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(54) **DOWNLIGHT**

(57) The application discloses a downlight, which includes a lamp body (8), a cover plate (1) with a first winding structure (2) and a second winding structure (3), a light-emitting element (4) installed on the cover plate (1), an electric wire (5) connected with the cover plate (1), and a deformable mounting member (6, 7) on the lamp body (8); the electric wire (5) includes a first wire (51), a second wire (52), and a protecting layer (53) sheathed outside the first wire (51) and the second wire (52), the first wire (51) has a first connecting part (511) located outside the protecting layer (53), and the second wire (52) has a second connecting part (521) located outside the protecting layer (53); the first connecting part (511) is wound around the first winding structure (2), and the second connecting part (521) is wound around the second winding structure (3).

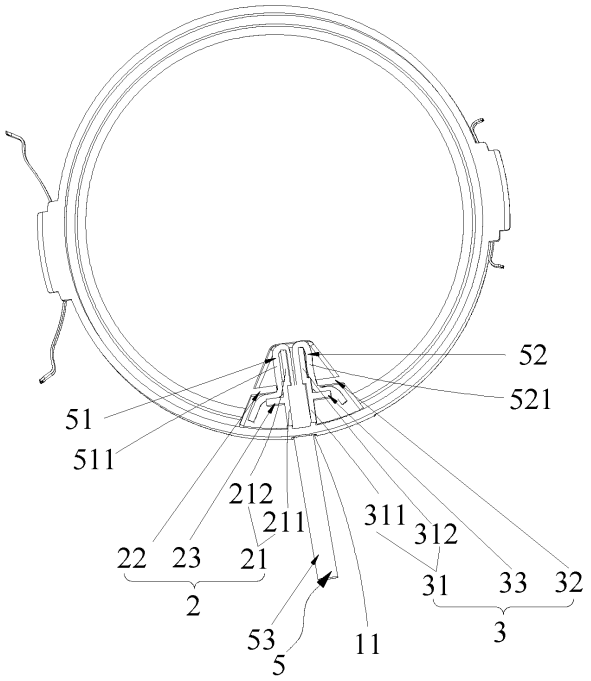

Fig. 2

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Description

TECHNICAL FIELD

[0001] This application relates to the field of lighting equipment, in particular to a downlight.

BACKGROUND

[0002] Lamps such as downlights are usually installed on a ceiling with a certain height, and it is difficult to assemble and disassemble, during which a certain interaction exists between the wire and the lamp body, easily causing loose connection between the wire and the lamp body and creating poor contacts at the wire-welding place, resulting in failure to the downlights. The existing anti-stretching method is to be fixed in a combination of gluing and a pressure block, with a high cost of materials with the anti-stretching structure to be fixed in a combination of gluing and a pressure block, and there are too many operation procedures, which leads to high labor costs. When fixing the electric wire with glue, the electric wire runs a long distance inside the lamp body and takes up a lot of space. In addition, the existing embedded lamps are installed in the mounting holes in the ceiling and other locations by means of plastic or metal bayonet. When the lamp is installed, the precision requirement of the opening size is very high. Too large or too small opening is impossible to be installed. Therefore, when the lamp is installed, the mounting hole often needs to be processed temporarily and adapted to the installation of the lamp, which will increase the complexity of the installation process.

BRIEF SUMMARY

[0003] The purpose of the present application is to provide a downlight, which aims to solve the problems in the prior art of the operation difficulty and complexity of the lamp during assembly and disassembly, and easily loosening of wires which causes failure to the downlight.

[0004] To achieve this purpose, this application adopts the following technical solutions:

A downlight, characterized by including a lamp body, a cover plate with a first winding structure and a second winding structure, a light-emitting element installed on the cover plate, an electric wire connected with the cover plate, and a deformable mounting member on the lamp body; the electric wire includes a first wire, a second wire, and a protecting layer sheathed outside the first wire and the second wire, the first wire has a first connecting part located outside the protecting layer, and the second wire has a second connecting part located outside the protecting layer; the first connecting part is wound around the first winding structure, and the second connecting part is wound around the second winding structure.

[0005] Further, the first winding structure and the second winding structure are arranged oppositely and spaced apart; the light-emitting element covers the first winding structure and the second winding structure.

[0006] Further, the first winding structure includes a first winding plate connected with the cover plate, and a first baffle arranged at a distance from the first winding plate; a gap between the first baffle and the first winding plate is provided for the first connecting part to pass through.

[0007] Further, the first winding structure further includes a first pre-tensioning plate connected with the first winding plate; the first pre-tensioning plate and the first baffle are parallel to each other; a gap between the first pre-tensioning plate and the first baffle is provided for the first connecting part to pass through.

[0008] Further, the first pre-tensioning plate and the first winding plate are perpendicular to each other; the distance between the first baffle and the first winding plate is smaller than the length of the first pre-tensioning plate.

[0009] Further, the second winding structure includes a second winding plate connected with the cover plate, and a second baffle arranged at a distance from the second winding plate; a gap between the second baffle and the second winding plate is provided for the second connecting part to pass through.

[0010] Further, the second winding structure further includes a second pre-tensioning plate connected with the second winding plate; the second pre-tensioning plate and the second baffle are parallel to each other; a gap between the second pre-tensioning plate and the second baffle is provided for the second connecting part to pass through.

[0011] Further, the second pre-tensioning plate and the second winding plate are perpendicular to each other; the distance between the second baffle and the second winding plate is smaller than the length of the second pre-tensioning plate.

[0012] Further, the cover plate is provided with a relief hole for the electric wire to pass through; the relief hole is located between the first winding plate and the second winding plate; the electric wire runs through the relief hole and is located between the first winding plate and the second winding plate.

[0013] Further, the first winding plate includes a first limiting part, and a second limiting part connected with one end of the first limiting part away from the relief hole; the second winding plate includes a third limiting part, and a fourth limiting part connected with one end of the third limiting part away from the relief hole; the gap between the first limiting part and the third limiting part is greater than the outer diameter of the protecting layer; the gap between the second limiting part and the fourth limiting part is smaller than the outer diameter of the protecting layer; the sum of the outer diameters of the first wire and the second wire is smaller than the gap between the second limiting part and the fourth limiting part.

[0014] Further, the mounting member includes an abutting sheet and an elastic sheet arranged oppositely and spaced apart on the lamp body, and the elastic sheet

includes a first connecting plate connected with the lamp body, and deformable plates at two opposite ends of the first connecting plate; one end of the deformable plate away from the first connecting plate is provided with a first abutting protrusion; the abutting sheet includes a second connecting plate, and abutting plates at two opposite ends of the second connecting plate; one end of the abutting plate away from the second connecting plate is provided with a second abutting protrusion.

[0015] Further, the deformable plate includes a first arc part connected with the first connecting plate, a second arc part connected with one end of the first arc part away from the first connecting plate, and a third arc part connected with one end of the second arc part away from the first arc part; the center of the first arc part is located on one side of the elastic sheet away from the lamp body, the center of the second arc part and the center of the first arc part are respectively located on two opposite sides of the elastic sheet; the center of the third arc part and the center of the second arc part are respectively located on two opposite sides of the elastic sheet.

[0016] Further, the deformable plate further includes a first force-applying part connected with the third arc part, the first abutting protrusion is provided on the first force-applying part, and the first abutting protrusion is zigzag-shaped, the first force-applying part and the first connecting plate are perpendicular to each other, and the first abutting protrusion is located on one end of the first force-applying part away from the third arc part.

[0017] Further, the abutting plate includes a connecting part connected with the second connecting plate, and a second force-applying part connected with one end of the connecting part away from the second connecting plate, the second abutting protrusion is located on the second force-applying part; the second abutting protrusion is zigzag-shaped.

[0018] Further, the abutting plate further includes a fourth arc part connected between the connecting part and the second force-applying part; the center of the fourth arc part is located on one side of the abutting sheet away from the lamp body; the second force-applying part and the second connecting plate are perpendicular to each other.

[0019] The beneficial effect of the present application is: the protecting layer at the end of the electric wire is cut off and parts of the first wire and the second wire, which are referred to as the first connecting part and the second connecting part, are exposed, and the sum of the outer diameters of the first wire and the second wire is smaller than the outer diameter of the protecting layer. Therefore, when the first connecting part is wound on the first winding structure and the second connecting part is wound on the second winding structure, the space occupied by the first connecting part of the first wire and the second connecting part of the second wire is smaller than the space occupied by the electric wire wound as a whole, so that the volume occupied by the anti-tensile structure of the downlight is sufficiently small. Moreover, when the downlight is installed in the mounting hole on the ceiling, etc., the elastic sheet on the lamp body is put into the mounting hole first, so that the elastic sheet is in contact with the inner wall of the mounting hole, and the lamp body applies force to the elastic sheet, deforming the elastic sheet in a direction close to the lamp body. After the elastic sheet is deformed, the farthest distance between the elastic sheet and the abutting sheet is reduced, so that the side where the abutting sheet is installed on the lamp body can also be put into the mounting hole, and then when the force applied to the lamp body is released, the elastic sheet is tend to return to its original shape. At this time, the elastic sheet and the abutting sheet are in contact with the inner wall of the mounting hole on the opposite sides of the lamp body, respectively; since the elastic sheet can be deformed to a certain level, the mounting hole is not required to have a high accuracy, and only needs to be larger than the size of the lamp body.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] In order to more clearly illustrate the technical solutions in the embodiments of the present application, the following will briefly introduce the accompanying drawings that need to be used in the description of the embodiments or the prior art. Obviously, the accompanying drawings in the following description are only some embodiments of the present application. Those skilled in the art can obtain other drawings based on these drawings without creative efforts.

Fig. 1 is a structural schematic diagram of a downlight in an embodiment of the application;
Fig. 2 is a structural schematic diagram of the cover plate in Fig. 1;
Fig. 3 is a partial schematic diagram of the cover plate in Fig. 2;
Fig. 4 is a cross-sectional view of the downlight in Fig. 1;
Fig. 5 is a structural schematic diagram of the elastic sheet in an embodiment of the application;
Fig. 6 is a structural schematic diagram of the abutting sheet in an embodiment of the application.

[0021] In the figures:

1. Cover plate; 11. Relief hole;
2. First winding structure; 21. First winding plate; 211. First limiting part; 212. Second limiting part; 22. First baffle; 23. First pre-tensioning plate;
3. Second winding structure; 31. Second winding plate; 311. Third limiting part; 312. Fourth limiting part; 32. Second baffle; 33. Second pre-tensioning plate;
4. Light-emitting element; 41. Reflective paper; 42. Light-guiding plate; 43. Annular light source plate; 44. Light-emitting part; 45. Light-diffusing plate; 46. Light-shielding plate; 47. Annular decorative sur-

face;
5. Electric wire; 51. First wire; 511. First connecting part; 52. Second wire; 521. Second connecting part; 53. Protecting layer;
6. Abutting sheet; 61. Second connecting plate; 611. Second buckle part; 62. Abutting plate; 621. Second abutting protrusion; 622. Connecting part; 623. Second force-applying part; 624. Fourth arc part;
7. Elastic sheet; 71. First connecting plate; 711. First buckle part; 72. Deformable plate; 721. First abutting protrusion; 722. First arc part; 723. Second arc part; 724. Third arc part; 725. First force-applying part;
8. Lamp body.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0022] In order to make the purpose, technical solutions, and advantages of this application clearer, the following further describes the application in detail with reference to the accompanying drawings and embodiments. It should be understood that the specific embodiments described here are only used to explain the application, and are not used to limit the application.

[0023] It should be noted that when an element is referred to as being "fixed to" or "disposed on" another element, it can be directly on the other element or indirectly above the other element. When an element is said to be "connected with" another element, it can be directly connected with the other element or indirectly connected with the other element.

[0024] It should be understood that the orientation or positional relationship indicated by the terms "length", "width", "upper", "lower", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom", "inner", "outer", etc. is based on the orientation or positional relationship shown in the drawings, and is only for the convenience of describing the application and simplifying the description, and does not indicate or imply the device or the element referred to must have a specific orientation, be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation of the present application.

[0025] In addition, the terms "first" and "second" are only used to describe, and cannot be understood as indicating or implying relative importance or implicitly indicating the number of indicated technical features. Thus, the features defined with "first" and "second" may explicitly or implicitly include one or more of these features. In the description of this application, "multiple" means two or more than two, unless otherwise specifically defined.

[0026] The implementation of this application will be described in detail below in conjunction with specific embodiments.

[0027] As shown in Figs. 1 to 3, an embodiment of the present application proposes a downlight, which includes a lamp body 8, a cover plate 1 with a first winding structure 2 and a second winding structure 3, a light-emitting element 4 installed on the cover plate 1, a deformable mounting member (6, 7) on the lamp body, and an electric wire 5 connected with the cover plate 1; the electric wire 5 includes a first wire 51, a second wire 52, and a protecting layer 53 sheathed outside the first wire 51 and the second wire 52; the first wire 51 has a first connecting part 511 located outside the protecting layer 53, and the second wire 52 has a second connecting part 521 located outside the protecting layer 53; the first connecting part 511 is wound around the first winding structure 2, and the second connecting part 521 is wound around the second winding structure 3.

[0028] In the embodiment of the present application, the electric wire 5 includes a first wire 51, a second wire 52, and a protecting layer 53 sheathed outside the first wire 51 and the second wire 52, so the outer diameter of the electric wire 5 is the outer diameter of the protecting layer 53. The protecting layer 53 at the end of the electric wire is cut off and parts of the first wire 51 and the second wire 52, which are referred to as the first connecting part 511 and the second connecting part 521 respectively, are exposed, and the sum of the outer diameters of the first wire 51 and the second wire 52 is smaller than the outer diameter of the protecting layer 53. Therefore, when the first connecting part 511 is wound on the first winding structure 2 and the second connecting part 521 is wound on the second winding structure 3, the space occupied by the first connecting part 511 of the first wire 51 and the second connecting part 521 of the second wire 52 is smaller than the space occupied by the electric wire 5 wound as a whole, so that the volume occupied by the anti-tensile structure of the downlight is sufficiently small.

[0029] The first connecting part 511 is wound around the first winding structure 2, and the second connecting part 521 is wound around the second winding structure 3. Compared with the fixing method of gluing combined with press block, the material cost and labor cost are reduced.

[0030] Further, as shown in Fig. 2, as another specific embodiment of the downlight provided by the present application, the first winding structure 2 and the second winding structure 3 are opposite and spaced apart, so the first connecting part 511 and the second connecting part 521 can be wound on opposite sides respectively, and the overlapping area of the two is small, which makes the internal structure of the cover plate 1 more compact; as shown in Fig. 4, the light-emitting element 4 covers the first winding structure 2 and the second winding structure 3 to limit the first connecting part 511 and the second connecting part 521 in the first winding structure 2 and the second winding structure 3 respectively by the light-emitting element 4, so as to avoid the first connecting part 511 and the second connecting part 521 detaching from the first winding structure 2 and the second winding structure 3 and improve the stability of the anti-tensile structure.

[0031] Further, as shown in Figs 2 to 3, as another specific embodiment of the downlight provided by the

present application, the first winding structure 2 includes a first winding plate 21 connected with the cover plate 1, and a first baffle 22 arranged at a distance from the first winding plate 21; a gap between the first baffle 22 and the first winding plate 21 is provided for the first connecting part 511 to pass through. The first connecting part 511 is wound from one side of the first winding plate 21 to the other side, and then is wound on the first baffle 22, so the first connecting part 511 is not easy to be pulled, and a better anti-tensile effect is achieved.

[0032] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the first winding structure 2 further includes a first pre-tensioning plate 23 connected with the first winding plate 21; the first pre-tensioning plate 23 and the first baffle 22 are parallel to each other; a gap between the first pre-tensioning plate 23 and the first baffle 22 is provided for the first connecting part 511 to pass through. The first pre-tensioning plate 23 can be matched with the first baffle 22, and the first connecting part 511 passes through the gap between the first pre-tensioning plate 23 and the first baffle 22 to further enhance the pre-tensioning and limiting effect of the first connecting part 511, so the first connecting part 511 is not easy to be pulled, and a better anti-tensile effect is achieved after winding.

[0033] Further, as shown in Figs 2 to 3, as another specific embodiment of the downlight provided by the present application, the first pre-tensioning plate 23 and the first winding plate 21 are perpendicular to each other; the distance between the first baffle 22 and the first winding plate 21 is smaller than the length of the first pre-tensioning plate 23. Further, the first connecting part 511 in the first winding structure 2 is limited by the double vertical structure, which further improves the anti-tension effect after winding.

[0034] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the second winding structure 3 includes a second winding plate 31 connected with the cover plate 1, and a second baffle 32 arranged at a distance from the second winding plate 31; a gap between the second baffle 32 and the second winding plate 31 is provided for the second connecting part 521 to pass through. The second connecting part 521 is wound from one side of the second winding plate 31 to the other side, and then is wound on the second baffle 32, so the second connecting part 521 is not easy to be pulled, and a better anti-tensile effect is achieved.

[0035] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the second winding structure 3 further includes a second pre-tensioning plate 33 connected with the second winding plate 31; the second pre-tensioning plate 33 and the second baffle 32 are parallel to each other; a gap between the second pre-tensioning plate 33 and the second baffle 32 is provided for the second connecting part 521 to pass through. The second pre-tensioning plate 33 can be matched with the second baffle 32, and the second connecting part 521 passes through the gap between the second pre-tensioning plate 33 and the second baffle 32 to further enhance the pre-tensioning and limiting effect of the second connecting part 521, so the second connecting part 521 is not easy to be pulled, and a better anti-tensile effect is achieved after winding.

[0036] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the second pre-tensioning plate 33 and the second winding plate 31 are perpendicular to each other; the distance between the second baffle 32 and the second winding plate 31 is smaller than the length of the second pre-tensioning plate 33. Further, the second connecting part 521 in the second winding structure 3 is limited by the double vertical structure, which further improves the anti-tension effect after winding.

[0037] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the cover plate 1 is provided with a relief hole 11 for the electric wire 5 to pass through; the relief hole 11 is located between the first winding plate 21 and the second winding plate 31; the electric wire 5 passes through the relief hole 11 and is located between the first winding plate 21 and the second winding plate 31. The electric wire 5 is inserted into the cover plate 1 through the relief hole 11, and passes through the gap between the first winding plate 21 and the second winding plate 31 to achieve a preliminary limit, and then the first connecting part 511 and the second connecting part 521 are respectively separated to both sides and enter the first winding structure 2 and the second winding structure 3 respectively.

[0038] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the first winding plate 21 includes a first limiting part 211, and a second limiting part 212 connected with one end of the first limiting part 211 away from the relief hole 11; the second winding plate 31 includes a third limiting part 311, and a fourth limiting part 312 connected with one end of the third limiting part 311 away from the relief hole 11; the gap between the first limiting part 211 and the third limiting part 311 is greater than the outer diameter of the protecting layer 53; the gap between the second limiting part 212 and the fourth limiting part 312 is smaller than the outer diameter of the protecting layer 53; the sum of the outer diameters of the first wire 51 and the second wire 52 is smaller than the gap between the second limiting part 212 and the fourth limiting part 312. Therefore, the main body of the electric wire 5 is located between the first limiting part 211 and the third limiting part 311, and the first connecting part 511 and the second connecting part 521 extending from the protecting layer 53 of the electric wire 5 pass through the gap between the second limiting part 212 and the fourth limiting part 312, then reach the other side of the first winding plate 21 and the second winding plate 31

respectively. Since the gap between the second limiting part 212 and the fourth limiting part 312 is smaller than the outer diameter of the protecting layer 53, the second limiting part 212 and the fourth limiting part 312 can be used as elements to abut and limit the electric wire 5, making the electric wire 5 unable to move along its axial direction.

[0039] Further, as shown in Figs. 2 to 3, as another specific embodiment of the downlight provided by the present application, the light-emitting element 4 includes a reflective paper 41 arranged in contact with the first winding structure 2 and the second winding structure 3, a light-guiding plate 42 located on one side of the reflective paper 41 away from the first winding structure 2, an annular light source plate 43 surrounding the light-guiding plate 42, a light-emitting element 44 installed on the annular light source plate 43, a light-diffusing plate 45 located on one side of the light-guiding plate 42 away from the reflective paper 41, a light-shielding plate 46 arranged around the light-diffusing plate 45, and a annular decorative surface 47 installed on the light-shielding plate 46. The light-guiding plate 42 is pressed on the first winding structure 2 and the second winding structure 3 by the reflective paper 41, so that the first connecting part 511 and the second connecting part 521 are not easily detached from the first winding structure 2 and the second winding structure 3.

[0040] As shown in Figs. 1, 5 and 6, the embodiment of the present application proposes a downlight, which includes a lamp body 8, a light-emitting element 4 arranged in the lamp body 8, an abutting sheet 6 arranged on the lamp body 8, and an elastic sheet 7 arranged on the lamp body 8; the abutting sheet 6 and the elastic sheet 7 are arranged oppositely and spaced apart; the elastic sheet 7 includes a first connecting plate 71 connected with the lamp body 8, and deformable plates 72 at two opposite ends of the first connecting plate 71; one end of the deformable plate 72 away from the first connecting plate 71 is provided with a first abutting protrusion 721; the abutting sheet 6 includes a second connecting plate 61, and abutting plates 62 at two opposite ends of the second connecting plate 61; one end of the abutting plate 62 away from the second connecting plate 61 is provided with a second abutting protrusion 621.

[0041] In the embodiment of the present application, when the downlight is installed in the mounting hole of the ceiling, etc., the elastic sheet 7 on the lamp body 8 is put into the mounting hole first, so that the elastic sheet 7 is in contact with the inner wall of the mounting hole, and the lamp body 8 applies force to the elastic sheet 7, deforming the elastic sheet 7 in a direction close to the lamp body 8. After the elastic sheet 7 is deformed, the farthest distance between the elastic sheet 7 and the abutting sheet 6 is reduced, so that the side where the abutting sheet 6 is installed on the lamp body 8 can also be put into the mounting hole, and then when the force applied to the lamp body 8 is released, the elastic sheet 7 is tend to return to its original shape. At this time, the elastic sheet 7 and the abutting sheet 6 are in contact with the inner wall of the mounting hole on the opposite sides of the lamp body 8, respectively, and the installation of the downlight is completed; since the elastic sheet 7 can be deformed to a certain level, the mounting hole is not required to have a high accuracy, and only needs to be larger than the size of the lamp body.

[0042] The first abutting protrusion 721 can increase the force of friction between the elastic sheet 7 and the inner wall of the mounting hole, and improve the mounting stability. The second abutting protrusion 621 can increase the force of friction between the abutting sheet 6 and the inner wall of the mounting hole, and cooperates with the first abutting protrusion 721 to further improve the mounting stability of the lamp body 8.

[0043] When the elastic sheet 7 is deformed, the first connecting plate 71 is fixedly connected with the lamp body 8, and the deformable plates 72 at both ends of the first connecting plate 71 are deformed.

[0044] Further, as shown in Fig. 5, as another specific embodiment of the downlight provided by the present application, the deformable plate 72 includes a first arc part 722 connected with the first connecting plate 71, a second arc part 723 connected with one end of the first arc part 722 away from the first connecting plate 71, and a third arc part 724 connected with one end of the second arc part 723 away from the first arc part 722; the center of the first arc part 722 is located on one side of the elastic sheet 7 away from the lamp body 8, the center of the second arc part 723 and the center of the first arc part 722 are respectively located on two opposite sides of the elastic sheet 7; the center of the third arc part 724 and the second arc part 723 are respectively located on two opposite sides of the elastic sheet 7.

[0045] The second arc part 723 serves as a transition element between the first arc part 722 and the third arc part 724. The first arc part 722 and the third arc part 724 are the main deformable parts, and two deformable parts provided, i.e. the first arc part 722 and the third arc part 724 can effectively improve the stability of the deformable plate 72 to return to its original size after being deformed. The elastic member usually has a certain range of deformation. When the certain range of deformation is exceeded, that is, the elastic member cannot return to its original shape after the force exceeds its own yield strength; therefore, the external force can be shared between the first arc part 722 and the third arc part 724, further increasing the overall yield strength of the deformable plate 72, and the deformable plate 72 still has sufficient ability to return to its original shape after being stressed, which can ensure that the elastic sheet 7 is in close contact with the inner wall of the mounting hole. The provision of the two deformable parts, i.e. the first arc part 722 and the third arc part 724 has the following effects: when one of the deformable parts is excessively deformed, the other can still apply sufficient pressure to the inner wall of the mounting hole, thereby realizing the installation of the lamp body 8.

[0046] Further, as shown in Fig. 5, as another specific embodiment of the downlight provided by the present application, the deformable plate 72 further includes a first force-applying part 725 connected with the third arc part 724, the first abutting protrusion 721 is provided on the first force-applying part 725. The deformation caused by the deformation of the first arc part 722 and the third arc part 724 is applied to the inner wall of the mounting hole through the first force-applying part 725, and the first abutting protrusion 721 can ensure the close contact of the first force-applying part 725 with the inner wall of the mounting hole.

[0047] Further, as shown in Fig. 5, as another specific embodiment of the downlight provided by the present application, the first abutting protrusion 721 is zigzag-shaped and can be pressed into the surface of the inner wall of the mounting hole; the first force-applying part 725 and the first connecting plate 71 are perpendicular to each other, so that the pressure transmitted by the first force-applying part 725 is directed to the lamp body 8, and the stability of the lamp body 8 is improved; the first abutting protrusion 721 is located on one end of the first force-applying part 725 away from the third arc part 724.

[0048] Further, as shown in Fig. 5, as another specific embodiment of the downlight provided by the present application, the first connecting plate 71 is provided with a first buckle part 711; the first buckle part 711 is located inside the lamp body 8. This can effectively prevent the detachment between the first connecting plate 71 and the lamp body 8.

[0049] Further, as shown in Figs. 1 to 5, as another specific embodiment of the downlight provided by the present application, the elastic sheet 7 is a metal member, and the first connecting plate 71 and the lamp body 8 are integrally injection-molded. The first connecting plate 71 of the elastic sheet 7 is used as an insert to be integrally injection-molded with the lamp body 8.

[0050] Further, as shown in Fig. 6, as another specific embodiment of the downlight provided by the present application, the abutting plate 62 includes a connecting part 622 connected with the second connecting plate 61, and a second force-applying part 623 connected with one end of the connecting part 622 away from the second connecting plate 61, the second abutting protrusion 621 is located on the second force-applying part 623; the second abutting protrusion 621 is zigzag-shaped, and can be inserted into the surface of the inner wall of the mounting hole to improve the mounting stability.

[0051] Further, as shown in Fig. 6, as another specific embodiment of the downlight provided by the present application, the abutting plate 62 further includes a fourth arc part 624 connected between the connecting part 622 and the second force-applying part 623; the center of the fourth arc part 624 is located on one side of the abutting sheet 6 away from the lamp body 8; the second force-applying part 623 and the second connecting plate 61 are perpendicular to each other. The fourth arc part 624 provides a certain level of deformation between the connecting part 622 and the second force-applying part 623, so that the second force-applying part 623 better contacts the inner wall of the mounting hole.

[0052] Further, as shown in Fig. 6, as another specific embodiment of the downlight provided by the present application, the second connecting plate 61 is provided with a second buckle part 611, and the second buckle part 611 is located inside the lamp body 8, to prevent the detachment between the second connecting plate and the lamp body 8.

[0053] Further, as shown in Figs. 1 and 6, as another specific embodiment of the downlight provided by the present application, the abutting sheet 6 is a metal member; the second connecting plate 61 and the lamp body 8 are integrally injection-molded. The second connecting plate 61 of the abutting sheet 6 is used as an insert to be injection-molded with the lamp body 8.

[0054] Further, as shown in Fig. 1, as another specific embodiment of the downlight provided by the present application, the lamp body 8 is circular; the elastic sheet 7 and the abutting sheet 6 are located on the same diameter of the lamp body 8, so the force exerted by the elastic sheet 7 and the abutting sheet 6 on the lamp body 8 is relatively symmetric, which ensures the mounting stability of the lamp body 8.

[0055] It can be understood that the solution in another specific implementation may be an embodiment which can be achieved by further improving on the basis of other embodiments.

[0056] Obviously, the above-mentioned embodiments of the present application are only used to clearly illustrate the examples of the present application, and are not intended to limit the implementation of the present application. For those skilled in the art, other changes or modifications in different forms can be made on the basis of the above description. It is unnecessary and impossible to list all the implementation here. Any modification, equivalent replacement and improvement made within the spirit and principle of this application shall be included in the protection scope of the claims of this application.

Claims

1. Downlight, **characterized in that** it includes a lamp body, a cover plate with a first winding structure and a second winding structure, a light-emitting element installed on the cover plate, an electric wire connected with the cover plate, and a deformable mounting member on the lamp body; the electric wire includes a first wire, a second wire, and a protecting layer sheathed outside the first wire and the second wire, the first wire has a first connecting part located outside the protecting layer, and the second wire has a second connecting part located outside the protecting layer; the first connecting part is wound around the first winding structure, and the second connecting part is wound around the second winding struc-

ture.

2. The downlight according to claim 1, wherein the first winding structure and the second winding structure are opposite and spaced apart; the light-emitting element covers the first winding structure and the second winding structure.

3. The downlight according to claim 2, wherein the first winding structure includes a first winding plate connected with the cover plate, and a first baffle arranged at a distance from the first winding plate; a gap between the first baffle and the first winding plate is provided for the first connecting part to pass through.

4. The downlight according to claim 3, wherein the first winding structure further includes a first pre-tensioning plate connected with the first winding plate; the first pre-tensioning plate and the first baffle are parallel to each other; a gap between the first pre-tensioning plate and the first baffle is provided for the first connecting part to pass through.

5. The downlight according to claim 4, wherein the first pre-tensioning plate and the first winding plate are perpendicular to each other; the distance between the first baffle and the first winding plate is smaller than the length of the first pre-tensioning plate.

6. The downlight according to claim 3, wherein the second winding structure includes a second winding plate connected with the cover plate, and a second baffle arranged at a distance from the second winding plate; a gap between the second baffle and the second winding plate is provided for the second connecting part to pass through.

7. The downlight according to claim 6, wherein the second winding structure further includes a second pre-tensioning plate connected with the second winding plate; the second pre-tensioning plate and the second baffle are parallel to each other; a gap between the second pre-tensioning plate and the second baffle is provided for the second connecting part to pass through.

8. The downlight according to claim 7, wherein the second pre-tensioning plate and the second winding plate are perpendicular to each other; the distance between the second baffle and the second winding plate is smaller than the length of the second pre-tensioning plate.

9. The downlight according to claim 6, wherein the cover plate is provided with a relief hole for the electric wire to pass through; the relief hole is located between the first winding plate and the second winding plate; the electric wire runs through the relief hole and is located between the first winding plate and the second winding plate.

10. The downlight according to claim 9, wherein the first winding plate includes a first limiting part, and a second limiting part connected with one end of the first limiting part away from the relief hole; the second winding plate includes a third limiting part, and a fourth limiting part connected with one end of the third limiting part away from the relief hole; the gap between the first limiting part and the third limiting part is greater than the outer diameter of the protecting layer; the gap between the second limiting part and the fourth limiting part is smaller than the outer diameter of the protecting layer; the sum of the outer diameters of the first wire and the second wire is smaller than the gap between the second limiting part and the fourth limiting part.

11. The downlight according to any one of claims 1-10, wherein the mounting member includes an abutting sheet and an elastic sheet arranged oppositely and spaced apart on the lamp body, and the elastic sheet includes a first connecting plate connected with the lamp body, and deformable plates at two opposite ends of the first connecting plate; one end of the deformable plate away from the first connecting plate is provided with a first abutting protrusion; the abutting sheet includes a second connecting plate, and abutting plates at two opposite ends of the second connecting plate; one end of the abutting plate away from the second connecting plate is provided with a second abutting protrusion.

12. The downlight according to claim 11, wherein the deformable plate includes a first arc part connected with the first connecting plate, a second arc part connected with one end of the first arc part away from the first connecting plate, and a third arc part connected with one end of the second arc part away from the first arc part; the center of the first arc part is located on one side of the elastic sheet away from the lamp body, the center of the second arc part and the center of the first arc part are respectively located on two opposite sides of the elastic sheet; the center of the third arc part and the center of the second arc part are respectively located on two opposite sides of the elastic sheet.

13. The downlight according to claim 12, wherein the deformable plate further includes a first force-applying part connected with the third arc part, the first abutting protrusion is provided on the first force-applying part, and the first abutting protrusion is zigzag-shaped, the first force-applying part and the first connecting plate are perpendicular to each other, and the first abutting protrusion is located on one end of

the first force-applying part away from the third arc part.

14. The downlight according to claim 11, wherein the abutting plate includes a connecting part connected with the second connecting plate, and a second force-applying part connected with one end of the connecting part away from the second connecting plate, the second abutting protrusion is located on the second force-applying part; the second abutting protrusion is zigzag-shaped.

15. The downlight according to claim 14, wherein the abutting plate further includes a fourth arc part connected between the connecting part and the second force-applying part; the center of the fourth arc part is located on one side of the abutting sheet away from the lamp body; the second force-applying part and the second connecting plate are perpendicular to each other.

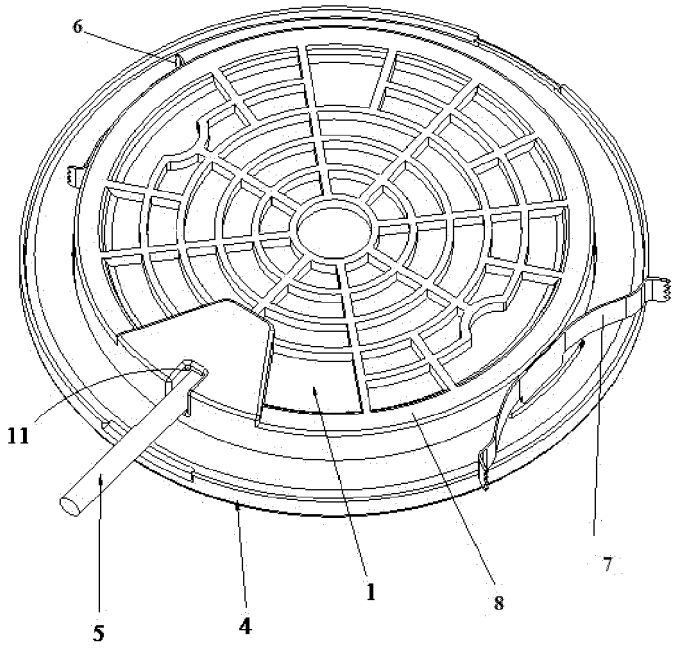

Fig. 1

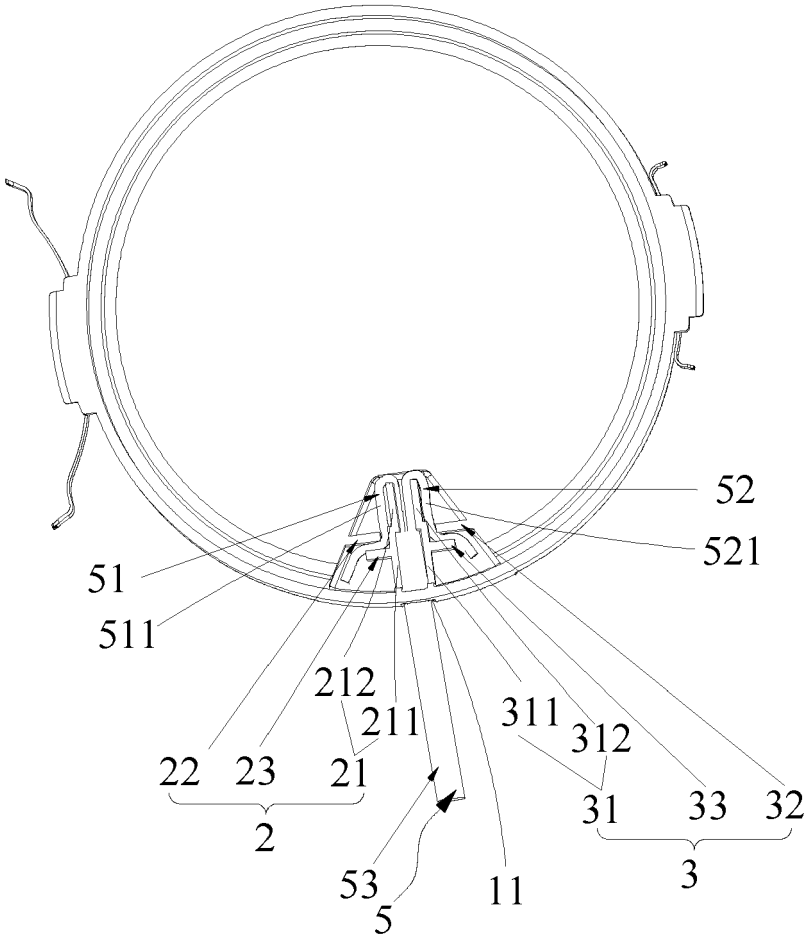

Fig. 2

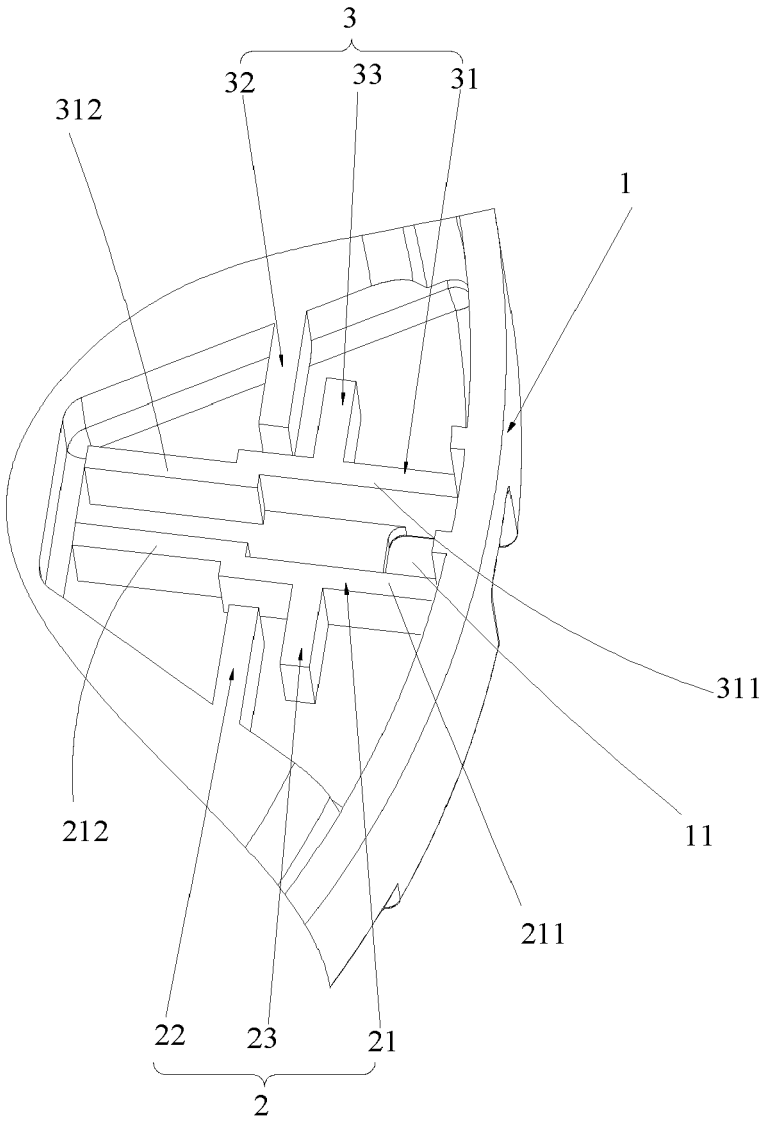

Fig. 3

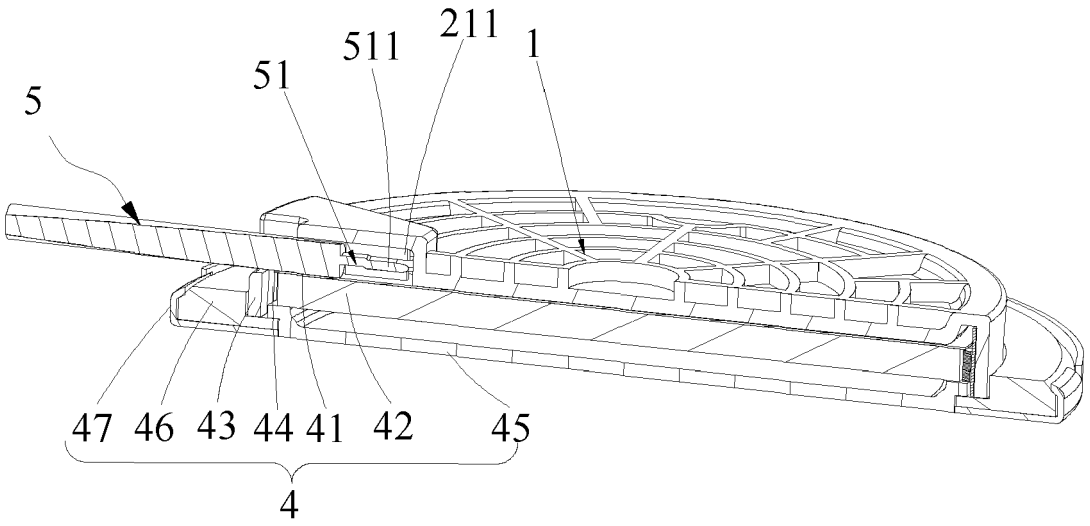
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Fig. 4

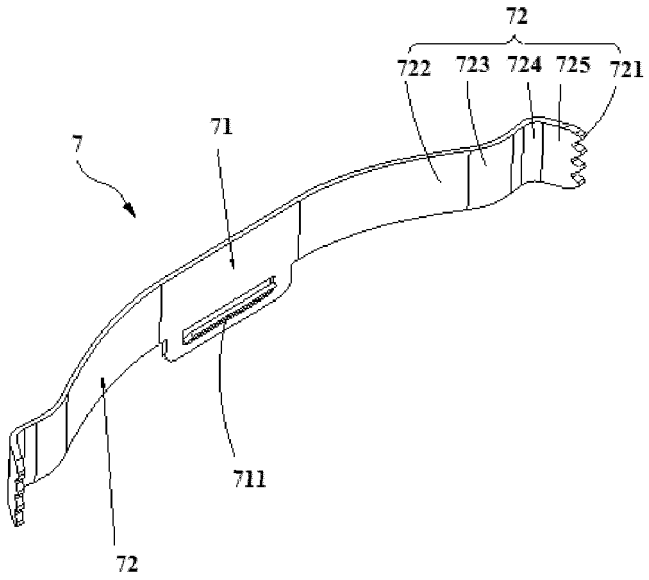
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Fig. 5

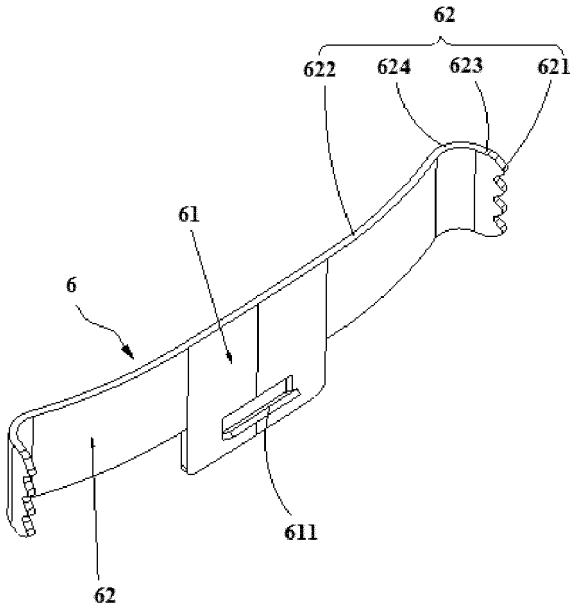

Fig. 6

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Application Number
EP 20 21 0678

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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