



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

(43) Date of publication:
16.01.2013 Bulletin 2013/03

(51) Int Cl.:
F21V 29/00 (2006.01) F21V 17/00 (2006.01)

(21) Application number: **10847210.1**

(86) International application number:
PCT/CN2010/072330

(22) Date of filing: **29.04.2010**

(87) International publication number:
WO 2011/109951 (15.09.2011 Gazette 2011/37)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **10.03.2010 CN 201020133242 U**

(71) Applicant: **Nanjing Handson Co. Ltd.**
Nanjing, Jiangsu 211100 (CN)

(72) Inventors:
• **SUN, Jianguo**
Nanjing
Jiangsu 211100 (CN)
• **PAN, Chenglin**
Nanjing
Jiangsu 211100 (CN)

(74) Representative: **Brunner, John Michael Owen**
Carpmaels & Ransford
One Southampton Row
London WC1B 5HA (GB)

(54) **DIE-CASTING LED ENERGY-SAVING LAMP**

(57) A die-casting LED energy-saving lamp, comprises a lamp mask (1), LED light source components (2), a lamp body (3), an insulated shell (4), a drive power supply (5) and a lamp head (6). A plurality of straight heat radiation fins and heat radiation grooves are uniformly arranged around the external edge of the lamp body (3). A flat-bottom heat-conductive round platform with a groove around it is arranged on the top of the lamp body (3). LED light source components (2) are fixed on the surface of the flat-bottom heat-conductive round platform. The lamp mask (1) is embedded in the groove of the flat-bottom heat-conductive round platform. A column cavity is formed in the center of the heat radiation structure of the lamp body (3). The drive power supply (5) and the insulated shell (4) are inserted into the column cavity after being integratively assembled. The insulated shell (4) is fixed with the bottom of the flat-bottom heat-conductive round platform. The lamp head (6) is fixed on the end of the insulated shell (4) far from the LED light source components (2), and is insulated from and fixed with the metallic lamp body (3).

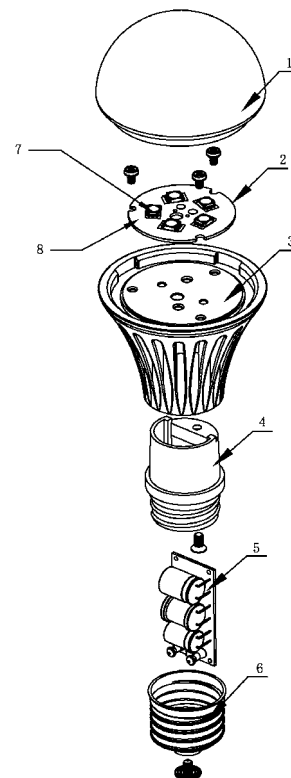


Fig.1

Description

TECHNICAL FIELD

[0001] The present invention relates to a die-casting LED energy-saving lamp, and more particularly, to an LED energy-saving lamp, of which the light source is power LED. The present invention belongs to the technical field of semiconductor lighting.

BACKGROUND OF THE INVENTION

[0002] Incandescent lamps have been used in lighting for a period of time, but now they are nearing their ends. Under the backgrounds of global climatic changes and energy shortages, it is of great concern to seek more energy saving lighting schemes. The LED energy-saving lamp is a new kind of environmental-friendly, high efficient, safer and more reliable lighting fixture.

[0003] Due to lighting effect and production cost, currently the LED energy-saving lamp is not competitive against the traditional high efficient light sources in the field of wide area white lighting and flood lighting. But the LED energy-saving lamp has incomparable advantages over the traditional light sources in fields of low power lighting, local lighting or safety lighting. In general, either low power LEDs or high power LEDs may be used to produce the LED energy-saving lamp. Practice proves that the light decay of the low power LED is faster than that of the high power LED, although the production cost of the low power LED is lower than that of the high power LED. What's more, too many low power LEDs are required in the LED energy-saving lamp, so it is inconvenient in assembling. Additionally, the LED energy-saving lamp produced with low power LEDs commonly has low lighting effect and short lifetime, and accidents due to too high temperature may be caused during the operation of the LED energy-saving lamp. In consideration of the above, it is more reasonable to produce the LED energy-saving lamp with high power LEDs.

SUMMARY OF THE INVENTION

[0004] On account of the defects in the prior art, the present invention aims at providing a die-casting LED energy-saving lamp, which is provided with an LED light source module comprising LEDs with power of one or more watts, to solve the problems of serious light decay and heat dissipation of the traditional low power LEDs. Also the present invention provides a producing scheme with simple process and low cost, so as to promote the timely implementation of new technologies.

[0005] The object of the present invention is achieved by the following technical schemes:

[0006] A die-casting LED energy-saving lamp, comprising a lamp mask, an LED light source module, a lamp body, an insulated casing, a driving power supply and a lamp holder, wherein, a plurality of straight heat dissipat-

ing fins and heat dissipating grooves are uniformly arranged around an outer wall of the lamp body; top of the lamp body of the high power energy-saving lamp is provided with a flat-bottomed heat-conducting round platform which has a groove along its periphery; the LED light source module is fixed on a surface of the flat-bottomed heat-conducting round platform; the lamp mask is fixed to the flat-bottomed heat-conducting round platform with the aid of the groove; an inner cavity is formed in center of heat dissipating structure of the lamp body; the driving power supply and the insulated casing are disposed in the inner cavity; the insulated casing is connected and fixed to a bottom of the flat-bottomed heat-conducting round platform; the lamp holder is connected and fixed to one end of the insulated casing, which is far from the LED light source module; and the lamp holder is fixed to and insulated from the lamp body.

[0007] Preferably, with respect to the die-casting LED energy-saving lamp above, the LED light source module a metal circuit board and monochromatic or polychromatic LEDs with power of one or more Watts, which are attached on a heat dissipating LED substrate; the LEDs are individually or integrally packaged and attached; and a light exit of the LED light source module corresponds to a position of the lamp mask.

[0008] Preferably, the lamp mask is made of glass, colophony or a mixture of polycarbonate, which has a light transmittance of over 95%; the lamp mask has a shape of a semisphere, spheroid, a column or a prism; and an inner wall of the lamp mask is frosted or additionally provided with intensifying coatings.

[0009] Preferably, the groove has several outwards concaves along an inner side of its outer wall, and the outer periphery of the outer wall forms a circumferential rib; and the lamp mask is fixed in the groove of the lamp body by adhesive. Preferably, inner walls of the groove are provided with threads; and the lamp mask is fixed in the groove by means of the threads. Preferably, bottom of the groove is provided with screw holes; and the lamp mask is fixed in the groove with screws. Preferably, the lamp body made of aluminum or aluminum alloy is provided with straight heat dissipating fins and heat dissipating grooves; the outer edge of the heat dissipating fin is chamfered and circular, and the bottom of the heat dissipating groove forms a semi circle processed by die casting and cutting; and surfaces of the heat dissipating grooves are processed by sandblasting, oxidizing and polishing.

[0010] Preferably, the insulated casing is cylindrical; a slot is formed in an inner cavity of the cylindrical insulated casing by die-casting; and the drive power supply is inserted in the slot.

[0011] Preferably, the drive power supply is provided with a rectangular printed circuit board; the cylindrical insulated casing has a semicircular opening at the top, the other part of the top forms a closed semicircular surface, at the central position of which is provided with a screw hole; and the insulated casing is fixed on the lamp

body with screw.

[0012] Preferably, the lamp holder of the LED energy-saving lamp is a metal interface, and is riveted to the insulated casing along an inner periphery of the lamp holder; and the metal interface is an E-27 radioceramic screw lamp holder made of nickel-plated copper.

[0013] The present invention has better stability and longer lifetime than the traditional incandescent tube or the low pressure fluorescent lamp. What's more, the lamp body of the energy-saving lamp designed by means of die casting has good performance of heat dissipation and provides convenience for quick assembling of LED products. The LED energy-saving lamp used for lighting radiates soft light, has beautiful appearance and colors, also has qualities of low loss, lower energy consumption and green environmental protection. The die-casting LED energy-saving lamp is apt for being widely used for prolonged lighting in families, shops, banks, hospitals, hotels, restaurants and other public places.

[0014] The die-casting LED energy-saving lamp of the present invention will be described in more details with reference to the embodiments and the accompanying figures in order to make the technical schemes of the present invention easily understood and grasped.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig.1 is an exploded view illustrating an embodiment of the die-casting LED energy-saving lamp of the present invention;

Fig.2 is a sectional view illustrating the structure of the die-casting LED energy-saving lamp shown in Fig.1;

Fig. 3 is a stereogram illustrating the assembled die-casting LED energy-saving lamp shown in Fig.1.

[0016] The elements in the above figures are denoted as follows:

1 ~ lamp mask; 2 ~ LED light source module;
3 ~ lamp body;
4 ~ insulated casing; 5 ~ driving power supply;
6 ~ lamp holder;
7 ~ light-emitting diode (LED); 8 ~ metal circuit board.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0017] Fig.1 is an exploded view illustrating an embodiment of the die-casting LED energy-saving lamp of the present invention, and Fig. 3 is a stereogram illustrating the assembled die-casting LED energy-saving lamp shown in Fig.1. As shown in Figs.1 and 3, the die-casting LED energy-saving lamp comprises a lamp mask 1, an LED light source module 2, a lamp body 3, an insulated

casing 4, a driving power supply 5 and a lamp holder 6 for electric connection.

[0018] Top of the lamp body 3 of the high power energy-saving lamp is provided with a flat-bottomed heat-conducting round platform. The LED light source module 2 is fixed on a surface of the flat-bottomed heat-conducting round platform fixed on the top of a heat dissipating structure of the lamp body 3. The flat-bottomed heat-conducting round platform has a groove along its periphery, and the lamp mask 1 is assembled on the lamp body 3 with the aid of the groove. Heat dissipating fins and heat dissipating grooves are uniformly arranged around an outer wall of the lamp body 3, and constitute the heat dissipating structure of the lamp body 3. An inner cavity is formed in the center of the heat dissipating structure of the lamp body 3, and the cylindrical insulated casing 4, which is fixed with the driving power supply 5, is disposed in the inner cavity. The cylindrical insulated casing 4 is connected and fixed to an upper portion of the lamp holder and a bottom of the flat-bottomed heat-conducting round platform of the lamp body.

[0019] The LED light source module 2 comprises a metal circuit board 8 and monochromatic or polychromatic LEDs 7 with power of one or more Watts. The LEDs 7 are individually or integrally packaged and attached on a heat dissipating LED substrate by thermally conductive adhesive. The heat dissipating LED substrate is, namely, the metal circuit board 8. The lamp mask 1 is disposed at a light exit of the LED light source module 2. The heat dissipating LED substrate is embedded and fixed with the aid of the groove at the top of the inner cavity of the lamp body. The LED light source module may be disposed above the groove at the top of the inner cavity of the lamp body.

[0020] Top of the flat-bottomed heat-conducting round platform is provided with a flat-bottomed boss, and the groove is annular and located along the periphery of the flat-bottomed boss. The metal circuit board 8 of the LED light source module 2 is fixed on the flat-bottomed boss, and the lamp mask 1 is fixed to the groove. The lamp mask 1 may have a shape of a semisphere, a column or a prism, and an inner wall of the lamp mask may be additionally provided with an intensifying coating or may be frosted. The lamp mask 1 is made of glass, colophony or a mixture of polycarbonate, which has a light transmittance of over 95%. The lamp mask 1 is not only shatterproof, dustproof and antiaging, but also has a grinding effect. The light shining through the lamp mask is soft and even, free from glare, and has a high lamp flux. The lamp mask is safe and reliable, and can be processed by simple processing method. Preferably, the groove has several outwards concaves along an inner side of its outer wall, and the outer periphery of the outer wall forms a circumferential rib. The lamp mask 1 is fixed on the lamp body 3 by adhesive. The groove provides convenience for fixing the lamp mask, also prevents attaching and fixing adhesive from overflowing excessively, so that the installation and maintenance of the lamp mask is easier.

[0021] The lamp body 3 with heat dissipating function is made of metal, which is usually aluminum or aluminum alloy. The lamp body 3 is processed by machining such as die casting, cutting and so on. A plurality of straight heat dissipating fins and heat dissipating grooves are uniformly arranged around the outer periphery of the lamp body 3. The outer edge of the heat dissipating fin is chamfered and circular, and the bottom of the heat dissipating grooves forms a semi circle. Surfaces of the heat dissipating fins and heat dissipating grooves are processed by sandblasting, oxidizing and polishing, in order to increase the area of heat dissipating surface, speed up heat dissipating and improve heat dissipating effect.

[0022] The LED light source module 2 may be disposed above the groove on the top of the inner cavity of the lamp body. In order to increase the luminous efficiency of the die-casting LED energy-saving lamp, light emergence angle and position of the light source can be adjusted by changing the height of the flat-bottomed heat-conducting round platform on the top of the inner cavity of the lamp body.

[0023] As shown in Fig.2, the lamp body 3 and the cylindrical insulated casing 4 are connected with built-in bolts or other detachable connectors. The cylindrical insulated casing 4 is disposed inside the inner cavity of the lamp body 3, and the driving power supply 5 is enclosed in the cylindrical insulated casing 4. The cylindrical insulated casing 4 has a semicircular opening at the top, the other part of the top forms a closed semicircular surface, at the central position of which is provided with a screw hole, in order to fix the cylindrical insulated casing 4 firmly at the bottom of the flat-bottomed heat-conducting round platform of the lamp body 4. Additionally, the driving power supply 5 is connected with electrodes of the LED light source module 2 through wire to form electrical connections.

[0024] Preferably, the lamp holder 6, a constituent part of the LED energy-saving lamp, is a metal interface, and the metal interface may be an E-27 radioceramic screw lamp holder made of nickel-plated copper or any other standard lamp holders. The inner side of the metal interface is provided with first threads which match with second threads at the bottom of the cylindrical insulated casing 4, so that the lamp holder can be riveted to the cylindrical insulated casing 4 along its inner periphery.

[0025] In a word, the die-casting LED energy-saving lamp has better stability and longer lifetime than the incandescent tube or low pressure fluorescent lamp. What's more, the die-casting LED energy-saving lamp radiates soft light, has beautiful appearance and colors, also has qualities of low loss, lower energy consumption and green environmental protection. It is widely used for prolonged lighting in families, shops, banks, hospitals, hotels, restaurants and other public places.

[0026] What described above are preferred embodiments of the die-casting LED energy-saving lamp. It will be understood by those skilled in the art that various mod-

ifications and replacements may be made therein without departing from the scope of the invention.

5 Claims

1. A die-casting LED energy-saving lamp, comprising a lamp mask, an LED light source module, a lamp body, an insulated casing, a driving power supply and a lamp holder, wherein, a plurality of straight heat dissipating fins and heat dissipating grooves are uniformly arranged around an outer wall of the lamp body (3); a top of the lamp body of the high power energy-saving lamp is provided with a flat-bottomed heat-conducting round platform which has a groove along its periphery; the LED light source module is fixed on a surface of the flat-bottomed heat-conducting round platform; the lamp mask is fixed to the flat-bottomed heat-conducting round platform with the aid of the groove; an inner cavity is formed in center of heat dissipating structure of the lamp body; the driving power supply and the insulated casing are disposed in the inner cavity; the insulated casing is connected and fixed to a bottom of the flat-bottomed heat-conducting round platform; the lamp holder is connected and fixed to one end of the insulated casing, which is far from the LED light source module; and the lamp holder is fixed to and insulated from the lamp body.
2. The die-casting LED energy-saving lamp according to claim 1, wherein, the LED light source module comprises a metal circuit board and monochromatic or polychromatic LEDs with power of one or more Watts, which are attached on a heat dissipating LED substrate; the LEDs are individually or integrally packaged and attached; and a light exit of the LED light source module corresponds to a position of the lamp mask.
3. The die-casting LED energy-saving lamp according to claim 1, wherein, the lamp mask is made of glass, colophony or a mixture of polycarbonate, which has a light transmittance of over 95%; the lamp mask has a shape of a semisphere, a column or a prism; and an inner wall of the lamp mask is frosted or additionally provided with intensifying coatings.
4. The die-casting LED energy-saving lamp according to claim 1, wherein, the lamp body is provided with the groove for assembling or fixing the lamp mask; the groove has several outwards concaves along an inner side of its outer wall, and outer periphery of the outer wall forms a circumferential rib; and the lamp mask is fixed in the groove of the lamp body by adhesive.
5. The die-casting LED energy-saving lamp according

to claim 1, wherein, the lamp body is provided with the groove for assembling or fixing the lamp mask; inner walls of the groove are provided with threads; and the lamp mask is fixed in the groove by means of the threads.

5

6. The die-casting LED energy-saving lamp according to claim 1, wherein, the lamp body is provided with the groove for assembling or fixing the lamp mask; a bottom of the groove is provided with screw holes; and the lamp mask is fixed in the groove with screws. 10
7. The die-casting LED energy-saving lamp according to claim 1, wherein, the lamp body made of aluminum or aluminum alloy is provided with straight heat dissipating fins and heat dissipating grooves; the outer edge of the heat dissipating fin is chamfered and circular, and the bottom of the heat dissipating grooves forms a semi circle processed by die casting and cutting; and surfaces of the heat dissipating grooves are processed by sandblasting, oxidizing and polishing. 15 20
8. The die-casting LED energy-saving lamp according to claim 1, wherein, the insulated casing is cylindrical; a slot is formed in an inner cavity of the cylindrical insulated casing by die-casting; and the drive power supply is inserted in the slot. 25
9. The die-casting LED energy-saving lamp according to claim 8, wherein, the drive power supply is provided with a rectangular printed circuit board; the cylindrical insulated casing has a semicircular opening at the top, the other part of the top forms a closed semicircular surface, at the central position of which is provided with a screw hole; and the insulated casing is fixed on the lamp body with screw. 30 35
10. The die-casting LED energy-saving lamp according to claim 1, wherein, the lamp holder of the LED energy-saving lamp is a metal interface, and is riveted to the insulated casing along an inner periphery of the lamp holder; and the metal interface is an E-27 radioceramic screw lamp holder made of nickel-plated copper. 40 45

50

55

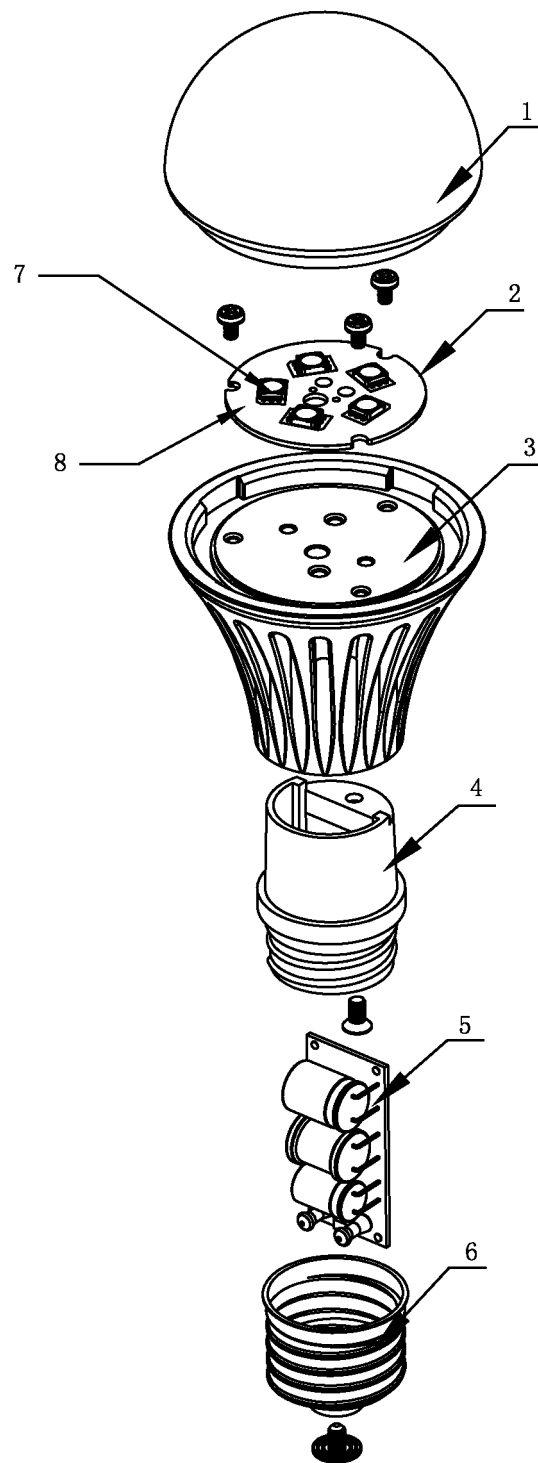


Fig.1

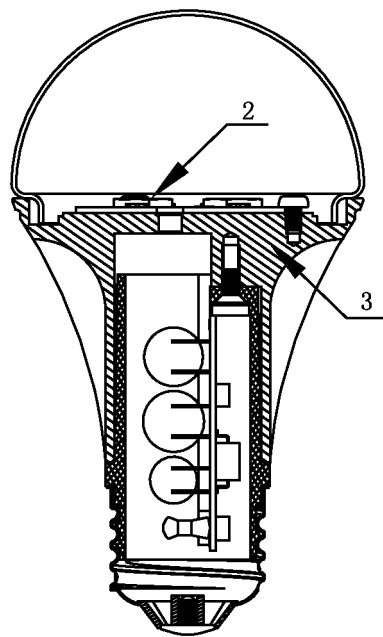


Fig.2

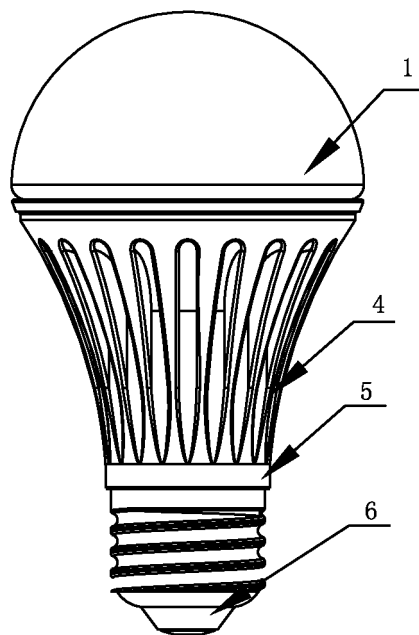


Fig.3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/072330

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:F21S,F21V

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,PWI,EPODOC:LED,light,emit-,diode,energy-,saving,heat,radiation,dissipat-,pin?,concave,groove?,die-,cast-,mask
,cavity,connect-,plastic,insulated,power

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN201382291Y (NANJING HANDSON CO., LTD.) 13 Jan.2010(13.01.2010) page 4 line 4 to page 6 line 5, Figs. 1-4	1-10
A	CN201284982Y (CHEN Chao) 05 Aug.2009(05.08.2009) the whole document	1-10
A	KR100939231B1 (JSJTEK CO LTD) 29 Jan.2010(29.01.2010) the whole document	1-10
A	KR100932192B1 (KIM YONG CHUL) 16 Dec.2009(16.12.2009) the whole document	1-10
A	CN201354958Y (DAI Jianguo) 02 Dec.2009(02.12.2009) the whole document	1-10
A	US2007230188A1 (LIN YI MIN) 04 Oct.2007(04.10.2007) the whole document	1-10
A	US2008037256A1 (LI C) 14 Feb.2008(14.02.2008) the whole document	1-10

☐ 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
10 Dec.2010(10.12.2010)Date of mailing of the international search report
23 Dec. 2010 (23.12.2010)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

HU, Yang

Telephone No. (86-10)62085583

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2010/072330

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN201382291Y	13-01-2010	NONE	
CN201284982Y	05-08-2009	NONE	
KR100939231B1	29-01-2010	NONE	
KR100932192B1	16-12-2009	NONE	
CN201354958Y	02-12-2009	NONE	
US2007230188A1	04-10-2007	TW303486U	21-12-2006
US2008037256A1	14-02-2008	NONE	

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/072330

CLASSIFICATION OF SUBJECT MATTER:

F21V29/00(2006.01)i;

F21V17/00(2006.01)n;