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(54) WATERPROOF UNIVERSAL LAMP

(57) A waterproof universal light fitting comprises a supporter, a rotator, a light source and a lamp holder. The light source and the lamp holder are mounted inside the rotator, which is partly inserted into the supporter. The contact surface between the supporter and the rotator is spherical. A seal ring in a state of compaction is fixed between the supporter and the rotator, and the inner diameter of the seal ring is equal to or less than the maximum diameter of the spherical surface.

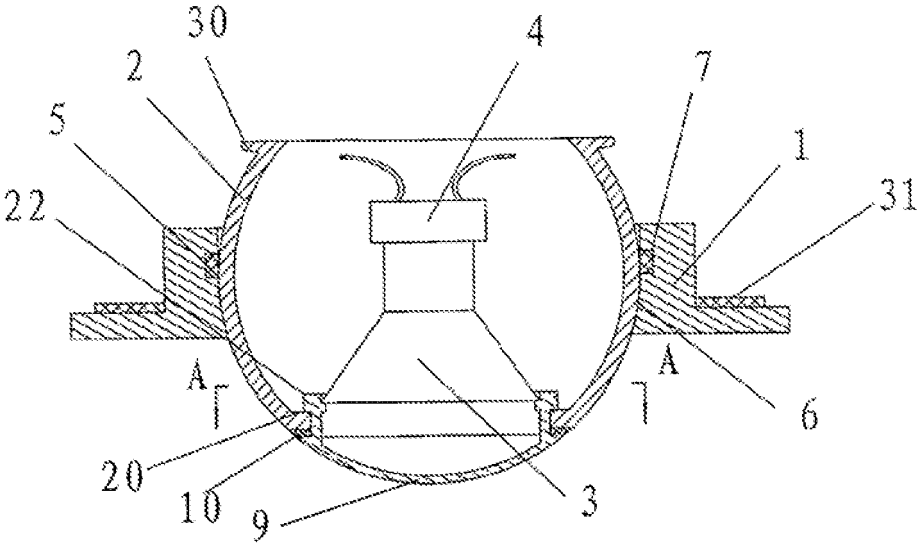

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a light fitting, and in particular to a waterproof light fitting with adjustable illumination angle.

BACKGROUND OF THE INVENTION

[0002] A known light fitting comprises a supporter, a rotator, a light source and a lamp holder. The light source and the lamp holder are mounted on the rotator, which is rotatably connected to the supporter by rivet or bolt. In this way, the rotator can only rotate with respect to the rivet or bolt, and therefore the illumination angle is limited. Moreover, when the light fitting is mounted in a washroom or bathroom, water or moisture may easily enter into the light fitting through the gap between the rotator and the supporter, corroding the electrical connections between the light source and the lamp holder and between the lamp holder and the wires, which may shorten the lifetime of the light fitting or even cause short circuit.

SUMMARY OF THE INVENTION

[0003] An object of the present invention is to provide a waterproof universal light fitting with freely adjustable illumination scope and long lifetime.

[0004] To fulfill the above-mentioned object, a waterproof universal light fitting is provided according to the present invention, which comprises a supporter, a rotator, a light source and a lamp holder; the light source and the lamp holder being mounted inside the rotator, which is rotatably and partly inserted on the supporter, with a spherical surface matching with the supporter. A seal ring in compaction state is fixed between the supporter and the rotator, the seal ring contacting the spherical surface of the rotator. The inner diameter of the seal ring is equal to or less than the maximum diameter of the spherical surface.

[0005] Preferably the seal ring is inserted in a groove on the inner side of the supporter. The rotator is provided with at least three limit protrusions at the upper edge, and an opening at the bottom to facilitate replacing of the light source. The opening is sealed by a transparent cover, with a sealing ring pressed between the cover and the edge of the opening.

[0006] The advantages of the present invention are as follow: for the rotator is partly inserted on the supporter, with a spherical surface matching with the supporter, the rotator can rotate freely at any angle inside the supporter, which enables a larger the illumination scope. Furthermore, a seal ring contacting the spherical surface of the rotator and in compaction state is fixed between the supporter and the rotator; and the inner diameter of the seal ring is equal to or less than the maximum diameter of the spherical surface, which therefore prevents the ingress of water or moisture into the light fitting through the gap between the rotator and the supporter, and the lifetime of the lamp is prolonged accordingly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The present invention will be better understood from the following description, relating to the attached drawings which show illustratively but not restrictively examples of the light fitting, wherein:

FIG. 1 is a schematic structural view of a preferred embodiment of the light fitting according to the present invention;

FIG. 2 is a sectional view of the light fitting shown in FIG. 1 taking along A-A;

FIG. 3 is an exploded view of the light fitting shown in FIG. 1;

FIG. 4 is the B-direction view of FIG. 3;

FIG. 5 is a schematic partial structural view of the second embodiment of the light fitting according to the present invention;

FIG. 6 is also a schematic partial structural view of the second embodiment of the light fitting according to the present invention;

FIG. 7 is a schematic structural view of the third embodiment of the light fitting according to the present invention.

DETAIL DESCRIPTION OF THE INVENTION

[0008] Referring to FIG. 1 to FIG. 4, the waterproof universal light fitting comprises a supporter 1, a rotator 2, a light source 3 and a lamp holder 4, wherein the light source 3 and the lamp holder 4 are mounted inside the rotator 2, which is partly inserted on the supporter 1, with a spherical surface matching with the supporter 1. The rotator 2 can rotate freely at any angle inside the supporter 1, so that the illumination scope of the light source 3 is enlarged. Furthermore, a seal ring 5 contacting the spherical surface of the rotator 2 and in compaction state is fixed between the supporter 1 and the rotator 2; and the inner diameter of the seal ring 5 is equal to or less than the maximum diameter of the spherical surface, which therefore prevents the ingress of water or moisture into the light fitting through the gap between the rotator and the supporter, and the lifetime of the lamp is prolonged accordingly. The supporter 1 is provided with a groove 7 on the inner side, in which the seal ring 5 is contained. Alternatively, the groove 7 may be substituted by an annular protrusion, on which the seal ring 5 is fixed. An elastic gasket 31 is mounted on the flange of the sup-

porter 1, and can form a seal between the flange of the supporter 1 and the ceiling panel in which the light fitting is installed, and serves a number of functions such as waterproof and sound isolating.

[0009] For a better waterproof performance, and to avoid detaching of the rotator 2 from the seal ring 5 due to excess rotation, the rotator 2 is provided with at least three limit protrusions 30 which are arranged symmetrically at the upper edge, either laterally or vertically. Alternatively, the limit protrusion 30 may be substituted by an annular protrusion.

[0010] Or alternatively, the rotator 2 is provided with an opening 8 at the bottom, which facilitates replacing of the light source. An annular protrusion 20 having a gap 21 is provided at the edge of the opening 8. The transparent cover 9 has a protrusion 22 for matching with the gap 21. Turn the cover 9 when the protrusion 22 passes through the gap 21, the cover 9 will be locked on the rotator 2. A seal ring 10 is pressed between the cover 9 and the edge of the opening 8. Alternatively, the cover 9 may be fixed on the rotator 2 by means of thread connection or by other known means in the art. As shown in FIG. 5, the transparent cover 9 is replaced with a glass plate 50, which is locked between the annular protrusion 20 and a snap spring 51 by the snap spring 51; while a waterproof seal ring 52 is pressed between the glass plate 50 and the annular protrusion 20.

[0011] As shown in FIG. 6 and 7, the rotator 2 may be provided with a single opening 23, the lamp holder 4 and the light source 3 is mounted inside the rotator 2. Alternatively, the lamp holder 4 and the light source 3 may be mounted on the rotator 2 by a supporting bracket 24.

[0012] Although the present invention has been described in connection with preferred embodiment thereof, many other variations and modifications will now become apparent to those skilled in the art without departing from the scope of the invention.

Claims

1. A waterproof universal light fitting, comprising:

a supporter (1);
a rotator (2);
a light source (3) mounted in the rotator (2);
a lamp holder (4) mounted in the rotator (2);

wherein the rotator (2) is rotatably and partly inserted on the supporter (1), with a spherical surface matching with the supporter (1); a seal ring (5) contacting the spherical surface of the rotator (2) and in compaction state is fixed between the supporter (1) and the rotator (2); the inner diameter of the seal ring (5) is equal to or less than the maximum diameter of the spherical surface (6).

2. The waterproof universal light fitting of claim 1, wherein the seal ring (5) is located at a groove (7) on the inner side of the supporter (1).

3. The waterproof universal light fitting of claim 1, wherein the rotator (2) is provided with at least three limit protrusions (30) at the upper edge.

4. The waterproof universal light fitting of claim 3, wherein the limit protrusions (30) are arranged symmetrically.

5. The waterproof universal light fitting of claim 1, wherein the rotator (2) is provided with an opening (8) at the bottom for facilitating replacing of light source, the opening (8) is sealed by a transparent cover (9), with a sealing ring (10) pressed between the cover (9) and the edge of the opening (8).

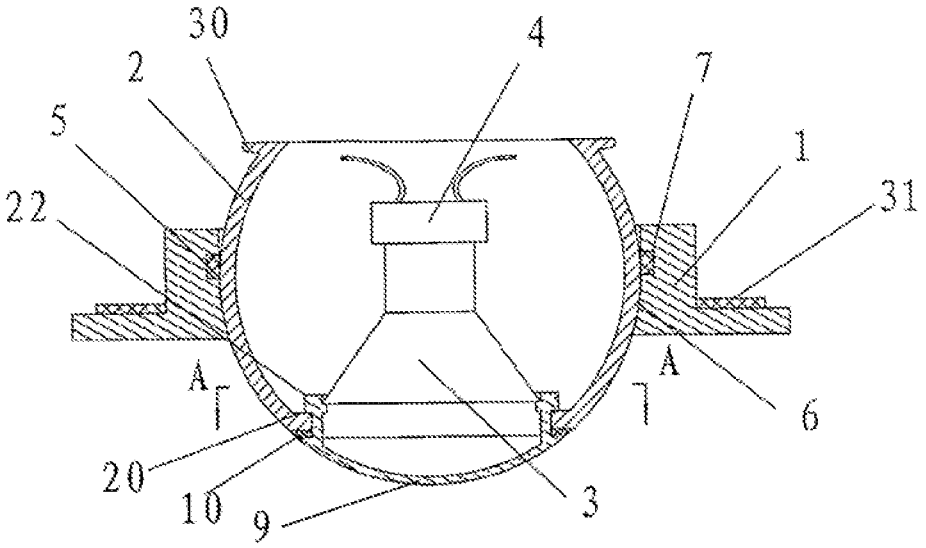

FIG. 1

A-A sectional view

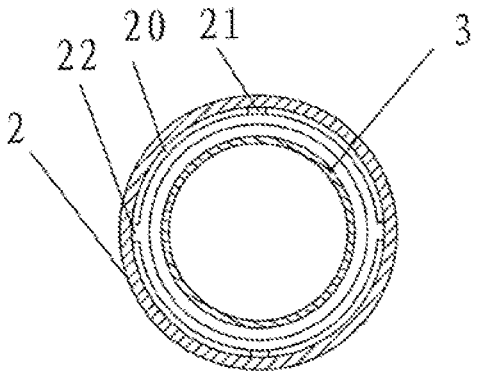

FIG. 2

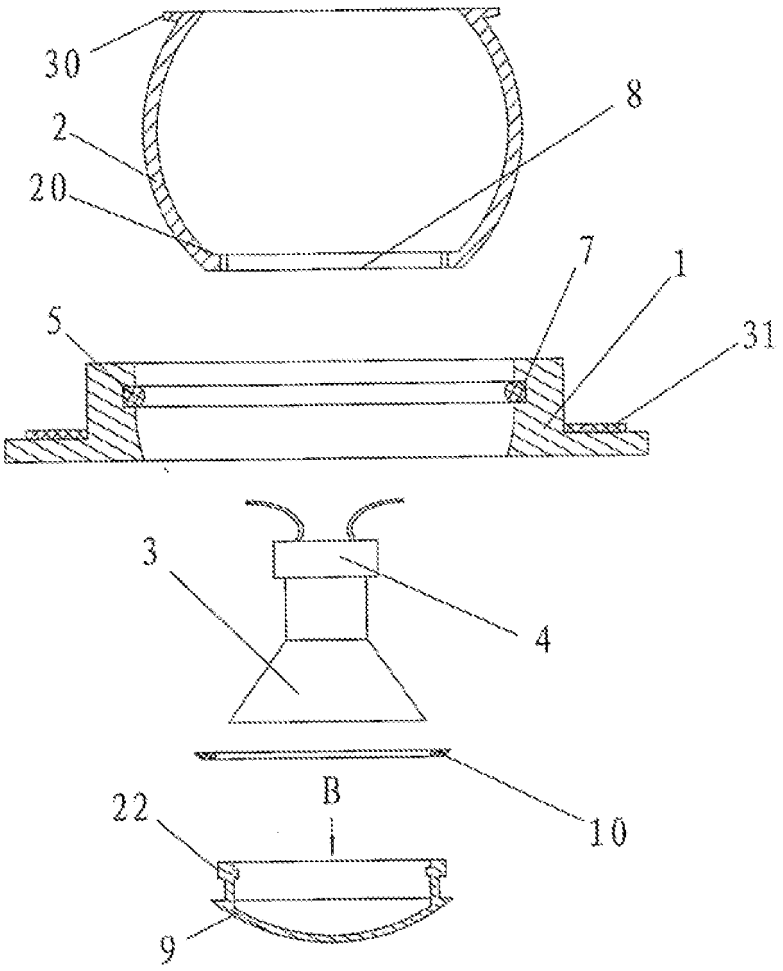

FIG. 3

B-direction view

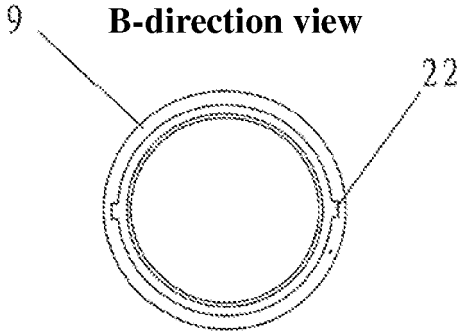

FIG. 4

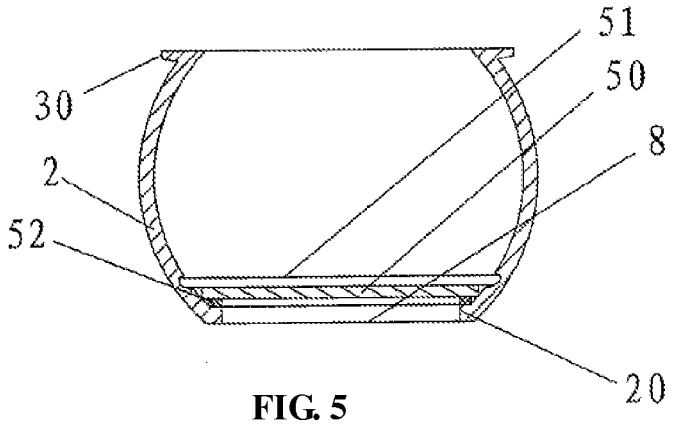

FIG. 5

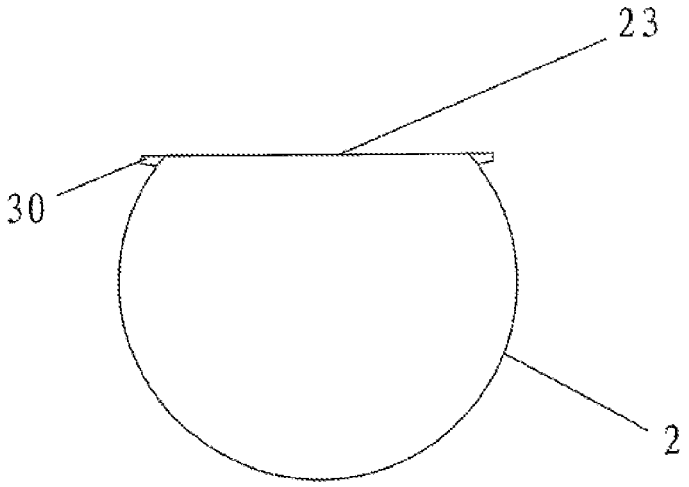

FIG. 6

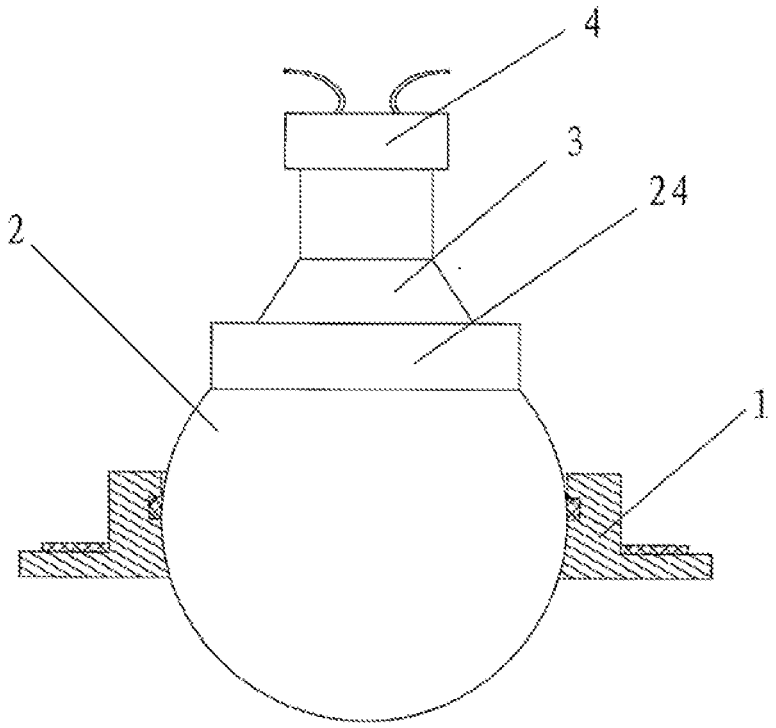

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/002330

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: F21

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, EPODOC,PAJ,CNPAT watertight, waterproof, universal, rotat+, sphere+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 2140016 Y (WEN,Zonghua), 11.Aug.1993 (11.08.1993), the whole	1-5
A	US 4996635 A (DEEPSEA POWER LIGHT), 26.Feb.1991 (26.02.1991), the whole	1-5
A	CN 1363783 A (JINGJI ENTERPRISE CO LTD), 14.Aug.2002 (14.08.2002), the whole	1-5
A	CN 2370272 Y (FAN,Banghong), 22.Mar.2000 (22.03.2000), the whole	1-5

☐ 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
06.Dec.2006 (06.12.2006)	11 · JAN 2007 (11 · 01 · 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 LI,Ying Telephone No. (86-10)62085820

Form PCT/ISA /210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2006/002330

CLASSIFICATION OF SUBJECT MATTER

F21S 8/00 (2006.01) i
F21V 21/29 (2006.01) i
F21V 31/00 (2006.01) i

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2006/002330

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 2140016 Y	11.08.1993	NONE	
US 4996635 A	26.02.1991	NONE	
CN 1363783 A	14.08.2002	CN 1138929 C	18.02.2004
CN 2370272 Y	22.03.2000	NONE	

Form PCT/ISA /210 (patent family annex) (April 2005)