



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

(43) Date of publication:  
**31.05.2017 Bulletin 2017/22**

(51) Int Cl.:  
**E04B 5/32 (2006.01)**

(21) Application number: **15825427.6**

(86) International application number:  
**PCT/ES2015/070227**

(22) Date of filing: **26.03.2015**

(87) International publication number:  
**WO 2016/012639 (28.01.2016 Gazette 2016/04)**

(84) Designated Contracting States:  
**AL 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 RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**MA**

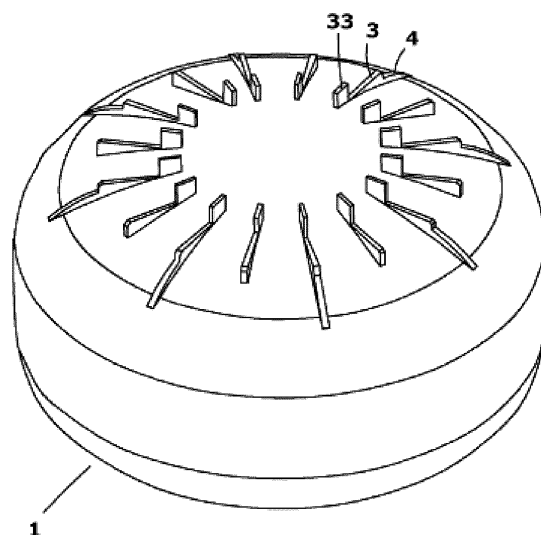
(72) Inventors:  
• **CASES APARICIO, Jorge**  
**E-46110 Godella (Valencia) (ES)**  
• **RAUSELL DONDERIS, Juan Adolfo**  
**E-46005 Valencia (ES)**  
  
(74) Representative: **Galán Vélez, Reyes**  
**KPZ Patentes y Marcas**  
**C/ Manolo Taberner 25 Bajo Izquierda**  
**ES-46018 Valencia (ES)**

(30) Priority: **25.07.2014 ES 201431042**

(71) Applicant: **Nuevashebridas, S.L.U.**  
**46110 Godella (Valencia) (ES)**

(54) **LIGHT-WEIGHT FILLING BODY FOR CONCRETE SLABS AND BLOCKS**

(57) The invention relates to a light- weight filling body for concrete slabs and blocks, formed by a single body or by two sub-bodies (2) which are preferably identical, or which can be joined together to define, once assembled, a single hollow filling body (1) having a spheroid shape, in general a substantially cylindrical lateral peripheral portion, and a substantially horizontal central upper portion, having a positioning element (5, 6) formed in the substantially horizontal upper portion, and a set of ribs (3) for supporting the metal reinforcement of the block, said ribs being raised above the surface of the filling body (1). According to one embodiment, the positioning body (5) is formed by a peripheral crown of a continuous height, according to another embodiment, same is formed by a set of portions or wedge-like pieces (8) having a circular sector shape, and according to another embodiment, same is formed by a set of raised portions (33) of the support ribs (3) on the end thereof closest to the centre of said body.



**Fig. 14**

## Description

[0001] This invention refers to a filling body used for occupying the space not subjected to tension in a concrete slab reinforced with metal meshes or rods (for example for a ceiling or floor deck) provided with a set of spacing ribs on which the rods rest. This is made up of a single body or two halves, generally identical to each other, able to be joined on site or before being transported to the place where these are to be placed; it also comprises a set of reinforcement ribs for the surface of the body to prevent it from deforming.

## State of the art

[0002] Different devices for lightening slabs made up of caissons which are integrated in the slab are known of. One example of this is ES2192454, which defines a caisson with a hollow body and a flat base, and means for joining these.

[0003] ES 1071113 U describes a polystyrene filling as a means for lightening slabs.

[0004] This type of filling nevertheless has a problem in its manufacturing and storage, since a large volume of storage and transport is required due to its light weight. ES1067600 describes a caisson for slabs which, similar to the previous one, also comprises legs for spacing this from the floor.

[0005] ES 2089947 also describes the construction of slabs with strengthening concrete elements lightened by means of expanded polystyrene blocks.

[0006] ES 1069999 describes a part applicable to lightening concrete slabs, built in two halves that can be assembled together, which is able to be joined with other similar pieces along the surface of a slab, this part being made up of essentially square section bodies with tabs at each of the angles, separated from each other by means of intermediate furrows and in which the reinforcement is placed above and below the whole part on vertical plates arranged in diagonal directions of the square. This piece involves different disadvantages, and in particular the tensions in the directions other than the main ones may not be properly supported, through being a square-section piece. There is furthermore no lightening in the upper and lower parts at the level of the reinforcements, for which reason the cost in concrete will be greater without this meaning any advantage as regards the strength of the slab.

[0007] Apart from this, assembling the halves requires one of four precise assembly positions, as the square shape of the body has a quaternary axis of symmetry.

[0008] EP2474677 describes a disk for lightening weight which is formed of an oblate spheroidal body, with a central crown on the upper and lower sides, in which said central crown has divisions along its length. The crown laterally defines the support positions of the metal reinforcement. The support of the reinforcement nevertheless rests directly on the surface of the spheroidal

body, which means that the covering of the concrete-reinforcement assembly is significantly reduced in the support zone in the disk, jeopardising its durability and strength.

## Description of the invention

[0009] This invention proposes a lightening device for concrete slabs with a spheroidal shape and an element positioning the reinforcement, which is made in two identical halves which allow this to be assembled in practically any angular position or in a single piece, and which has ribs emerging from the positioning element which define a support for the reinforcement so that the concrete surrounds the rods appropriately without forfeiting any strength and durability. When these are two halves, this defines a hollow body after being assembled.

[0010] In a more detailed fashion, the filling and lightening body of the invention is provided with the following elements:

- A single body made by blow-moulding, or a pair of spheroidal half-bodies normally made by injection; the bodies of this pair of items will normally be identical.
- Means for joining the spheroidal bodies together in different angular positions, when the product is made in two half-bodies; this joining means could be of the mortise and tenon type, bayonet type or any joining means suitable for the purpose proposed;
- A set of external ribs for supporting the reinforcement; these external ribs for supporting the reinforcement can be elements emerging perpendicularly from the surface of the spheroidal body or consist of a fold or deformation of said surface;
- A set of strengthening ribs of the spheroidal body; said ribs can be interior, exterior or have an interior portion and an exterior portion; when placed on the inside, some of these ribs could be an extension of the support ribs;
- Upper and lower elements for positioning the reinforcements; according to one option these elements consist of upper and lower caps emerging from the spheroidal body; according to one option the caps have a concave spheroidal shape; according to another independent option compatible with the previous one, the caps are made up of a set of portions in the form of a circular sector, specifically four circular sectors; according to another option these elements consist of two continuous circular crowns; the positioning elements may also be formed of an extension of the ribs, for example by means of super-elevation of the end closest to the centre of the respective upper and lower portions of the filling body, understanding that said ribs could even extend beyond said super-elevation for aesthetic and/or construction reasons.

**[0011]** The ceiling or floor slab is assembled by placing the lower mesh and the lightening devices of the invention, at regular distances, in the gaps formed by its longitudinal and transversal rods, to form a matrix of rows and columns, also defining longitudinal and transversal spaces between them which will form the corresponding beams. The reinforcement rests on the support ribs. The central concavity is filled with concrete so that after the floor or ceiling slab has been made this has a continuous support in that zone over the entire surface area of said concavity.

#### Brief description of the drawings

**[0012]** In order to illustrate the following explanation we are enclosing seven sheets of drawings with this descriptive report, in which the essence of this invention is represented in fourteen figures as an example, and in which:

- Figure 1 shows an upper view of a filling and lightening body according to a first embodiment of this invention;
- Figure 2 shows a lateral view of the filling body of Figure 1;
- Figure 3 shows an upper view of a filling and lightening body according to a second embodiment of this invention;
- Figure 4 shows a cross-section view of the filling body of Figure 3;
- Figure 5 shows a lateral view of the filling body of Figures 3 and 4;
- Figure 6 shows a lateral view of the filling body of Figures 3 to 5, but turned through a certain angle in respect of the one seen in Figure 5;
- Figure 7 shows a detail of a cross-section of the filling body at one of the support ribs;
- Figure 8 shows a detail of a cross-section of the filling body at one of the support ribs according to a first embodiment option;
- Figure 9 shows a detail of a cross-section of the filling body at one of the support ribs according to a second embodiment option;
- Figure 10 shows a perspective view of the filling body according to a first form of embodiment, according to Figures 1 and 2;
- Figure 11 shows a perspective view of the filling body according to a second form of embodiment,

according to Figures 3 to 6,

- Figure 12 shows an upper view of the filling and lightening body according to a third form of embodiment in which the support ribs form a super-elevation in a central portion;
- Figure 13 shows a side view of the filling body in the form of embodiment of Figure 12; and
- Figure 14 shows a perspective view of the filling body according to the third form of embodiment of Figures 12 and 13.

**[0013]** The following reference numbers can be observed in these figures:

- 1 filling body
- 2 each of the two half-bodies of the filling body
- 3 support ribs
- 4 strengthening ribs
- 5 positioning element, according to a first embodiment, in the shape of a continuous crown
- 6 positioning element, according to a second embodiment, in the shape of circular sectors (portions in an essentially triangular shape, like cheese cut into wedges)
- 7 concavity of the positioning element
- 8 wedge, i.e. portion of the positioning element in a wedge-shape
- 31 solid section of the support ribs
- 32 angular section of the support ribs through deformation of the surface of the filling body
- 33 over-elevated portion of the support ribs

#### Detailed description of the forms of embodiment

**[0014]** This invention is described as a filling body (1), which has a spheroidal shape, normally with a substantially vertical (cylindrical) lateral portion, and a substantially horizontal upper portion, which is made up of two half-bodies (2), made by injection or blow-moulding of plastic material. The two half-bodies are preferably identical to each other and comprise means for joining one half-body to the other. Said joining means are evenly distributed at regular or irregular angular distances, and can alternate male elements with female elements, so that one half body can be joined to the other (2) in one of many relative angular positions. Without constituting any limitation, the means for joining the half-bodies (2) can be:

- A mortise and tenon join;
- Threaded portions;
- A bayonet closure;
- Press-fitting.

**[0015]** The upper surface (or lower surface, in the op-

posite half-body) of the half-body (2) is provided with a positioning element. In accordance with a first form of embodiment, a positioning element (5) in an annular or crown shape with a continuous height is placed in the horizontal portion of the lightening body (1), around the axis of symmetry in the upper (or lower) spheroidal cap. In this case, the annular crown leaves a substantially cylindrical hollow inside it which will be filled in with the concrete when this is poured into the corresponding form-work.

**[0016]** In accordance with a second form of embodiment the positioning element (6) is formed of a set of wedges (8), whose vertex is angled towards the axis of symmetry. These wedges have a concavity (7) with progressive depth until this blends with the surface in the zone close to the axis of symmetry. The curve of this concavity has the advantage of representing a strong support for the concrete, stronger towards the centre and less towards the periphery, and is reinforced by the spaces found between each pair of wedges (8).

**[0017]** On the surface of the filling body, in zones close to the positioning element (5, 6) there is a set of support ribs (3) in a radial position, which are placed in a super-elevated position in respect of the surface of the filling body (1). According to a first option (Figure 8) said ribs consist of two plates formed on the surface of said filling body (1); (31) is used to indicate the section according to said first option. According to a second option, which is shown in Figure 9, and indicated with (32), the ribs are formed by the deformation of the surface of said filling body (1) in an angular shape. The ribs have at least one substantially horizontal portion, whose upper edge is aligned with the base of the positioning element (5, 6), so that said positioning element (5,6) rises up in respect of the height of said support ribs (3).

**[0018]** Furthermore, to be able to minimise the amount of mass of the material used for making the filling body (1), a set of strengthening ribs (4) is used. These ribs, like the support ribs (3) can be made by forming a plate on the (interior or exterior) surface of the filling body (1), or by deformation of the surface of said filling body (1).

**[0019]** The strengthening ribs (4) can be defined as a continuation of the support ribs (3) and/or independently from these.

**[0020]** According to a third form of embodiment, a positioning element is defined with a super-elevated portion (33) of the support ribs (3) in the part of these closest to the centre. According to this form of embodiment, the structural rods will rest on the support ribs (3) set at a certain distance from the hollow body, which will allow these to be totally covered with concrete, and at the same time it will be the rib itself which will determine by means of its over-elevated portion (33) the limit or position that said rod will have to take prior to pouring the concrete. All of this also allows a flow of the mass of concrete also in the central parts of the hollow bodies.

**[0021]** The support ribs obviously also have a strengthening function.

**[0022]** The number of radial ribs is not under eight nor over twenty-four, variable depending on their length, with an optimum number of sixteen.

**[0023]** By using these filling bodies safer, cheaper and/or stronger structures than the ones described in the background can be obtained.

## Claims

1. A lightening filling body for concrete floor and ceiling slabs, this body being made up of a hollow piece which has a general configuration with spheroidal shape, with a perimeter portion and central upper and lower portions, also comprising a positioning element (5,6) formed in lower portion (5,6), **characterised by** also having:

- A positioning element (5,6) formed in the upper portion; and
- A set of spacing support ribs (3) for the metal reinforcements of the slab, which are arranged in a super-elevated position in respect of the surface of the filling body (1).

2. A lightening filling body for concrete floor and ceiling slabs, according to claim 1, characterised in that this is made up of two identical half-bodies (2), which are able to be joined together to define, after being assembled, a single hollow filling body (1).

3. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 2, **characterised in that** the perimeter portion has form the side substantially cylindrical shape, vertical in the usage position, and **in that** the upper and lower portions have substantially flat shape, which is horizontal in the usage position.

4. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 2, **characterised in that** this has a substantially spherical shape.

5. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 4, **characterised in that** the positioning elements (5, 6) formed in the upper and lower portions of the filling body also constitute spacing and centring elements for structural reinforcements.

6. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 5, **characterised in that** the support ribs (3) are formed as plates emerging from the surface of the filling body (1) placed in radial position, with a solid section (31).

7. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 5, **character-**

ised in that the support ribs (3) are formed as a deformation of the surface of the filling body (1) and are placed in a radial position, with an angular section (32).

8. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 6 to 7, **characterised in that** the support ribs (3) have at least one substantially horizontal portion, whose upper edge is aligned with the base of the positioning element (5, 6), so that said positioning elements (5, 6) emerges in respect of the height of said support ribs (3). 5
9. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 8, **characterised in that** the number of radial support ribs (3) is equal or over eight. 10
10. A lightening filling body for concrete floor and ceiling slabs, according to claims 9, **characterised in that** the number of radial support ribs (3) is equal or over twenty- four. 15
11. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 9 to 10, **characterised in that** the number of radial support ribs (3) is sixteen. 20
12. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (5) is formed of a perimeter crown with continuous height. 25
13. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (6) is formed of a set of wedges (8) with a circular sector shape. 30
14. A lightening filling body for concrete floor and ceiling slabs, according to claim 13, **characterised in that** the positioning body (6) has a concavity (7), with progressive depth until this blends with the surface in the zone close to the axis of symmetry. 35
15. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (6) is formed of a set of super- elevated wedges (33) of the support ribs (3) at the end closest to the centre of the upper and lower portions respectively, of said body. 40

#### Amended claims under Art. 19.1 PCT

1. A lightening filling body for concrete floor and ceiling slabs, this body being made up of a hollow piece which has a general configuration with spheroidal shape, with a perimeter portion and central upper 45

and lower portions, also comprising a positioning element (5,6) formed in lower portion (5,6), **characterised by** also having:

- a positioning element (5,6) formed in the upper portion; and
- a set of spacing support ribs (3) for the metal reinforcements of the slab, which are arranged in a super-elevated position in respect of the surface of the filling body (1).

2. A lightening filling body for concrete floor and ceiling slabs, according to claim 1, **characterised in that** this is made up of two identical half-bodies (2), which are able to be joined together to define, after being assembled, a single hollow filling body (1).

3. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 2, **characterised in that** the perimeter portion has from the side a substantially cylindrical shape, vertical in the usage position, and **in that** the upper and lower portions have a substantially flat shape, which is horizontal in the usage position.

4. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 2, **characterised in that** this has a substantially spherical shape.

5. A lightening filling body for concrete floor and ceiling slabs, according to one of claims 1 to 4, **characterised in that** the positioning elements (5,6) formed in the upper and lower portions of the filling body also constitute spacing and centring elements for the structural reinforcements.

6. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 5, **characterised in that** the support ribs (3) are formed as plates emerging from the surface of the filling body (1) placed in radial position, with a solid section (31).

7. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 5, **characterised in that** the support ribs (3) are formed as a deformation of the surface of the filling body (1) and are placed in a radial position, with an angular section (32).

8. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 6 to 7, **characterised in that** the support ribs (3) have at least one substantially horizontal portion, whose upper edge is aligned with the base of the positioning element (5,6), so that said positioning element (5,6) emerges in respect of the height of said support ribs (3).

9. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 8, **characterised in that** the number of radial support ribs (3) is equal or over eight.

5

10. A lightening filling body for concrete floor and ceiling slabs, according to claim 9, **characterised in that** the number of radial support ribs (3) is equal or over twenty-four.

10

11. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 9 to 10, **characterised in that** the number of radial support ribs (3) is sixteen.

15

12. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (5) is formed of a perimeter crown with continuous height.

20

13. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (6) is formed of a set of wedges (8) with a circular sector shape.

25

14. A lightening filling body for concrete floor and ceiling slabs, according to claim 13, **characterised in that** the positioning body (6) has a concavity (7), with progressive depth until this blends with the surface in the zone close to the axis of symmetry.

30

15. A lightening filling body for concrete floor and ceiling slabs, according to any of claims 1 to 11, **characterised in that** the positioning body (6) is formed of a set of super-elevated wedges (33) of the support ribs (3) at the end closest to the centre of the upper and lower portions respectively, of said body.

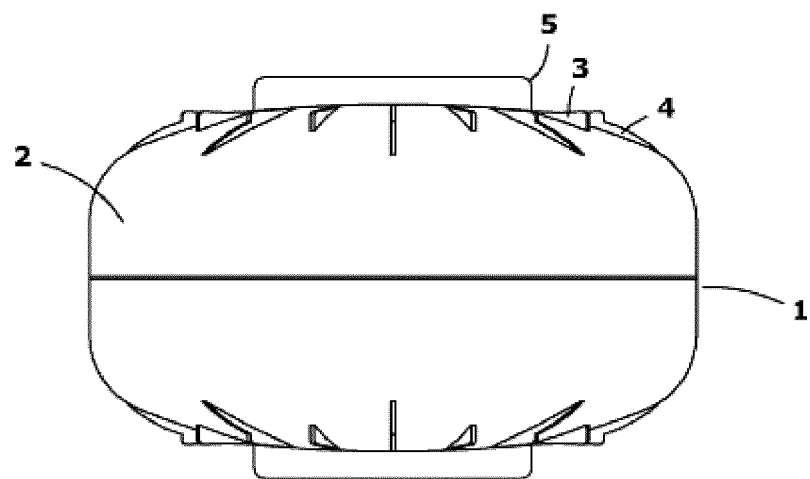
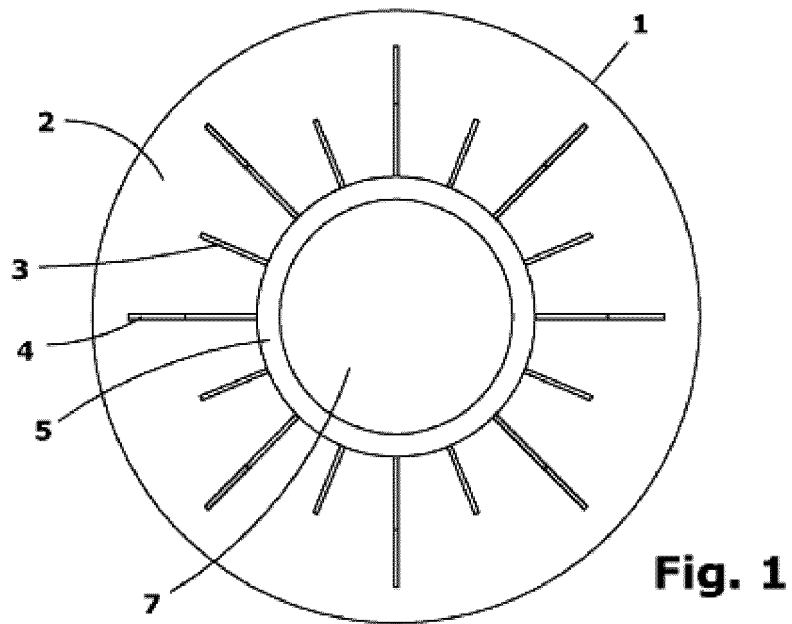
35

40

45

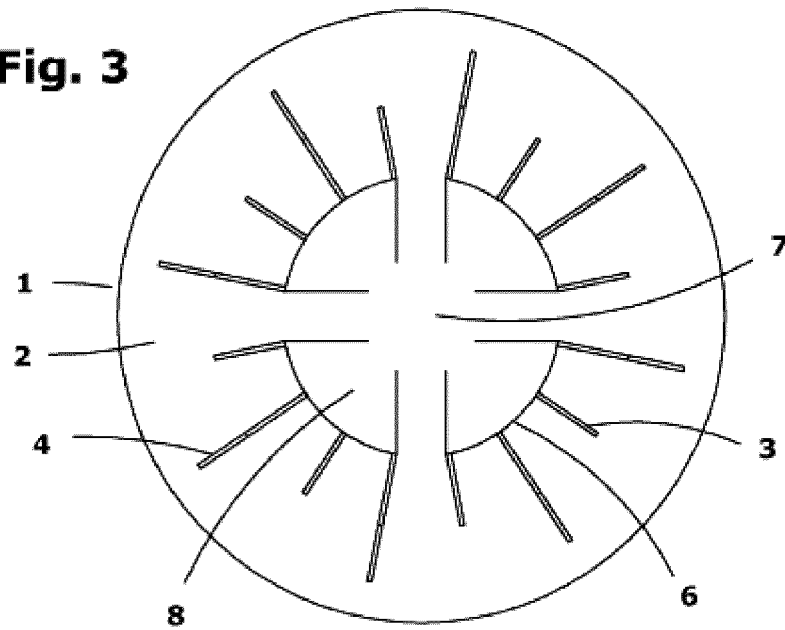
50

55

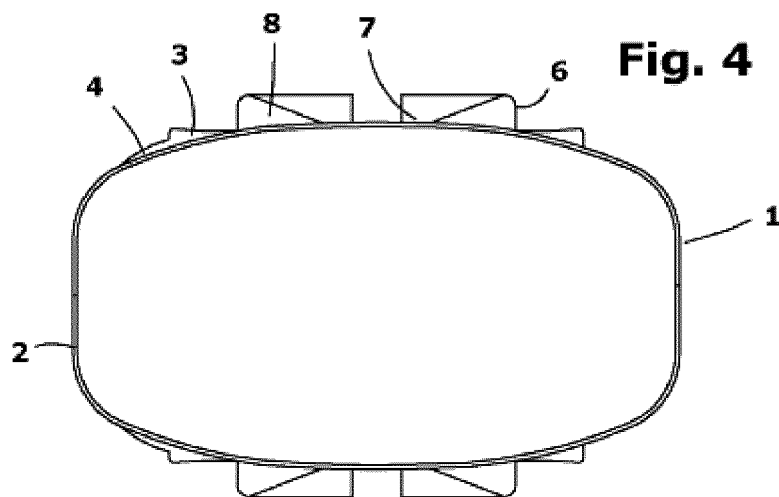


**Fig. 2**

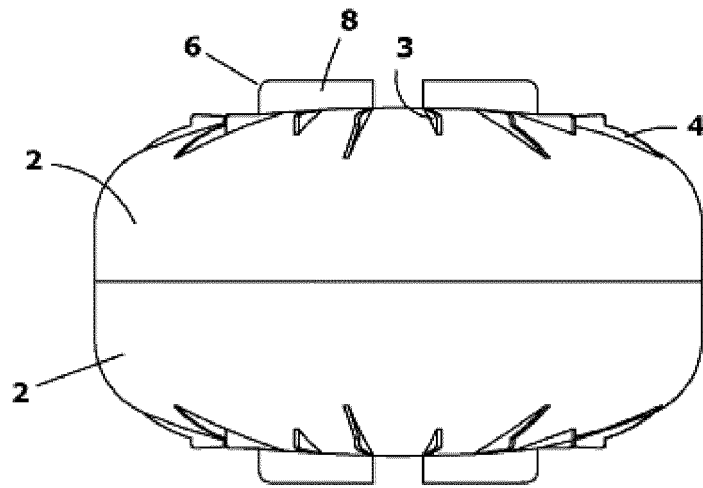
**Fig. 3**



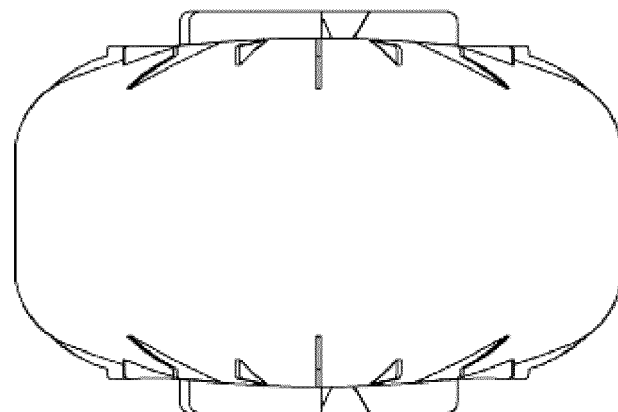
**Fig. 4**



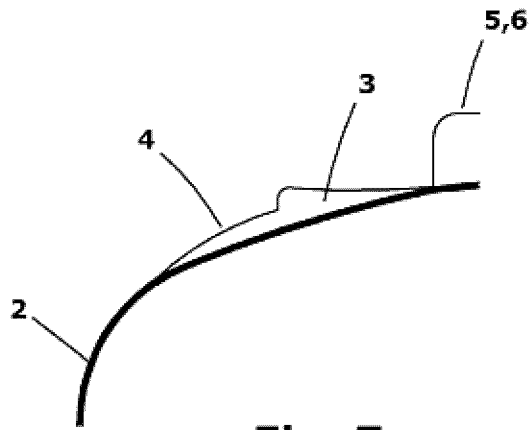




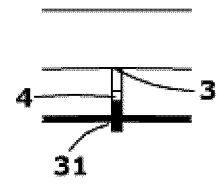
**Fig. 5**



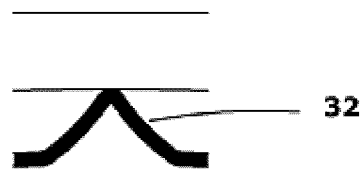
**Fig. 6**



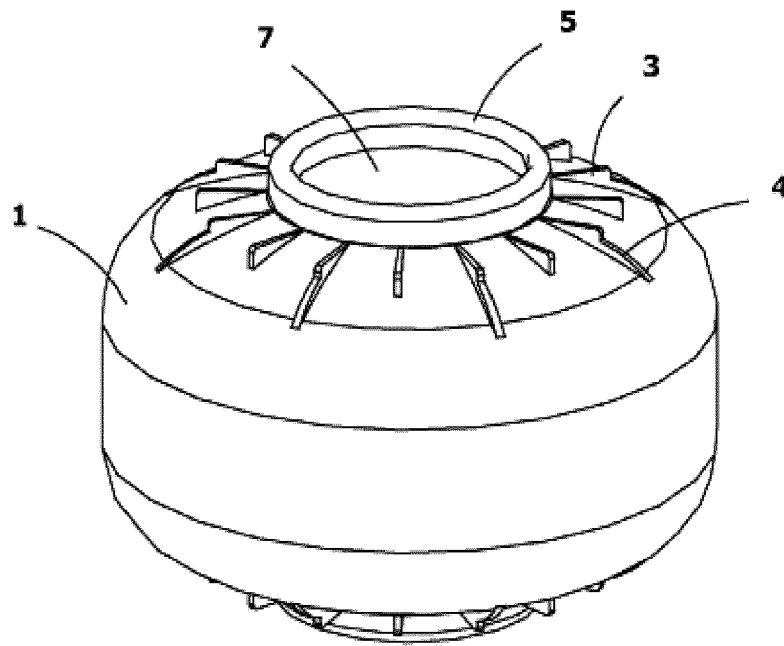
**Fig. 7**



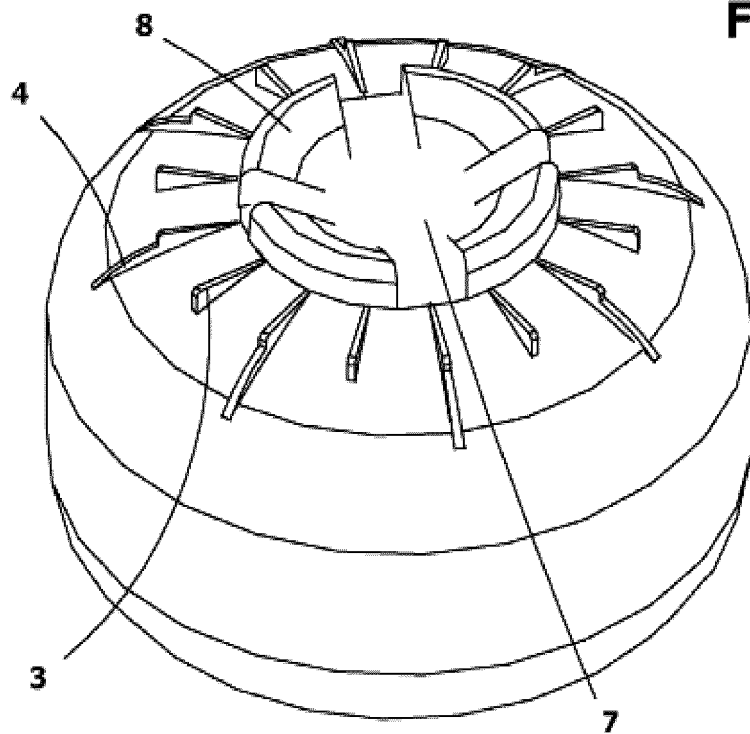
**Fig. 8**



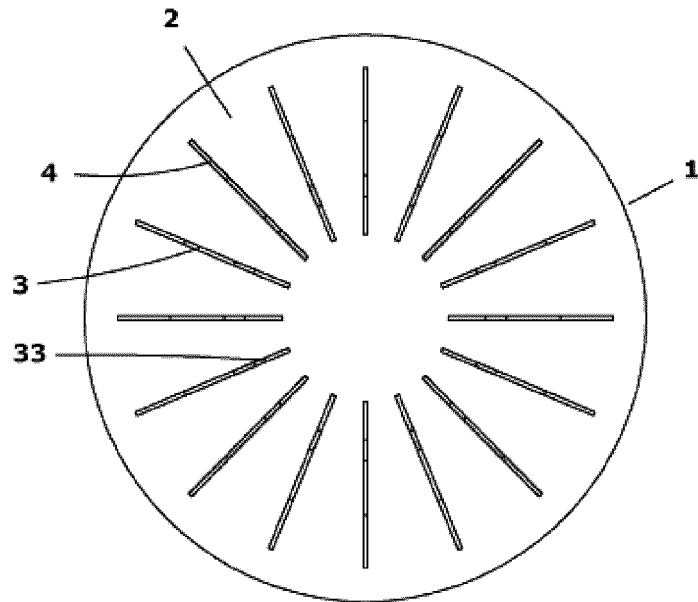
**Fig. 9**



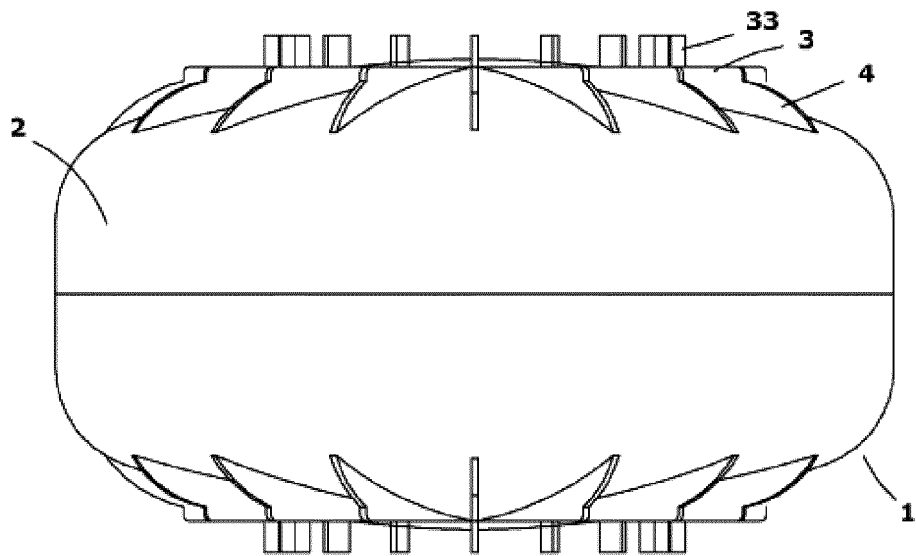
**Fig. 10**



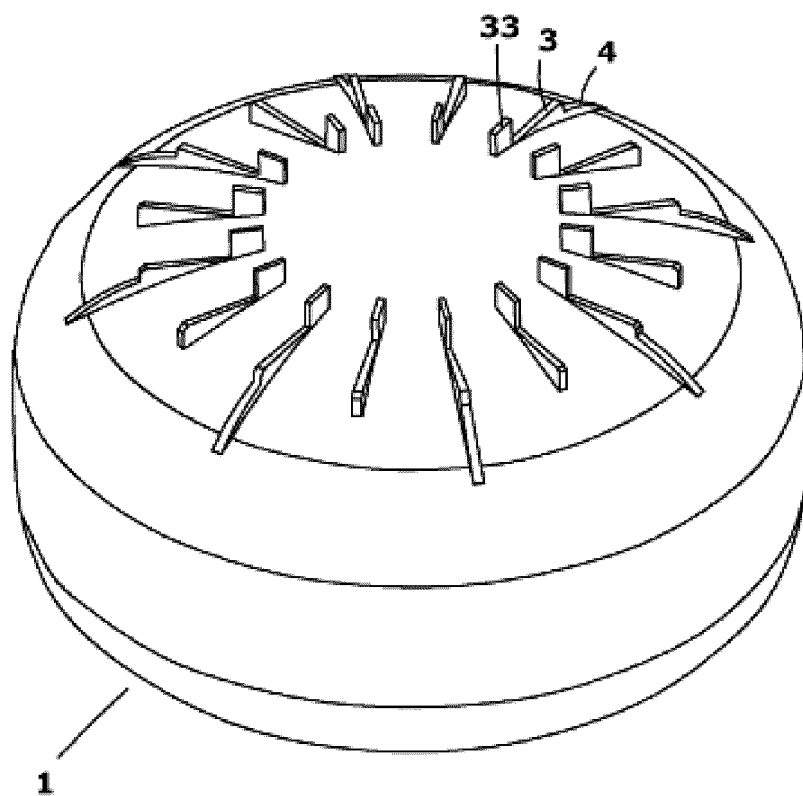
**Fig. 11**



**Fig. 12**



**Fig. 13**



**Fig. 14**

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ES2015/070227

## A. CLASSIFICATION OF SUBJECT MATTER

**E04B5/32** (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)

**E04B**

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, INVENES**

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 101036580B B1 (SHIN HWA ENGINEERING CO LTD) 25/05/2011, (abstract). [on line] [retrieved the 16/06/2015]. Retrieved from: EPODOC/EPO Database; figures 1-1b.	1,2,4,12
A	US 2012311959 A1 (MIEDZIK GEORG ET AL.) 13/12/2012, abstract; paragraphs [0034]-[0037]; claims 1,5-19,24; figures.	1
A	KR 100875697B B1 (BANSEOK TOP BASE CO LTD ET AL.) 23/12/2008, figures 1-8.	1-5
A	EP 2474677 A2 (LEVINTON RICARDO HORACIO ET AL.) 11/07/2012, figures 1-4, 17-28	1,5,13
A	WO 9964696 A1 (SCHOELLER PLAST IND GMBH ET AL.) 16/12/1999, abstract; figures 3,4.	1,2,4

☒ 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 document 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 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  
**30/06/2015**

Date of mailing of the international search report  
**(13/07/2015)**

Name and mailing address of the ISA/

Authorized officer  
M. Sánchez Robles

OFICINA ESPAÑOLA DE PATENTES Y MARCAS  
Paseo de la Castellana, 75 - 28071 Madrid (España)  
Facsimile No.: 91 349 53 04

Telephone No. 91 3495431

Form PCT/ISA/210 (second sheet) (July 2009)

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ES2015/070227

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2009027628 A1 (MASSEY CHRISTOPHER JON) 05/03/2009, page 3, line 28-page 5, línea27; figures 1-5.	1,2,6
A	ES 1069999U U (DE MAS CARAL JORGE ET AL.) 01/06/2009, page 4, lines 23-26, 33-53; figures.	1,2,6

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

# EP 3 173 542 A1

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2015/070227

Information on patent family members

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
KR101036580B B1	25.05.2011	NONE	
KR100875697B B1	23.12.2008	WO2010018989 A2 WO2010018989 A3	18.02.2010 24.06.2010
ES1069999U U	01.06.2009	ES1069999Y Y	06.10.2009
US2012311959 A1	13.12.2012	PT2516763E E TW201130626 A RU2012130934 A RU2546698 C2 SG181813 A1 US9038352 B2 CN102812189 A CN102812189B B KR20120096105 A EP2516763 A1 EP2516763 B1 WO2011075856 A1 EP2336445 A1	27.02.2014 16.09.2011 27.01.2014 10.04.2015 30.07.2012 26.05.2015 05.12.2012 20.05.2015 29.08.2012 31.10.2012 27.11.2013 30.06.2011 22.06.2011
WO9964696 A1	16.12.1999	EP1086281 A1 EP1086281 B1 WO9964693 A1 WO9964693 A9 AU4607199 A AU4510599 A	28.03.2001 07.09.2005 16.12.1999 10.02.2000 30.12.1999 30.12.1999
WO2009027628 A1	05.03.2009	NONE	
EP2474677 A2	11.07.2012	ES2446326T T3 US2012200004 A1 WO2011050487 A2 WO2011050487 A3 AR073837 A1 UY32946 A	07.03.2014 09.08.2012 05.05.2011 11.08.2011 09.12.2010 30.11.2010

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



**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- ES 2192454 [0002]
- ES 1071113 U [0003]
- ES 1067600 [0004]
- ES 2089947 [0005]
- ES 1069999 [0006]
- EP 2474677 A [0008]