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(54) **Title:** LIGHTING DEVICE

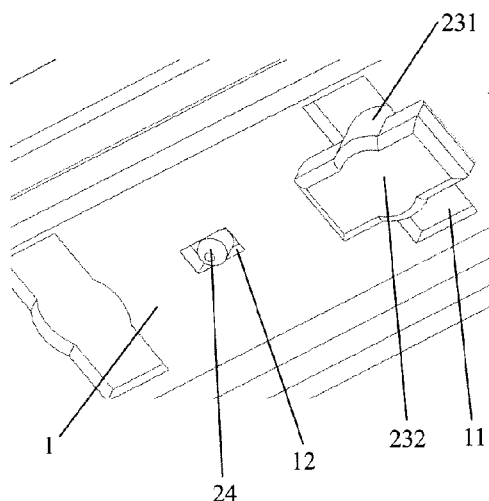


Figure 5e

(57) **Abstract:** The present invention relates to a lighting device (100), which comprises a mounting profile (1) and at least one light emitting module (2), the light emitting module (2) includes a housing (22) accommodating a light emitting assembly (21), wherein the lighting device (100) further comprises a locking structure, wherein the locking structure includes at least one first through hole (11) formed on the mounting profile (1) and a first projection part (23) formed on a first side of the housing (22), wherein the first projection part (23) and the first through hole (11) are configured in such a manner, so that the mounting profile (1) and the light emitting module (2) are detachable locked together by rotating the first projection part (23) with respect to the first through hole (11) after inserting the first projection part (23) into the first through hole (11).

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Description

Lighting Device

5 **Technical Field**

The present invention relates to a lighting device.

Background Art

With rising prosperity of commercial activities, products are usually promoted by lighting the advertisements thereof by
10 lamp light in the open air, or the contour of a building is revealed through lamp light. Hereby, light strings are generally used to decorate advertisements or delineate the contour of a building. However, with continuous development of lighting technology, LED light sources are widely used as respec-
15 tive light sources in light strings. In this case, the respective LED light sources are stringed with each other. In an actual installation process, the respective LED light sources have to be fixed at a predetermined position; particularly in certain outdoor applications, an installation
20 process of such a type is very complex and difficult. And a mounting profile is usually equipped for LED strings in a lighting device of the above type. During installation, an LED string is firstly fixed on the mounting profile. In this case, bolts are generally used to fix the respective LED
25 light sources of the LED string on the mounting profile. It is very complex for an assembly technician, and specialized tools are required during the installation, which results in increase of costs. In another solution, the mounting profile is configured to be elastic. The LED light source is engaged
30 in an installation space formed by the elastic mounting profile, so that the LED light source is held in the mounting profile through an elastic deformation of the mounting profile. However, one disadvantage of this mode lies in that the

position of the LED light source on the mounting profile is not accurate enough, and the deformation of the mounting profile might cause dropping off of the LED light source accommodated therein.

5 **Summary of the Invention**

In order to solve the above technical problem, the present invention provides a lighting device. The light emitting module and mounting profile of the lighting device according to the present invention can be position-accurately and reliably
10 held together with each other without using accessories. The lighting device of such a type is simple in assembly and requires low cost.

The object of the present invention is achieved through a lighting device in such a manner, viz. the lighting device
15 comprises a mounting profile and at least one light emitting module, said light emitting module includes a housing accommodating a light emitting assembly, wherein the lighting device further comprises a locking structure, wherein the locking structure includes at least one first through hole formed
20 on the mounting profile and a first projection part formed on a first side of the housing, wherein the first projection part and the first through hole are configured in such a manner, so that the mounting profile and the light emitting module are detachable locked together by rotating the first projection
25 part with respect to the first through hole after inserting the first projection part into the first through hole. In an embodiment of the present invention, the fixed connection between the light emitting module and the mounting profile requires no additional components, e.g. bolts. The
30 housing per se of the light emitting module can be in detachable connection with the mounting profile. It realizes not only a simple assembly, but also an accurate positioning of

the light emitting module on the mounting profile.

According to the present invention, it is provided that the first projection part is configured to be pluggable into the first through hole from one side of the mounting profile in a start position and lockable to the other side of the mounting profile in a final position after rotation with respect to the first through hole. In an embodiment of the present invention, it is required that the first projection part of the light emitting module has to be aligned to the first through hole on the mounting profile in the start position prior to the fixation of the light emitting module to the mounting profile, and in the start position, the first through hole allows the insertion of the first projection part. Moreover, the housing is rotated, after the first projection part is inserted into the first through hole, while the first projection part rotates together with the housing, and is locked to the other side of the mounting profile in the final position.

It is preferable that the first projection part includes a cylindrical pillar and a locking head, wherein one end of the pillar is in connection with the first side of the housing, and the other end is in connection with the locking head, wherein the locking head is pluggable into the first through hole from one side of the mounting profile in the start position and lockable to the other side of the mounting profile in the final position. Hereby, the cylindrical pillar functions as a rotation axis, and the housing rotates about the pillar as an axis from the start position to the final position. In the meanwhile, the function of the locking head lies in being locked to the other side of the first through hole in the final position, so as to prevent the first projection part from dropping out of the first through hole, in order to assure a reliable fixed connection of the housing, viz. the

light emitting module with the mounting profile.

It is advantageous that viewing from a cross-section parallel to the first side, the locking head has a first length in a first direction and a second length in a second direction perpendicular to the first direction, wherein the first length is larger than the second length. In the present embodiment, the contour of the locking head is defined, wherein the locking head is overall similar to a cuboid connected to a free end of the pillar, wherein the first length is equivalent to the long edge of the cuboid, while the second length is equivalent to the short edge. Moreover, the free end of the pillar is in connection with a middle position of the cuboid, so that the pillar and the locking head form a T-shaped structure. After the first projection part is inserted into the first through hole, and the light emitting module and the mounting profile are further rotated with respect to each other, both edges of the T-shaped structure form a locking part, so as to prevent the first projection part from dropping out of the first through hole.

It is further advantageous that the second length is at least equal to the diameter of the cylindrical pillar in the cross-section.

According to the present invention, it is provided that the contour of the first through hole matches the contour of the locking head. In other words, viewing from the cross-section, the contour of the first through hole and that of the locking head can be completely identical. However, said first through hole can also be configured in such a manner, viz. said first through hole has a contour orientation similar to that of the locking head, while having a size larger than the contour of the locking head. The advantage of such a design form lies in

that the locking head can easily penetrate the first through hole in the start position, and the contour of the locking head will not coincide with the contour of the first through hole in projection part after the relative rotation between the light emitting module and the mounting profile, so that the locking head limits the relative movement between the light emitting module and the mounting profile, even the two has a moving trend of departing from each other due to an external force.

10 According to the present invention, it is further provided that the mounting profile further includes a plurality of second through holes, and the light emitting module further includes a second projection part formed on the first side of the housing, wherein the second projection part is inserted
15 into the second through hole in the final position, so as to prevent the light emitting module from rotating about the first projection part with respect to the first through hole. Actually, the second through hole and the second projection part commonly function for positioning. In the final position,
20 tion, the second through hole and the second projection part can well prevent the rotation motion of the light emitting module having the pillar as an axis.

It is preferable that the second projection part is configured as a cylindrical positioning pillar. The production of
25 the cylindrical positioning pillar is simpler and easier. It is advantageous that the second through hole is configured as a circular hole, wherein the diameter of the circular hole is at least equal to the diameter of the positioning pillar.

It is optional that the second through hole is configured as
30 an elongated hole, wherein the side length of the elongated hole is at least equal to the diameter of the positioning

pillar. Such an elongated hole can be square or rectangular. However, no matter an elongated hole of which shape is used, it shall satisfy the following requirement, viz. the length of the side of the elongated hole has to be equal to or
5 slightly larger than the diameter of the positioning pillar, wherein the extension direction of the side of the elongated hole is perpendicular to the longitudinal direction of the mounting profile.

According to the present invention, it is provided that the
10 first projection part, the second projection part and the housing are made integrally as one piece. It greatly reduces the manufacturing complexity of the lighting device according to the present invention.

It is advantageous that the first projection part, the second
15 projection part and the housing are made of a thermoplastic polyurethane elastomer material. When the second projection part is configured as elastic, the second projection part could have an elastic deformation during the rotation of the light emitting module with respect to the mounting profile,
20 and could be inserted into the second through hole when reaching at the position of the second through hole and under the effect of a reset force, so as to generate a positioning action together with the second through hole.

It is preferable that the mounting profile is made of a
25 metal. A metallic support has a higher strength, and is easier to manufacture. Of course, other synthetic materials can also be used to manufacture the mounting profile.

According to the present invention, it is provided that the light emitting assembly is an LED light emitting assembly.
30 LED light emitting assemblies have advantages of high lumi-

nous efficiency, long service life and environmental protection.

It shall be understood that both the above general description and the following detailed description are for illustrative and explanative purposes in order to provide further description of the claimed present invention.

Brief Description of the Drawings

The accompanying drawings constitute a part of the present Description and are used to provide further understanding of the present invention. Such accompanying drawings illustrate the embodiments of the present invention and are used to describe the principles of the present invention together with the Description. In the accompanying drawings, the same components are represented by the same reference numbers. As shown in the drawings:

Figure 1 is a side view of the light emitting module of the lighting device according to the present invention;

Figure 2 is a bottom view of the light emitting module in Figure 1;

Figure 3 is a schematic diagram of the mounting profile of the light emitting module according to the present invention;

Figure 4 is a schematic local view of the mounting profile in Figure 3; and

Figures 5a to 5e are procedure charts for mounting the light emitting module in Figure 1 to the mounting profile in Figure 3.

Detailed Description of the Embodiments

Figure 1 shows a schematic diagram of one light emitting module 2 of the lighting device 100 according to the present invention. It shall be indicated hereby that Figure 1 only
5 schematically shows one light emitting module 2. In an actual application, the lighting device 100 may comprise a plurality of light emitting modules 2 that are connected in series with each other. The light emitting module 2 as shown in the figure has no essential differences from the light emitting module in the prior art, and the two both comprise a housing 22
10 accommodating a light emitting assembly 21. A light emitting module 2 having two light emitting assemblies 21 is shown in the figure, wherein the two light emitting assemblies 21 are both configured as LED light emitting assemblies. It shall be
15 indicated hereby that the difference between the light emitting module 2 shown in Figure 1 and the light emitting module in the prior art lies in that a first projection part 23 as a constituent part of a locking structure of the lighting device 100 and a second projection part 24 arranged in a certain interval from the first projection part 23 are formed on
20 a first side of the light emitting module 2 departing from the light emitting assemblies 21.

It can be seen from the figure that the first projection part 23 includes a cylindrical pillar 231 and a locking head 232,
25 wherein one end of the pillar 231 is in connection with the first side of the housing 22, and the other end is in connection with the locking head 232. Moreover, at the right side of the first projection part 23 as shown in Figure 1, the second projection part 24 is shown, which is configured as a
30 cylindrical positioning pillar. In an embodiment of the present invention, the first projection part 23, the second projection part 24 and the housing 22 are made of a thermoplastic polyurethane elastomer material.

A bottom view of the light emitting assembly 2 in Figure 1 is shown in Figure 2. The shape and positional relation between the first projection part 23 and the second projection part 24 can be clearly seen from the figure. Particularly, the contour of the locking head 232 of the first projection part 23 viewing from a cross-section parallel to the first side can be observed. It can be seen from the figure that the locking head 232 has a first length in a first direction and a second length in a second direction perpendicular to the first direction, wherein the first length is larger than the second length. In the present example, the locking head 232 is overall similar to a cuboid connected to a free end of the pillar 231, wherein the first length is equivalent to the long edge of the cuboid, while the second length is equivalent to the short edge. Moreover, the free end of the pillar 231 is in connection with a middle position of the cuboid, so that the pillar 231 and the locking head 232 form a T-shaped structure. In the present example, two arc-shaped projection parts are formed in a central region of the rectangular contour, and said position corresponds to the position of the pillar 231; in the present example, the diameter of the pillar 231 is slightly longer than the short edge of the rectangular locking head 232. However, the length of the short edge of the locking head 232, viz. the second length can also be equal to or larger than the diameter of the pillar 231.

Figure 3 shows a schematic diagram of the mounting profile 1 of the lighting device 100 according to the present invention. It can be seen from the figure that said mounting profile 1 is configured as an elongated part, a plurality of first through holes 11 and second through holes 12 are formed thereon, wherein the first through holes 11 and the second through holes 12 are arranged in an interval from each other. In an embodiment of the present invention, the mounting pro-

file 1 is made of a metal, as a metallic support has a higher strength and is easy to manufacture. Of course, other synthetic materials can also be used to manufacture the mounting profile 1.

5 Figure 4 shows a schematic local view of the mounting profile 1 as shown in Figure 3. Two first through holes 11 and a second through hole 12 arranged between the two first through holes 11 can be seen from the figure. With reference to the contour of the locking head 232 of the first projection part 23 in a cross-section as shown in Figure 2, the first through
10 hole 11 has the same contour orientation. In the present example, the contour of the first through hole 11 is at least as large as that of the locking head 232. Moreover, it can further be seen from Figure 4 that the second through hole 12
15 is configured as a rectangular hole. In other optional examples, the second through hole 12 can also be configured to be square or circular. In a situation of a rectangular hole, the side length of the elongated hole is at least the same as the diameter of the positioning pillar. And in a situation of a
20 circular hole, the diameter of the circular hole is at least the same as the diameter of the positioning pillar.

Figures 5a to 5e show procedure charts for mounting the light emitting module 2 in Figure 1 to the mounting profile 1 in Figure 3. It can be seen from Figure 5a that the light emitting module 2 is aligned from above of the mounting profile 1 to the first through hole formed on the mounting profile 1 by means of the first projection part 23, and the current position is called as the so-called first position, in which the projected contour of the locking head 232 of the first projection part 23 coincides with that of the first through hole 11, so that the first projection part 23 is allowed to penetrate the first through hole 11. Figure 5b shows a first pro-
25
30

jection part 23 penetrating the first through hole 11. It can be seen from the figure that the locking head 232 of the first projection part 23 penetrates the first through hole 11 and enters from one side (invisible) of the mounting profile 1 into the other side (the side facing an observer) of the mounting profile 1. Moreover, it can further be observed from said view that the first through hole 11 completely matches the locking head 232 in contour.

In Figure 5c, the light emitting module 2 is rotated with respect to the mounting profile 1. And when viewing at present, the second projection part 24 rests on the edge of the mounting profile 1. However, as the second projection part 24 is made of an elastic flexible material, the second projection part 24 can have an elastic deformation when the light emitting module 2 is further rotated, and it is allowed that the light emitting module 2 is rotated to the state as shown in Figure 5d.

In the state as shown in Figure 5d, the light emitting module 2 completely coincides with the mounting profile 1, in other words, the longitudinal direction of the light emitting module 2 is completely identical with that of the mounting profile 1, viz. the so-called final position is obtained. At present, the contour of the first through hole 11 no longer coincides with that of the locking head 232, in other words, the two form a cruciform arrangement. Figure 5e shows such a positional relation in a clearer manner, and it can be seen from the figure that the two sides of the locking head 232 at both sides of the pillar 231 respectively engage with a structure adjacent to the first through hole 11 of the mounting profile 1, so as to prevent the first projection part 23 from dropping out of the first through hole 11. Moreover, it can further be seen from the figure that the second projec-

tion part 24 that is cylindrical and configured as positioning pillar is inserted into the second through hole 12 under the effect of an elastic reset force, so as to prevent the rotation of the light emitting module 2 with respect to the mounting profile 1 having the pillar 231 as rotation axis. In this case, a reliable and position-fixed connection between the light emitting module 2 and the mounting profile 1 is realized without using additional assembling tools and fastening pieces.

10 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.

List of reference signs

1		mounting profile
11		first through hole
12		second through hole
5	2	light emitting module
	21	light emitting assembly
	22	housing
	23	first projection part
	231	pillar
10	232	locking head
	24	second projection part

Patent claims

1. A lighting device (100) comprising a mounting profile (1) and at least one light emitting module (2), the light emitting module (2) includes a housing (22) accom-
5 modating a light emitting assembly (21), wherein the lighting device (100) further comprises a locking structure, wherein the locking structure includes at least one first through hole (11) formed on the mounting profile (1) and a first projection part (23) formed on a
10 first side of the housing (22), wherein the first projection part (23) and the first through hole (11) are configured in such a manner, that the mounting profile (1) and the light emitting module (2) are detachable locked together by rotating the first projection part
15 (23) with respect to the first through hole (11) after inserting the first projection part (23) into the first through hole (11).
2. The lighting device (100) according to Claim 1, characterized in that the first projection part (23) is configured to be pluggable into the first through hole (11)
20 from one side of the mounting profile (1) in a start position and lockable to the other side of the mounting profile (1) in a final position after rotation of the first projection part (23) with respect to the first
25 through hole (11).
3. The lighting device (100) according to Claim 2, characterized in that the first projection part (23) includes a cylindrical pillar (231) and a locking head (232), wherein one end of the pillar (231) is in connection
30 with the first side of the housing (22), and the other end is in connection with the locking head (232),

wherein the locking head (232) is pluggable into the first through hole (11) from one side of the mounting profile (1) in the start position and lockable to the other side of the mounting profile (1) in the final position.

4. The lighting device (100) according to Claim 3, characterized in that viewing from a cross-section parallel to the first side, the locking head (232) has a first length in a first direction and a second length in a second direction perpendicular to the first direction, wherein the first length is larger than the second length.
5. The lighting device (100) according to Claim 4, characterized in that the second length is at least equal to the diameter of the cylindrical pillar in the cross-section.
6. The lighting device (100) according to Claim 4 or 5, characterized in that the contour of the first through hole (11) matches the contour of the locking head (232) viewing from the cross-section.
7. The lighting device (100) according to any one of Claims 2 to 5, characterized in that the mounting profile (1) further includes a plurality of second through holes (12), and the light emitting module (2) further includes a second projection part (24) formed on the first side of the housing (22), wherein the second projection part (24) is inserted into the second through hole (12) in the final position, so as to prevent the light emitting module (2) from rotating about the first projection part (23) with respect to the mounting profile (1).

8. The lighting device (100) according to Claim 7, characterized in that the second projection part (24) is configured as a cylindrical positioning pillar.
9. The lighting device (100) according to Claim 8, characterized in that the second through hole (12) is configured as a circular hole, wherein the diameter of the circular hole is at least equal to the diameter of the positioning pillar.
10. The lighting device (100) according to Claim 8, characterized in that the second through hole (12) is configured as an elongated hole, wherein the side length of the elongated hole is at least equal to the diameter of the positioning pillar.
11. The lighting device (100) according to Claim 7, characterized in that the first projection part (23), the second projection part (24) and the housing (22) are made integrally as one piece.
12. The lighting device (100) according to Claim 7, characterized in that the first projection part (23), the second projection part (24) and the housing (22) are made of a thermoplastic polyurethane elastomer material.
13. The lighting device (100) according to any one of Claims 1 to 5, characterized in that the mounting profile (1) is made of a metal.
14. The lighting device (100) according to any one of Claims 1 to 5, characterized in that the light emitting assembly (21) is an LED light emitting assembly.

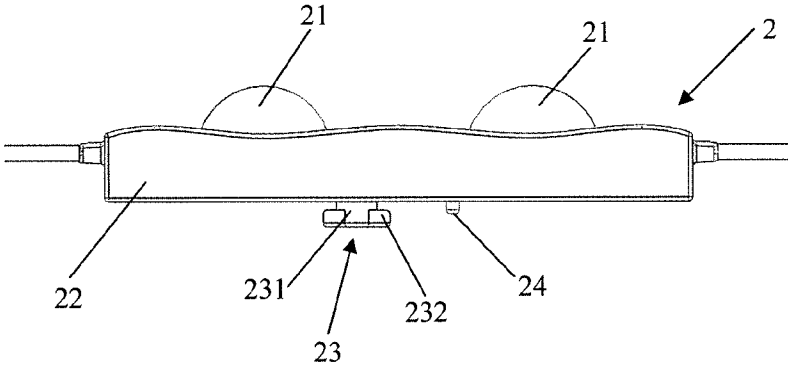


Figure 1

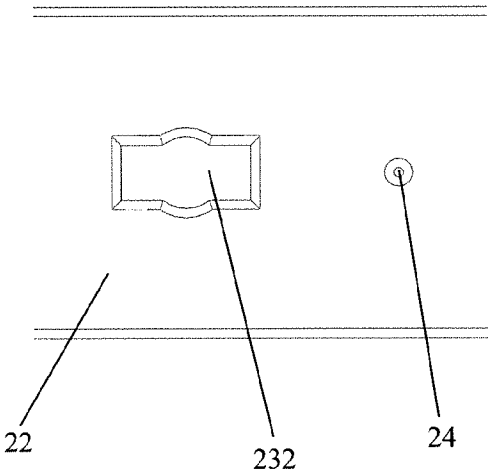
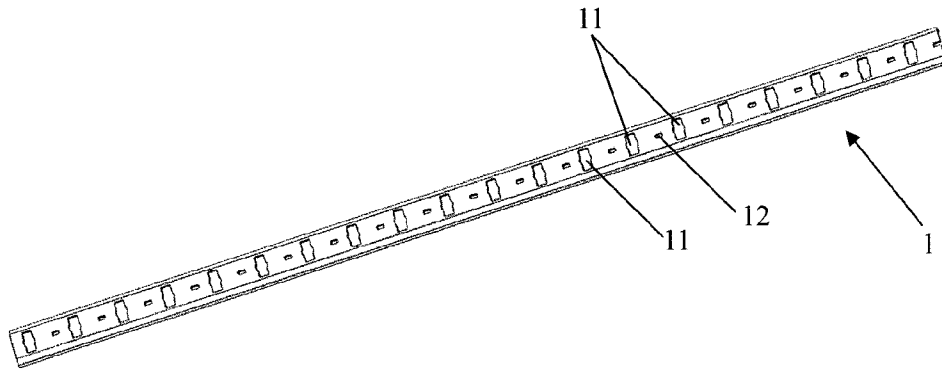
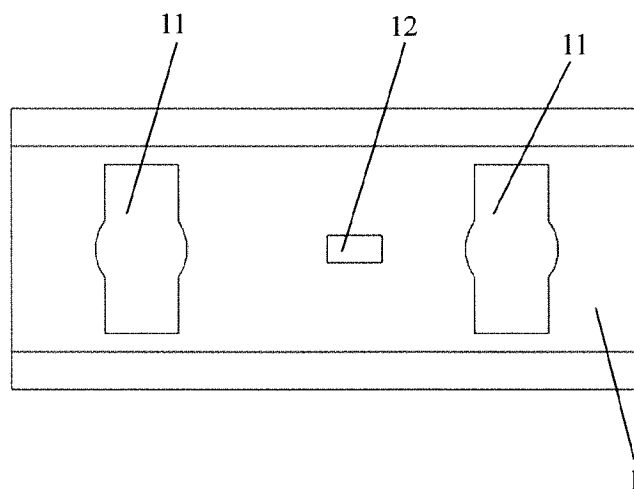


Figure 2

**Figure 3****Figure 4**

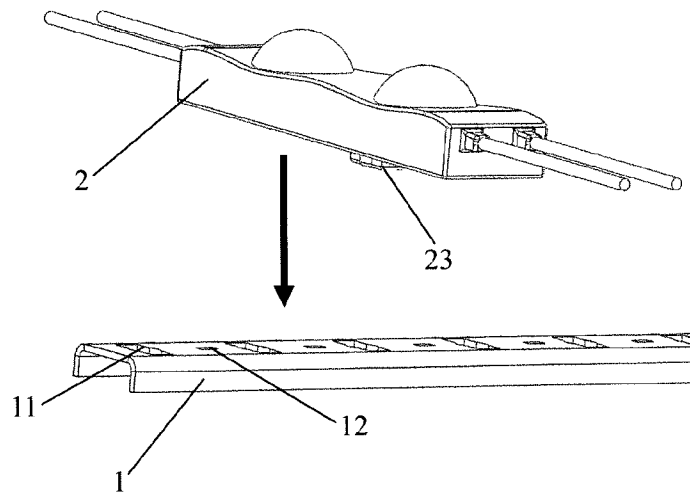


Figure 5a

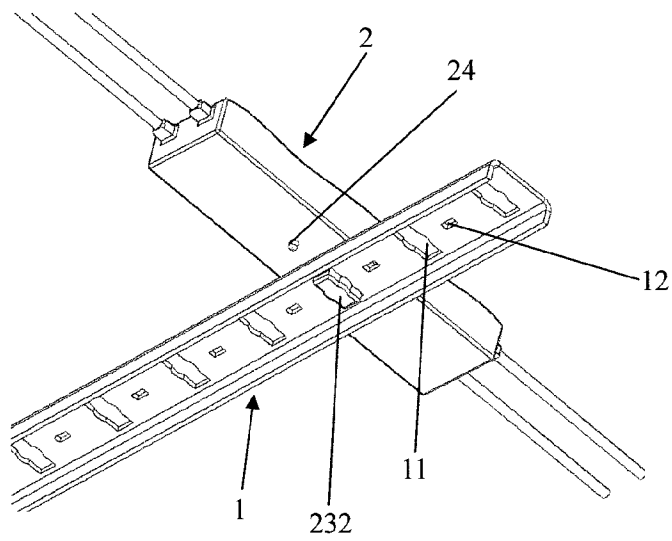


Figure 5b

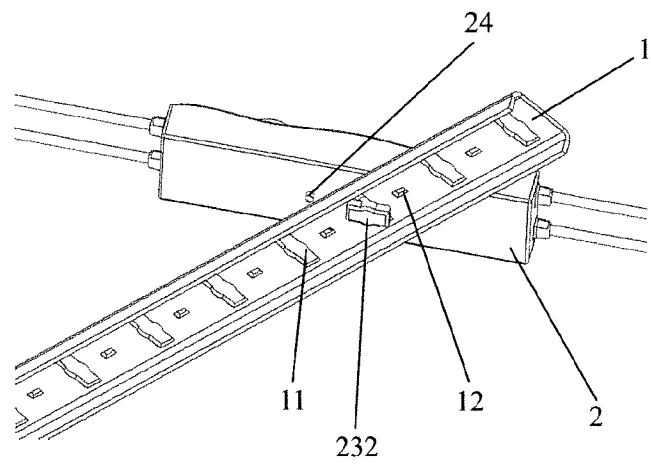


Figure 5c

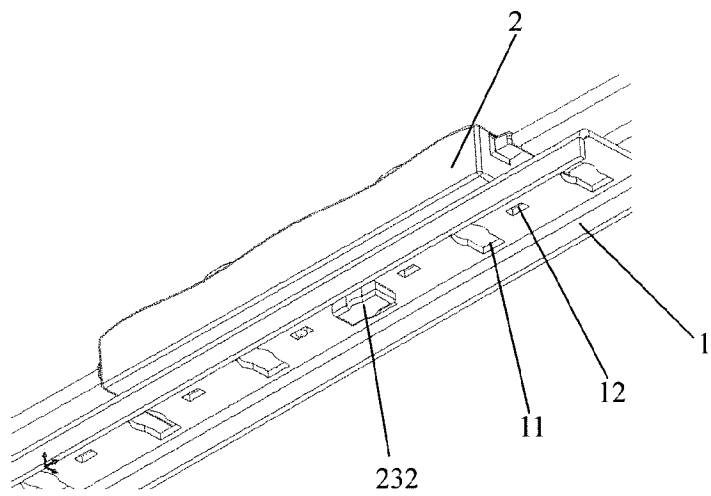


Figure 5d

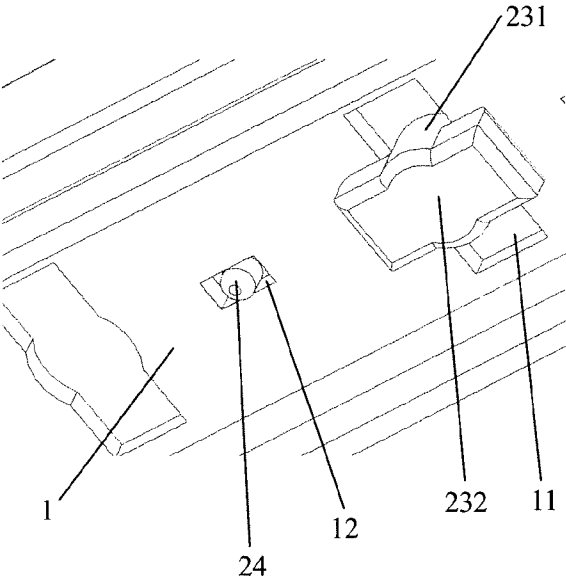


Figure 5e

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2014/053770

A. CLASSIFICATION OF SUBJECT MATTER

INV. F21V21/02
ADD. F21Y101/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F21V F21S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 012 979 A (HARVEY HUBBEL) 3 September 1935 (1935-09-03) page 1, column 1, line 1 - line 6 page 1, column 2, line 41 - line 53 figures 1-18 page 2, column 1, line 21 - line 43 page 3, column 1, line 15 - line 58 -----	1-14
X	US 2002/066847 A1 (BELKNAP LEE J [US]) 6 June 2002 (2002-06-06) paragraphs [0006], [0030] paragraph [0043] - paragraph [0046] figures 1-17 -----	1-14
X	DE 20 2012 001723 U1 (FLOS SPA [IT]) 19 April 2012 (2012-04-19) paragraph [0029] - paragraph [0032] figures 3-5 -----	1-6, 13, 14
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Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

30 April 2014

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13/05/2014

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2014/053770

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 986 780 A (NIVET ANDRE) 19 October 1976 (1976-10-19) figures 1,2 -----	1-6,9-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2014/053770

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012979	A	03-09-1935	NONE
US 2002066847	A1	06-06-2002	NONE
DE 202012001723	U1	19-04-2012	NONE
US 3986780	A	19-10-1976	CA 1056580 A1 19-06-1979
		FR 2273967 A1 02-01-1976	
		JP S515445 A 17-01-1976	
		US 3986780 A 19-10-1976	