device of claim 1, wherein the power controller comprises a plate having an end provided with a plurality of guide terminals for electrical connection with the power device, the plate having therein at least an LED driving control IC.
3. The power device of claim 2, wherein the light-penetrable lamp is a slender lamp installed on a fluorescent lamp holder, and the casing of the power device is connected to the slender lamp.
4. A power device of an LED lighting module, the LED lighting module comprising a light-penetrable lamp having therein an LED lighting component, and the power device being disposed inside the light-penetrable lamp, the power device being characterized in that: the light-penetrable lamp has a guide slot in communication with the power device; and the power device further comprises a power controller corresponding in position to the guide slot and insertable thereinto for controlling power supplied to the LED lighting module.
5. The power device of claim 4, wherein the power controller comprises a plate having an end provided with a plurality of guide terminals for electrical connection with the power device, the plate having therein at least an LED driving control IC.
6. The power device of claim 5, wherein the light-penetrable lamp is a slender lamp installed on a fluorescent lamp holder, and the power device has a casing disposed inside the slender lamp.

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