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(54) ULTRATHIN PROJECTING LAMP

(57) The present patent application discloses a slim spotlight including a surface cover, a glass plate, a rubber ring, a reflector cover, a light expansion hood, a waterproof ring, a bolt, a seal ring, a nut, a mounting bracket and a body. A LED circuit without power supply is set between the light expansion hood and the body. The rear side of the body has a plurality of screw holes and the screw holes pass through the body. The cover is provided with a plurality of hidden holes which match up with the screw holes. The output port of the LED circuit comprises a rectifier bridge, a safety capacitor, a piezoresistor and a filter capacitor. The safety capacitor is connected in series between a firing line and a null line; the piezoresistor is connected in series between the firing line and the null line; the input port of the rectifier bridge connects with the firing line and the null line; the output port of the rectifier bridge connects the positive lead of the filtering capacitor; the input port of the LED circuit connects a number of high-voltage LED lamp beads in series. The slim spotlight adopts a plurality of screw holes on the back of the body to mount the surface cover which offers a large light emitting area and ensures a slim outer housing. The electrical circuit of the slim spotlight uses the high-voltage LED lamp beads and eliminates the power supply which makes the slim spotlight thinner and lighter.

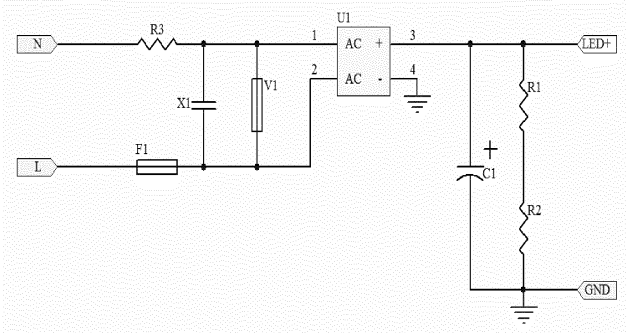

Figure 4

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Description

Field of the Patent Application

[0001] This patent application relates to the technical field of the spotlight, and particularly relate to a slim spotlight.

Background

[0002] The mounting method of the front cover and the body of the spotlight in the market usually uses the screw to pass through front cover and into the body. This design increases the thickness of the entire spotlight, and affects the beauty of the spotlight. The LED lamp beads of the existing spotlight require the regulator or constant current power supply, which also increases the thickness of the entire spotlight. To eliminate the power supply and make the product thinner will definitely satisfy the customer.

Summary

[0003] The object of the present patent application is to overcome the above deficiencies and provide a slim spotlight.

[0004] The present patent application provides a slim spotlight, including a surface cover, a glass plate, a rubber ring, a reflector cover, a light expansion hood, a waterproof ring, a bolt, a seal ring, a nut, a mounting bracket and a body. A LED circuit without power supply is set between the light expansion hood and the body, the rear side of the body has a plurality of screw holes, the screw holes pass through the body, the surface cover is provided with a plurality of hidden holes which match up with the screw holes. The output of the LED circuit includes a rectifier bridge, a safety capacitor, a piezoresistor and a filter capacitor, the safety capacitor is connected in series between a firing line and a null line; the piezoresistor is connected in series between the firing line and the null line; the input port of the rectifier bridge connects with the firing line and the null line; the output port of the rectifier bridge connects the positive lead of the filtering capacitor; the input port of the LED circuit connects a number of high-voltage LED lamp beads in series. In one aspect of the present patent application, a fuse is connected in series between the firing line and the safety capacitor, wherein the fuse is a self-resettable fuse.

[0005] In another aspect of the present patent application, the rectifier bridge is a surface mount device.

[0006] In another aspect of the present patent application, the filter capacitor connects in parallel with a current-limiting resistor.

[0007] In another aspect of the present patent application, the negative lead of the high-voltage LED lamp bead connects in series with a diode.

[0008] In yet another aspect of the present patent application, the diode is a SMT packaged constant current diode.

[0009] The slim spotlight of the patent application has the following advantages: the slim spotlight adopts a plurality of screw holes on the back of the body to mount the surface cover. This assembly method offers a large light emitting area, and ensures a slim outer housing. The electrical circuit of the slim spotlight uses the high-voltage LED lamp beads and eliminates the power supply, which makes the slim spotlight thinner and lighter.

Brief Descriptions of the Drawings

[0010]

Figure 1 is an exploded view of a slim spotlight according to one embodiment of the present patent application.

Figure 2 is a rear view of the body of the slim spotlight of the present patent application.

Figure 3 is a rear view of the surface cover of the slim spotlight of the present patent application.

Figure 4 is the circuit diagram of the output port of the LED of the present patent application.

Figure 5 is the circuit diagram of the intput port of the LED of the present patent application.

Detailed Description

[0011] Reference will now be made in detail to a preferred embodiment of the slim spotlight disclosed in the present patent application, examples of which are also provided in the following description. Exemplary embodiments of the slim spotlight disclosed in the present patent application are described in detail, although it will be apparent to those skilled in the relevant art that some features that are not particularly important to an understanding of the slim spotlight may not be shown for the sake of clarity. The following examples are used to illustrate the present patent application but not intended to limit the scope of the present patent application.

[0012] Referring to Figures 1-5, a slim spotlight includes a surface cover 1, a glass plate 2, a rubber ring 3, a reflector cover 4, a light expansion hood 5, a waterproof ring 6, a bolt 7, a seal ring 8, a nut 9, a mounting bracket 10 and a body 11. A LED circuit 14 without power supply is set between the light expansion hood 5 and the body 11. The rear side of body 12 has a plurality of screw holes 12. The screw holes 12 pass through the body 11. The surface cover 1 is provided with a plurality of hidden holes 13 which match up with the screw holes 12.

[0013] The output port of the LED circuit 14 includes a rectifier bridge U1, a safety capacitor X1, a piezoresistor V1 and a filter capacitor C1, the safety capacitor X1 is connected in series between the firing line L and the null line N. The piezoresistor V1 is connected in series between the firing line L and the null line N. The input port of the rectifier bridge U1 connects with the firing line L and the null line N. The output port of the rectifier bridge U1 connects the positive lead of the filtering Capacitor

C1. The input port of the LED circuit 14 connects a number of high-voltage LED lamp beads D1 ~ D8 in series. In this embodiment, the null line N connects in series with a resistor R3 with small resistance value.

[0014] A fuse F1 is connected in series between the firing line L and the safety capacitor X1. The fuse F1 is a self-resettable fuse.

[0015] The rectifier bridge U1 is preferably a surface mount device.

[0016] The filter capacitor C1 connects in parallel with current-limiting resistors R1 and R2.

[0017] The negative lead of the high-voltage LED lamp bead D8 connects in series with a diode DP1.

[0018] The diode DP1 is preferably a SMT constant current diode.

[0019] The slim spotlight adopts a plurality of screw holes on the back of the body to mount the cover, which offers a large lightemitting area and ensures a slim outer housing. The maximum thickness of the entire slim spotlight is only 25mm, which is slimmer than the existing similar products. The electrical circuit of the slim spotlight uses the high-voltage LED lamp beads, which eliminates the power supply and makes the slim spotlight thinner and lighter.

[0020] The above are only preferred embodiments of the present patent application, it should be understood that the slim spotlight disclosed in the present patent application is not limited to the precise embodiments described above and that various changes and modifications thereof may be effected by one skilled in the art without departing from the spirit or scope of the protection. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of this disclosure.

Claims

1. A slim spotlight comprising a surface cover, a glass plate, a rubber ring, a reflector cover, a light expansion hood, a waterproof ring, a bolt, a seal ring, a nut, a mounting bracket and a body, **characterizing in that** a LED circuit without power supply is set between the light expansion hood and the body, a rear side of the body has a plurality of screw holes, the screw holes pass through the body, the surface cover is provided with a plurality of hidden holes which match up with the screw holes; the output port of the LED circuit comprises a rectifier bridge, a safety capacitor, a piezoresistor and a filter capacitor, the safety capacitor is connected in series between a firing line and a null line; the piezoresistor is connected in series between the firing line and the null line; an input port of the rectifier bridge connects with the firing line and the null line; an output of the rectifier bridge connects a positive lead of the filtering capacitor; an input port of the LED circuit connects a number of high-voltage LED lamp beads in series.

2. The slim spotlight of claim 1, **characterizing in that** a fuse is connected in series between the firing line and the safety capacitor, wherein the fuse is a self-resettable fuse.

3. The slim spotlight of claim 1, **characterizing in that** the rectifier bridge is a surface mount device.

4. The slim spotlight of claim 1, **characterizing in that** the filter capacitor connects in parallel with a current-limiting resistor.

5. The slim spotlight of any one of claims 1-4, **characterizing in that** a negative lead of the high-voltage LED lamp bead connects in series with a diode.

6. The slim spotlight of claim 5, **characterizing in that** the diode is a SMT constant current diode.

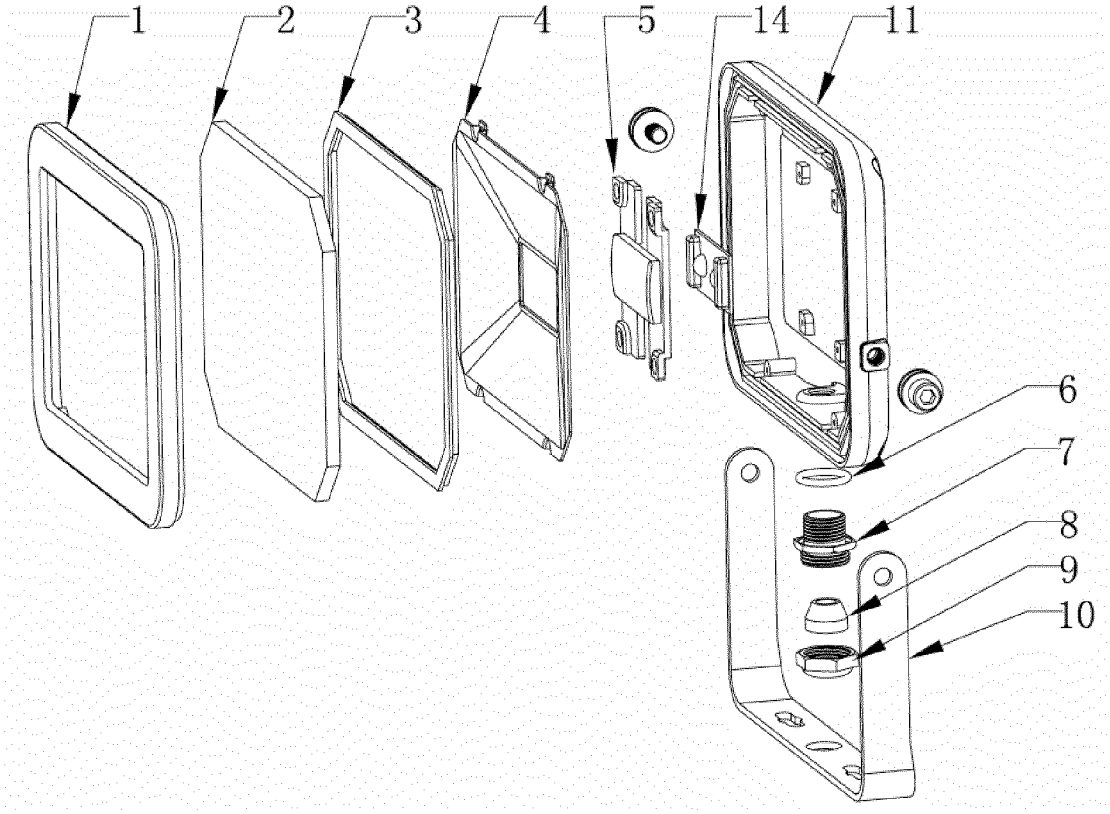

Figure 1

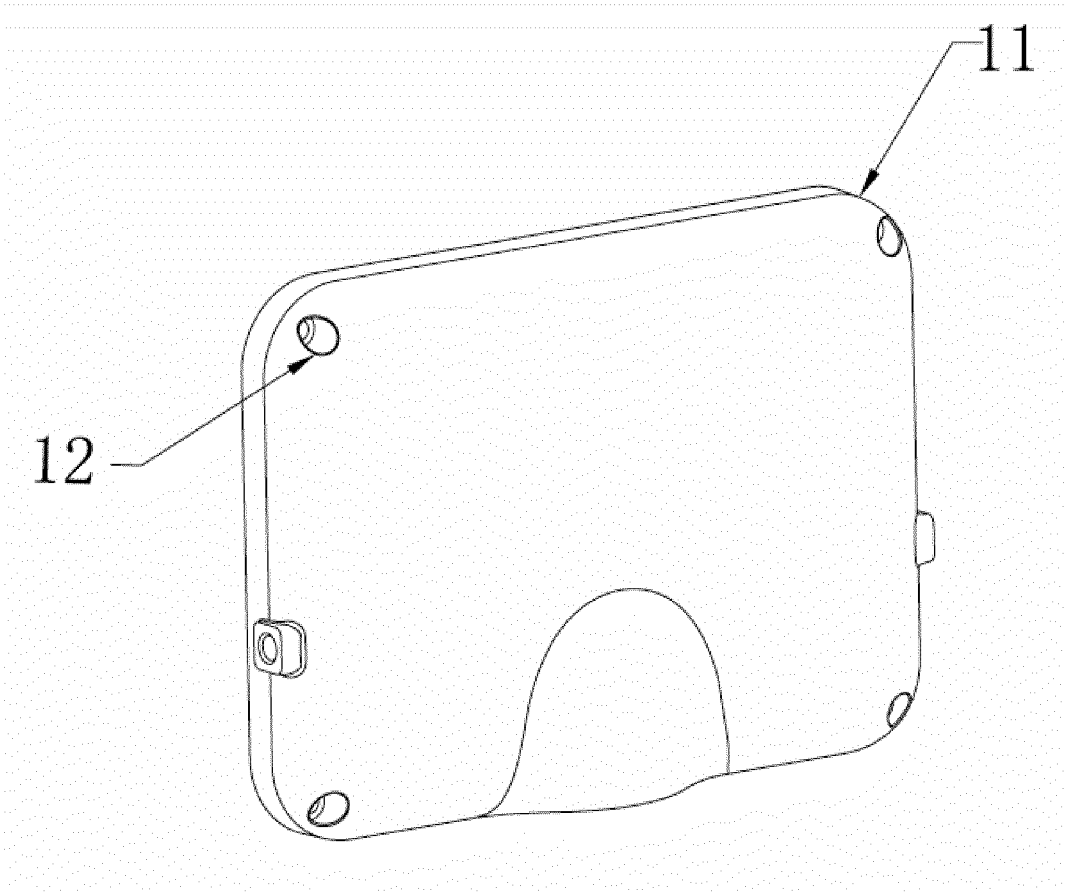

Figure 2

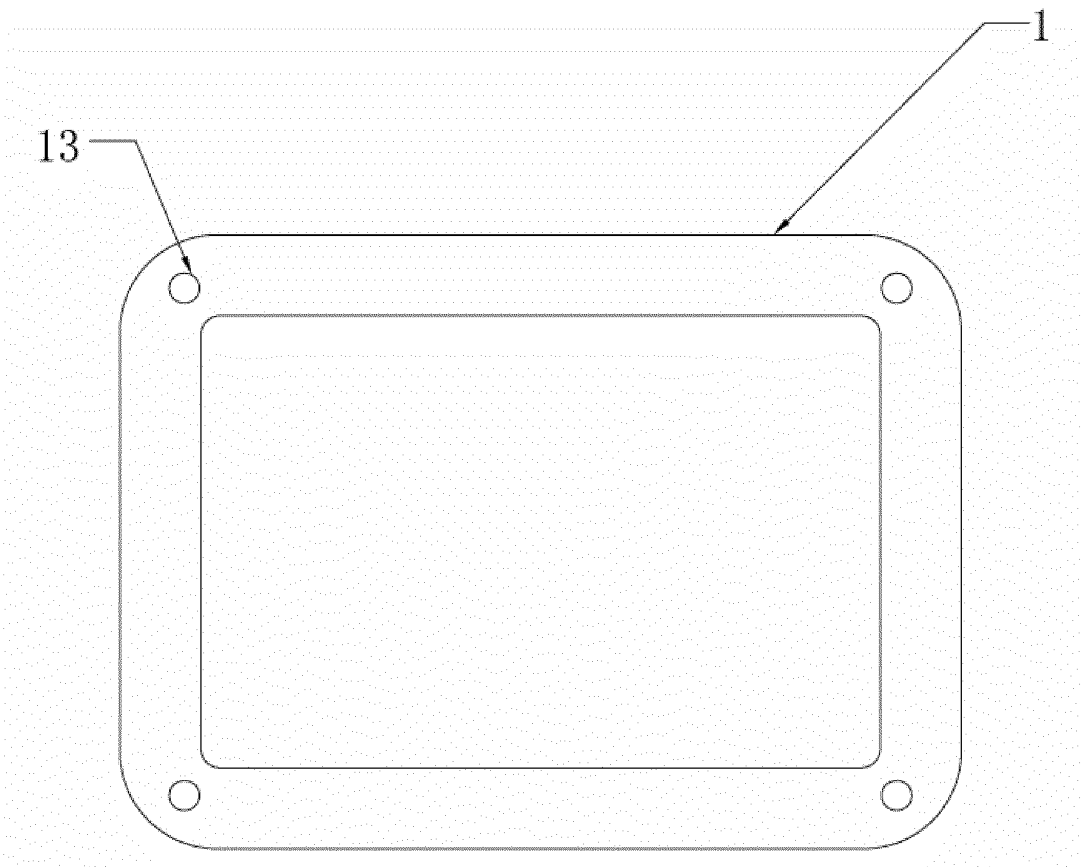

Figure 3

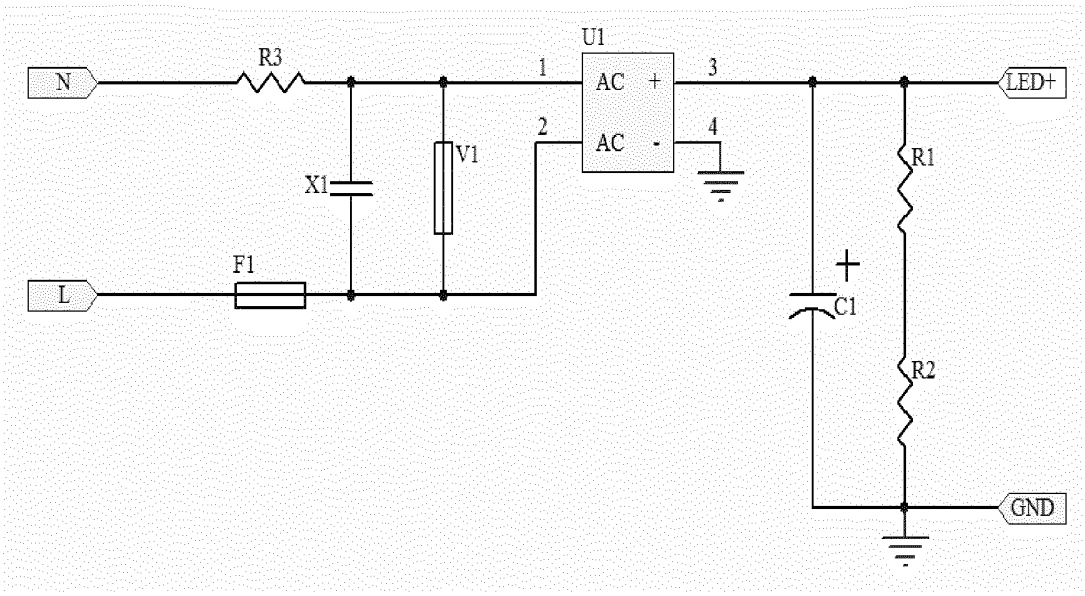

Figure 4

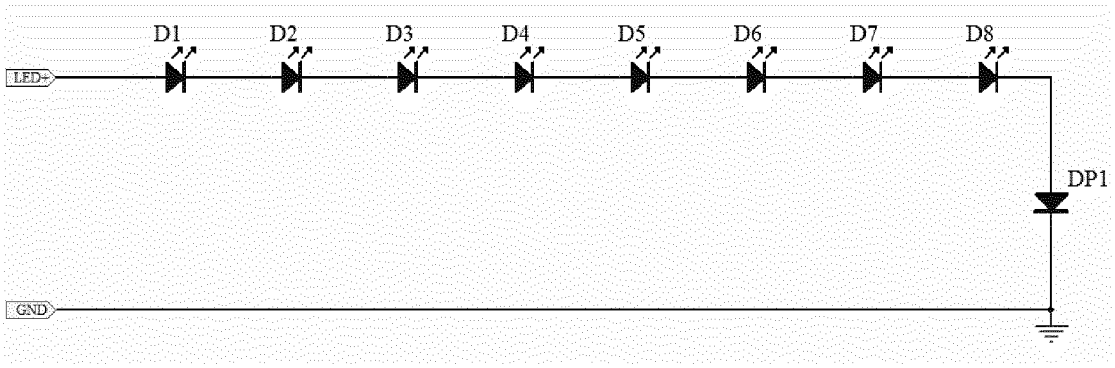

Figure 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/090681

A. CLASSIFICATION OF SUBJECT MATTER

See the 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: F21S 2/-; F21V 13/-; F21V 17/-; F21Y 101/-; H05B 37/-

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)

CNPAT, WPI, EPODOC, CNKI: projection lamp, drive, power supply, high voltage, non-drive, safety capacitance, spot+ and light+, LED, rectifier s bridge?, piezoresistor, voltage? s resistance?, capacitance?

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 203309620 U (NINGBO LONGYU PHOTOELECTRIC TECHNOLOGY CO., LTD.), 27 November 2013 (27.11.2013), description, paragraphs [0015]-[0018], and figure 1	1-6
Y	CN 102933005 A (SHANGHAI DANGOO ELECTRONICS CO., LTD.), 13 February 2013 (13.02.2013), description, paragraphs [0008]-[0010], and figure 1	1-6
Y	CN 101404842 A (JIANGYIN WANGDA ELECTRONIC CO., LTD.), 08 April 2009 (08.04.2009), description, page 7, line 5 to page 8, the bottom line, and figure 4	1-6
A	US 2011037409 A1 (CREE LED LIGHTING SOLUTIONS, INC.), 17 February 2011 (17.02.2011), the whole document	1-6
A	CN 2886319 Y (NANJING HANDSON CO., LTD.), 04 April 2007 (04.04.2007), the whole document	1-6
A	CN 202791659 U (CHANGZHOU ALADDIN LIGHTING & ELECTRIC CO., LTD.), 13 March 2013 (13.03.2013), the whole document	1-6

☐ 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 March 2014 (14.03.2014)	**03 April 2014 (03.04.2014)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **KANG, Dandan** Telephone No.: (86-10) **62413593**

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2013/090681

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 203309620 U	27.11.2013	None	
CN 102933005 A	13.02.2013	None	
CN 101404842 A	08.04.2009	CN 101404842 B	14.09.2011
US 2011037409 A1	17.02.2011	US 8648546 B2	11.02.2014
		WO 2011019448 A1	17.02.2011
CN 2886319 Y	04.04.2007	None	
CN 202791659 U	13.03.2013	None	

Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/090681

A. CLASSIFICATION OF SUBJECT MATTER

F21S 2/00 (2006.01) i

F21V 13/00 (2006.01) i

F21V 17/10 (2006.01) i

F21V 17/12 (2006.01) i

H05B 37/02 (2006.01) i

F21Y 101/02 (2006.01) n

Form PCT/ISA/210 (extra sheet) (July 2009)