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(71) Applicant: **S.I.E.-SOCIEDADE INTERNACIONAL DE EMBALAGENS, S.A.**
**2400-019 Leiria (PT)**

(72) Inventors:
- **FREIRE FALCÃO TELES CARAMELO, Daniel**
**1700-141 LISBOA (PT)**
- **QUITÉRIO GARCIA CARVALHO, Agostinho Miguel**
**2400-842 LEIRIA (PT)**

(74) Representative: **CSY London**
**10 Fetter Lane**
**London EC4A 1BR (GB)**

# (54) SIGNALLING AND BARRIER SYSTEM AND PROCESS OF HANDLING THEREOF

(57) The present invention refers to a signalling and barrier system, such as for traffic regulation, comprising a plurality of modules (1) adapted so that can collect a ballast means and that can be connected laterally to each other, said modules (1) presenting a base (11) and a top part (12).

The present invention further refers to a process of handling of said signalling and barrier system.

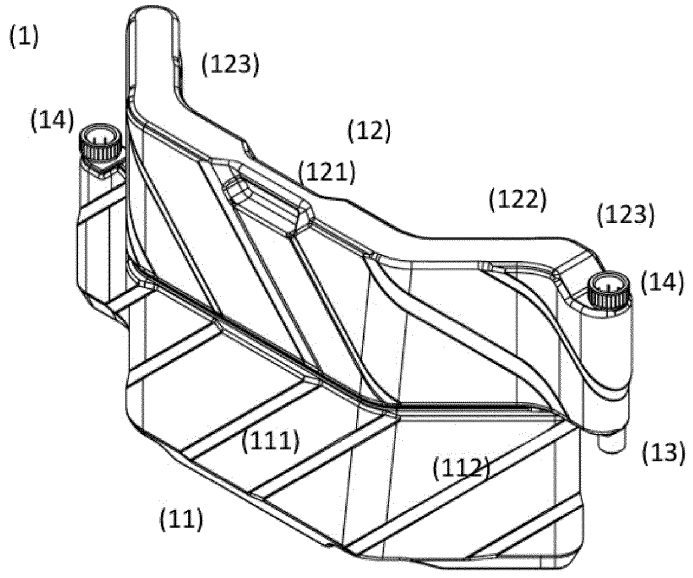


**FIGURE 1**

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## Description

### Field of the invention

**[0001]** The present invention refers to the field of the signalling and barrier systems, such as for example for regulation of road traffic, of alignments of circulation ways and barriers of particular zones in the traffic way, comprising a plurality of modules, in particular in the form of signalling blocks, and similar devices.

**[0002]** The present invention further refers to a process of handling of said signalling and barrier system.

### Background of the invention

**[0003]** The prior art includes different solutions of traffic signalling devices of blocks type in general, also known as "jerseys", and devices of type signalling blocks and circulation ways, provided so that can be simply placed upon the pavement, without retention or fixation thereto.

**[0004]** Considering that it is desirable that such blocks present a minimum height that renders them substantially visible by incoming traffic, one of the problems associated with this type of devices is therefore a respective stability standing and, function thereof, weight and volume.

**[0005]** In this context, it is known to produce this type of devices in synthetic material and confining an interior space.

**[0006]** Document US 5,836,714 discloses a control barrier system comprising a module of block type adapted so that can be retained laterally with neighbouring blocks thereby forming a substantially continuous succession that extends along a barrier direction. Said module extends along a direction and presents a lateral section with a shape of triangular type, with a posterior wall developing along a generally vertical direction and a frontal wall developing along a generally oblique direction. According to a preferred embodiment, said module is provided so that the posterior and frontal faces can be collapsed, thereby reducing the occupied volume to the thickness of said posterior and frontal faces.

**[0007]** Document US 6, 086, 285 also discloses a control barrier system that comprises a barrier module defining a chamber for ballast. In particular, said frontal and posterior faces are adapted so that the modules can be disposed with same directly opposing front faces, thereby completely occupying a cubic-type volume.

**[0008]** Document US 6,669,402 B1 discloses a protection barrier system for absorbing impact of similar type. Said barrier module presents engagement means developing along most part of the height of module of respective lateral edges, in particular engagement means that include a projection-like element on one side and a cavity-like element configured in corresponding manner on the other side.

**[0009]** Document EP 2393986 B1 discloses a protection barrier with water ballast that comprises modules adapted so that can be laterally retained by a plurality of engagement points along the height, and so that provide that any two neighbouring modules can be arranged at an angle. Moreover, according to an embodiment, two of said substantially similar modules can also be disposed one on top of the other.

**[0010]** Document US 9,016,668 B1 also discloses a barrier whereby any two substantially similar modules can be vertically stacked and present a connecting element.

**[0011]** Document WO 2015/ 135044 A1 discloses a barrier that comprises barrier modules presenting an open base and frontal and posterior walls that narrow from the base towards the top and thereby enable the modules to be stored by successively stacking ones within the others.

**[0012]** Document US 9,677,233 B2 discloses a barrier system of the type of the present invention, wherein each barrier module presents generally vertical frontal and posterior walls, so that confines a substantially parallelepiped volume for collecting ballast means.

**[0013]** Document EP 1865111 A1 discloses a pedestrian or traffic barrier that comprises a panel curved in opposing edge regions each one of which having an engagement foot on the pavement whereas another foot extends obliquely from an opposite face of panel. Said barrier presents a plurality of crossing openings in the central and lateral regions, and does not confine a collection space for ballast means.

**[0014]** Document US 5,993,103 discloses a control barrier with one or two support legs arranged on the lateral face so that can be rotated between a closed position where they are clapped down, and an open position where they form a "U" when seen in top view, thereby providing a stable standing placement configuration.

**[0015]** There is, therefore, the need for a traffic signalling and barrier system that comprises modules presenting a smaller volume per linear meter of barrier extension, and that provides a simpler handling of said system.

### General description of the invention

**[0016]** The objective of the present invention is to provide a traffic signalling and barrier system, for example roadway traffic, comprising a plurality of modules adapted so that can contain a ballast means and that can be successively laterally engaged with each other, and wherein each module presents a smaller volume per linear metre of extension of barrier, simultaneously providing structural stability, and a more efficient handling.

**[0017]** The objective above is solved according to the present invention by means of a traffic signalling system according to claim 1.

**[0018]** In particular, said objective is solved by means of a system whereby each module presents a central region with a cross-section that when seen in side view, presents a different shape and a different dimension than the cross-section of the lateral regions when seen in side view.

**[0019]** It is preferred when each module presents a central part that develops in a first direction and two lateral parts that develop as a continuation of each one of the lateral portions of said central region, in a second direction, backwards along a shape angle of acute shape.

**[0020]** It is particularly preferred when said angle is of at least 30° and at most 70° with relation to said first direction, so that said module presents a general shape of "U" type when seen in top view.

**[0021]** It is preferred when said modules present said central and lateral parts provided as a single piece and confining a single interior space adapted for collecting a ballast means.

**[0022]** It is preferred when said modules present a total extension in a barrier alignment direction, of at least 1 m and at most 1,5 m, preferentially an extension of 1,2 m, so that best occupy the space provided by a standard pallet.

**[0023]** It is preferred when said modules present a height of at least 50 cm, preferentially at most 1,5 m, preferentially at most 1,0 m.

**[0024]** A related objective of the present invention is that of providing a more ergonomic process of installation of a traffic signalling and barrier system.

**[0025]** The aforementioned objective is solved according to the present invention by means of a process according to claim 14.

## Description of the Figures

**[0026]** The present invention shall be explained hereinafter with greater detail based upon the preferred embodiments and upon the attached Figures.

**[0027]** The Figures shows, in simplified schematic representations:

Figure 1: Perspective view of an embodiment of module (1) of a system according to the present invention;

Figure 2: front view of said embodiment of module (1) in a standing position;

Figure 3: perspective view of a plurality of modules (1) according to the invention, disposed in adjacent manner in a standing position upon a standard pallet;

Figure 4: top views of said embodiment of module (1) according to the invention;

Figure 5: side (of the right-hand side) and cut views (AA) according to Figure 4, of a module (1) according to the invention;

Figure 6: cut (BB) (of the right-hand side) and curt views (CC) according to Figure 4, of module (1) according to the invention;

Figure 7: top view of a plurality of modules (1) disposed as represented in Figure 3;

Figure 8: cut view (DD) according to Figure 7;

Figure 9: side view of a plurality of modules (1) arranged as represented in Figure 3;

Figure 10: frontal view of a plurality of modules (1) disposed as represented in Figure 3.

## Description of a preferred embodiment of the invention

**[0028]** **Figures 1** and **2** represent views of an embodiment of a module (1) of a traffic signalling and barrier system according to the present invention.

**[0029]** Said module (1) presents a central region (111, 121) developing along a first direction and with a frontal wall and a posterior wall developing from the base region, and further presents module connection means (13, 14) adapted so that provide removable connection with laterally arranged neighbouring modules (1).

**[0030]** According to a first inventive aspect, said module (1) further presents two lateral regions (112, 122; 113, 123) that develop laterally in a second posterior direction and forming an acute shape angle ($\alpha$) with relation to said central region (111, 121).

**[0031]** It is preferred when said module (1) presents a central region (111, 121) that corresponds to at least half, preferentially more than half of the total extension of said module (1) along said first direction.

**[0032]** It is further preferred when said module (1) presents a central region (1) and lateral regions (112, 122; 113, 123) developing in different directions, and said central and lateral regions confine a common collection space adapted so that can collect a ballast means inside thereof.

**[0033]** This disposition of said lateral regions (112, 122; 113, 123) advantageously provides a smaller construction volumetric with better sustentation of the module (1), for a given length of barrier provided by the same, while simultaneously providing the possibility of disposing a plurality of modules (1) with smaller storage occupation volume, as represented in **Figure 3.**

**[0034]** As can be observed in **Figures 4**, **5** and **6**, these advantages are reinforced when said module (1) presents frontal and posterior walls that develop along oblique directions with relation to the direction of the gravity force in said central region (111, 121) and that develop at least approximately parallel to the direction of the gravity force on said lateral regions (112, 122; 113, 123).

**[0035]** As can be further observed in **Figure 4**, said shape angle ($\alpha$), corresponding to the smaller angle formed by a central plane of said lateral regions (112, 122; 113, 123) and a central plane of said central region (111, 121) of module (1), is comprised between 10° and 80°, preferentially between 30° and 60°.

**[0036]** In fact, this interval of angle of said lateral regions (112, 122; 113, 123) reveals as particularly advantageous for the configuration of the module (1) both in terms of sustention reliability, as in terms of simplicity and reduction of the volume of stacked storage.

**[0037]** As can be further observed in **Figure 5**, it is further preferred when said module (1) presents, on said central region (111, 121), a lateral section of generally trapezoidal shape when seen in side view, whereby respective base regions present a width D1, D2) smaller than half, preferentially smaller than a quarter of the length (L1, L2), and are bigger, preferentially at most two times bigger than respective top regions.

**[0038]** According to a preferred embodiment, each module (1) presents a base part (11) and a top part (12) that extend along the extension of module in said first direction, and are provided as at least one of: in a single piece that confines a single interior space and presenting a single entry of ballast means and a fluid communication between said base (11) and top parts (12), and in two separate pieces that confine two interior spaces provided with respective entries of ballast means.

**[0039]** In particular, said module (1) can comprise a base part (11) presenting a base region (111) adapted so that can be placed upon the pavement, and a top region (112), and a top part (12) presenting a base region (121) and with a width that corresponds at least approximately to the width of the top region (112) of said base part (11), whereby said base (11) and top parts (12) are provided as different parts.

**[0040]** It is preferred when said entries of ballast means are adapted so that can be closed by said module connection means (14), in particular by the cavity element (14).

**[0041]** The ballast means preferentially used in the module (1) according to the present invention shall be a fluid means, such as for example a liquid such as water.

**[0042]** As can be easily derived from the Figures, the traffic system of barrier type according to the present invention comprises a plurality of modules (1) that can be retained ones in the others in removable manner by means of said module connection means (13, 14) provided in opposing lateral edge parts of said module (1), whereby one of said lateral edge parts is provided on said base part (11) and the other lateral edge part is provided on said top part (12), and whereby presents a downwards-oriented tooth element (13) on one of the lateral edge parts, and presents a upwards-oriented cavity element (14) on the other lateral edge part, at a height and configured in corresponding manner to said tooth element (13), in a manner of male-female type connection.

**[0043]** According to a preferred embodiment, said module connection means (13, 14) present cavity elements (14) configured as lids of openings adapted for filling of the space confined inside with a ballast means, whereby said lids further preferentially presents a mechanic engagement, for example of screw thread type or similar, for removable retention of cavity elements (14) in respective openings.

**[0044]** It is further preferred when said modules connection means (13, 14) are provided in the opposing lateral edge regions of said base (11) and top parts (12) that develop along an alignment similar to the one of said central region (11, 12), including a lateral edge region of said base part (11), whereby in this case includes a cavity element (14), and on a lateral edge region of the opposite lateral region of said top part (12), whereby in this case includes a cavity element (14) and a tooth element (13), whereby said tooth element (13) and cavity element (14) present an engagement shape of tubular type with a cross-section of circular shape.

**[0045]** As can be further observed in **Figures 7** and **10**, the modules (1) according to the present invention are configured so that provide the placement of 5 modules on a pallet of standard dimensions, for example placed standing ones next to the others and with alternating orientations of respective base and top parts.

**[0046]** It is preferred when said module (1) presents respective frontal and posterior walls that develop along similar and symmetric direction relative to a central plane of said central region (11, 12) and lateral regions (112, 122; 113, 123), configured so that a plurality of modules (1) can be disposed adjacently, for example piled up ones upon the others, in dispositions with respective base and top regions successively alternated.

**[0047]** It is further preferred when said module (1) is produced in a synthetic material by means of plastic extrusion method.

**[0048]** A process according to the present invention of storing modules (1) therefore comprises the steps of providing a first module (1) disposed standing upon a base region, or lying on the posterior wall of respective central region and with respective edge regions oriented upwards, and afterwards providing a second module (1) adjacent on the side of said first module (1) and disposed standing upon a top region, or lying on the posterior wall of respective central region and with respective edge regions oriented upwards.

**[0049]** These steps can be successively repeated with additional modules (1).

**[0050]** A process according to the present invention of disposing a plurality of modules in a traffic barrier alignment includes connecting two modules (1) disposed successively along a barrier alignment by means of engagement of a tooth element (13) provided on a second lateral edge of a first module (1) inside of a lid element (14) provided in a first lateral edge of a second module (1) .

**[0051]** It is preferred when the process further includes filling the interior of a first module (1) with a ballast means, for example water, after removing said lid element (14) provided in a lateral edge of module (1).

**[0052]** After use of the barrier system in a given barrier disposition, the process can include emptying the interior of a first module (1) from respective ballast means, after removing at least one of lid elements (14) provided in a

first and second lateral edge of said module (1).

## Claims

1. **System** for providing signalling and barrier functions, such as for regulation of road traffic, comprising a plurality of modules (1) adapted so that can be engaged with each other in respective lateral edge regions, each module (1) presenting:

   - a central region (111, 121) developing in a first direction and with a front wall and a back wall developing upwards from the base region adapted for placement on the pavement,
   - two lateral regions (112, 122; 113, 123) that develop outwards from the opposite lateral edges of said central region, in a second direction, backwards and forming a shape angle ($\alpha$) non-orthogonal in relation to said central region (111, 121),

   whereby said central region (111, 121) and lateral regions (112, 122; 113, 123) are provided as a single piece and where the front and back walls are devoid of through openings,
   **characterized**
   **in that** said module (1) presents a central region (111, 121) with a cross-section when seen in side view, of different shape and different dimension from the cross-section of the lateral regions (112, 122; 113, 123) when seen in side view.

2. System according to claim 1, **characterized in that** said module (1) presents front and back wall that develop in oblique direction in relation to the direction of the gravity force in said central region (111, 121) and that develop at least approximately parallel to the gravity direction in said lateral regions (112, 122; 113, 123).

3. System according to claim 1 or 2, **characterized in that** said module (1) presents, in said central region (111, 121), a lateral cross-section of generally trapezoidal shape when seen in side view, whereby respective base regions present a width (D1, D2) that is smaller than half, preferentially smaller than a quarter of the length (L1, L2), and are bigger, preferentially at most two times bigger than respective top regions.

4. System according to any one of claims 1 to 3, **characterized**
   **in that** said module (1) presents a central region (111, 121) that corresponds to at least half, preferentially to more than half of the total extension of said module (1) along said first direction, and
   **in that** the transition regions between said central region (111, 121) and said lateral regions (112, 122; 113, 123) develop at least approximately in curve, devoid of sharp edges between plane surfaces.

5. System according to any one of claims 1 to 4, **characterized**
   **in that** said module (1) presents a central region (111, 121) and lateral regions (112, 122; 113, 123) that confine a common collection space adapted so that can collect a ballast means inside thereof.

6. System according to any one of previous claims 1 to 5, **characterized**
   **in that** said shape angle ($\alpha$), corresponding to the smaller angle formed by a central plane of said lateral regions (112, 122; 113, 123) and a central plane of said central region (111, 121) of module (1), is comprised between 10° and 80°, preferentially between 30° and 60°.

7. System according to any one of previous claims 1 to 6, **characterized**
   **in that** said module (1) presents a base part (11) and a top part (12) that extend along the extension of module in a first direction, and are provided as at least one of:

   - a single piece that confines a single interior space and presenting a single entry by means of ballast and fluid communication between said base (11) and top parts (12),
   - in two separate pieces that confine two interior spaces provided with respective entries of ballast means,

   whereby said entries of ballast means are adapted so that can be closed by said module connection means (14), in particular by said cavity element (14).

8. System according to any one of previous claims 1 to 7, **characterized**
   **in that** said module (1) further comprises module connection means (13, 14) adapted so that provide removable connection with laterally disposed neighbouring modules (1), and
   **in that** said module connection means (13, 14) are provided on opposite lateral edge parts of said module (1),
   whereby one of said lateral edge parts is provided on said base part (11) and the other lateral edge part is provided on said top part (12), and
   whereby one of said lateral edge parts presents a downwards-oriented tooth element (13), and the other lateral edge part presents an upwards-oriented cavity element (14), at a height and configured in corresponding manner to said tooth element (13), in a manner of male-female type connection.

**9.** System according to claim 8, **characterized in that** said module connection means (13, 14) present cavity elements (14) configured as lids of openings adapted for providing filling of the space confined inside with ballast means, whereby said lids preferentially further present a mechanic engagement, for example of screw thread type or similar, for removable retention of the cavity elements (14) in respective openings.

**10.** System according to any one of previous claims, **characterized in that** said module connection means (13, 14) are provided in opposite lateral edge regions of said base (11) and top parts (12) that develop in an alignment similar to that of said central region (11, 12), including a lateral edge region of the lateral region of said base part (11), whereby in this case includes a cavity element (14), and on a lateral edge region of the opposite lateral region of said top part (12), whereby in this case includes a cavity element (14) and a tooth element (13), whereby said tooth element (13) and cavity element (14) present an engagement shape of tubular type with a cross-section for example of circular shape.

**11.** System according to any one of previous claims, **characterized in that** said module (1) presents:

- a base part (11) presenting a base region (111) adapted so that can be placed upon the pavement, and a top region (112), and
- a top part (12) presenting a base region (121) and with a width that corresponds at least approximately to the width of the top region (112) of said base part (11),

whereby said base (11) and top parts (12) are provided as different pieces.

**12.** System according to any one of previous claims, **characterized in that** said module (1) presents respective frontal and posterior walls that develop along directions that are similar and symmetric with relation to a central plane of said central region (11, 12) and lateral regions (112, 122; 113, 123), configured so that a plurality of modules (1) can be disposed adjacently to each other, for example with ones stacked upon the others, in dispositions with respective base and top regions successively alternated.

**13.** System according to any one of previous claims, **characterized in that** said module (1) is produced in a synthetic material, preferentially by means of a plastic extraction method or by a similar method.

**14. Process** of handling of a barrier and signalling system, in particular of a system according to any one of claims 1 to 13, said process being **characterized in that** comprises the following steps:

- providing a first module (1) disposed standing upon a base region thereof, or laying upon the back wall of the central region thereof and with respective edge regions oriented upwards;
- providing a second module (1) adjacently next to said first module (1) and standing upon a top region thereof, or laying upon the back wall of central region thereof and with respective edge regions oriented upwards, respectively in alternated manner respective to said first module (1),
- optionally, repeating at least one of previous steps with additional modules (1).

**15.** Process according to claim 14, **characterized in that** includes the step:

- connecting two modules (1) arranged successively along a barrier alignment by means of engagement of a tooth element (13) provided on a second lateral edge of a first module (1) inside of a lid element (14) provided on a first lateral edge of a second module (1);
- optionally, repeating the previous step with additional modules (1),

and preferentially, further includes the steps:

- filling the interior of a first module (1) with a ballast means, for example water, after removing the lid element (14) provided on a second lateral edge of module (1);
- emptying the interior of a first module (1) of respective ballast means, after removing at least one of the lid elements (14) provided on a first and on a second lateral edge of said module (1).

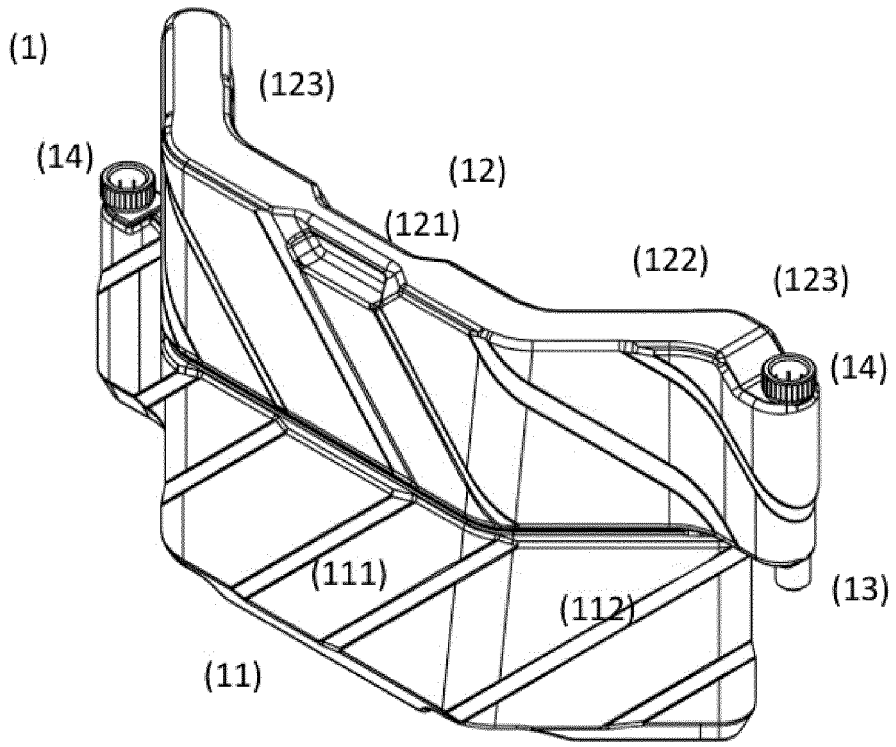


FIGURE 1

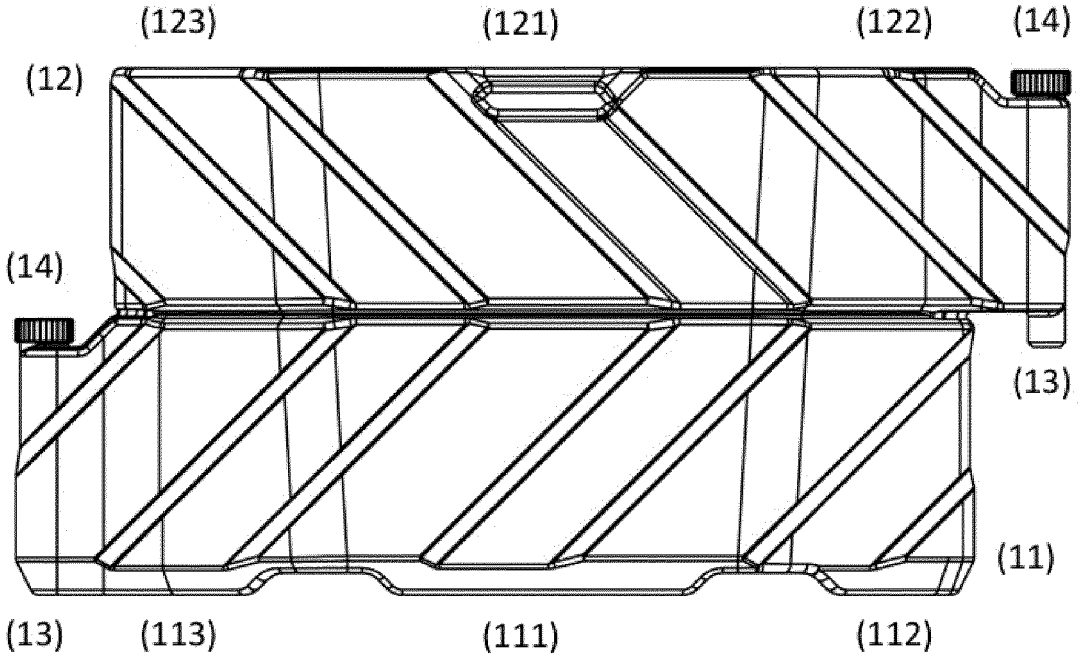


FIGURE 2

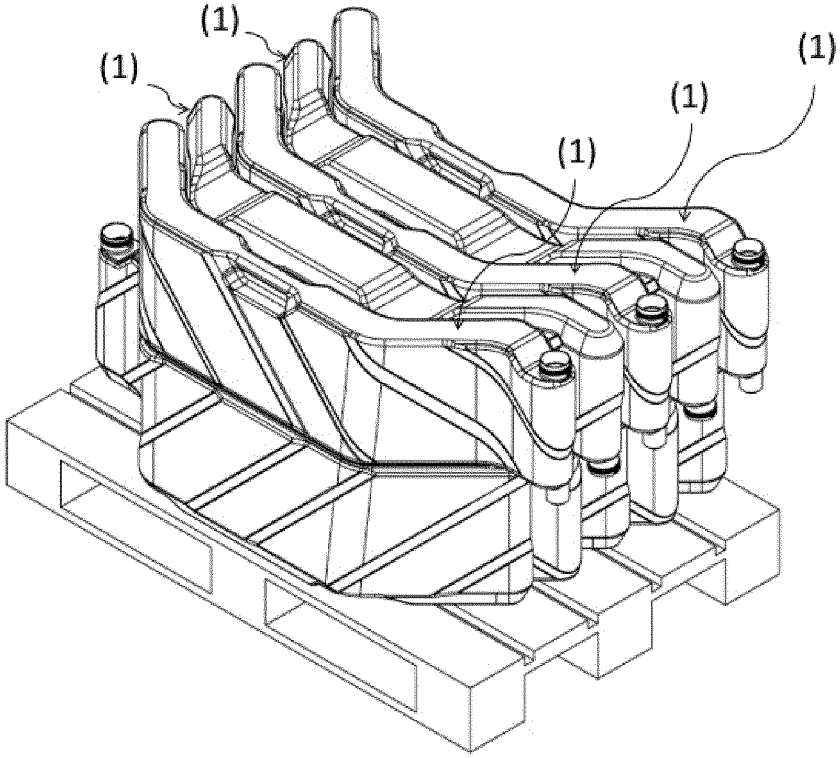


FIGURE 3

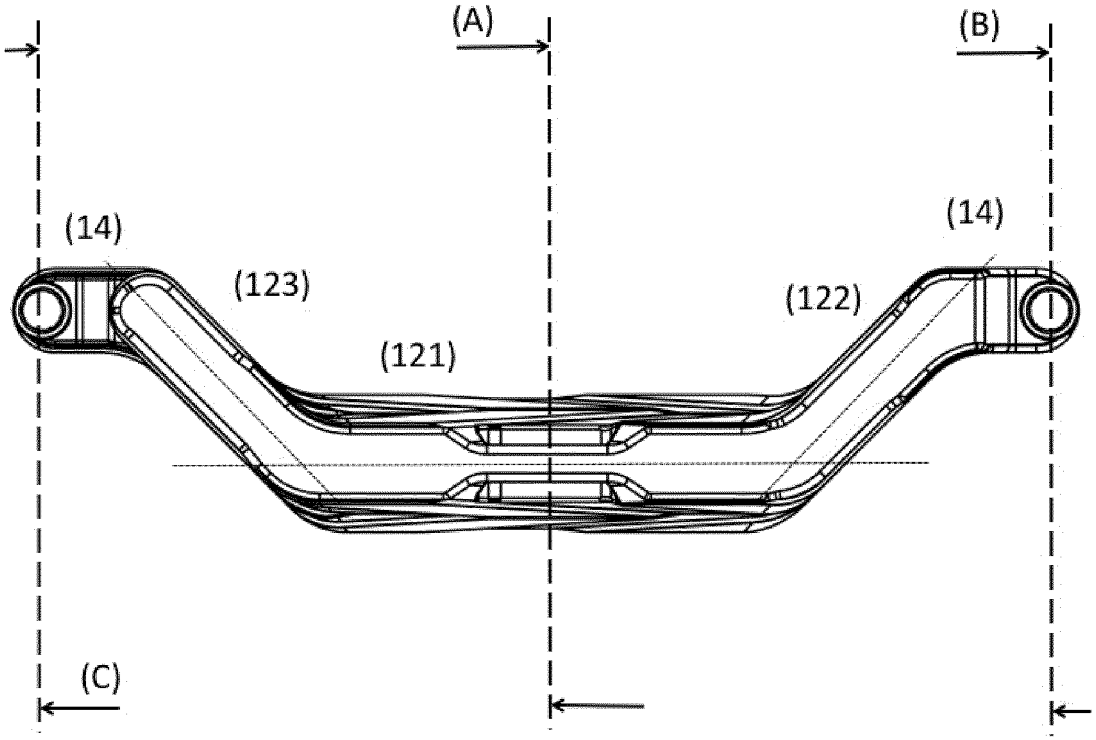


FIGURE 4

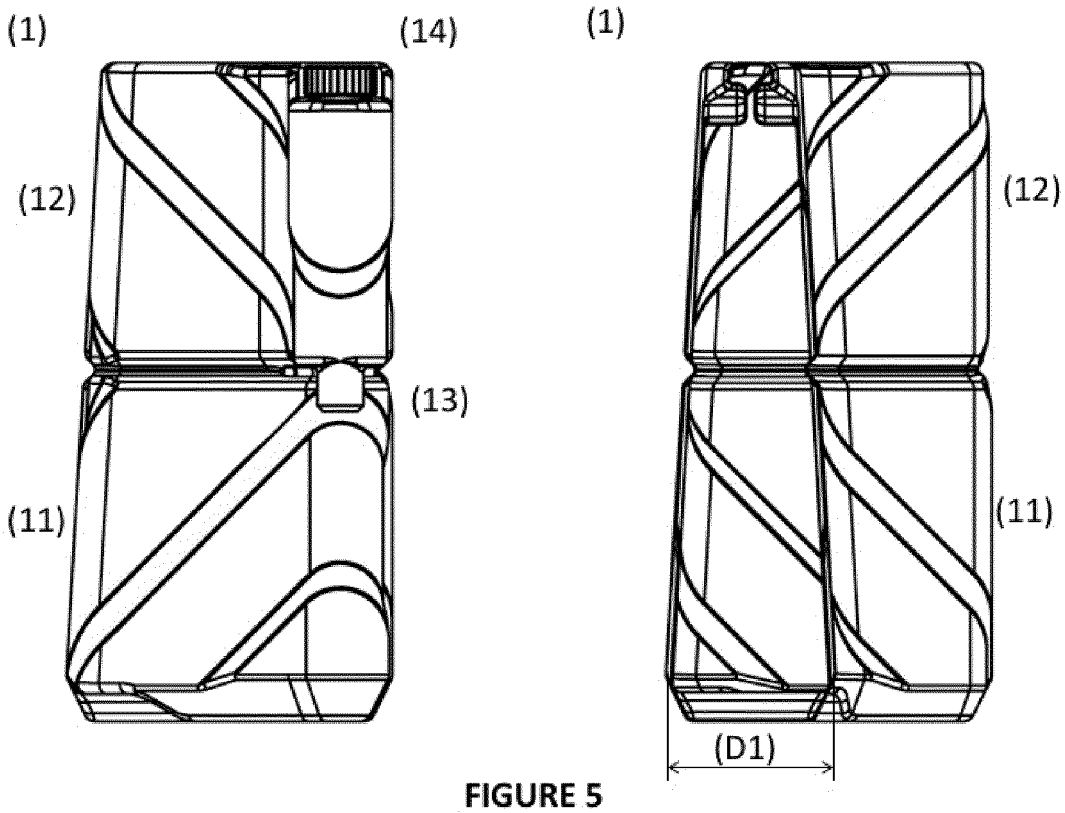


FIGURE 5

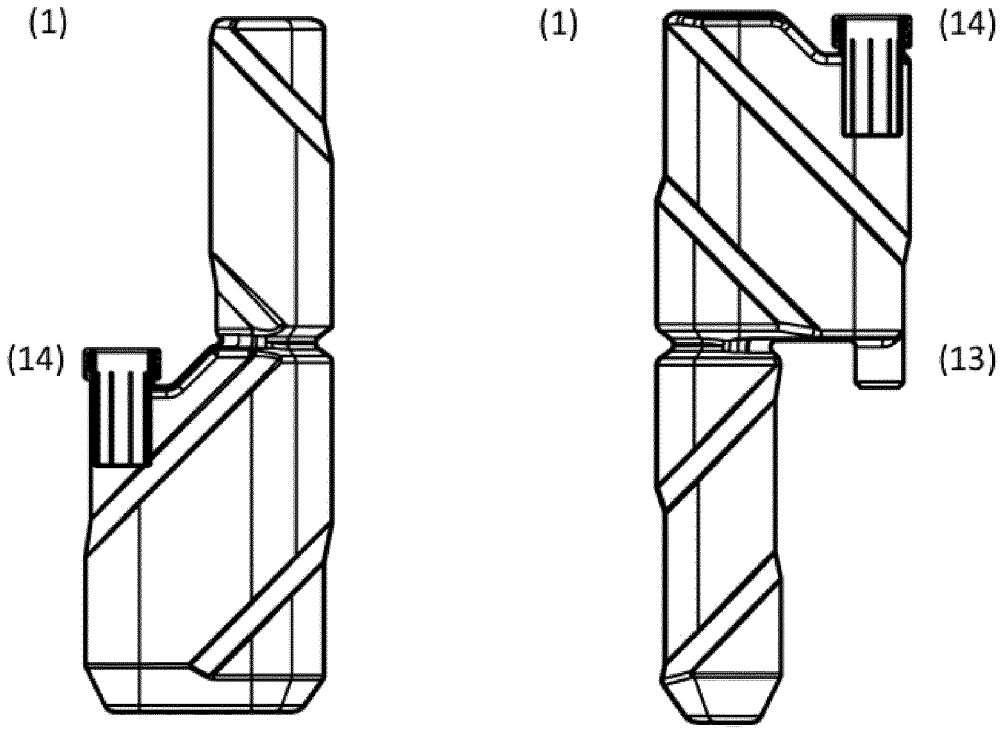


FIGURE 6

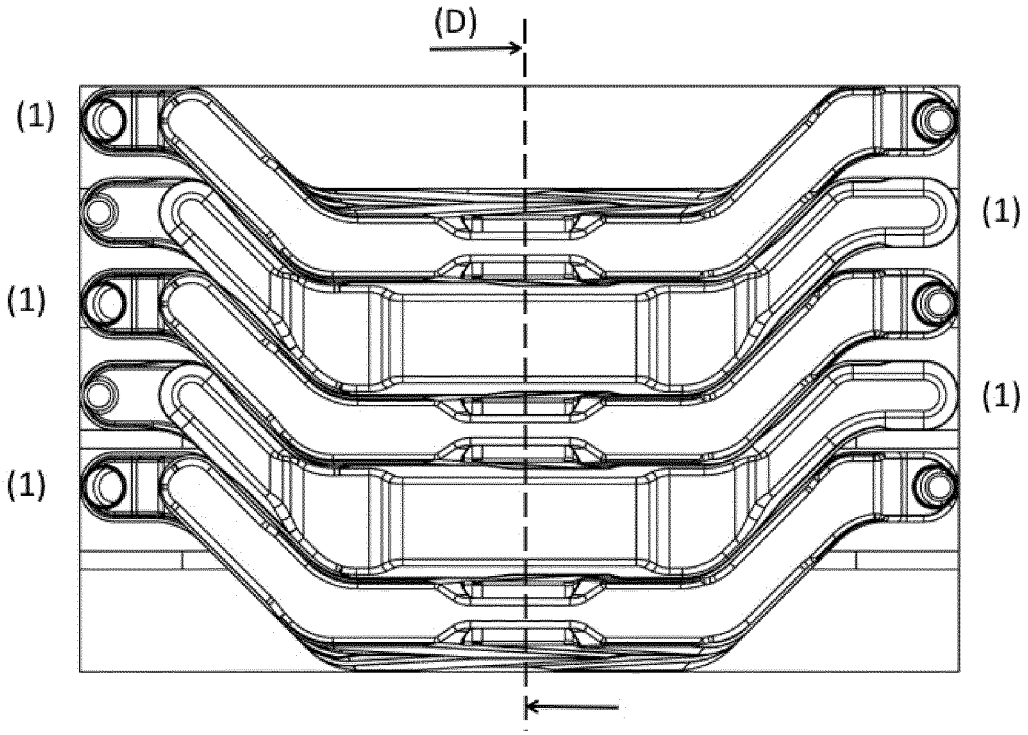


FIGURE 7

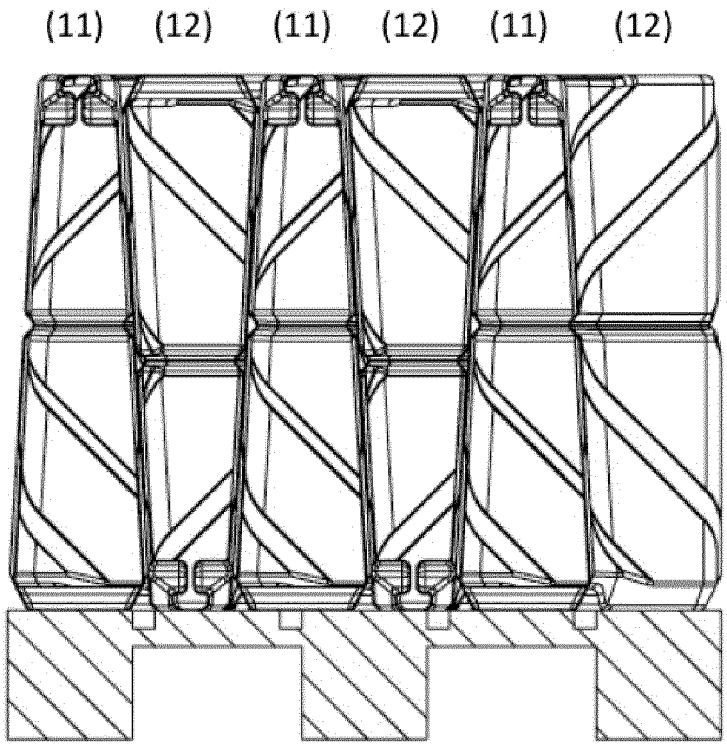


FIGURE 8

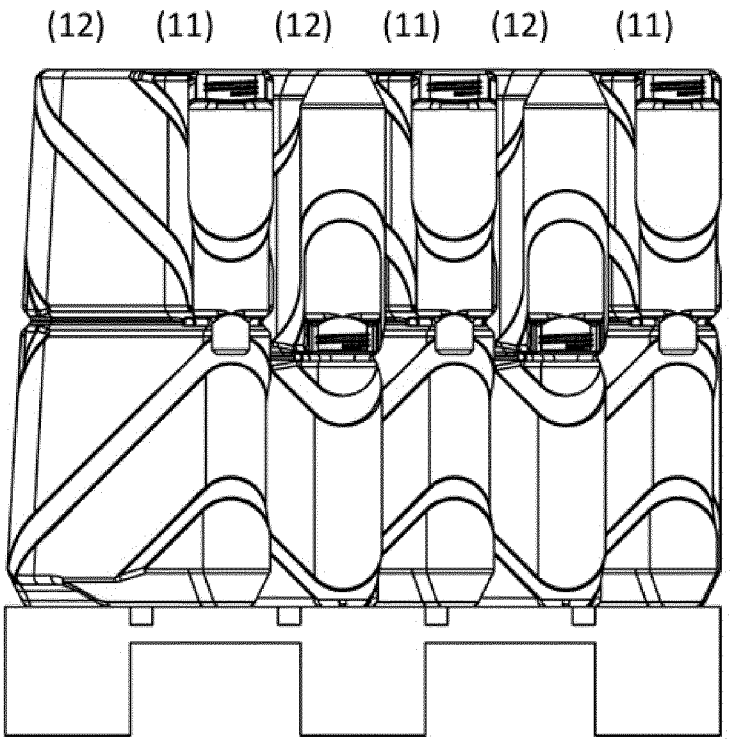


FIGURE 9

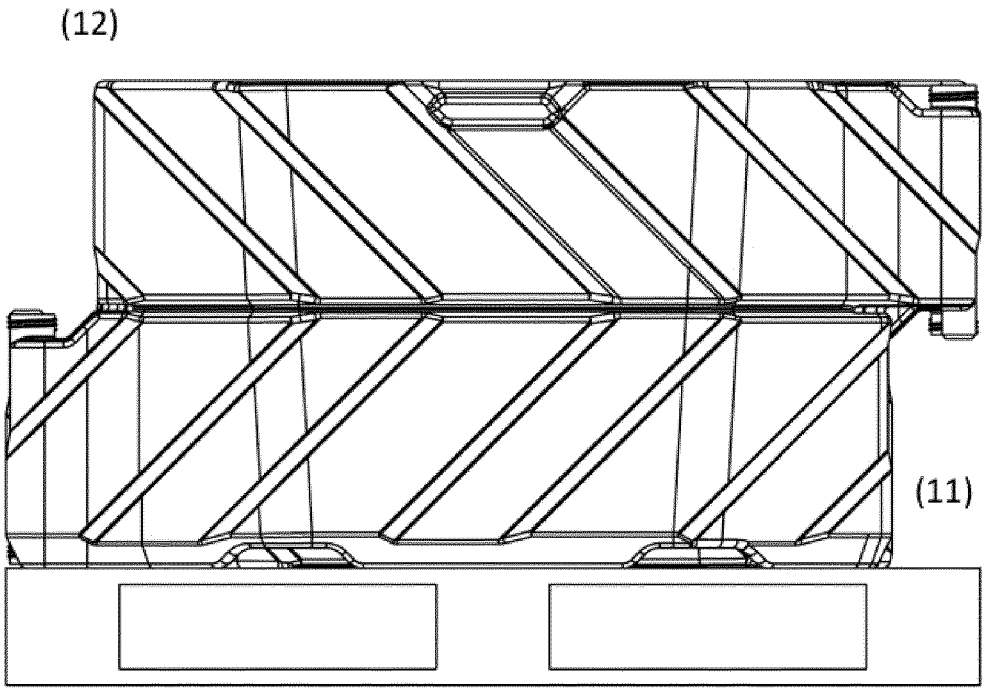


FIGURE 10

RELATÓRIO DE PESQUISA INTERNACIONAL

Depósito internacional Nº
PCT/PT2019/000004

A. CLASSIFICAÇÃO DO OBJETO

INV. E01F13/02 E01F15/08

De acordo com a Classificação Internacional de Patentes (IPC) ou conforme a classificação nacional e IPC

B. DOMINIOS ABRANGIDOS PELA PESQUISA

Documentação mínima pesquisada (sistema de classificação seguido pelo símbolo da classificação)

E01F

Documentação adicional pesquisada, além da mínima, na medida em que tais documentos estão incluídos nos domínios pesquisados

Base de dados eletrônica consultada durante a pesquisa internacional (nome da base de dados e, se necessário, termos usados na pesquisa)

EPO-Internal, WPI Data

C. DOCUMENTOS CONSIDERADOS RELEVANTES

| Categoria* | Documentos citados, com indicação de partes relevantes, se apropriado | Relevante para as reivindicações Nº |
|---|---|---|
| X | FR 2 826 024 A1 (DARRIEU ALAIN [FR]) 20 de dezembro de 2002 (20/12/2002) | 1-7 |
| A | todo o documento | 8-15 |
| | --- | |
| X | US 7 588 387 B1 (CHRISTENSEN MARC E [US] ET AL) 15 de setembro de 2009 (15-09-2009) | 14,15 |
| A | coluna 5, linhas 52-67; figuras 1,2,10,12,13 | 1-13 |
| | --- | |
| X | FR 2 849 875 A1 (LACROIX SIGNALISATION [FR]) 16 de julho de 2004 (16-07-2004) | 14,15 |
| A | página 8, linha 12 - página 9, linha 4; Figura 2 | 1-13 |
| | --- | |
| A | EP 2 393 986 A2 (TRAFFIX DEVICES INC [US]) 14 de dezembro de 2011 (14-12-2011) citado nas figuras 3, 7,8,12-14-32-34,42,43 | 1-15 |
| | --- | |
| | -/-- | |

[X] Documentos adicionais estão listados na continuação do Quadro C [X] Ver o anexo de família da patentes

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Formulário PCT/ISA/210 (segunda página) (Julho 2008)

RELATÓRIO DE PESQUISA INTERNACIONAL

Depósito internacional Nº
PCT/PT2019/000004

| Categoria* | Citação do documento com indicação de partes relevantes, quando apropriado | Relevante para as reivindicações Nº |
|---|---|---|
| A | GB 2 471 063 A (SOULSBY JOHN [GB]; PRICILLA SOULSBY [GB] ET AL.) 22 de dezembro de 2010 (22.12.2010) abstrato; figuras 12a, 22a, 22b, 23, 26 | 1-15 |

Formulário PCT/ISA/210 (continuação da segunda página) (Julho 2008)

RELATÓRIO DE PESQUISA INTERNACIONAL
Informação relativa a membros da família da patentes

Depósito internacional Nº
PCT/PT2019/000004

| | | | | | |
|---|---|---|---|---|---|
| FR 2826024 | A1 | 20-12-2002 | FR | 2826024 A1 | 20-12-2002 |
| | | | WO | 02103119 A1 | 27-12-2002 |
| US 7588387 | B1 | 15-09-2009 | US | 7588387 B1 | 15-09-2009 |
| | | | US | 2010034584 A1 | 11-02-2010 |
| FR 2849875 | A1 | 16-07-2004 | NENHUM | | |
| EP 2393986 | A2 | 14-12-2011 | DK | 2393986 T3 | 19-12-2016 |
| | | | EP | 2393986 A2 | 14-12-2011 |
| | | | JP | 5373923 B2 | 18-12-2013 |
| | | | JP | 2012516957 A | 26-07-2012 |
| | | | US | 2010196094 A1 | 05-08-2010 |
| | | | US | 2011262225 A1 | 27-10-2011 |
| | | | US | 2013307181 A1 | 21-11-2013 |
| | | | WO | 2010091121 A2 | 12-08-2010 |
| GB 2471063 | A | 22-12-2010 | NENHUM | | |

Formulário PCT/ISA/210 (anexo da família de patentes) (Julho 2008)

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- US 5836714 A **[0006]**
- US 6086285 A **[0007]**
- US 6669402 B1 **[0008]**
- EP 2393986 B1 **[0009]**
- US 9016668 B1 **[0010]**
- WO 2015135044 A1 **[0011]**
- US 9677233 B2 **[0012]**
- EP 1865111 A1 **[0013]**
- US 5993103 A **[0014]**