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(54) MANHOLE COVER DEVICE

(57) Manhole cover device, of the type that is installed in at least one cover element (5) or in a frame (4) that defines a passage opening (40), said cover element (5) covering, at least partially, the passage opening (40) when it closes on the frame (4), said device comprising an elastic means (3) that fixed to the cover element (5) or to the frame (4), which in the rest position occupies a predetermined position and when closing the cover element (5), said elastic means (3) contracts due to the pressure of the cover element (5) or the frame (4) against said elastic means (3), recovering at least partially its rest position once said pressure reduces, and the cover element (5) remains locked also in the frame (4) due to the action of said elastic means (3).

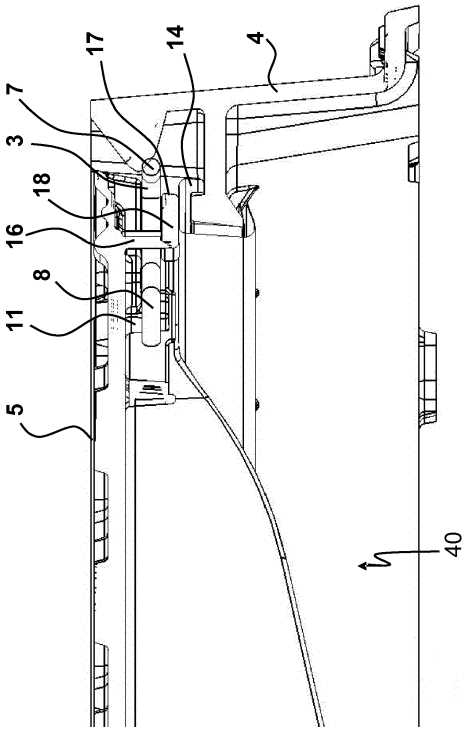


FIG. 2

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Description

[0001] Manhole cover device, of the type that is installed in at least one cover element or in a frame that defines a passage opening, said cover element covering, at least partially, the passage opening when it closes on the frame, device comprises an elastic means fixed to the cover element or to the frame, which in the rest position occupies a predetermined position and when closing the cover element, said elastic means contracts due to the pressure of the cover element or the frame against said elastic means, recovering at least partially its rest position once said pressure reduces, and the cover element remains locked also in the frame due to the action of said elastic means and because said elastic means comprises a main body, which ends in at least two ends, a first end and a second end of a continuous geometric profile, being said first end coupled to a first fixing element provided on the cover element or on the frame and with said second end being equally anchored to a second fixing element provided on the cover element or on the frame, such that the first fixing element is closer to the perimeter of the passage opening that the second fixing element, with said first fixing element and said second fixing element not aligned with respect to the perimeter of the passage opening, and in the fixing operation of the elastic means to the cover element or to the frame the first end once coupled to the first fixing element rotates on said first fixing element rotating said elastic element towards the interior of the cover element or frame, being said elastic element stopped upon its locking at the second end with the second fixing element to which it is coupled.

BACKGROUND OF THE INVENTION

[0002] Different closing systems are known in the state of the art of manhole cover closures.

[0003] So Utility Model No. 9800584 (ES1039659) "TAPA DE REGISTRO" [Manhole cover], from 1998, in the name of the applicant firm, which relates to a manhole cover, comprising a fixed external frame, a cover coupled to the inside contour of said frame, cover locking means and unlocking means with respect to said external frame, characterised in that the means for locking the cover to the frame comprise two elastic arms, joined at their ends to the cover, that extend radially so that their free ends are near the periphery of the cover, with said ends coupling in complementary projections or cavities for the cover frame.

[0004] Also Utility Model No. 200002661 (ES2211238) "REGISTRO CON DISPOSITIVO DE CIERRE Y UTIL DE APERTURA/CIERRE PORTATIL DE BOLSILLO" [Manhole cover with closing device and portable, pocket opening/closing tool] is known, from the year 2000, in the name of the firm COFUNCO, S.A., which relates to a manhole with closing device and portable, pocket opening/closing tool comprising a fixed frame, a cover that can couple with the internal contour of said frame, at least a pair of elastic arms that start from a lower internal part and which extend towards the peripheral edge, with free ends projecting therefrom and being housed in a cavity in the frame where they fit into corresponding coupling projections, with a passage opening in an extension of the cover on the ends for inserting the opening/closing tool that comprises configurations and cam elements that can pass through said passage with the tool inserted in a position and remain trapped when changing to the necessary position so that said elements decouple said arms of said coupling projections.

[0005] It is also worth mentioning Spanish Patent No. 200702328 (ES2338290) "REGISTRO DE SERVICIOS PROVISTO DE UN DISPOSITIVO DE CIERRE Y DE UN UTIL DE APERTURA O CIERRE PORTATIL DE BOLSILLO" [Services manhole with a closure device and a portable, pocket opening/closing tool), from the year 2007, in the name of the firm COFUNCO, S.A., which relates to a services manhole with a closure device and a portable, pocket opening/closing tool that comprises a fixed frame, a grid that can couple with the internal contour of said fixed frame, and at least one pair of fork-shaped elastic arms, with the closure device comprising anchoring means arranged on respective peripheral ends of the at least one pair of elastic arms that can couple with an end stop element, in the closure position, arranged in a position in front of said anchoring means, with a passage being provided in the at least one pair of elastic arms for inserting said tool, and characterised in that the at least one pair of elastic arms is integral with the grid or with the frame. A services manhole is obtained of the type provided with a grid with a simpler structural configuration of the elastic arms and with greater mechanical strength. It is particularly worth highlighting in Figure 2, where said elastic arms are illustrated in clearly.

[0006] Finally, it is worth highlighting Spanish Utility Model No. 201331167 (ES1096505), "DISPOSITIVO DE CIERRE PARA REGISTRO" [Closuring device for manhole], by the same applicant firm, applied for in 2013, which relates to a closure device for manhole, of the type installed in a lid of a cover, characterised in that it comprises a housing in said cover and an elastic means that attaches to said housing, which in the rest position occupies a given position and when said cover is pressed with the elastic means on a frame of the manhole to close the cover said elastic means due to the action of the frame contracts in the direction towards the centre of the cover, recovering its original position once said frame has been overcome and also locking the cover in the frame.

BRIEF DESCRIPTION OF THE INVENTION

[0007] This application comes under the sector of closure systems for manholes.

[0008] The nearest document is Spanish Utility Model No. 201331167 (ES1096505). Said Utility Model aims to

obtain a more simple construction model, adaptable to any frame, and with a reduction in costs. To do this the inventors designed a new closure device which with the pressure by an operator to close the cover, contracts, compressing itself in the direction towards the centre of the cover as it slides and contacts the anchoring structure of the frame, until once the frame has been overcome, it recovers its original position locking the cover against the frame.

[0009] This invention is an improvement of said Utility Model, an evolution thereof. So the inventors have looked for an improvement in assembling the elastic means, so that it is not necessary to use a hydraulic tool in many cases to be able to remove or put in place said elastic means.

[0010] Moreover, the aim of this application is that it can be installed both in the frame and in the cover element (for example, a cover, a grid, etc.).

[0011] This way, they have developed a new elastic means, where the ends of the elastic means remain anchored in some attachment elements that prevent its exit, positioned well in the cover element, or in the frame.

[0012] The first of the ends that remains anchored to the first fixing element and which behaves also like a rotation axis, allows introducing and attaching the other end of the elastic means, in other words, installing first said end on one of the attachment elements, said end rotates, rotating also the elastic means and the second end fits in without any effort, in the other attachment means, with said elastic means remaining at the same time completely immobile and fitted.

[0013] The first of the attachment elements, the one that facilitates the rotation, is nearer the perimeter of the passage opening than the second attachment element, this facilitates its fitting and rotation.

[0014] It is an object of this invention a closure device for manhole, of the type installed in at least one cover element or frame that defines a passage opening, covering, at least partially, said cover element the passage opening when it is closed over the frame, that comprises an elastic means that attaches to the cover element or frame, which in the rest position occupies a predetermined position and when closing the cover element, said elastic means contracts due to the action of the pressure by the cover element or frame against said elastic means, recovering at least partially its rest position once said pressure reduces, and with the cover element also remaining blocked in the frame due to the action of said elastic means characterised in that said elastic means comprises a main body, that ends in at least two ends, a first end and a second end with a continuous geometric profile, with said first end being coupled to a first fixing element on the cover element or frame and with said second end being equally anchored to a second fixing element on the cover element or frame, with the first fixing element being nearer the perimeter of the passage opening than the second attachment element, with said first fixing element and said second fixing element not being aligned with respect to the perimeter of the passage opening, and in that in the attachment operation of the elastic means in the cover element or frame the first end once coupled to the first fixing element rotates on said first fixing element rotating said elastic element towards the inside of the cover element or frame, with said elastic element being retained upon locking itself at the second end with the second fixing element coupled to it.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to facilitate the explanation attached to this specification there are five sheets of drawings representing a practical embodiment, which is provided as a non-limiting example of the scope of this invention:

- Figure 1 is a perspective view of the object of this invention,
- Figure 1b is a view of Figure 1 without the coating element,
- Figure 2 is a partial cross-section of the closure device along the line II-II of Figure 1.
- Figure 3 is a detail of the front view of the closure device with the cover open, and
- Figure 4 is a lower view, in detail, of the open cover.

SPECIFIC EMBODIMENT OF THIS INVENTION

[0016] Therefore, Figure 1 illustrates a cover element 5, a locking system 15 and a frame 4.

[0017] Figure 1b illustrates the frame 4 and a passage opening 40.

[0018] Figure 2 illustrates the passage opening 40, the cover element 5, the frame 4, an elastic body 3, a main body 7, a second end 8 of an elastic means, a second fixing element 11, an airtight seal 14, an internal perimeter area 17, a perimeter support 18 and a support element 16.

[0019] Figure 3 illustrates the cover element 5, the elastic means 3, with its first end 6, its second end 8, its main body 7, its first attachment means 10, the locking system 15, the support element 16, the perimeter support 18 and the cavity 19.

[0020] Figure 4 illustrates a housing 2, the elastic means 3, with its first end 6, its second end 8, its main body 7 its first fixing element 10, the second fixing element 11, the locking system 15, the support element 16, the perimeter support 18 and the cavity 19.

[0021] In this embodiment the cover element 5 is a cover, even when it also covers all those models that comprise more than one cover (for example with the cover element divided into four triangular covers). Also protected, instead of a cover, is any other element that fulfils the function of covering, even if it is partially for example a grid.

[0022] As a prior consideration, it is important to highlight that this embodiment is illustrated with the specific embodiment wherein the elastic means 3 is installed in

the cover 5, even if it could be installed in frame 4 and have the same effect. Therefore, the fact that this embodiment implies illustrating it in the cover 5 it does not limit the possibility that it can be installed in the frame 4, which has been tested successfully by the applicant firm.

[0023] In a specific embodiment, in any unexplained operating issues, the applicants refer to their Spanish Utility Model No. 201331167 (ES1096505).

[0024] The closure device for manholes, in this embodiment, is of the type that is installed in a cover 5.

[0025] It also comprises an elastic means 3 that attaches to said housing 2, as will be explained later in detail, and which in the rest position occupies a given position and when pressing said cover 5 with the elastic means 3 on a frame 4 of the manhole to close the cover 5, said elastic means 3 changes its position by contracting.

[0026] The elastic means 3, as occurred in the closest document, due to the action of the frame 4, which is rigid, contracts in the direction towards the centre of the cover 5, away from the perimeter of the passage opening 40, recovering its rest position once said frame 4 has been overcome and also locking cover 5 in the frame 4.

[0027] The elastic means 3 is made up of a continuous geometric profile and it comprises a main body 7, which is the area of said elastic means 3 that will come into contact with the frame 4, where the elastic means 3 later contracts.

[0028] The main body 7 ends in at least two ends, a first end 6 and a second end 8. The first end 6 couples to the first fixing element 10 on cover 5. Also the second end 8 is anchored to a second fixing element 11, also on cover 5.

[0029] In this embodiment the elastic means 3 comprises two ends 6,7, even if it could be envisaged that it had more apart from the first and second end but which are not used to couple to an attachment element.

[0030] In this embodiment the elastic means 3 has an asymmetric omega shape, even if it could adopt another more convenient shape.

[0031] The first fixing element 10 is nearer the perimeter of the passage opening 40 than the second fixing element 11, this is like this because it facilitates introducing the elastic means 3 in the cover 5, as detailed below.

[0032] This way, when it is desired to attach or install the elastic means 3 in cover 5, the first end 6 would be inserted initially until it couples with the first fixing element 10.

[0033] Then the elastic means 3 is moved towards the inside through its first end 6, which rotates on the first fixing element 10, which causes said elastic means 3 to rotate also towards the inside of the cover 5.

[0034] Then, the elastic means 3, upon finding its second end 8 with the second fixing element 11, is initially locked, and this is via predetermined pressure that it overcomes the strength and the second end 8 is coupled on the second fixing element 11.

[0035] The said first end 6 described above, it so that the elastic means 3 can rotate on the first fixing element 10, taking it as a rotation axis. Once the second end 8 reaches the second fixing element 11 then it anchors it with elastic means 3 remaining perfectly anchored and without hardly any effort.

[0036] Therefore, the first fixing element 10 acts as rotation and anchoring axis and the second fixing element 11 as an anchoring axis, with the two attachment elements 10,11 unaligned with respect to the perimeter of the passage opening 40, which facilitates inserting the elastic means 3 as explained above.

[0037] This type of elastic means 3 facilitates changing or disassembling it, as it can be replaced with another one in the event that it were damaged, without any great effort, but maintaining the attachment and elasticity conditions of the document indicated as the closest background to the invention.

[0038] The inventors have been able to test that this special shape of the elastic means 3, allows said elastic means 3 to not become deformed, since the attachment elements 10, 11 provide it in turn with rigidity, without making it lose its elastic properties.

[0039] With respect to strengthening further the area of the elastic means 3 optionally it has been envisaged that cover 5, in the area where the elastic means 3 is found, comprises a cavity 19, delimited at the top by the cover 5 and at the bottom by a splint 18, that belongs to the internal perimeter area 17 of the cover, which defines a passage opening for the elastic means 3.

[0040] This way, this cavity 19 protects the elastic means 3 from knocks with the frame 4.

[0041] One of the most issues that worried the inventors the most was the subject of the airtightness of the cover 5 with frame 4 with respect to frame 4. So the increase this airtightness it has been envisaged that the perimeter support 18 is continuous and wider than the rest of the internal perimeter area 17.

[0042] This way, in the most complicated area in terms of airtightness, said internal perimeter area 17 extends, connecting to said area. Also with this internal perimeter area 17 continuous support is provided along the whole perimeter of both the cover 5 and the frame 4.

[0043] Therefore, deteriorations of the airtightness seal 14 are avoided, as the airtightness joint 14 could be placed along the whole of the internal perimeter area.

[0044] Also, said cavity 19 comprises a support element 16, like a pillar (like in bridges), that strengthens the cavity 19 and leaves side by side the first end 6 and the second end 8. This way, it avoids the perimeter support 18 sinking or folding, as it is reinforced.

[0045] Finally, the device can comprise a locking system 15 arranged in the area of the cavity 19, that locks the elastic means 3. This way, any possible handling by third parties is avoided.

[0046] This invention describes a new manholes cover device. The examples mentioned here are non-limiting of this invention, therefore it could have different applications and/or adaptations, all within the scope of the

following claims.

Claims

1. Manhole cover device, of the type that is installed in at least one cover element (5) or in a frame (4) that defines a passage opening (40), said cover element (5) covering, at least partially, the passage opening (40) when it closes on the frame (4), device comprises an elastic means (3) that fixed to the cover element (5) or to the frame (4), which in the rest position occupies a predetermined position and when closing the cover element (5), said elastic means (3) contracts due to the pressure of the cover element (5) or the frame (4) against said elastic means (3), recovering at least partially its rest position once said pressure reduces, and the cover element (5) remains locked also in the frame (4) due to the action of said elastic means (3) **characterised:**

   - **in that** said elastic means (3) comprises a main body (7), that ends in at least two ends, a first end (6) and a second end (8) of a continuous geometric profile, being said first end (6) coupled to a first fixing element (10) provided on the cover element (5) or on the frame (4) and said second end (8) remaining equally anchored to a second fixing element (11) provided on the cover element (5) or in the frame (4), such that the first fixing element is closer to the perimeter of the passage opening (40) that the second fixing element (11), being said first fixing element (10) and said second fixing element (11) not aligned with respect to the perimeter of the passage opening (40), and,
   - **in that** in the fixing operation of the elastic means (3) to the cover element (5) or the frame (4) the first end (6) once coupled to the first fixing element (10) rotates on said first fixing element (10) rotating said elastic element (3) towards the interior of the cover element (5) or the frame (4), being said elastic means (3) stopped upon its locking at the second end (8) with the second fixing element (11) to which it is coupled.

2. Device, according to claim 1, **characterised in that** the cover element (5) or the frame (4), comprises a cavity (19), in the area where the elastic means (3) is found, delimited at the top by the cover element (5) or the frame (4) and at the bottom by a continuous perimeter support (18), that belongs to the internal perimeter area (17) of the cover element or frame, which defines an entrance for passing the elastic means (3).

3. Device, according to claim 2, **characterised in that** the perimeter support (18) is continuous.

4. Device, according to claim 3, **characterised in that** said cavity (19) comprises at least one support (16), that reinforces and makes the cavity (19) rigid and leaves side by side the first end (6) and the second end (8).

5. Device, according to any of the preceding claims, **characterised in that** it comprises a locking system (15) arranged in the area of the cavity (19), that locks the elastic means (3) preventing the release of the cover element (5).

6. Device, according to any of the preceding claims, **characterised in that** the elastic means (3) adopts an asymmetric omega shape.

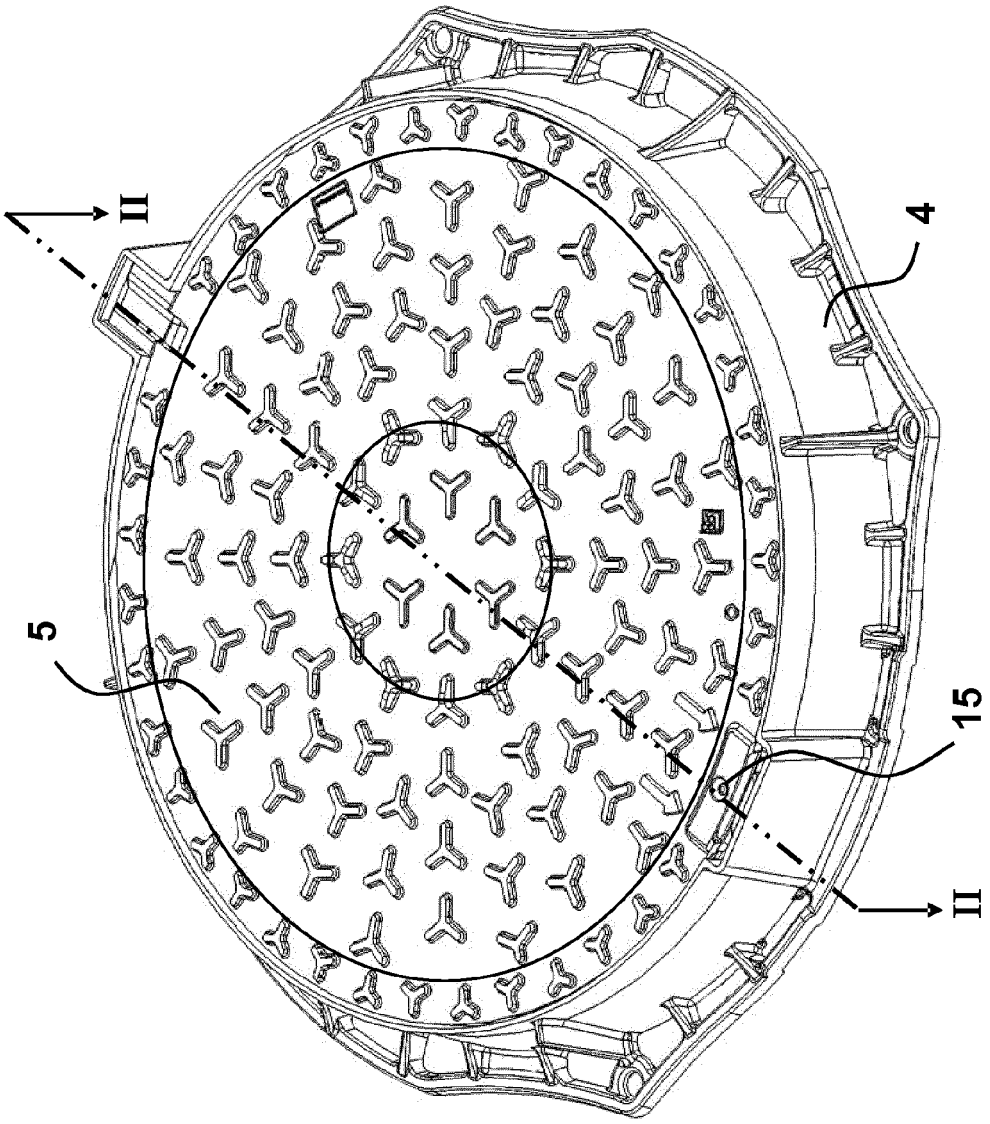


FIG. 1

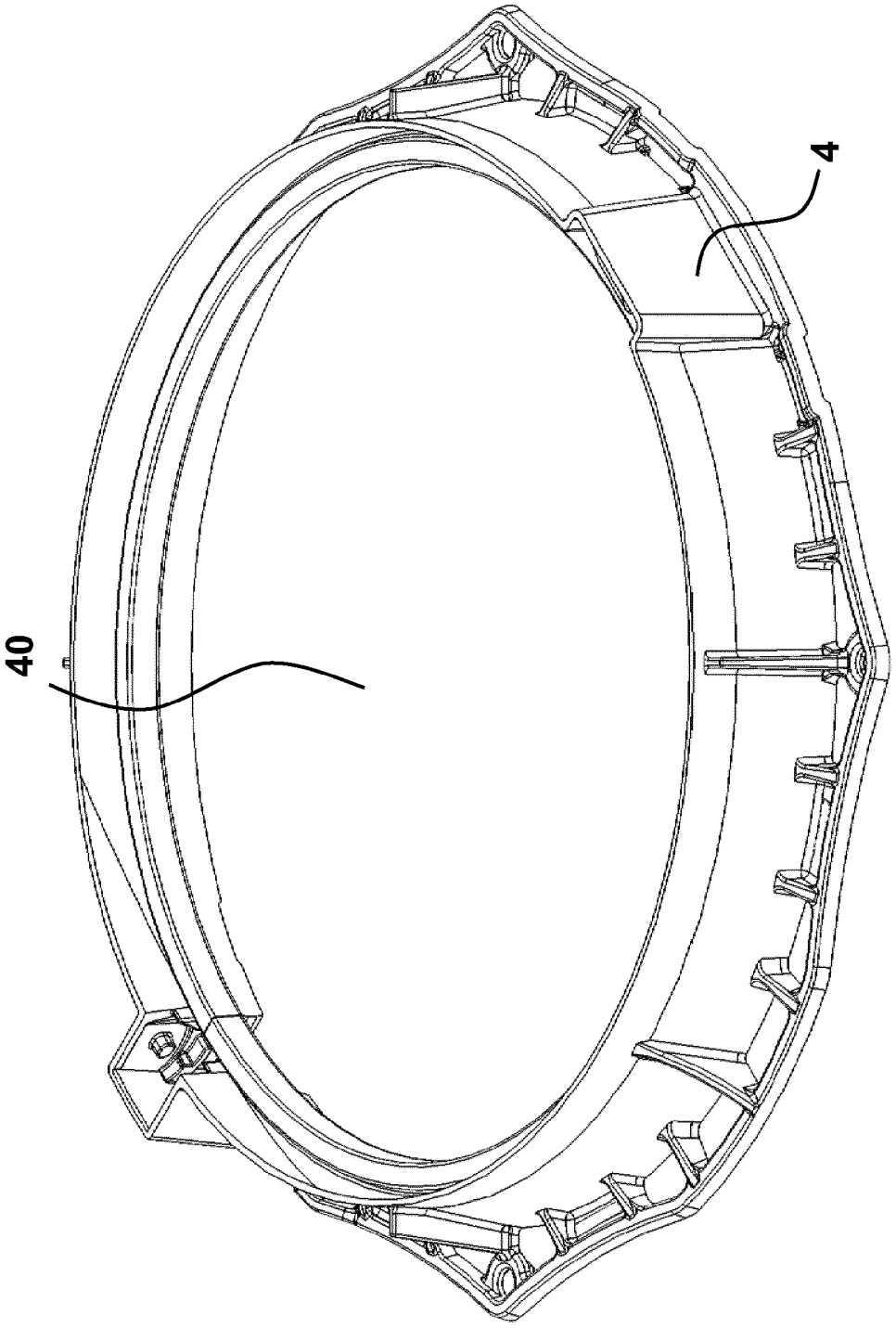


FIG. 1b

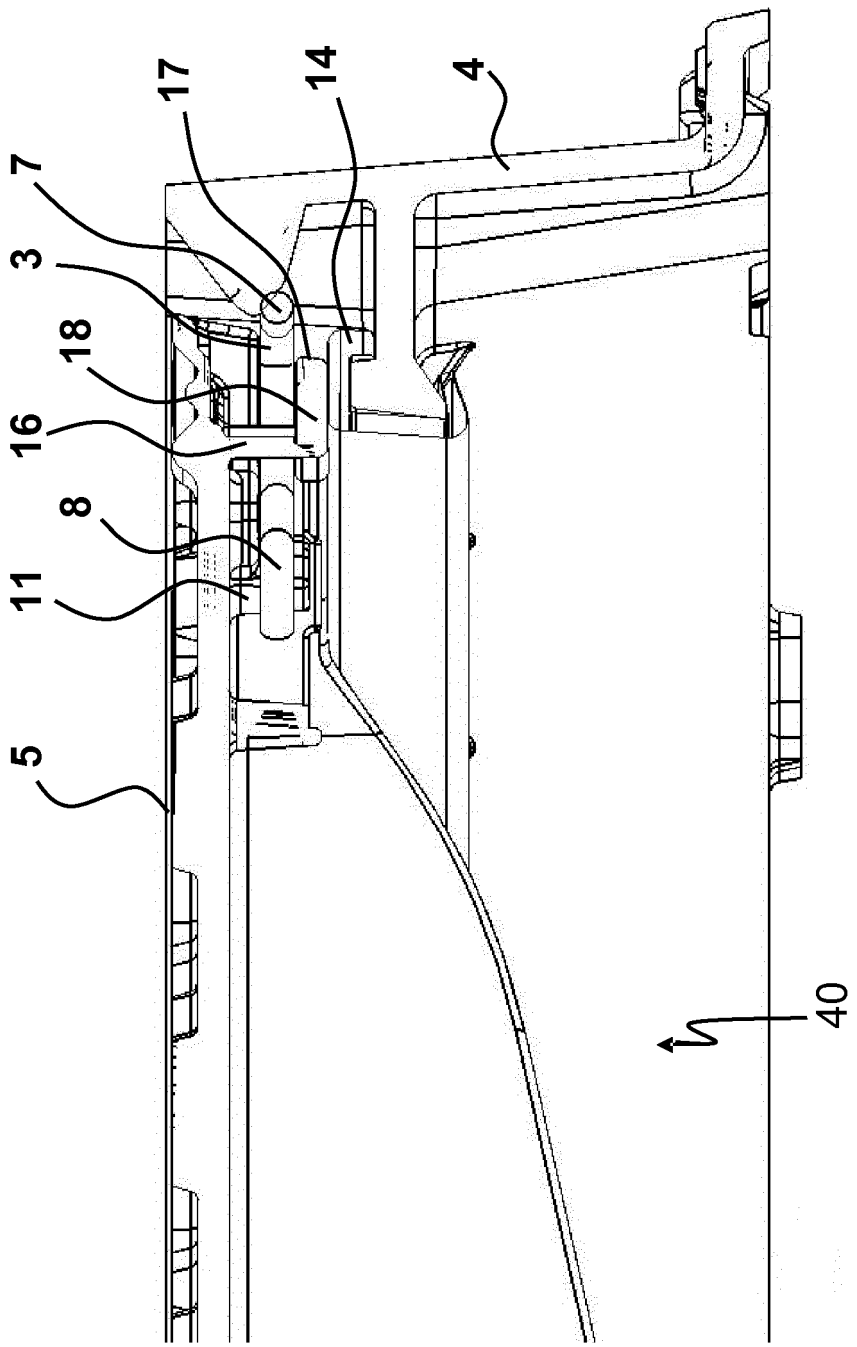


FIG. 2

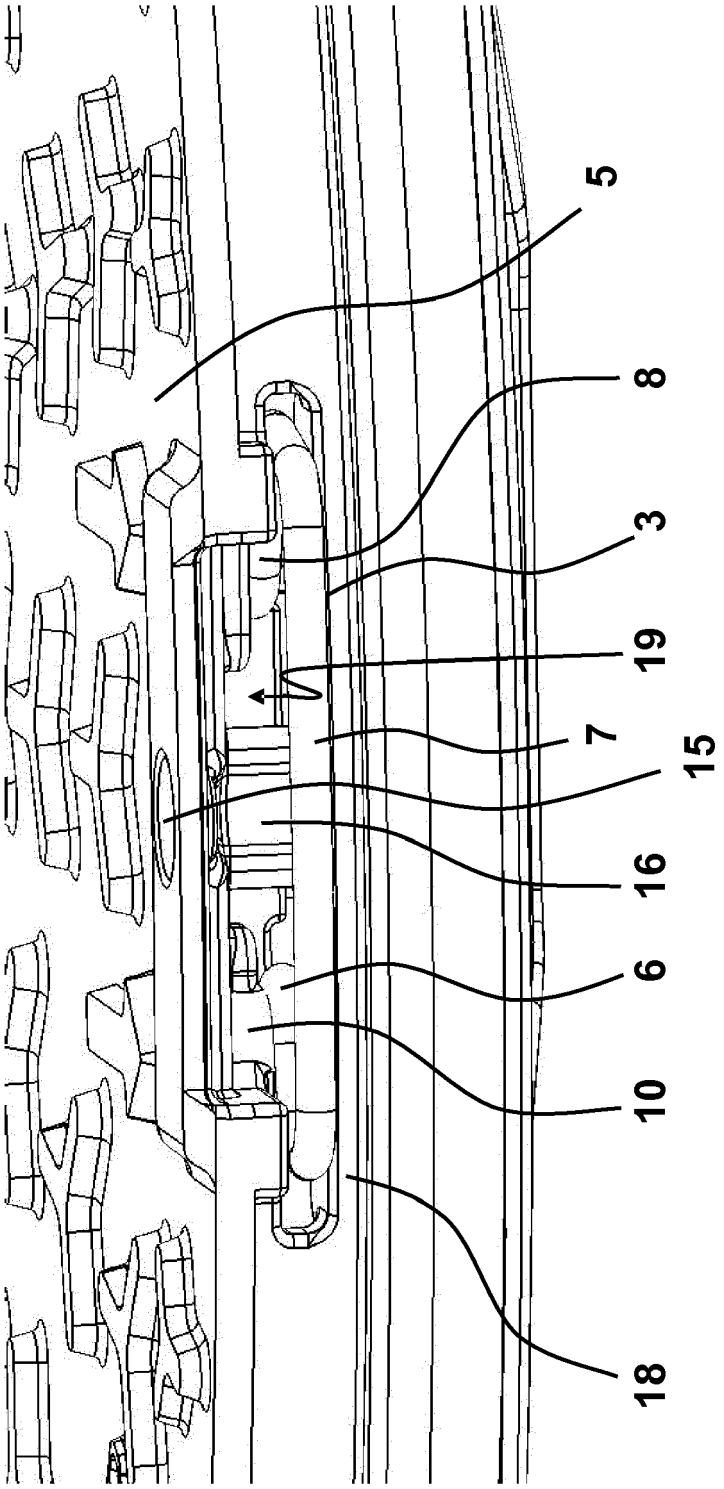


FIG. 3

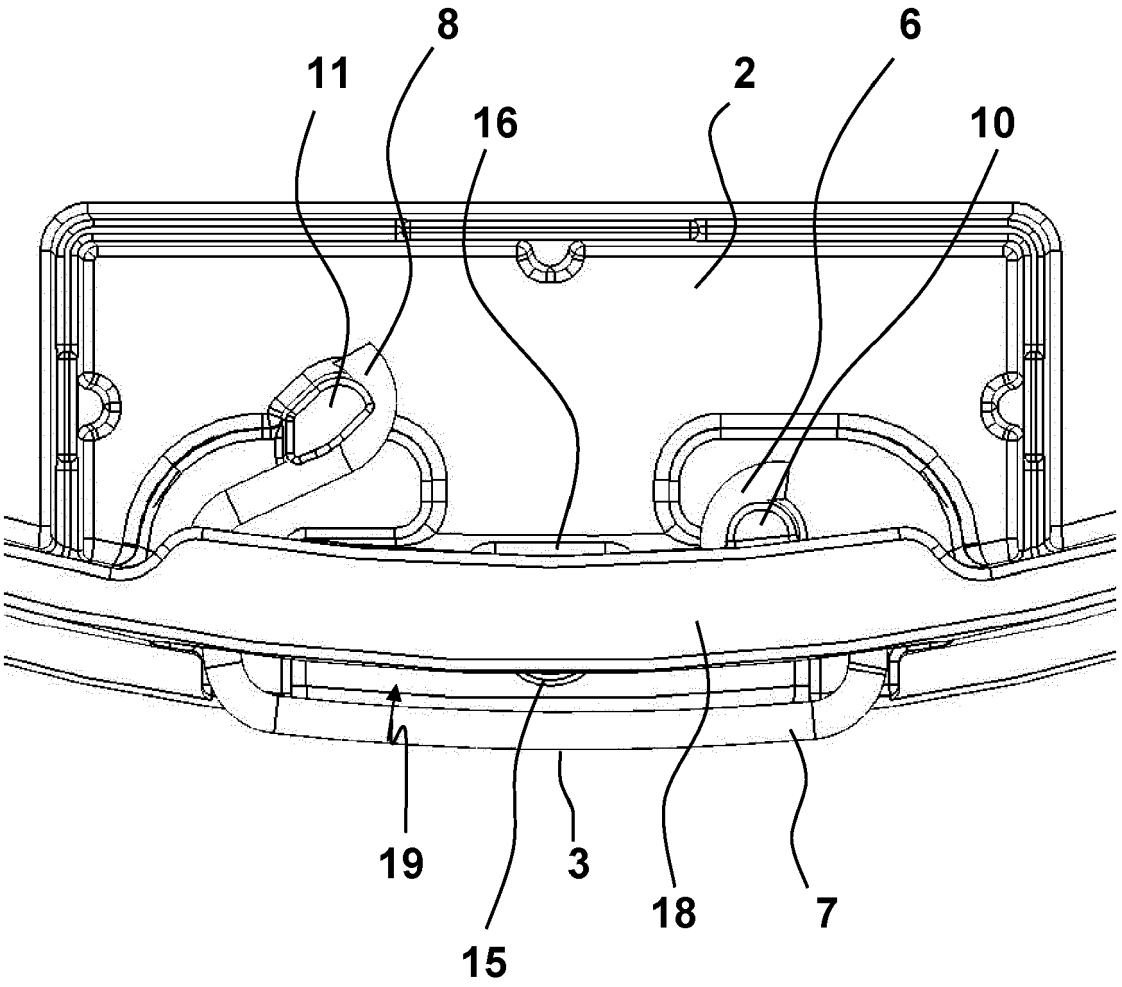


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 15 38 2268

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	ES 1 096 505 U (FUNDICIONES DE ODENA S A [ES]) 20 December 2013 (2013-12-20) * the whole document *	1-6	INV. E02D29/14
A	EP 1 571 264 A1 (TPL TECNOGHISA S R L [IT]) 7 September 2005 (2005-09-07) * abstract; figures 1-6 *	1-6	

TECHNICAL FIELDS SEARCHED (IPC)

E02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 October 2015	Koulo, G

CATEGORY OF CITED DOCUMENTS

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16-10-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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- ES 201331167 **[0006] [0008] [0023]**
- ES 1096505 **[0006] [0008] [0023]**