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(54) LAMP CONVENIENT TO INSTALL AND DIVERSE APPLICATION MODULE USING SAME

(57) A lamp that is convenient to install and a diverse application module using the same are disclosed. The lamp comprises a lamp panel, a plurality of lamp wicks, a plug, a profile, and an anti-glare assembly, wherein the plurality of lamp wicks are fixed to the lamp panel, the distance between centers of every two adjacent lamp wicks ranges from 24.5mm to 25.5mm. Five application modules respectively having a length of 562mm-566mm, 1162mm-1166mm, 1462mm-1466mm, 1762mm-1766mm, and 2362mm-2366mm are provided to make the plurality of lamp wicks adaptively installed all over the lamp panel, so that the size of the application module of the invention meets the ZHAGA standards. Besides, the plug fulfills quick connection to the light panel, the profile increases the length of the diverse application module, and the anti-glare assembly reduces the UGR of the lamp to reduce harm to eyes. The invention focuses on solving the problems of non-conformity of existing application modules to the ZHAGA standards, as well as raw materials waste and size inconsistency in the field of application modules.

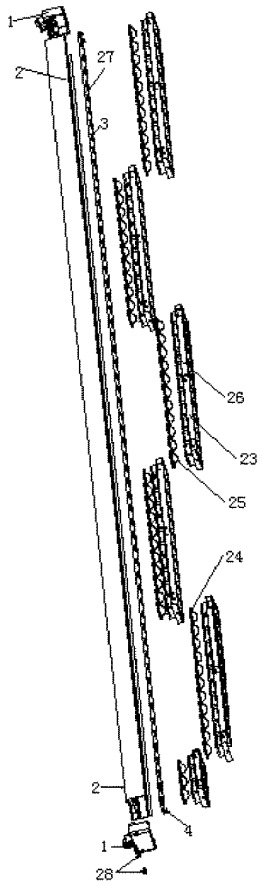

Fig.18

EP 3 851 736 A1

Description

BACKGROUND OF THE INVENTION

1. Technical Field

[0001] The invention relates to the field of application modules, in particular to a lamp that is convenient to install and a diverse application module using the same.

2. Description of Related Art

[0002] ZHAGA, as an association of top LED manufacturers in the world, aims to realize the compatibility and interchangeability of optical engines through standardization and to facilitate the wide application of LED technologies hereby. The ZHAGA standard defines a stable design platform for lamp manufacturers by standardizing interfaces of the optical engines, so that a large quantity of products incompatible with optical engine products on the market are avoided, thus reducing the development cost of light source applications.

[0003] Existing application modules in the market are not in accordance with the ZHAGA standards and have non-unified sizes, which result in a severe waste of raw materials and size inconsistency in the field of application modules. Besides, the lack of standardization causes non-uniform lighting effects of lamps, and consequentially, the consumers of the application modules are greatly troubled.

BRIEF SUMMARY OF THE INVENTION

[0004] The patent of invention aims to solve the following technical problems: the non-standardized sizes of application modules in the existing market cannot meet the European ZHAGA standards and lead to inconsistency of application modules of existing lamps, waste of raw materials and non-uniform lighting effects.

[0005] The technical solution of the invention to settle the above-mentioned technical problem is as follows:

[0006] A lamp that is convenient to install comprises a lamp panel and a plurality of lamp wicks fixed to the lamp panel, wherein the distance between centers of every two adjacent lamp wicks range from 24.5mm to 25.5mm to make the plurality of lamp wicks adaptively installed all over the lamp panel.

[0007] Particularly, each lamp wick is an integrated LED lamp or includes four square LED lamps.

[0008] Particularly, the distance between the centers of every two lamp wicks is set as 24.5mm, 25mm, or 25.5mm to meet the European ZHAGA standards.

[0009] Particularly, the number of the lamp wicks is 22, 46, 58, 70, or 94.

[0010] Particularly, the lamp panel is thin and rectangular on the whole, and the lamp wicks are uniformly distributed in the length direction of the lamp panel.

[0011] Particularly, the lamp panel is provided with a circuit to supply a current to the lamp wicks fixed to the lamp panel by means of tin soldering or bonding.

[0012] A diverse application module comprises plugs, a profile, an anti-glare assembly, and the lamp convenient to install, wherein the anti-glare assembly is installed on the front side of the lamp panel, the profile is installed on the back side of the lamp panel, and the plugs are installed at two ends of the lamp panel, the profile, and the anti-glare assembly to fix the profile, the anti-glare assembly, and the lamp panel.

[0013] Each plug includes a plug body and a conductive elastic sheet, wherein the plug body includes a connection protrusion and a first lug boss and is formed with grooves to make the two ends of the anti-glare assembly fixed to the two ends of the lamp panel.

[0014] Particularly, the grooves are located at the two ends of the anti-glare assembly and the two ends of the profile, and the anti-glare assembly is clamped in the grooves, so that a combination of the grooves, the anti-glare assembly, and the profile meets the ZHAGA standards.

[0015] Furthermore, the length of the combination of the grooves, the anti-glare assembly, and the profile meets the ZHAGA standard, and the number of the lamp wicks and the cup number of the anti-glare assembly meet the ZHAGA standard.

[0016] Particularly, the anti-glare assembly is formed by a plurality of independent anti-glare parts connected into a whole, and each anti-glare part is one cup.

[0017] Particularly, the height from the first lug boss to the bottom face of the plug ranges from 25.8mm to 26.2mm, the width of the plug ranges from 36.8mm to 37.2mm, and the conductive elastic sheet is installed in one groove and is electrically connected to the lamp panel.

[0018] Particularly, the height from the first lug boss to the bottom face of the plug is defined as the height of the diverse application module, and the width of the plug is defined as the width of the diverse application module.

[0019] Particularly, an electrical connector is arranged at each end of the lamp panel and is electrically connected to the conductive elastic sheet.

[0020] The profile is connected to the anti-glare assembly to fix the lamp panel and is provided with a cross beam to bear the weights of the lamp panel and the anti-glare assembly.

[0021] Particularly, the profile is rectangular on the whole and allows the back side of the lamp panel to be clamped therein.

[0022] Particularly, one or two reinforcing rods are arranged in the profile.

[0023] Particularly, the two ends of the profile are clamped and fixed to the plugs through screws, buckles, or hooks.

[0024] The anti-glare assembly includes an anti-glare shade and a reflector, wherein the anti-glare shade includes an installation part allowing the reflector to be detachably installed thereon, and the lamp panel and the

installation part are detachably installed to make sure that the centers of the lamp wicks correspond to the center of the reflector.

[0025] Particularly, the reflector includes a reflection cup and a lens or is a combination of the reflection cup and the lens.

[0026] Particularly, the reflector is integrally designed to be integrally installed on the anti-glare shade.

[0027] Particularly, the anti-glare assembly performs optical processing on light emitted from LED lamps in the lamp wicks to make a UGR of the light less than 19.

[0028] The diverse application module has a length ranging from 562mm to 566mm, from 1162mm to 1166mm, from 1462mm to 1466mm, from 1762mm to 1766mm, or from 2362mm to 2366mm according to the ZHAGA standards.

[0029] Furthermore, the overall length of a product is set to range from 562mm to 566mm, from 1162mm to 1166mm, from 1462mm to 1466mm, from 1762mm to 1766mm, or from 2362mm to 2366mm to respectively meet the length requirements of a 0.6m module, a 1.2m module, a 1.5m module, a 1.8m module, and a 2.4m module in the European ZHAGA standard.

[0030] The invention has the following beneficial effects: the sizes of lamps and application modules on the existing market are standardized to meet the European ZHAGA standards and to unify the sizes of profiles and lamp panels on the existing market, and material waste of the lamps and the application modules using the same is reduced.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0031]

Fig. 1 is a schematic diagram of a 0.6m module, a 1.2m module, a 1.5m module, a 1.8m module, and a 2.4m module in an embodiment;

Fig. 2 is a structural view of a lamp panel having two ends supplied with power in an embodiment;

Fig. 3 is a structural view of a lamp wick in an embodiment;

Fig. 4 is a structural view of a plug in an embodiment;

Fig. 5 is an assembly diagram of the plug, the lamp panel, and a profile in an embodiment;

Fig. 6 is a structural view of the profile in an embodiment;

Fig. 7 is a schematic diagram of an anti-glare assembly in an embodiment;

Fig. 8 is an assembly diagram of the anti-glare assembly, the profile, plugs, and grooves in an embodiment;

Fig. 9 is an assembly diagram of the anti-glare assembly, the profile, and the plugs in an embodiment;

Fig. 10 is a sectional assembly diagram of the anti-glare assembly, the profile, and the lamp panel in an embodiment;

Fig. 11 is an assembly diagram of the profile and the plug in an embodiment;

Fig. 12 is a schematic diagram of an anti-glare assembly having adjacent lamp wicks spaced by a distance of 24.5mm in the 0.6m module in an embodiment;

Fig. 13 is a schematic diagram of a diverse application module having adjacent lamp wicks spaced by a distance of 24.5mm in the 0.6mr module in an embodiment;

Fig. 14 is a schematic diagram of the anti-glare assembly having adjacent lamp wicks spaced by a distance of 25mm in the 0.6m module in an embodiment;

Fig. 15 is a schematic diagram of the diverse application module having adjacent lamp wicks adjacently spaced by a distance of 25mm in the 0.6m module in an embodiment;

Fig. 16 is a schematic diagram of the anti-glare assembly having adjacent lamp wicks spaced by a distance of 25.5mm in the 0.6m module in an embodiment;

Fig. 17 is a schematic diagram of the diverse application module having adjacent lamp wicks spaced by a distance of 25.5mm in the 0.6m module in an embodiment;

Fig. 18 is an exploded view of a lamp convenient to install and the diverse application module using the same.

DETAILED DESCRIPTION OF THE INVENTION

[0032] For a better understanding of the objectives, technical solutions, and advantages of the invention, the invention is further expounded below with reference to the accompanying drawings and embodiments. It should be understood that the specific embodiments in the following description are only used to explain the invention, and are not intended to limit the invention.

[0033] It should be noted that the directional or positional relations indicated by terms such as "center", "upper", "lower", "left", "right", "vertical", "horizontal", "internal", and "external" are based on directional or positional relations shown in the accompanying drawings, these terms are only used to facilitate and simplify the description of the invention, and do not indicate or imply that devices or elements referred to must have specific directions or must be formed and operated in specific directions, and these terms should not to be understood as limitations of the invention.

[0034] Furthermore, unless otherwise clearly specified or defined, terms such as "mounting", "connected" and "connection" in the description of the invention ought to be broadly interpreted. For instance, "connection" may refer to fixed connection, detachable connection, integral connection, mechanical connection, electrical connection, direct connection, indirect connection via a medium, internal communication of two elements, wireless con-

nection, or wired connection. Those ordinarily skilled in the art can comprehend the specific meanings of the above terms in the invention as the case may be.

[0035] Besides, the technical features involved in the following embodiments of the invention can be combined without conflicting with each other.

[0036] The solution adopted by the invention to fulfill the above objective is as follows:

[0037] Fig. 1 and Fig. 2 show a lamp convenient to install and a diverse application module using the same. The diverse application module comprises plugs 1, a profile 2, an anti-glare assembly, and a lamp panel 27, wherein the anti-glare assembly is installed on the front side of the lamp panel 27, the profile 2 is installed on the back side of the lamp panel 27, and the plugs 1 are installed at two ends of the lamp panel, the profile 2, and the anti-glare assembly to fix the profile 2, the anti-glare assembly, and the lamp panel.

[0038] Wherein, there are five diverse application modules which are respectively a 0.6m module, a 1.2m module, a 1.5m module, a 1.8m module, and a 2.4m module.

[0039] Wherein, the lamp comprises the lamp panel 27 and a plurality of lamp wicks 3 fixed to the lamp panel 27, wherein each lamp wick 3 is formed by four LED lamps 30, and the distance between centers of every two adjacent lamp wicks 3 is designed as 24.5mm, 24.8mm, 25mm, 25.2mm, 25.5mm, or the like to meet the European ZHAGA standard.

[0040] The distance between every two adjacent anti-glare shades 23 and the distance between every two adjacent reflectors are designed as 24.5mm, 24.8mm, 25mm, 25.2mm, 25.5mm, or the like.

[0041] Wherein, the number of the lamp wicks 3 and the cup number of cups of the anti-glare assembly are respectively set as 22, 46, 58, 70, and 94 according to the 0.6m module, the 1.2m module, the 1.5m module, the 1.8m module, and the 2.4m module.

[0042] Wherein, the height from a first lug boss 8 to the bottom face of one plug 1 is defined as the height of the diverse application module, and the width of the plug 1 is defined as the width of the diverse application module.

[0043] Wherein, the height of the diverse application module is 25.8mm, 25.9mm, 26mm, 26.1mm, 26.2mm, or the like.

[0044] Wherein, the width of the diverse application module is 36.8mm, 36.9mm, 37mm, 37.1mm, 37.2mm, or the like.

[0045] The diverse application module is, by length, the 0.6m module, the 1.2m module, the 1.5m module, the 1.8m module, or the 2.4m module as specified by the ZHAGA standard.

[0046] Wherein, the length of the 0.6m module is 562mm, 563mm, 563.5mm, 564mm, 565mm, 565.5mm, 566mm, or the like.

[0047] Wherein, the length of the 1.2m module is 1162mm, 1163mm, 1163.5mm, 1164mm, 1165mm, 1165.5mm, 1166mm, or the like.

[0048] Wherein, the length of the 1.5m module is 1462mm, 1463mm, 1463.5mm, 1464mm, 1465mm, 1465.5mm, 1466mm, or the like.

[0049] Wherein, the length of the 1.8m module is 1762mm, 1763mm, 1763.5mm, 1764mm, 1765mm, 1765.5mm, 1766mm, or the like.

[0050] Wherein, the length of the 2.4m module is 2362mm, 2363mm, 2363.5mm, 2364mm, 2365mm, 2365.5mm, 2366mm, or the like.

[0051] Wherein, in an embodiment of the invention, the diverse application module has two ends supplied with power.

[0052] Wherein, in an embodiment of the invention, each reflector is formed by a reflection cup 24 and a lens 25.

[0053] Wherein, the glare rating of light processed by the anti-glare assembly is 19, 18, 17, 16, 13, 10, 9, 4, or the like.

[0054] Wherein, in an embodiment of the invention, electrical connectors are SMD terminals 4.

[0055] Wherein, in an embodiment of the invention, two ends of the profile 2 are fixedly connected to the plugs through bolts 28.

Embodiment 1

[0056] A lamp convenient to install and a diverse application module using the same are provided in this embodiment. The diverse application module comprises plugs 1, a profile 2, an anti-glare shade 23, reflection cups 24, lenses 25, and a lamp panel 27, wherein the anti-glare shade 23, the reflection cups 24, and the lenses 25 are installed on the front side of the lamp panel 27 and have two ends clamped in grooves 12 in the plugs 1; the profile 2 is installed on the back side of the lamp panel 27 and has two ends clamped with the plugs 1; and two ends of the lamp panel 27 are inserted into the plugs 1 installed at the two ends of the lamp panel 27, the profile 2, the anti-glare shade 23, the reflection cups 24, and the lenses 25 to fix the profile 2, the anti-glare shade 23, the reflection cups 24, the lenses 25, and the lamp panel 27.

[0057] As shown in Fig. 2, Fig. 3, and Fig. 18, a plurality of lamp wicks 3 are fixed to the lamp panel 27 by means of tin soldering and are linearly arrayed all over the lamp panel 27 which supplies power to the lamp wicks 3 through a printed circuit located on the lamp panel 27, each lamp wick 3 includes four square LED lamps 30, and the two ends of the lamp panel 27 are narrowed to form connection ends respectively provided with a SMD terminal 4.

[0058] As shown in Fig. 4, Fig. 5, Fig. 8, and Fig. 18, the plugs 1 are blocky on the whole. Each plug 1 includes a plug body 6 and conductive elastic sheets 5, wherein the conductive elastic sheets 5 penetrate through the plug body 6 to be connected to an electrical protrusion 7, the grooves 12 are formed in the side faces of the plug body 6, have the two ends of the anti-glare shade 23, the

reflection cups 24, the lenses 25, and the lamp panel 27 fixed therein, and are located in the two ends of the anti-glare shade 23 and the two ends of the profile 2, the anti-glare shade 23 is clamped in the grooves 12, and the profile 2 abuts against the plug 1 to make the grooves 12 combined with the anti-glare shade 23 and the profile 2 to form an overall length; the number of the lamp wicks and the cup number of the anti-glare shade 23, the reflection cups 24, and the lenses 25 meet the ZHAGA standard; each conductive elastic sheet 5 includes an upper insertion part 9 and a lower elastic sheet 13, wherein the insertion part 9 is typically electrically connected to a power supply and is provided with a limit buckle 11 for fixing the conductive elastic sheet 5 in the plug body 6; and the conductive elastic sheets 5 are electrically connected and clamped with SMD terminals 4 on the lamp panel 27.

[0059] As shown in Fig. 5, Fig. 9, and Fig. 10, the profile 2 includes side walls 14, a first cross beam 16, and a second cross beam 15, wherein first projections 15 and second projections 17 are horizontally symmetrically distributed on the side walls 14, and the first projections 15 are clamped with the anti-glare shade 23 to position and fix the anti-glare shade 23; the first cross beam 16 includes a support platform 18 having a width consistent with the width of the lamp panel 27, and a first protrusion point 19 and a second protrusion point 20 are arranged at two ends of the support platform 18 to jointly support the lamp panel 27; and two reinforcing rods 21 are arranged between the second cross beam 15 and the first cross beam 16 to reinforce the profile 2. Each plug 1 is formed with two bolt holes 29, the profile is formed with two ear holes 22, and bolts 28 penetrate through the bolt holes 29 and the ear holes 22 to fix the profile 2 and the plugs 1 together.

[0060] As shown in Fig. 7, Fig. 9, Fig. 10, and Fig. 11, the anti-glare assembly includes the anti-glare shade 23, the reflection cups 24, and the lenses 25, wherein the lenses 25 are installed on the reflection cups 24 which are installed on an installation part of the anti-glare shade 23, and the reflection cups 24 and the lenses 25 are respectively integrally designed. The reflection cups 24 are connected to form a single-row integral strip, and the lenses 25 are connected to form a single-row integral strip; and the reflection cups 24 and the lenses 25 are both clamped on the strip-shaped anti-glare shade 23. The anti-glare shade 23, the reflection cups 24, and the lenses 25 refract and reflect light emitted from the LED lamps 30, so that the UGR of the light is 18.

[0061] The anti-glare shade 23 has the two ends clamped in the grooves 12 in the plugs 1, and is clamped by means of the first projections 15 and the second projections 7 on the profile 2.

[0062] As shown in Fig. 12 and Fig. 13, the distance between centers of every two adjacent lamp wicks 3 is 24.5mm, the application module has a length of 564mm, a width of 37mm, and a height of 26mm, and the number of the lamp wicks 3 is 22.

Embodiment 2

[0063] On this basis of Embodiment 1, only the size of the diverse application module is changed as follows in this embodiment: as shown in Fig. 14 and Fig. 15, the distance between the centers of every two adjacent lamp wicks 3 is 25mm, the application module has a length of 564mm, a width of 37mm, and a height of 26mm, and the number of the lamp wicks 3 is 22.

Embodiment 3

[0064] On this basis of Embodiment 2, only the size of the diverse application module is changed as follows in this embodiment: as shown in Fig. 16 and Fig. 17, the distance between the centers of every two adjacent lamp wicks 3 is 25.5mm, the application module has a length of 564mm, a width of 37mm, and a height of 26mm, and the number of the lamp wicks 3 is 22.

[0065] In Embodiment 1, Embodiment 2, and Embodiment 3, the influence of changes to the distance between the lamp wicks 3 on the technical effect of a 0.6m module is the same as that of the changes to the distance between the lamp wicks 3 on the technical effect of a 1.2m module, a 1.5m module, a 1.8m module, and a 2.4m module. Thus, specific embodiments of the 1.2m module, the 1.5m module, the 1.8m module, and the 2.4m module are no longer illustrated.

[0066] The above embodiments are specifically described in details to show several implementations of invention, and should not be understood as limitations on the scope of the patent of invention. It should be noted that those ordinarily skilled in the art are permitted to make several transformations and improvements without deviating from the conception of the invention, and all these transformations and improvements should also fall within the protection scope of the invention. Thus, the protection scope of the patent of invention should be subject to the appended claims.

Claims

1. A lamp that is convenient to install, comprising a lamp panel and a plurality of lamp wicks fixed to the lamp panel, wherein a distance between centers of every two adjacent said lamp wicks range from 24.5mm to 25.5mm to make the plurality of lamp wicks adaptively installed on the lamp panel.

2. The lamp that is convenient to install according to Claim 1, wherein the distance between the centers of every two adjacent said lamp wicks is 24.5mm, 25mm, or 25.5mm.

3. A diverse application module, comprising plugs, a profile, an anti-glare assembly, and the lamp that is convenient to install according to Claim 1, wherein

the anti-glare assembly is installed on a front side of the lamp panel, the profile is installed on a back side of the lamp panel, and the plugs are installed at two ends of the lamp panel, the profile, and the anti-glare assembly to fix the profile, the anti-glare assembly, and the lamp panel.

4. The diverse application module according to Claim 3, wherein grooves are formed in plug bodies, and the two ends of the anti-glare assembly are fixedly connected to the two ends of the lamp panel through the grooves to make sure that a length of the diverse application module, the number of the lamp wicks, and a cup number of the anti-glare assembly meet a ZHAGA standard.

5. The diverse application module according to Claim 4, wherein each said plug includes one said plug body and a conductive elastic sheet, wherein the plug body includes a connection protrusion and a first lug boss, a height from the first lug boss to a bottom face of the plug ranges from 25.8mm to 26.2mm, a width of the plug ranges from 36.8mm to 37.2mm, and the conductive elastic sheet is installed in one said groove and is electrically connected to the lamp panel.

6. The diverse application module according to Claim 4, wherein an electrical connector is arranged on the lamp panel and is electrically connected to a conductive elastic sheet.

7. The diverse application module according to Claim 3, wherein the profile is connected to the anti-glare assembly to fix the lamp panel and is provided with a cross beam to bear weights of the lamp panel and the anti-glare assembly.

8. The diverse application module according to Claim 3, wherein the anti-glare assembly includes an anti-glare shade and a reflector detachably installed on the anti-glare shade, wherein the lamp panel and the anti-glare shade are detachably installed to make sure that the centers of the lamp wicks correspond to a center of the reflector; and the anti-glare assembly performs optical processing on the lamp wicks to make a UGR less than 19.

9. The diverse application module according to Claim 8, wherein the reflector is integrally designed to be integrally installed on the anti-glare shade.

10. The diverse application module according to Claim 3, wherein the diverse application module has a length ranging from 562mm to 566mm, from 1162mm to 1166mm, from 1462mm to 1466mm, from 1762mm to 1766mm, or from 2362mm to 2366mm.

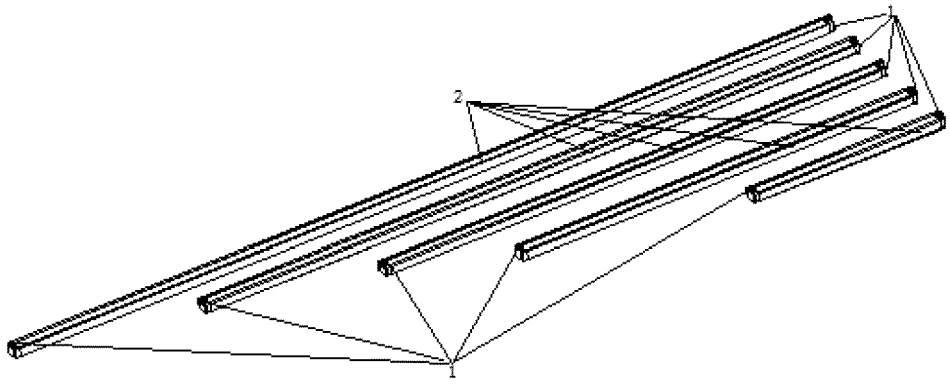

Fig.1

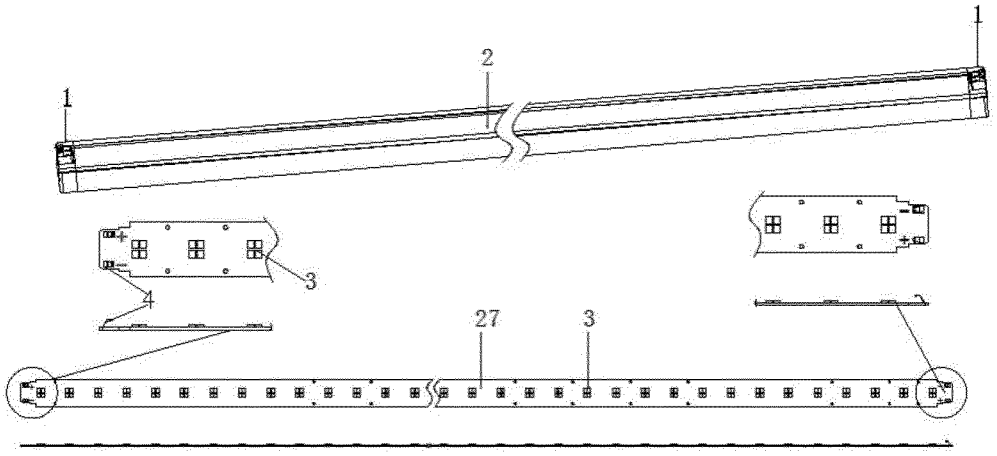

Fig.2

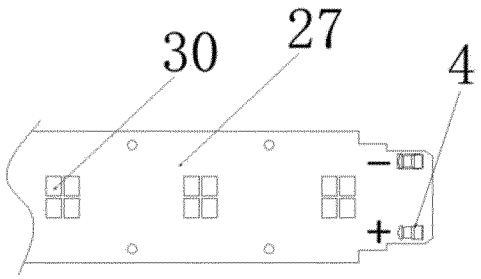

Fig.3

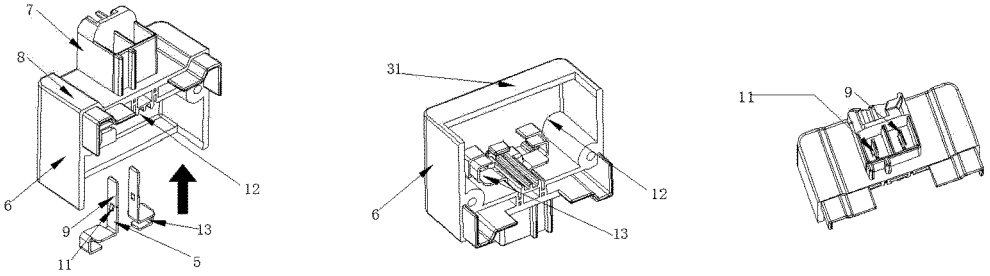

Fig.4

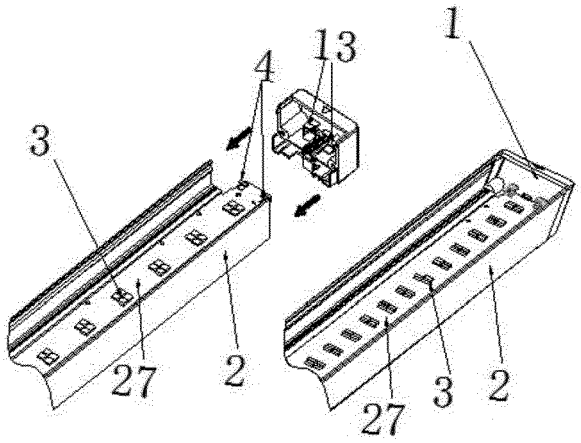

Fig.5

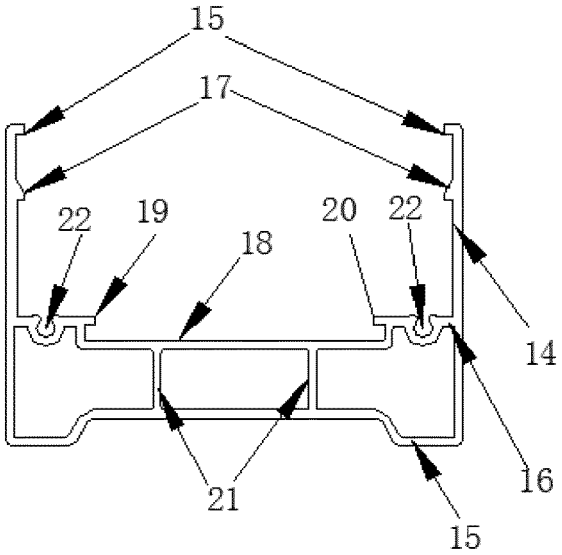

Fig.6

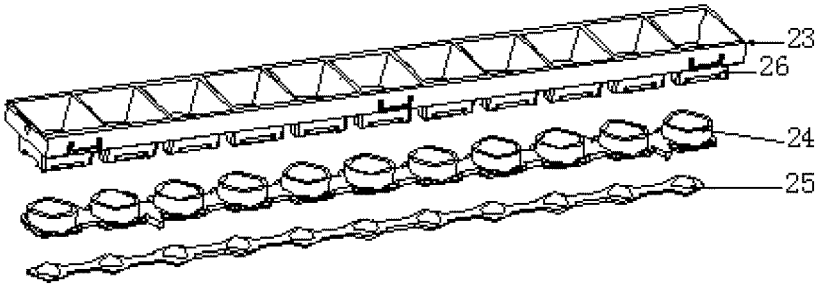

Fig.7

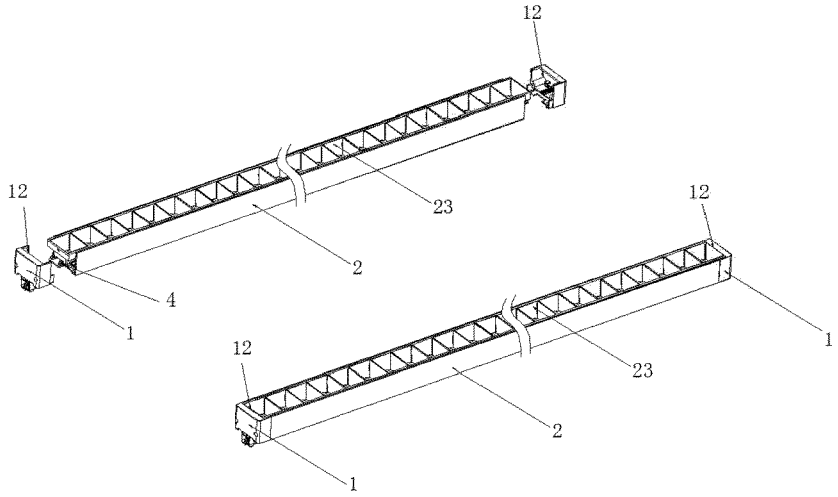

Fig.8

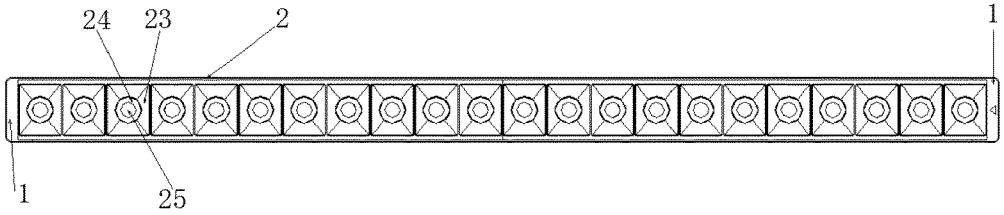

Fig.9

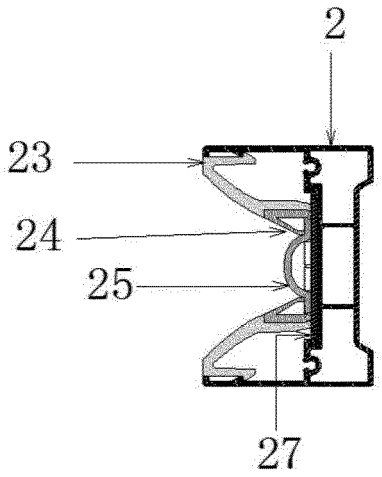

Fig.10

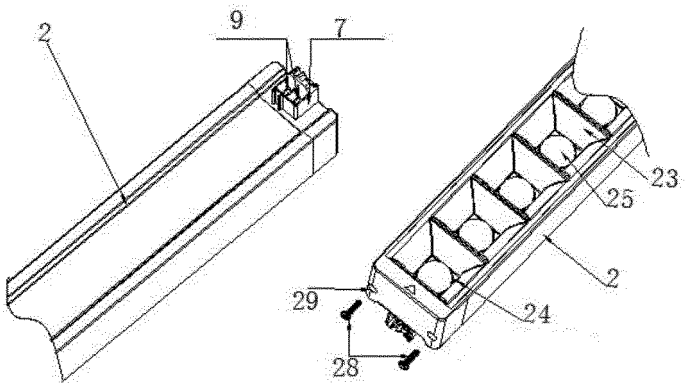

Fig.11

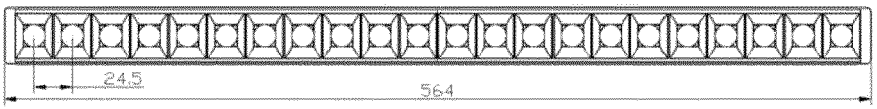

Fig.12

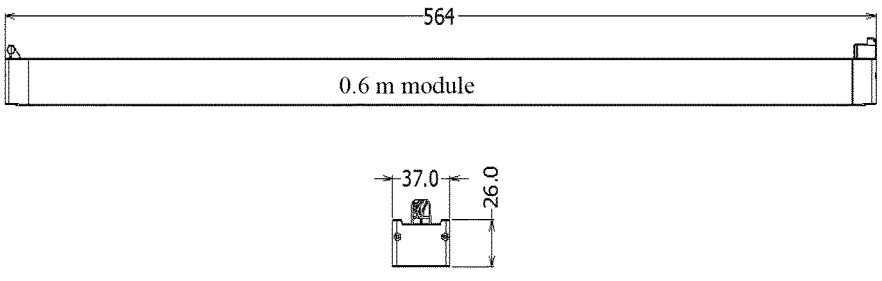

Fig.13

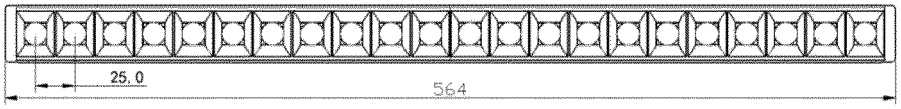

Fig.14

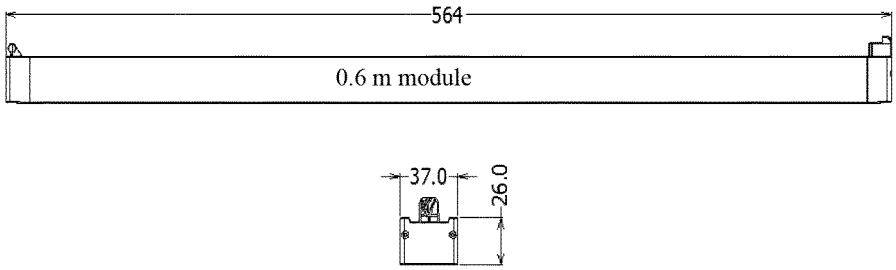

Fig.15

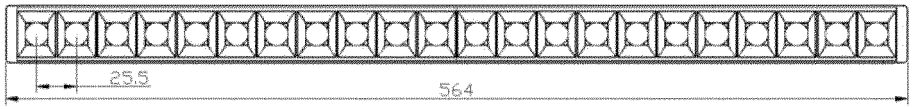

Fig.16

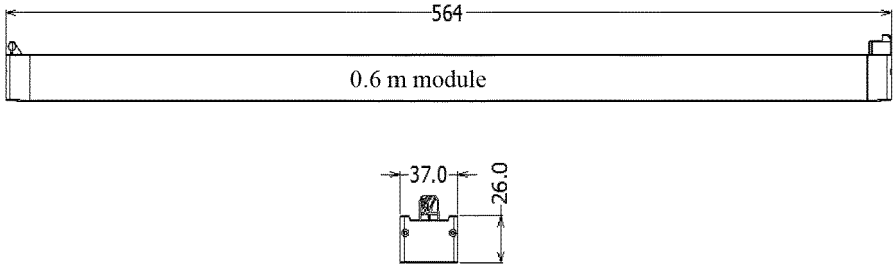

Fig.17

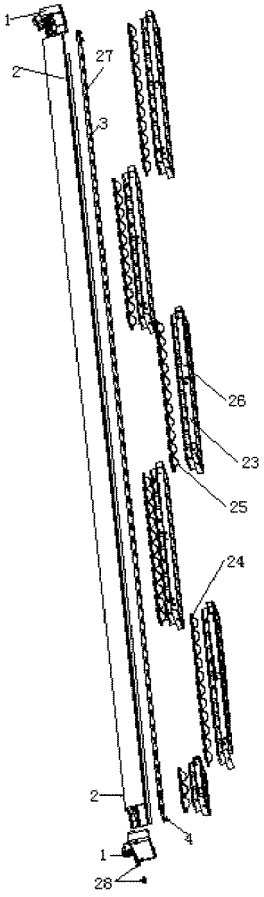

Fig.18

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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 7993

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F21S
F21V
F21Y

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 June 2021	Dinkla, Remko

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