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A reflective mask structure of projector lamp

Field of the invention

This invention relates to a reflective mask structure for projector lamp, and it specifically means a reflective mask structure for projector lamp with high
5 luminance and uniformity, with reflective efficiency as high as 95% so as to provide high reflective efficiency illumination and remote illumination effect.

Background of the invention

Moreover, lighting device is a necessity in the daily life, and lots of sites need optical source, for example, factory, organization and school, road and tunnel;
10 and such optical sources can provide people with bright and safe environment in the night or in the dark site.

In addition, the above lighting devices, due to the wide site area, are mostly installed at location that is far from the ground surface so as to provide wider lighting scope; however, currently, the general light device contains a inverted
15 bowl shape lamp mask, and on the inner top surface of the inverted bowl shape lamp mask, it is installed with a luminescence lamp body, generally speaking, the inverted bowl shape lamp mask is made up of material of higher optical reflective efficiency (for example, Al and alloy, etc.); meanwhile, on the inner wall, a surface of specific curvature is formed so as to collect the light source emitted
20 from luminescence lamp body, hence, after long distance of propagation, the luminance of the light source will not decay excessively, moreover, luminescence lamp body needs to be high intensity gas discharge lamp (for

example, Na lamp, metal halide lamp and mercury lamp, etc.), which consumes more power, to provide sufficient illumination.

However, the light focusing effect of the above lighting devices is bad, which usually leads to the drawback of insufficient luminance in the remote lighting occasion; therefore, currently, most of the suppliers are studying aggressively how to adjust the curvature of the inner wall surface of inverted bowl shape lamp mask so as to improve the drawback of insufficient luminance; however, it can only let the reflected light of luminescence lamp body light source be more centralized, it can only reduce the light source decay rate, but it has only limited effect in enhancing the reflective efficiency of the light and the illumination uniformity, hence, in the real embodiment and utilization, it still has drawbacks such as low luminance due to bad reflective efficiency and the centralization of light at the center due to bad uniformity, hence, the light illumination at the peripheral area is thus greatly reduced, and there is still great room of improvement.

Summary of the invention

Therefore, the inventor of this patent, with the rich design, development and practical manufacturing experiences in the related industries, has innovated reflective mask structure for projector lamp, which is a reflective mask structure for projector lamp with high luminance and high uniformity and with reflective efficiency as high as 95% so as to provide high reflective efficiency illumination and remote illumination effect.

In order to achieve the above embodiment objective, the inventor of this invention thus prepared the following embodiment technique, which mainly includes an internally concave accommodation slot, and at the front end of the accommodation slot, it is formed with an opening; moreover, within
5 accommodation slot, it is installed with at least one luminescence device; wherein, on the wall surface of accommodation slot, it is installed with a plurality of reflective bumped particulates so that the light source of luminescence device can, through the reflection of the reflective bumped particulate, be projected onto the external side through the opening; moreover, in one embodiment,
10 accommodation slot can be of spherical shape, and reflective bumped particulate is of arc shape; furthermore, reflective bumped particulate is installed in the form of corresponding arrangement on the wall surface of accommodation slot, and the surface of reflective bumped particulate can be treated with vacuum electroplating so as to enhance the reflective effect.

15 Therefore, when the light ray emitted by luminescence device is incident on the reflective bumped particulate of the wall surface of accommodation slot, since reflective bumped particulate is of arc shape, light ray that is projected onto reflective bumped particulate will generate reflection of different angle along the arc surface of reflective bumped particulate, moreover, since the wall surface of
20 accommodation slot is fully covered with reflective bumped particulates that are installed in corresponding arrangement way, the reflective light can then be reflected back-and-forth and alternately in accommodation slot so as to generate light ray of high density, hence, the luminance and uniformity of light ray emitted by luminescence device can be enhanced, and the issue of insufficient

luminance due to bad reflective efficiency in traditional lighting device can then be improved, moreover, drawbacks such as centralization of light ray on the center due to bad uniformity and the subsequent sudden reduction of light ray luminance in the peripheral area can be greatly reduced.

- 5 Moreover, for the reflective mask structure for projector lamp of this invention, it can be installed with an optically transparent cover at the opening that is made up of steel-reinforced glass to achieve the sealing effect and to avoid the invasion of dust or moisture into the luminescence device within the accommodation slot and the subsequent shortening of the lifetime.

10 Brief description of the figures

Figure 1: The stereo drawing of the appearance of better embodiment of this invention.

Figure 2: The cross section drawing of better embodiment of this invention.

Figure 3: The cross sectional illustration of ray propagation in accommodation

- 15 slot when the better embodiment of this invention is embodied and utilized

Symbol description of the main components

- | | |
|------------------------|------------------------------------|
| (1) accommodation slot | (11) reflective bumped particulate |
| (2) opening | (3) luminescence device |

Detailed description of the preferred embodiment

The main objective of this invention and the advantages of its structure and function will be described based on the structure in the following figure accompanied with the real embodiment so that the examiner can have more in-depth and solid understanding on this invention.

- 5 First, please refer to figure 1 ~ figure 2, which is better embodiment of the reflective mask structure for projector lamp of this invention, and it mainly contains an internally concave accommodation slot (1) At the front end of accommodation slot (1), an opening (2) is formed, and within accommodation slot (1), it is installed with at least one luminescence device (3); wherein, on the
- 10 wall surface of accommodation slot (1), it is installed with a plurality of reflective bumped particulates (11) so that the light source of luminescence device (3) can, through the reflection of reflective bumped particulate(11), be projected uniformly onto the external side through opening (2); in the present embodiment, accommodation slot (1) is of spherical shape, and reflective bumped particulate
- 15 (11) is of arc shape; furthermore, reflective bumped particulate (11) is installed in corresponding arrangement way on the wall surface of accommodation slot (1), and the surface of reflective bumped particulate (11) is treated by vacuum electroplating so as to enhance the reflective effectiveness.

According to the above mentioned reflective mask structure for projector lamp, in

20 real embodiment and utilization, please refer to figure 3 as well as figure 1; first, luminescence device (3) is assembled within accommodation slot (1), next, activate luminescence device (3), at this moment, the optical ray emitted by luminescence device (3) will fall on the reflective bumped particulate (11) of the

wall surface of accommodation slot (1), meanwhile, since reflective bumped particulate (11) is of arc shape, optical ray projected on reflective bumped particulate (11) will generate reflection of different angles along the arc surface of reflective bumped particulate (11), moreover, since the wall surface of accommodation slot (1) is fully covered with reflective bumped particulates (11) that are installed in corresponding arrangement, reflective light can then get reflected back-and-forth and alternately within accommodation slot(1) so as to generate high density light rays, and the luminance and uniformity of the ray emitted by luminescence device (3) is then enhanced; from the experimental results, the reflection efficiency reached can be as high as 95%.

Therefore, using the reflective mask structure for projector lamp of this invention, light ray with high luminance and uniformity can be obtained, and high reflective efficiency illumination and remote illumination effect can then be generated, and such light ray can be necessary light source for site of wider area such as: factory, organization and school, road and tunnel, etc.; meanwhile, using light ray of high luminance and uniformity, the installation distance of the light device can be increased, and the total quantity needed of the light devices can be reduced, finally, the setup cost and power consumption of the lighting device can be reduced, and it will possess further effectiveness of energy saving and carbon reduction.

In addition, the reflective mask structure for projector lamp of this invention can be further installed with one optically transparent cover (not labeled in the figure) at the opening (2) location so as to achieve the sealing effectiveness and to

avoid the shortening of lifetime of luminescence device (3) within accommodation slot (1) due to the influence of dust or moisture; wherein, the optically transparent cover is made up of steel-reinforced glass.

From the above embodiment, it can be seen that when this invention is compared to the prior art, it has the following advantages:

1. The reflective mask structure of projector lamp of this invention is installed on the arc shape reflective bumped particulate at the wall surface of accommodation slot so that light ray emitted from luminescence device and directed towards reflective bumped particulate will follow generate reflection of different angle along the arc surface of reflective bumped particulate, meanwhile, it will be reflected back-and-forth and alternately within accommodation slot so as to generate high density light ray, meanwhile, the luminance and uniformity of light ray emitted from luminescence device will be enhanced so as to improve the drawbacks in traditional lighting device such as the insufficient luminance due to bad reflection efficiency and the centralization of light ray on the center due to bad uniformity and the subsequent light illumination sudden reduction in the peripheral area.
2. The reflective mask structure of the projector lamp of this invention can be further installed with optically transparent cover that is made up of steel-reinforced glass so as to achieve sealing function and to avoid the shortening of lifetime of luminescence device within the accommodation slot due to the influence of dust or moisture.

Claims

1. A reflective mask structure for projector lamp, which mainly comprises of internally concave accommodation slot, and the front end of the accommodation slot is formed with an opening, meanwhile, within the accommodation slot, it is installed at least with one luminescence device; wherein, the wall surface of the accommodation slot is installed with a plurality of reflective bumped particulates so that the light source of the luminescence device can, through the reflection of the reflective bumped particulate, be projected to the external side uniformly through the opening.
2. The reflective mask structure for projector lamp of claim 1 wherein the accommodation slot is of spherical shape.
3. The reflective mask structure for projector lamp of claim 1 wherein the reflective bumped particulate is of arc shape.
4. The reflective mask structure for projector lamp of claim 1 wherein the opening is further installed with an optically transparent cover.
5. The reflective mask structure for projector lamp of claim 4 wherein the optically transparent cover is made up of steel-reinforced glass.
6. The reflective mask structure for projector lamp of claim 1 wherein the reflective bumped particulate is installed in corresponding arrangement way on the wall surface of the accommodation slot.
7. The reflective mask structure for projector lamp of claim 1 wherein the surface of the reflective bumped particulate is treated with vacuum electroplating.