(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 080 950 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
22.07.2009 Bulletin 2009/30

(21) Application number: **06805211.7**

(22) Date of filing: **10.11.2006**

(51) Int Cl.:
F21V 29/00 *(2006.01)* ***H01K 1/58*** *(2006.01)*
F21V 25/10 *(2006.01)*

(86) International application number:
PCT/CN2006/003017

(87) International publication number:
WO 2008/055387 (15.05.2008 Gazette 2008/20)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

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(54) A HEAT DISSIPATING APPARATUS FOR LAMP AND METHOD THEREOF

(57) A heat dissipating design for lamp is disclosed. The heat dissipating design of the present invention comprises a main body, which includes a cover. The cover seals up the top portion of the heat dissipating unit, and hence a sealed space is formed. A plurality of light generating units, a light generating units plate, an AC/DC adapter unit and one or more heat conducting pieces are disposed in the sealed space. When heat is generated by the light generating units and the AC/DC adapter unit, heat is transferred to the light generating units plate and the heat conducting pieces and then to the heat dissipating unit and the heat dissipating pieces. Heat is then dissipated into the ambient air. In this way, heat may be dissipated quickly and efficiently.

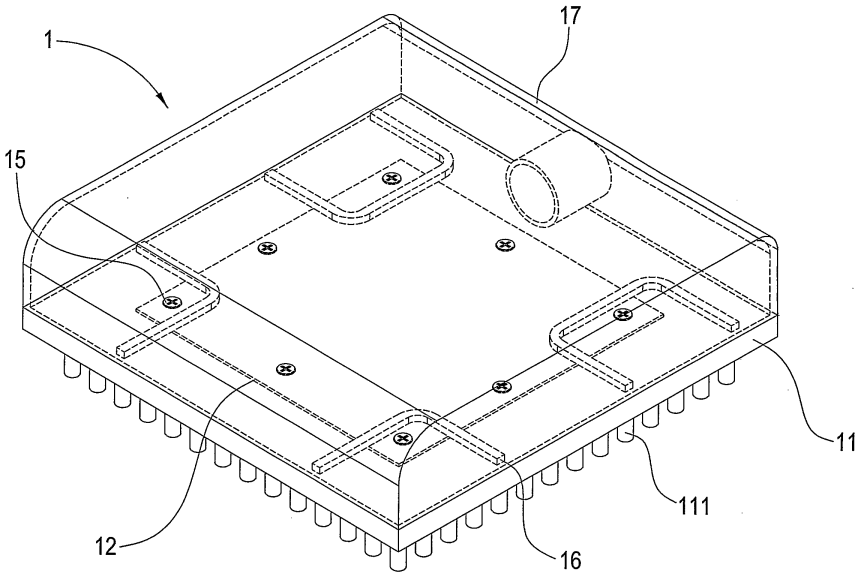

FIG. 1 *A*

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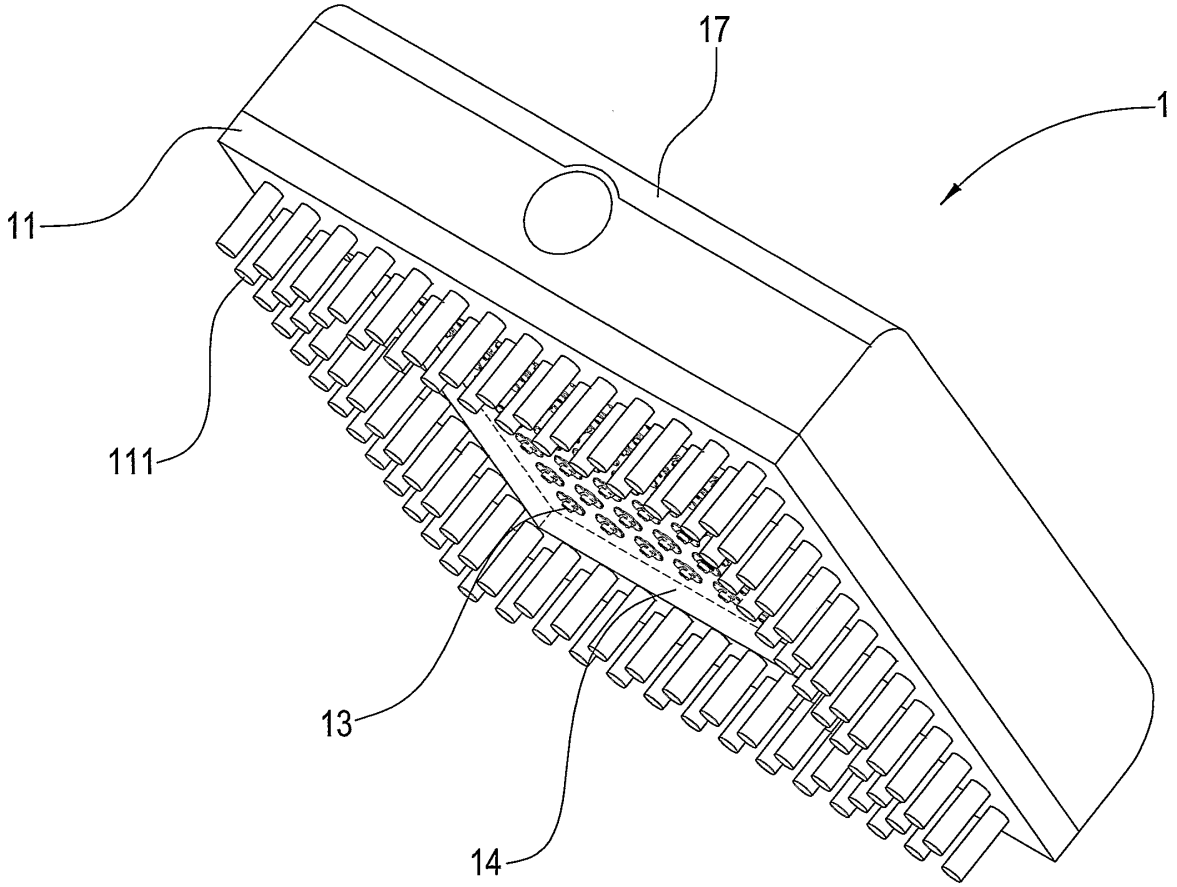

FIG. 1 *B*

Description

BACKGROUND OF THE INVENTION

1. Field of the invention

[0001] The invention generally relates to a heat dissipating design for lamp. More particularly, the invention relates to a heat dissipating design (for lamp) that can prevent the damages caused by dusts, water, insects, corrosion and erosion and can prevent the accumulation of dusts on top of the lamp and its heat dissipating unit so that the heat dissipating capacity of a lamp would not be reduced.

2. Description of the prior art

[0002] Lamps are needed for roads, yards and outdoor places so as to ensure safety at home and in the outdoor and prevent burglaries. Therefore, lamps are indispensable in the modern life. However, lamps of the prior art have the following disadvantages:

1. Traditionally, there have been several types of lamps: sodium lamp, mercury lamp, etc. As of now, LED lamp will become a major type of lamp because it has a high efficiency, a longer service life and a variety of colors and is environmentally friendly. In comparison to these traditional types of lamps, LED lamp requires a higher heat dissipating capacity.
2. In the prior art, the heat dissipating design for an LED lamp is: heat is transferred to a cover and then to a plurality of heat dissipating pieces extending from the cover. Its heat dissipating capacity and intensity of luminance may be reduced and its service life may be shortened by the accumulation of dusts, birds' droppings and nests, etc.

[0003] From the above, we can see that the prior art lamps have many disadvantages and need to be improved.

[0004] To eliminate the disadvantages of the prior art lamps, the inventor has put in a lot of effort in the subject and has successfully come up with the heat dissipating design (for lamp) of the present invention.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is to provide a heat dissipating design (for lamp) that can prevent the damages caused by dusts, water, insects, corrosion and erosion.

[0006] Another object of the present invention is to provide a heat dissipating design (for lamp) that can prevent the accumulation of dusts and wherein the heat dissipating pieces extend downwards or sideways so as to enhance the heat dissipating capacity by the ambient cold air rising upwards and to keep other undesirable factors (such as dusts) off.

[0007] A third object of the present invention is to provide a heat dissipating design (for lamp) wherein an AC/DC adapter unit is used to supply DC (direct current) to the light generating units so as to be more economical (because no battery is needed).

[0008] A fourth object of the present invention is to provide a heat dissipating design (for lamp) wherein a programmable timer and sensor circuit and an overheating protection circuit are disposed in an AC/DC adapter unit so as to turn off or on the light generating units and protect the light generating units from overheating.

[0009] The heat dissipating design of the present invention comprises a supporting rod and a main body. The main body includes a heat dissipating unit, a light generating units plate, one or more heat conducting pieces, an AC/DC adapter unit and a cover. The light generating units plate is fixedly fitted to an opening at the central portion or other appropriate location of the heat dissipating unit so that the light generating units point downwards or sideways. The AC/DC adapter unit is fitted on top of the heat conducting pieces. The cover is fitted on top of the heat dissipating unit. The cover seals up the top portion of the heat dissipating unit, and hence a sealed space is formed. The light generating units plate, AC/DC adapter unit and heat conducting pieces are disposed in the sealed space. When heat is generated by the light generating units, heat is transferred to the light generating units plate and the heat conducting pieces and then to the heat dissipating unit and the heat dissipating pieces. Heat is then dissipated into the ambient air. In addition, because the heat dissipating pieces of the heat dissipating unit extend downwards, dusts will not accumulate on them (so that their heat dissipating capacity will not be reduced) so that such lamp may have a longer service life.

[0010] These features and advantages of the present invention will be fully understood and appreciated from the following detailed description of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Figs. 1A and 1B are perspective views showing the first embodiment of the present invention.
Fig. 2 is a perspective view showing the second embodiment of the present invention.
Fig. 3 is a perspective view showing the first embodiment of the present invention in operation.
Fig. 4 is a perspective view showing the third embodiment of the present invention.
Fig. 5 is a perspective view showing the fourth embodiment of the present invention.
Fig. 6 is a view showing the fifth embodiment of the present invention.
Fig. 7 is a view showing the fifth embodiment of the

present invention in operation.

Fig. 8 is a view showing the sixth embodiment of the present invention in operation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0012] Please see Figs. 1A, 1B and 2 for the first embodiment of the present invention. The first embodiment of the heat dissipating design comprises a heat dissipating unit 11, a light generating units plate 12, one or more heat conducting pieces 16 and a cover 17.

[0013] An opening (not shown in the drawings) is provided at the central portion or other appropriate location of the heat dissipating unit 11. The top surface may be a planer surface or other type of surface, and a plurality of heat dissipating pieces 111 downwards extend from the bottom side of the heat dissipating unit 11. The heat dissipating pieces 111 may have the shape of a cylindrical rod (as illustrated in Figs. 1A and 1B) or the shape of a flat rectangular sheet (as illustrated in Fig. 2) or other shape. The heat dissipating pieces 111 point downwards or sideways so that dusts, birds' droppings and nests, etc. will not fall and accumulate on the pieces 111 so that their heat dissipating capacity will not be reduced and their heat dissipating capacity may be enhanced by the ambient cold air rising upwards.

[0014] A plurality of light generating units are fitted on the light generating units plate 12. The light generating units plate 12 may be made of aluminum or other types of highly conductive metals. The light generating units 13 may be fitted on the underside or wide walls of plate 12. The light generating units 13 may be LED, OLED or other types of light generating units. Also, a cover 4 is fitted on top of the light generating units 13. The plate 12 is fixedly fitted by fasteners 15 to an opening at the central portion or other appropriate location of the heat dissipating unit 11 so as to seal up the opening and so that the light generating units 13 fitted on the underside of plate 12 may point downwards or sideways.

[0015] A portion of each heat conducting piece 16 is in contact with the top surface of the light generating units plate 12, and other portions are in contact with the top surface of the heat dissipating unit 11. The heat conducting pieces 16 may be heat-conducting tubes or heat-conducting flat sheets.

[0016] The cover 17 may have the form of a lampshade. The cover 17 is fitted on top of the heat dissipating unit 11. The cover 17 seals up the top portion of the heat dissipating unit 11, and hence the light generating units plate 12 and the heat conducting pieces 16 are sealed from the ambient surroundings so that they will not be affected or damaged by dusts, water, insects, corrosion and erosion.

[0017] Now, please see Fig. 3, which illustrates the first embodiment of the present invention in operation. When heat is generated by the light generating units 13, heat is transferred to the light generating units plate 12 and the heat conducting pieces 16 and then to the heat dissipating unit 11 and the heat dissipating pieces 111. Heat is then dissipated into the ambient air. In this way, heat may be dissipated quickly so that the light generating units 13 will not be damaged by overheating.

[0018] In addition, because the light generating units plate 12 and the heat conducting pieces 16 are in a sealed space and the heat dissipating pieces 111 point downwards or sideways, no dusts will accumulate on light generating units plate 12, the heat conducting pieces 16 and the heat dissipating pieces 111; therefore, a high efficiency of heat dissipation may be ensured.

[0019] Now, please see Fig. 4, which illustrates a third embodiment of the present invention. The design of the third embodiment is similar to the first embodiment illustrated in Figs. 1A and 1B except that an AC/DC adapter unit 18 is used in the third embodiment. The AC/DC adapter unit 18 is fitted on top of and in contact with the heat conducting pieces 16 so that heat generated by the AC/DC adapter unit 18 and a sensor circuit may be transferred to the heat conducting pieces 16 and then to the heat dissipating unit 11 and the heat dissipating pieces 111. Heat is then transferred to the ambient air. In this way, the AC/DC adapter unit 18 may have a longer service life.

[0020] The AC/DC adapter unit unit 18 serves to convert the AC supplied from an electrical outlet to DC; then the DC (direct current) is fed to the light generating units 13. In addition, a programmable timer and sensor circuit and an overheating protection circuit are disposed in the AC/DC adapter unit 18. The programmable timer circuit serves as a timer so as to turn off and turn on the light generating units 13. The overheating protection circuit can detect the temperatures of the light generating units 13; if the light generating units 13 overheat, the overheating protection circuit will turn off the light generating units 13 automatically.

[0021] Now, please see Fig. 5, which is a fourth embodiment of the present invention. The design of the fourth embodiment is similar to the first embodiment illustrated in Figs. 1A and 1B except that the cover 17 has a planer shape so that the cover 17 may be in contact with the top surface of the heat dissipating unit 11 1 so as to increase the efficiency of heat dissipation.

[0022] Now, please see Fig. 6, which is a fifth embodiment of the present invention. The lamp comprises a main body 2, which includes a heat dissipating unit 21 and a reflective cover 24.

[0023] The heat dissipating unit 21 may have a very long length. A plurality of heat dissipating pieces 211 extend from the bottom side of the heat dissipating unit 21 towards the ground. The heat dissipating pieces 211 may have the shape of a cylindrical rod or the shape of a flat rectangular sheet or other shape. A set of light generating units 22 are fitted on one side or both sides of the heat dissipating unit 21. A cover 23 is fitted onto each set of light generating units 22 so as to seal up the latter.

[0024] The reflective cover 24 has an arcuate shape.

The width of the reflective cover 24 is larger than that of the heat dissipating unit 21, and the length of the reflective cover 24 may be very long. The reflective cover 24 is fixedly fitted on the top surface of the heat dissipating unit 21 so as to cover the light generating units 22 and so that the light generated by the light generating units 22 may be reflected by the reflective cover 24 so as to propagate downwards so that the light would not dazzle our eyes and the light generating units 22 may become brighter and eye-friendly.

[0025] Now, please see Fig. 7, which illustrates the fifth embodiment as shown in Fig. 6 in operation. When heat is generated by the light generating units 22, heat is quickly transferred to the heat dissipating unit 21 and then to the heat dissipating pieces 211. Heat is then dissipated into the ambient air. Because the heat dissipating pieces 211 point downwards, dusts would not fall and accumulate on the heat dissipating pieces 211 so that the heat dissipating pieces 211 may be kept at their highest heat dissipating capacity.

[0026] Please see Fig. 8, which is a sixth embodiment of the present invention. The sixth embodiment of the present invention is similar to the fifth embodiment shown in Fig. 6 except that covers 23 are disposed on the reflective cover 24 so as to seal up light generating units 22.

[0027] In addition, the reflective cover may have a round shape, a rectangular shape, an oval shape or other shape.

[0028] In comparison to the prior art, the heat dissipating design of the present invention has the following four advantages:

1. The heat dissipating design of the present invention can prevent the damages caused by dusts, water, insects, corrosion and erosion.
2. In the heat dissipating design of the present invention, because the heat dissipating pieces of the heat dissipating unit extend downwards towards the ground, the heat dissipating capacity may be enhanced by the ambient cold air rising upwards and other undesirable factors (such as dusts) are kept off; therefore, the heat dissipating pieces may be kept at their highest heat dissipating capacity.
3. In the heat dissipating design of the present invention, an AC/DC adapter unit is used to supply DC (direct current) to the light generating units so as to be more economical (because no battery is needed).
4. In the heat dissipating design of the present invention, a programmable timer and sensor circuit and an overheating protection circuit are disposed in the AC/DC adapter unit. The programmable timer and sensor circuit serves as a timer so as to turn off or on the light generating units, while the overheating protection circuit can protect the light generating units from overheating.

[0029] Many changes and modifications in the above described embodiment of the invention can, of course, be carried out without departing from the scope thereof. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

Claims

1. A heat dissipating design for lamp, **characterized in that** the heat dissipating pieces (111) of a heat dissipating unit (11) extend downwards, wherein a light generating units plate (12) is fixedly fitted to an opening at the central portion or other appropriate location of the heat dissipating unit (11) so that a plurality of light generating units (13) point downwards, and wherein a portion of each heat conducting piece (16) is in contact with the top surface of the light generating units plate (12) and other portions are in contact with the top surface of the heat dissipating unit (11), **characterized in that** the heat dissipating unit (11) and the light generating units plate (12) and the heat conducting pieces (16) are disposed in a completely sealed space created by a cover, and that heat generated by the light generating units (13) is transferred to the light generating units plate (12) and the heat conducting pieces (16) and then to the heat dissipating unit (11) and the heat dissipating pieces (111) and finally into the ambient air.

2. The heat dissipating design as in claim 1, wherein an AC/DC adapter unit (18) is fitted on top of and in contact with the heat conducting pieces (16) so that heat generated by the AC/DC adapter unit (18) may be transferred to the light generating units plate (12) and the heat conducting pieces (16) and then to the heat dissipating unit (11) and the heat dissipating pieces (111) and finally into the ambient air.

3. The heat dissipating design as in claim 1, wherein the heat dissipating pieces (111) of the heat dissipating unit (11) extend downwards and the light generating units (13) are fitted on the heat dissipating unit (11) so that heat generated by the light generating units (13) is transferred to the heat dissipating unit (11) and the heat dissipating pieces (111) and finally into the ambient air.

4. A heat dissipating design for lamp, comprising:

   a heat dissipating unit (11), wherein an opening is provided at the central portion or other appropriate location of the heat dissipating unit (11) and a plurality of heat dissipating pieces (111) downwards extend from the bottom surface of the heat dissipating unit (11);
   a light generating units plate (12), fixedly fitted to the opening so as to seal it up, wherein a

plurality of light generating units (13) may be fitted on the underside or wide walls of the light generating units plate (12) so that the light generating units (13) may point downwards ;
one or more heat conducting pieces (16), wherein a portion of each heat conducting piece (16) is in contact with the top surface of the light generating units plate (12) and other portions are in contact with the top surface of the heat dissipating unit (11); and
a cover, fitted on top of the heat dissipating unit (11), wherein a completely sealed space is formed above the heat dissipating unit (11) so that the light generating units plate (12) and the heat conducting pieces (16) are disposed in such completely sealed space.

5. The heat dissipating design as in claim 4, wherein the heat dissipating pieces (111) may have the shape of a cylindrical rod or the shape of a flat rectangular sheet or other shape.

6. The heat dissipating design as in claim 4, wherein the light generating units plate (12) may be made of aluminum or other types of highly conductive metals.

7. The heat dissipating design as in claim 4, wherein the light generating units (13) may be LED, OLED or other types of light generating units.

8. The heat dissipating design as in claim 4, wherein the cover (17) may have the form of a lampshade.

9. The heat dissipating design as in claim 4, wherein the cover (17) may have a planer shape so that the cover (17) may be in contact with the top surface of the heat dissipating unit (11) so as to increase the efficiency of heat dissipation.

10. The heat dissipating design as in claim 4, wherein the heat conducting pieces (16) may be heat conducting tubes or heat conducting flat sheets or other forms of heat conducting pieces.

11. The heat dissipating design as in claim 4, further comprising an AC/DC adapter unit (18), wherein the AC/DC adapter unit (18) is fitted on top of and in contact with the heat conducting pieces (16) so that heat generated by the AC/DC adapter unit (18) may be transferred to the heat conducting pieces (16) and then to the heat dissipating unit (11) and the heat dissipating pieces (111) and finally to the ambient air.

12. The heat dissipating design as in claim 11, wherein the AC/DC adapter unit (18) includes a programmable timer and sensor circuit, which serves as a timer so as to turn off and turn on the light generating units (13).

13. The heat dissipating design as in claim 11, wherein the AC/DC adapter unit (18) also includes an overheating protection circuit, which can detect the temperatures of the light generating units (13) and may turn off the light generating units automatically if their temperature gets too high.

14. A heat dissipating design for lamp, comprising:

a heat dissipating unit (21), wherein a plurality of heat dissipating pieces (211) downwards or sideways extend from the bottom surface of the heat dissipating unit (21) and a set of light generating units (22) may be fitted on one side or both sides of the heat dissipating unit (21), and wherein a cover is fitted onto each set of light generating units (22) so as to seal up the latter; and a reflective cover (24), and is fixedly fitted on the top surface of the heat dissipating unit (21) so that the light generated by the light generating units (22) may be reflected by the reflective cover (24) so as to propagate downwards.

15. The heat dissipating design as in claim 14, wherein the reflective cover (24) has an arcuate shape and the width of the reflective cover (24) is larger than that of the heat dissipating unit (21).

16. The heat dissipating design as in claim 14, wherein the reflective cover (24) may be integrally formed with the heat dissipating unit (21).

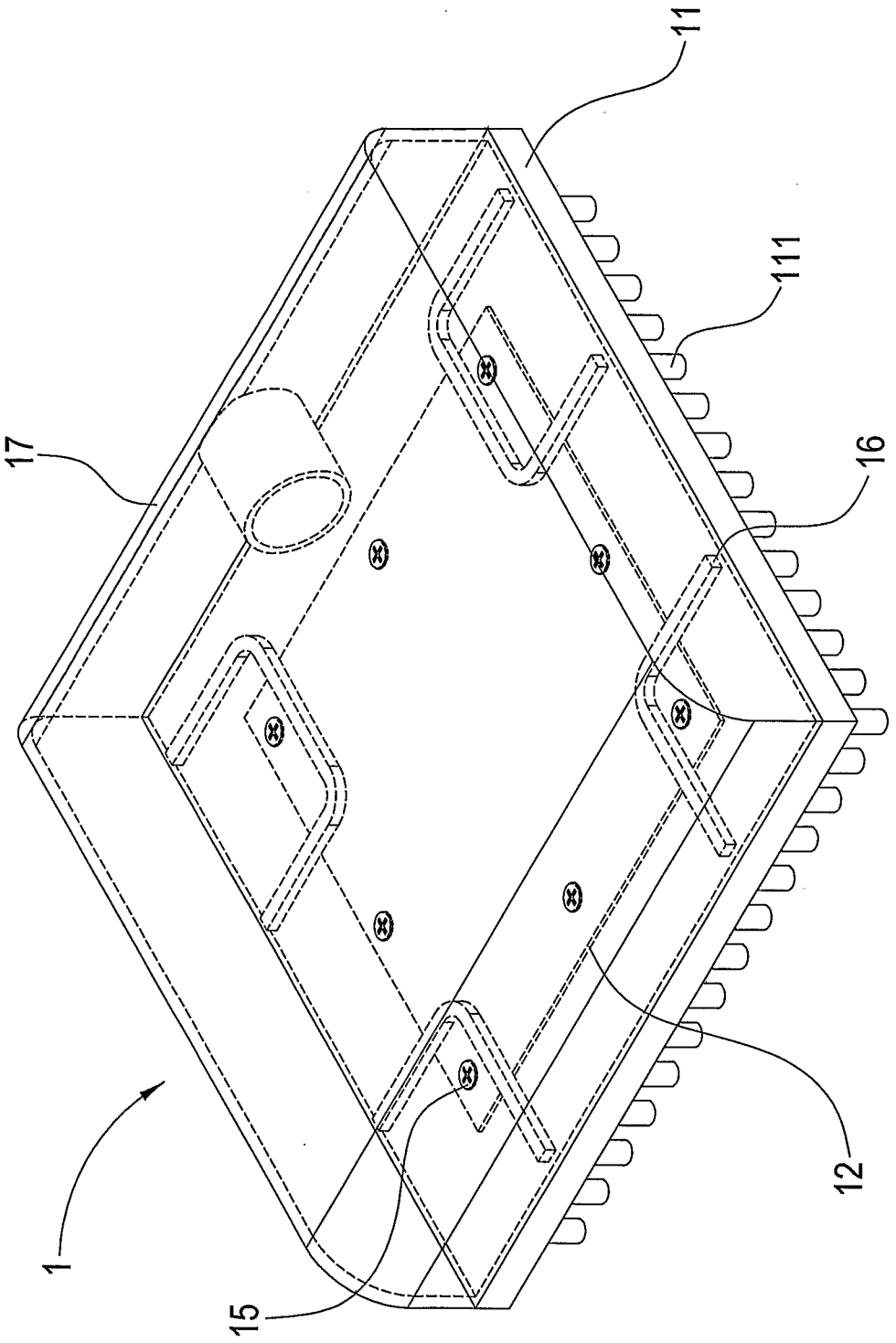

FIG. 1 A

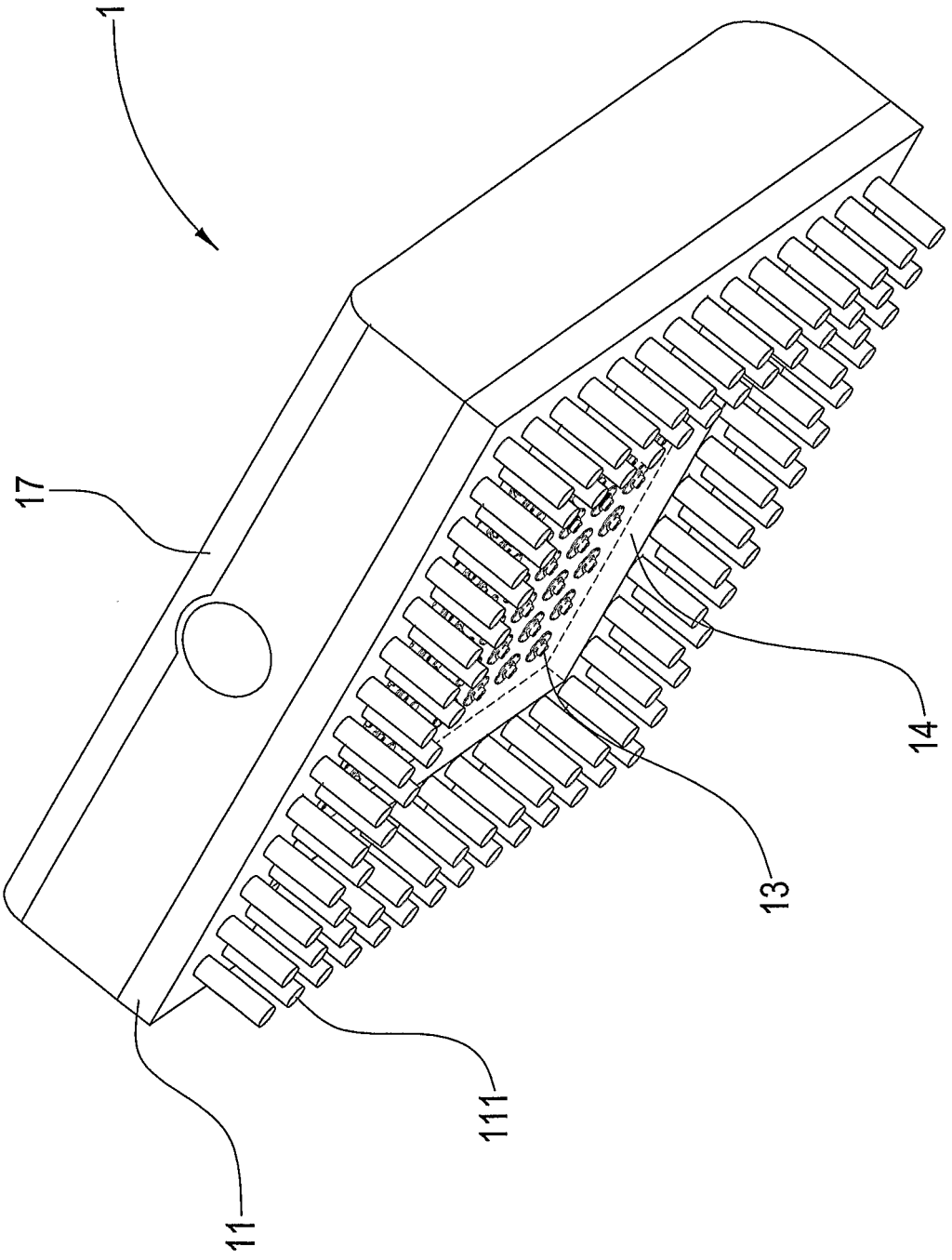

FIG. 1 *B*

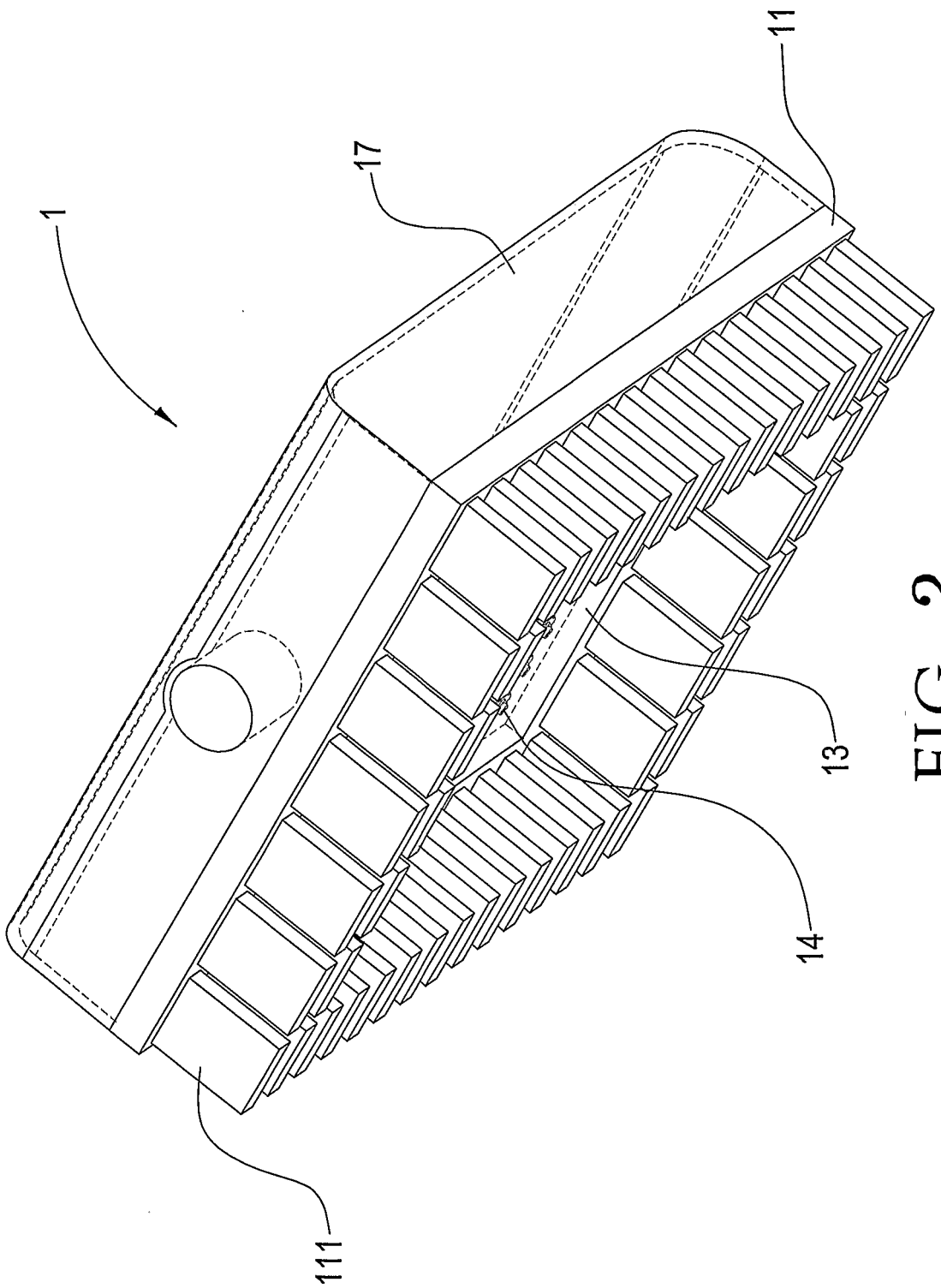

FIG. 2

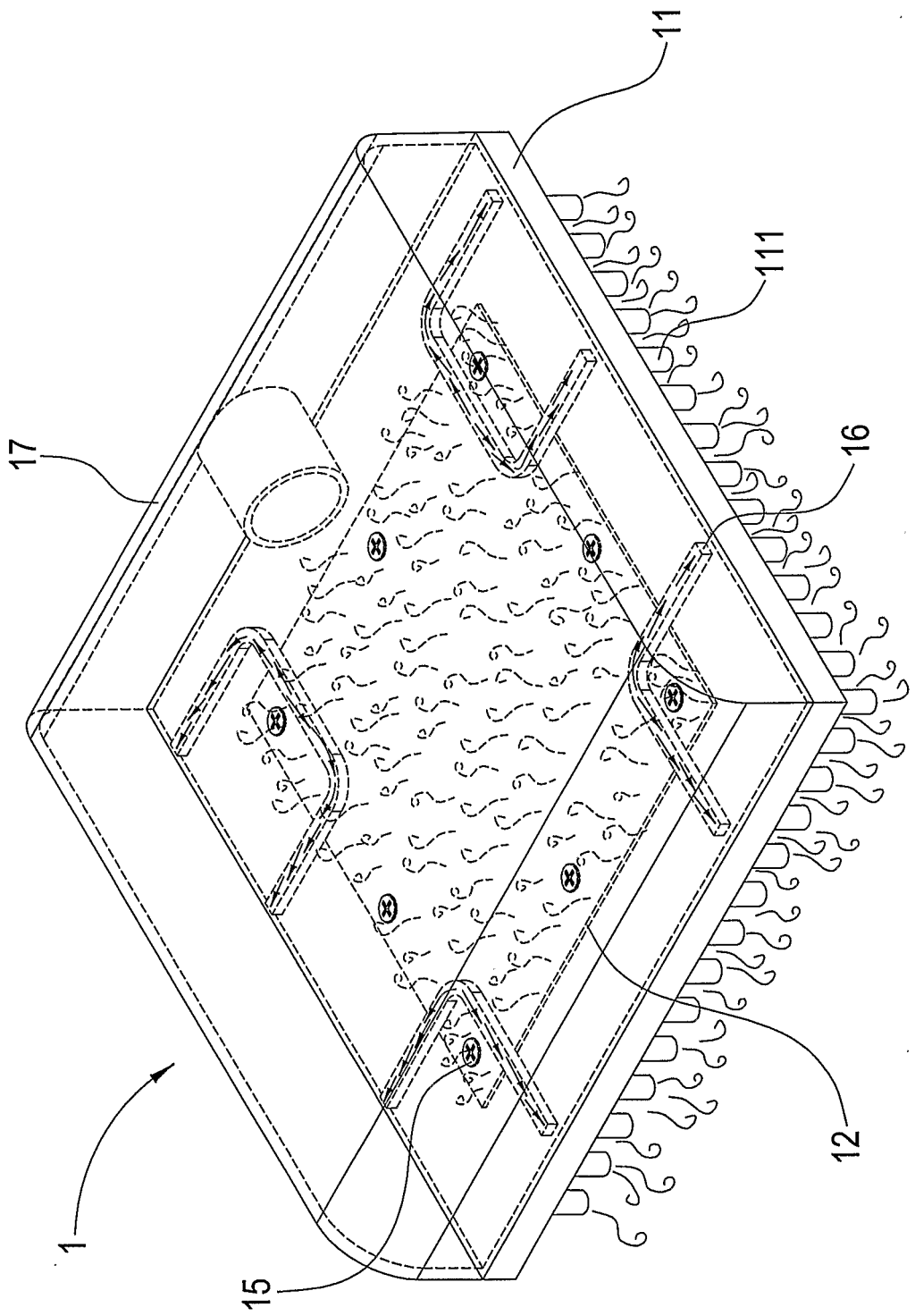

FIG. 3

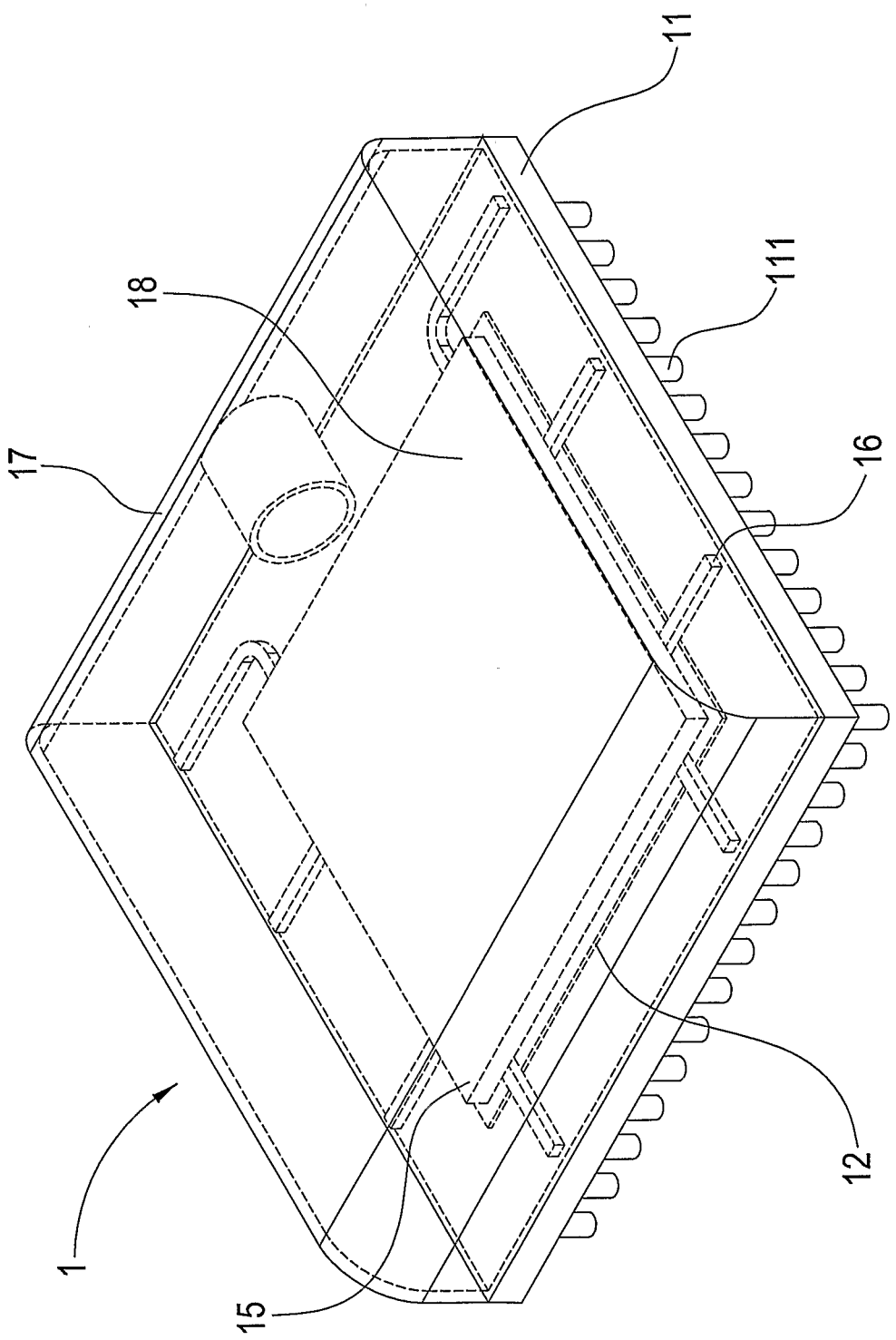

FIG. 4

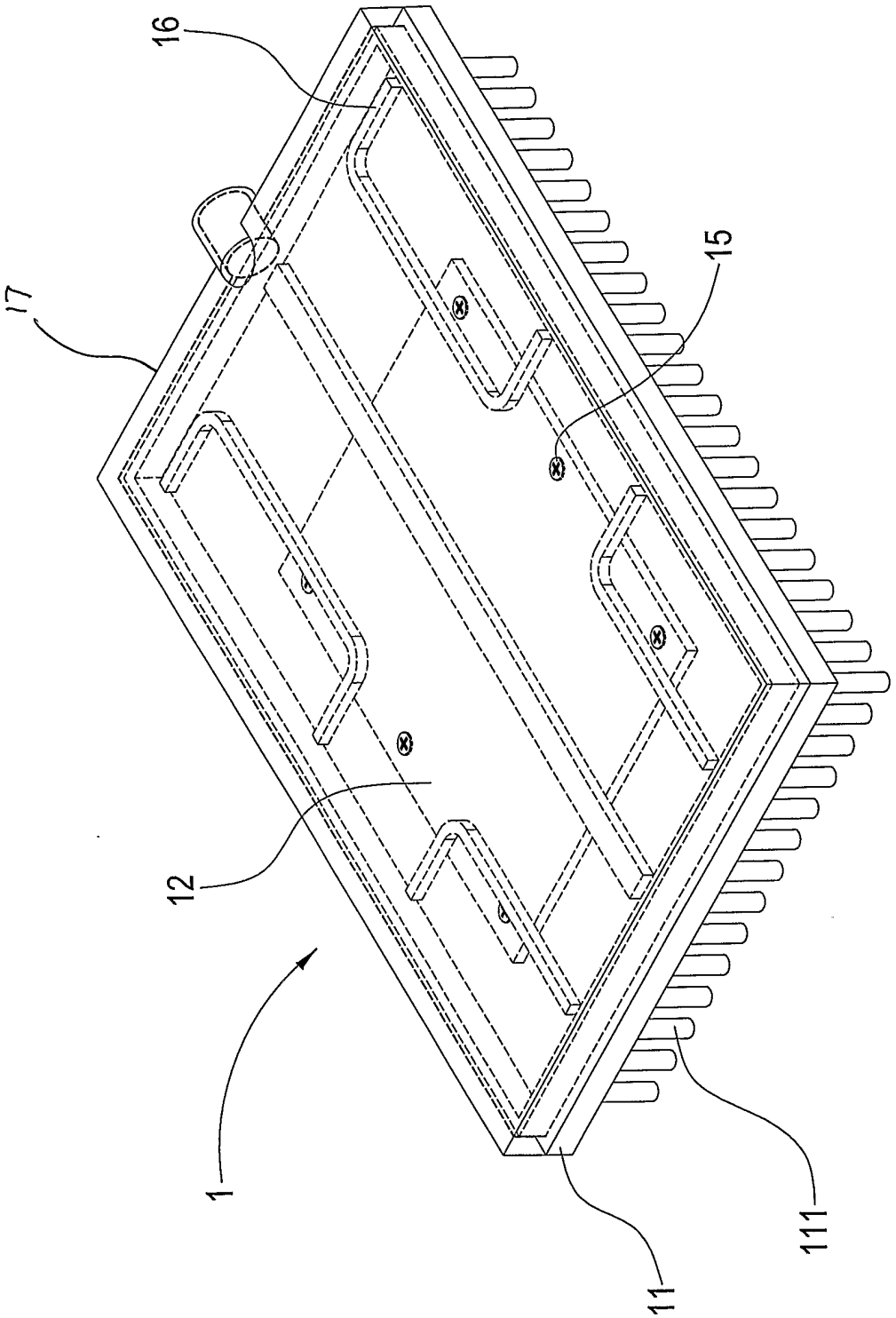

FIG. 5

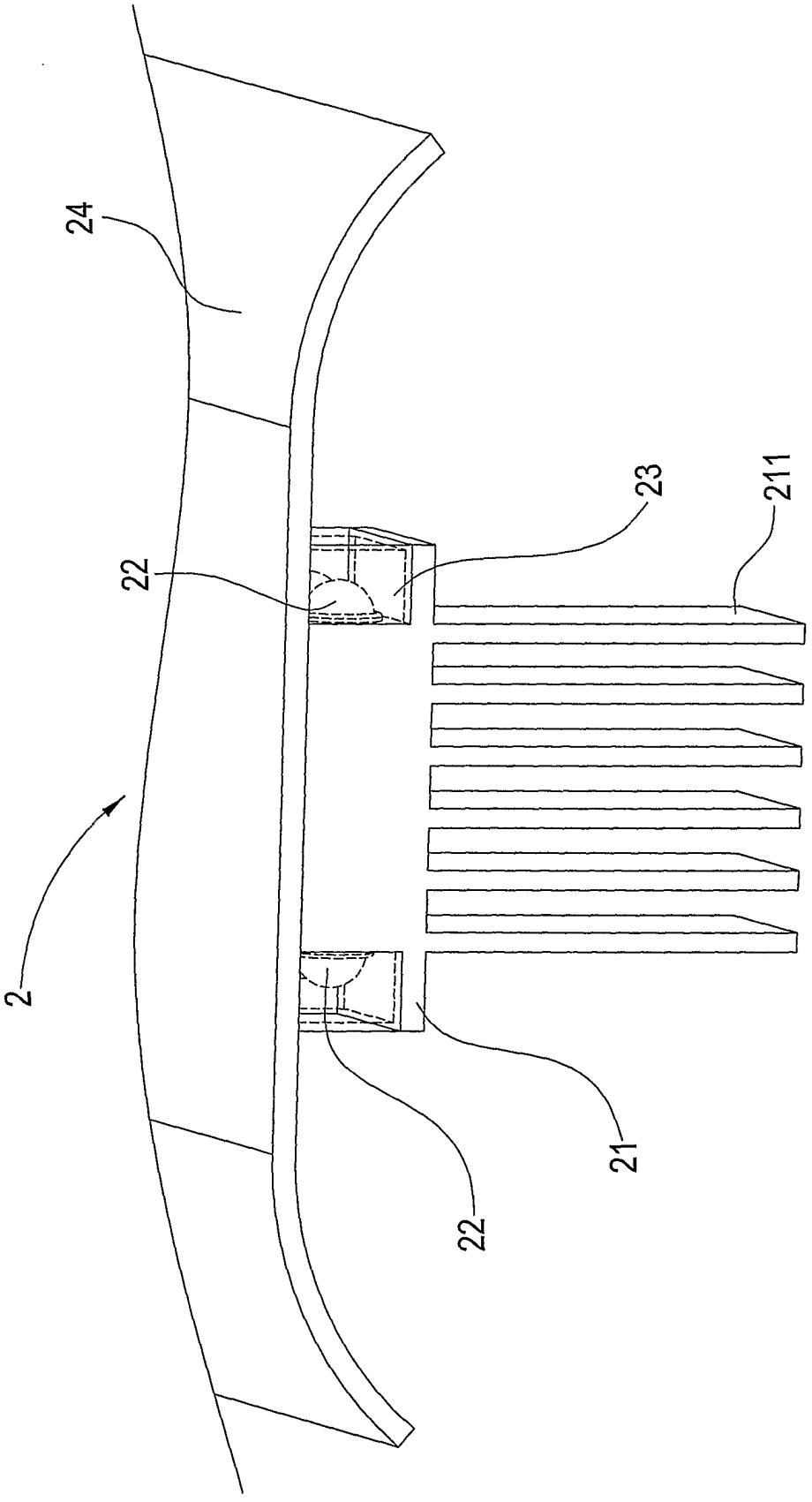

FIG. 6

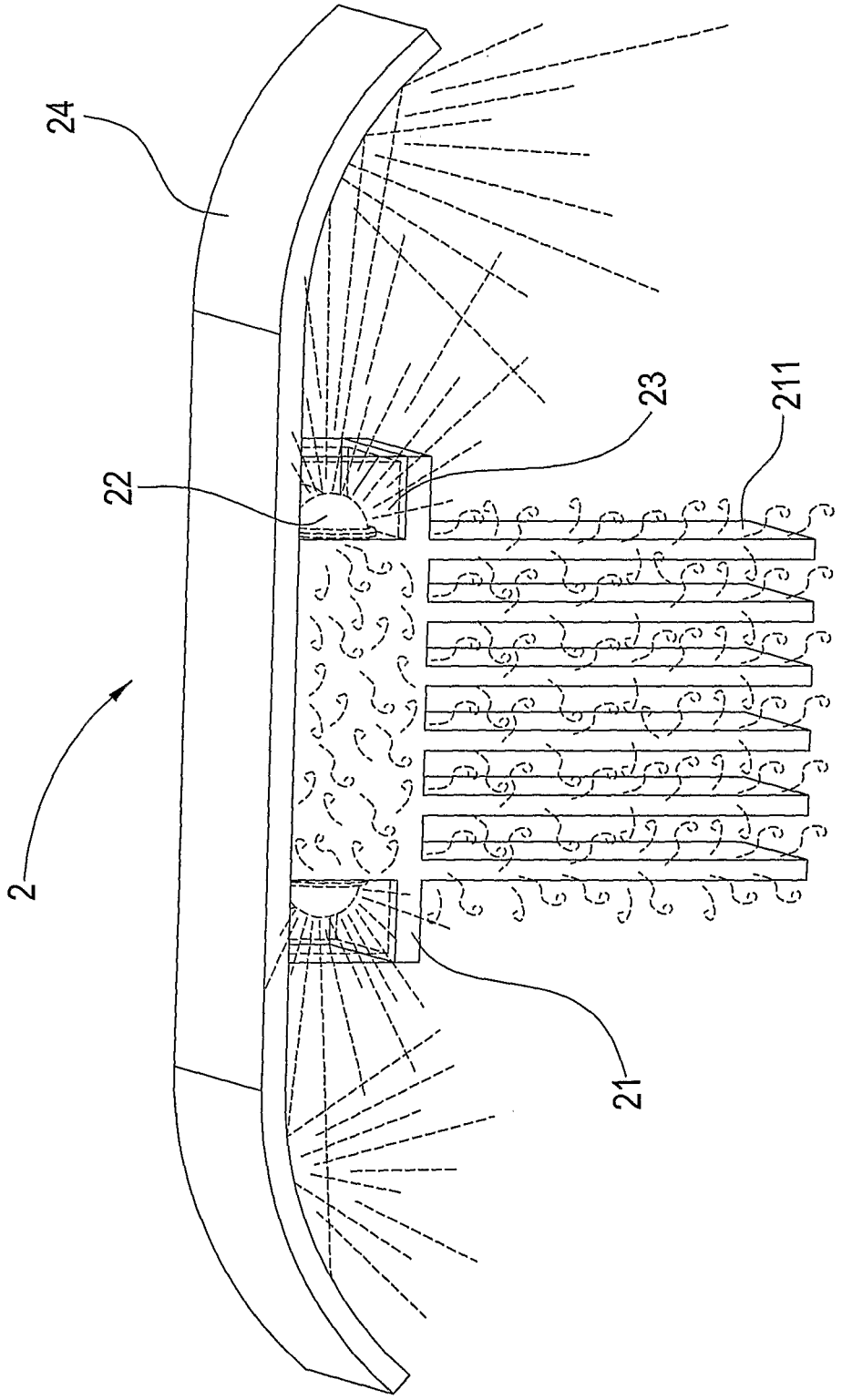

FIG. 7

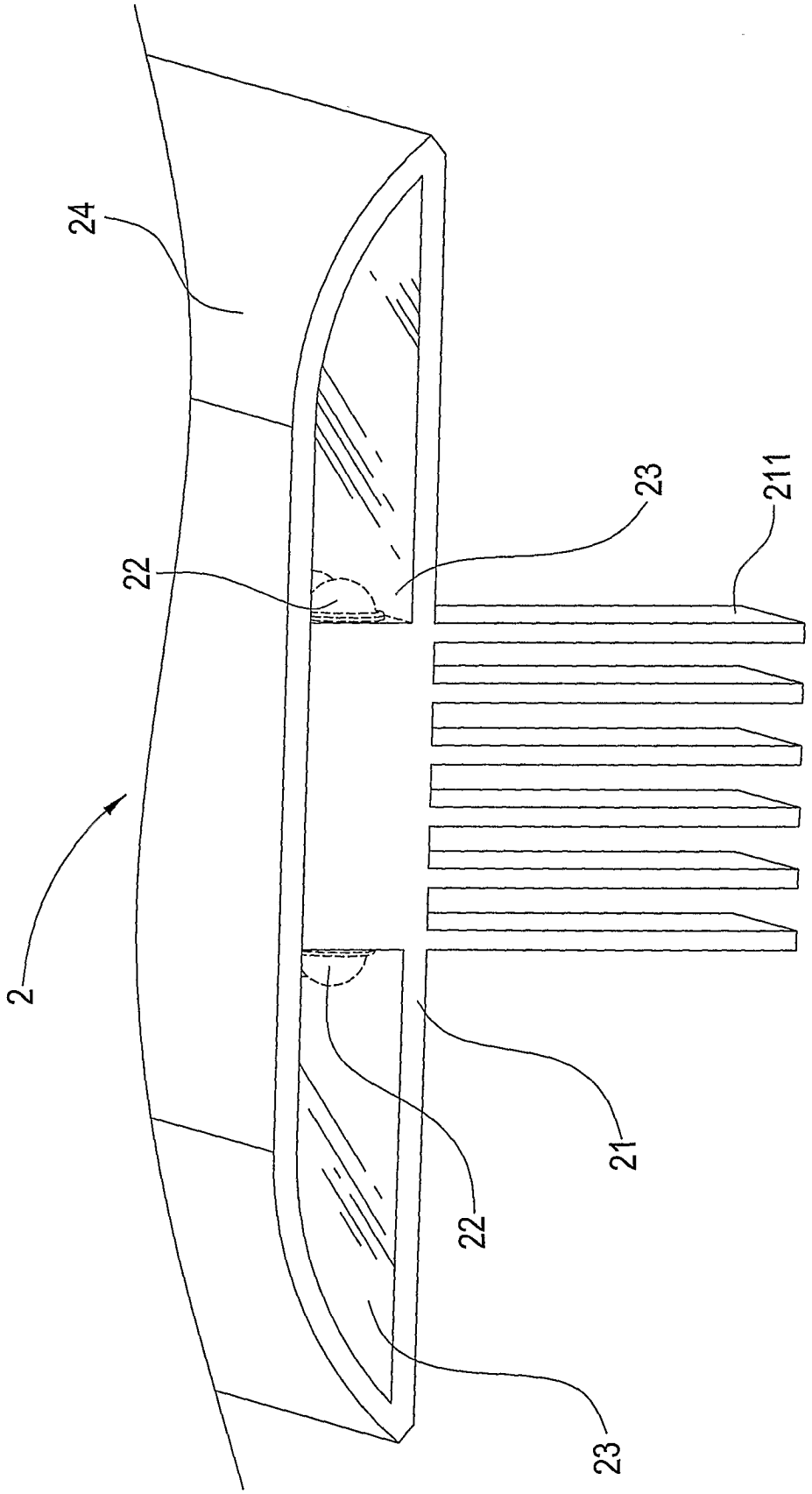

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/003017

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)

IPC: F21V, H01K, H01J

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)

WPI PAJ EPODOC CNPAT CNKI heat dissipat+ eliminat+ remove loss conduct+ glisten reflect+ lamp light illuminat+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN2708095Y (GE,Shichao) 06July 2005 (06.07.2005) description page 2, line 14- page 3,line 26, Figs.4,5; claims 1-8	1-16
X/Y	CN2641451Y (XIANGHU Co.LTD) 15 Sept.2004 (15.09.2004) description pages3-5, Fig.1	3/14-16
X/Y	CN2713301Y (SU,Guofen) 27 July 2005 (27.07.2005) description pages 1-3, Figs. 1-8	3/14-16
X/Y	CN2743689Y(NEW LAMP SOURCE SCIENCE AND TECHNOLOGY)30 November 2005(30.11.2005) description pages 2-3, Figs.1-3	3/14-16
X	CN2644878Y (GE,Shichao) 29 Sept.2004 (29.09.2004) description pages 1- 3, Fig.1	3
X/Y	US2006092640A1 (Chia Mao Li) 04 May2006 (04.05.2006) description page 1,paragraph 8- page2,paragraph 27, Figs.1-7	1-3/14-16

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 August 2007(14.08.2007)	30 • AUG 2007 (30 • 08 • 2007)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer 谢刚 Gang Xie Telephone No. (86-10) 62085844

Form PCT/ISA /210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/003017

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

There are four inventions defined by independent claims1,3,4,14. the same or corresponding technical features among four inventions above are as follows: the heat dissipating pieces of a heat dissipating unit extend laterally or towards the ground. A light generating unit is provided on the heat dissipating unit. When heat is generated by the light generating unit, heat is transferred from the light generating unit to the heat dissipating unit and finally transferred to the ambient air via the heat dissipating pieces provided on the heat dissipating unit. Among the technical features above, most of them are disclosed by D1, the technical features other than features disclosed by D1 belong to common technical measures. That is, there are not any technical features contributed to the prior art. Thus the inventions above lack unity according to Rule 13.2 PCT.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA /210 (continuation of first sheet (2)) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2006/003017

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/003017

CLASSIFICATION OF SUBJECT MATTER

F21V29/00 (2006.01) i
H01K1/58 (2006.01) i
F21V 25/10 (2006.01) n

Form PCT/ISA /210 (extra sheet) (April 2007)