(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 312 103 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.04.2018 Bulletin 2018/17

(51) Int Cl.:
B65D 5/70 *(2006.01)* ***B65D 75/58*** *(2006.01)*

(21) Application number: **16194890.6**

(22) Date of filing: **20.10.2016**

(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 MD

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(54) ANGLED OPENING DEVICE

(57) An opening system (100) for a container of a packaging material (101) is disclosed, wherein the opening system comprises a strip zone (102) to be opened when opening the container, the strip zone extending between a first location (103) and second location (104) when arranged on a plane (107) of the packaging material for the container, whereby the container, upon opening of the strip zone, has an opening that extends along the opened strip zone between the first and second location. The opening system comprises a grip element (105) attached to the strip zone adjacent the first location for opening of the strip zone when moving the grip element, and wherein the strip zone extends, when arranged on the plane of the packaging material for the container, in a longitudinal direction (106) of the strip zone, in at least two non-parallel directions (A, A', A") in said plane. A method of producing an opening system for a container and a container comprising an opening system is also disclosed.

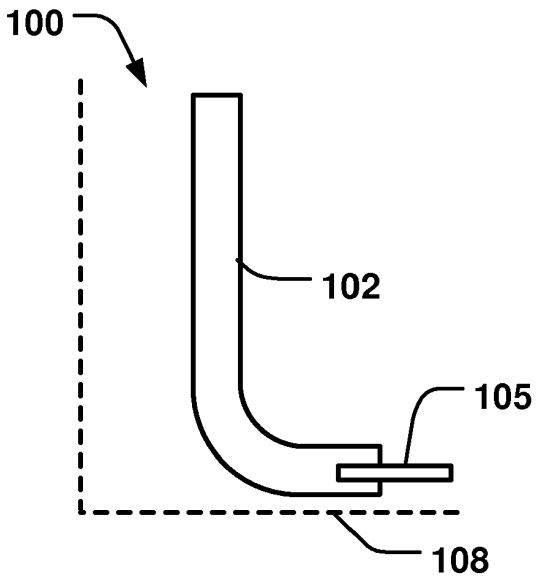

Fig. 3a

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Description

Technical Field

[0001] The present invention generally relates to the field of opening systems. More particularly, the present invention relates to an opening system for containers having food products therein, a method of producing the opening system, and a container comprising the opening system.

Background

[0002] Today there are several opening systems used for containers depending on how the container is made and how it is used. The configuration of an opening in a container has impact on several aspects of the finished container, including ease of use, both in terms of the operation of the opening system itself, and how well the opening system cooperates with the purpose of the container and the filling product. The type of product influences for example the desired width of the opening, e.g. a wider opening can facilitate the extraction of a highly viscous filler product from the container. The manufacturing process of the container set limitations on how the opening can be configured in the final container. While it is necessary to follow the specifications dictated by a particular manufacturing process, it is desired to appeal to as many of the end user requirements on the container as possible. Known opening systems typically lead to compromises on either the manufacturing side or the end user side. Manufacturing compromises include for example increased waste of the manufacturing material or more complex processes with lower throughput and increased costs. Whereas compromises on the user side impact the functionality, such as opening systems that lead to significant filler product residues and waste, or opening systems that are difficult to operate for some people with for instance motor skill injuries which makes it hard for them to open containers or elderly people having a lowered muscular capability.

[0003] Hence, an improved opening system would be advantageous and in particular allowing for avoiding more of the above mentioned problems and compromises.

Summary

[0004] Accordingly, examples of the present invention preferably seeks to mitigate, alleviate or eliminate one or more deficiencies, disadvantages or issues in the art, such as the above-identified, singly or in any combination by providing a device according to the appended patent claims.

[0005] According to a first aspect an opening system for a container of a packaging material is provided, wherein the opening system comprises a strip zone to be opened when opening the container, the strip zone extending between a first location and second location when arranged on a plane of packaging material for a container, whereby the container, upon opening of the strip zone, has an opening that extends along the opened strip zone between the first and second location. The opening system further comprising a grip element attached to the strip zone adjacent the first location for opening of the strip zone when moving the grip element, and wherein the strip zone extends, when arranged on a plane of packaging material for a container, in a longitudinal direction of the strip zone, in at least two non-parallel directions in said plane.

[0006] According to a second aspect a method of producing an opening system for a container is provided, the method comprising providing a packaging material, providing a strip zone in the packaging material to be opened when opening the container, the strip zone extending between a first location and second location in the packaging material, and attaching a grip element to the strip zone adjacent the first location, and wherein providing the strip zone comprises extending the strip zone in at least two non-parallel directions in a plane of the packaging material between the first and second location.

[0007] According to a third aspect a container comprising an opening system according to the first aspect is provided.

[0008] Further examples of the invention are defined in the dependent claims, wherein features for the second and third aspects of the disclosure are as for the first aspect mutatis mutandis.

[0009] Some examples of the disclosure provide for a greater variance in the dimensions of the opening in a container for a fixed dimension of the container.

[0010] Some examples of the disclosure provide for improved optimization of the dimensions of the opening with respect to the filler material in the container.

[0011] Some examples of the disclosure provide for an easier opening of the opening system.

[0012] Some examples of the disclosure provide for a quicker opening of the opening system.

[0013] Some examples of the disclosure provide for an opening system where it is easier to grip, and maintain a grip, for opening the opening system.

[0014] Some examples of the disclosure provide for an opening system where it is easier to maintain a container in the open state.

[0015] Some examples of the disclosure provide for less residues and waste of filler material in a container after having consumed or extracted the filler material through the opening.

[0016] Some examples of the disclosure provide for a quicker extraction of the filler material from the container.

[0017] Some examples of the disclosure provide for a more efficient use of packaging material.

[0018] Some examples of the disclosure provide for a simpler manufacturing process.

[0019] Some examples of the disclosure provide for an

opening system where less force is required to initially break open the opening.

[0020] Some examples of the disclosure provide for a more compact opening system.

[0021] Some examples of the disclosure provide for an opening system which has a reduced profile to facilitate stacking of multiple containers.

[0022] Some examples of the disclosure provide for an opening system configured to give a cleaner cut or tear of the opening.

[0023] Some examples of the disclosure provide for increasing the robustness of the opening system.

[0024] It should be emphasized that the term "comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

Brief Description of the Drawings

[0025] These and other aspects, features and advantages of which examples of the invention are capable of will be apparent and elucidated from the following description of examples of the present invention, reference being made to the accompanying drawings, in which

Fig. 1 is a top view of an opening system for a container;
Fig. 2 is a detail of an opening system in a top view;
Figs. 3a-f are views of an opening system, in which Figs. 3a-d are top views and Figs. 3e-f are perspective views where the packaging material has been folded;
Fig. 4 is a view from the reversed side of an opening system, relative the top view seen in Fig. 1;
Fig. 5 is a detail of an opening system on the reversed side;
Fig. 6 is a side view of a detail of an opening system; and
Fig. 7 is a flowchart of a method of producing an opening system.

Detailed Description

[0026] Specific examples of the invention will now be described with reference to the accompanying drawings. This invention may, however, be embodied in many different forms and should not be construed as limited to the examples set forth herein; rather, these examples are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. The terminology used in the detailed description of the examples illustrated in the accompanying drawings is not intended to be limiting of the invention. In the drawings, like numbers refer to like elements.

[0027] Fig. 1 illustrates an example of an opening system 100 for a container, where the container is formed of a packaging material 101. The opening system 100 comprises a strip zone 102 to be opened when opening the container. The strip zone 102 extends between a first location 103 and second location 104 when arranged or provided on, or in, a plane 107 of the packaging material 101. Fig. 1 illustrates a plane 107 of the packaging material 101 that extends between upper and lower horizontally aligned dashed lines (denoted with upper and lower reference numerals 119 and 108, respectively), in which the strip zone 102 lies. This means that a container with such strip zone 102 has an opening that extends along the opened strip zone 102 between the first 103 and second location 104. The strip zone 102 may be an area in the packaging material that has a reduced resistance to shear forces inflicted into the packaging material 101 when engaging to open the container with the strip zone 102. The strip zone 102 may in that sense comprise a layer of material of reduced thickness, and/or a material having a reduced strength in one or two of the directions of the opening direction of the strip zone 102, or other weakening elements such as micro perforations, or a different type of packaging material. The strip zone 102 may comprise a pre-punched hole in the packaging material 101 that has been covered with a layer of a secondary sealing material such as a laminate, aluminum foil or other material for preventing any food product to leak. The strip zone 102 may be an area that is being ripped off of the packaging material 101 when opening the container, i.e. removed from the packaging material 101. It is also conceivable that the strip zone 102 encompass an area that is otherwise torn or perforated to produce a hole in the strip zone 102 while the torn or perforated material remains largely attached to the packaging material 101, for example along the edges of the strip zone 102. The opening system 100 comprises a grip element 105 attached to the strip zone 102 adjacent the first location 103. The grip element 105 is configured for opening of the strip zone 102 when moving the grip element 105, for example in a pulling, pushing, twisting or similar action, so that a force is transferred via the grip element 105 into the strip zone 102, for opening the latter.

[0028] The strip zone 102 extends, when arranged on the plane 107 of packaging material 101 for a container, in a longitudinal direction 106 of the strip zone, in at least two non-parallel directions (A, A', A"), on the plane 107. Fig. 1 illustrates a plane 107 of the packaging material 101 in which the strip zone 102 lies in this example. Lower edge 108 and upper edge 119 of the plane 107 may be the edges of the packaging material 101, i.e. defining the edges of the sheet of the packaging material from which the container is formed. In this case, lower and upper edge 108, 119, may be subsequently joined together to form a container. Edges 108 and/or 119 may also be the edges of a container formed from the packaging material 101, i.e. defining a packaging material plane 107 on a side, such as a front face, of such container. In the example shown in Fig. 1, the longitudinal extension 106 of

the strip zone 102 follows first a first direction (A), starting from the first location 103, and then a second direction (A') in the plane 107, towards the second location 104, and where the second direction (A') is non-parallel to the first direction. For a grip element 105 having a fixed geometry relative its fixation point, at the first location 103 of the strip zone 102, it is thus possible to extend the opening of a container along a path of longitudinal extension independent of the limitations posed by the location and geometrical arrangement of the grip element 105 in the plane 107 of the packaging material 101. The grip element 105 typically has a preferred orientation and placement relative the strip zone 102, in order to provide the best grip and/or allowing opening of the strip zone 102 with the least amount of force while still being positioned to best avoid unintentional opening. Thus, the container opening system 100 may for example follow a path - i.e. the path of the strip zone 102 - independent of such restraints to better fulfill requirements such as needing a certain width of the opening such as the full width of the container, to easily extract the contents of the container, with a minimum amount of content residues remaining in the container for a given extraction time. A preferred position of the first location 103 of the strip zone and the grip element 105 attached thereto can be close to an edge 108. The edge 108 may be a packaging material edge that is to be joined and sealed against a corresponding edge to form a container. Starting with the strip zone 102 closer to the edge 108 provides for maximizing the size of the opening for a given width of packaging material 101. At the same time, it is desired to not compromise on the opening mechanism, which can be the case when pushing the limits of packaging material real estate which can lead to undesired miniaturization of the opening mechanism that can be inefficient or difficult to operate. As mentioned above, the present disclosure provides for avoiding such compromises in that the restraints posed by having a preferred orientation, geometrical arrangement, or size of the grip element 105 for ease of operation, are not limiting when having the strip zone 102 extending in at least two non-parallel directions (A, A') in the plane of the packaging material 107. This is due to that the strip zone may extend in an direction (A') in which the opening of the container will largely extend (e.g. vertically in Fig. 1), while in a position close to the edge 108 extend in another direction (A) (e.g. horizontally in Fig. 1) in order to accommodate a desired arrangement or size of the grip element 105 that would otherwise be limited by the close proximity to the edge 108 of the packaging material 101. A better utilization of the available space is thus provided. This in turn can save the amount of packaging material used. For example, a container to storing a specific volume may have to be increased in size in certain dimensions if having requirements on the width of the opening. This in turn may not be possible if it is desired to have a specifically dimensioned container. Thus, it is provided for maximizing the width of the opening, e.g. minimizing the distance (d) between the strip zone 102 and the packaging material edge 108, illustrated in Fig. 1, while maintaining ease of operation and efficiency of the opening system 100, including the grip element 105. For example, in Fig. 1, lower and upper edges 108, 119, may be joined together, forming a tub-like container, so that the wider opening provides a lid of the tube-like container, that can be completely opened with ease, and stay opened when removing the material in the container.

[0029] The at least two non-parallel directions (A, A', A") may intersect at a first angle, which can be perpendicular (V1), as seen in the example in Fig. 1, or oblique (V2) as illustrated in Fig. 3b, or acute (V3) as illustrated in Fig. 3d, if comparing the same intersection between the least two non-parallel directions (A, A', A"). It may be desirable to have the strip zone 102 tracking a variety of paths in the packaging material 101 depending on the type of container and application in which the opening system 100 is to be used, in order to get the desired configuration and orientation of the opening. In Fig. 3b, for example, the edge 108 may extend in a certain oblique angle (V2), in a first direction (A), relative the transverse direction (A') in which it is desired to have the extension of the opening. Fig. 3d illustrates an example where the opening, i.e. the strip zone 102, also extends across substantially the entire width in the transverse direction (A') but where the first direction (A) in which the strip zone extends, from its first location 103, has been angled further inwards into the plane 107, increasing the distance to the edge 108. This can provide for an even more accessible grip element 105, e.g. being larger in size or having an angle that allows for an easier grip, while maintaining a maximum width of the opening. Fig. 3d shows a strip zone 102 that approximates a semi-circular shape, that also extends in a third direction (A") adjacent the second location 104, which may also be advantageous for certain applications, e.g. where it is desired to provide an opening in the form of a lid on e.g. the face of a container.

[0030] The grip element 105 may have a longitudinally extending direction (B) that is parallel to one of the least two non-parallel directions (A, A', A"). Fig. 1 shows an example where the grip element 105 has an elongated shape and extends in a longitudinal direction (B), which is parallel to the direction (A) in which the strip zone 102 is to be initially opened, here referred to as the first direction (A). When having the first direction (A) aligned along the edge 108 of the packaging material, and the grip element 105 aligned along the same, at the first location 103, then the grip element 105 can fulfill the requirements as discussed previously with respect to user friendliness and efficient operation - e.g. maintaining a certain minimum dimension for gripping with the fingers - while maintaining the necessary opening width along the second direction (A') in which the strip zone extends, being non-parallel to the first direction (A). This also minimizes the distance (d) from the opening to the edge 108. It could in an example be even zero or close to zero.

[0031] The grip element 105 may be attached to the

strip zone at a distal end 109 of the grip element 105, as illustrated in Fig. 1. The grip element 105 may extend from the distal end 109 in the longitudinally extending direction (B) which is opposite the direction (A) in which the strip zone 105 is to be initially opened. Having the grip element 105 extending from the distal end 109 opposite the direction in which the strip zone 105 is to be initially opened maximizes the momentum exerted from the grip element 105, via its attachment to the strip zone 102, onwards to the strip zone itself, for breaking open the same at the onset of opening. This reduces the required force needed to break the opening.

[0032] Figs. 3e-f illustrate examples where the packaging material has been folded along an edge 108' of the packaging material 101 to form a container 300. As seen in Fig. 3f, the at least two non-parallel directions (A, A') lie in the same plane 107 of the packaging material, which is construed as the surface area 107 within the edge 108 and the folding line 108'. Compared to Fig. 3e, it is clear that the strip zone 102 can be placed closer to the edge 108, while maintaining the same longitudinal extension of the grip element 105, in accordance with the advantages described above in relation to having the at least two non-parallel directions (A, A'). Fig. 3f illustrates that this advantageously provides a larger pivotable lid on top of the container above the strip zone 102. Also, since the corresponding residual distance (d) (illustrated in Fig. 1) between the strip zone 102 and the edge 108 is minimized, it will be easier to keep the lid in the open position, due to less material at the position of the container where the distance (d) is located - material which would otherwise restrain the pivoting action of the lid.

[0033] The at least two non-parallel directions (A, A', A") may lie in the same plane of the packaging material as a longitudinal sealing edge 108 of the packaging material. This is advantageous since, during manufacturing, the strip zone 102 and resulting opening can be placed close to the edge 108 of the packaging material 101 as explained above. It is also conceivable that the edge is instead a folding edge 108', e.g. when it is desired to have the opening extending on a front face of the container only, and not to the sides. In such case the packaging material edge 108, i.e. sealing edge 108, may in some applications be located on another face of the container, but the advantages described above still applies to the opening at the front face of the container.

[0034] Referring again to Fig. 1, the strip zone 102 at the first location 103 extends, in a longitudinal direction 106 thereof, in a direction (A) in which the strip zone 102 is to be initially opened and which may be parallel to a longitudinal sealing edge 108 of the packaging material 101, as illustrated. The strip zone 102 bends into a second direction (A', A") in which it extends, towards the second location 104, whereby the second direction (A', A") is non-parallel to the direction in which the strip zone is to be initially opened (A), i.e. the first direction (A). Having the first direction (A) aligned parallel with the edge 108 provides for minimizing the distance (d) between the strip zone 102 and the edge 108. It is conceivable that the first direction (A) is aligned with an angle to the edge 108, as may be required for certain applications.

[0035] The grip element 105 may lie flush with the plane 107 of the packaging material 101, which is illustrated in the side view of Fig. 6. The grip element 105 may further comprise an angled extension 110 at a proximal tip 111 of the grip element, opposite a distal portion 109 thereof, being angled away from the plane of the packaging material. This provides for easily lifting the grip element 101 from the surface of the packaging material 101 while keeping a flush profile that prevent accumulation of chemicals, e.g. peroxide, during the production process. The compact design also facilitates stacking and packing several containers together.

[0036] The strip zone 102 may extend at least partly along a non-straight path so that it forms a curvature 118 between the first 103 and second location 103, as illustrated in Fig. 1. The curvature allows a smooth transition when the opening propagates along the strip zone 102, during the opening process, between the at least two non-parallel directions (A, A', A") in a plane 107 of the packaging material 101. This can prevent undesired tearing of the packaging material 101 outside the strip zone 102. The radius of curvature can be chosen depending on the properties of the packaging material 101, where more brittle materials can benefit from a larger radius.

[0037] The opening system 100 may further comprise an opening element 112 attached to the strip zone 102 at an inside of the packaging material 101, and being fixedly arranged in relation to the grip element 105. The opening element 112 is illustrated in e.g. Figs. 4-5 showing the bottom side of the opening system, relative to the top view in Fig. 1. The opening element 112 may be configured to be removed from the inside of the packaging material 101 when moving the grip element 105 when opening the strip zone 102. The opening element 112 can facilitates opening the strip zone 102, since it may cut through the edges of the strip zone 102. Further it provides for a robust opening system 100 since forces exerted onto the external grip element 105 can propagate to the internal opening element 112 where the force can dissipate over a larger surface area, reducing any pressure on the single external location on the opening strip 102 where the grip element 105 is attached. The grip element 105 is connected with the opening element 112 through the sealing strip zone 102 (indicated by the portion 102 in Fig. 5), for example by extending through the strip zone 102. Or the grip element 105 and the opening element 112 may be joined with fixation means to either side of the strip zone 102. The grip element 105 and the opening element 112 may be injection molded in a single piece. The opening element 112 may extend on the inside of the packaging material 101 along the entire length of the strip zone 102, as illustrated in Fig. 4.

[0038] The opening element 105 may comprise a tapered portion 113 adjacent the grip element 105, as illustrated in Fig. 5. The tapered portion 113 can penetrate

the strip zone 102 when pulling the grip element 105, so that less force will be required to break the opening. It is conceivable that any protrusion with reduced cross-sectional dimension with respect to the opening element 112 can facilitate in such a manner.

[0039] A tip 114 of the tapered portion 113 may be centrally aligned with an elongated rib 116 in the distal portion 109 of the grip element 105 being attached to the strip zone 102, which is illustrated in Fig. 2. The elongated rib 116 may be aligned with the longitudinal extension (B) if the grip element 105. The rib 116 is arranged in the interface of the connection between the grip element 105 and the opening element 112 via the strip zone 102. The opening force will in this manner be concentrated to the tip 114 of the opening element 112, which will facilitate a more successful and easier opening. Several ribs 116 may be aligned across a width 115 of the opening element 105, and also be arranged in a V-shape to further improve transferring of the force exerted on the grip element 105 to the opening element 112 at the inside surface.

[0040] The opening system 100 may further comprise an opening support 117 at an outside of the packaging material 101 which at least partly encompasses the opening strip 102 and extends in the at least two non-parallel directions (A, A', A"). The opening support can provide a counterforce against the packaging material 101 when the strip zone 102 is opened, thereby preventing tearing of the packaging material outside the strip zone 102, and generally act as a guiding element along the at least two non-parallel directions (A, A', A") during the opening.

[0041] The opening system 100 can be provided on various packaging materials 101. It is conceivable that the opening system 100 is formed directly on the packaging material 101, e.g. by injection molding, or be attached to the packaging material in a modular based manner, such as providing the opening support 117, and/or the opening element 112, and/or the grip element 105, as separated or integrated finished components that are subsequently attached to a packaging material 101.

[0042] Fig. 7 illustrates a flowchart of a method 200 of producing an opening system 100 for a container. The method 200 comprises providing 201 a packaging material 101, and providing 202 a strip zone 102 in the packaging material 101 to be opened when opening the container. The strip zone 102 extends between a first location 103 and second location 104 in the packaging material 101. The method 200 comprises further attaching 203 a grip element 105 to the strip zone 102 adjacent the first location 103. Providing the strip zone 102 comprises extending 204 the strip zone 102 in at least two non-parallel directions (A, A', A") in a plane 107 of the packaging material 101 between the first 103 and second 104 location. The method 200 provides for the advantages described above.

[0043] The method 200 of producing an opening system may further comprise pre-making 205 an opening through the packaging material 101. The pre-made opening may extend along the strip zone 101.

[0044] A container 300 is provided comprising an opening system 100, where the opening system comprises a strip zone 102 to be opened when opening the container, the strip zone extending between a first location 103 and second location 104 in the packaging material 101 of the container. The container 300, upon opening of the strip zone, has an opening that extends along the opened strip zone between the first and second location. A grip element 105 is attached to the strip zone adjacent the first location for opening of the strip zone when moving the grip element. The strip zone extends, in a longitudinal direction 106 thereof, in at least two non-parallel directions (A, A', A") in a plane 107 of the packaging material.

[0045] It should be readily understood that the general principle of the above description is applicable to a variety of packages including food packages, such as Tetra Fino Aseptic, but also other packages serving as containers for viscous fluids. Additionally, the above description is applicable to a variety of packaging materials, such as a pre-laminated packaging material and it is apparent for a skilled person that the above principles would also be valid for other packaging material, also having various types of treatments for e.g. secure an oxygen barrier, prevents light or other common material treatments.

[0046] The present invention has been described above with reference to specific examples. However, other examples than the above described are equally possible within the scope of the invention. The different features and steps of the invention may be combined in other combinations than those described. The scope of the invention is only limited by the appended patent claims.

[0047] More generally, those skilled in the art will readily appreciate that all parameters, dimensions, materials, and configurations described herein are meant to be exemplary and that the actual parameters, dimensions, materials, and/or configurations will depend upon the specific application or applications for which the teachings of the present invention is/are used.

Claims

1. An opening system (100) for a container of a packaging material (101), the opening system comprising;
   a strip zone (102) to be opened when opening the container, the strip zone extending between a first location (103) and second location (104) when arranged on a plane (107) of packaging material (101) for a container, whereby the container, upon opening of the strip zone, has an opening that extends along the opened strip zone between the first and second location, and
   a grip element (105) attached to the strip zone adjacent the first location for opening of the strip zone when moving the grip element, and wherein the strip

zone extends, when arranged on a plane (107) of packaging material (101) for a container, in a longitudinal direction (106) of the strip zone, in at least two non-parallel directions (A, A', A") in said plane (107).

2. Opening system according to claim 1, wherein the at least two non-parallel directions intersect at a first angle (V1, V2, V3), being perpendicular, oblique or acute.

3. Opening system according to claim 1 or 2, wherein the grip element has a longitudinally extending direction (B) that is parallel to one of the least two non-parallel directions (A, A', A").

4. Opening system according to claim 3, wherein the grip element is attached to the strip zone at a distal end (109) of the grip element, and wherein the grip element extends from the distal end in the longitudinally extending direction (B) which is opposite the direction (A) in which the strip zone is to be initially opened.

5. Opening system according to any of claims 1 - 4, wherein the at least two non-parallel directions (A, A', A") lies in the same plane when arranged on a plane (107) of the packaging material.

6. Opening system according to any of claims 1 - 5, wherein the at least two non-parallel directions (A, A', A") lies in the same plane, when arranged on a plane of the packaging material, as a longitudinal sealing edge (108) of the packaging material.

7. Opening system according to any of claims 1 - 6, wherein the strip zone at the first location extends, in a longitudinal direction thereof, in a direction (A) in which the strip zone is to be initially opened and which is parallel to a longitudinal sealing edge (108) of the packaging material, and wherein the strip zone bends into a second direction (A', A"), in which it extends towards the second location, whereby the second direction is non-parallel to the direction in which the strip zone is to be initially opened.

8. Opening system according to any of claims 1 - 7, wherein, when arranged on a plane (107) of the packaging material, the grip element lies flush with the plane (107), the grip element further comprising an angled extension (110) at a proximal tip (111) of the grip element, opposite a distal portion (109) thereof, being angled away from the plane of the packaging material.

9. Opening system according to any of claims 1 - 8, wherein the strip zone extends at least partly along a non-straight path so that it forms a curvature (118) between the first and second location.

10. Opening system according to any of claims 1 - 9, further comprising an opening element (112) attached to the strip zone, the opening element is configured to be arranged at an inside of the packaging material, and being fixedly arranged in relation to the grip element, whereby the opening element is configured to be removed from the inside of the packaging material along with moving the grip element when opening the strip zone.

11. Opening system according to claim 10, wherein the opening element comprises a tapered portion (113) adjacent the grip element, the tapered portion penetrating the strip zone when pulling the grip element, wherein a tip (114) of the tapered portion is centrally aligned with an elongated rib (116) in the distal portion (109) of the grip element being attached to the strip zone, the elongated rib being aligned with the longitudinal extension (B) if the grip element.

12. Opening system according to any of claims 1 - 11, further comprising an opening support (117) configured to be arranged at an outside of the packaging material and which at least partly encompasses the opening strip and which extends in the at least two non-parallel directions (A, A', A").

13. A method (200) of producing an opening system (100) for a container comprising;
providing (201) a packaging material (101),
providing (202) a strip zone (102) in the packaging material to be opened when opening the container, the strip zone extending between a first location (103) and second location (104) in the packaging material,
attaching (203) a grip element (105) to the strip zone adjacent the first location (103), wherein providing the strip zone comprises extending (204) the strip zone in at least two non-parallel directions (A, A', A") in a plane (107) of the packaging material between the first and second location.

14. Method of producing an opening system according to claim 13 further comprising pre-making (205) an opening through the packaging material, the opening extending along the strip zone.

15. A container (300) comprising an opening system according to any one of claims 1-12.

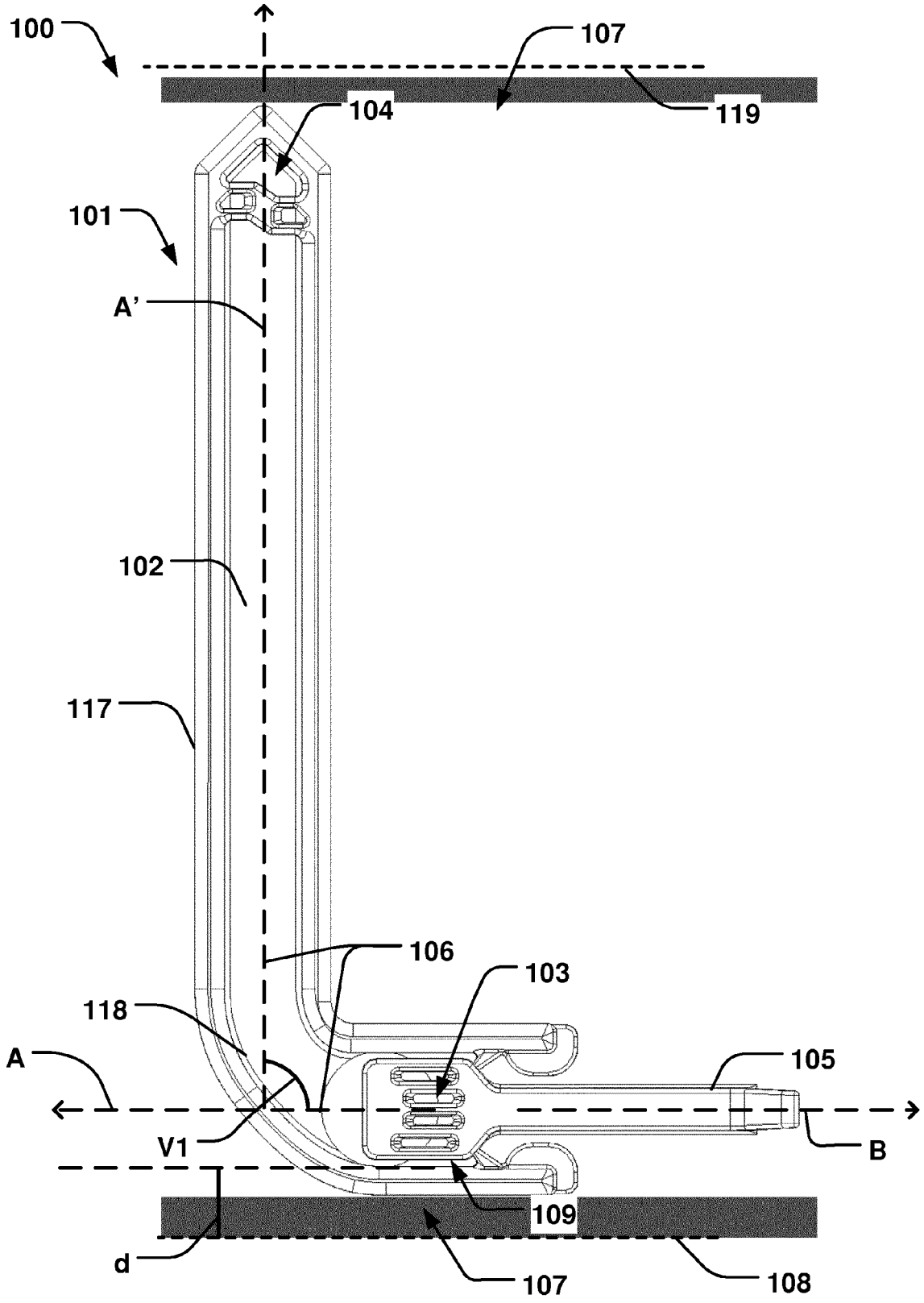

Fig. 1

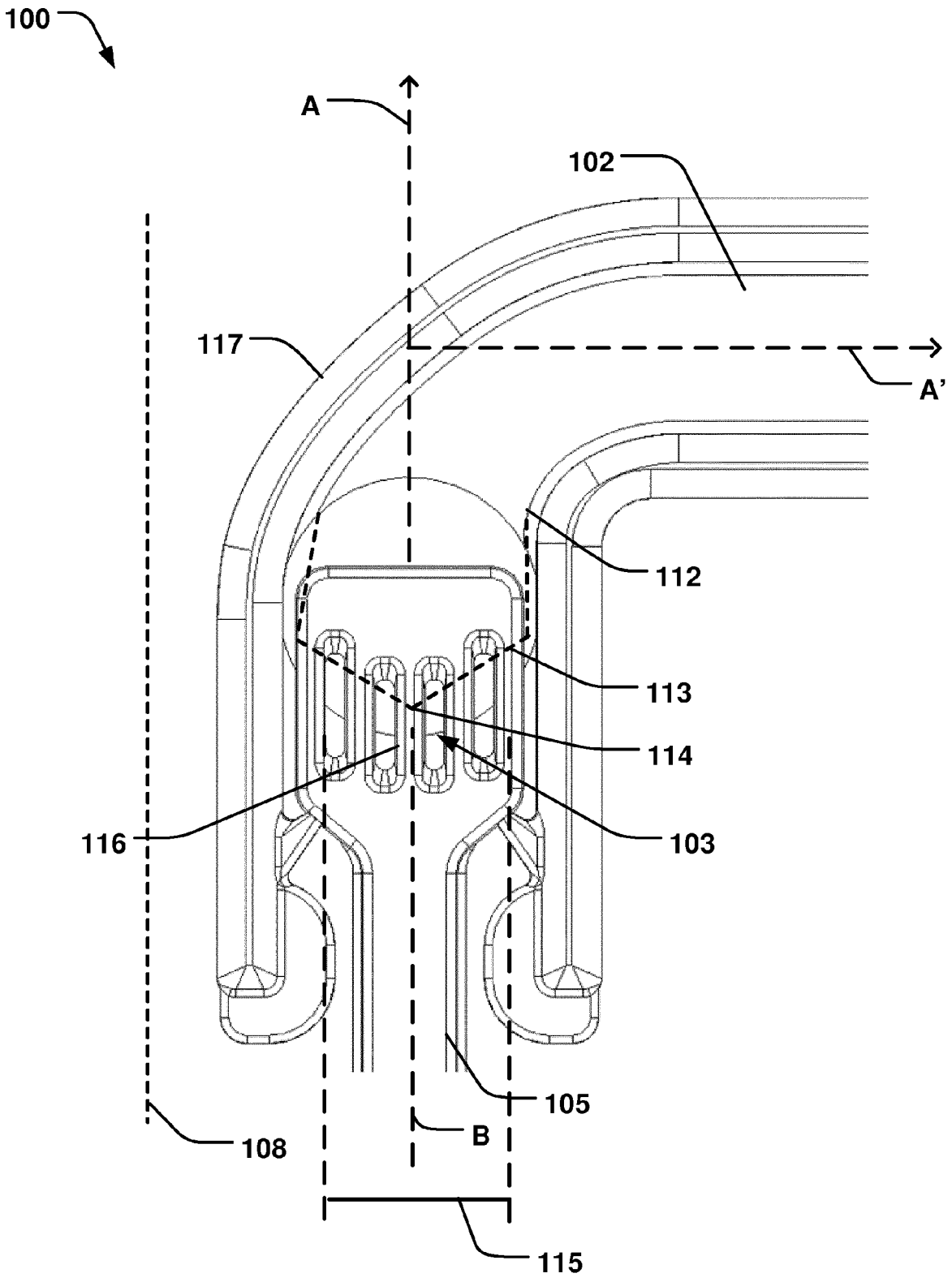

Fig. 2

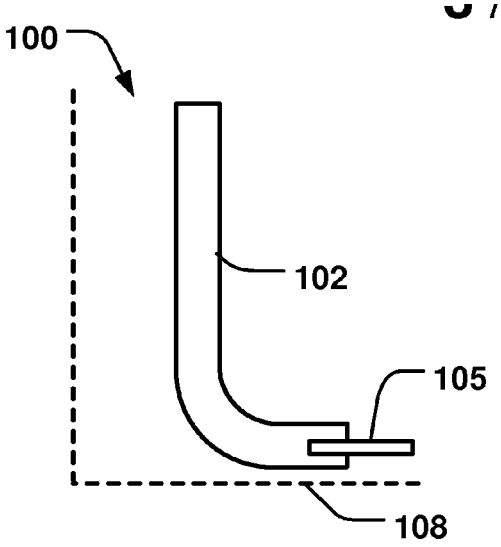

Fig. 3a

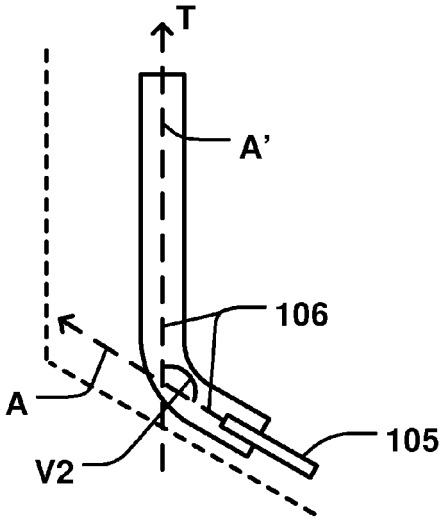

Fig. 3b

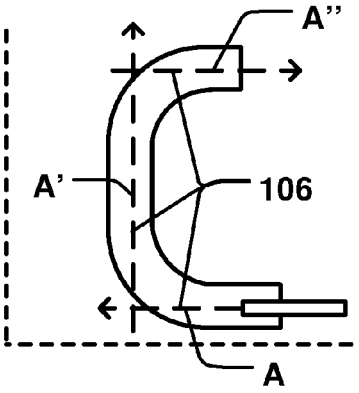

Fig. 3c

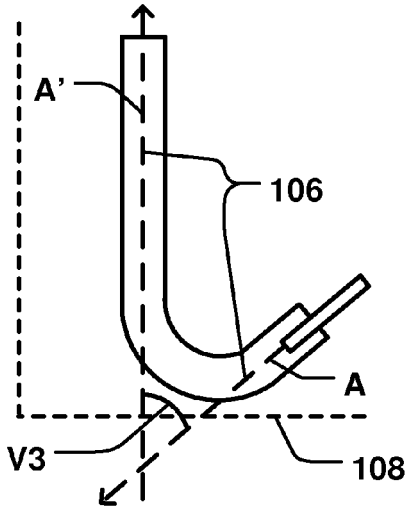

Fig. 3d

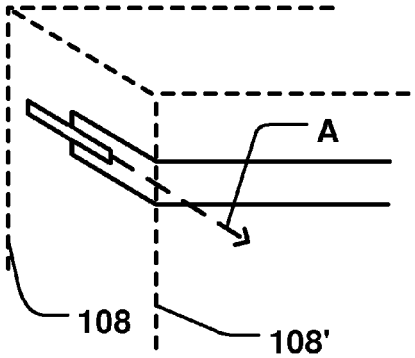

Fig. 3e

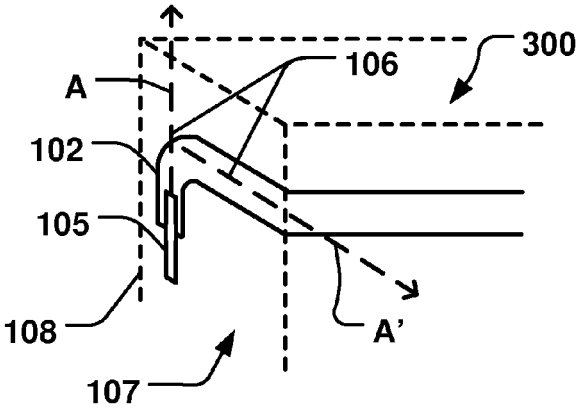

Fig. 3f

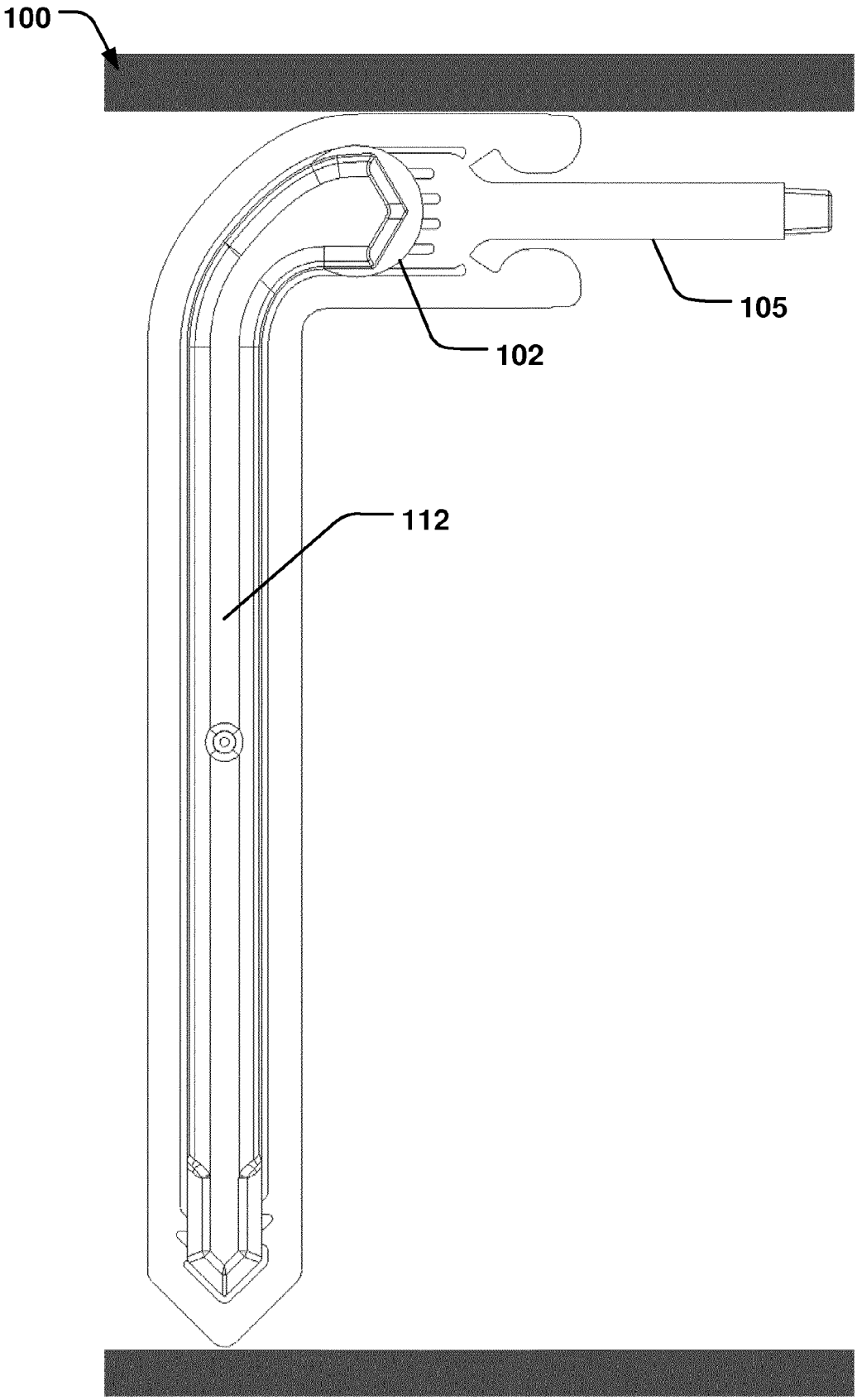

Fig. 4

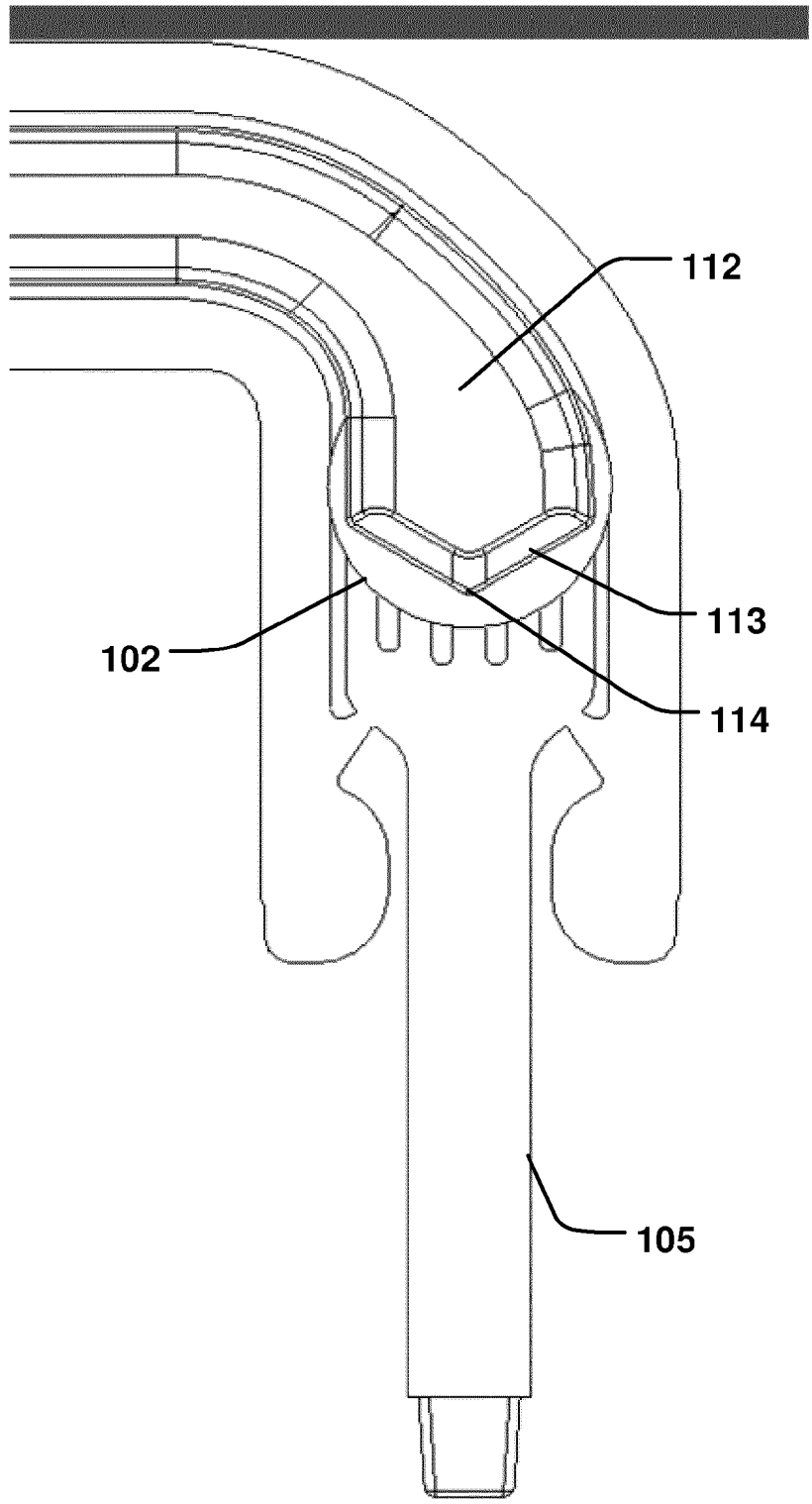

Fig. 5

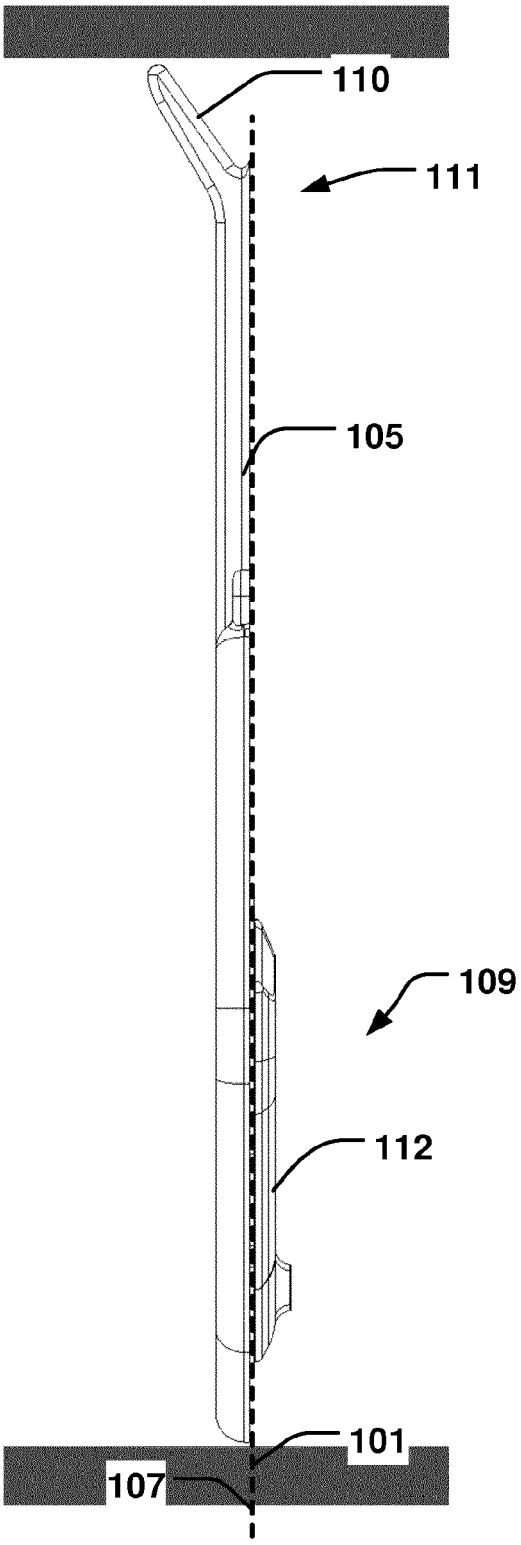

Fig. 6

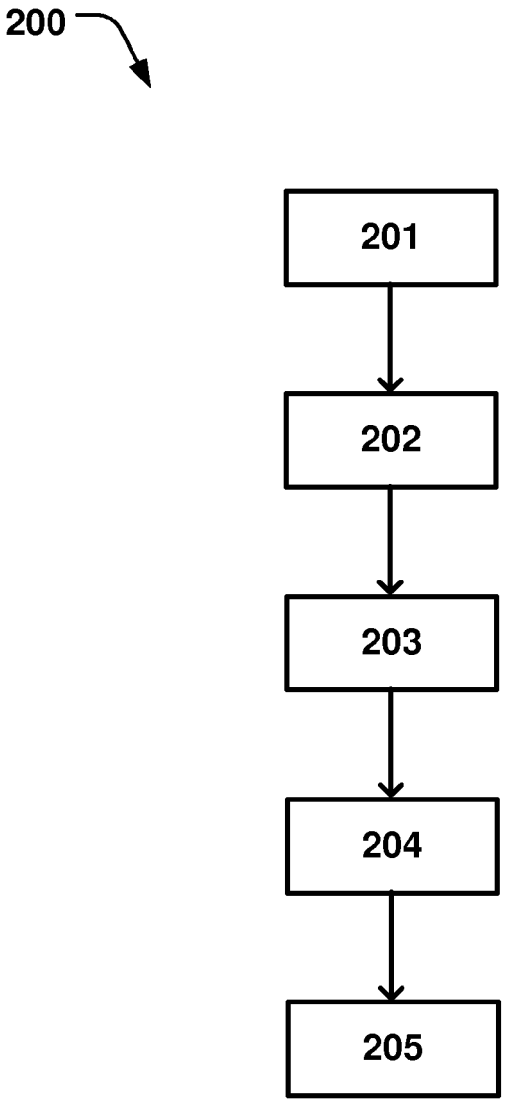

Fig. 7

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Application Number
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Place of search	Date of completion of the search	Examiner
Munich	21 February 2017	Leijten, René

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