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[Continued on next page]

(54) Title: A CLOSURE

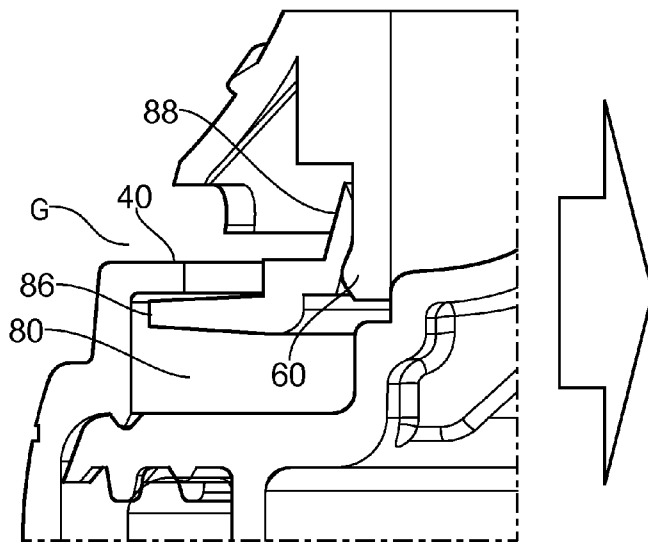


FIG. 5A

(57) Abstract: A flip-top dispensing closure is provided and comprises a base (15) connectable to a container neck and a lid (20) connected to the base by a hinge (25) so as to be movable between a closed position and an open position. The closure comprises a tamper-evident drop band (32) irreversibly moved from a first position to a second position to indicate if the lid has been opened. The lid comprises retention means (60) for non-frangibly holding the band in the first position in an initial closed position, and as the lid is moved towards the open position the band is released from the retention means and moves to the second position.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG). **Published:**

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

A CLOSURE

The present invention relates generally to a closure and particularly, although not exclusively, to a container closure including one or more tamper-indicating features.

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There is a widespread requirement within the field of closures for mechanisms which can be used to indicate to a consumer if a closure is unopened. One very common system uses a drop band which is frangibly connected to the open end of a closure base and which drops onto and remains on a container neck if the closure base is removed. There are also frangible mechanisms for indicating if two parts of a closure have been separated, for example, if a lid has been removed from a base.

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The present invention seeks to provide improvements over known tamper-indicating closures.

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According to the present invention there is provided a flip-top dispensing closure comprising a base connectable to a container neck and a lid connected to the base by a hinge so as to be movable between a closed position and an open position, the closure comprising a tamper-evident drop band irreversibly moved from a first position to a second position to indicate if the lid has been opened, the lid comprising retention means for non-frangibly holding the band in the first position in an initial closed position, and as the lid is moved towards the open position the band is released from the retention means and moves to the second position.

20

The base may cause the band to be released from the lid as it moves away from the initial closed position. For example the base may restrain the band as the lid is opened so that it is caused to be released from the lid (e.g. pulled away from the lid).

5 The band may be generally annular.

The band may be a unitary structure. For example the band may be a one-piece moulded structure. The band itself may be unaffected by movement from the first to the second position i.e. it is not broken or deformed but simply moves.

10

The band may comprise one or more flaps for non-frangibly engaging the lid retention means. The flap/s may be inclined radially inwards so that they can grip onto a bead or the like on the lid. This would then allow the band to be non-frangibly pulled away from the lid i.e. it is not broken away from the lid.

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The retention means may comprise an annular bead. The bead may, for example, be formed on a skirt or the like on the lid, such as an internal depending skirt. The bead may be formed at or in the region of a free end of a skirt or the like.

20 The band may be located in the interior of the closure. For example the band may be carried in the interior of the lid and then be transferred to the interior of the base.

The holding means may help to prevent the band from returning to the first position. For example, if the holding means is a bead on the lid the band may be pulled over the

bead as the lid is opened but then cannot pass back over the bead (for example if the closure is inverted).

The lid may include a window in which or through which the band is visible in the first
5 position and out of which the band falls as it moves to the second position.

The base may include a void or pocket into which the band drops. This means that the band is not released from the closure but remains captive in the base once the closure is first opened.

10

The closure may comprise a dispensing member.

The dispensing member may be formed separately from the base and the lid. Alternatively the dispensing member may be formed integrally with the base.

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The dispensing member may comprise a spout, such as a drinking spout. The spout member may be fitted into the bore of a container neck in use.

The present invention also provides a closure as described herein in combination with
20 a container.

Different aspects and embodiments of the invention may be used separately or together.

Further particular and preferred aspects of the present invention are set out in the accompanying independent and dependent claims. Features of the dependent claims may be combined with the features of the independent claims as appropriate, and in combination other than those explicitly set out in the claims.

5

The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Figure 1A is a side view of a closure formed in accordance with the present invention
10 and shown in an unopened condition;

Figure 1B is a section of the closure of Figure 1A taken along line A-A;

Figures 2 to 4 is a sequence showing the closure of Figure 1 as it moves from an
15 unopened condition, through an opened condition and back to a closed condition;

Figures 5A and 5B show schematically how a tamper-evident band forming part of the closure of Figures 1 to 4 moves to indicate opening; and

20 Figure 6 is a perspective view of a tamper-evident band of Figure 5.

The example embodiments are described in sufficient detail to enable those of ordinary skill in the art to embody and implement the systems and processes herein described. It is important to understand that embodiments can be provided in many

alternate forms and should not be construed as limited to the examples set forth herein.

Accordingly, while embodiment can be modified in various ways and take on various
5 alternative forms, specific embodiments thereof are shown in the drawings and
described in detail below as examples. There is no intent to limit to the particular
forms disclosed. On the contrary, all modifications, equivalents, and alternatives falling
within the scope of the appended claims should be included. Elements of the example
embodiments are consistently denoted by the same reference numerals throughout
10 the drawings and detailed description where appropriate.

Unless otherwise defined, all terms (including technical and scientific terms) used
herein are to be interpreted as is customary in the art. It will be further understood
that terms in common usage should also be interpreted as is customary in the relevant
15 art and not in an idealised or overly formal sense unless expressly so defined herein.

Referring now to the drawings, wherein like reference numbers are used to designate
like elements throughout the various views, several embodiments of the present
invention are further described. The figures are not necessarily drawn to scale, and in
20 some instances the drawings may have been exaggerated or simplified for illustrative
purposes only. One of ordinary skill in the art will appreciate the many possible
applications and variations of the present invention based on the following examples of
possible embodiments of the present invention.

Figures 1A and 1B show a flip-top closure generally indicated 10 fitted onto a container neck 5. The closure 10 comprises a base 15 and a lid 20 which are connected to each other by a hinge 25.

5 The base 15 comprises a generally cylindrical sidewall 30 open at both ends. At one end of the sidewall 30 a tamper-evident drop band 32 is frangibly connected. The band 35 is used to indicate if the closure is removed from the container neck one fitted. At the other end of the sidewall 30 a shoulder 35 is provided which merges into a radially inwardly extending flange 40.

10

The interior of the sidewall 30 is provided with an internal screw thread 37 for engaging a corresponding external screw thread 6 on the neck 5.

15 The lid 20 comprises a top plate 45. A curved outer sidewall 50 depends from the periphery of the plate 45. A generally cylindrical annular skirt 55 depends from the sidewall 50. The free end of the skirt 55 extends axially slightly beyond the free end of the sidewall (radially inwardly thereof) and is provided with an annular retention bead 60. A gap G is formed between the free end of the skirt 55 and the flange 40.

20 In this embodiment the closure 10 is further provided with a dispensing spout member 65. The spout member 65 comprises a generally cylindrical drinking spout 66, an intermediate generally frustoconical portion 67 and a base portion 75.

25 The spout member 65 comprises a generally cylindrical sidewall 69. At the end of the spout sidewall opposite the intermediate portion an inclined annular orifice wall 70

extends inwards and from it an axial annular wall 71 depends; the wall 71 defines an orifice 72. In the closed position a lid spigot 21, which depends from the top plate 45 enters through the wall 71 to close the orifice 72. The end of the wall 69 opposite the orifice is provided with a radially inwardly projecting annular bead 73 which retains a
5 self-closing valve 74.

The base portion 75 comprises a radial annular flange 76 with an annular seal 77 depending therefrom. In use, the seal 77 enters the bore of the container neck such that it seals against its inner surface, and the flange 76 fits onto the container neck rim
10 7.

It will be noted that a void or pocket 80 is formed between the spout flange 76 and the shoulder 35 / flange 40 of the base.

15 As shown best in Figures 5 and 6, the closure 10 further comprises a tamper-evident drop band 85. The band 85 comprises a radial annular flange 86. An annular step 87 is upstanding from and extends around the inner periphery of the flange 86. At the centre of the step 87 a plurality of circumferentially spaced inclined flaps 88 extend radially inwardly.

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Figure 5A shows the band 85 fitted into the closure. The flaps 88 fit over the bead 60 and the flange 86 is located under the flange 40.

If the lid 20 is opened axial movement of the band 85 is resisted by the inter-engagement of the flanges 40, 86 which causes the flaps to be pulled over the bead 60 as shown in Figure 5B.

- 5 It will be noted that in the unopened position shown in Figure 5A the flaps 88 are visible through the gap G, whereas when the band 85 drops down into the void 80 the flaps 88 are no longer visible so as to indicate the closure has been opened.

Figure 2 to 4 are a sequence of drawings illustrating the closure 10 in an unopened
10 position (Figures 2A and 2B), an open position (Figures 3A and 3B) and a reclosed position (Figures 4A and 4B).

Although illustrative embodiments of the invention have been disclosed in detail
herein, with reference to the accompanying drawings, it is understood that the
15 invention is not limited to the precise embodiments shown and that various changes and modifications can be effected therein by one skilled in the art without departing from the scope of the invention.

CLAIMS

1. A flip-top dispensing closure comprising a base connectable to a container neck and a lid connected to the base by a hinge so as to be movable between a closed position and an open position, the closure comprising a tamper-evident drop band irreversibly moved from a first position to a second position to indicate if the lid has been opened, the lid comprising retention means for non-frangibly holding the band in the first position in an initial closed position, and as the lid is moved towards the open position the band is released from the retention means and moves to the second position.
2. A closure as claimed in claim 1, in which the base causes the band to be released from the lid as it moves away from the initial closed position.
3. A closure as claimed in claim 1 or claim 2, in which the band is generally annular.
4. A closure as claimed in claim 1 or claim 2, in which the band is a unitary structure.
5. A closure as claimed in any preceding claim, in which the band comprises one or more flaps for non-frangibly engaging the lid retention means.
6. A closure as claimed in any preceding claim, in which the retention means comprise an annular bead.

7. A closure as claimed in any preceding claim, in which the band is located in the interior of the closure.

8. A closure as claimed in any preceding claim, in which the holding means help to
5 prevent the band from returning to the first position.

9. A closure as claimed in any preceding claim, in which the lid includes a window in which or through which the band is visible in the first position and out of which the band falls as it moves to the second position.

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10. A closure as claimed in any preceding claim, in which the base includes a void or pocket into which the band drops.

11. A closure as claimed in any preceding claim, in which the closure comprises a
15 dispensing member.

12. A closure as claimed in claim 11, in which the dispensing member is formed separately from the base and the lid.

20 13. A closure as claimed in claim 11, in which the dispensing member is formed integrally with the base.

14. A closure as claimed in any of claims 11 to 13, in which the dispensing member comprises a spout.

25

15. A closure substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

16. A closure as claimed in any preceding claim in combination with a container.

5

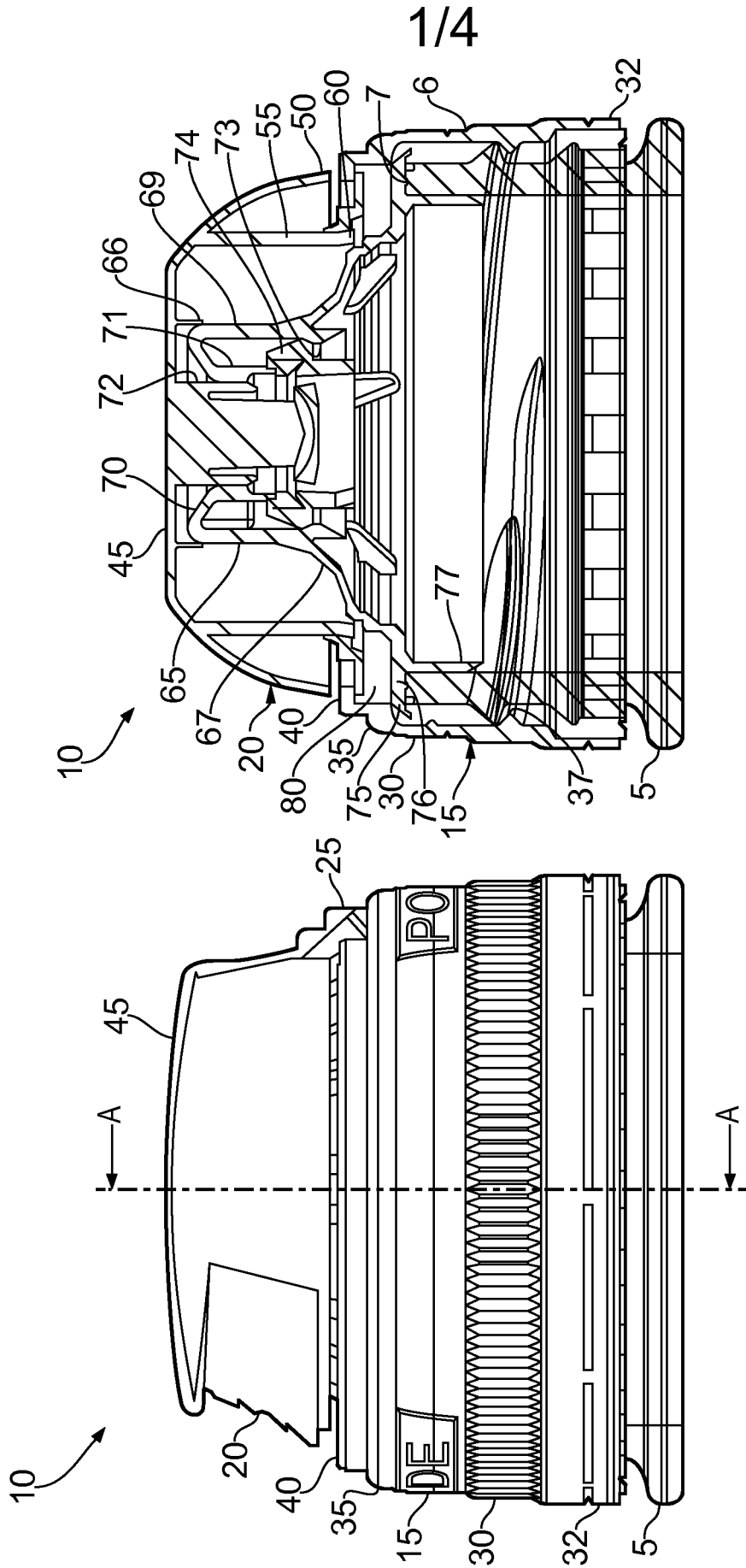


FIG. 1B

FIG. 1A

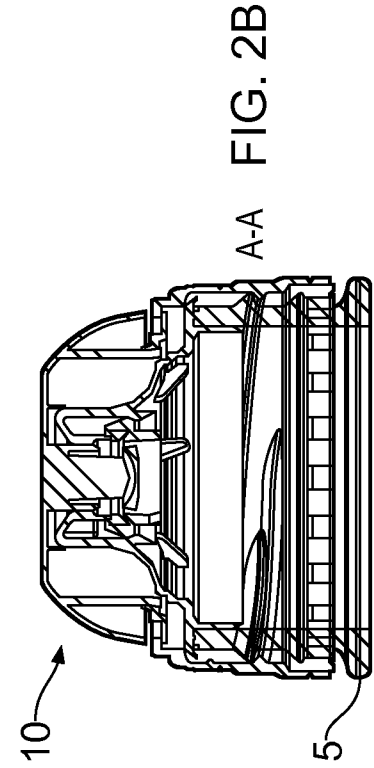


FIG. 2A

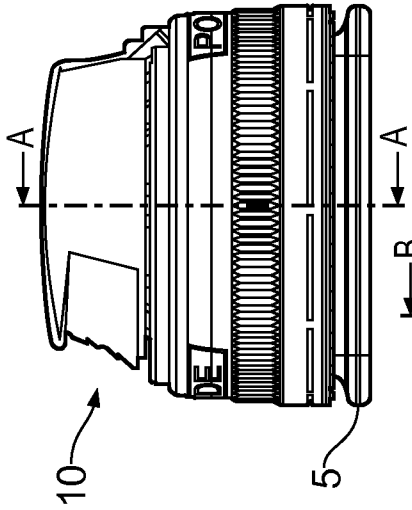


FIG. 3A

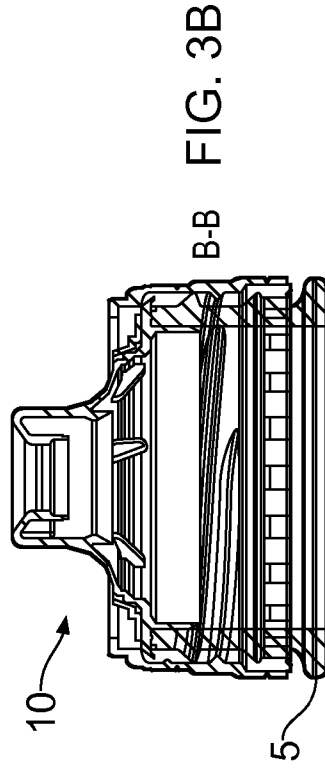


FIG. 3B

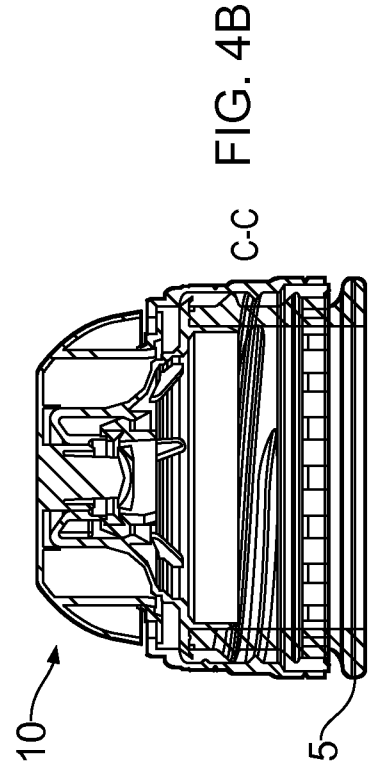


FIG. 4A

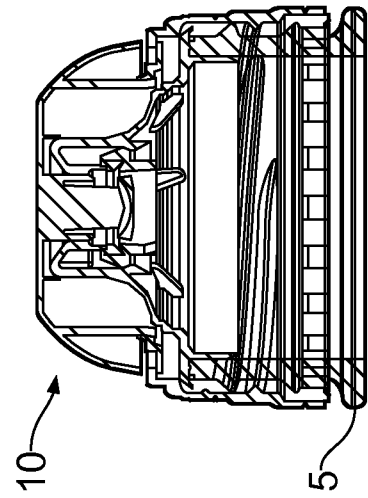


FIG. 4B

FIG. 2B

A-A

B-B

C-C

3/4

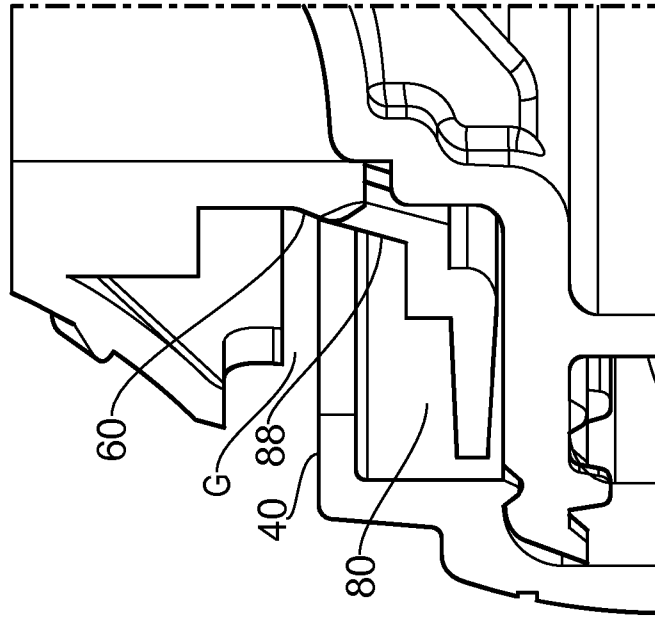


FIG. 5B

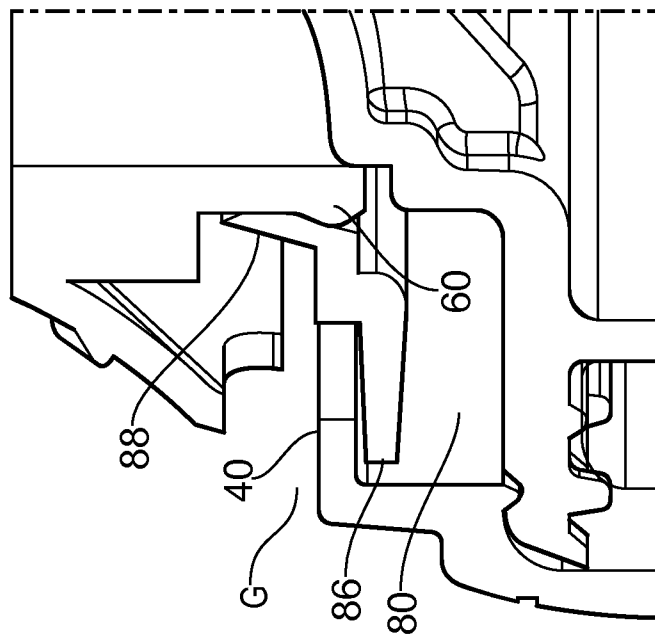
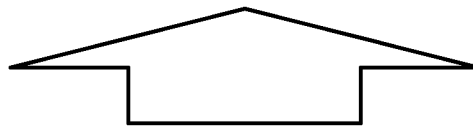


FIG. 5A

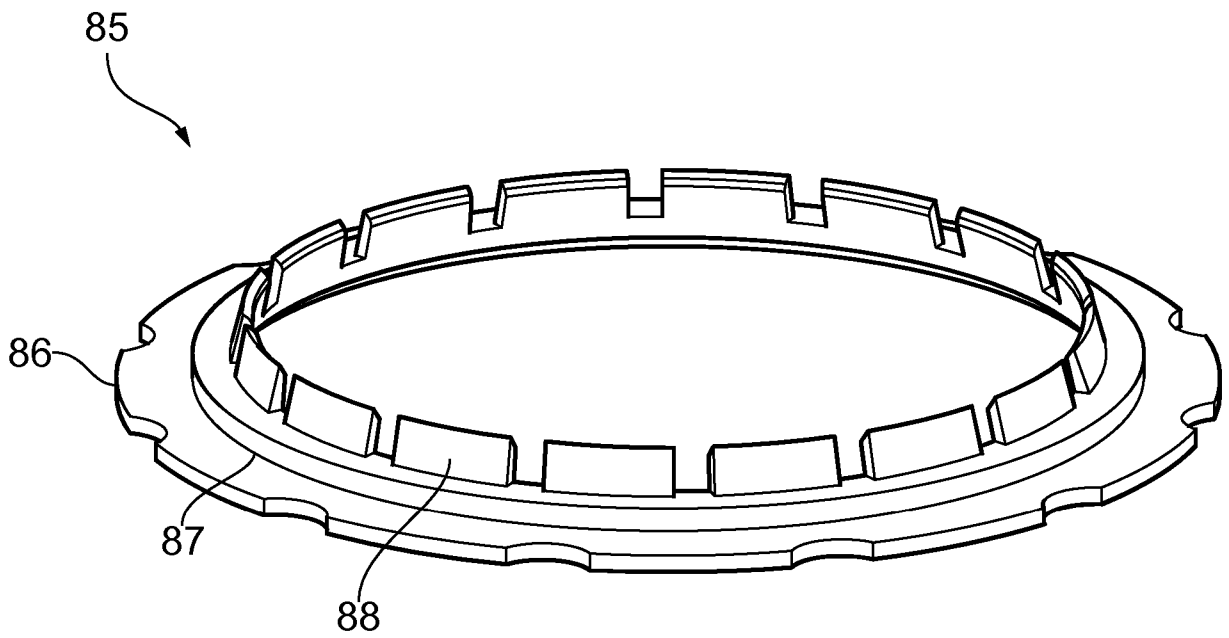


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/062095

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 16
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/062095

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D47/08
ADD.

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)
B65D

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 2015/049066 A1 (OBRIST CLOSURES SWITZERLAND [CH]) 9 April 2015 (2015-04-09) figure 12 ----- | 1-11, 13-15,17 |
| Y | US 2011/056904 A1 (ROZENBERG TZVI AKIVA [IL]) 10 March 2011 (2011-03-10) paragraphs [0008], [0009]; figures 7A,7B ----- | 1-11, 13-15,17 |
| A | EP 1 892 194 A1 (OBRIST CLOSURES SWITZERLAND [CH]) 27 February 2008 (2008-02-27) paragraph [0032] ----- | 9 |

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 application or patent 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 such 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

28 July 2016

Date of mailing of the international search report

05/08/2016

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Authorized officer

Sundell, Olli

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/062095

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date | |
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| | | | PT 1892194 E | 22-09-2010 |
| | | | PT 2213584 E | 24-08-2011 |
| ----- | | | | |

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 16

Claim 16 was not searched, because it contravenes Rule 6.2(a) PCT.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.