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(54) Streetlight module

(57) A streetlight module includes a lens assembly (1), a sealing ring (2), a heat-conducting baseplate (3) and a heat-dissipating assembly (4); the lens assembly is mounted in the front side of the heat-conducting baseplate, and the sealing ring is mounted between the lens assembly and the heat-dissipating assembly such that a sealed space is defined between the lens assembly and the heat-conducting baseplate; a plurality of LED lights (5) are provided on the heat-conducting baseplate (3); the LED lights are positioned inside the sealed space and are electrically connected to the input end of the power supply; the heat-dissipating assembly (4) is on the back side of the heat-conducting baseplate (3). The present invention has good heat-dissipating and waterproof performance with high efficiency, as well as long lifetime.

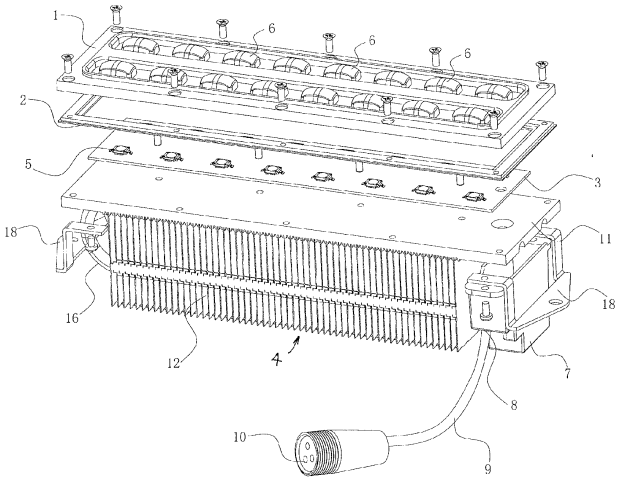


Fig. 3

EP 2 436 967 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a streetlight module.

BACKGROUND OF THE INVENTION

[0002] Most of the known streetlights in the art adopt a high voltage sodium lamp or metal halogen lamp. With the development of technology, LED streetlights have been developed. Because of the high light efficiency of LEDs and the good design of its lens assembly, the light efficiency and the multiple utilization rate of the LED as light source are larger than traditional streetlights. However, LED lights will generate a lot of heat during use, which can reduce the light efficiency and the lifetime of LED lights in case of poor heat-dissipating condition. On the other hand, the waterproof problem of each of a plurality of LED lights that are used as light source should be taken into consideration, so as to prevent the insulation of the streetlights from being damaged by incoming rainwater. The known LED streetlights, however, still have drawbacks in heat-dissipation and water resistance.

SUMMARY OF THE INVENTION

[0003] The object of the present invention is to provide a streetlight module which overcomes the drawbacks of those in the art. The present invention has good heat dissipation and waterproof performance, as well as long lifetime.

[0004] To achieve the above object, the technical solution is as follows:

A streetlight module comprises:

a heat-conducting baseplate, wherein a plurality of LED lights are provided on the heat-conducting baseplate;

a lens assembly mounted on a front side of the heat-conducting baseplate;

a heat-dissipating assembly mounted on a back side of the heat-conducting baseplate; and

a sealing ring mounted between the lens assembly and the heat-dissipating assembly, in order to define a sealed space between the lens assembly and the heat-conducting baseplate, said plurality of LED lights being located inside the sealed space and electrically connected to an input end of a power supply.

[0005] Preferably, a plurality of steamed bread-shaped lenses are provided on an upper surface of said lens assembly, each of the bread-shaped lenses is corresponding to each of the LED lights assembly.

[0006] Preferably, the streetlight module further includes a waterproof box, and a constant-current module between the LED lights and the input end of the power supply. The constant-current module is disposed inside the waterproof box. The waterproof box is configured with a wire hole, through which the wire passes and electrically connects the input end of the power supply with the constant-current module. A protective sheath for protecting the wire is provided at the wire hole. A waterproof joint is provided at the input end of the power supply.

[0007] Preferably, the heat-dissipating assembly includes a mounting plate and a plurality of heat-dissipating fins. A plurality of parallel slots are provided on the mounting plate. A plurality of heat-dissipating fins are superposed and parallel to each other. The end of the heat-dissipating fin adjacent to the mounting plate is the fixed end of the heat-dissipating fin. The fixed ends of the heat-dissipating fins are respectively inserted into the slots. The fixed ends of the heat-dissipating fins are in the shape of a straight piece, while the slots are vertical slots, with process slots provided between each pair of adjacent vertical slots.

[0008] Preferably, the streetlight module further includes cramps, on which a plurality of locating slots are provided. The rest sides of the heat-dissipating fins are inserted into the locating slots of the cramps.

[0009] Preferably, there are at least three cramps, which are respectively provided at the upper side, the left side and the right side of the heat-dissipating fins.

[0010] Preferably, the process slots are V-shaped or U-shaped.

[0011] Preferably, through holes are provided on each of the heat-dissipating fins, while on the mounting plate a heat-conducting copper pipe is connected; the conducting copper pipe passes through the through holes of all heat-dissipating fins.

[0012] Preferably, corresponding convection holes are provided on each of the heat-dissipating fins, with a ventilation gap provided between the adjacent heat-dissipating fins at the side and the top thereof.

[0013] Preferably, brackets are provided at both ends of the mounting plate.

[0014] To sum up, the present invention has the following advantages:

1. A sealed space is formed between the lens assembly and the heat-conducting baseplate, wherein a plurality of LED lights are located, the sealed space prevents the rainwater from entering into the sealed space, and therefore it improves the overall waterproof performance of the streetlight module.

2. During the operation, heat generated by LED lights is transferred by the heat-conducting baseplate to the heat-dissipating assembly, and is then emitted

into the atmosphere, which improves the heat-dissipating performance of the streetlight module, and therefore extends the lifetime of the LED lights.

3. Excellent design of the lens ensures good effective spots in use to be obtained.

4. The constant-current module can enable the power input of LED lights to be in constant current, improving the stability of the LED lights during operation. Meanwhile, heat generated by the constant-current module can also be emitted into the air through the heat-dissipating assembly. In addition, the constant-current module and its wire are all waterproof, which improves the stability of the entire streetlight module.

5. The fixed ends of the heat-dissipating fins are in the shape of a straight piece, and the slots are vertical slots. When fixing, the heat-dissipating fins can be vertically inserted into respective vertical slots directly, and then be pressed by the mould at the process slots which are located at both sides of the slots. This process is easy to be achieved with higher manufacture efficiency.

6. The efficient of heat-conducting from the heat-conducting baseplate to the heat-dissipating fins is enhanced attribute to the heat-conducting copper pipe.

7. The fixing stability of the heat-dissipating fins is improved by the cramps fixing at the side of the heat-dissipating fins.

8. Process slots in V shape or U shape are adopted to tightly press the heat-dissipating fins.

9. By the configuration of the convection holes and the ventilation gap on the heat-dissipating fins, heat exchange between the heat-dissipating fins and the air is enhanced, which improves the heat-dissipating performance of the streetlight module.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Figure 1 is the schematic perspective view of the streetlight module according to an embodiment of the present invention;

Figure 2 is the schematic bottom view of the streetlight module according to an embodiment of the present invention;

Figure 3 is an exploded view of the streetlight module according to an embodiment of the present invention;

Figure 4 is a structural view of the heat-dissipating assembly;

Figure 5 is a structural view showing the connection of the mounting plate and the heat-dissipating fins;

Figure 6 is a structural view showing the connection of the cramps and the heat-dissipating fins.

Reference numbers:

[0016] 1. lens assembly; 2. sealing ring; 3. heat-conducting baseplate; 4. heat-dissipating assembly; 5. LED lights; 6. lens; 7. waterproof box; 8. protective sheath; 9. wire; 10. waterproof joint; 11. mounting plate; 12. heat-dissipating fins; 13. slots; 14. process slot; 15. cramps; 16. heat-conducting copper pipe; 17. convection holes; 18. bracket.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Embodiments of the present invention will be described in detail with reference to the drawings.

[0018] As shown from Fig. 1 to Fig. 6, a streetlight module includes a lens assembly 1, a sealing ring 2, a heat-conducting baseplate 3 and a heat-dissipating assembly 4. The lens assembly 1 is mounted on the front side of the heat-conducting baseplate 3, and the sealing ring 2 is mounted between the lens assembly 1 and the heat-dissipating assembly 4 such that a sealed space is defined between the lens assembly 1 and the heat-conducting baseplate 3. A plurality of LED lights 5 are provided on the heat-conducting baseplate 3. The LED lights 5 are positioned inside the sealed space and are electrically connected to the input end of the power supply. The heat-dissipating assembly 4 is on the back side of the heat-conducting baseplate 3.

[0019] A plurality of steamed bread-shaped or loaf-shaped lenses 6 are provided on the upper surface of the lens assembly 1, each of which is corresponding to the respective LED light 5. The refracting surfaces of the lenses are convexly curved and rectangular in plan. The streetlight module also includes a waterproof box 7, and a constant-current module between the LED lights 5 and the input end of the power supply. The constant-current module is disposed inside the waterproof box 7. The waterproof box 7 is configured with a wire hole, through which the wire 9 passes and electrically connects the input end of the power supply with the constant-current module. A protective sheath 8 is provided at the wire hole. A waterproof joint 10 is provided at the input end of the power supply.

[0020] The heat-dissipating assembly 4 includes a mounting plate 11 and a plurality of heat-dissipating fins 12. A plurality of slots 13 parallel to each other are provided on the mounting plate 11. The plurality of heat-dissipating fins 12 are superposed and parallel to each

other. The fixed ends of the heat-dissipating fins 12 are adjacent to the mounting plate 11. The fixed ends of the heat-dissipating fins 12 are respectively inserted into the slots 13. The fixed ends of the heat-dissipating fins 12 are in the shape of a straight piece, while the slots 13 are vertical slots, with process slots 14 provided between each pair of adjacent slots 13.

[0021] The heat-dissipating assembly 4 further includes cramps 15, on which a plurality of locating slots are provided. The other sides of the heat-dissipating fins 12 are inserted into the locating slots of the cramps 15. There are four cramps 15, of which two cramps 15 are provided at the upper side of the heat-dissipating fins 12, and the other two cramps 15 are provided at the left side and the right side of the heat-dissipating fins 12. The process slots 14 are V-shaped or U-shaped. There are through holes provided on each heat-dissipating fin 12, while on the mounting plate 11 a heat-conducting copper pipe 16 is connected; the conducting copper pipe 16 passes through the through holes of all heat-dissipating fins 12. Corresponding convection holes 17 are provided on each heat-dissipating fin 12, with a ventilation gap provided between adjacent heat-dissipating fins 12 on the side and the top. Brackets 18 are provided at both ends of the mounting plate.

[0022] The advantages of this embodiment are as follows:

1. A sealed space is formed between the lens assembly 1 and the heat-conducting baseplate 3, wherein a plurality of LED lights 5 are located in the sealed space, the sealed space prevents rainwater from entering, and therefore it improves the overall waterproof performance of the streetlight module.

2. During the operation, heat generated by LED lights 5 is transferred by the heat-conducting baseplate 3 to the heat-dissipating assembly 4, and is then emitted into the atmosphere, which improves the heat dissipation performance of the streetlight module, and therefore extends the lifetime of the LED lights 5.

3. Excellent design of the lens ensures good effective spots in use to be obtained.

4. The constant-current module enables the power input of LED lights 5 to be in constant current, improving the stability of the LED lights 5 during operation. Meanwhile, heat generated by the constant-current module 4 can also be emitted into the air through the heat-dissipating assembly. In addition, the constant-current module and its wire 9 are all waterproof, which improves the stability of the whole streetlight module.

5. The fixed end of the heat-dissipating fin 12 is in the shape of a straight piece, and the slots 13 are vertical slots. When fixing, the heat-dissipating fins 12 can be vertically inserted into respective vertical slots 13 directly, and then be pressed by a mould at the process slots 14 which are located at both sides of the slots 13. This process is easy to achieve with higher manufacture efficiency.

6. The efficiency of heat conduction from the heat-conducting baseplate 3 to the heat-dissipating fins 12 is improved by the heat-conducting copper pipe 16.

7. The fixing stability of the heat-dissipating fins 12 is much enhanced by the cramps 15 fixed at the sides of the heat-dissipating fins 12.

8. Process slots 14 in V shape or U shape are adopted to tightly press the heat-dissipating fins 12.

9. With the configuration of the ventilation gaps and the convection holes 17 on the heat-dissipating fins 12, heat exchange between the heat-dissipating fins 12 and the air is enhanced, which improves the heat-dissipating performance of the streetlight module.

[0023] The above described is only a detailed embodiment of the present invention, and is not meant to limit the protective scope of the present invention; it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof, which is defined by the claims.

Claims

1. A streetlight module, comprising:

a heat-conducting baseplate;
a plurality of LED lights provided on the heat-conducting baseplate;
a lens assembly mounted on a front side of the heat-conducting baseplate;
a heat-dissipating assembly mounted on a back side of the heat-conducting baseplate; and
a sealing ring mounted between the lens assembly and the heat-dissipating assembly such that a sealed space is defined between the lens assembly and the heat-conducting baseplate, said plurality of LED lights being located inside the sealed space and electrically connected to an input end of a power supply.

2. The streetlight module of claim 1, wherein a plurality of steamed bread-shaped lenses are provided on an upper surface of said lens assembly, each of the bread-shaped lenses corresponding to one of the LED lights.

3. The streetlight module of claim 1 or 2, wherein said

streetlight module further comprises a waterproof box, and a constant-current module connected between said LED lights and the input end of the power supply; the constant-current module being disposed inside the waterproof box; the waterproof box being configured with a wire hole, through which a wire passes and electrically connects the input end of the power supply with the constant-current module; a protective sheath for protecting the wire provided at the wire hole; and a waterproof joint provided at the input end of the power supply.

4. The streetlight module of any one of claim 1 to claim 3, wherein said heat-dissipating assembly comprises a mounting plate and a plurality of heat-dissipating fins; a plurality of slots parallel to each other are provided on the mounting plate; the plurality of heat-dissipating fins are superposed and parallel to each other; an end of each of the heat-dissipating fins adjacent to said mounting plate is a fixed end; the fixed ends of the heat-dissipating fins are respectively inserted into the slots; the fixed end of each of the heat-dissipating fins is in the shape of a straight piece, while the slots are vertical slots, and process slots are provided between each pair of adjacent vertical slots.

5. The streetlight module of claim 4, wherein said streetlight module further comprises cramps, on which a plurality of locating slots are provided; the other sides of said heat-dissipating fins being inserted into the locating slots of the cramps.

6. The streetlight module of claim 5, wherein there are at least three cramps, which are respectively provided at an upper side, a left side and a right side of said heat-dissipating fins.

7. The streetlight module of claim 4, 5 or 6, wherein said process slots are V-shaped or U-shaped.

8. The streetlight module of claim 4, 5, 6 or 7, wherein corresponding through holes are provided on each of the heat-dissipating fins, while on said mounting plate a heat-conducting copper pipe is connected; said conducting copper pipe passing through the through holes of all the heat-dissipating fins.

9. The streetlight module of claim 4, 5, 6, 7 or 8, wherein corresponding convection holes are provided on each of the heat-dissipating fins, and a ventilation gap is provided between adjacent heat-dissipating fins at the side and the top thereof.

10. The streetlight module of any of claims 4 to 9, wherein brackets are provided at both ends of said mounting plate.

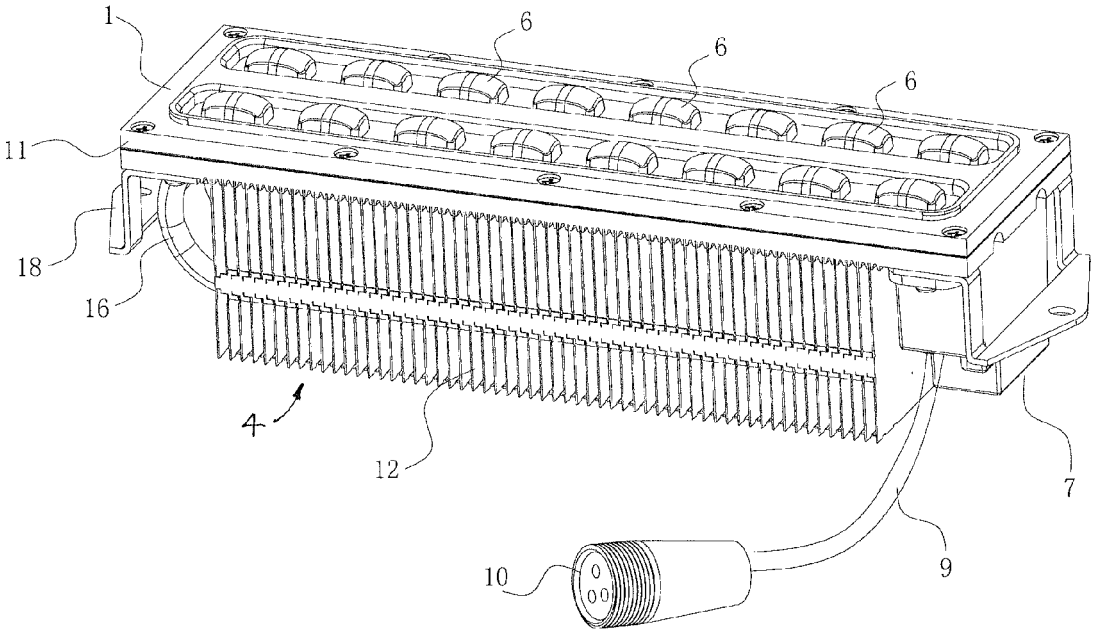


Fig. 1

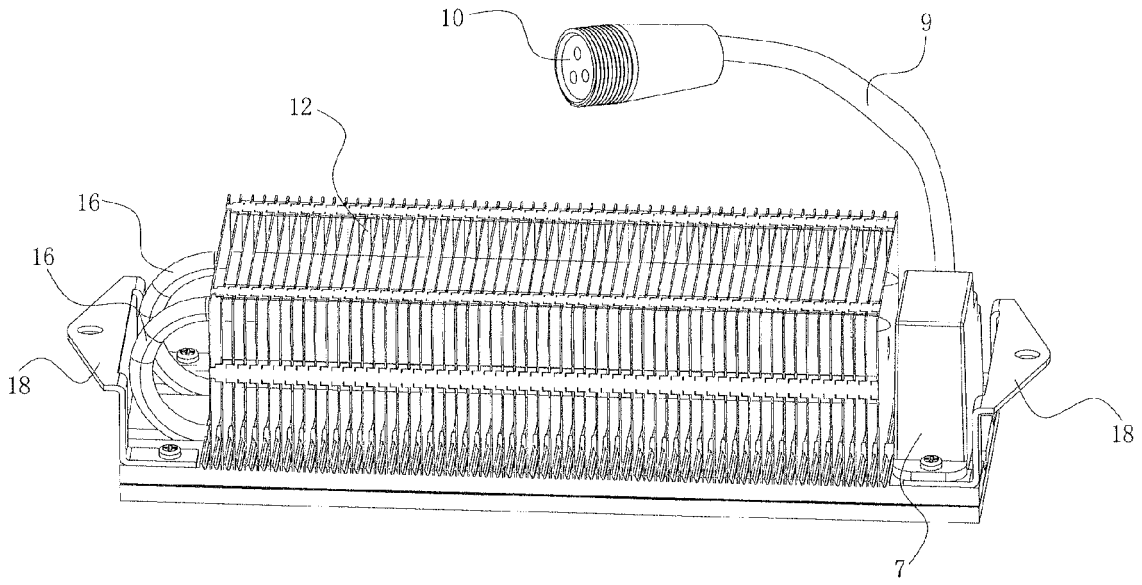


Fig. 2

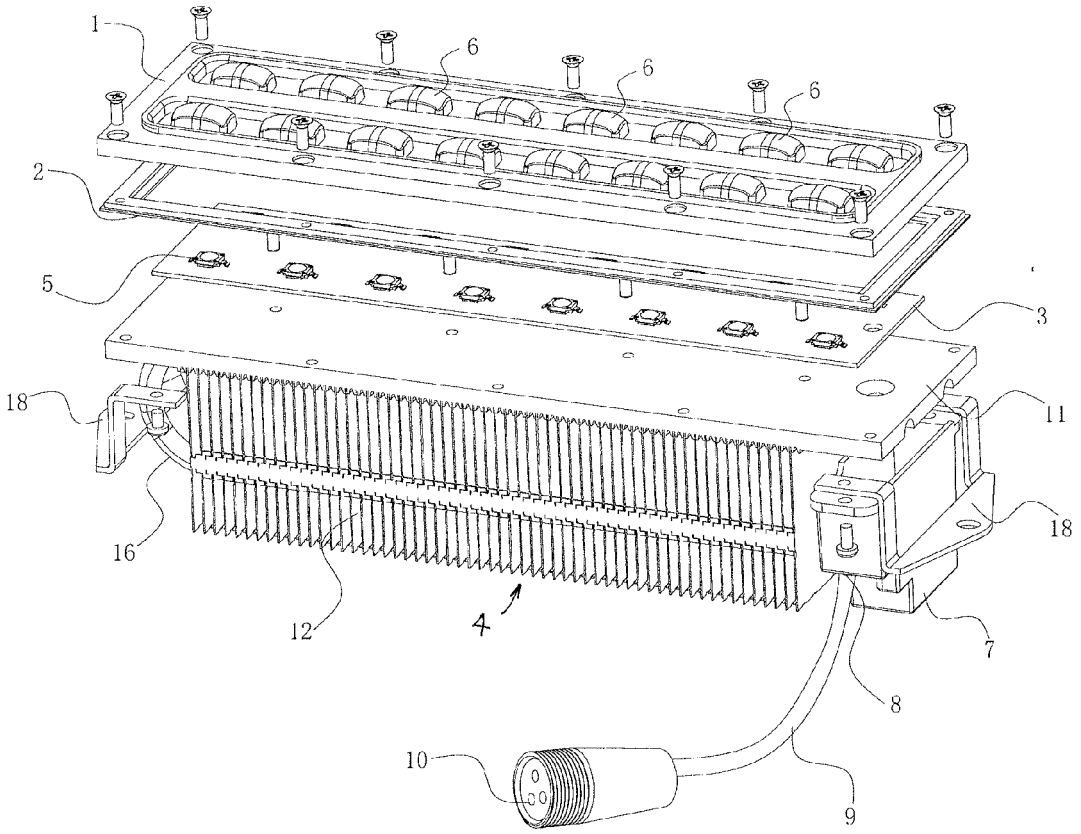


Fig. 3

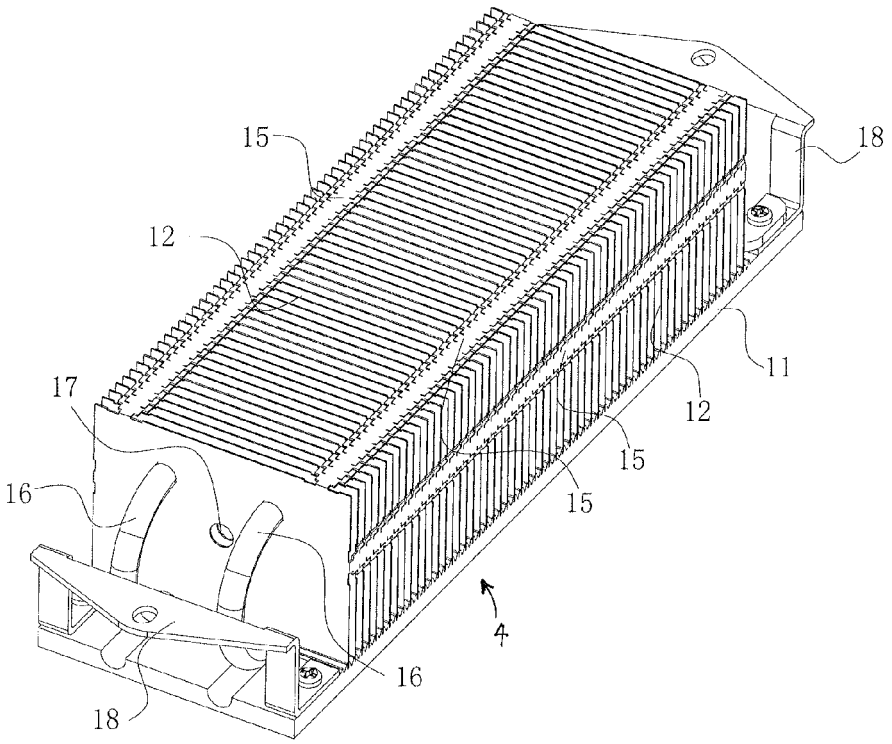


Fig. 4

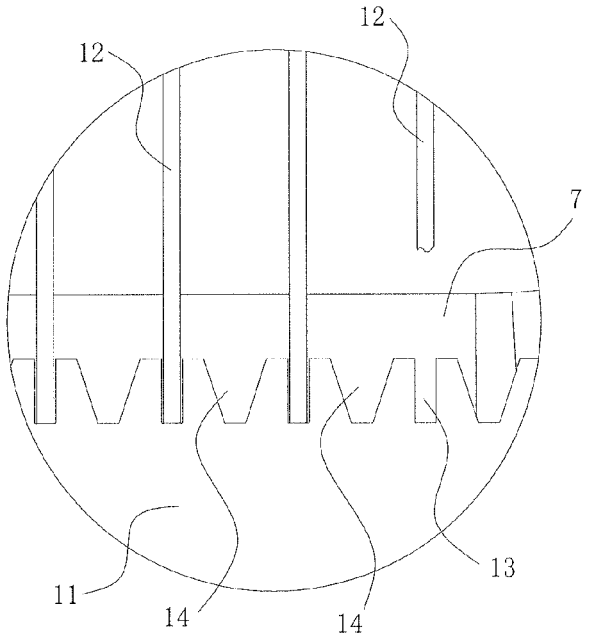


Fig. 5

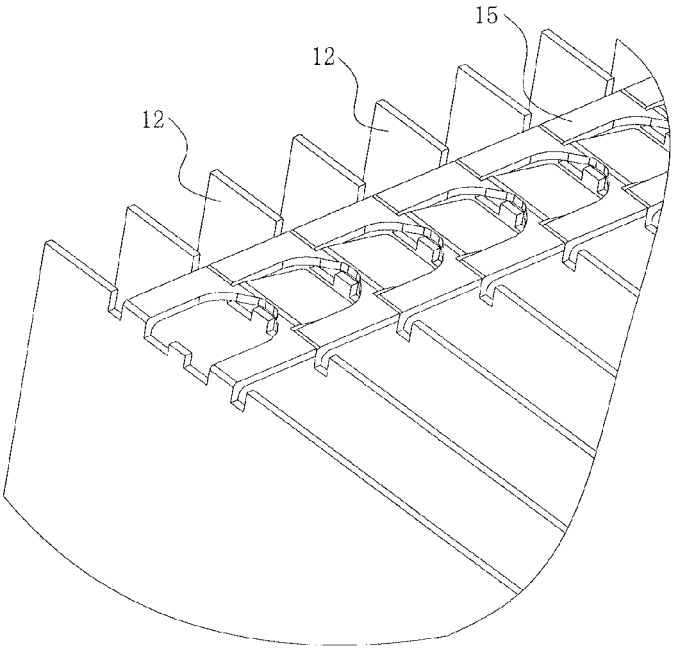


Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 3648

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 Y	WO 2009/145892 A1 (RUUD LIGHTING INC [US]; GUILLIEN WAYNE [US]; SIEBERS SCOT [US]; KAPELL) 3 December 2009 (2009-12-03) * page 5, line 27 - page 10, line 3; figures 1-9 *	1,2 3-10	INV. F21S8/00 F21S8/08 F21V29/00 F21V31/00
Y	US 2008/273326 A1 (WILCOX KURT S [US] ET AL) 6 November 2008 (2008-11-06) * paragraph [0023] - paragraph [0029]; figures 1-5 *	3	
Y	US 7 338 186 B1 (WU CHUNG [TW] ET AL) 4 March 2008 (2008-03-04) * column 2, line 10 - column 3, line 59; figures 1-6 *	4,5,7-10	
Y A	US 2009/225543 A1 (JACOBSON BENJAMIN A [US] ET AL) 10 September 2009 (2009-09-10) * paragraph [0032] - paragraph [0066]; figures 1,12 *	6 2	
			TECHNICAL FIELDS SEARCHED (IPC) F21S F21V

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 January 2012	Arboreanu, Antoniu

CATEGORY OF CITED DOCUMENTS

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10-01-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009145892 A1	03-12-2009	AU 2009251808 A1	03-12-2009
		CA 2725835 A1	03-12-2009
		EP 2294620 A1	16-03-2011
		US 2009298376 A1	03-12-2009
		WO 2009145892 A1	03-12-2009
US 2008273326 A1	06-11-2008	AU 2008248067 A1	13-11-2008
		CA 2685918 A1	13-11-2008
		CN 101680627 A	24-03-2010
		EP 2142848 A1	13-01-2010
		JP 2010526422 A	29-07-2010
		KR 20100018508 A	17-02-2010
		RU 2009144995 A	10-06-2011
		US 2008273326 A1	06-11-2008
		WO 2008137170 A1	13-11-2008
US 7338186 B1	04-03-2008	NONE	
US 2009225543 A1	10-09-2009	CN 102016395 A	13-04-2011
		EP 2263036 A1	22-12-2010
		KR 20100124804 A	29-11-2010
		US 2009225543 A1	10-09-2009
		WO 2009110976 A1	11-09-2009

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