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— *as to the identity of the inventor (Rule 4.17(i))*

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(54) Title: LIGHTING ARRANGEMENTS

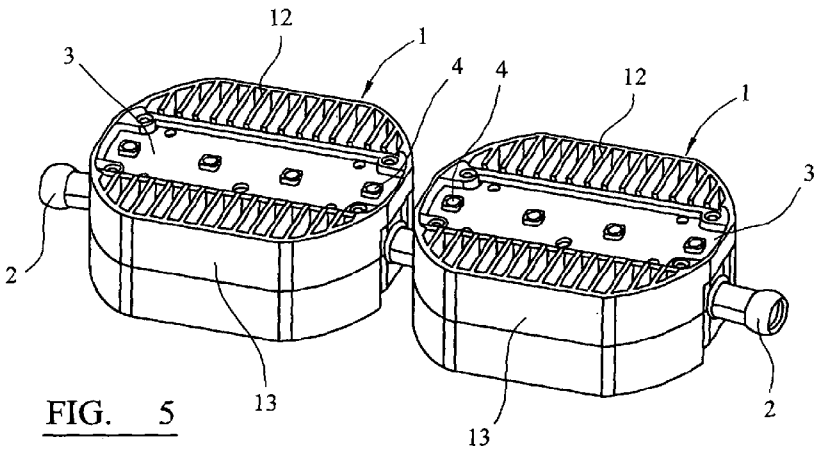


FIG. 5

(57) Abstract: An electric lighting arrangement including a plurality of lighting units (1) each containing a plurality of LED lights (4), to form a strip of lights. The units (1) are adapted to be joined together by means of a ball joint arrangement (2), which comprises two conjoined balls (7), each ball (7) being adapted to be mounted in a retaining bail cup (9) in a lighting unit, ball cups (9) being provided on opposed ends of the units (1) to enable the units to be pivotable one relative to the other in all planes. Each lighting unit (1) includes a main body (3) incorporating a heat sink in the form of heat conducting fins (12).

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Lighting arrangements

The present invention relates to lighting arrangements, particularly but not exclusively, for providing distinctive lighting patterns to areas such as auditoria, commercial reception areas public spaces and hotel lounges.

In such large areas there is a requirement for lighting systems which, particularly when dealing with complex shaped spaces, require a significant amount of flexibility to enable the light to be directed in the direction and with the intensity required for the desired lighting effect. Typically, a solution to this problem is achieved by individually designing and assembling a bespoke lighting system for each installation. Such an installation is therefore almost inevitably extremely expensive to design, manufacture and install.

The present invention seeks to provide a solution to this problem by providing lighting units which can be rapidly assembled into a lighting arrangement to provide the required amount of light and to enable the individual lights to be directed in the required direction substantially independently of the other light units in the system. Such systems typically include a large number of lighting elements which generate a great deal of heat, and the present invention also seeks to provide an arrangement to facilitate the removal of heat from the units

According to the present invention there is provided an electric lighting arrangement including at least two lighting units each containing at least one light source, the units being adapted to be joined together by means of a universal joint mechanism to enable the units to be pivotable one relative to the other in all planes. wherein each lighting unit includes a main body incorporating a heat sink in the form of heat conducting fins.

In a preferred embodiment, the fins are formed integrally with the main body.

In a preferred arrangement each unit has a plurality of light sources, and the light sources may be arranged linearly along the length of the unit. The unit is preferably elongate and the light sources are preferably arranged along the longitudinal axis of the unit.

Advantageously, the light sources are LEDs.

In a preferred embodiment, the universal joint mechanism comprises a ball joint arrangement, which preferably comprises two conjoined balls, each ball being adapted to be mounted in a retaining ball cup in a lighting unit, ball cups being provided on opposed ends of the unit.

Preferably, the or each ball joint arrangement has a through bore through which a power cable passes to provide power to the light sources.

In a preferred arrangement, a plurality of said lighting units are adapted to be joined together to form a strip of lights.

Preferably, a common power cable passes through all the units, power for the individual light sources being tapped from the power cable.

In an alternative embodiment, the ball joints are a snap fit in the associated ball cup the ball joints and ball caps may be formed of a synthetic plastics material. In a further improvement, the balls and associated cups include electrical contacts through which the light sources are electrically connected to a power source.

Preferred embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, in which:-

Figure 1 shows a perspective view of two conjoined lighting units of a lighting arrangement,

Figure 2 shows a plan view of Figure 1,

Figure 3 shows a sectional view along the line CC of Figure 2,

Figure 4 shows an exploded view of Figure 1,

Figure 5 shows a perspective you of a further embodiment of two conjoined lighting units,

Figure 6 shows a plan view of Figure 1,

Figure 7 shows a cross-sectional view along the line BB of Figure 6, and

Figure 8 shows an exploded view of Figure 5.

Referring now to Figures 1-4, there is shown an embodiment of a lighting arrangement consisting of two lighting units 1 joined together by a ball joint arrangement 2. Each lighting unit 1 consists of a main body 3 in the form of an elongate holder having mounted on one face a series of linearly aligned light sources 4 in the form of LEDs mounted on a plate which is secured to the main body 1. As shown in Figure 2, the light sources 4 are linearly aligned along the central axis of the light units 1. The main body 3 also forms a heat sink to assist in dissipating the heat generated by the light sources 4 in use.

The electrical wiring for the lights, and a power cable are contained, in use, within the main body 3 but are not shown. The opposite face of the main body to the light sources is closed by a retaining plate 5.

As shown particularly in Figures 3 and 4, the two light units 1 are adjoined by a ball joint arrangement 2 each of which comprises a pair 6 of conjoined balls 7 the balls 7 being spaced by a short joining sleeve 8. Each ball 7 is adapted to be pivotally retained in a ball cup 9 located in the end of an associated one of the light units 1. The ball cup 9 consists of a first part 10 formed in or secured to the main body 3 and a second part in the form of a closure cap 11 secured by screws to the first part 10 to retain the ball 7 in the cup in such a way as to enable the ball 7 to pivot relative to the main body 3 in all planes.

A second light unit 1 is secured to the other ball 7 of the ball arrangement 2 to thus secure the two light units together so that they are pivotable one relative to the other in all planes. It can thus be seen that a plurality of light units can be secured together to form a long strip of lights. Sufficient friction is provided in the pivotal engagement so that the two units remain in the orientation set by the installer but can be readily adjusted manually to the required position

Referring now to Figures 5-8 there is shown a modified embodiment in which like parts bear like references. This embodiment is identical in construction to that shown in Figures 1-4 except that the main body 3 incorporates a heat sink in the form of fins 12 which dissipate heat generated by the light sources. In one form the fins 12 are formed on a separate body which is secured to the main body 3 but, in an alternative embodiment are, formed integrally with the main body which may be formed of a one piece alloy diecasting, for example.

In an alternative arrangement, not shown in the drawings, the ball joint arrangement 2 and the associated cups 9 are formed of a synthetic plastics material, which is electrically non-conductive. In such an arrangement the ball cup is an integral unit which is secured to the main body and the balls 7 are a snap fit in the cups 9. Such an arrangement would facilitate assembly of a plurality of the light units. It is envisaged that the light sources of each unit may be hardwired and the light sources connected to electrical contacts on the cups which are automatically engaged by contacts on the balls, when units are joined together, to form an electrical path to an external power source .

In a further embodiment (not shown), the retaining ball cups may consist of a fixed hemispherical base part secured in the unit into which the ball can be inserted, with a retaining ring having a part spherical inner face engaging the ball and being retained in position by means of a circlip or threaded ring to thereby secure the ball to the unit.

CLAIMS

1. An electric lighting arrangement including at least two lighting units each containing at least one light source, the units being adapted to be joined together by means of a universal joint mechanism to enable the units to be pivotable one relative to the other in all planes, wherein each lighting unit includes a main body incorporating a heat sink in the form of heat conducting fins.

2. A lighting arrangement according to claim 1, wherein the fins are formed integrally with the main body.

3. A lighting arrangement according to any one of the preceding claims wherein each unit has a plurality of light sources.

4. A lighting arrangement according to claim 3, wherein each unit is elongate and the light sources are arranged linearly along the length of the unit.

5. A lighting arrangement according to any one of the preceding claims wherein the light sources comprise LEDs.

6. A lighting arrangement according to any one of the preceding claims wherein the universal joint mechanism comprises a ball joint arrangement.

7. A lighting arrangement according to claim 6, wherein the ball joint arrangement comprises two conjoined balls and each ball being adapted to be mounted in a pivotable manner in a retaining ball cup in a lighting unit, ball cups being provided on opposed ends of the unit.

8. A lighting arrangement according to claim 6 or 7 wherein the or each ball joint arrangement has a through bore through which a power cable passes to provide power to the light sources.

9. A lighting arrangement according to any one of the preceding claims wherein a plurality of said lighting units are adapted to be joined together to form a strip of lights.

10. A lighting arrangement according to claim 8 or 9 when dependent on thereon, wherein a common power cable passes through all the units, power for the individual light sources being tapped from the power cable.

11. A lighting arrangement and according to claim 6 or any one of claims 7 to 10 when dependent thereon, wherein the ball joints are a snap fit in the associated ball cup.

12. A lighting arrangement according to claim 11, wherein the ball joints and ball caps are formed of a synthetic plastics material.

13. A lighting arrangement as claimed in claim 11 or 12, wherein the balls and associated cups include co-operating electrical contacts through which the light sources are electrically connected to a power source.

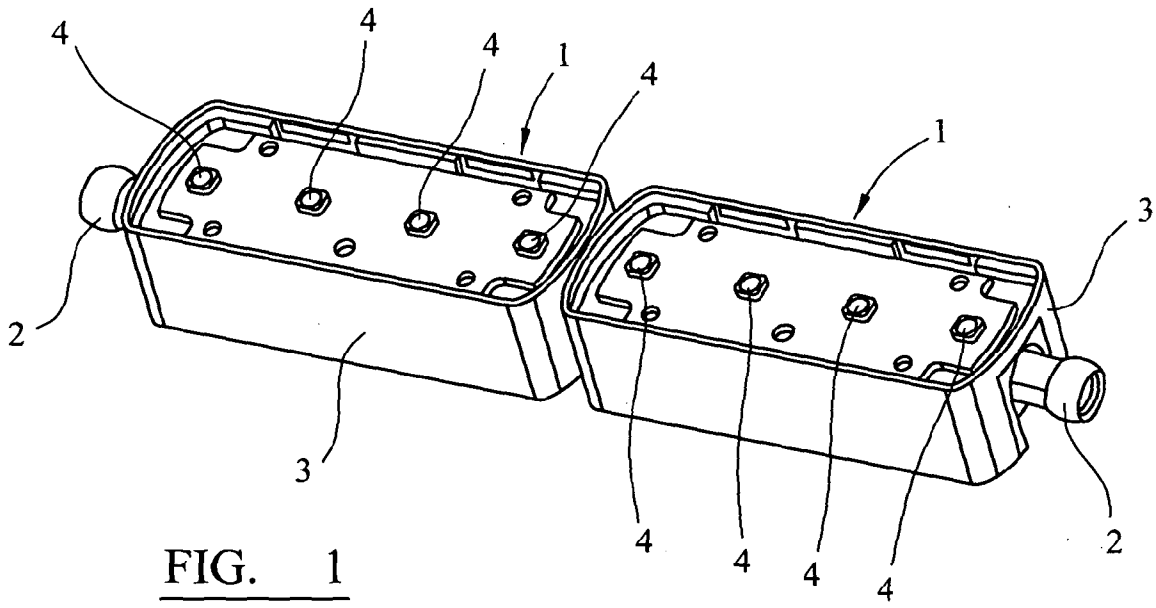


FIG. 1

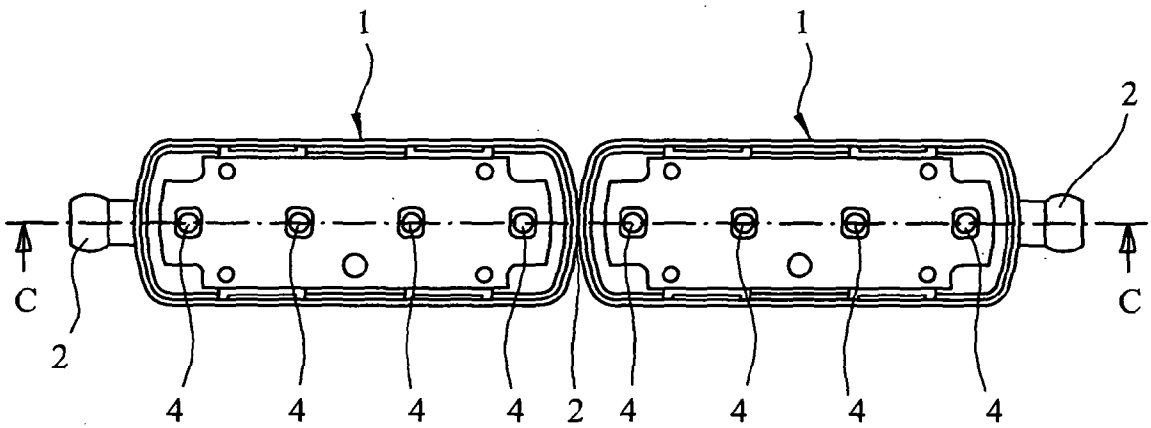


FIG. 2

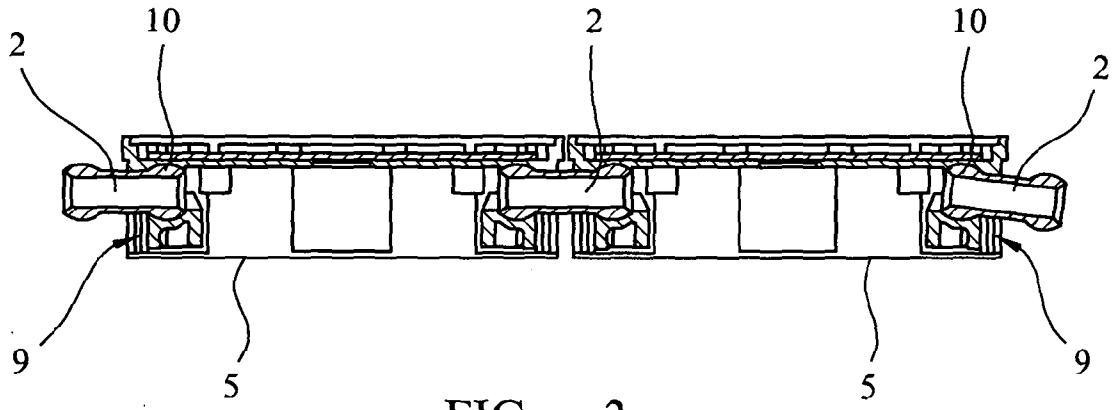


FIG. 3

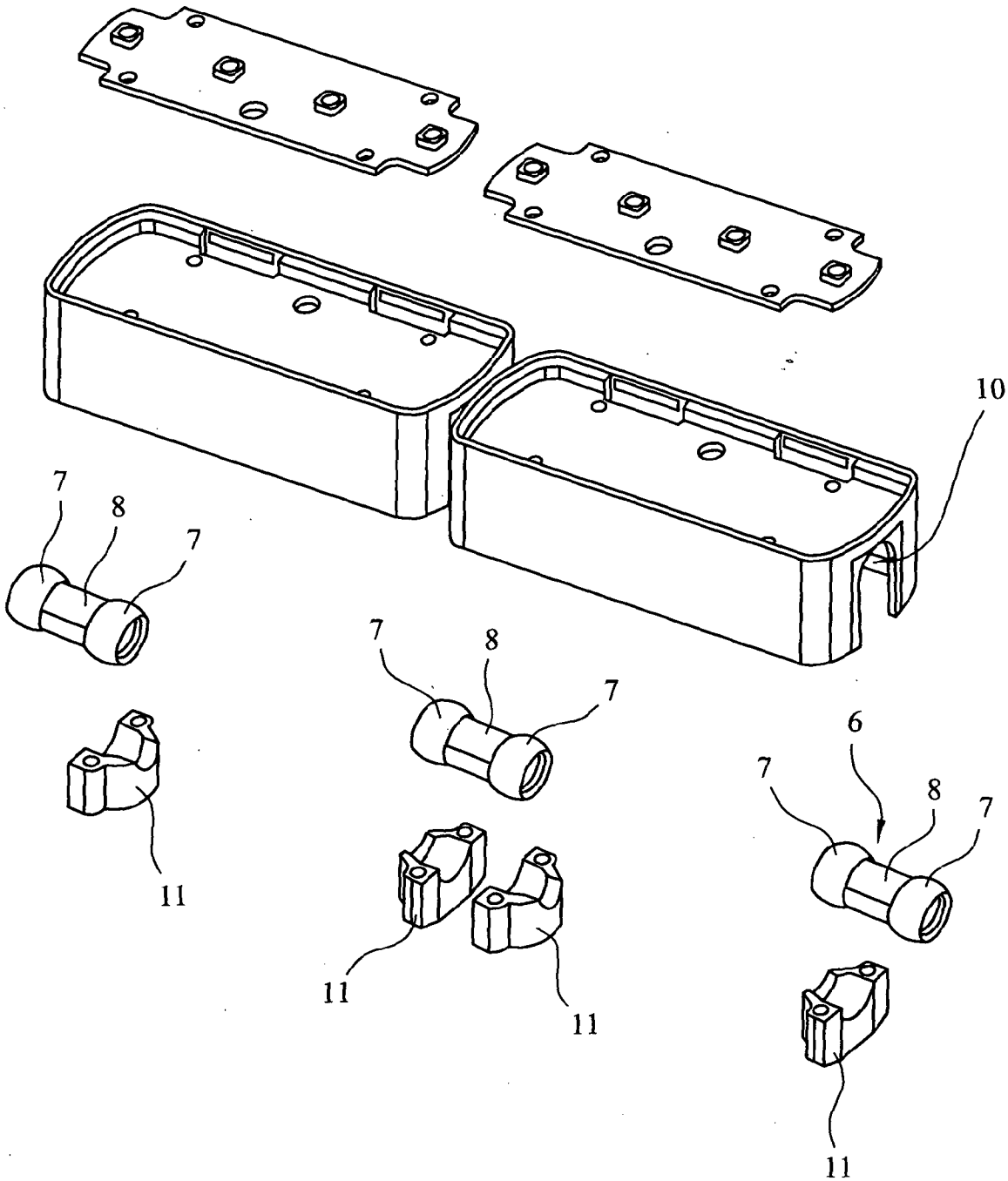


FIG. 4

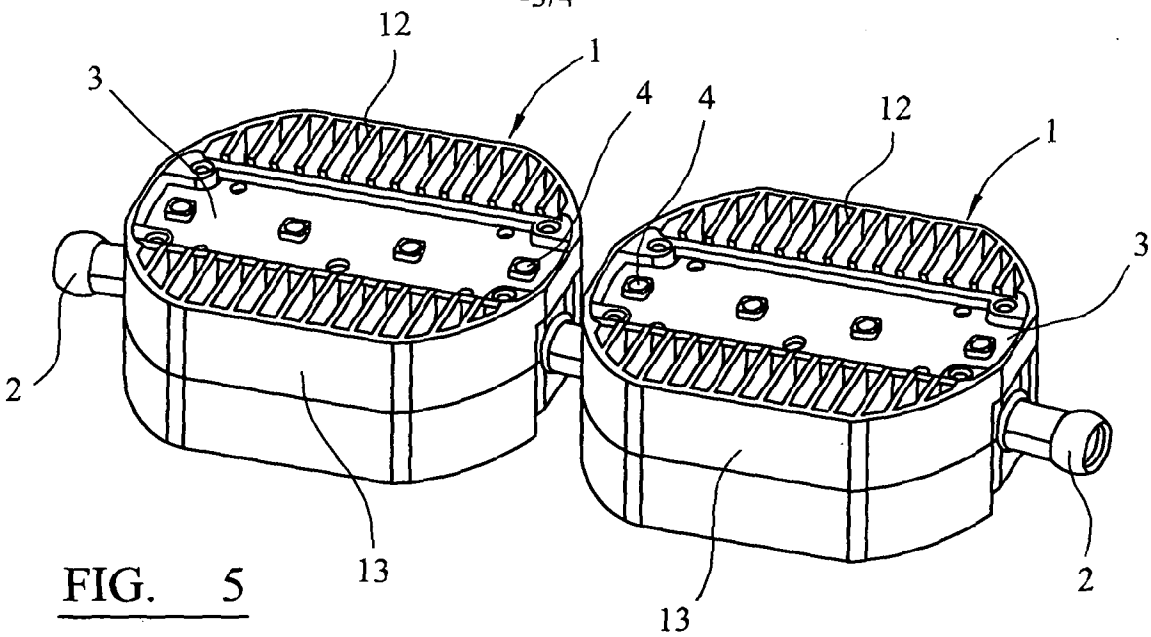


FIG. 5

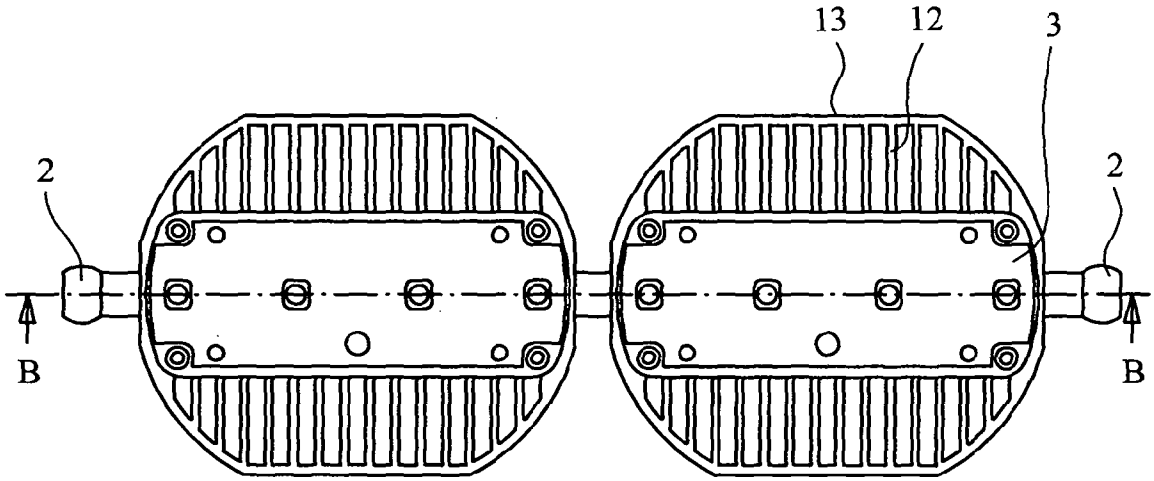


FIG. 6

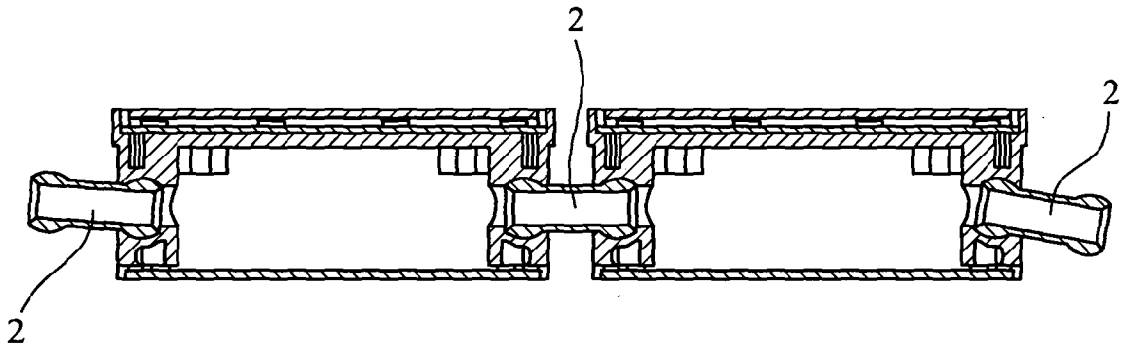


FIG. 7

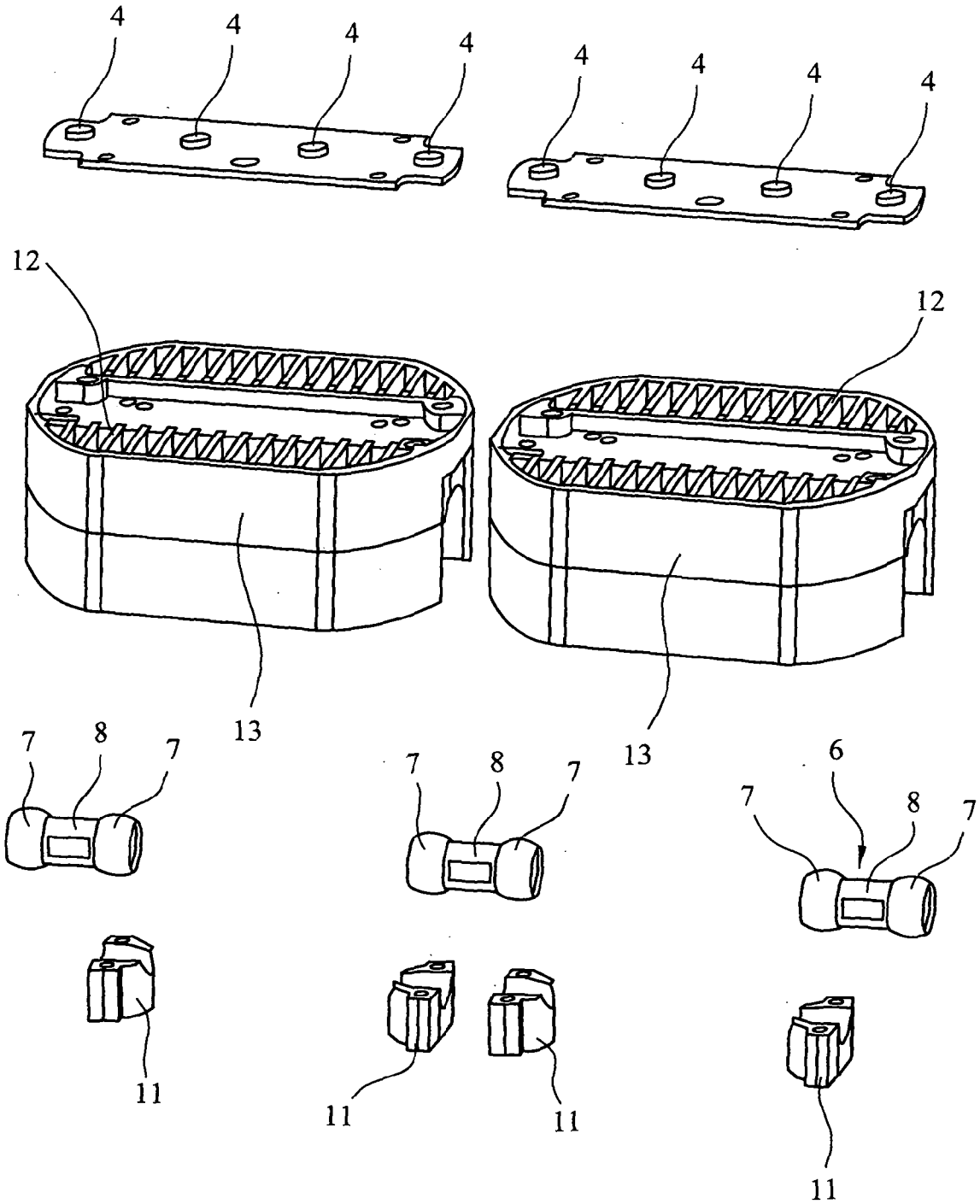


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/000831

A. CLASSIFICATION OF SUBJECT MATTER
INV. F21V29/00 F21V21/005 F21V23/06
ADD. F21Y101/02

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)
F21V F21Y

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 03/058114 A1 (PLESNIK VIT [CZ]) 17 July 2003 (2003-07-17) page 4, paragraph 2 - paragraph 3 figure 1	1-13
Y	US 7 165 863 B1 (THOMAS JAMES G [US] ET AL) 23 January 2007 (2007-01-23) column 6, line 62 - column 7, line 7 column 6, line 3 - line 12; figure 1 column 6	1-13
A	US 3 188 794 A (JOHNSON RAYMOND D) 15 June 1965 (1965-06-15) figures 1,2	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 April 2013	22/04/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Prévot, Eric

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2012/000831

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03058114 A1	17-07-2003	AT 334338 T	15-08-2006
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