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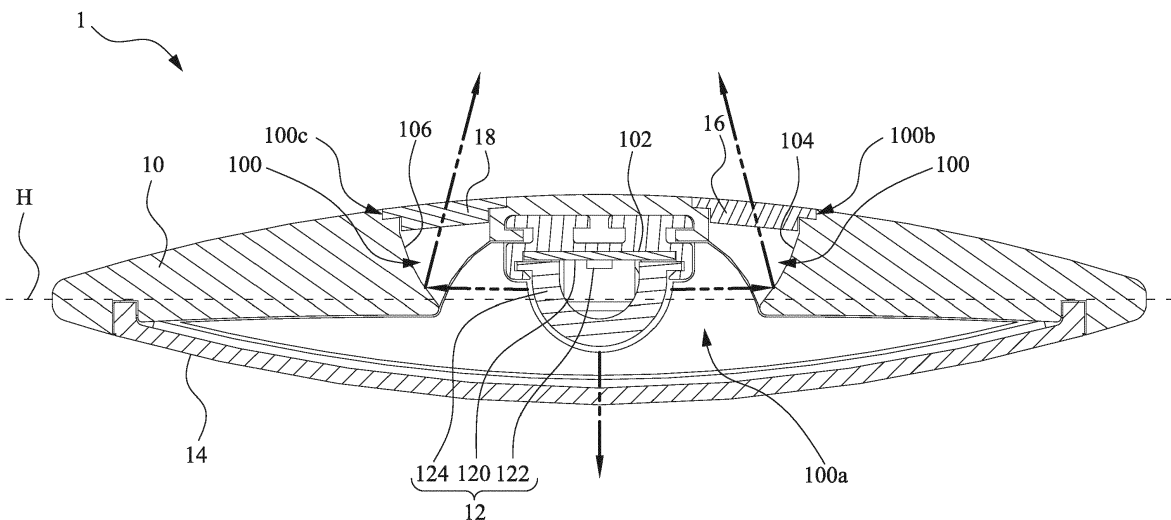
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(54) **Lamp**

(57) A lamp (1) including a base (10) and a light-emitting module (12) is disclosed. The base (10) has a hollow portion (100). The hollow portion (100) has a first opening (100a) and a second opening (100b). The first opening (100a) and the second opening (100b) are respectively located at two opposite sides of the base (10). The base (10) further includes a mounting surface (102) and a reflective surface (104, 106) located within the hollow portion (100). The mounting surface (102) faces toward the first opening (100a). The reflective surface (104, 106) substantially faces toward the mounting surface (102) and the second opening (100b). The light-emitting module (12) is disposed at the mounting surface (102) and emits a light toward the first opening (100a). A part of the light is reflected by the reflective surface (104, 106) and then leaves from the second opening (100b).

tion (100). The mounting surface (102) faces toward the first opening (100a). The reflective surface (104, 106) substantially faces toward the mounting surface (102) and the second opening (100b). The light-emitting module (12) is disposed at the mounting surface (102) and emits a light toward the first opening (100a). A part of the light is reflected by the reflective surface (104, 106) and then leaves from the second opening (100b).



**Fig. 2**

## Description

### BACKGROUND

Technical Field

**[0001]** The present disclosure relates to a lamp.

Description of Related Art

**[0002]** In general, lamps in a building are mostly installed on the ceiling to directly illuminate the interior space, so as to obtain maximum illumination. However, the light of direct illumination is very harsh, which not only causes glare but also may make users feel fatigue and apathy, so recent trends are beginning to promote the use of indirect illumination. Indirect illumination uses techniques in which lamps are installed below the ceiling, and the lamps illuminate toward the ceiling, so that the light emitted by the lamps will be illuminated on the ceiling, and then be reflected to the interior space by the ceiling, and thus softens the light. Therefore, indirect illumination not only can effectively improve the aforementioned disadvantages, but also can significantly improve the atmosphere in the interior space.

**[0003]** Indirect illumination must be reflected by the ceiling, therefore the illumination of the lamps are often significantly reduced, so the current practice is to install a main lamp on the ceiling used as direct illumination and install a plurality of auxiliary lamps used as indirect illumination. Therefore, the users can selectively use the direct illumination or the indirect illumination at any time in accordance with the needs.

**[0004]** However, the main lamp and the auxiliary lamps are independent units, so they not only occupy more interior space but also require a higher cost. In particular, the auxiliary lamps must be installed adjacent to the ceiling to reduce the attenuation of illumination, so the lamps need to use several holders or additional shelves to fix the auxiliary lamps, which may result in even higher installation costs.

**[0005]** Accordingly, providing a lamp capable of providing direct illumination and indirect illumination to solve the aforementioned problems becomes an important issue to be solved by those in the industry.

### SUMMARY

**[0006]** The disclosure provides a lamp. The lamp includes a base and a light-emitting module. The base has a hollow portion. The hollow portion has a first opening and a second opening. The first opening and the second opening are respectively located at two opposite sides of the base. The base further includes a mounting surface and a first reflective surface located within the hollow portion. The mounting surface faces toward the first opening. The first reflective surface substantially faces toward the mounting surface and the second opening.

The light-emitting module is disposed at the mounting surface and emits a light toward the first opening. A part of the light is reflected by the first reflective surface and then leaves from the second opening.

**[0007]** In an embodiment of the disclosure, the light-emitting module includes a circuit board and a plurality of light sources. The circuit board is fixed to the mounting surface. The light sources are disposed on the circuit board along an arrangement direction.

**[0008]** In an embodiment of the disclosure, the circuit board further includes an electrical connector. The electrical connector is located at an end of the circuit board. The lamp further includes a connecting member and a plurality of fasteners. The connecting member is configured to connect the base and another base of another lamp. The fasteners are fastened to the connecting member respectively through the base and the another base, so that the base and the another base are fixed to the connecting member.

**[0009]** In an embodiment of the disclosure, the connecting member has a passage. The electrical connector and another electrical connector of the another lamp insert into the passage and are electrically connected to each other.

**[0010]** In an embodiment of the disclosure, the light sources are blue light-emitting diodes. The light-emitting module further includes a fluorescent powder mask. The fluorescent powder mask is fixed to the circuit board and covers the light sources.

**[0011]** In an embodiment of the disclosure, the lamp further includes a lampshade. The lampshade is fixed to the base and covers the first opening.

**[0012]** In an embodiment of the disclosure, the lampshade is transparent, and the material of the lampshade includes PMMA (Poly(methyl methacrylate)).

**[0013]** In an embodiment of the disclosure, the hollow portion further has a third opening. The third opening and the second opening are located at the same side of the base. The base further includes a second reflective surface located within the hollow portion. The mounting surface is located between the first reflective surface and the second reflective surface. The second reflective surface substantially faces toward the mounting surface and the third opening. Another part of the light is reflected by the second reflective surface and then leaves from the third opening.

**[0014]** In an embodiment of the disclosure, the lamp further includes a first diffusion sheet and a second diffusion sheet. The first diffusion sheet is located at the second opening. The second diffusion sheet is located at the third opening.

**[0015]** In an embodiment of the disclosure, the base is an extruded aluminum substrate, and the first reflective surface and the second reflective surface are anodized surfaces.

**[0016]** Accordingly, the lamp of the disclosure disposes the light-emitting module in the hollow portion of the base, and the light-emitting module faces toward the first

opening of the hollow portion, so that the light emitted out of the first opening by the light-emitting module can serve as direct illumination of the lamp. Moreover, the base of the lamp has the reflective surface in the hollow portion, and the reflective surface can reflect a part of the light emitted by the light-emitting module to the second opening of the hollow portion, so that the light emitted out of the second opening can serve as indirect illumination of the lamp. That is, the lamp of the disclosure is equipped with secondary optical design. Furthermore, an extruded aluminum substrate is used as the base of the lamp, and the reflective surface is anodized to obtain excellent reflectance, so the lamp of the disclosure is lighter and thinner than conventional lamps in the market, and conventional reflective cups that are additionally installed can be replaced by the reflective surface of the lamp of the disclosure. Therefore, the lamp of the disclosure can achieve the purposes of reducing footprint, optical space, and acquisition costs. In addition, the base made of the extruded aluminum substrate has a cooling effect, so the heat generated by the light-emitting module can be transmitted to the base via the circuit board of the light-emitting module, and then be directly dissipated from the surface of the base. Meanwhile, the circuit board has an autologous heat dissipation function, so the circuit board combined with the base made of the extruded aluminum substrate can dissipate the heat generated by an 18-25 W lamp.

**[0017]** It is to be understood that both the foregoing general description and the following detailed description are by examples, and are intended to provide further explanation of the disclosure as claimed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0018]** The disclosure can be more fully understood by reading the following detailed description of the embodiment, with reference made to the accompanying drawings as follows:

Fig. 1A is a perspective view of a lamp according to an embodiment of the disclosure;

Fig. 1B is an exploded view of the lamp in Fig. 1A;

Fig. 2 is a cross-sectional view of the lamp in Fig. 1A along line 3-3';

Fig. 3 is a perspective view of a lamp assembly according to an embodiment of the disclosure;

Fig. 4A is a partial perspective view of the lamp assembly in Fig. 3;

Fig. 4B is a partial exploded view of the lamp assembly in Fig. 3; and

Fig. 5 is a cross-sectional view of the lamp assembly

in Fig. 4A.

#### DETAILED DESCRIPTION

**[0019]** Reference will now be made in detail to the present embodiments of the disclosure, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

**[0020]** Fig. 1A is a perspective view of a lamp 1 according to an embodiment of the disclosure. Fig. 1B is an exploded view of the lamp 1 in Fig. 1A. Fig. 2 is a cross-sectional view of the lamp 1 in Fig. 1A along line 3-3'.

**[0021]** As shown in Fig. 1A to Fig. 2, in the embodiment of the disclosure, the lamp 1 includes a base 10 and a light-emitting module 12. The base 10 of the lamp 1 has a hollow portion 100. The hollow portion 100 of the base 10 has a first opening 100a, a second opening 100b, and a third opening 100c. The first opening 100a and the second opening 100b of the hollow portion 100 are respectively located at two opposite sides of the base 10 (i.e., the lower side and the upper side in Fig. 2), and third opening 100c and the second opening 100b are located at the same side of the base 10. The base 10 further includes a mounting surface 102, a first reflective surface 104, and a second reflective surface 106 located within the hollow portion 100. The mounting surface 102 of the base 10 faces toward the first opening 100a and located between the first reflective surface 104 and the second reflective surface 106. The first reflective surface 104 of the base 10 substantially faces toward the mounting surface 102 and the second opening 100b. The second reflective surface 106 of the base 10 substantially faces toward the mounting surface 102 and the third opening 100c.

**[0022]** The light-emitting module 12 of the lamp 1 is disposed at the mounting surface 102 of the base 10 and emits a light toward the first opening 100a of the hollow portion 100. Therefore, the light emitted out of the first opening 100a by the light-emitting module 12 can serve as direct illumination of the lamp 1. In addition, because the beam angle of the light-emitting module 12 covers at least a part of the first reflective surface 104 and at least a part of the second reflective surface 106, a part of the light emitted by the light-emitting module 12 is reflected by the first reflective surface 104 of the base 10 and then leaves from the second opening 100b of the hollow portion 100, and another part of the light emitted by the light-emitting module 12 is reflected by the second reflective surface 106 of the base 10 and then leaves from the third opening 100c of the hollow portion 100. Hence, the light emitted out of the second opening 100b and the third opening 100c of the hollow portion 100 can serve as indirect illumination for the lamp 1.

**[0023]** It can be seen that the lamp 1 of the disclosure is equipped with secondary optical design within the hol-

low portion 100 of the base 10, so as to create lighting effects on the top side and the bottom side of the lamp 1. In particular, the light emitted out of the second opening 100b and the third opening 100c are initially reflected by the first reflective surface 104 and the second reflective surface 106 respectively and then consequently reflected by the ceiling (not shown), so as to provide a light softening effect better than those provided by conventional lamps, and to make the atmosphere in the interior space more better.

**[0024]** In the embodiment of the disclosure, the base 10 of the lamp 1 is an extruded aluminum substrate, and the first reflective surface 104 and the second reflective surface 106 are directly formed by extruding aluminum, so the lamp 1 of the disclosure is lighter and thinner than the conventional lamps in the market, and conventional reflective cups that are additionally installed can be omitted. Furthermore, in the embodiment of the disclosure, the first reflective surface 104 and the second reflective surface 106 of the base 10 are anodized surfaces, so as to obtain excellent reflectance. Hence, the lamp 1 of the disclosure can achieve the purposes of reducing footprint, optical space, and acquisition costs.

**[0025]** In an embodiment of the disclosure, the first reflective surface 104 and the second reflective surface 106 of the base 10 are plated surfaces, so as to similarly obtain the excellent reflectance.

**[0026]** In an embodiment of the disclosure, the first reflective surface 104 and the second reflective surface 106 of the base 10 are cambered surface and substantially recessed away from the light-emitting module 12, but the disclosure is not limited in this regard. In practical applications, the first reflective surface 104 and the second reflective surface 106 of the base 10 can also be flat surfaces.

**[0027]** As shown in Fig. 2, in the embodiment of the disclosure, the light-emitting module 12 of the lamp 1 includes a circuit board 120, a plurality of light sources 122, and a fluorescent powder mask 124. The circuit board 120 of the light-emitting module 12 is fixed to the mounting surface 102 of the base 10. The light sources 122 of the light-emitting module 12 are disposed on the circuit board 120 along an arrangement direction D (shown in Fig. 1 B). The fluorescent powder mask 124 of the light-emitting module 12 is fixed to the circuit board 120 and covers the light sources 122. Furthermore, the fluorescent powder mask 124 of the light-emitting module 12 covers the circuit board 120. An outer edge of the circuit board 120 is flush with that of the fluorescent powder mask 124 without protruding out of that of the fluorescent powder mask 124, so as to prevent the light leakage problem caused by that a part of the circuit board 120 is not covered by the fluorescent powder mask 124.

**[0028]** That is, the light-emitting module 12 is a light bar type light-emitter. The light sources 122 of the light-emitting module 12 are blue light-emitting diodes. After the blue light emitted by the light sources 122 passes through the fluorescent powder mask 124, the blue light

is transformed into a white light by the fluorescent powder mask 124. The white light can refer to a warm white light, a neutral white light, or a cool white light, but the disclosure is not limited in this regard. In another embodiment of the disclosure, the light-emitting module 12 of the lamp 1 is a PLCC (Plastic Leaded Chip Carrier) light-emitting module.

**[0029]** It should be pointed out that a horizontal tangent H (as shown in Fig. 2) parallel to the mounting surface 102 is defined on the base 10 to divide the base 10 into an upper part and a lower part. The upper part includes the second opening 100b and the third opening 100c of the hollow portion 100, and the lower part includes the first opening 100a of the hollow portion 100. In order to ensure that parts of the light emitted by the light-emitting module 12 can be respectively reflected by the first reflective surface 104 and the second reflective surface 106 and to be respectively emitted out of the second opening 100b and the third opening 100c, it is preferable to dispose the light sources 122 of the light-emitting module 12 at a location above the center of the horizontal tangent H (including the center). In addition, the fluorescent powder mask 124 of the light-emitting module 12 downwardly protrudes out of a lower edge of the base 10.

**[0030]** In the embodiment of the disclosure, the lamp 1 further includes a lampshade 14, a first diffusion sheet 16, and a second diffusion sheet 18. The lampshade 14 of the lamp 1 is fixed to the base 10 and covers the first opening 100a of the base 10. The first diffusion sheet 16 of the lamp 1 is located at the second opening 100b of the base 10, and the second diffusion sheet 18 is located at the third opening 100c of the lamp 1. Hence, before being emitted out of the second opening 100b and the third opening 100c of the base 10, the parts of the light will respectively pass through the first diffusion sheet 16 and the second diffusion sheet 18, so as to make the indirect illumination has an obvious atomizing effect.

**[0031]** In the embodiment of the disclosure, the lampshade 14 of the lamp 1 is transparent, and the material of the lampshade 14 includes PMMA (Poly(methyl methacrylate)), but the disclosure is not limited in this regard. In another embodiment of the disclosure, the lampshade 14 of the lamp 1 can also be a diffusion plate, which not only can make the direct illumination has an obvious atomizing effect, but also can make the direct illumination multiple scatter between the base 10 and the lampshade 14 to generate an effect of surface light.

**[0032]** As shown in Fig. 1A and Fig. 1B, in the embodiment of the disclosure, the lamp 1 can be further assembled with two side covers 24 and two hanging wire assemblies 26. The side covers 24 are respectively assembled to two side surfaces of the base 10, so as to prevent the light emitted by the light-emitting module 12 from leaking from the side surfaces of the base 10. The hanging wire assemblies 26 are fixed to the upper side of the base 10 and respectively adjacent to the side surfaces of the base 10, so as to hang the lamp 1 on the ceiling.

**[0033]** Fig. 3 is a perspective view of a lamp assembly

3 according to an embodiment of the disclosure. Fig. 4A is a partial perspective view of the lamp assembly 3 in Fig. 3. Fig. 4B is a partial exploded view of the lamp assembly 3 in Fig. 3. Fig. 5 is a cross-sectional view of the lamp assembly 3 in Fig. 4A.

**[0034]** As shown in Fig. 3 to Fig. 5, in the embodiment of the disclosure, the lamp assembly 3 includes two lamps 1, a connecting member 20, and a plurality of fasteners 22. The structures, connection relationships, and functions of the base 10, the light-emitting module 12, the lampshade 14, the first diffusion sheet 16, and the second diffusion sheet 18 included in each of the lamps 1 of the lamp assembly 3 are similar to those of the embodiment of the lamp 1 in Fig. 2, so they will not be introduced again here. That is, the lamp assembly 3 of the embodiment can be regarded as a combination assembled by two lamps 1 shown in Fig. 2. In order to clearly introduce the lamp assembly 3 of the embodiment, the lampshade 14 and the fluorescent powder mask 124 of the light-emitting module 12 in Fig. 4A and Fig. 4B are removed.

**[0035]** As shown in Fig. 4A to Fig. 5 with reference to Fig. 1B, in the embodiment of the disclosure, it should be pointed out that the circuit board 120 of each of the light-emitting modules 12 further includes a first electrical connector 120a and a second electrical connector 120b. The first electrical connector 120a and the second electrical connector 120b are respectively located at two ends of the circuit board 120. The connecting member 20 of the lamp assembly 3 is detachably connected between the base 10 of the right lamp 1 and another base 10 of another left lamp 1. The fasteners 22 of the lamp assembly 3 are fastened to the connecting member 20 respectively through the base 10 and the another base 10, so that the base 10 and the another base 10 are fixed to the connecting member 20.

**[0036]** Moreover, the connecting member 20 of the lamp assembly 3 has a passage 200. The first electrical connector 120a of the right lamp 1 and the second electrical connector 120b of the another left lamp 1 insert into the passage 200 of the connecting member 20, and are electrically connected to each other in the passage 200. Hence, the light-emitting modules 12 of the lamps 1 can be connected in series, and thus can be switched on or switched off simultaneously.

**[0037]** In the embodiment of the disclosure, the arrangement directions D of the light-emitting modules of the lamp assembly 3 are parallel to each other, but the disclosure is not limited in this regard. In practical applications, the structure of the connecting member 20 can be modified to make the arrangement directions D of the light-emitting modules be not parallel to each other.

**[0038]** In the embodiment of the disclosure, the lamp assembly 3 includes two lamps 1 and a single connecting member 20, but the disclosure is not limited in this regard. In practical applications, the numbers of the lamps 1 and the connecting members 20 can be increased, and a continuous linear lamp assembly can be assembled by se-

quentially connecting the lamps 1 by using the connecting members 20.

**[0039]** In addition, in practical applications, by modifying the structures of the connecting members 20, a lamp assembly with special shape can be assembled by sequentially connecting the lamps 1 by using the modified connecting members 20. For example, three lamps 1 and three connecting members 20 can assemble a triangular lamp assembly, and four lamps 1 and four connecting members 20 can assemble a rectangular lamp assembly, but the disclosure is not limited in this regard.

**[0040]** As shown in Fig. 3, in the embodiment of the disclosure, the lamp assembly 3 can be assembled with two side covers 24 and two hanging wire assemblies 26. The side covers 24 can be respectively assembled to two side surfaces of the bases 10 of the lamps 1 that are away from each other, so as to prevent the light emitted by the light-emitting modules 12 from leaking out from the side surfaces. The hanging wire assemblies 26 are fixed to the upper side of the bases 10 and respectively adjacent to the side surfaces, so as to hang the lamp assembly 3 on the ceiling.

**[0041]** According to the foregoing recitations of the embodiments of the disclosure, it can be seen that the lamp of the disclosure disposes the light-emitting module in the hollow portion of the base, and the light-emitting module faces toward the first opening of the hollow portion, so that the light emitted out of the first opening by the light-emitting module can serve as direct illumination of the lamp. Moreover, the base of the lamp has the reflective surface in the hollow portion, and the reflective surface can reflect a part of the light emitted by the light-emitting module to the second opening of the hollow portion, so that the light emitted out of the second opening can serve as indirect illumination of the lamp. That is, the lamp of the disclosure is equipped with secondary optical design. Furthermore, an extruded aluminum substrate is used to be the base of the lamp, and the reflective surface is anodized to obtain excellent reflectance, so the lamp of the disclosure is lighter and thinner than conventional lamps in the market, and conventional reflective cups that are additionally installed can be replaced by the reflective surface of the lamp of the disclosure. Therefore, the lamp of the disclosure can achieve the purposes of reducing footprint, optical space, and acquisition costs. In addition, the base made of the extruded aluminum substrate has a cooling effect, so the heat generated by the light-emitting module can be transmitted to the base via the circuit board of the light-emitting module, and then be directly dissipated from the surface of the base. Meanwhile, the circuit board has an autologous heat dissipation function, so the circuit board combined with the base made of the extruded aluminum substrate can solve the heat generated by an 18-25 W lamp.

**Claims****1.** A lamp, comprising:

a base having a hollow portion, the hollow portion having a first opening and a second opening, the first opening and the second opening being respectively located at two opposite sides of the base, the base further comprising a mounting surface and a first reflective surface located within the hollow portion, wherein the mounting surface faces toward the first opening, and the first reflective surface substantially faces toward the mounting surface and the second opening; and

a light-emitting module disposed at the mounting surface and emitting a light toward the first opening, wherein a part of the light is reflected by the first reflective surface and then leaves from the second opening.

**2.** The lamp of claim 1, wherein the light-emitting module comprises:

a circuit board fixed to the mounting surface; and  
a plurality of light sources disposed on the circuit board along an arrangement direction.

**3.** The lamp of claim 2, wherein the circuit board further comprises an electrical connector, the electrical connector is located at an end of the circuit board, and the lamp further comprises:

a connecting member configured to connect the base and another base of another lamp; and  
a plurality of fasteners fastened to the connecting member respectively through the base and the another base, so that the base and the another base are fixed to the connecting member.

**4.** The lamp of claim 3 wherein the connecting member has a passage, the electrical connector and another electrical connector of the another lamp insert into the passage and are electrically connected to each other.**5.** The lamp of claim 2, wherein the light sources are blue light-emitting diodes, the light-emitting module further comprises a fluorescent powder mask, and the fluorescent powder mask is fixed to the circuit board and covers the light sources.**6.** The lamp of claim 1, further comprising a lampshade fixed to the base and covering the first opening.**7.** The lamp of claim 6, wherein the lampshade is transparent, and the material of the lampshade comprises PMMA (Poly(methyl methacrylate)).**8.** The lamp of claim 6, wherein the lampshade is a diffusion plate.**9.** The lamp of claim 1, wherein the hollow portion further has a third opening, the third opening and the second opening are located at the same side of the base, the base further comprises a second reflective surface located within the hollow portion, the mounting surface is located between the first reflective surface and the second reflective surface, the second reflective surface substantially faces toward the mounting surface and the third opening, and another part of the light is reflected by the second reflective surface and then leaves from the third opening.**10.** The lamp of claim 9, further comprising a first diffusion sheet and a second diffusion sheet, the first diffusion sheet is located at the second opening, and the second diffusion sheet is located at the third opening.**11.** The lamp of claim 1, wherein the base is an extruded aluminum substrate, and the first reflective surface and the second reflective surface are anodized surfaces.

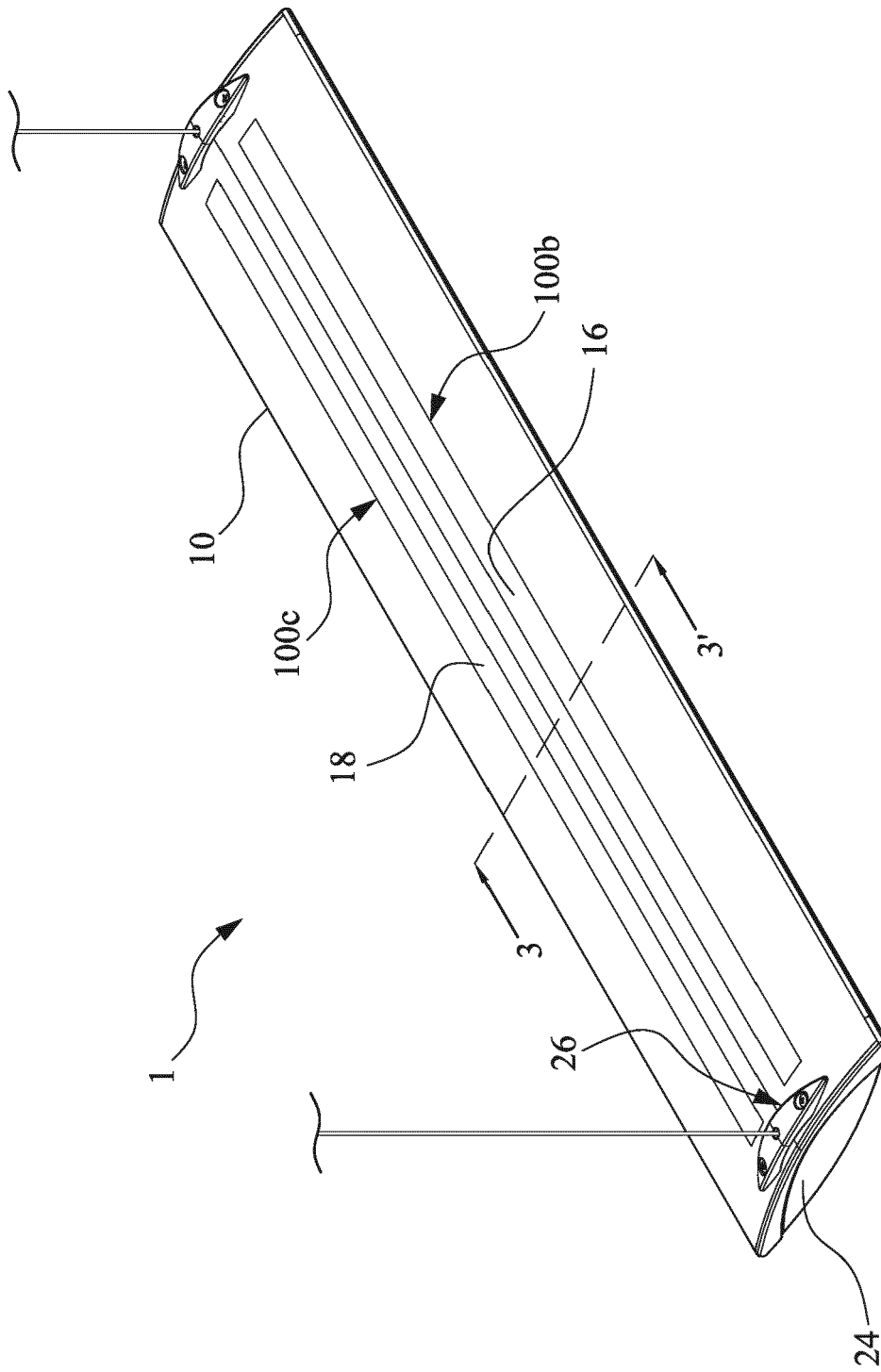


Fig. 1A

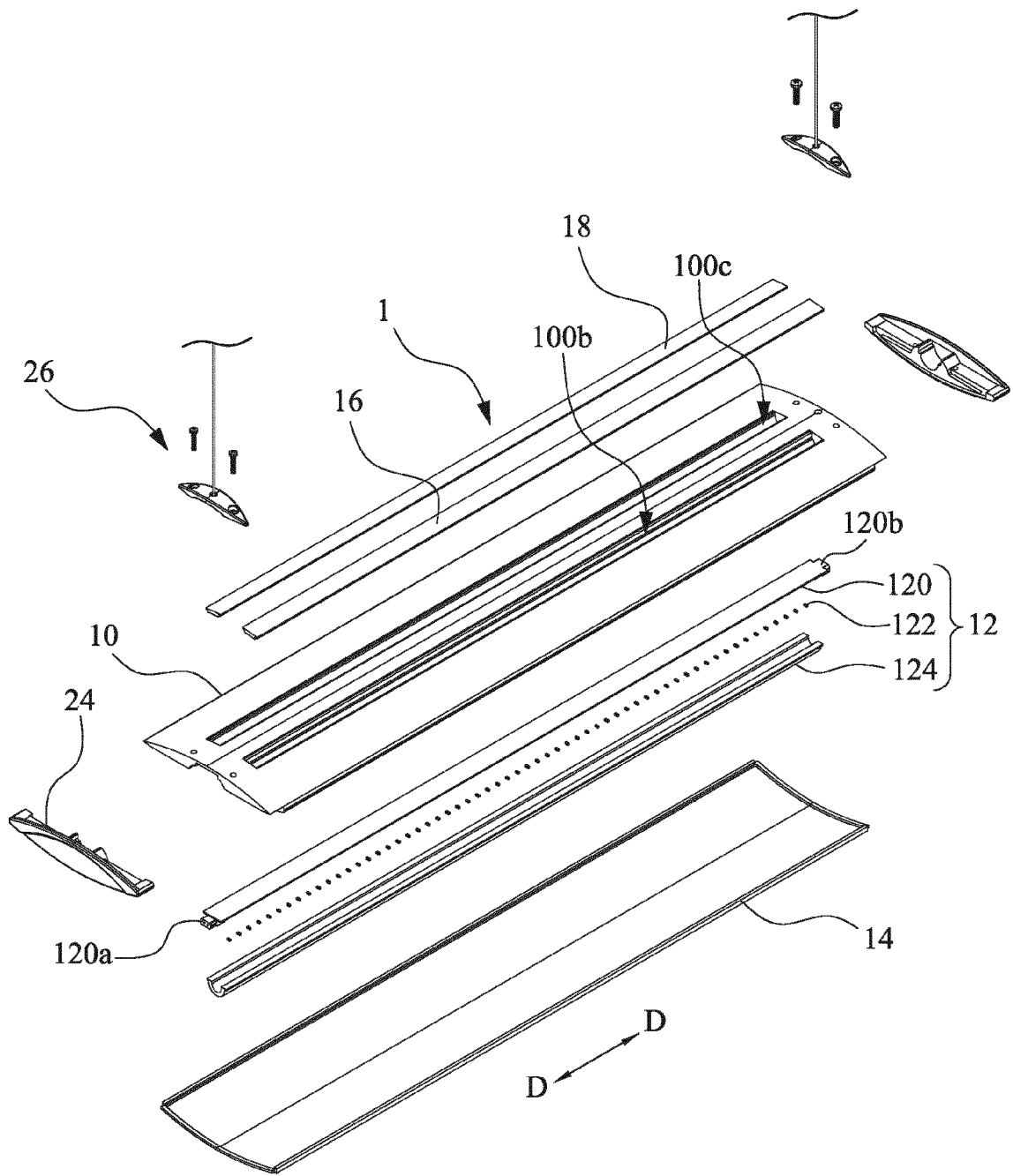


Fig. 1B

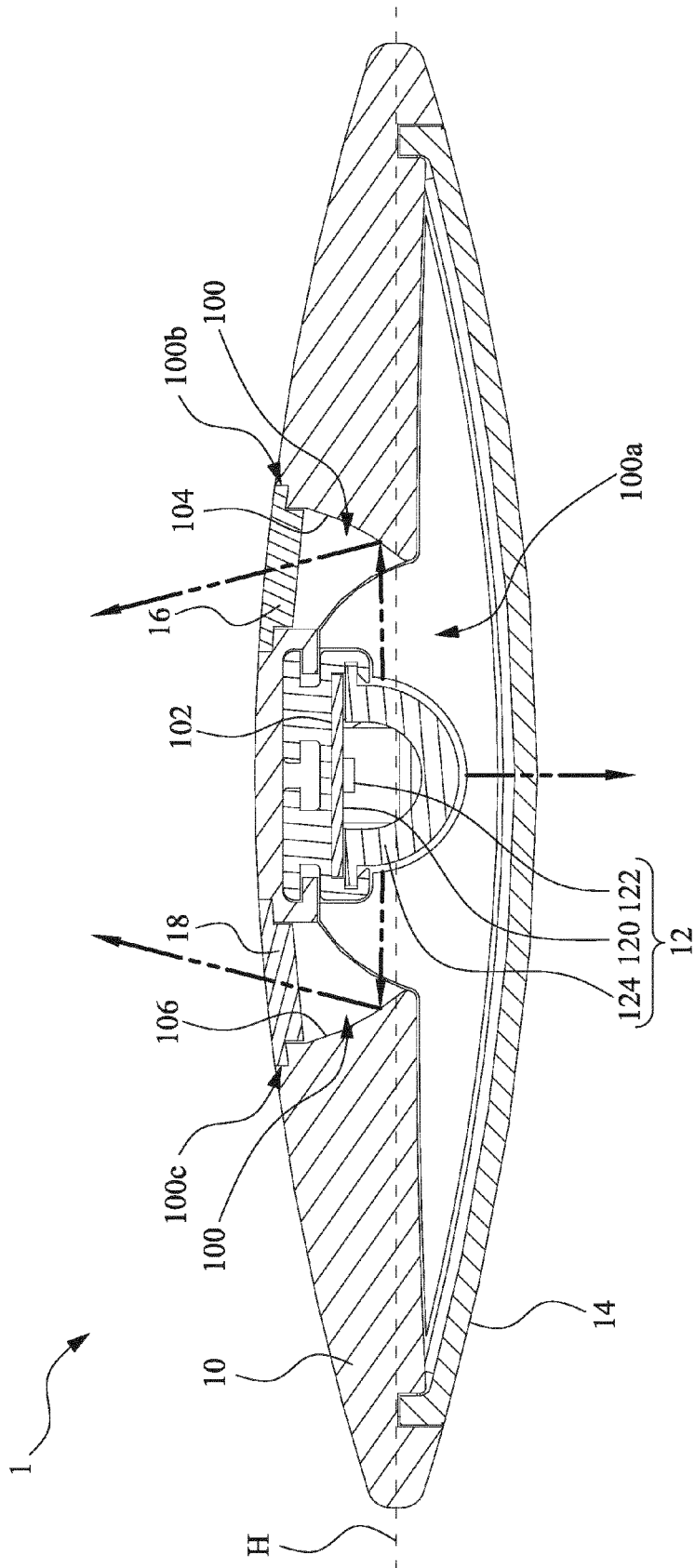


Fig. 2



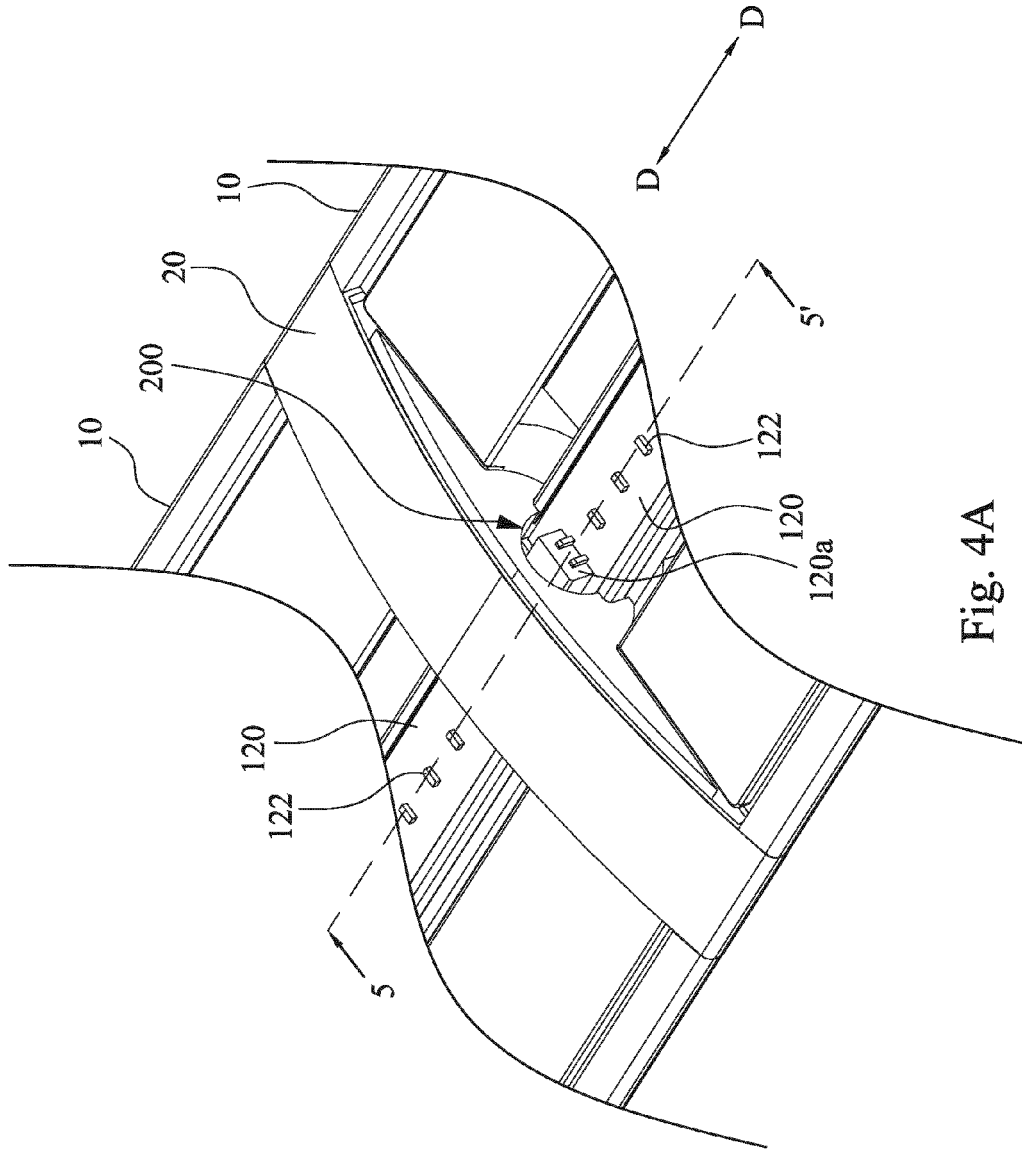


Fig. 4A

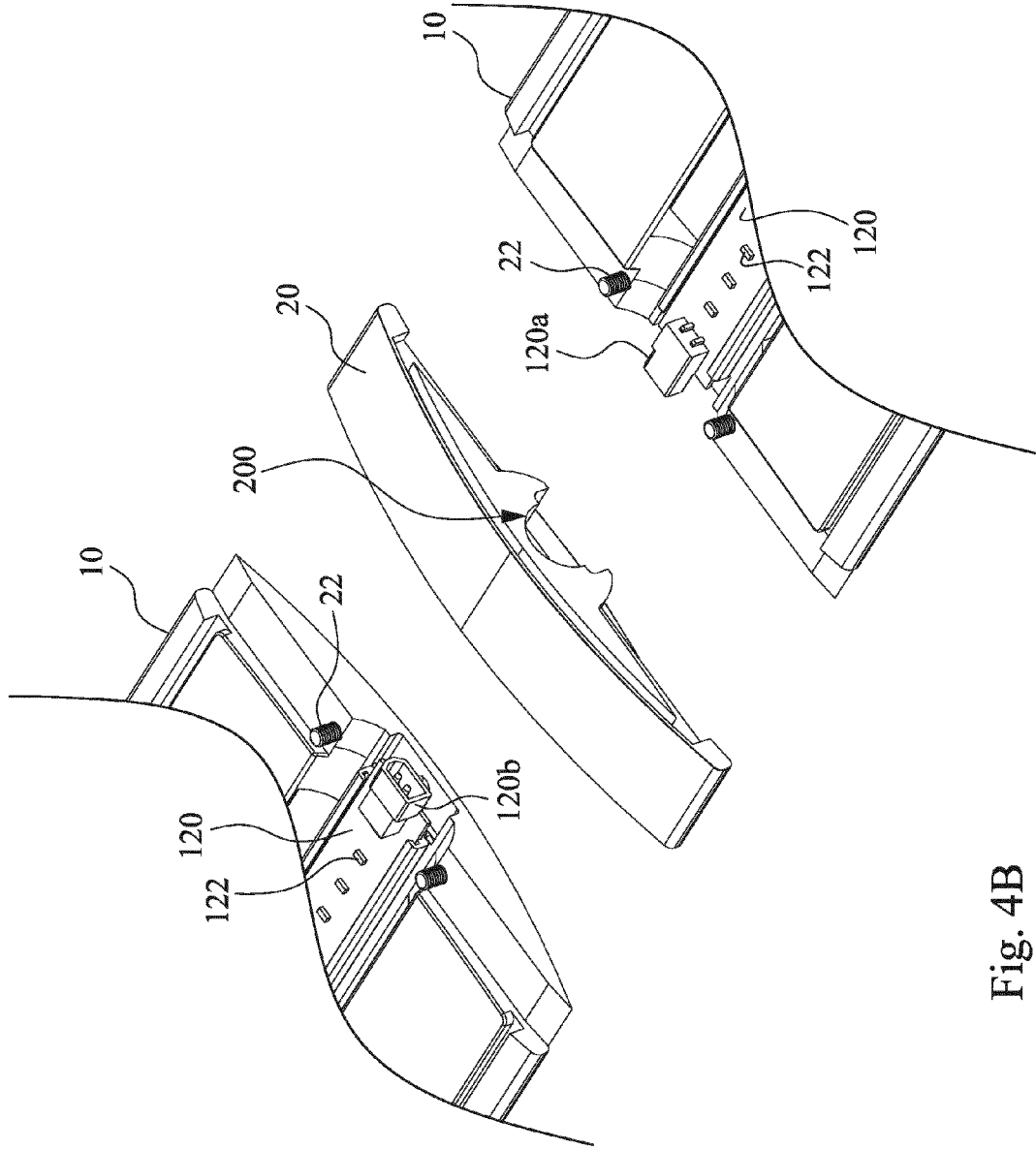


Fig. 4B





EUROPEAN SEARCH REPORT

Application Number  
EP 14 19 1379

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2010 037630 A1 (GRIMM MANFRED [DE]) 22 March 2012 (2012-03-22)	1,6-11	INV. F21S8/06 F21V7/00 F21V23/00
Y	* figure 6 * * paragraphs [0015] - [0020], [0041] - [0046] *	3,4	
X	US 2005/180132 A1 (CHUNG CASEY [US]) 18 August 2005 (2005-08-18)	1,6,8,9,11	ADD. F21Y101/02 F21Y103/00
X	US 2013/021777 A1 (PICKARD PAUL KENNETH [US] ET AL) 24 January 2013 (2013-01-24) * figures 3, 7, 8, 9A, 9B * * paragraphs [0032], [0035] - [0039] *	1,2,5-11	
X	DE 10 2012 006887 A1 (RADOLUX GES FUER LICHTTECHNIK MBH [DE]) 11 October 2012 (2012-10-11)	1,2,6-10	
	* figures 2, 7, 8 * * paragraphs [0003], [0006], [0030] - [0037], [0043], [0044] * * claim 1 *		TECHNICAL FIELDS SEARCHED (IPC)
X	DE 100 11 378 A1 (SITECO BELEUCHTUNGSTECH GMBH [DE]) 30 November 2000 (2000-11-30) * figures 1, 2, 5, 6 * * column 5, line 46 - column 6, line 38 * * column 7, line 32 - column 9, line 16 *	1,6,7	F21S F21V F21Y F21K
X	DE 79 10 659 U1 (SIEMENS AG) 12 July 1979 (1979-07-12)	1,8-10	
	* figure 1 * * claim 1 * * page 2, line 7 - page 3, line 30 *		
----- -/--			
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 April 2015	Examiner Vida, Gyorgy
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number  
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2013/286637 A1 (LAY MICHAEL [US] ET AL) 31 October 2013 (2013-10-31) * figures 9A-9G, 14A, 14B * * paragraphs [0079] - [0084], [0095], [0096] *	3,4	
A	----- WO 2011/028773 A1 (BUDIKE LOTHAR E S [US]; BINA DAVE [US]) 10 March 2011 (2011-03-10) * figures 16-20 * * paragraphs [0057] - [0061] * -----	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 April 2015	Examiner Vida, Gyorgy
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 14 19 1379

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-04-2015

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102010037630 A1	22-03-2012	NONE	
US 2005180132 A1	18-08-2005	US 2005180132 A1 US 2009122551 A1	18-08-2005 14-05-2009
US 2013021777 A1	24-01-2013	CN 103814251 A EP 2734783 A1 US 2013021777 A1 WO 2013016001 A1	21-05-2014 28-05-2014 24-01-2013 31-01-2013
DE 102012006887 A1	11-10-2012	DE 102012006887 A1 DE 202011005029 U1	11-10-2012 22-04-2014
DE 10011378 A1	30-11-2000	NONE	
DE 7910659 U1	12-07-1979	NONE	
US 2013286637 A1	31-10-2013	CN 103423666 A US 2013286637 A1	04-12-2013 31-10-2013
WO 2011028773 A1	10-03-2011	US 2011310614 A1 WO 2011028773 A1	22-12-2011 10-03-2011

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82