



(43) International Publication Date  
5 February 2015 (05.02.2015)

- (51) International Patent Classification:  
F21V 21/29 (2006.01) F21V 21/02 (2006.01)  
F21V 21/26 (2006.01)
- (21) International Application Number:  
PCT/AU2014/000755
- (22) International Filing Date:  
28 July 2014 (28.07.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
2013902935 1 August 2013 (01.08.2013) AU
- (71) Applicant: BRIGHTGREEN PTY LTD [AU/AU]; PO Box 1400, Collingwood, Victoria 3066 (AU).
- (72) Inventors: O'DRISCOLL, David; PO Box 1400, Collingwood, Victoria 3066 (AU). CARTER, Trent; PO Box 1400, Collingwood, Victoria 3066 (AU).
- (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, BN, BR, BW, BY,

BZ, CA, CH, CL, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published: — with international search report (Art. 21(3))

(54) Title: ADJUSTABLE LIGHTING DEVICE

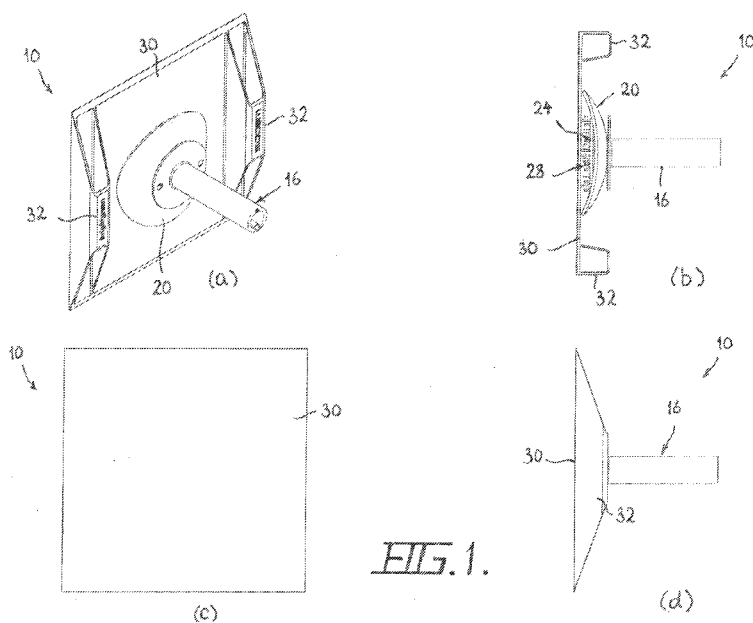


FIG. 1.

Elevations and Isometric View

(57) Abstract: An indirect lighting device which may be adjusted to direct a light source onto adjacent surfaces and means of assembly. The device comprises of an adjustable support arm, luminaire body and light source, wherein the luminaire body is mechanically coupled to the adjustable support arm, attaching the lighting device to the adjacent surface. The light source is supported by the luminaire body such that it is directed backwards towards the mounting surface, the light source may be directed by means of the adjustable support arm which permits a pivoting movement of the luminaire body about at least one axis.

WO 2015/013741 A1

## ADJUSTABLE LIGHTING DEVICE

### Field of the Invention

The present invention relates to an adjustable lighting device and relates particularly,  
5 though not exclusively, to an adjustable lighting device that employs an LED array as  
the light source.

### Background to the Invention

10 Electroluminescence - the creation of light by passing an electrical current through a  
material - using a diode was first observed in 1907 by English engineer Henry  
Joseph Round. In 1927 Russian scientist Oleg Losev built on Round's research to  
invent the first light emitting diode (LED), based on diodes used in radio receivers. In  
1961 American experimenters Robert Biard and Gary Pittman, found that gallium  
15 arsenide (GaAs) emitted infrared radiation when electric current was applied. They  
successfully applied for and obtained a patent for the infrared LED.

Not until 1962 did American scientist Nick Holonyak develop red, low-level LEDs.  
These were extremely expensive, but were followed by the development of mass-  
produced, affordable low-level LEDs in 1968 for use as indicator lights. The first  
20 high-brightness LED was produced in 1992 by Shuji Nakamura, a Japanese  
engineer. Nakamura's blue LED eventually led to the phosphor-based high efficiency  
white LEDs used in Brightgreen bulbs today.

LEDs are now being used in many applications, for example, to replace the  
traditional halogen globes used for internal lighting, such as in downlights and other  
25 decorative internal lighting fixtures.

The present invention was developed with a view to providing an adjustable lighting  
device which employs LEDs as the light source, which may typically be used as an  
internal decorative light fixture. However it will be evident that any suitable light  
source may be employed and the the invention is not limited to the use of LEDs.

References to prior art in this specification are provided for illustrative purposes only and are not to be taken as an admission that such prior art is part of the common general knowledge in Australia or elsewhere.

## 5 Summary of the Invention

According to one aspect of the present invention there is provided an adjustable lighting device comprising:

a light source;

10 a luminaire body on which the light source is supported, the light source facing backwards towards a wall, ceiling or other surface on which the device is mounted;

an adjustable support arm mechanically coupled to the luminaire body for attaching the lighting device to the wall, ceiling or other surface, the mechanical coupling permitting pivoting movement of the luminaire body about at least one axis wherein, in use, the direction in which light is directed from the light source to the wall, ceiling  
15 or other surface may be varied.

Preferably the mechanical coupling is a ball and socket joint which permits pivoting movement of the luminaire body about multiple axes.

Preferably the lighting device further comprises a diffuser mounted in front of the light source, the diffuser distributing the light from the light source more uniformly  
20 onto the wall, ceiling or other surface.

In the preferred embodiment the light source is an LED array. Typically the LEDs are arranged in a circular array on a rear surface of the luminaire body. Preferably the diffuser is also of circular configuration. Typically each LED in the array is fitted with a micro-lens on its front surface.

25 Preferably the luminaire body comprises a mounting plate which forms a heat sink for the LED array, the mounting plate being provided with a plurality of cooling fins on its rear face.

Typically the lighting device further comprises an opaque grip panel which is attached to the rear of the luminaire body. In the illustrated embodiment the grip

panel is of rectangular configuration (a square). However it will be appreciated that the grip panel could be of any desired shape or configuration. In use, the grip panel can be gripped on each side to adjust the angle of the lighting device relative to the wall, ceiling or other surface on which it is mounted.

- 5 . Advantageously the adjustable support arm comprises a first elongate member which is mechanically coupled at one end to the luminaire body, and which is slidably received in one end of a second hollow elongate member, the second elongate member being attachable at the other end to the wall, ceiling or other surface whereby, in use, the support arm is telescopically adjustable by sliding the  
10 first member into or out of the second member.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers. Likewise the word "preferably" or variations  
15 such as "preferred", will be understood to imply that a stated integer or group of integers is desirable but not essential to the working of the invention.

20

### **Brief Description of the Drawings**

The nature of the invention will be better understood from the following detailed description of several specific embodiments of the lighting device, given by way of  
25 example only, with reference to the accompanying drawings, in which:

Figure 1 (a) is a rear top isometric view of a first embodiment of a lighting device according to the present invention;

Figures 1 (b), (c) and (d) are a plan elevation, front elevation and side elevation respectively of the lighting device of Figure 1 (a);

30 Figure 2 is a rear elevation of the lighting device of Figure 1 (a);

Figure 3 is a section view through the line A-A in Figure 2 of the lighting device

of Figure 1 (a);

Figure 4 is a side elevation of the lighting device of Figure 1 (a) illustrating adjustment of the beam spread;

Figure 5 is a rear elevation of the lighting device of Figure 1 (a) illustrating adjustment of the light direction; and,

Figures 6 (a) and (b) are a side elevation and plan elevation respectively of the lighting device of Figure 1 (a) further illustrating adjustment of the light direction.

## 10 Detailed Description of Preferred Embodiments

A preferred embodiment of an adjustable lighting device 10 in accordance with the invention, as illustrated in Figures 1 to 6, comprises a light source 12 and a luminaire body 14 on which the light source 12 is supported. The light source 12 (see Figure 3) is mounted so that it faces backwards towards a wall, ceiling or other surface on which the device is mounted (not shown). An adjustable support arm 16 is mechanically coupled to the luminaire body 14 for attaching the lighting device 10 to the wall, ceiling or other surface. The mechanical coupling of the adjustable support arm 16 to the luminaire body 14 permits pivoting movement of the luminaire body about at least one axis. In use, the direction in which light is directed from the light source 12 to the wall, ceiling or other surface may be varied.

Thus, for example, if the device 10 is wall mounted in an internal living area, light from the light source 12 may be directed onto the wall to create subtle and decorative lighting effects. The direction and/or angle in which the light is directed may be adjusted via the adjustable support arm 16 to vary the lighting effects.

Preferably the mechanical coupling is a ball and socket joint 18 which permits pivoting movement of the luminaire body 14 about multiple axes (i.e. in any direction). Preferably the lighting device further comprises a diffuser 20 mounted in front of the light source 12. The diffuser 20 distributes the light from the light source 12 more uniformly onto the wall, ceiling or other surface.

In the described embodiment the light source 12 is an array of LEDs 22 (see Figure 3). The LEDs 22 are arranged in a circular array on a rear surface of the luminaire

body 14. Preferably the diffuser 20 is also of circular configuration and is made of translucent material. Typically each LED 22 in the array is fitted with a micro-lens on its front surface. As noted above, any suitable light source may be used, and the invention is not limited to the use LEDs. However LEDs are particularly advantageous because of their compact size and improved efficiency (high brightness and low power consumption).

In this embodiment, the luminaire body 14 comprises a mounting plate 24 on which a printed circuit board (PCB) 26 for the LEDs 22 is mounted. The mounting plate 24 also forms a heat sink for the LED array, and is provided with a plurality of cooling fins 28 on its front face, as can be seen most clearly in Figures 1 (b) and 6(b). The ball of the ball and socket joint 18 is received in a recess formed in the centre of the mounting plate 24, as can be seen most clearly in Figure 3. The diffuser 20 is fastened to the mounting plate 24 by two M2 fasteners (not visible in the drawings). This clamps the PCB 26 to the mounting plate 24 and assembles the ball and socket joint 18.

Typically the lighting device further comprises an opaque grip panel 30 which is attached to the rear of the luminaire body. In the illustrated embodiment the grip panel 30 is formed with a hollow section 32 on each of two opposite sides which may be used as hand grips. In this embodiment the grip panel 30 is of rectangular configuration (a square). However it will be appreciated that the grip panel 30 may be of any desired shape or configuration. In use, the grip panel 30 can be gripped with two hands on each side to adjust the angle of the lighting device 10 relative to the wall, ceiling or other surface on which it is mounted.

Advantageously the adjustable support arm 16 comprises a first elongate member 36 which is mechanically coupled at one end to the luminaire body 14, as can be seen most clearly in Figure 3. The first elongate member 36 is slidably received through one end of a second hollow elongate member 38. The second elongate member 38 is attachable at its other end to the wall, ceiling or other surface on which the device 10 is mounted. Both elongate members 36 and 38 are typically cylindrical in shape. The first elongate member 36 is formed with the ball of the ball and socket joint 18 on its one end. In use, the support arm 16 is telescopically adjustable by

sliding the first member 36 into or out of the second member 38. In this way the beam spread of the light source 12 can effectively be adjusted.

Now that a preferred embodiment of the lighting device has been described in detail,  
5 it will be apparent that the described embodiment provides a number of advantages over the prior art, including the following:

- (i) It can be easily adjusted to modify the direction and spread of the light onto the adjacent wall, ceiling or other surface on which the device 10 is mounted.
- (2) It is of simple but robust design and provides an innovative and aesthetically  
10 attractive means of changing the ambience of an internal space.
- (3) The LED array provides a low-power, high brightness light source, which may also be dimmable if desired.

It will be readily apparent to persons skilled in the relevant arts that various  
15 modifications and improvements may be made to the foregoing embodiments, in addition to those already described, without departing from the basic inventive concepts of the present invention. For example, the mechanical coupling of the adjustable arm to the luminaire body may be via any suitable coupling, for example, a simple hinge; although a ball and socket joint is preferably because of its  
20 versatility. Therefore, it will be appreciated that the scope of the invention is not limited to the specific embodiments described.

**The Claims defining the invention are as follows:**

1. An adjustable lighting device comprising:

a light source;

5 a luminaire body on which the light source is supported, the light source facing backwards towards a wall, ceiling or other surface on which the device is mounted;

an adjustable support arm mechanically coupled to the luminaire body for attaching the lighting device to the wall, ceiling or other surface, the mechanical coupling permitting pivoting movement of the luminaire body about at least one axis wherein,  
10 in use, the direction in which light is directed from the light source to the wall, ceiling or other surface may be varied.

2. An adjustable lighting device as defined in claim 1, wherein the mechanical coupling is a ball and socket joint which permits pivoting movement of the luminaire body about multiple axes.

15 3. An adjustable lighting device as defined in claim 1 or claim 2, further comprising a diffuser mounted in front of the light source, the diffuser distributing the light from the light source more uniformly onto the wall, ceiling or other surface.

20

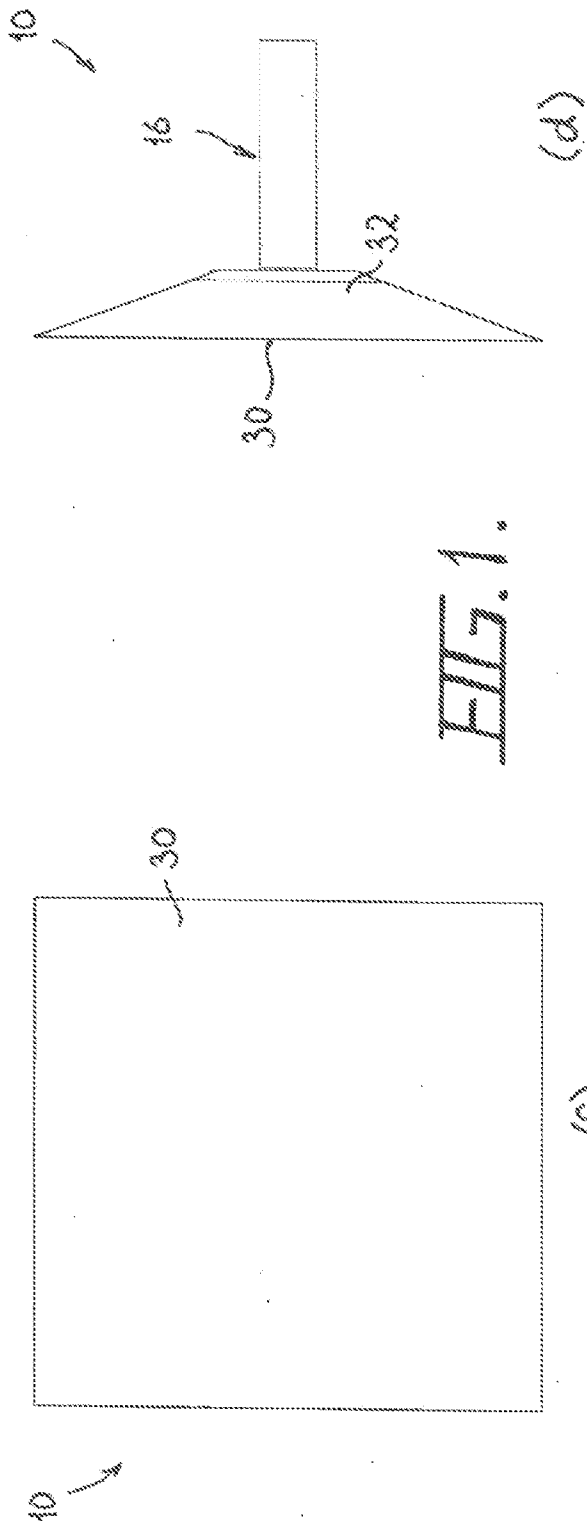
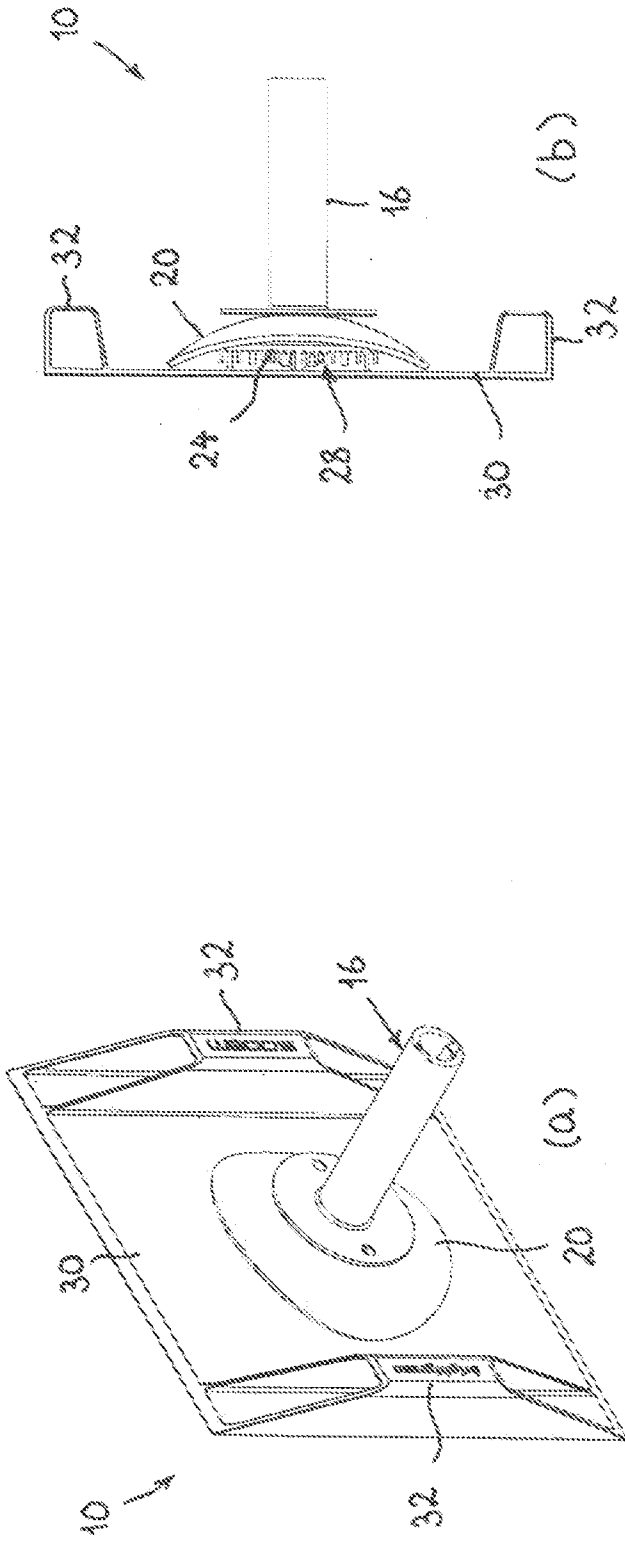
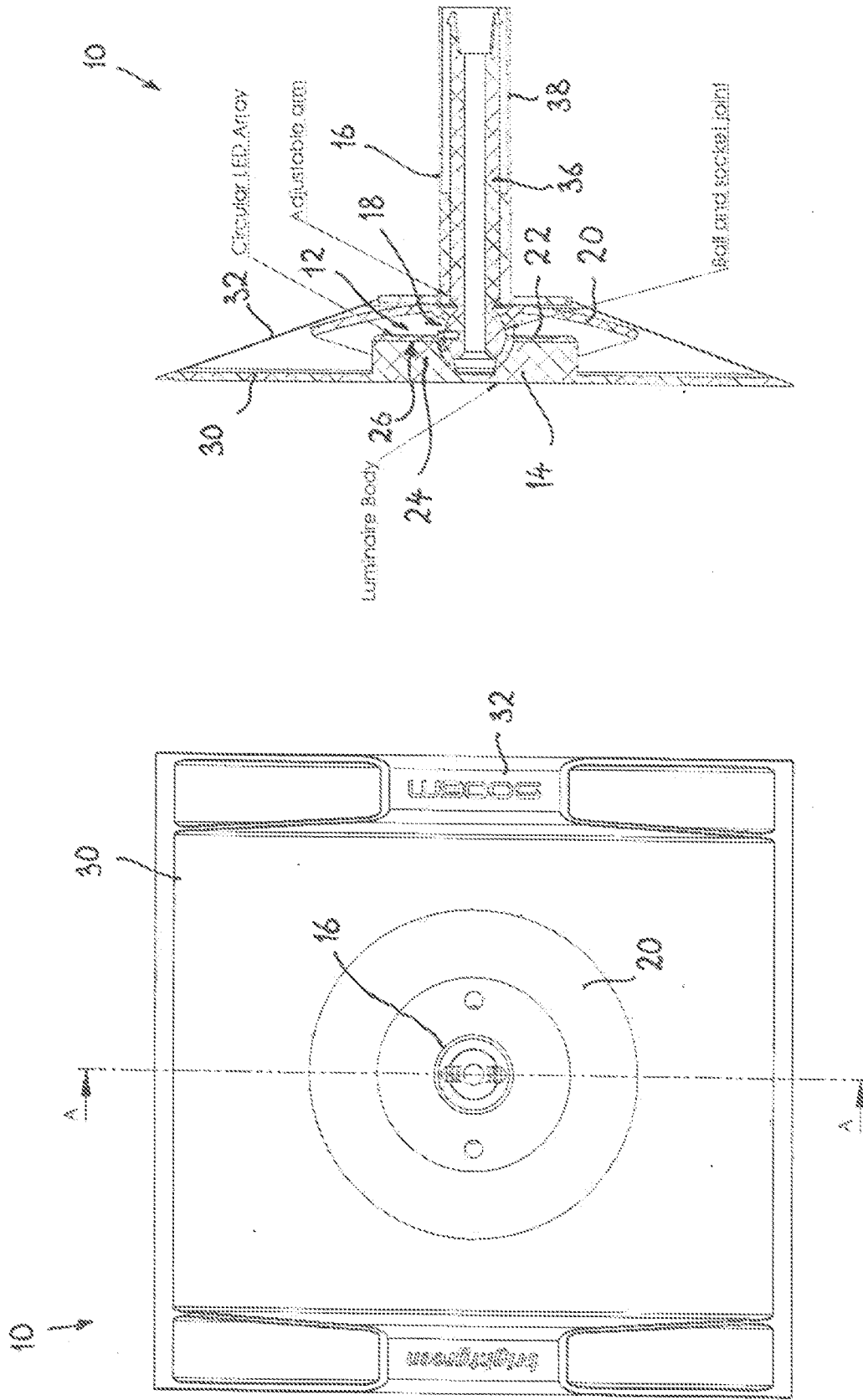


FIG. 1.

Elevations and Isometric View



Device Assembly  
SECTION A-A

FIG. 3.

FIG. 2.

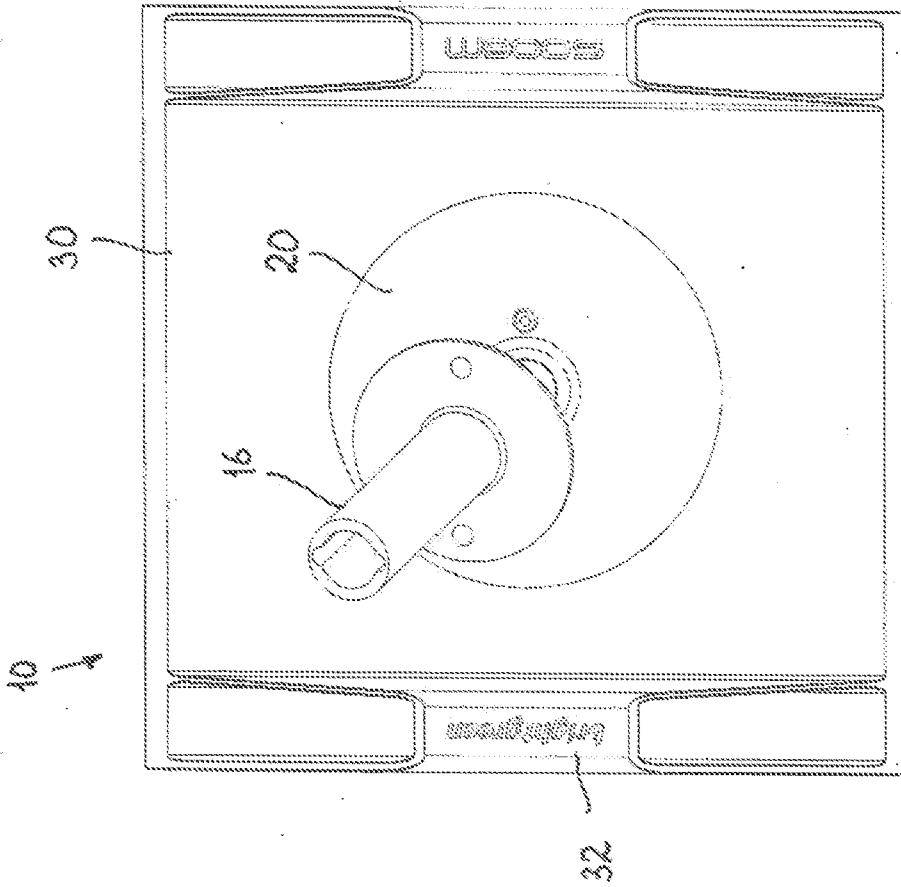


FIG. 4.

Adjustment of Beam Spread

10

30

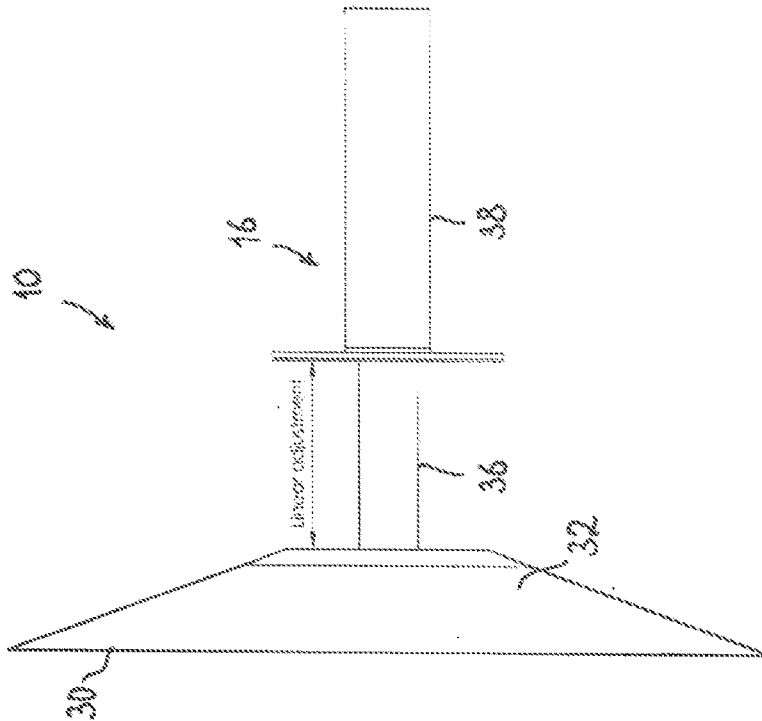
16

20

32

FIG. 5.

Adjustment of Light Direction



10

30

16

38

36

32

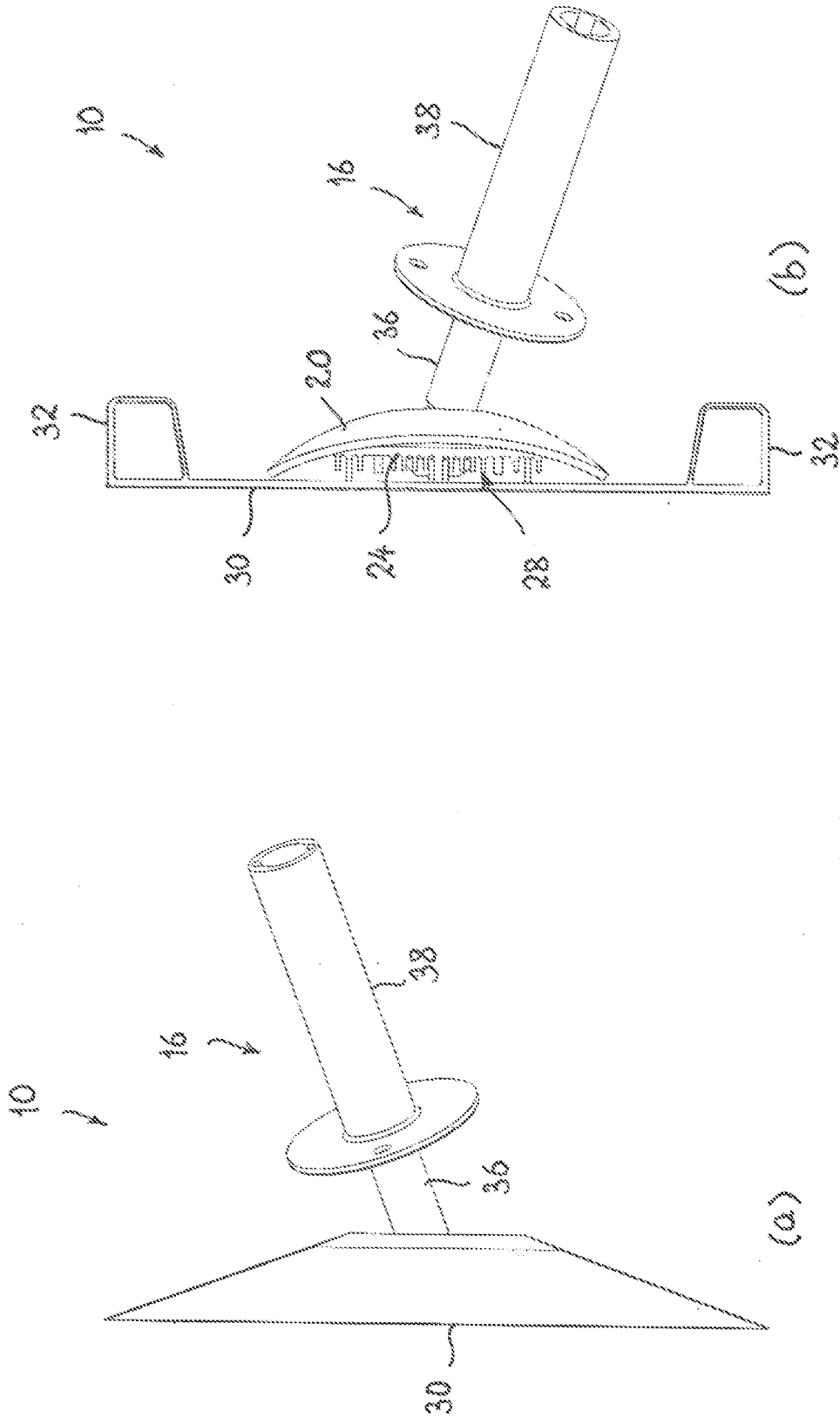


FIG. 6.

Adjustment of Light Direction

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2014/000755

## A. CLASSIFICATION OF SUBJECT MATTER

F21V 21/29 (2006.01) F21V 21/26 (2006.01) F21V 21/02 (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)

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)

Databases: WPI, EPODOC and IPC/CPC mark F21S, F21V and Keywords: luminaire, light\_fitting, lamp, spot\_light, feature\_wall, indirect, decorat, adjust, alter, rotate, ball, socket and like terms.

Databases: ESPACENET, GOOGLE and GOOGLE PATENTS and Keywords: feature, decorative, wall, light, ball, socket, adjust and like terms.

Applicant and inventor search on ESPACENET: Brightgreen; driscoll and keyword: light; carter trent.

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Documents are listed in the continuation of Box C		



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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search  
30 October 2014Date of mailing of the international search report  
30 October 2014

## Name and mailing address of the ISA/AU

AUSTRALIAN PATENT OFFICE  
PO BOX 200, WODEN ACT 2606, AUSTRALIA  
Email address: pct@ipaustalia.gov.au

## Authorised officer

Graeme Evans  
AUSTRALIAN PATENT OFFICE  
(ISO 9001 Quality Certified Service)  
Telephone No. 0262832822

## INTERNATIONAL SEARCH REPORT

International application No.

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

**PCT/AU2014/000755**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2013-138032 A (TANIMOTO MISAKO) 11 July 2013 Abstract and Fig 3	1-3
X	WO 2009/140872 A1 (CHEUNG) 26 November 2009 Abstract and Figs 1-3	1-3
X	US 2008/0158894 A1 (DIXON et al) 03 July 2008 Abstract and Fig 1	1-3
X	US 2001/0009511 A1 (GRIFFITHS) 26 July 2001 Abstract and Fig 1	1-3
X	US 3772527 A (DARLING et al) 13 November 1973 Abstract and Figs 1, 3, 5-8	1-3
X	US 4414613 A (MAYER) 08 November 1983 Abstract and Figs 1-4, 6-9	1-3
X	US 4160285 A (SHIBLA) 03 July 1979 Abstract and Fig 1-4	1-3
X	US 788035 A (FERGUSSON) 25 April 1905 Fig 6	1-3
X	US 972480 A (SOUTHWICK) 11 October 1910 Fig 1	1-3
X	CN 202221061 U (SHEN YANYAN) 16 May 2012 Abstract and Fig 1	1-3

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU2014/000755**

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

<b>Patent Document/s Cited in Search Report</b>		<b>Patent Family Member/s</b>	
<b>Publication Number</b>	<b>Publication Date</b>	<b>Publication Number</b>	<b>Publication Date</b>
JP 2013-138032 A	11 July 2013	JP 5545685 B2	09 Jul 2014
WO 2009/140872 A1	26 November 2009	None	
US 2008/0158894 A1	03 July 2008	US 7762688 B2	27 Jul 2010
		CN 101107475 A	16 Jan 2008
		DE 102005007711 A1	31 Aug 2006
		EP 1848923 A1	31 Oct 2007
		EP 1848923 B1	28 Jan 2009
		WO 2006087216 A1	24 Aug 2006
US 2001/0009511 A1	26 July 2001	US 6604842 B2	12 Aug 2003
		EP 1118815 A2	25 Jul 2001
		GB 2358461 A	25 Jul 2001
		GB 2358461 B	20 Nov 2002
US 3772527 A	13 November 1973	CA 985254 A1	09 Mar 1976
US 4414613 A	08 November 1983	US 4357651 A	02 Nov 1982
US 4160285 A	03 July 1979	None	
US 788035 A	25 April 1905	None	
US 972480 A	11 October 1910	None	
CN 202221061 U	16 May 2012	None	

**End of Annex**