

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 August 2009 (27.08.2009)

PCT

(10) International Publication Number  
**WO 2009/105033 A1**

(51) International Patent Classification:

F21V 23/02 (2006.01) H01J 61/52 (2006.01)  
F21V 29/00 (2006.01) H01J 61/56 (2006.01)

(21) International Application Number:

PCT/SG2008/000060

(22) International Filing Date:

21 February 2008 (21.02.2008)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant (for all designated States except US): **ISUNU PTE LTD** [SG/SG]; 18, Tuas West Avenue, Singapore 638434 (SG).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MUESSLI, Daniel** [CH/SG]; 18, Tuas West Avenue, Singapore 638434 (SG).

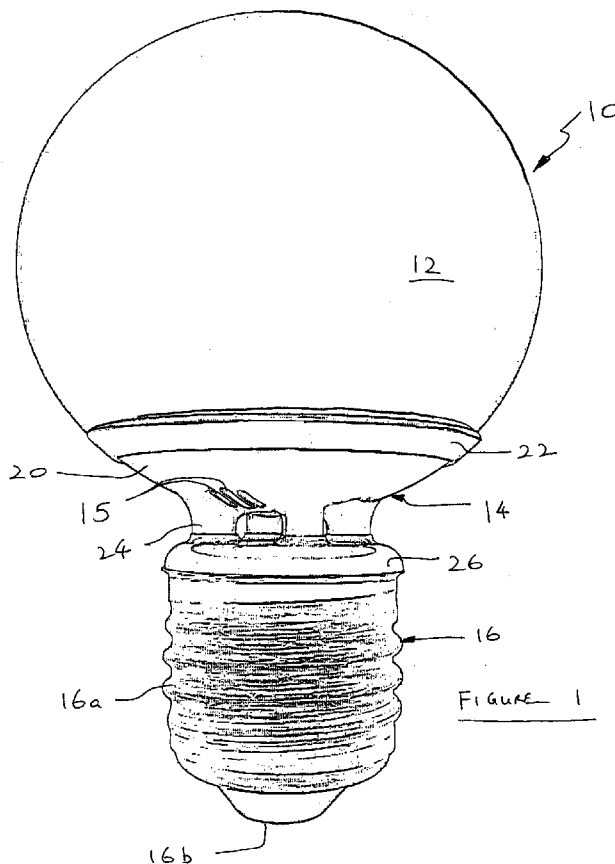
(74) Agent: **POH, Chee Kian, Daniel**; Lloyd Wise, Tanjong Pagar, PO Box 636, Singapore 910816 (SG).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

[Continued on next page]

(54) Title: AN ELECTRIC LIGHT



[Continued on next page]



WO 2009/105033 A1



---

MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI **Published:**  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, — *with international search report (Art. 21(3))*  
NE, SN, TD, TG).

**Declarations under Rule 4.17:**

— *of inventorship (Rule 4.17(iv))*

---

**(57) Abstract:** An electric light is disclosed herein. In a preferred embodiment, an electric light (10) comprises a light transmissible housing (12) enclosing a discharge lamp, a base (16) for housing a ballast (28) and an intermediate member (14) for supporting the discharge lamp and has a plurality of leg members (24). The plurality of leg members (24) is arranged to space the discharge lamp from the base (16).

## AN ELECTRIC LIGHT

### Background and Field of the Invention

5 This invention relates to an electric light, more particularly but not exclusively, to an energy saving lamp.

A discharge lamp is often preferred over an incandescent lamp because a discharge lamp consumes less electricity and thus saves energy. However, a  
10 discharge lamp requires a ballast to operate and thus, a conventional arrangement includes a discharge lamp directly connected to a base that houses the ballast. The operation of the discharge lamp generates heat and it is inevitable that the heat generated would be transferred to the base which houses the ballast. As a result, prolong usage of the discharge lamp may create  
15 sufficient amount of heat that could affect the normal operation of the ballast.

It is an object of the present invention to provide an electric light which addresses at least one of the disadvantages of the prior art and/or to provide the public with a useful choice.

20

### Summary of the Invention

In general terms, the present invention relates to an electric light comprising a spacer to space a discharge lamp away from an ignition circuit to reduce heat  
25 from being transferred to the ignition circuit.

In a first specific expression of the invention, there is provided an electric light comprising a discharge lamp; a base for housing an ignition circuit, the ignition circuit being electrically connected to the discharge lamp, and an intermediate member for supporting the discharge lamp and has a plurality of leg members, the plurality of leg members being arranged to space the discharge lamp from the base.

A discharge lamp (or arc lamp) produces light by using an electrical arc running through gas plasma and the terms are used broadly in this application to include high pressure arc lamps such as mercury vapour lamps, high pressure sodium arc lamps and metal halide arc lamps etc, and low pressure arc lamps such as fluorescent lamps etc.

As described in the preferred embodiment, the leg members function as spacers to space the discharge lamp away from the base which houses the ignition circuit and thus, the space created allows heat to be transferred to ambient air, instead of to the ignition circuit. As a result, this prolongs the operational life of the ignition circuit.

20

Preferably, the intermediate member comprises a platform for supporting the discharge lamp, and a connection member for connecting to the base, the plurality of leg members extending from the connection member to the platform so as to space the discharge lamp from the base. The intermediate member is

preferably manufactured as one integral unit so that it is easier to assemble the electric light together.

The electric light may further comprise a heat transfer device for transferring  
5 heat away from the ignition circuit, and this may include a metallic member housed within the base. The presence of the heat transfer device helps to reduce heat accumulation in the ignition circuit.

Depending on the type, the electric light may further comprise a light  
10 transmissible housing for housing the discharge lamp and the intermediate member is arranged to support the light transmissible housing. Of course, the light transmissible housing may come in various shapes and sizes depending on requirement and also to satisfy consumers' liking.

15 To help cool the discharge lamp, the electric light may include one or more ventilation apertures disposed at the intermediate member that is located near to an end of the discharge lamp. The ventilation apertures may also be arranged such that they are disposed next to one of the plurality of leg members.

20

The leg members vary again depending on requirements. Preferably, there should be at least three leg members, but two leg members are also envisaged just like five or more leg members. Preferably, the leg members are spaced at regular intervals which will give a neater arrangement.

25

The discharge lamp may be of various types and designs such as a fluorescent lamp.

In a second specific expression of the invention, there is provided an electric  
5 light comprising a discharge lamp; a light transmissible housing for housing the discharge lamp, a base for housing a ballast, the ballast being electrically connected to the discharge lamp, wherein the light transmissible housing includes one or more ventilation apertures.

10 Preferably, the electric light of the second specific expression further comprises an intermediate member for supporting the light transmission housing and which has a plurality of leg members. The plurality of leg members are arranged to space the discharge lamp from the base.

15 The electric light may include an energy saving lamp.

#### Brief Description of the Drawings

An embodiment of the invention will now be described, by way of example, with  
20 reference to the accompanying drawings in which,

Figure 1 is a perspective view of a light bulb comprising a light transmissible housing enclosing a discharge lamp and a base connected to the light transmissible housing via an intermediate member, according to a preferred  
25 embodiment of the present invention;

Figure 2 shows the light bulb of Figure 1 with part of the base removed to reveal a ballast;

- 5 Figure 3 shows the base of Figure 2 in a different orientation and scale to show the ballast in more detail (and without showing the light transmissible housing);

Figures 4 and 5 illustrate different embodiments of the light bulb (in different scales) of the present invention.

10

#### Detailed Description of the Preferred Embodiment

Figure 1 shows a light bulb 10 according to a preferred embodiment of the present invention. The light bulb 10 comprises a light transmissible housing 12  
15 made from acrylic, an intermediate member 14 arranged to support the light transmissible housing 12 and a base 16 connected to the intermediate member 14. The base 16 includes a conductive screw cap 16a with a threaded body and a central electrical contact 16b that is arranged to be secured to a standard light bulb socket without modification.

20

The light transmissible housing 12 is generally spherical in shape and is open at one end. The light transmissible housing 12 is arranged to enclose a discharge lamp (not shown) and in this embodiment, the discharge lamp is in the form of a U-shaped fluorescent tube that is mounted to a support platform 20 of the  
25 intermediate member 14. The support platform 20 is concave and has a rim 22

so that the support platform 20 is configured to close the open end of the light transmissible housing 12 and in the process supports the light transmissible housing 12 as is shown in Figure 1. The connection between the light transmissible housing 12 and the support platform 20 is by conventional means  
5 and this will not be elaborated. The intermediate member 14 includes a number of ventilation apertures 15 formed as elongate channels in Figure 1 and these are disposed at the support platform 20 and arranged near or close to one end of the fluorescent lamp. The ventilation from the apertures 15 cools one end of the CFL tube.

10

The intermediate member 12 is moulded from polycarbonate as a single part, separately and independently from the discharge lamp, and includes a plurality of leg members that extends from the support platform 20. In this embodiment, there are five leg members 24 (which is shown more clearly in Figure 2)  
15 regularly spaced. The intermediate member 12 further includes a circular connection member 26 that connects to the other end of the five leg members 24. As is shown from Figure 1, the connection member 26 is arranged to cap the base 16 and thus, the five leg members 24 are configured to space the light transmissible housing (and thus the discharge lamp) from the base 16.

20

The discharge lamp is electrically connected to a ballast 28 housed within the base 16 and this is shown more clearly in Figures 2 and 3. It should be mentioned that part of the base 16 has been omitted and the connection member 26 shown as transparent in these figures in order to show the internal



configuration of the light bulb 10 more clearly. Also, in Figure 2, a heat sink is not shown in order to show the structure of the leg members 24 more clearly.

As it can be appreciated from Figure 2, each of the leg members 24 has a  
5 central hollow cylindrical channel 30 (although only three leg members 24 are visible in Figure 2) and this allows electrical wires (not shown) from the ballast 28 to be connected to the discharge lamp. The electrical connection thus allows the ballast to ignite the discharge lamp. As shown in Figure 3, the light bulb 10 includes a heat sink 32 in the form of a metal body that is arranged in contact  
10 with the ballast 26. The heat sink 32 has two legs 34 to support the metal body and which are attached to the inner surface of the connection member 26.

In use, the operation of the fluorescent tubes heats up the air within the light transmissible housing 12 but the heat transfer to the ballast 28 is reduced due  
15 to the spacing between the light transmissible housing 12 and the base 16. Of course, the greater the spacing between the light transmissible housing 12 and the base 16, the more effective it is to reduce heat from being transferred to the ballast 28. However, this should be balanced with the aesthetic appeal and application of the light bulb since if the leg members 24 are too long, this may  
20 not be aesthetically appealing or unnecessary.

Further, the spacing between the leg members 24 acts as an air gap which means that heat is actually transferred to ambient air thus, reducing heat to be transferred to the ballast 28. Likewise, the ventilation apertures 15 are close to  
25 one end of the fluorescent lamp to cool the fluorescent lamp. The use of the

heat sink 32 conducts heat away from the ballast 28 which reduces heat accumulation in the base 16 which may affect the normal operation of the ballast.

5 The described embodiment should not be construed as limitative. For example, it should be apparent that the present invention also covers other types of discharge lamps for example, compact fluorescent lights (CFL), mercury vapour arc lamps and high pressure arc lamps, not just to a fluorescent lamp. Further, the fluorescent lamp may be in other shapes and sizes and not necessary U-  
10 shaped. Similarly, in the described embodiment, the light transmissible housing 12 is generally spherical but it is envisaged that the housing 12 may be in other shapes, for example tear-drop shape etc or and examples of other shapes are shown in Figure 4. The light bulbs of Figure 4 also show a different sized base and also have two or three leg members 50,60, as compared to the described  
15 embodiment. This goes to show that the base 16 may be in other shapes and sizes with the screw cap 16a replaced by other electrical connection means adapted to connect the electric bulb 10 to other types of light sockets (eg. pin types).

20 Indeed, the number of leg members may vary and not necessarily five as shown in the described embodiment. Factors to consider may be weight of the discharge lamp and also aesthetically what number and arrangement of the leg members would appeal to consumers.

Each of the leg members 24 in the preferred embodiment is described with the central hollow cylindrical channel 30 but this may not be necessary in that perhaps, only two leg members 24 having the hollow cylindrical channel 30 may be necessary.

5

The light bulb 10 of the preferred embodiment has the ventilation apertures 15 as well as the leg members 24 but either one feature may be sufficient depending on requirement. Also, the light bulb 10 uses a ballast 28 as an example of an ignition circuit 14 but other suitable ignition circuits may be used to ignite the discharge lamp. Also, the ballast may be electronic, electrical or magnetic ballast.

The described embodiment used a light bulb having a spherical light transmissible housing as an example but the present invention is applicable for other electric lights such as compact fluorescent lights (CFL) and examples of these, in various heights and spiral configurations, are shown in Figure 5. Since they are very similar, a brief description will be made here with reference to the one on the right side of Figure 5. A CFL 100 includes a spiral-type fluorescent tube 102 supported by an intermediate member 104 and a base 106 for housing a ballast similar to the described embodiment. The structure of the intermediate member and the base 106 is very similar to that of the preferred embodiment and thus, it is suffice to simply point out that there is no need for a light transmissible housing to enclose the spiral-type fluorescent tube 102. The intermediate member 104 has five leg members 108 to space the fluorescent tube 102 from the base 106. Of course, the more spirals means a longer

25

fluorescent tube (compare the leftmost and rightmost CFL in Figure 5) and higher light output and as a result, greater heat generation. Thus, for a fluorescent tube that emits more light (thus consumes more power) the presence of the leg members 104 is particularly useful to transfer heat to the ambient air between fluorescent tube 102 and the base 106 and thus, reduce heat to the ballast. Similarly, a heat sink for the ballast may be incorporated within the base 106.

Having now fully described the invention, it should be apparent to one of ordinary skill in the art that many modifications can be made hereto without departing from the scope as claimed.

**CLAIMS**

1. An electric light comprising  
a discharge lamp;  
5 a base for housing an ignition circuit, the ignition circuit being electrically  
connected to the discharge lamp, and  
an intermediate member for supporting the discharge lamp and has a  
plurality of leg members, the plurality of leg members being arranged to  
space the discharge lamp from the base.  
10
2. An electric light according to claim 1, wherein the intermediate member  
comprises a platform for supporting the discharge lamp, and a  
connection member for connecting to the base, the plurality of leg  
members extending from the connection member to the platform so as to  
15 space the discharge lamp from the base.
3. An electric light according to claim 1 or 2, further comprising a heat  
transfer device for transferring heat away from the ignition circuit.
- 20 4. An electric light according to claim 3, wherein the heat transfer device  
includes a metallic member housed within the base.
5. An electric light according to any preceding claim, further comprising a  
light transmissible housing for housing the discharge lamp, the

intermediate member being arranged to support the light transmissible housing.

- 5 6. An electric light according to any preceding claim, wherein the intermediate member includes one or more ventilation apertures.
7. An electric light according to claim 6, wherein the one or more ventilation apertures are disposed adjacent to an end of the discharge lamp.
- 10 8. An electric light according to claim 6 or 7, wherein the one or more ventilation apertures are disposed next to one of the plurality of leg members.
- 15 9. An electric light according to any of the preceding claims, further comprising at least three leg members spaced from each other at regular intervals.
10. An electric light according to any preceding claim, wherein the discharge lamp is in the form of a fluorescent lamp.
- 20 11. An electric light according to claim 10, wherein the fluorescent lamp is spiral shape.
12. An electric light comprising  
25 a discharge lamp;

a light transmissible housing for housing the discharge lamp,  
a base for housing a ballast, the ballast being electrically connected to  
the discharge lamp, wherein the light transmissible housing includes one  
or more ventilation apertures.

5

13. An electric light according to claim 12, further comprising  
an intermediate member for supporting the light transmission housing  
and has a plurality of leg members, the plurality of leg members being  
arranged to space the discharge lamp from the base.

10

14. An electric light according to any preceding claim, wherein the electric  
light includes an energy saving lamp.

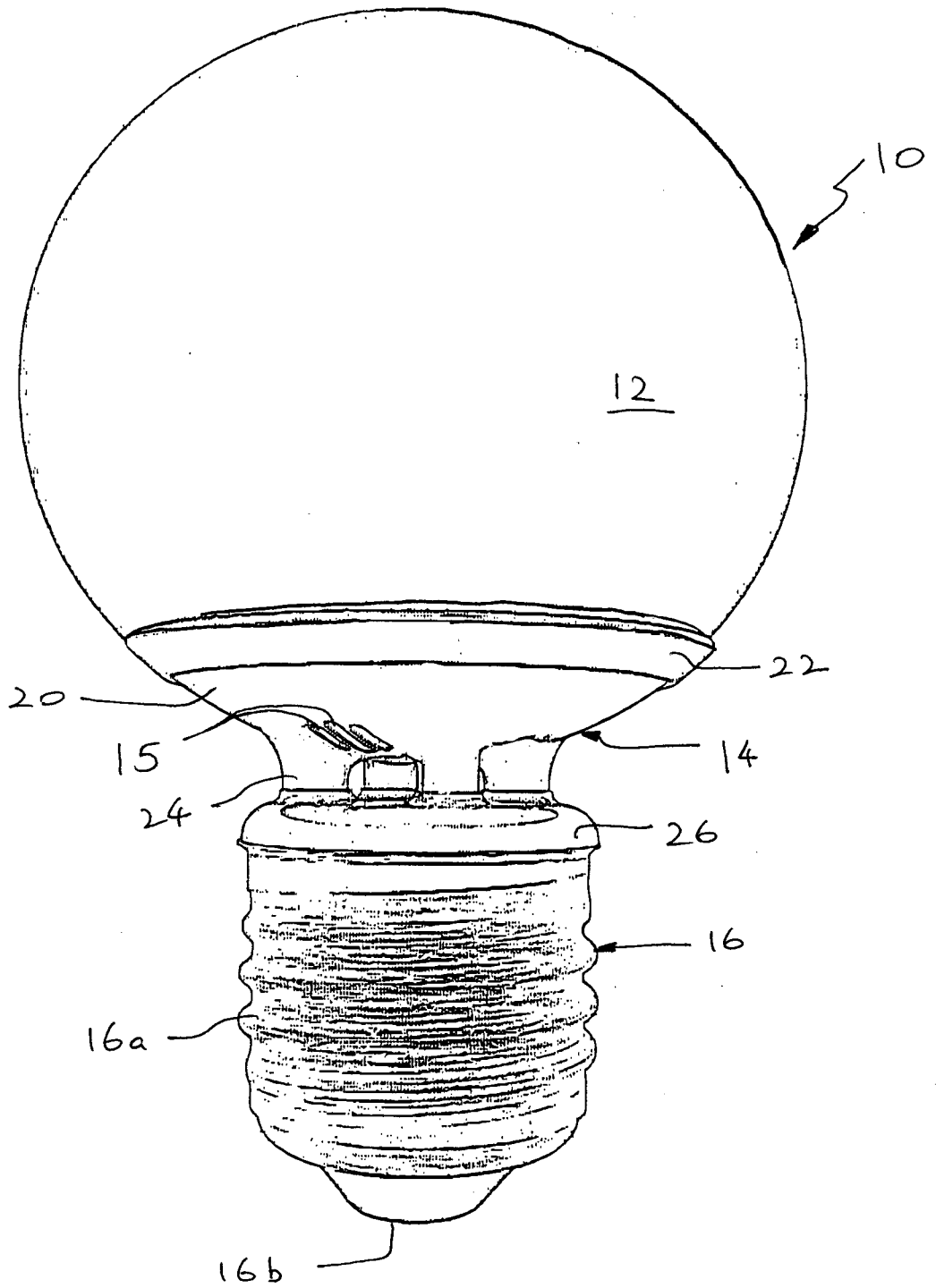


FIGURE 1



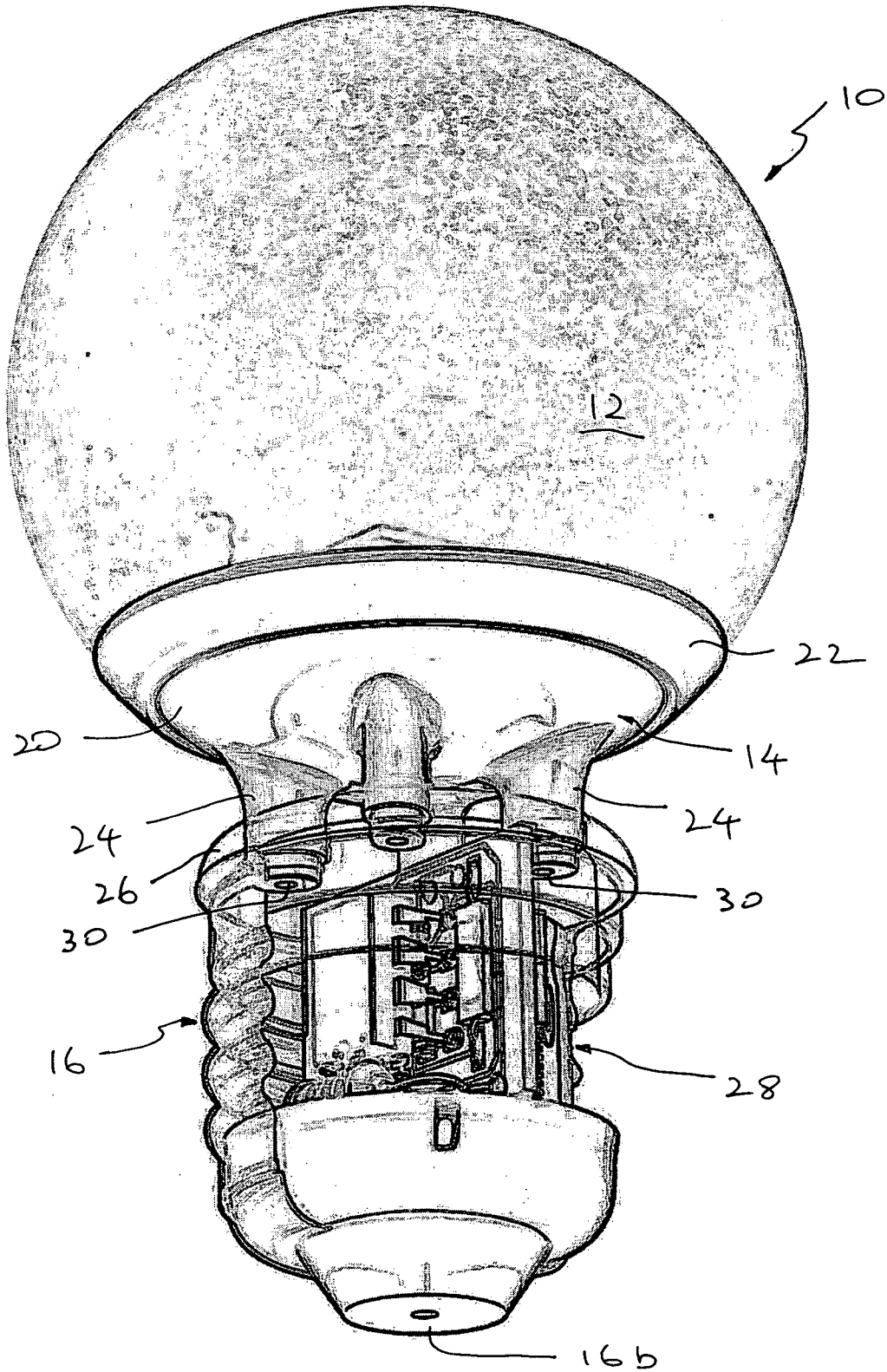


FIGURE 2

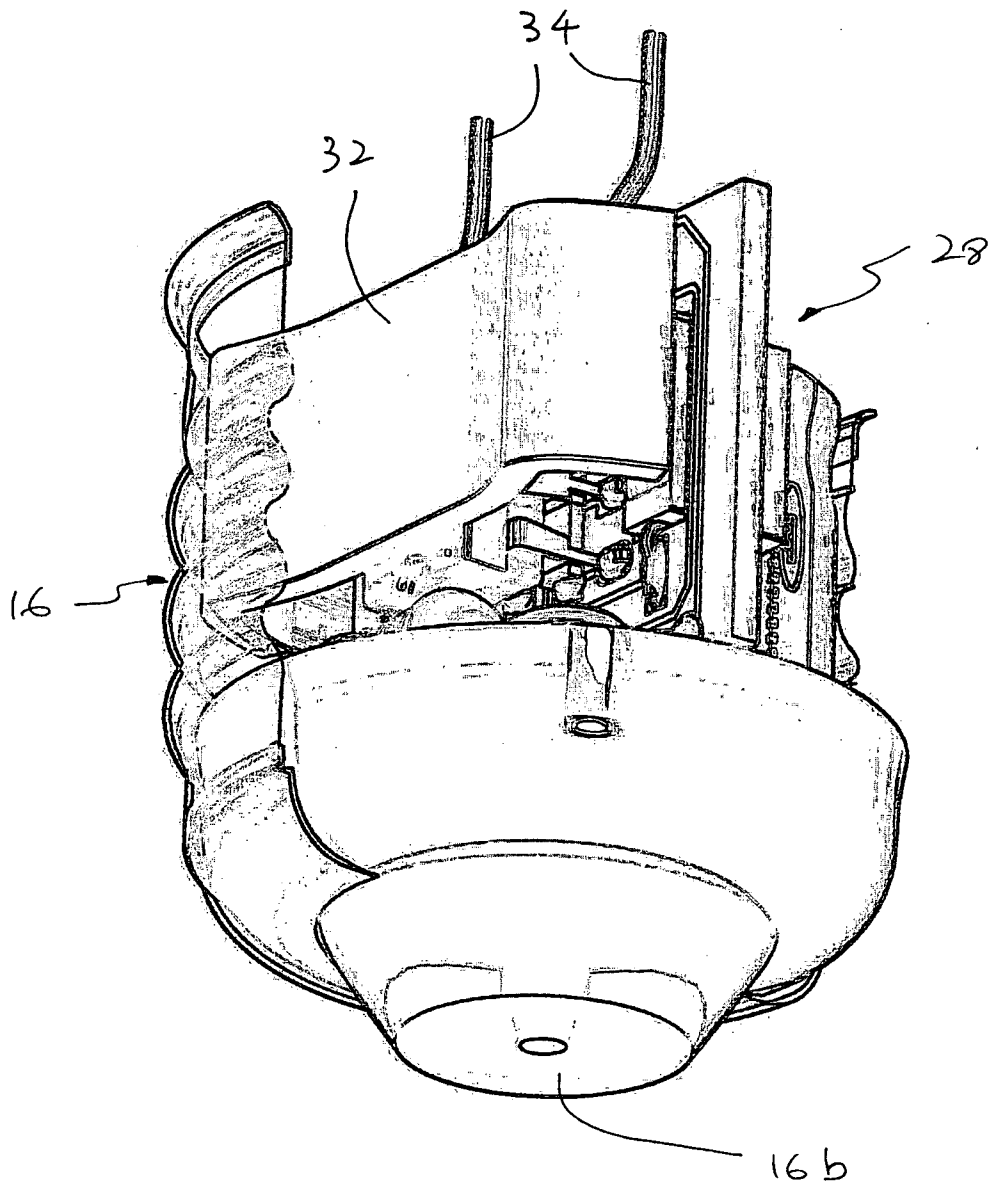


Figure 3

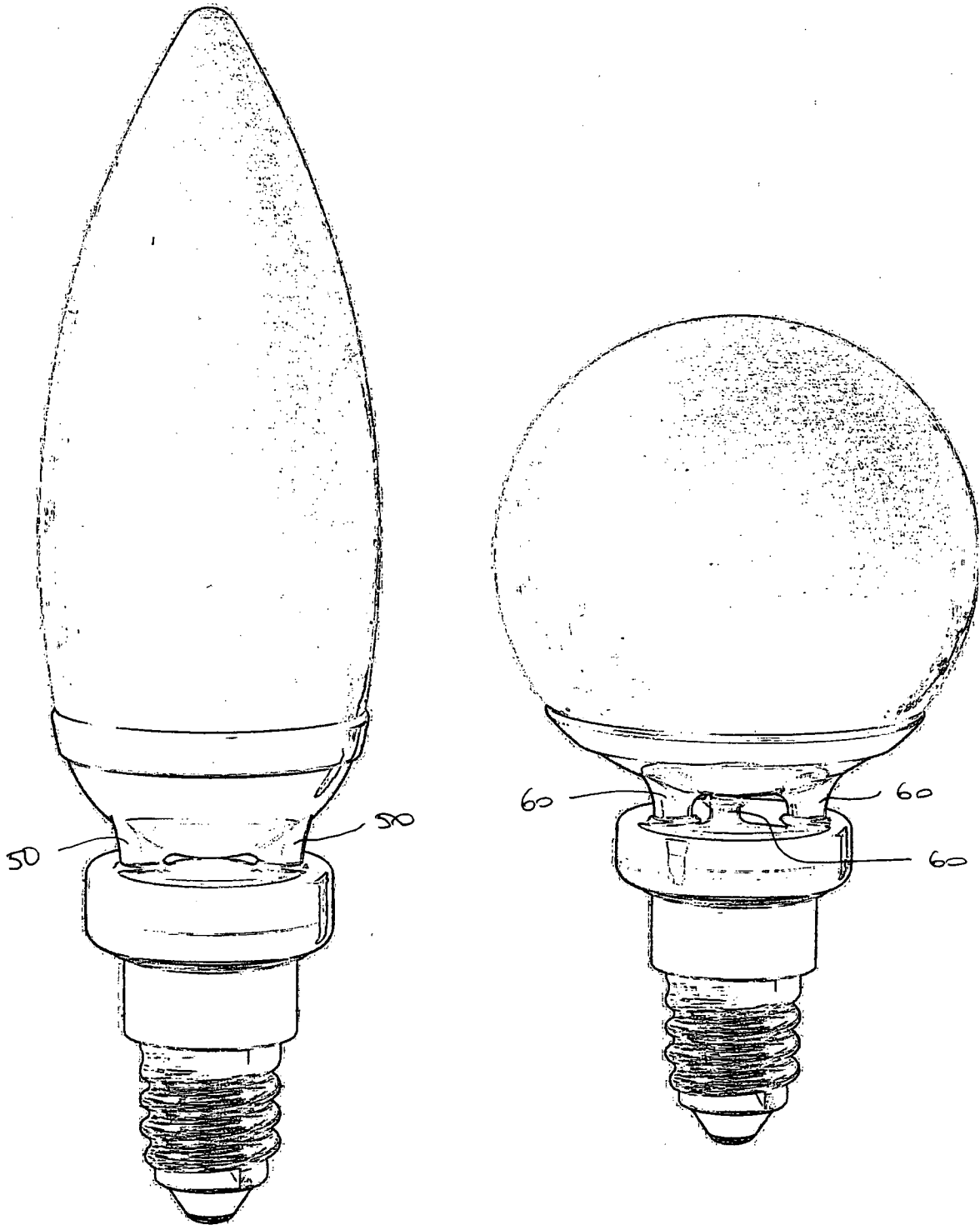


FIGURE 4

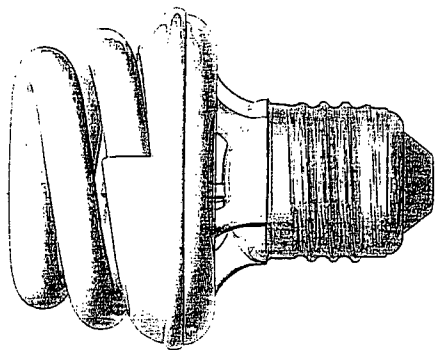
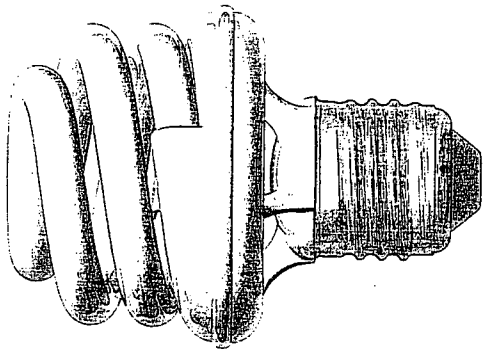
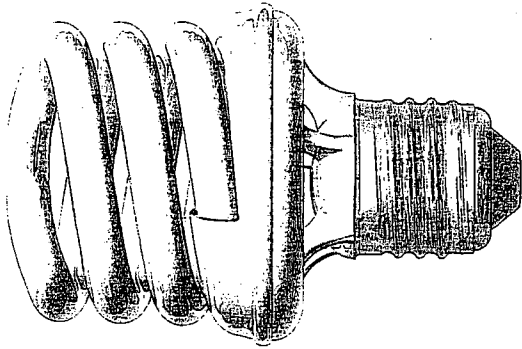
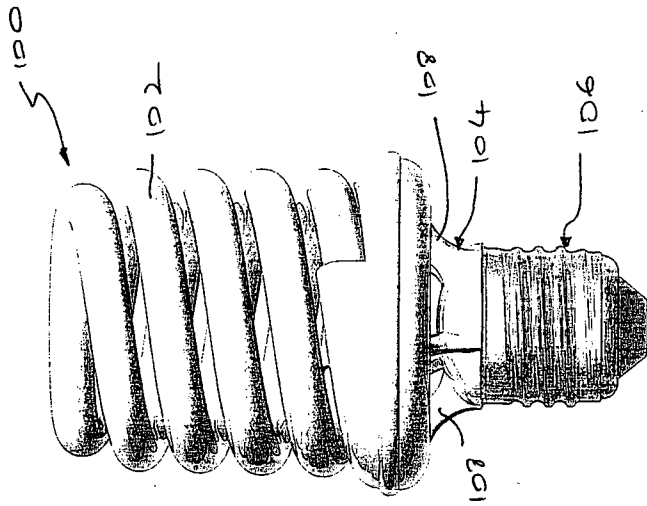


FIGURE 5

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SG 2008/000060

A. CLASSIFICATION OF SUBJECT MATTER IPC <sup>8</sup> : <b>F21V 23/02</b> (2006.01); <b>F21V 29/00</b> (2006.01); <b>H01J 61/52</b> (2006.01); <b>H01J 61/56</b> (2006.01) 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 <sup>8</sup> :		
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) EPODOC, WPI		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6400104 B1 (HAM) 4 June 2002 (04.06.2002) <i>abstract; column 4, line 34 - column 5, line 13; figures 5-8</i>	1, 2, 6-11, 14
Y	--	3-5, 12, 13
Y	US 2002/024814 A1 (MATSUBA) 28 February 2002 (28.02.2002) <i>abstract; paragraphs 0014, 0017, 0023; figure 1</i>	3-5
Y	US 4503360 A (BEDEL) 5 March 1985 (05.03.1985) <i>abstract; figures</i>	12, 13
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 20 April 2009 (20.04.2009)		Date of mailing of the international search report 14 May 2009 (14.05.2009)
Name and mailing address of the ISA/ AT <b>Austrian Patent Office</b> Dresdner Straße 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24 / 535		Authorized officer HARASEK S. Telephone No. +43 / 1 / 534 24 / 574

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SG 2008/000060

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4485331 A (HARADEN) 27 November 1984 (27.11.1984) <i>abstract; column 1, line 64 - column 2, line 28; figures 1, 2</i>	1, 3, 6, 8, 10, 14
X	-- US 6445131 B1 (WÜRSCHING) 3 September 2002 (03.09.2002) <i>abstract; column 2, line 47 - column 4, line 38; figures</i> ----	1, 2, 9, 14

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SG 2008/000060

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US A 6400104		US B1 6400104	2002-06-04
US A 2002024814		CN A 1341952	2002-03-27
		US A1 2002024814	2002-02-28
		JP A 2002075011	2002-03-15
US A 4503360		JP A 59035303	1984-02-27
		EP A2 0100121	1984-02-08
		US A 4503360	1985-03-05
US A 4485331		CA A1 1189044	1985-06-18
		US A 4485331	1984-11-27
US A 6445131		US B1 6445131	2002-09-03