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(54) **MOUNTING MECHANISM AND LIGHTING APPARATUS HAVING THE MOUNTING MECHANISM**

MONTAGEMECANISMUS UND BELEUCHTUNGSVORRICHTUNG MIT DEM
MONTAGEMECANISMUS

MÉCANISME DE MONTAGE ET APPAREIL D'ÉCLAIRAGE COMPORTANT LE MÉCANISME DE
MONTAGE

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(56) References cited:
**EP-A1- 1 936 265 US-A- 6 095 660
US-A1- 2003 067 778**

EP 2 671 017 B1

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Description

Technical Field

[0001] The present invention relates to a mounting mechanism used for a lighting apparatus, and in addition, the present invention further relates to a lighting apparatus having the mounting mechanism of the above type.

Background Art

[0002] The downlight as a common lighting apparatus is more and more widely used. In order to mount the downlight on the mounting surface such as ceiling, the radially opposite sides of the lamp cylinder of the downlight are usually provided with a spring or spring plate extending radially and outwardly beyond the profile of the lamp cylinder. When mounting the downlight, the spring or spring plate is pressed manually or with a tool to make it pass through the mounting hole of the ceiling together with the lamp cylinder. The spring or spring plate rebounds under the action of the spring force so as to fix the downlight on the ceiling. However, as the ceiling is usually fabricated by a light material with a low hardness, the mounting should be conducted carefully to prevent the spring or spring plate from damaging the ceiling. But after the downlight is mounted on the ceiling, for the purpose of maintenance, the downlight should be taken out from the ceiling. In this case, the hand or tool usually can hardly get into the ceiling to press the spring or spring plate, and the downlight should be pulled out directly from the mounting hole of the ceiling. At this moment, the spring or spring plate inevitably abuts against the edge of the mounting hole, which quite likely causes the spring or spring plate to damage the edge of the mounting hole.

Summary of the Invention

[0003] Therefore, one object of the present invention lies in providing a mounting mechanism used for a lighting apparatus. With this type of mounting mechanism, the lighting apparatus such as downlight can be simply mounted and fixed into the mounting surface such as the ceiling, and the edge of the mounting hole of the ceiling will not be damaged when the lighting apparatus is mounted and taken out. In addition, the present invention further relates to a lighting apparatus having the mounting mechanism of the above type. This type of lighting apparatus can be simply mounted into the mounting hole of the ceiling and simply taken out therefrom without damaging the edge of the mounting hole.

[0004] The first object of the present invention is achieved by a mounting mechanism used for a lighting apparatus via the following solution, i.e. the mounting mechanism has a base to be fixed on the mounting surface, wherein the base is provided with at least two notches, each of the notches is provided with a slide bar connected between two opposite side surfaces of the notch,

each slide bar is sleeved with a locking member capable of sliding thereon, and wherein the base is provided with a first locating member and a second locating member, and wherein the first locating member is used to limit the locking member in a locked mounting state, and the second locating member is used to limit the locking member in an inserted state. With such a solution, when the locking member is in the inserted state, the locking member stands up vertically on the slide bar, but due to the presence of the second locating member, the locking member will not fall down inwardly. That is to say, the locking member will not fall down towards the direction of the lamp group structure provided in the base but it can fall down in the direction away from the light group structure. After the locking member falls down in the direction away from the light group structure, the locking member correspondingly slides to a locked mounting position where the first locating member abuts against the locking member to prevent the locking member from falling down towards the vertical direction so as to reliably fix the lighting apparatus into the mounting hole of the mounting surface. When the mounting mechanism of this type is used to mount the lighting apparatus into the mounting hole or to take it out from the mounting hole, the locking member will not come into contact with the edge of the mounting hole, and therefore, the edge of the mounting hole will not be damaged.

[0005] According to a preferred solution of the present invention, the first locating member and the second locating member are provided on two opposite side surfaces of the notch, so that the first and second locating members can be simply held in the profile of the base, which further decreases the number of the parts projecting beyond the base and avoids damage to the edge of the mounting hole of the mounting surface.

[0006] It is provided according to the present invention that the first locating member and the second locating member are located above the slide bar in the vertical direction with respect to the mounting surface and at both sides of the slide bar in the horizontal direction. This structure ensures the locking member to be capable of standing up on the slide bar in the inserted state but not to fall down towards the direction of the light group provided in the base, and when the locking member is in the locked mounting state, the locking member is ensured to reliably abut against the mounting surface.

[0007] It is provided according to the present invention that the width from a free end of the first locating member to a side surface of the notch and provided with the second locating member is bigger than or equal to the width of the locking member so as to ensure the locking member to be capable of standing up on the slide bar and to abut against the second locating member to maintain the inserted state.

[0008] It is provided according to a preferred solution of the present invention that the free ends of the first locating member and the second locating member are connected to each other. As the first locating member

and the second locating member are disposed opposite to each other at both sides of the slide bar, respectively, in a staggered arrangement, when the locking member slides in the stand-up state, it likely slides beyond the first locating member so that it cannot fall down in the direction away from the light group structure due to the prevention of the first locating member. Therefore, to connect the free ends of the first locating member and the second locating member to each other can reliably avoid occurrence of such situation.

[0009] Preferably, the free end of the first locating member is rounded. The free end cut to be round allows the locking member to easily slide under the first locating member.

[0010] According to a preferred solution of the present invention, the first locating member has a wave-shaped profile at one side facing the bottom portion of the notch and one side of the locking member is provided with a protruding portion in cooperation with the wave-shaped profile. When the locking member slides under the first locating member, due to the cooperation between the wave-shaped profile and the protruding portion, the locking member is effectively prevented from escaping from under the first locating member.

[0011] Preferably, the first locating member gradually gets thinner from its connecting portion with the notch to the free end. After the locking member falls down from the stand-up state, as the locking member gradually slides towards the direction of the connecting portion of the first locating member and the notch, the angle of the locking member with respect to the mounting surface will gradually get bigger until the end of the locking member abuts against the mounting surface. An additional advantage is brought about hereby, i.e. the locking member can slide to different positions under the first locating member depending upon different thicknesses of the mounting surface, for instance, when the mounting surface has a relatively large thickness, the locking member merely slides a quite short distance under the first locating member, and when the mounting surface has a relatively small thickness, the locking member merely slides a quite long distance under the first locating member until arriving at the connecting portion of the first locating member and the notch, so that the mounting mechanism fixes the lighting apparatus into the mounting surface reliably.

[0012] According to a preferred solution of the present invention, the end of the locking member is provided with an anti-skid stopping structure facing one side of the bottom portion of the notch in the locked mounting position. The anti-skid stopping structure of this type can ensure that the locking member can be fixed on the mounting surface reliably when the base rotates with respect to the mounting surface but will not rotate with the base, and also it ensures that the locking member can slide to under the first locating member.

[0013] Preferably, the base, first locating member and second locating member are made in one piece, which

reduces the hardness in fabricating the mounting mechanism to a certain extent.

[0014] The other object of the present invention is achieved by a lighting apparatus having the mounting mechanism according to the present invention.

Brief Description of the Drawings

[0015] The drawings constitute a portion of the Description for further understanding of the present invention. These drawings illustrate the embodiments of the present invention and explain the principle of the present invention together with the Description. In the drawings, the same element is represented by the same reference sign, wherein

Figure 1 is a schematic view of the mounting mechanism in the inserted state according to the present invention;

Figure 2 is a schematic view of the mounting mechanism in the locked mounting state according to the present invention; and

Figure 3 is a partial view of the mounting mechanism according to the present invention.

Detailed Description of the Embodiments

[0016] Figure 1 is a schematic view of the mounting mechanism in the inserted state according to the present invention. From the figure it can be seen that the mounting mechanism has a cylinder-shaped base 1 with a notch 2 provided at either side of two opposite sides thereof, each notch 2 being provided with a slide bar 3 connected between two opposite side surfaces of the notch 2, each slide bar 3 being sleeved with a locking member 4 capable of sliding thereon, wherein the base 1 is provided with a first locating member 5a and a second locating member 5b, and wherein the first locating member 5a and the second locating member 5b are located above the slide bar 3 in the vertical direction with respect to the mounting surface and at both sides of the slide bar 3 in the horizontal direction. In the inserted state, the locking member 4 stands up on the slide bar 3, and it will not fall down towards the inside of the base, i.e. the direction of the lamp group structure, due to the prevention of the second locating member 5b, but the locking member can fall down towards the outside of the base, i.e. the direction away from the lamp group structure.

[0017] Figure 2 is a schematic view of the mounting mechanism in the locked mounting state according to the present invention. In the locked mounting state, the locking member 4 is under the first locating member 5a which prevents the locking member from standing up, thus, the two locking members 4 project from the profile of the base 1 so as to prevent the mounting mechanism together with the lighting apparatus from escaping from the

mounting hole of the mounting surface, i.e. of the ceiling, and further, the lighting apparatus is fixed on the ceiling.

[0018] Figure 3 is an enlarged partial view of the mounting mechanism according to the present invention. In this partial view, only an enlarged view of one locking member of the mounting mechanism is shown. From the figure it can be seen that the free ends of the first locating member 5a and the second locating member 5b are connected to each other so as to prevent the locking member 4 from sliding beyond the first locating member 5a during the sliding in the stand-up state, thus, due to the prevention of the first locating member 5a, it will not fall down in the direction away from the lamp group structure.

[0019] In addition, it can be seen from Figure 3 that the free end of the first locating member 5a is rounded, and the locking member 4 can easily slide to under the first locating member 5a. Furthermore, one side of the first locating member 5a facing the mounting surface has a wave-shaped profile, and moreover one side of the locking member 4 is provided with a protruding portion 6 in cooperation with the wave-shaped profile. Thus, in the locked mounting state, it can simply ensure that the locking member 4 will not escape from under the first locating member 5a. It also can be seen from the figure that the first locating member 5a gradually gets thinner from its connecting portion with the notch 2 to the free end. After the locking member 4 falls down from the stand-up state, as the locking member 4 gradually slides towards the direction of the connecting portion of the first locating member 5a and the notch 2, the angle of the locking member 4 with respect to the mounting surface will gradually get bigger until the end 7 of the locking member 4 abuts against the mounting surface. Herein, the locking member 4 can slide to different positions under the first locating member 5a depending upon different thicknesses of the mounting surface, for instance, when the mounting surface has a relatively large thickness, the locking member 4 merely slides a quite short distance under the first locating member 5a, and when the mounting surface has a relatively small thickness, the locking member 4 merely slides a quite long distance under the first locating member 5a until arriving at the connecting portion of the first locating member 5a and the notch, so that the mounting mechanism fixes the lighting apparatus into the mounting surface reliably.

[0020] And furthermore, it is also shown in Figure 3 that the end 7 of the locking member 4 is provided with an anti-skid stopping structure 8 towards one side of the bottom portion of the notch 2 in the locked mounting position. The anti-skid stopping structure 8 of this type can ensure that the locking member 4 can be fixed on the mounting surface reliably when the base 1 rotates with respect to the mounting surface but will not rotate with the base 1, and also it can ensure that the locking member 4 can slide to under the first locating member 5a.

[0021] Next, the application of the mounting mechanism according to the present invention will be described in detail. Before starting the installation, the locking mem-

ber 4 is manually slid to the position of the second locating member 5b, stood up from the slide bar 3, and held manually. The locking member 4 together with the base 1 is inserted into the mounting surface, i.e. the mounting hole of the ceiling. At this moment, as the locking member 4 is no longer held manually, the locking member 4 falls down towards the direction of the ceiling under the action of gravity, and is locked into the ceiling using the anti-skid stopping structure 8 (designed to be an anchoring bolt) on the end 7 thereof. Subsequently, the base 1 is rotated with respect to the ceiling, at this moment, the locking member slides under the first locating member 5a and locked in this position, thus, the lighting apparatus is fixed into the mounting hole of the ceiling. When the lighting apparatus is to be taken out, the process will be performed in the reverse order.

[0022] The above is merely preferred embodiments of the present invention but not to limit the present invention. For the person skilled in the art, the present invention may have various alterations and changes. Any alterations, equivalent substitutions, improvements, within the spirit and principle of the present invention, should be covered in the protection scope of the present invention.

25 List of reference signs

[0023]

1	base
2	notch
3	slide bar
4	locking member
5a	first locating member
5b	second locating member
6	protruding portion
7	end
8	anti-skid stopping structure

40 Claims

1. A mounting mechanism used for a lighting apparatus, having a base (1) to be fixed on a mounting surface, wherein the base (1) is provided with at least two notches (2), each of the notches (2) is provided with a slide bar (3) connected between two opposite side surfaces of the notch (2), each slide bar (3) is sleeved with a locking member (4) capable of sliding thereon, and wherein the base (1) is provided with a first locating member (5a) and a second locating member (5b), and wherein the first locating member (5a) is used to limit the locking member (4) in a locked mounting state, and the second locating member (5b) is used to limit the locking member (4) in an inserted state.
2. The mounting mechanism according to Claim 1, wherein the first locating member (5a) and the sec-

ond locating member (5b) are provided on two opposite side surfaces of the notch (2).

3. The mounting mechanism according to Claim 1 or 2, wherein the first locating member (5a) and the second locating member (5b) are located above the slide bar (3) in a vertical direction with respect to the mounting surface and at both sides of the slide bar (3) in a horizontal direction. 5
4. The mounting mechanism according to any one of Claims 1 to 3, wherein a width from a free end of the first locating member (5a) to a side surface of the notch (2) which is provided with the second locating member (5b) is bigger than or equal to a width of the locking member (4). 10
5. The mounting mechanism according to Claim 1, wherein free ends of the first locating member (5a) and the second locating member (5b) are connected to each other. 15
6. The mounting mechanism according to Claim 1, wherein the free end of the first locating member (5a) is rounded. 20
7. The mounting mechanism according to Claim 1, wherein the first locating member (5a) has a wave-shaped profile at one side facing a bottom portion of the notch (2) and one side of the locking member (4) is provided with a protruding portion (6) in cooperation with the wave-shaped profile. 25
8. The mounting mechanism according to Claim 1, wherein the first locating member (5a) gradually gets thinner from its connecting portion with the notch (2) to a free end. 30
9. The mounting mechanism according to Claim 7, wherein an end (7) of the locking member (4) is provided with an anti-skid stopping structure (8) facing one side of the bottom portion of the notch (2) in the locked mounting position. 35
10. The mounting mechanism according to any one of Claims 1 to 9, wherein the base (1), the first locating member (5a) and the second locating member (5b) are made in one piece. 40
11. A lighting apparatus, wherein the lighting apparatus has the mounting mechanism according to any one of Claims 1 to 10. 45

Patentansprüche 55

1. Montagemechanismus, der für eine Beleuchtungseinrichtung verwendet wird, mit einer Basis (1), die

an einer Montageoberfläche zu befestigen ist, wobei die Basis (1) mit wenigstens zwei Aussparungen (2) versehen ist, wobei jede der Aussparungen (2) mit einer Gleitschiene (3) versehen ist, die zwischen zwei gegenüberliegenden Seitenoberflächen der Aussparung (2) verbunden ist, wobei jede Gleitschiene (3) seitlich abstehend mit einem Arretierungselement (4) versehen ist, das dazu in der Lage ist, darauf zu gleiten, und wobei die Basis (1) mit einem ersten Lokalisierungselement (5a) und einem zweiten Lokalisierungselement (5b) versehen ist und wobei das erste Lokalisierungselement (5a) verwendet wird, um das Arretierungselement (4) in einem relativen Montagezustand einzugrenzen, und wobei das zweite Lokalisierungselement (5b) verwendet wird, um das Arretierungselement (4) in einem eingefügten Zustand zu begrenzen.

2. Montagemechanismus nach Anspruch 1, wobei das erste Lokalisierungselement (5a) und das zweite Lokalisierungselement (5b) auf zwei gegenüberliegenden Seitenoberflächen der Aussparung (2) bereitgestellt sind.
3. Montagemechanismus nach Anspruch 1 und 2, wobei sich das erste Lokalisierungselement (5a) und das zweite Lokalisierungselement (5b) oberhalb der Gleitschiene (3) in einer vertikalen Richtung mit Bezug auf die Montageoberfläche und auf beiden Seiten der Gleitschiene (3) in einer Horizontalrichtung befinden.
4. Montagemechanismus nach einem der Ansprüche 1 bis 3, wobei eine Breite von einem freien Ende des ersten Lokalisierungselements (5a) zu einer Seitenoberfläche der Aussparung (2), die mit dem zweiten Lokalisierungselement (5b) versehen ist, größer als eine oder gleich einer Breite des Arretierungselements (4) ist.
5. Montagemechanismus nach Anspruch 1, wobei freie Enden des ersten Lokalisierungselements (5a) und des zweiten Lokalisierungselements (5b) miteinander verbunden sind.
6. Montagemechanismus nach Anspruch 1, wobei das freie Ende des ersten Lokalisierungselements (5a) abgerundet ist.
7. Montagemechanismus nach Anspruch 1, wobei das erste Lokalisierungselement (5a) ein wellenförmiges Profil auf einer Seite, die einem unteren Teil der Aussparung (2) zugewandt ist, aufweist und eine Seite des Arretierungselements (4) mit einem hervorstehenden Teil (6) in Zusammenarbeit mit dem wellenförmigen Profil versehen ist.
8. Montagemechanismus nach Anspruch 1, wobei das

erste Lokalisierungselement (5a) von seinem Verbindungsteil mit der Aussparung (2) aus zu einem freien Ende hin allmählich dünner wird.

9. Montagemechanismus nach Anspruch 7, wobei ein Ende (7) des Arretierungselements (4) mit einer Antirutsch-Stoppstruktur (8) versehen ist, die einer Seite des unteren Teils der Aussparung (2) in der arretierten Montageposition zugewandt ist.
10. Montagemechanismus nach einem der Ansprüche 1 bis 9, wobei die Basis (1), das erste Lokalisierungselement (5a) und das zweite Lokalisierungselement (5b) in einem Stück gefertigt sind.
11. Beleuchtungseinrichtung, wobei die Beleuchtungseinrichtung den Montagemechanismus nach einem der Ansprüche 1 bis 10 aufweist.

Revendications

1. Mécanisme de montage utilisé pour un appareil d'éclairage, présentant une base (1) destinée à être fixée sur une surface de montage, dans lequel la base (1) est munie d'au moins deux encoches (2), chacune des encoches (2) est munie d'une glissière (3) raccordée entre deux surfaces latérales opposées de l'encoche (2), chaque glissière (3) est chemisée avec un élément de verrouillage (4) capable de coulisser sur celle-ci, et dans lequel la base (1) est munie d'un premier élément de positionnement (5a) et d'un deuxième élément de positionnement (5b), et dans lequel le premier élément de positionnement (5a) est utilisé pour limiter l'élément de verrouillage (4) dans un état de montage verrouillé, et le deuxième élément de positionnement (5b) est utilisé pour limiter l'élément de verrouillage (4) dans un état inséré.
2. Mécanisme de montage selon la revendication 1, dans lequel le premier élément de positionnement (5a) et le deuxième élément de positionnement (5b) sont fournis sur deux surfaces latérales opposées de l'encoche (2).
3. Mécanisme de montage selon la revendication 1 ou 2, dans lequel le premier élément de positionnement (5a) et le deuxième élément de positionnement (5b) sont situés au-dessus de la glissière (3) dans une direction verticale par rapport à la surface de montage et au niveau des deux côtés de la glissière (3) dans une direction horizontale.
4. Mécanisme de montage selon l'une quelconque des revendications 1 à 3, dans lequel une largeur entre une extrémité libre du premier élément de positionnement (5a) et une surface latérale de l'encoche (2)

qui est munie du deuxième élément de positionnement (5b) est supérieure ou égale à une largeur de l'élément de verrouillage (4).

5. Mécanisme de montage selon la revendication 1, dans lequel des extrémités libres du premier élément de positionnement (5a) et du deuxième élément de positionnement (5b) sont raccordées l'une à l'autre.
6. Mécanisme de montage selon la revendication 1, dans lequel l'extrémité libre du premier élément de positionnement (5a) est arrondie.
7. Mécanisme de montage selon la revendication 1, dans lequel le premier élément de positionnement (5a) présente un profil de forme ondulée au niveau d'un côté faisant face à une partie inférieure de l'encoche (2) et un côté de l'élément de verrouillage (4) est muni d'une partie saillante (6) coopérant avec le profil de forme ondulée.
8. Mécanisme de montage selon la revendication 1, dans lequel le premier élément de positionnement (5a) devient progressivement plus mince à partir de sa partie raccordement munie de l'encoche (2) vers une extrémité libre.
9. Mécanisme de montage selon la revendication 7, dans lequel une extrémité (7) de l'élément de verrouillage (4) est munie d'une structure d'arrêt antipatinage (8) faisant face à un côté de la partie fond de l'encoche (2) dans la position de montage verrouillée.
10. Mécanisme de montage selon l'une quelconque des revendications 1 à 9, dans lequel la base (1), le premier élément de positionnement (5a) et le deuxième élément de positionnement (5b) sont réalisés d'un seul tenant.
11. Appareil d'éclairage, dans lequel l'appareil d'éclairage présente le mécanisme de montage selon l'une quelconque des revendications 1 à 10.

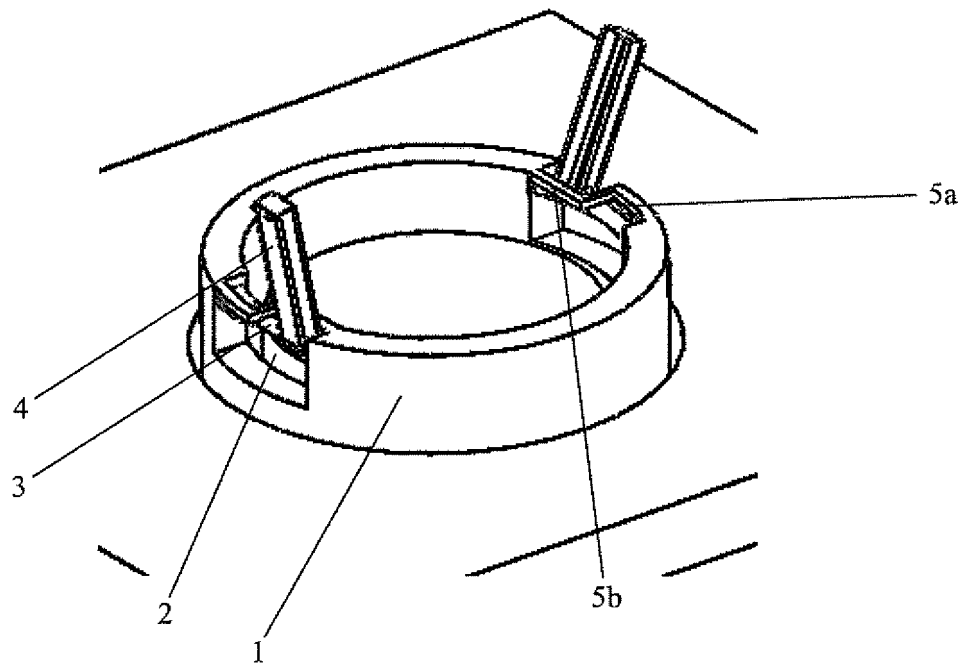


Figure 1

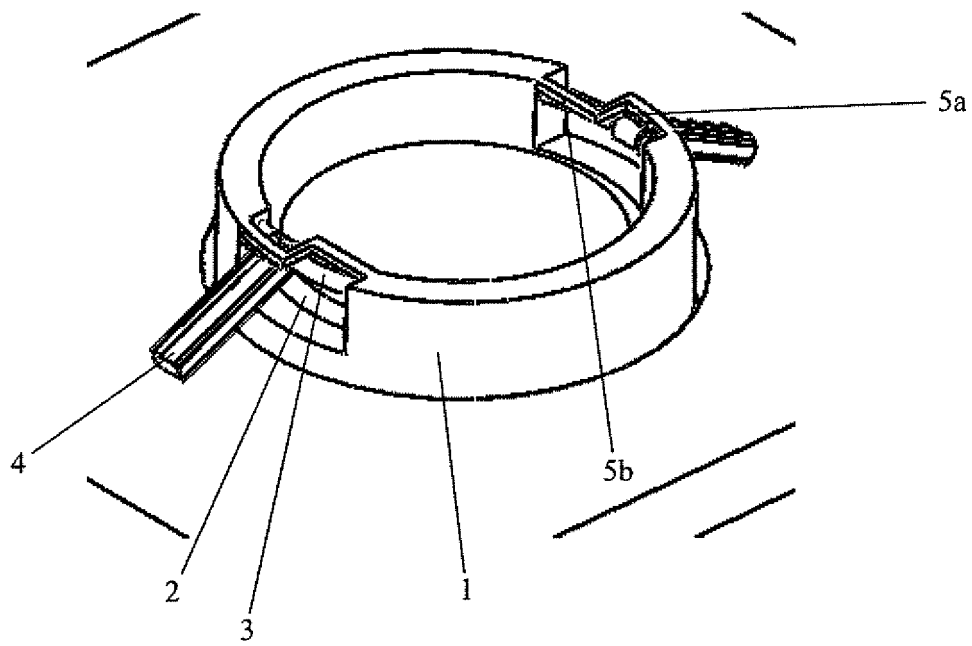


Figure 2

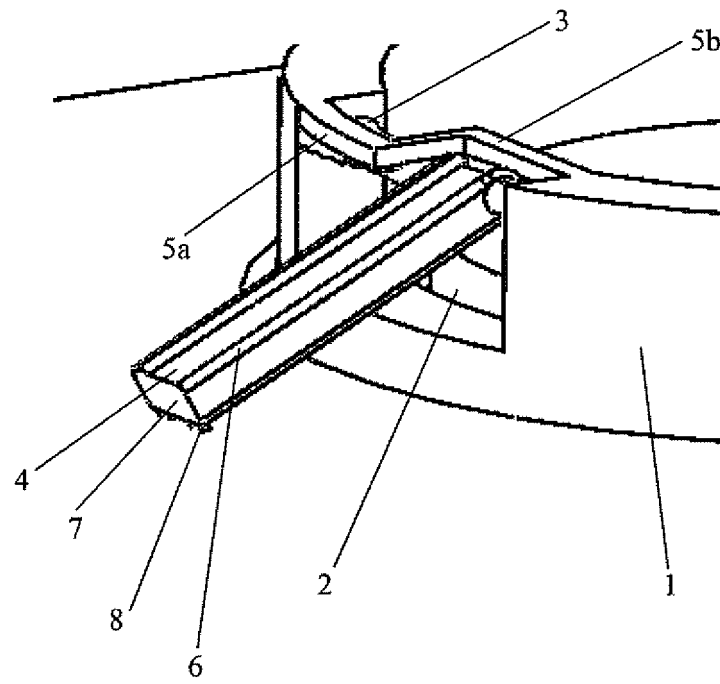


Figure 3