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(54) **FRAMELESS PANEL LAMP**

(57) The present application provides a frameless panel lamp, which includes a chassis (1), a light source assembly (2), a driving assembly (3), and a light-transmitting plate (4); the light source assembly (2) is disposed inside the chassis (1), the chassis (1) includes a base plate (11) and side plates (12) surrounding edges of the base plate (11), and each of the side plates (12) is provided with a mounting portion (13) bending outward away from the edges of the base plate (11); the mounting portion (13) includes a horizontal portion (131) and a bending portion (132) bending toward a light-emitting direction, and the horizontal portion (131) is provided with a first convex ring (1311) toward the light-emitting direction; an adhesive is disposed between the first convex ring (1311) and the bending portion (132), and the light-transmitting plate (4) is bonded to the horizontal portion (131) through the adhesive and is attached to a top portion of the first convex ring (1311). The light-transmitting plate (4) is fixed on the mounting portion (13) through bonding, and the aluminum frame can be omitted at this time, which saves cost and does not affect the light-emitting effect; at the same time, the first convex ring (1311) provided on the horizontal portion (131) can be used to prevent the adhesive from overflowing to the light-emitting surface of the light-transmitting plate (4), ensuring the light-emitting effect of the light transmitting plate, and due that the aluminum frame is omitted, the light-emitting surface of the chassis (1) can coincide with the light-emitting surface of the light-transmitting plate (4), thereby effectively ensuring the light-emitting effect and light-emitting angle of the panel lamp.

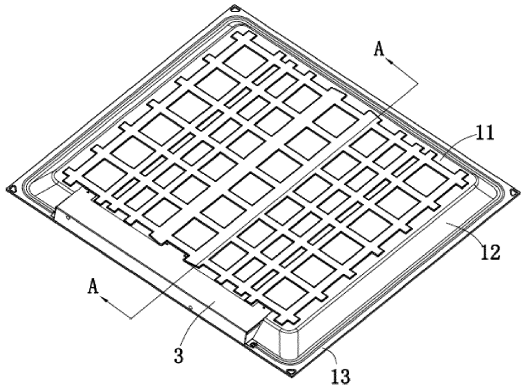


FIG. 2

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## Description

### Technical Field

**[0001]** The present application relates to the technical field of lamp, and more particularly to a frameless panel lamp.

### Background

**[0002]** The existing panel lamp generally includes a chassis, a light source assembly, a driving assembly, a light-transmitting plate, and an aluminum frame. The installation method of the aluminum frame, the light-transmitting plate and the chassis is shown in FIG. 1. The chassis a and the aluminum frame b are fixedly connected through screws c, and the chassis a abuts the light-transmitting plate d in the aluminum frame b. The above installation method increases the installation cost on one hand, and on the other hand, the aluminum frame b will form a circle of light-shielding ring at the light-emitting opening of the chassis a. On the one hand, the light-shielding ring makes the actual light-emitting area on the chassis a smaller than that of the light-emitting opening on the chassis a, and on the other hand limits the light-emitting angle of the chassis a, resulting in a relatively poor light-emitting effect and light-emitting angle of the panel lamp.

### Summary

**[0003]** An object of the embodiment of the present application is to provide a frameless panel lamp, which aims to solve the technical problem of high cost, poor light-emitting effect and poor light-emitting angle in the installation method of the light-transmitting plate using the aluminum frame in the prior art.

**[0004]** In order to achieve above-mentioned object, the technical solution adopted in the present application is to provide a frameless panel lamp, which includes: a chassis, a light source assembly, a driving assembly, and a light-transmitting plate; the light source assembly is disposed inside the chassis, the chassis includes a base plate and side plates surrounding edges of the base plate, and each of the side plates is provided with a mounting portion bending outward away from the edges of the base plate; the mounting portion includes a horizontal portion and a bending portion bending toward a light-emitting direction, and the horizontal portion is provided with a first convex ring toward the light-emitting direction; an adhesive is disposed between the first convex ring and the bending portion, and the light-transmitting plate is bonded to the horizontal portion through the adhesive and is attached to a top portion of the first convex ring.

**[0005]** In an embodiment, the horizontal portion is provided with a second convex ring toward the light-emitting direction, and the second convex ring being located between the first convex ring and the bending portion; a protruding height of the second convex ring relative to the horizontal portion is less than a protruding height of the first convex ring relative to the horizontal portion; a first groove configured for receiving the adhesive is formed between the first convex ring and the second convex ring, and a second groove configured for receiving the adhesive overflowing from the first groove is formed between the second convex ring and the bending portion.

**[0006]** In an embodiment, the bending portion comprises a first plate and a second plate, an end of the first plate is connected to the horizontal portion, and the other end of the first plate is connected to an end of the second plate; an angle is formed between the first plate and the second plate such that a gap is formed between the second plate and the horizontal portion, and an edge of the light-transmitting plate is inserted into the gap and being overlapped on the second plate.

**[0007]** In an embodiment, the first plate and the second plate are perpendicular to each other, the second plate is parallel to the horizontal portion, and the light-transmitting plate overlaps on an inner surface of the second plate; or the first plate and the second plate are parallel, and the light-transmitting board overlaps on an end surface of the second plate.

**[0008]** In an embodiment, the base plate is a rectangular plate, the side plates are provided with four, and two opposite side plates are respectively provided with the bending portion.

**[0009]** In an embodiment, he base plate is a rectangular plate, the side plates are provided with four, and three of the side plates are respectively provided with the bending portion.

**[0010]** In an embodiment, a top portion of the first convex ring is a flat surface.

**[0011]** In an embodiment, the light-transmitting plate is a diffuser plate or a prismatic plate.

**[0012]** In an embodiment, the adhesive is transparent glue or milky white glue, and the adhesive is in a paste.

**[0013]** In an embodiment, the driving assembly is disposed at an outer surface of the chassis, and the driving assembly comprises a drive board, an insulating sheet and a protective cover, the insulating sheet covers the drive board, and the protective cover is detachably connected to the chassis and covers the drive board.

**[0014]** The beneficial effect of the frameless panel lamp provided by the present application is that by providing a mounting portion bent outward on the side plates, the light-transmitting plate is fixed on the mounting portion through bonding, and the aluminum frame can be omitted at this time, which saves cost and does not affect the light-emitting effect; at the same time, the first convex ring provided on the horizontal portion can be used to prevent the adhesive from overflowing to the light-emitting surface of the light-transmitting plate, ensuring the light-emitting effect of the light transmitting plate, and due that the aluminum frame is omitted, the light-emitting surface of the chassis can coincide with the light-emitting surface of the light-transmitting plate, thereby effectively

ensuring the light-emitting effect and light-emitting angle of the panel lamp.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0015]** In order to explain the embodiments of the present application more clearly, a brief introduction regarding the accompanying drawings that need to be used for describing the embodiments of the present application or the prior art is given below; it is obvious that the accompanying drawings described as follows are only some embodiments of the present application, for those skilled in the art, other drawings can also be obtained according to the current drawings on the premise of paying no creative labor.

FIG. 1 is a schematic view of an installation structure of an aluminum frame, a light-transmitting plate, and a chassis of a panel lamp in the prior art;

FIG. 2 is a schematic view of an overall structure of a frameless panel lamp provided by an embodiment of the present application;

FIG. 3 is a structural schematic sectional view at A-A in FIG. 2;

FIG. 4 is an enlarged view at B in FIG. 3;

FIG. 5 is a schematic view of an installation structure of a driving assembly and a chassis in a frameless panel lamp provided by an embodiment of the present application;

FIG. 6 is an explosion view of a driving assembly in a frameless panel lamp provided by an embodiment of the present application.

**[0016]** In the drawings, the reference numerals are listed and referred to as follows::

1-chassis; 11-base plate; 13-mounting portion; 131-horizontal portion; 1311-first convex ring; 1312-second convex ring; 1313-first groove; 1314-second groove; 1315-positioning post; 1316- limiting sheet; 132-bending portion; 1321-first plate; 1322-second plate; 2-light source assembly; 3-driving assembly; 31-drive board; 32-insulating sheet; 331-positioning hole; 332-insertion sheet; 4-light-transmitting plate.

## DETAILED DESCRIPTION

**[0017]** In order to make the purpose, the technical solution and the advantages of the present application be clearer and more understandable, the present application will be further described in detail below with reference to accompanying figures and embodiments. It should be understood that the specific embodiments described herein are merely intended to illustrate but not to limit the present application.

**[0018]** It is noted that when a component is referred to as being "fixed to" or "disposed on" another component, it can be directly or indirectly on another component. When a component is referred to as being "connected to" another component, it can be directly or indirectly connected to another component.

**[0019]** In the description of the present application, it needs to be understood that, directions or location relationships indicated by terms such as "length", "width", "up", "down", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", and so on are the directions or location relationships shown in the accompanying figures, which are only intended to describe the present application conveniently and simplify the description, but not to indicate or imply that an indicated device or component must have specific locations or be constructed and manipulated according to specific locations; therefore, these terms shouldn't be considered as any limitation to the present application.

**[0020]** In addition, terms "the first" and "the second" are only used in describe purposes, and should not be considered as indicating or implying any relative importance, or impliedly indicating the number of indicated technical features. As such, technical feature(s) restricted by "the first" or "the second" can explicitly or impliedly comprise one or more such technical feature(s). In the description of the present application, "a plurality of' means two or more, unless there is additional explicit and specific limitation.

**[0021]** As shown in FIGS. 2 to 4, a frameless panel lamp provided by an embodiment of the present application will now be described.

**[0022]** The frameless panel lamp includes the chassis 1, the light source assembly 2, the driving assembly 3, and the light-transmitting plate 4. The light source assembly 2 is disposed inside the chassis 1, the chassis 1 includes the base plate 11 and the side plates 12 surrounding the edges of base plate 11, and a cavity is enclosed between the side plates 12 and the base plate 11, the light source assembly 2 specifically disposes on the inner surface of the base plate 11, the side plates 12 are formed a trumpet shape, and the end of the side plates 12 away from the base plate 11 forms a light-emitting opening. The light-emitting opening is the larger end of the opening of the side plates 12, which is used to ensure the light-emitting angle of the panel lamp is large enough, and the light source assembly 2 emits light toward the light-emitting opening. Specifically, the edges of the side plates 12 away from the base plate 11 is bent outward to form the mounting portion 13, and the mounting portion 13 is bent in a direction away from the light-emitting opening to ensure the effective light-emitting area of the light-emitting opening.

**[0023]** As shown in FIGS. 2 to 4, in the embodiments, the mounting portion 13 includes the horizontal portion 131 and the bending portion 132 bent toward the light-emitting direction, the horizontal portion 131 and the base plate 11 are parallel to each other, and the horizontal portion 131 is provided with the first convex ring 1311 toward the light-emitting direction, and an adhesive (not shown in the FIGs) is provided between the first convex ring 1311 and the bending portion 132, the light-trans-

mitting plate 4 is bonded to the horizontal portion 131 through the adhesive and is connected to the top portion of the first convex ring 1311, and the light-transmitting plate 4 is matched with the top portion of the first convex ring 1311 o prevent the adhesive from overflowing to the light-transmitting plate 4 at the light-emitting opening, thereby ensuring the light-emitting effect the light-transmitting plate 4. The light-transmitting plate 4 is fixedly connected to the chassis 1 by bonding, so that the aluminum frame and screws can be omitted, which simplifies installation, saves costs, and ensures the light-emitting effect.

**[0024]** The frameless panel lamp provided by the embodiments of the present application fixes the light-transmitting plate 4 on the mounting portion 13 by bonding, and the aluminum frame can be omitted, which saves costs; at the same time, the first convex ring 1311 disposed on the horizontal portion 131 of the mounting portion 13 can be used to prevent the adhesive from overflowing to the light-transmitting plate 4 to ensure the light-emitting effect the light-transmitting plate 4, and due that the aluminum frame is omitted, the light-emitting surface of the chassis 1 can be coincided with the light-emitting surface of the light-transmitting plate 4, thereby effectively ensuring the light-emitting effect and the light-emitting angle of the lamp panel lamp.

**[0025]** As shown in FIGS. 2 to 4, a second convex ring 1312 is provided on the horizontal portion 131 toward the light-emitting direction, the second convex ring 1312 is located between the first convex ring 1311 and the bending portion 132, and the protruding height of the second convex ring 1312 relative to the horizontal portion 131 is less than the protruding height of the first convex ring 1311 relative to the horizontal portion 131. The first groove 1313 configured for receiving the adhesive is formed between the first convex ring 1311 and the second convex ring 1312, and the second groove 1314 configured for receiving the adhesive overflowing from the first groove 1313 is formed between the second convex ring 1312 and the bending portion 132. The first groove 1313 is used to receive the adhesive and guide the adhesive, so that the adhesive fills the first groove 1313 and is bonded to the light-transmitting plate 4, the protruding height of the second convex ring 1312 relative to the horizontal portion 131 is less than the protruding height of the first convex ring 1311 relative to the horizontal portion 131, such that when light-transmitting plate 4 and the top of the first convex ring 1311 are attached, the first groove 1313 and the second groove 1314 are communicated to each other, and the excess adhesive in the first groove 1313 will overflow into the second groove 1314, which can effectively prevent the adhesive from overflowing to the light-emitting surface of the light-transmitting plate 4. In other embodiments, a third convex ring, a fourth convex ring, or a fifth convex ring may be provided on the horizontal portion 131, as long as the height of the first convex ring 1311 on the horizontal portion 131 is the highest.

**[0026]** In the embodiments, the adhesive is preferably in a paste, such as "toothpaste state", so that when filling the adhesive to the first groove 1313, the height of the adhesive is slightly higher than the height of the first convex ring 1311, so that the light-transmitting plate 4 contact with adhesive first during mounting, and then attached to the top portion of the first convex ring 1311, so that adhesive and light-transmitting plate 4 can be effectively bonded. Alternatively, in other embodiments, the light-transmitting plate 4 is first attached to the top portion of the first convex ring 1311, and then fills the adhesive to the first groove 1313, since the first groove 1313 is an annular groove, when filling the adhesive to the first groove 1313, the adhesive gradually fills the first groove 1313 and adheres to the light-transmitting plate 4. At this time, when the adhesive is continued to be filled into the first groove 1313, due to the blocking effect of the first convex ring 1311, the excess adhesive will overflow to the second groove 1314 and being collected inside the second groove 1314 to prevent adhesive overflowing and ensure the light-emitting effect and appearance of the panel lamp.

**[0027]** As shown in FIGS. 2 to 4, in the embodiments, the bending portion 132 includes the first plate 1321 and the second plate 1322, an end of the first plate 1321 is connected to the horizontal portion 131, and the other end of the first plate 1321 is connected to an end of the second plate 1322, an angle is formed between the first plate 1321 and the second plate 1322, and a gap is formed between the second plate 1322 and the horizontal portion 131, and the edge of the light-transmitting plate 4 is inserted into the gap and overlaps the second plate 1322. The arrangement of the second plate 1322 is used to prevent the light-transmitting plate 4 from falling due to adhesive aging, and to ensure the safety of the panel lamp. In other embodiments, the bending portion 132 is a bent plate perpendicular to the horizontal portion 131, and the side surface of the light-transmitting plate 4 is attached to the inner surface of the bending portion 132.

**[0028]** In an implementation of the embodiments, the bending portion 132 is an L-shaped plate, the first plate 1321 and the second plate 1322 are perpendicular to each other, the second plate 1322 is parallel to the horizontal portion 131, and the light-transmitting plate 4 overlaps on the inner surface of the second plate 1322. In another implementation of the embodiments, the bending portion 132 is a U-shaped plate, the first plate 1321 and the second plate 1322 are parallel to each other, the first plate 1321 and the second plate 1322 are attached or there is a gap between the two, the light-transmitting plate 4 overlaps the end surface of the second plate 1322.

**[0029]** In the embodiments, the base plate 11 is a rectangular plate, and the side plates 12 are provided with four. Among them, two opposite side plates 12 are respectively provided with the bending portion 132. During mounting, the light-transmitting plate 4 is inserted into the gap between the second plate 1322 and the horizontal portion 131, and the light-transmitting plate 4 is over-

lapped on the second plate 1322, and then adhesive is filled into the first groove 1313. In other embodiments, three of the four side plates 12 are respectively provided with the bending portion 132, which further ensures the firmness of the light-transmitting plate 4 installed on the chassis 1.

**[0030]** As shown in FIGS. 2 to 4, in the embodiments, the top portion of the first convex ring 1311 is a flat surface, and the flat surface is used to increase the contact area between the first convex ring 1311 and the light-transmitting plate 4, thereby increasing the anti-overflow capacity between the first convex ring 1311 and the light transmitting plate 4 to ensure that the adhesive will not overflow to the light-emitting surface of the light-transmitting plate 4.

**[0031]** In the embodiments, the light-transmitting plate 4 is a prism plate, that is, the light-transmitting plate 4 has a pattern on the light-emitting surface, and the pattern is used to improve the light-emitting effect of the light-transmitting plate 4. The light-transmitting plate 4 is a diffuser, which can increase the light-transmitting angle. The light-transmitting plate 4 plastic plate and the light-transmitting plate 4 is milky white.

**[0032]** In the embodiments, the adhesive is transparent glue or milky white glue, which is similar to the color of light-transmitting plate 4, so as to ensure the aesthetics of the appearance of the panel lamp.

**[0033]** As shown in FIG. 3, in this embodiment, the light source assembly 2 includes a plurality of LED light bars arranged at intervals, and the plurality of LED light bars are electrically connected to the driving assembly 3 through an adapter plate or a wire. Specifically, a plurality of mounting grooves are arranged at intervals on the base plate 11, and one LED light bar is bonded or fixed by screws in each mounting groove, and the mounting grooves are arranged at equal intervals, which is used to ensure the uniformity of light-emitting of the p panel lamp.. In other embodiments, the light source assembly 2 includes a light source circuit board and a plurality of LED lamp beads arranged on the light source circuit board.

**[0034]** As shown in FIG. 2, FIG. 5 and FIG. 6, in the embodiments, the driving assembly 3 is provided on the outer surface of the chassis 1, the base plate 11 is provided with through holes (not shown in the figure), the through holes are used for guiding conductive wires, thereby realizing electrical connection between driving assembly 3 and light source assembly 2. Specifically, the driving assembly 3 includes the drive board 31, the insulating sheet 32, and the protective cover 33. The insulating sheet 32 covers the drive board 31. The protective cover 33 is detachably connected to the chassis 1 and covers the drive board 31. Specifically, the driving assembly 3 is arranged on the outer surface of the horizontal portion 131. The purpose of this arrangement is to disperse the two heat sources of the driving assembly 3 and the light source assembly 2, thereby improving the heat dissipation effect of the panel lamp and effectively avoiding the influence of heat concentration on the light source assembly 2. The chassis 1 is made of aluminum or aluminum alloy by die-casting, the insulating sheet 32 is a plastic sheet, and the insulating sheet 32 is used to insulate and isolate the drive board 31 and the chassis 1 to ensure that the drive board 31 can work normally. The drive board 31 is a conventional driving structure of the panel lamp, which is basically a module component in the industry, and it and the related electronic components and circuits contained therein will not be described in detail here.

**[0035]** In the embodiments, the base plate 11 is provided with a number of positioning posts 1315, the protective cover 33 is provided with positioning holes 331 corresponding to the positioning posts 1315, and both sides of the protective cover 33 are provided with insertion sheets 332, the horizontal portions 131 is provided with limiting sheets 1316, and a slot is provided between the limiting sheet 1316 and the horizontal portion 131, the insertion sheets 332 and the limiting sheets 1316 are mainly used to restrict the protective cover 33 from moving in the vertical direction (the surface perpendicular to the base plate 11), the positioning posts 1315 and the positioning holes 331 are mainly used to restrict the protective cover 33 from moving in the horizontal direction (the surface parallel to the base plate 11). When the insertion sheets 332 are inserted into the slots and the positioning posts 1315 are inserted into the positioning holes 331, the protective cover 33 is fixed on the outer surface of the horizontal portion 131, and the driving assembly 3 is arranged on the horizontal portion 13, which can effectively lower the e overall thickness of the panel lamp. In other embodiments, the protective cover 33 may be fixed on the outer surface of the horizontal portion 131 by means of locking screws. In the embodiments, the outer surface refers to the outside of the panel lamp.

## Claims

1. A frameless panel lamp, comprising: a chassis (1), a light source assembly (2), a driving assembly (3), and a light-transmitting plate (4); **characterized in that**:
   the light source assembly (2) is disposed inside the chassis (1), the chassis (1) comprises a base plate (11) and side plates (12) surrounding edges of the base plate (11), and each of the side plates (12) is provided with a mounting portion (13) bending outward away from the edges of the base plate (11); the mounting portion (13) comprises a horizontal portion (131) and a bending portion (132) bending toward a light-emitting direction, and the horizontal portion (131) is provided with a first convex ring (1311) toward the light-emitting direction; an adhesive is disposed between the first convex ring (1311) and the bending portion (132), and the light-transmitting plate (4) is bonded to the horizontal portion

(131) through the adhesive and is attached to a top portion of the first convex ring (1311).

**2.** The frameless panel lamp of claim 1, wherein the horizontal portion (131) is provided with a second convex ring (1312) toward the light-emitting direction, and the second convex ring (1312) being located between the first convex ring (1311) and the bending portion (132); a protruding height of the second convex ring (1312) relative to the horizontal portion (131) is less than a protruding height of the first convex ring (1311) relative to the horizontal portion (131); a first groove (1313) configured for receiving the adhesive is formed between the first convex ring (1311) and the second convex ring (1312), and a second groove (1314) configured for receiving the adhesive overflowing from the first groove (1313) is formed between the second convex ring (1312) and the bending portion (132).

**3.** The frameless panel lamp of claim 1, wherein the bending portion (132) comprises a first plate (1321) and a second plate (1322), an end of the first plate (1321) is connected to the horizontal portion (131), and the other end of the first plate (1321) is connected to an end of the second plate (1322); an angle is formed between the first plate (1321) and the second plate (1322) such that a gap is formed between the second plate (1322) and the horizontal portion (131), and an edge of the light-transmitting plate (4) is inserted into the gap and being overlapped on the second plate (1322).

**4.** The frameless panel lamp of claim 3, wherein the first plate (1321) and the second plate (1322) are perpendicular to each other, the second plate (1322) is parallel to the horizontal portion (131), and the light-transmitting plate (4) overlaps on an inner surface of the second plate (1322); or the first plate (1321) and the second plate (1322) are parallel, and the light-transmitting board overlaps on an end surface of the second plate (1322).

**5.** The frameless panel lamp of claim 4, wherein the base plate (11) is a rectangular plate, the side plates (12) are provided with four, and two opposite side plates (12) are respectively provided with the bending portion (132).

**6.** The frameless panel lamp of claim 4, wherein the base plate (11) is a rectangular plate, the side plates (12) are provided with four, and three of the side plates (12) are respectively provided with the bending portion (132).

**7.** The frameless panel lamp of claim 1, wherein a top portion of the first convex ring (1311) is a flat surface.

**8.** The frameless panel lamp according to any one of claims 1-7, wherein the light-transmitting plate (4) is a diffuser plate or a prismatic plate.

**9.** The frameless panel lamp according to any one of claims 1-7, wherein the adhesive is transparent glue or milky white glue, and the adhesive is in a paste.

**10.** The frameless panel lamp according to any one of claims 1-7, wherein the driving assembly (3) is disposed at an outer surface of the chassis (1), and the driving assembly (3) comprises a drive board (31), an insulating sheet (32) and a protective cover (33), the insulating sheet (32) covers the drive board (31), and the protective cover (33) is detachably connected to the chassis (1) and covers the drive board (31).

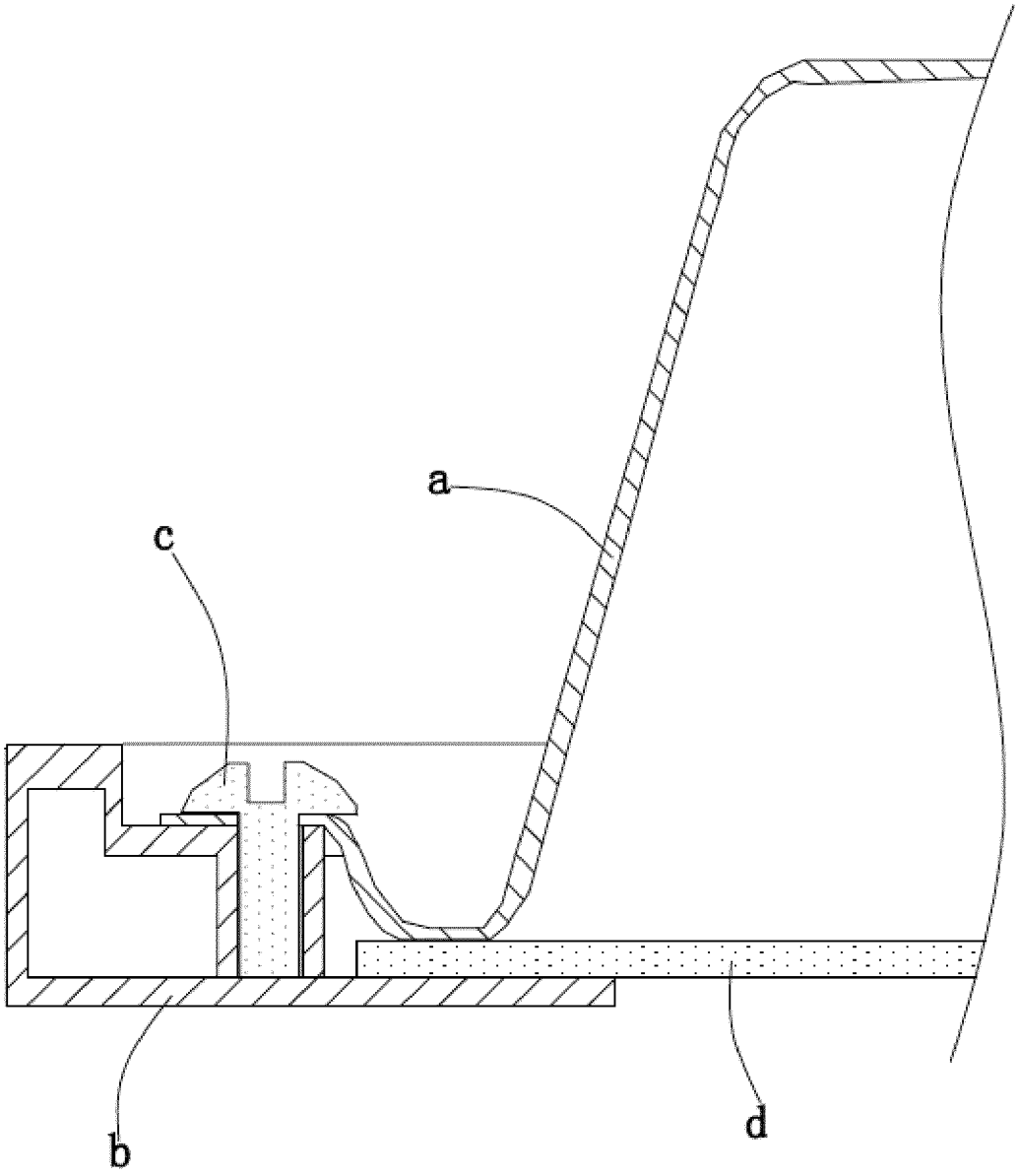


FIG. 1

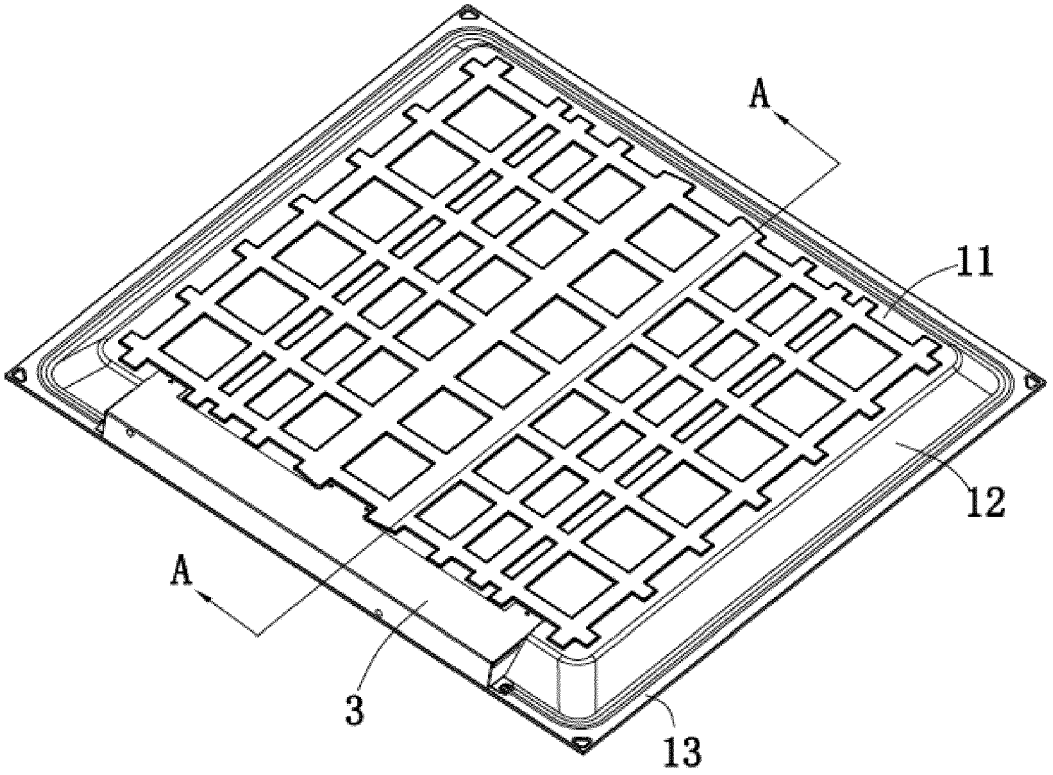


FIG. 2

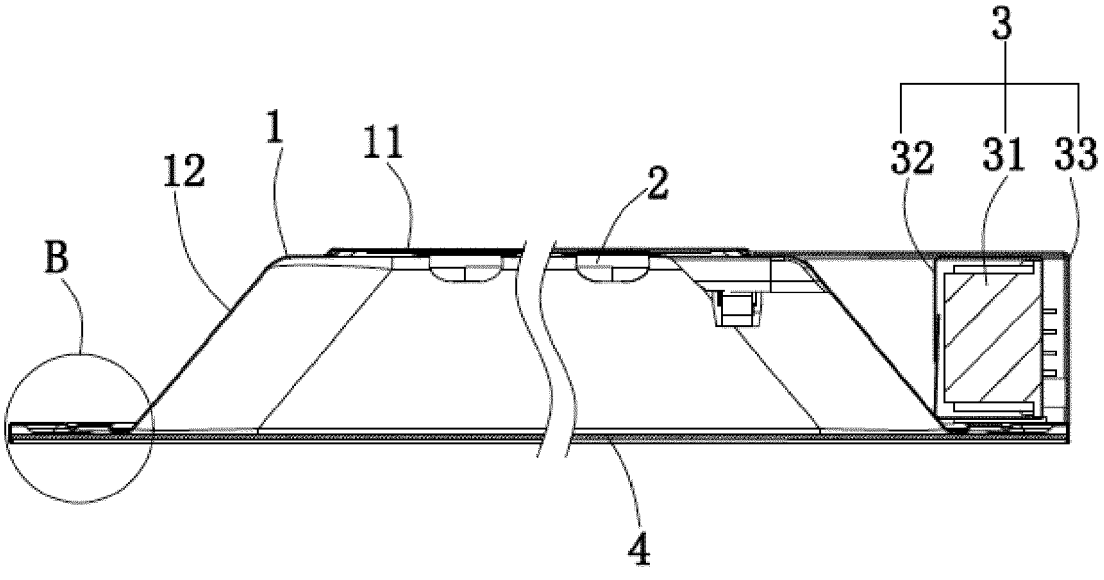


FIG. 3

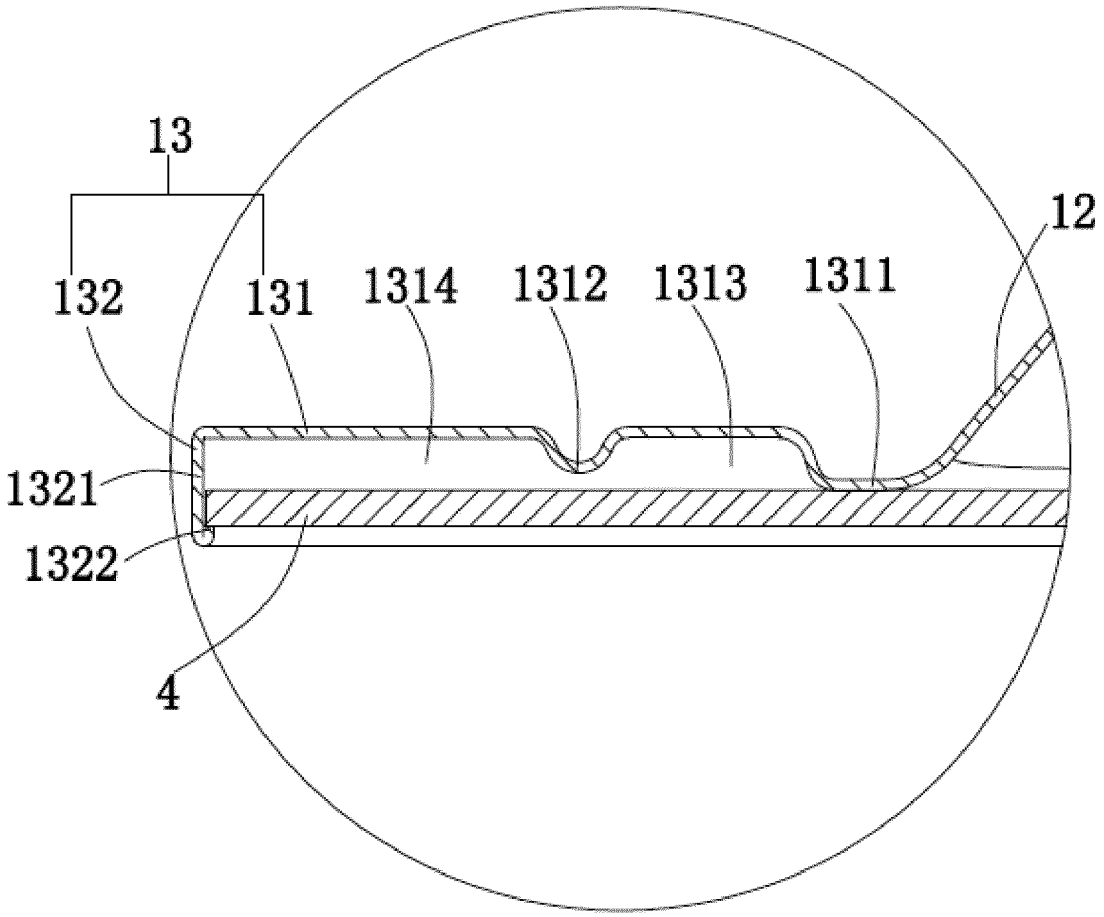


FIG. 4

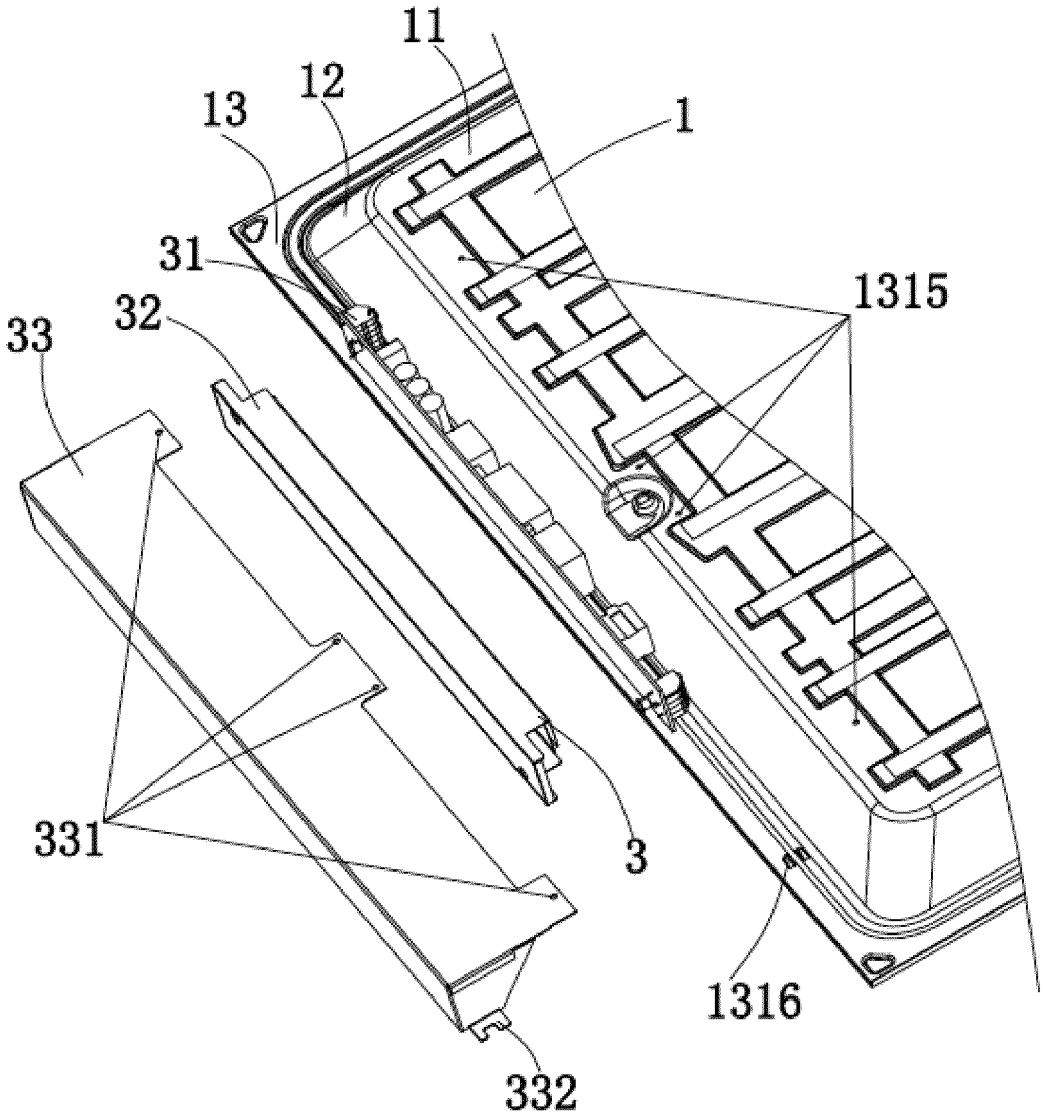


FIG. 5

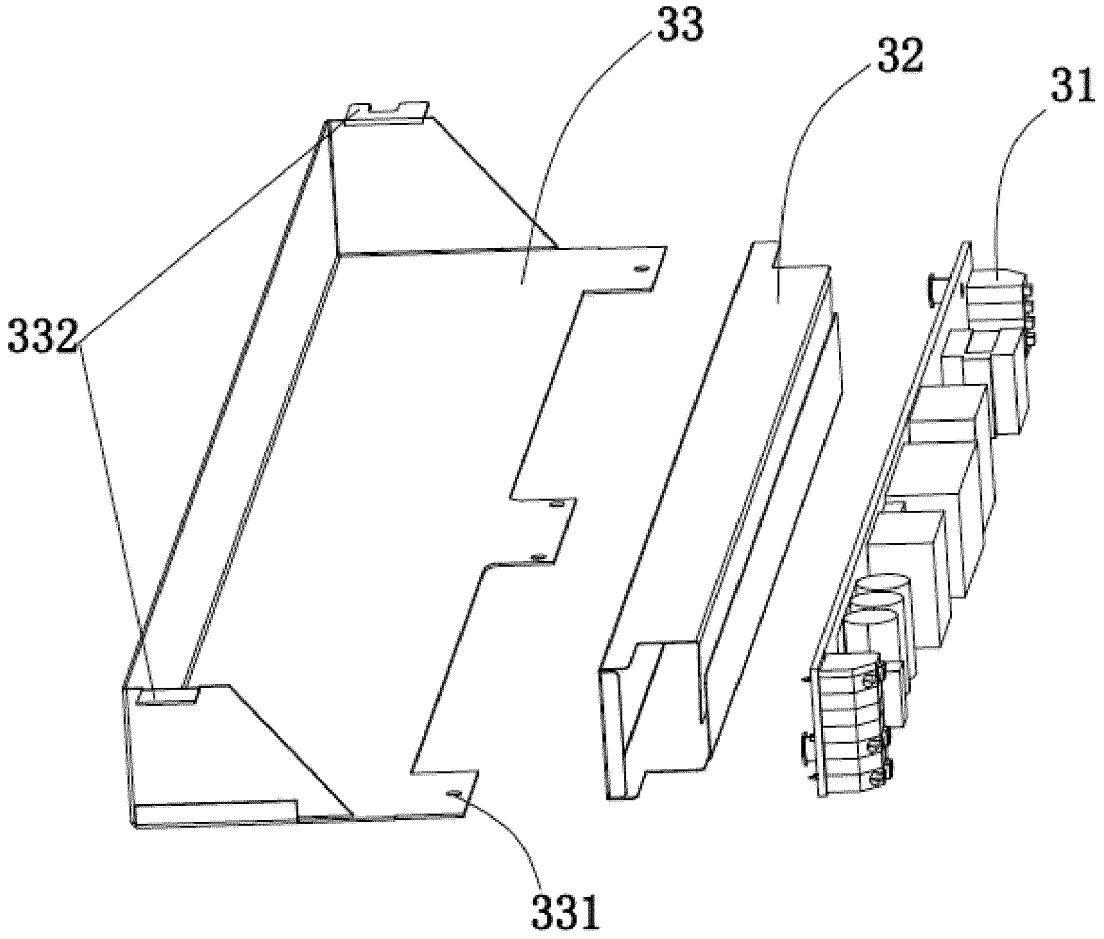


FIG. 6

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# EUROPEAN SEARCH REPORT

Application Number
EP 21 18 9073

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
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TECHNICAL FIELDS SEARCHED (IPC)
F21V
F21Y

1 The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 16 December 2021 | Dinkla, Remko |

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