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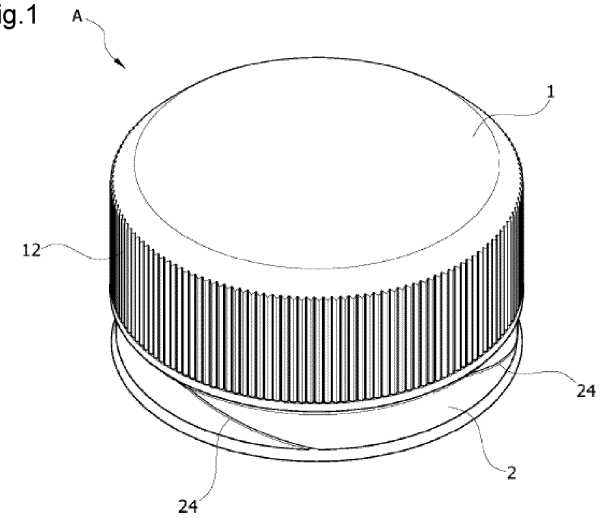
(54) PET CONTAINER CAP WITH SIMULTANEOUSLY SEPARABLE END RING

(57) A PET container cap, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, is proposed. The cap includes a cap body which is provided on and coupled to the injection part so as to provide tight blocking for preservation of contents; and an end ring which is integrally formed at the lower side of the cap body, is restricted by an annular protrusion formed at the lower side of the outer circumference of the injection part, exhibits a sealing function enabling grasping of openness of the cap body, and causes transformation in a separation process of the cap body by a user, so that the end ring is simultaneously separated together with the cap body from the injection part.

Fig.1



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Description

Technical Field

[0001] The present invention relates to a PET container cap with a simultaneously separable end ring and, more particularly, to a PET container cap with a simultaneously separable end ring, in which when a cap body (a cap) provided on and coupled to an injection part of a PET container is separated, an end ring provided on the lower side of the cap body may be separated therewith.

Background Art

[0002] Since a polyethylene terephthalate (PET) container which is currently used is especially light, transparent, and recyclable, the PET container has become popular as a container for food and beverage.

[0003] Since the PET container was invented, this was immediately used in the industry due to the boom of a soda drinks and the advantages of the PET material. This container was so booming that 100 billion bottles were produced per year around 1999. At first, this was mostly used as a container for containing liquid such as beverage or sauce. However, recently, the container is used as various package materials for containing alcoholic beverages such as beer or soju as well as eye drops and detergent, so now PET containers have become essential in the living environment of consumers.

[0004] Meanwhile, a cap is provided on an injection part (spout) of the PET container to provide tight blocking for preserving contents (food and beverage, etc.) and a sealing function for identifying openness.

[0005] Specifically, a conventional PET container includes a container body that contains contents, and a cap that is coupled to an injection part of the container body. A spiral binding protrusion for fastening the cap and an annular protrusion for preventing the separation of the cap are formed on an outer circumference of the injection part of the container body.

[0006] Further, the cap includes a cap body that seals and tightly blocks the injection part of the container body and an end ring that seals the cap body. A spiral protrusion is formed on the inner circumference of the cap body to correspond to a binding protrusion formed on the outer circumference of the injection part, and a plurality of interference protrusions is formed on the inner circumference of the end ring to engage with the annular protrusion formed on the outer circumference of the injection part.

[0007] Therefore, even if the cap is rotated counterclockwise to be separated from the injection part of the PET container, the interference protrusion on the inner circumference of the end ring engages with the annular protrusion on the outer circumference of the injection part to be thereby constrained. Consequently, the end ring remains in the PET container.

[0008] In this regard, the PET container and the cap are made of different materials, i.e., PET and PE (high density polyethylene; HDPE). In order to satisfy the recyclability (recycling) of the PET container, it is preferable to separate different materials, i.e., the cap and the end ring that is the accessory of the cap and then recover a single material if possible.

[0009] To this end, the end ring is separated from the PET container in the method of cutting the end ring using a cutting tool such as scissors or nippers. However, because of the inconvenience of this method, the PET container is usually recovered with the end ring remaining. This makes separate garbage collection difficult, so the PET container is thrown away as general waste, thus wasting resources as well as causing environmental pollution.

[0010] In order to solve the problem, Korean Patent Laid-Open Publication No. 10-2012-0101626 has disclosed a structure for removing an end ring of a resin bottle cap and a container having the same. The conventional structure for removing the end ring of the resin bottle cap and the container having the same are configured such that a portion of a ring stop upper flange (annular protrusion) for restricting the end ring on an injection part is cut in the shape of a slope to form a guide flange cut part. Thus, if the end ring is rotated, a plurality of protruding flaps (interference protrusions) formed on the inner circumference of the end ring leaves the guide flange cut part, thus allowing the end ring to be easily removed from the injection part.

[0011] However, since the guide flange cut part should be necessarily formed to achieve the above-described structure for removing the end ring, there is a problem of lack of compatibility that the injection part of the PET container should be manufactured in a shape different from the conventional injection part, which makes it somewhat difficult to apply in practice.

[0012] Eventually, in the process of separating the cap from the PET container without changing the shape of the PET container, research and development for the PET container cap in which the end ring can be separated (removed) together are required.

Disclosure

Technical Problem

[0013] The present invention has been made to solve the above-mentioned problems and difficulties and relates to a PET container cap with a simultaneously separable end ring, in which the end ring on the lower side of a cap body is transformed in the process of separating the cap body (cap) from an injection part of a PET container, so the restriction force of the end ring (interference protrusion formed on an inner circumference) by an annular protrusion protruding from the outer circumference of the injection part is lost when the cap body is separated, and thus the end ring can also be separated (removed).

Technical Solution

[0014] In order to accomplish the above objective, the present invention provides a PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap including a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents; and an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion formed on a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is simultaneously separated together with the cap body from the injection part.

[0015] The cap body may further include a spiral protrusion formed on an inner circumference of the cap body to correspond to a spiral fastening protrusion formed on the outer circumference of the injection part; and a knurling part formed on an outer circumference of the cap body to prevent a slip when a user holds the cap with his or her hand and rotates the cap clockwise/counterclockwise.

[0016] The end ring may include an interference protrusion formed on an inner circumference of the end ring to engage with a restraint protrusion of the injection part when the cap body is coupled to the injection part; a connecting projection integrally connected to a portion of a lower end of the cap body to cause transformation in a separation process of the cap body; and a sealing projection integrally connected to another portion of the lower end of the cap body to be fractured in the separation process of the cap body and to enable the openness of the cap body to be identified.

[0017] The end ring may include a plurality of cut parts that are cut long to extend from an uppermost end to a lowermost end, are inclined in one direction, and are formed at regular intervals to cause degradation of a ring-shaped preservation ability as a gap is increased by the connecting projection that maintains a connection state with the cap body in the separation process of the cap body.

[0018] The connecting projection may be connected to the cap body to increase the gap of the cut part in the separation process of the cap body, may protrude from an upper end, and may be connected to the lower end of the cap body while extending long from a first end of the cut part to a predetermined range, and the sealing projection may be connected to the cap body, may protrude from an upper end to exhibit the sealing function that enables the openness of the cap body to be identified as the sealing protrusion is fractured in the separation process of the cap body, and may be connected to a lower end of the cap body while extending short from a second end of the cut part to a predetermined range.

[0019] The cut part may be cut long to extend from an uppermost end to a position adjacent to a lowermost end and thereby lead to transformation that causes a restriction force of the connecting projection to be lost by the restraint protrusion formed on the outer circumference of the injection part as the gap is increased by an upward movement of the connecting projection connected to the cap body in the separation process of the cap body, and the cut part may be formed in a slope type having an inclination in one direction.

[0020] The present invention provides a PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap including a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents; and an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion protruding from a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is separated together with the cap body from the injection part, wherein the end ring may include an interference protrusion restricted by the annular protrusion when the cap body is coupled to the injection part; a plurality of transformation parts transformed to flare out, thus allowing the interference protrusion to pass over the annular protrusion when the cap body is separated from the injection part, due to a "⌐"-shaped cut part extending horizontally and vertically from a boundary of the cap body; and a sealing projection protruding from an upper end of each of the transformation parts to be integrally connected to a lower end of the cap body, fractured in the separation process of the cap body, and enabling the openness of the cap body to be identified depending on a fractured state.

[0021] The interference protrusion may protrude from an inner surface of the transformation part to be restricted by the annular protrusion, may have an inclination in which a protruding end thereof is inclined upwards, and may be bent downwards by the annular protrusion in the process of separating the cap body from the injection part, thus causing the transformation of the transformation part and allowing the interference protrusion to pass over the annular protrusion when the transformation part is transformed.

[0022] The interference protrusion may be in a shape of a simple protrusion that causes the transformation of the transformation part in the process of separating the cap body from the injection part and allows the interference protrusion to pass over the annular protrusion when the transformation part is transformed.

[0023] The present invention provides a PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state

of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap including a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents; an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion protruding from a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is separated together with the cap body from the injection part, the cap body and the end ring being separated from each other by a cut part; a plurality of interference protrusions formed on an inner circumference of a boundary between the cap body and the end ring to protrude at regular intervals, connecting the cap body and the end ring, restricted by the annular protrusion when the cap body is coupled to the injection part, and changed in shape to pass over the annular protrusion in the process of separating the cap body; and a sealing projection formed on the inner circumference of the boundary, connecting a lower end of the cap body and an upper end of the end ring, fractured in the separation process of the cap body, and enabling the openness of the cap body to be identified depending on the fractured state.

[0024] The interference protrusion may be integrally connected at both ends thereof to the lower end of the cap body and the upper end of the end ring, and may be bent to a side to be restricted by the annular protrusion, thus having a shape of "<", and may be spread out by the annular protrusion in the process of separating the cap body from the injection part, so the cap body and the end ring may be separated from each other and thereby the sealing projection may be fractured and interference of the annular protrusion may be avoided to allow the end ring to be simultaneously separated.

Advantageous Effects

[0025] As described above, a PET container cap with a simultaneously separable end ring of the present invention allows a cap body as well as an end ring on a lower side of the cap to be simultaneously separated in the process of separating the cap body (cap) from an injection part of a PET container, thus making it possible to recover the PET container as a single material for satisfying recyclability (recycling).

[0026] In particular, as described above, when a cap body is rotated counterclockwise to be separated from an injection part of a PET container, this leads to the transformation (degradation of the preservation ability of a ring shape) of an end ring, thereby allowing an interference protrusion formed on the inner circumference of the end ring to disengage from an annular protrusion formed on the outer circumference of the injection part. Consequently, it is possible to more easily separate the end ring from the injection part.

[0027] Furthermore, the above-described effects do not only facilitate separating an end ring, but also serve as a guideline for developing competitive products, thus enhancing the quality of life. Therefore, this is a very useful invention that can greatly contribute to the establishment of a policy and recovery technology for a waste-resource recycling industry that recovers and recycles resources from discarded waste resources.

Description of Drawings

[0028]

FIGS. 1 to 3 are a perspective view and a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a first embodiment of the present invention.

FIG. 4 is a perspective view illustrating important parts of the configuration of the end ring of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention.

FIG. 5 is a sectional view illustrating the use of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention.

FIGS. 6 to 8 are a perspective view and a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a second embodiment of the present invention.

FIG. 9 is a perspective view illustrating important parts of the configuration of the end ring of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention.

FIG. 10 is a sectional view illustrating the use of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention.

FIG. 11 is a sectional view illustrating another configuration of an interference protrusion, in the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention.

FIG. 12 is a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a third embodiment of the present invention.

FIGS. 13 to 15 are diagrams illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention.

FIGS. 16 and 17 are sectional views illustrating the transformation of the end ring when the PET container cap with the simultaneously separable end

ring in accordance with the first embodiment of the present invention is separated.

FIGS. 18 to 20 are sectional views illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention.

FIGS. 21 to 24 are sectional views illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the third embodiment of the present invention.

Mode for Invention

[0029] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings such that a person of ordinary skill in the art to which the present invention pertains can easily practice the present invention.

[0030] First, it is to be noted that the same reference numerals are used throughout the drawings to designate the same or similar components. Further, if it is determined that the detailed description of a known configuration or function may obscure the gist of the present invention in the description of the present invention, the detailed description will be omitted.

[0031] FIGS. 1 to 3 are a perspective view and a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a first embodiment of the present invention, FIG. 4 is a perspective view illustrating important parts of the configuration of the end ring of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention, and FIG. 5 is a sectional view illustrating the use of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention.

[0032] As shown in FIGS. 1 to 3, the PET container cap A with the simultaneously separable end ring in accordance with the first embodiment of the present invention includes a cap body 1 that is provided on and coupled to an injection part of the PET container to preserve contents, and an end ring 2 that is integrally formed on the lower side of the cap body 1, is restricted by an annular protrusion formed on the lower side of the outer circumference of the injection part, has a sealing function for identifying the openness of the cap body 1, and causes transformation in a separation process of the cap body 1 by a user, so the end ring 2 is simultaneously separated together with the cap body 1 from the injection part of the PET container.

[0033] The cap body 1 is provided on and coupled to the injection part of the PET container for the purpose of preservation so as to prevent the leakage of contents (food and beverage, etc.) contained in the PET container, and a binding protrusion 11 is formed on the inner circumference of the cap body to correspond to a spiral binding protrusion formed on the outer circumference of the injection part of the PET container.

[0034] Preferably, a knurling part 12 is further formed on the outer circumference of the cap body 1 to prevent a slip when a user holds the cap with his or her hand and rotates the cap clockwise/counterclockwise.

[0035] The end ring 2 exhibits the sealing function of the cap body 1 that is provided on and coupled to the injection part of the PET container. As shown in FIGS. 4 and 5, an interference protrusion 21 is formed on the inner circumference of the end ring to engage with an annular protrusion 920 formed on the outer circumference of an injection part 910 when the cap body 1 is coupled to the injection part 910 of the PET container 900.

[0036] Further, a connecting projection 22 and a sealing projection 23 are formed on the end ring. The connecting projection is integrally connected to a portion of a lower end of the cap body 1 to cause the transformation in the separation process of the cap body 1. The sealing projection 23 is integrally connected to another portion of the lower end of the cap body 1 to be fractured in the separation process of the cap body 1 and identify the openness of the cap body 1.

[0037] In addition, a plurality of cut parts 24 is cut long to extend from an uppermost end to a lowermost end, is inclined in one direction, and is formed at regular intervals to cause degradation of a ring-shaped preservation ability as a gap is increased by the connecting projection 22 that maintains a connection state with the cap body 1 in the separation process of the cap body 1.

[0038] The connecting projection 22 is connected to the cap body 1 to increase the gap of the cut part 24 in the separation process of the cap body 1, protrudes from an upper end, and is connected to the lower end of the cap body 1 while extending long from a first end of the cut part 24 to a predetermined range.

[0039] The sealing projection 23 is connected to the cap body 1, exhibits the sealing function to allow a user to identify the openness of the cap body 1 as the sealing protrusion is fractured in the separation process of the cap body 1, protrudes from the upper end, and is connected to the lower end of the cap body 1 while extending short from a second end of the cut part 24 to a predetermined range.

[0040] The cut part 24 leads to transformation (degradation of the ring-shaped preservation ability) to cause the restriction force of the connecting projection 22 to be lost by the annular protrusion 920 formed on the outer circumference of the injection part 910 as the gap is increased by the upward movement of the connecting projection 22 connected to the cap body 1 in the separation process of the cap body 1. The cut part is cut long to extend from the uppermost end to a position adjacent to the lowermost end, and is preferably formed in a slope type having an inclination in one direction.

[0041] Meanwhile, FIGS. 6 to 8 are a perspective view and a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a second embodiment of the

present invention, FIG. 9 is a perspective view illustrating important parts of the configuration of the end ring of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention, and FIG. 10 is a sectional view illustrating the use of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention. As shown in FIGS. 6 to 8, a PET container cap A-1 with a simultaneously separable end ring in accordance with the second embodiment of the present invention includes a cap body 1 that is provided on and coupled to an injection part 910 of the PET container 900 to preserve contents, and an end ring 2 that is integrally formed on the lower side of the cap body 1, is restricted by an annular protrusion 920 formed on the lower side of the outer circumference of the injection part 910, has a sealing function for identifying the openness of the cap body 1, and causes transformation in a separation process of the cap body 1 by a user, so the end ring is separated together with the cap body 1 from the injection part 910 of the PET container 900.

[0042] The cap body 1 is coupled to the injection part 910 of the PET container 900 to prevent the leakage of the contents contained in the PET container 900, and the binding protrusion 11 is formed on the inner circumference of the cap body to correspond to a binding protrusion 930 protruding spirally from the outer circumference of the injection part 910 of the PET container 900.

[0043] Preferably, as shown in FIG. 8, the binding protrusion 11 is formed on the inner circumference of the cap body 1, and the knurling part 12 is formed on the outer circumference thereof.

[0044] The end ring 2 is intended to realize the sealing function of the cap body 1 that is coupled to the injection part 910 of the PET container 900. As shown in FIGS. 8 and 9, the end ring includes an interference protrusion 21-1 that is restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 when the cap body 1 is coupled to the injection part 910, and a plurality of transformation parts 25 that are transformed to flare out, thus allowing the interference protrusion 21-1 to pass over the annular protrusion 920 when the cap body 1 is separated from the PET container 900 due to the cut part 24-1.

[0045] Further, a sealing projection 23-1 protrudes from the upper end of the transformation part 25 to be integrally connected to the lower end of the cap body 1, is fractured in the separation process of the cap body 1, and enables the openness of the cap body 1 to be identified depending on the fractured state.

[0046] The interference protrusion 21-1 has an inclination in which an end thereof protrudes upwards from the inner surface of the transformation part 25, so the interference protrusion may be restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 of the PET container 900. In the process of separating the cap body 1 from the injection part 910, the interference protrusion is bent downwards by the annular protrusion 920, thus causing the transformation of the transformation part 25 and allowing the interference protrusion to pass over the annular protrusion 920 when the transformation part 25 is transformed.

[0047] As shown in FIG. 8, it is preferable that the cut part 24-1 extends horizontally and vertically from a boundary (uppermost end) of the cap body 1 in the shape of "⌐".

[0048] Further, FIG. 11 is a sectional view illustrating another configuration of an interference protrusion, in the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention. In the PET container cap with the simultaneously separable end ring in accordance with the second embodiment, as shown in FIG. 11, the interference protrusion 21-2 of another configuration may be in the shape of a simple protrusion that causes the transformation of the transformation part 25 in the process of separating the cap body 1 and allows the interference protrusion to pass over the annular protrusion 920 when the transformation part is transformed.

[0049] On the other hand, FIG. 12 is a sectional view illustrating the configuration of a PET container cap with a simultaneously separable end ring in accordance with a third embodiment of the present invention. As shown in FIG. 12, the PET container cap A-2 with the simultaneously separable end ring in accordance with the third embodiment of the present invention includes a cap body 1 that is provided on and coupled to an injection part 910 of the PET container 900 to preserve contents, and an end ring 2 that is integrally formed on the lower side of the cap body 1, is restricted by an annular protrusion 920 formed on the lower side of the outer circumference of the injection part 910, has a sealing function for identifying the openness of the cap body 1, and causes transformation in the separation process of the cap body 1 by a user, so the end ring is separated together with the cap body 1 from the injection part 910 of the PET container 900. The cap body 1 and the end ring 2 are separated from each other by a cut part 24-2.

[0050] Preferably, as shown in FIG. 12, the binding protrusion 11 is formed on the inner circumference of the cap body 1, and the knurling part 12 is formed on the outer circumference thereof.

[0051] Further, a plurality of interference protrusions 21-3 and a sealing projection 23-2 are formed on an inner circumference of a boundary between the cap body 1 and the end ring 2 separated to each other by the cut part 24-2. The interference protrusions protruding at regular intervals connect the cap body and the end ring, are restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 when the cap body 1 is coupled to the injection part 910 of the PET container 900, and are changed in shape to pass over the annular protrusion 920 in the process of separating the cap body 1 from the PET container 900. The

sealing projection connects the lower end of the cap body 1 and the upper end of the end ring 2, is fractured in the separation process of the cap body 1, and enables the openness of the cap body 1 to be identified depending on the fractured state.

[0052] The interference protrusion 21-3 is integrally connected at both ends thereof to the lower end of the cap body 1 and the upper end of the end ring 2, and is bent to a side to be restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 of the PET container 900, thus having the shape of "<". In the process of separating the cap body 1 from the injection part 910, the cap body 1 and the end ring 2 are separated from each other by the annular protrusion 920, so the sealing projection 23-2 is fractured and the interference of the annular protrusion 920 may be avoided to allow the end ring 2 to be simultaneously separated.

[0053] The operation of the PET container cap A with the simultaneously separable end ring according to the present invention configured as such will be described in detail. The operation of the cap A with the simultaneously separable end ring according to the first embodiment of the present invention is as follows.

[0054] FIGS. 13 to 15 are diagrams illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention, and FIGS. 16 and 17 are sectional views illustrating the transformation of the end ring when the PET container cap with the simultaneously separable end ring in accordance with the first embodiment of the present invention is separated. As shown in FIG. 13, the PET container cap A with the simultaneously separable end ring in accordance with the first embodiment of the present invention is coupled to the injection part 910 of the PET container 900, thus sealing and tightly blocking the injection part 910 to preserve contents (food and beverage, etc.) contained in the PET container 900, and providing the sealing function to enable the openness to be identified.

[0055] In this state, the cap A is separated from the injection part 910, so a user may drink the contents contained in the PET container 900. As described above, in the separation process of the cap A, the end ring 2 connected to the lower side of the cap body 1 is separated together with the cap body 1, so the end ring can be easily removed from the PET container 900.

[0056] In other words, the cap body 1 coupled to the injection part 910 of the PET container 900 is rotated counterclockwise, so the cap body 1 moves upwards along the injection part 910. By continuing this process, the cap body is completely separated from the PET container 900, thus opening the injection part 910. Thereby, a user may drink beverage contained in the PET container 900.

[0057] In such a process, the end ring 2 integrally provided on the lower side of the cap body 1 is separated (removed) from the injection part 910 together with the cap body 1, so it is possible to recover the PET container 900 of a single material, thus greatly enhancing recyclability.

[0058] Specifically, if the cap body 1 coupled to the injection part 910 is rotated counterclockwise to open the injection part 910, the binding protrusion 11 formed on the inner circumference of the cap body 1 moves along the binding protrusion 930 formed on the outer circumference of the injection part 910 of the PET container 900, so the cap body 1 moves to the upper side of the injection part 910. By continuing this process, the cap body is completely separated from the injection part 910 of the PET container 900.

[0059] In this regard, as the interference protrusion 21 formed on the inner circumference of the end ring 2 engages with the annular protrusion 920 formed on the outer circumference of the injection part 910 (see FIG. 16), as shown in FIG. 17, a gap between the cap body 1 and the end ring 2 increases. In such a process, the sealing projection 23 formed on the upper end of the end ring 2 and connected to the lower end of the cap body 1 is fractured by tension. Further, a portion of the end ring 2 on which the connecting projection 22 is formed is lifted upwards about the cut part 24 by the connecting projection 22 formed on another upper end of the end ring 2 and connected to another lower end of the cap body 1, thus causing transformation in which the gap of the cut part 24 increases. Due to the loss of the shape preservation ability (degradation of the ring-shaped preservation ability) caused by the transformation of the end ring 2, as shown in FIG. 17, the interference protrusion 21 on the inner circumference of the end ring 2 passes over the annular protrusion 920 on the outer circumference of the injection part 910 of the PET container 900. Thus, as shown in FIG. 15, the end ring 2 completely escapes from the injection part 910 and the end ring 2 as well as the cap body 1 may be simultaneously separated from the PET container 900.

[0060] Therefore, it is possible to separate both the cap body 1 and the end ring 22 that is the accessory of the cap body 1, thus recovering the PET container 900 of a single material and thereby maximizing recyclability (see FIG. 15) .

[0061] Further, FIGS. 18 to 20 are sectional views illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the second embodiment of the present invention. The operation of the cap A-1 with the simultaneously separable end ring in accordance with the second embodiment of the present invention is as follows.

[0062] As shown in FIGS. 18 to 20, the PET container cap A-1 with the simultaneously separable end ring in accordance with the second embodiment of the present invention is coupled to the injection part 910 of the PET container 900 (see FIG. 10), thus sealing and tightly blocking the injection part 910 to preserve contents (food and beverage, etc.) contained in the PET container 900,

and providing the sealing function to enable the openness to be identified.

[0063] In this state, the cap A-1 is separated from the injection part 910, so a user may drink the contents contained in the PET container 900. As described above, in the separation process of the cap A-1, the end ring 2 connected to the lower side of the cap body 1 is separated together with the cap body 1, so the end ring can be easily removed from the PET container 900.

[0064] In other words, the cap body 1 coupled to the injection part 910 of the PET container 900 is rotated counterclockwise, so the cap body 1 moves upwards along the injection part 910. By continuing the process (rotation), the cap body is completely separated from the PET container 900, thus opening the injection part 910. Thereby, a user may drink beverage contained in the PET container 900.

[0065] In such a process, the end ring 2 integrally provided on the lower side of the cap body 1 is separated (removed) from the injection part 910 together with the cap body 1, so it is possible to recover the PET container 900 of a single material, thus greatly enhancing recyclability.

[0066] Specifically, if the cap body 1 coupled to the injection part 910 is rotated counterclockwise to open the injection part 910, the binding protrusion 11 formed on the inner circumference of the cap body 1 moves along the binding protrusion 930 formed on the outer circumference of the injection part 910 of the PET container 900, so the cap body 1 moves to the upper side of the injection part 910. By continuing this process, the cap body is completely separated from the injection part 910 of the PET container 900.

[0067] That is, as shown in FIG. 18, the protruding end of the interference protrusion 21-1 of the end ring 2 restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 is bent downwards by the interference of the annular protrusion 920. Thus, due to the loss of the shape preservation ability (degradation of the ring-shaped preservation ability) caused by transformation in which the transformation part 25 flares out as the protruding end of the interference protrusion 21-1 is bent downwards, as shown in FIG. 19, the sealing projection 23-1 formed on the upper end of the end ring 2 and connected to the lower end of the cap body 1 is fractured by tension. Further, as the interference protrusion 21-1 is completely bent downwards with the continued process, as shown in FIG. 19, the interference protrusion 21-1 on the inner circumference of the end ring 2 may pass over the annular protrusion 920 protruding from the outer circumference of the injection part 910 of the PET container 900. Thus, as shown in FIG. 20, the end ring 2 may be simultaneously separated from the injection part 910 of the PET container 900 along the cap body 1.

[0068] Therefore, it is possible to separate both the cap body 1 and the end ring 22 that is the accessory of the cap body 1, thus recovering the PET container 900 of a single material and thereby maximizing recyclability.

[0069] Further, FIGS. 21 to 24 are sectional views illustrating the operation of the PET container cap with the simultaneously separable end ring in accordance with the third embodiment of the present invention. The operation of the cap A-2 with the simultaneously separable end ring in accordance with the third embodiment of the present invention is as follows.

[0070] If the cap body 1 of the cap A-2 coupled to the injection part 910 is rotated counterclockwise to open the injection part 910 as shown in FIGS. 21 and 22, the interference protrusion 21-3 of the end ring 2 restricted by the annular protrusion 920 protruding from the outer circumference of the injection part 910 is completely spread out by the interference of the annular protrusion 920 as shown in FIG. 23. Thus, the cap body 1 and the end ring 2 are separated from each other, so the sealing projection 23-1 formed on the upper end of the end ring 2 and connected to the lower end of the cap body 1 is fractured by tension. Further, the interference protrusion 21-3 may pass over the annular protrusion 920 protruding from the outer circumference of the injection part 910 of the PET container 900. Thus, as shown in FIG. 24, the end ring 2 may be simultaneously separated from the injection part 910 of the PET container 900 along the cap body 1.

[0071] In conclusion, the PET container cap A, A-1, or A-2 with the simultaneously separable end ring according to the present invention is configured such that the end ring 2 as well as the cap body 1 can be simultaneously separated in the process of separating the cap body 1 from the injection part 910 of the PET container 900, thus enabling the PET container 900 to be recovered as a single material for satisfying recyclability (recycling).

[0072] In particular, as described above, when the cap body 1 is rotated counterclockwise to be separated from the injection part 910 of the PET container 900, this increases the gap of the cut part 24 and leads to the transformation (degradation of the preservation ability of the ring shape) of the end ring 2, thereby allowing the interference protrusion 21, 21-1, 21-2, or 21-3 to disengage from the annular protrusion 920 formed on the outer circumference of the injection part 910. Consequently, it is possible to more easily separate the end ring 2 from the injection part 910.

[0073] While the present invention has been particularly described with reference to exemplary embodiments shown in the drawings, it will be understood by those of ordinary skill in the art that the exemplary embodiments have been described for illustrative purposes, and various changes and modifications may be made without departing from the spirit and scope of the present invention as defined by the appended claims. Accordingly, embodiments of the present invention are intended not to limit the technical idea of the invention but to illustrate the technical idea. The scope of the present invention is not limited to the embodiments. It is to be understood that the scope of the present invention is defined solely by the following claims and equivalences thereof.

Industrial Applicability

[0074] In a waste-resource recycling industry that recovers and recycles resources from discarded waste resources, a cap body as well as an end ring on the lower side of the cap can be simultaneously separated in the process of separating the cap body (cap) from an injection part of the PET container, so it is possible to recover the PET container as a single material for satisfying recyclability.

Claims

1. A PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap comprising:

   a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents; and
   an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion formed on a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is simultaneously separated together with the cap body from the injection part.

2. The PET container cap of claim 1, wherein the cap body further comprises:

   a spiral protrusion formed on an inner circumference of the cap body to correspond to a spiral fastening protrusion formed on the outer circumference of the injection part; and
   a knurling part formed on an outer circumference of the cap body to prevent a slip when a user holds the cap with his or her hand and rotates the cap clockwise/counterclockwise.

3. The PET container cap of claim 1, wherein the end ring comprises:

   an interference protrusion formed on an inner circumference of the end ring to engage with a restraint protrusion of the injection part when the cap body is coupled to the injection part;
   a connecting projection integrally connected to a portion of a lower end of the cap body to cause transformation in a separation process of the cap body; and
   a sealing projection integrally connected to another portion of the lower end of the cap body to be fractured in the separation process of the cap body and to enable the openness of the cap body to be identified.

4. The PET container cap of claim 3, wherein the end ring comprises a plurality of cut parts that are cut long to extend from an uppermost end to a lowermost end, are inclined in one direction, and are formed at regular intervals to cause degradation of a ring-shaped preservation ability as a gap is increased by the connecting projection that maintains a connection state with the cap body in the separation process of the cap body.

5. The PET container cap of claim 4, wherein the connecting projection is connected to the cap body to increase the gap of the cut part in the separation process of the cap body, protrudes from an upper end, and is connected to the lower end of the cap body while extending long from a first end of the cut part to a predetermined range, and
   the sealing projection is connected to the cap body, protrudes from an upper end to exhibit the sealing function that enables the openness of the cap body to be identified as the sealing protrusion is fractured in the separation process of the cap body, and is connected to a lower end of the cap body while extending short from a second end of the cut part to a predetermined range.

6. The PET container cap of claim 4, wherein the cut part is cut long to extend from an uppermost end to a position adjacent to a lowermost end and thereby leads to transformation that causes a restriction force of the connecting projection to be lost by the restraint protrusion formed on the outer circumference of the injection part as the gap is increased by an upward movement of the connecting projection connected to the cap body in the separation process of the cap body, and the cut part is formed in a slope type having an inclination in one direction.

7. A PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap comprising:

   a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents; and
   an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion protruding from a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the

cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is separated together with the cap body from the injection part,
wherein the end ring comprises:

an interference protrusion restricted by the annular protrusion when the cap body is coupled to the injection part;
a plurality of transformation parts transformed to flare out, thus allowing the interference protrusion to pass over the annular protrusion when the cap body is separated from the injection part, due to a "⌐"-shaped cut part extending horizontally and vertically from a boundary of the cap body; and
a sealing projection protruding from an upper end of each of the transformation parts to be integrally connected to a lower end of the cap body, fractured in the separation process of the cap body, and enabling the openness of the cap body to be identified depending on a fractured state.

8. The PET container cap of claim 7, wherein the interference protrusion protrudes from an inner surface of the transformation part to be restricted by the annular protrusion, has an inclination in which a protruding end thereof is inclined upwards, and is bent downwards by the annular protrusion in the process of separating the cap body from the injection part, thus causing the transformation of the transformation part and allowing the interference protrusion to pass over the annular protrusion when the transformation part is transformed.

9. The PET container cap of claim 7, wherein the interference protrusion is in a shape of a simple protrusion that causes the transformation of the transformation part in the process of separating the cap body from the injection part and allows the interference protrusion to pass over the annular protrusion when the transformation part is transformed.

10. A PET container cap with a simultaneously separable end ring, which provides tight blocking for preservation of contents in a state of being provided on and coupled to an injection part and provides a sealing function enabling awareness of openness, the cap comprising:

a cap body provided on and coupled to the injection part to provide tight blocking for preservation of the contents;
an end ring integrally formed on a lower side of the cap body, restricted by an annular protrusion protruding from a lower side of an outer circumference of the injection part, exhibiting a sealing function enabling grasping of openness of the cap body, and causing transformation in a separation process of the cap body by a user, so the end ring is separated together with the cap body from the injection part, the cap body and the end ring being separated from each other by a cut part;
a plurality of interference protrusions formed on an inner circumference of a boundary between the cap body and the end ring to protrude at regular intervals, connecting the cap body and the end ring, restricted by the annular protrusion when the cap body is coupled to the injection part, and changed in shape to pass over the annular protrusion in the process of separating the cap body; and
a sealing projection formed on the inner circumference of the boundary, connecting a lower end of the cap body and an upper end of the end ring, fractured in the separation process of the cap body, and enabling the openness of the cap body to be identified depending on the fractured state.

11. The PET container cap of claim 10, wherein the interference protrusion is integrally connected at both ends thereof to the lower end of the cap body and the upper end of the end ring, and is bent to a side to be restricted by the annular protrusion, thus having a shape of " <", and is spread out by the annular protrusion in the process of separating the cap body from the injection part, so the cap body and the end ring are separated from each other and thereby the sealing projection is fractured and interference of the annular protrusion may be avoided to allow the end ring to be simultaneously separated.

Fig.1

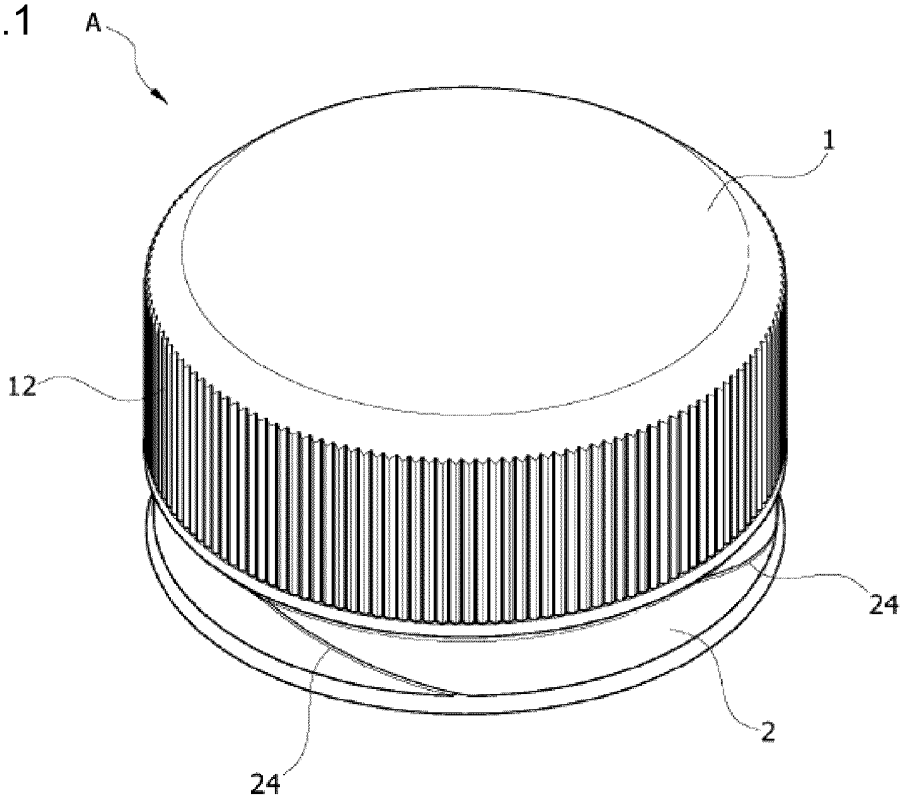

Fig.2

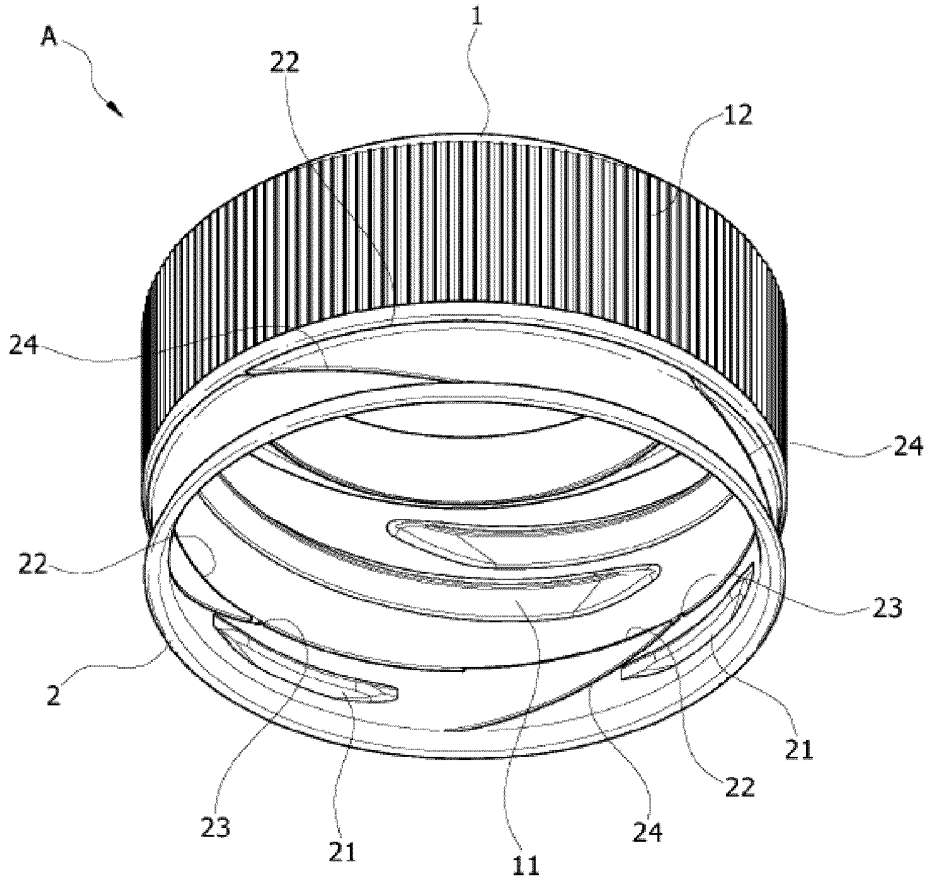

Fig.3

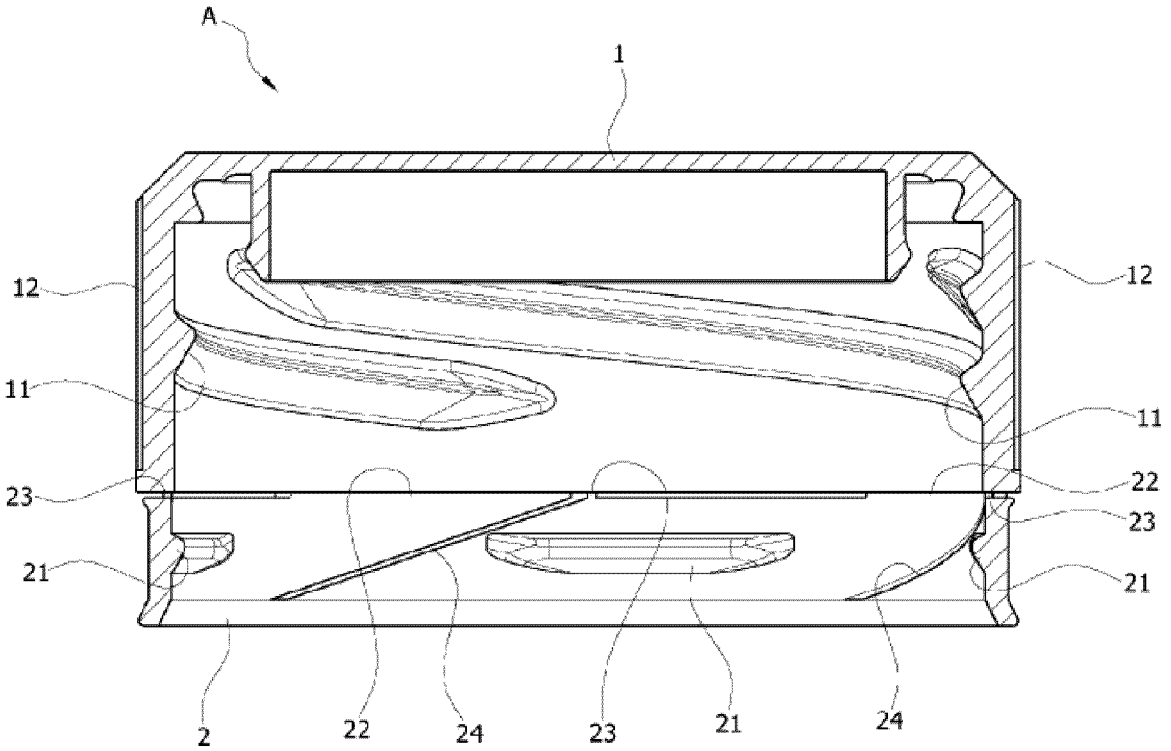

Fig.4

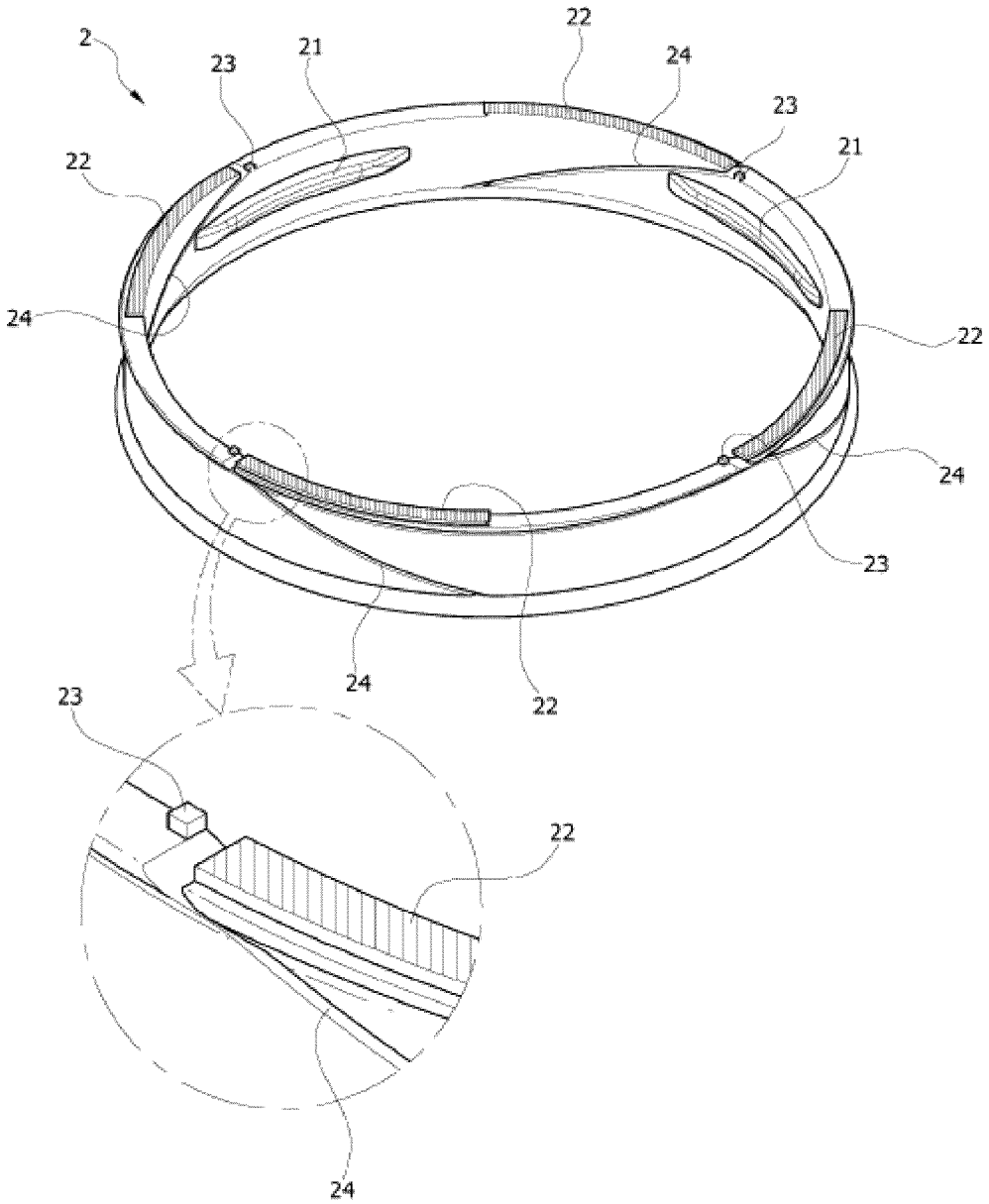

Fig.5

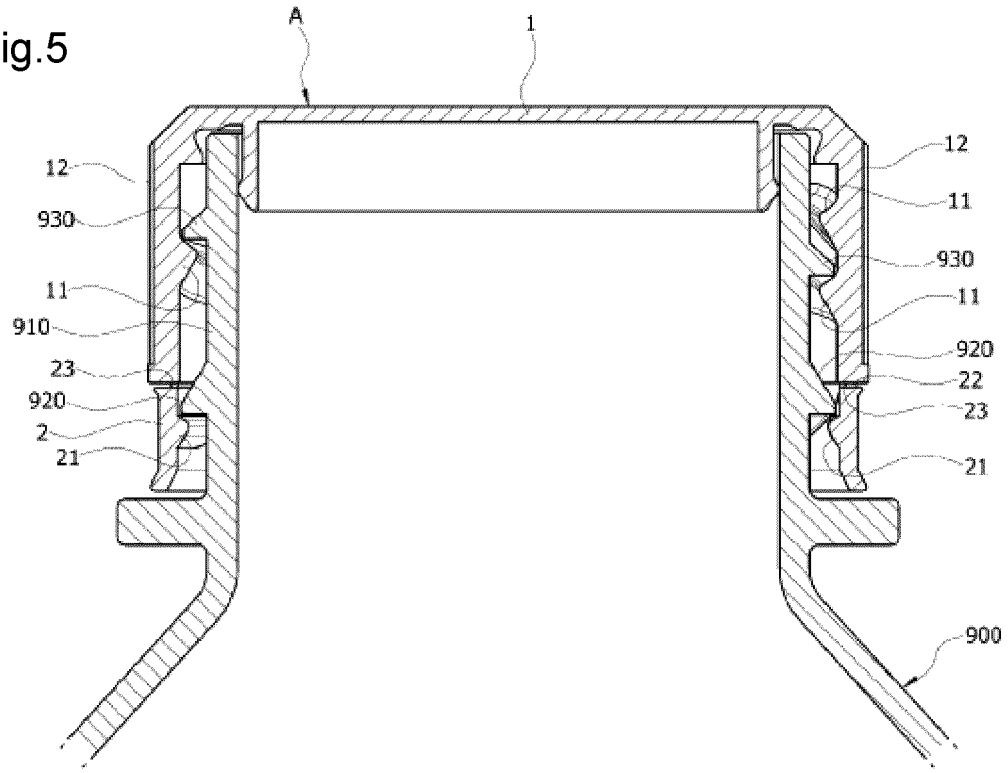
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Fig.6

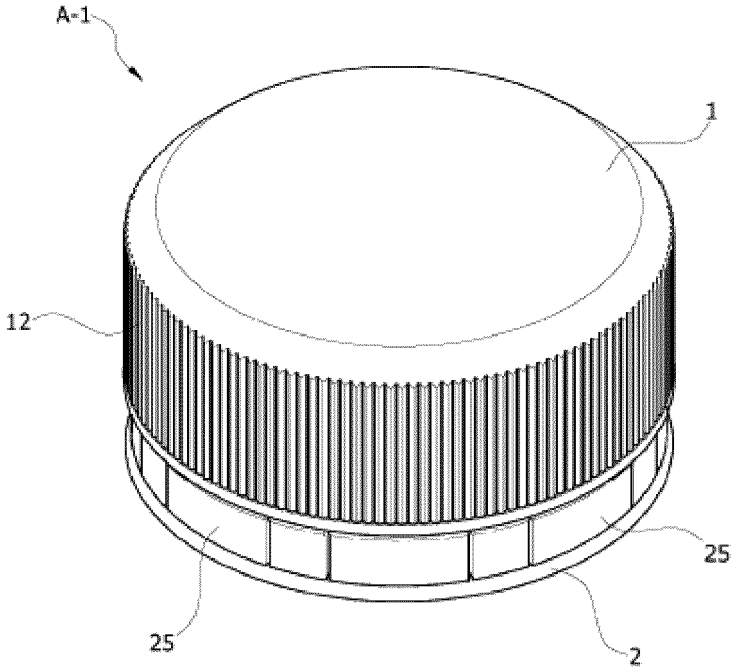
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Fig.7

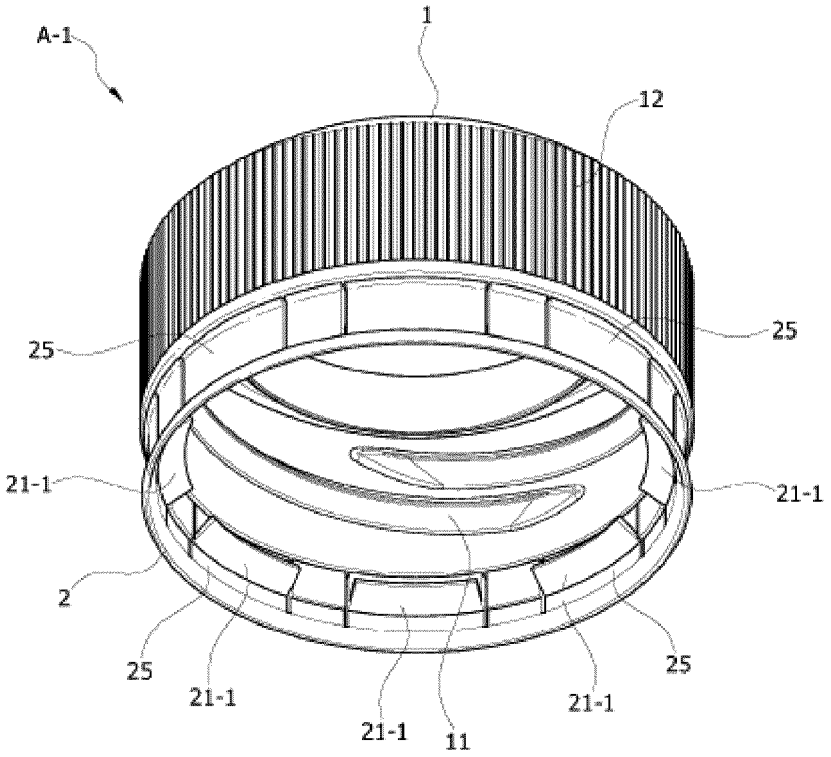
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Fig.8

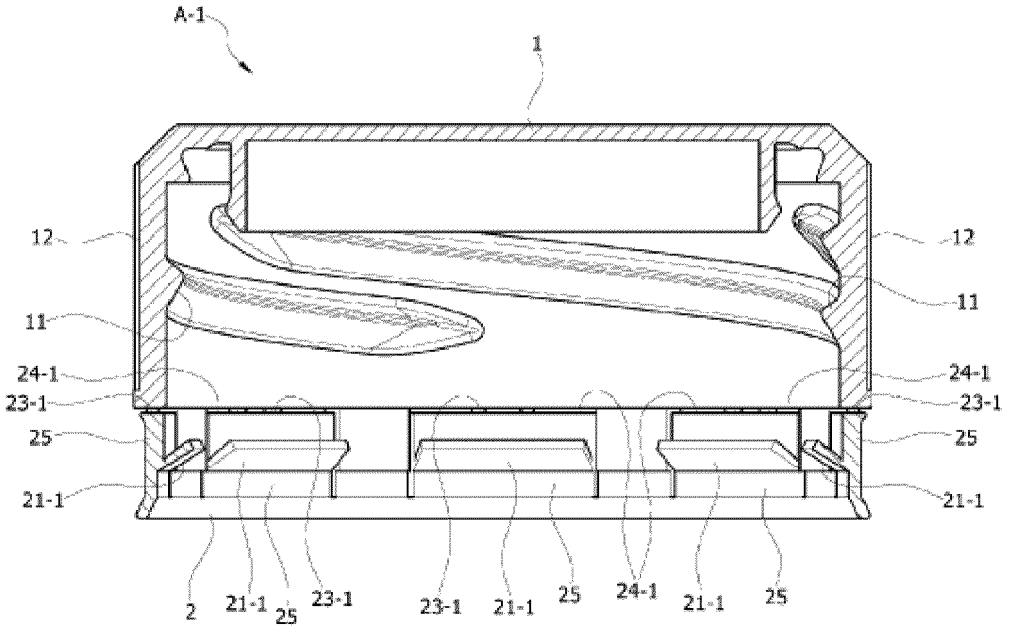
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Fig.9

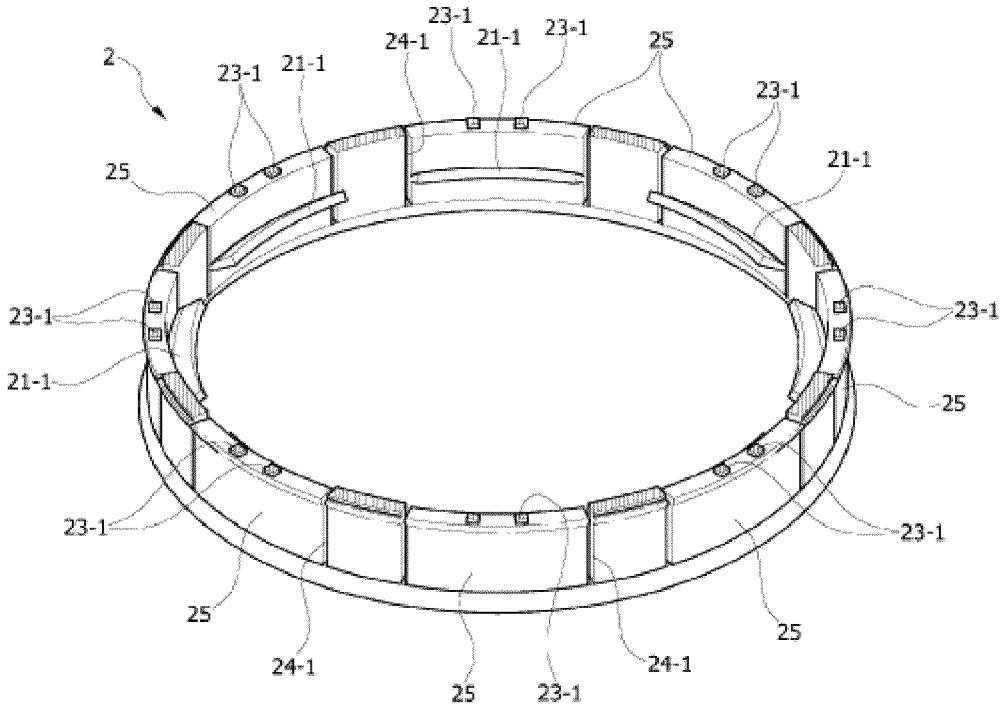
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Fig.10

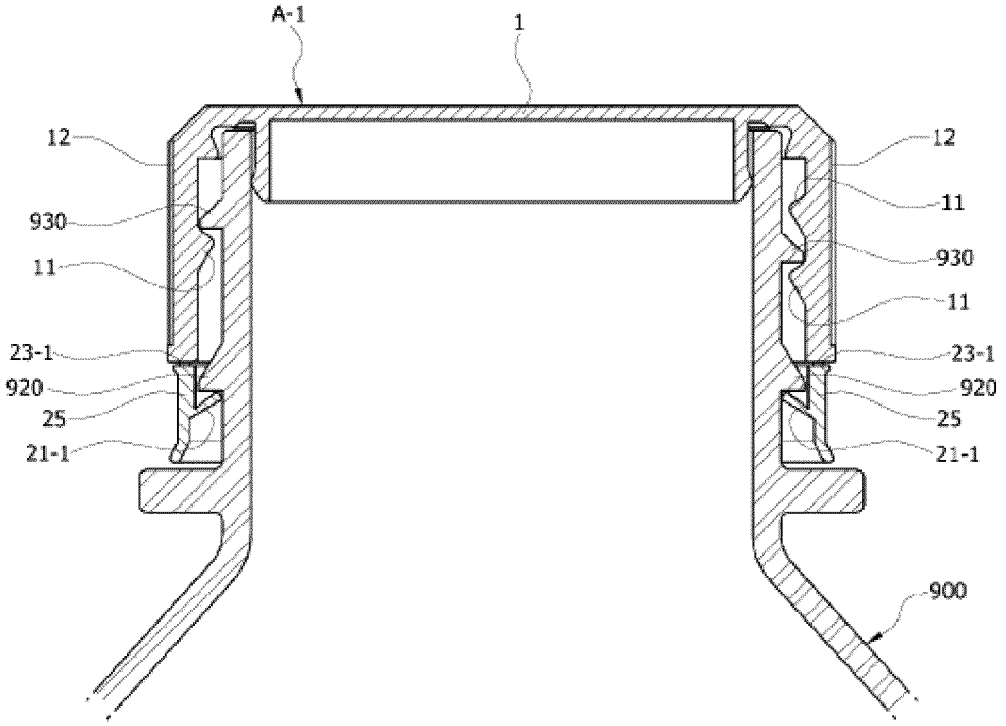
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Fig.11

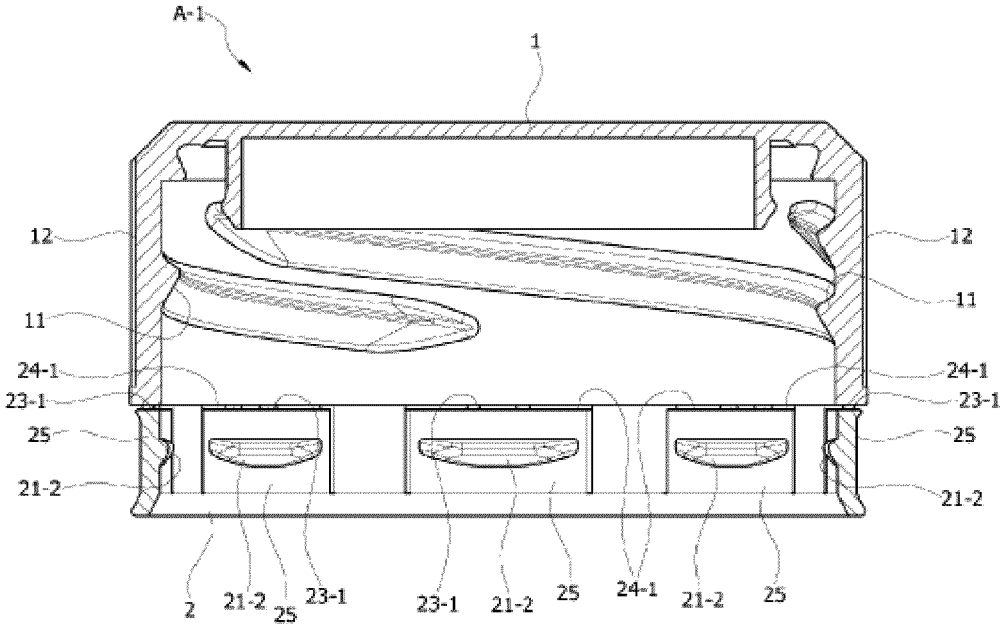
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Fig.12

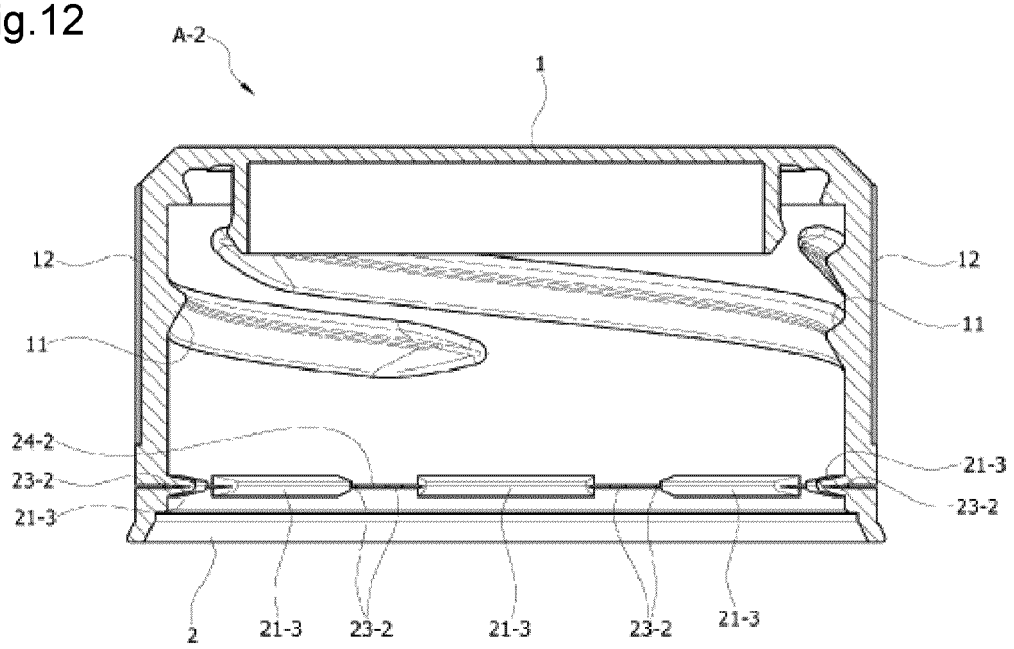
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Fig.13

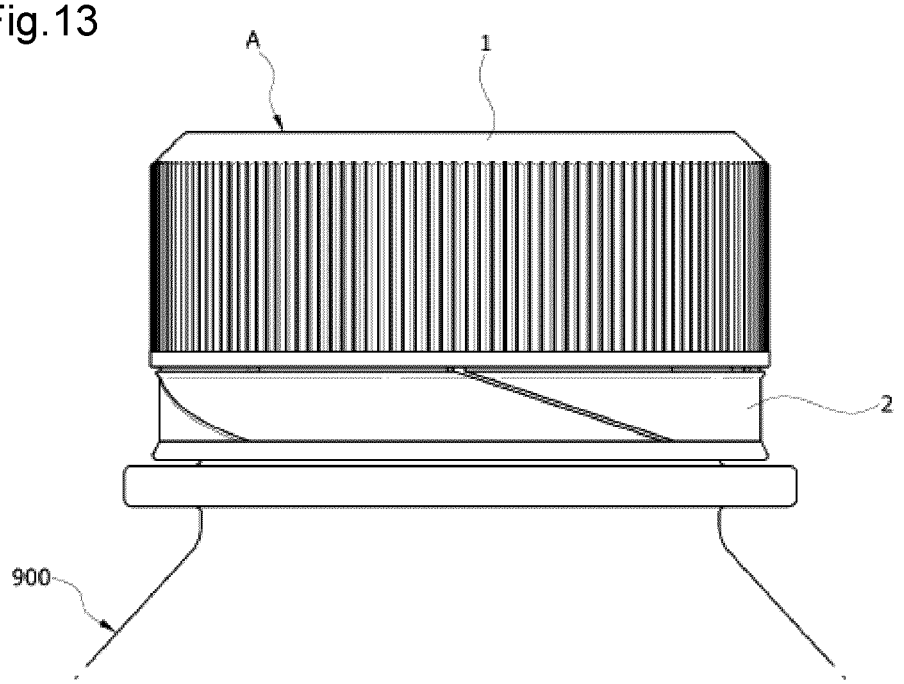

Fig.14

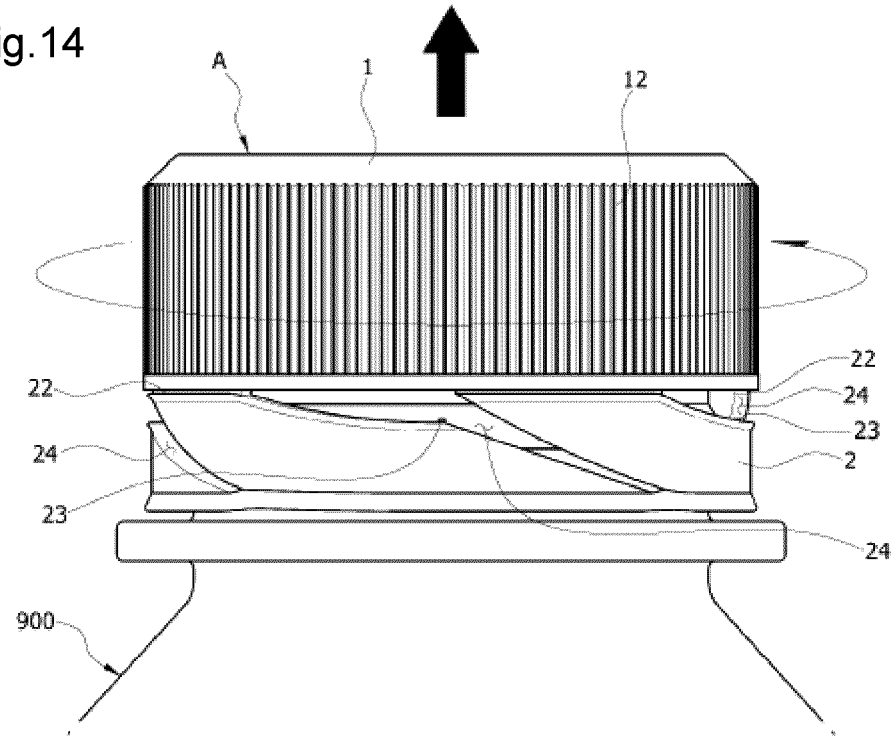

Fig.15

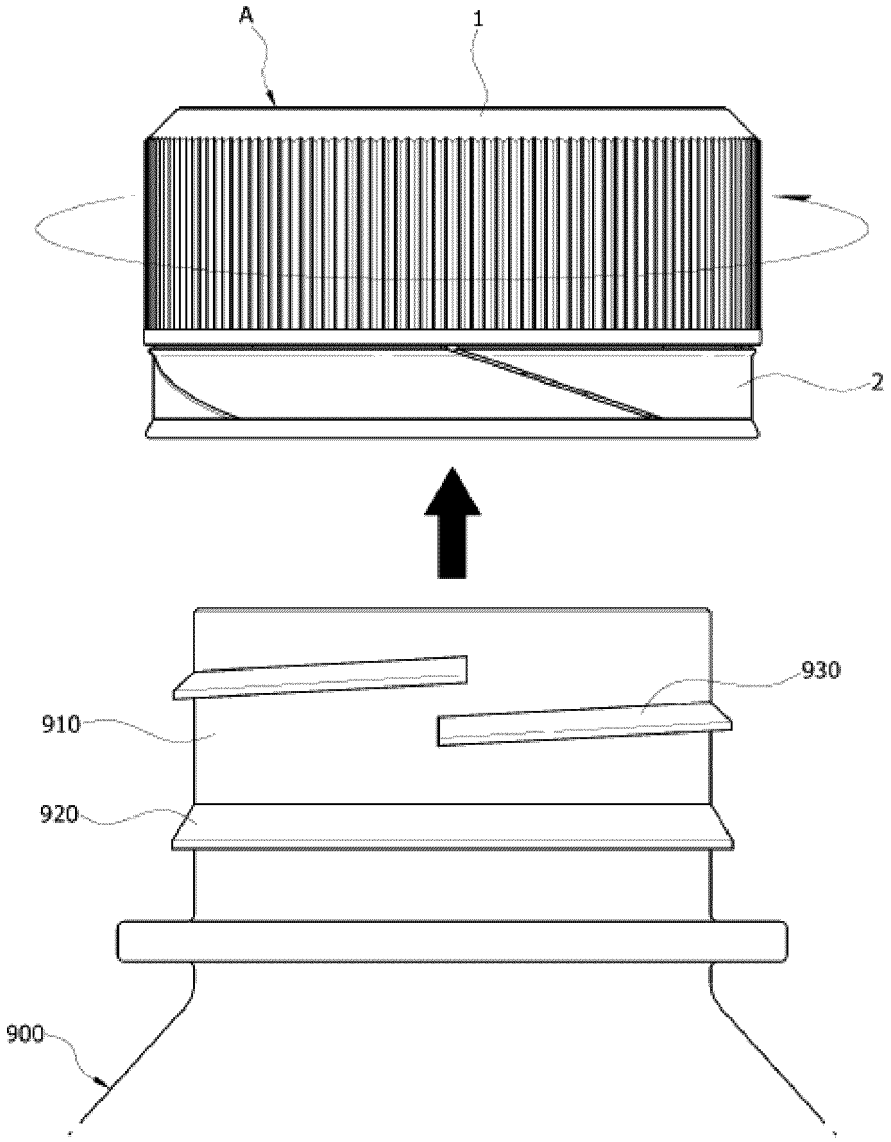

Fig.16

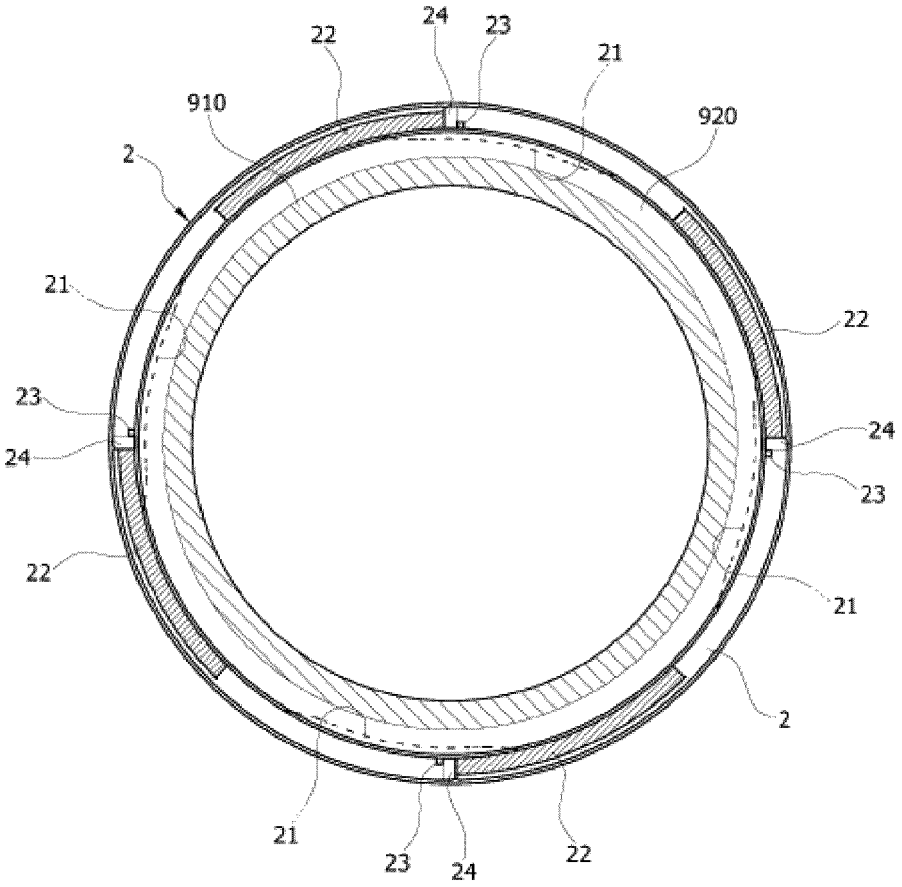

Fig.17

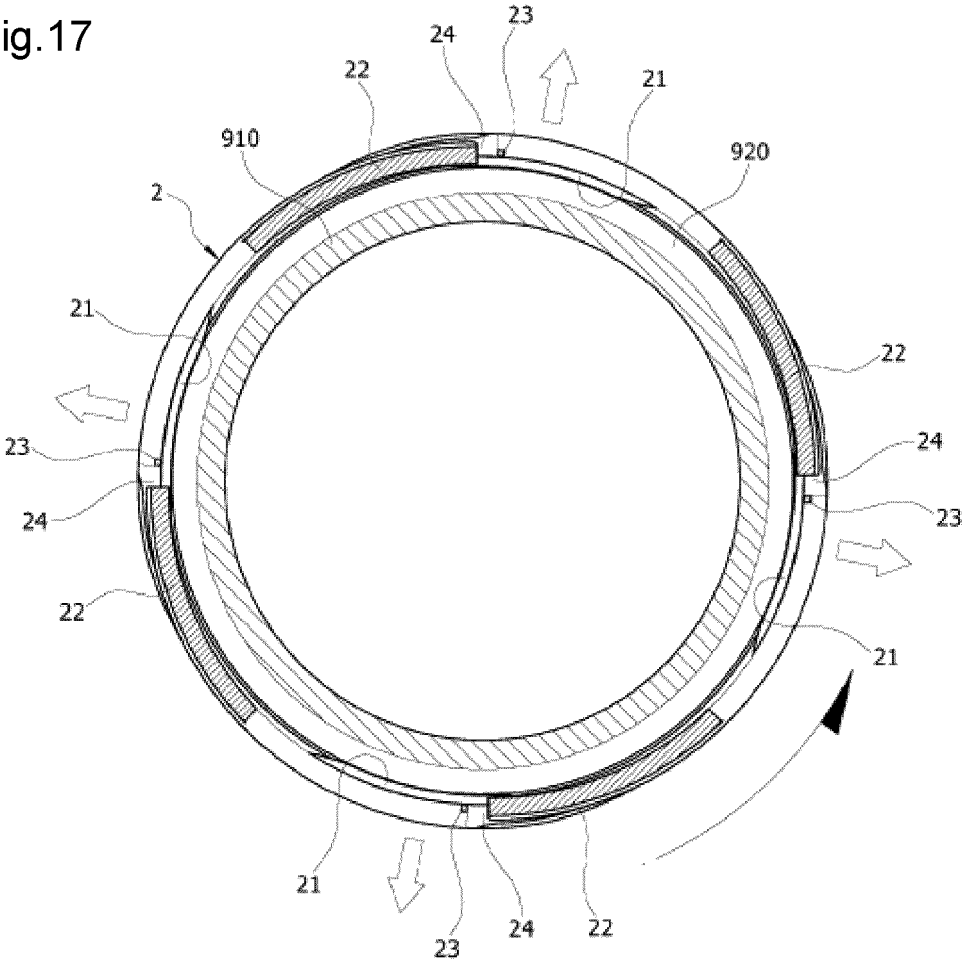
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Fig.18

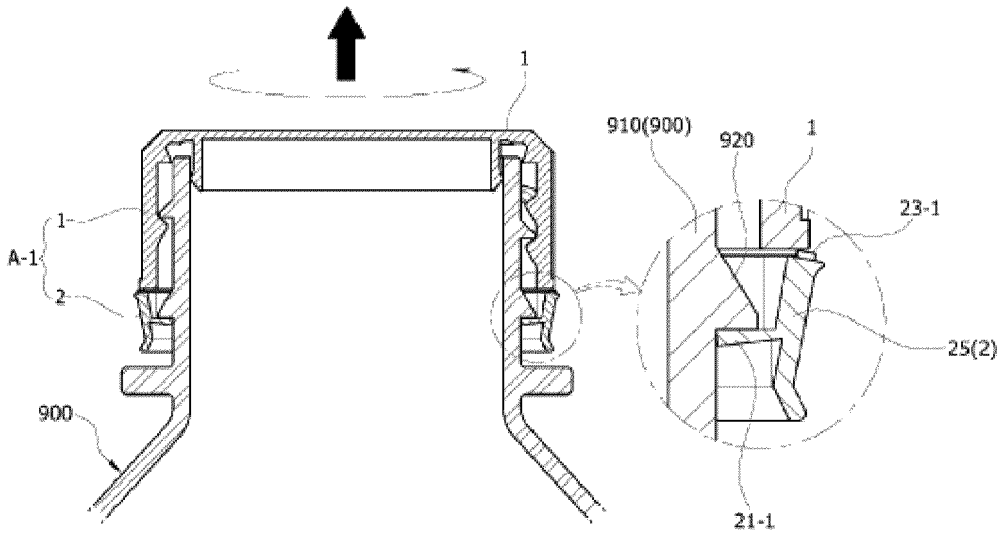
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Fig.19

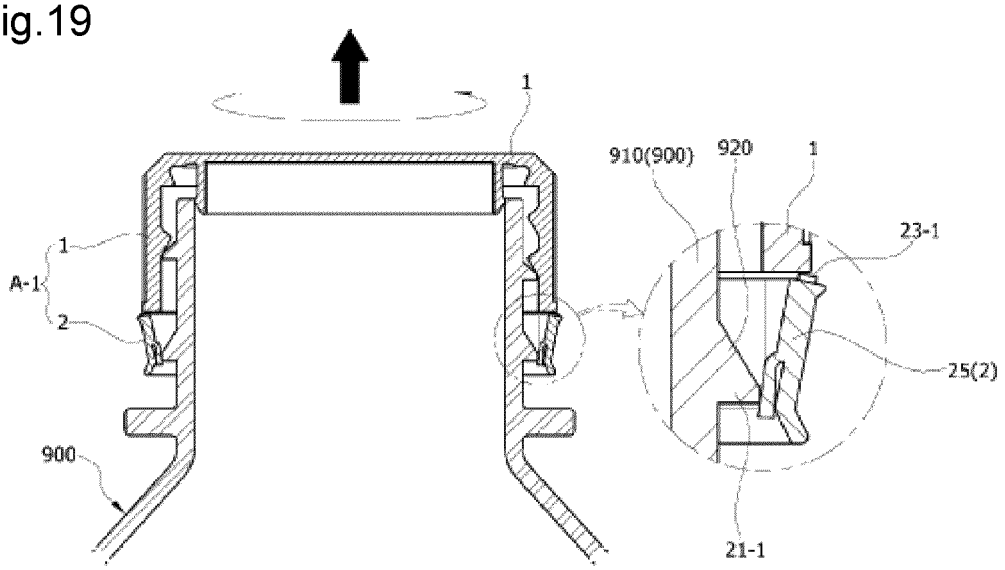

Fig.20

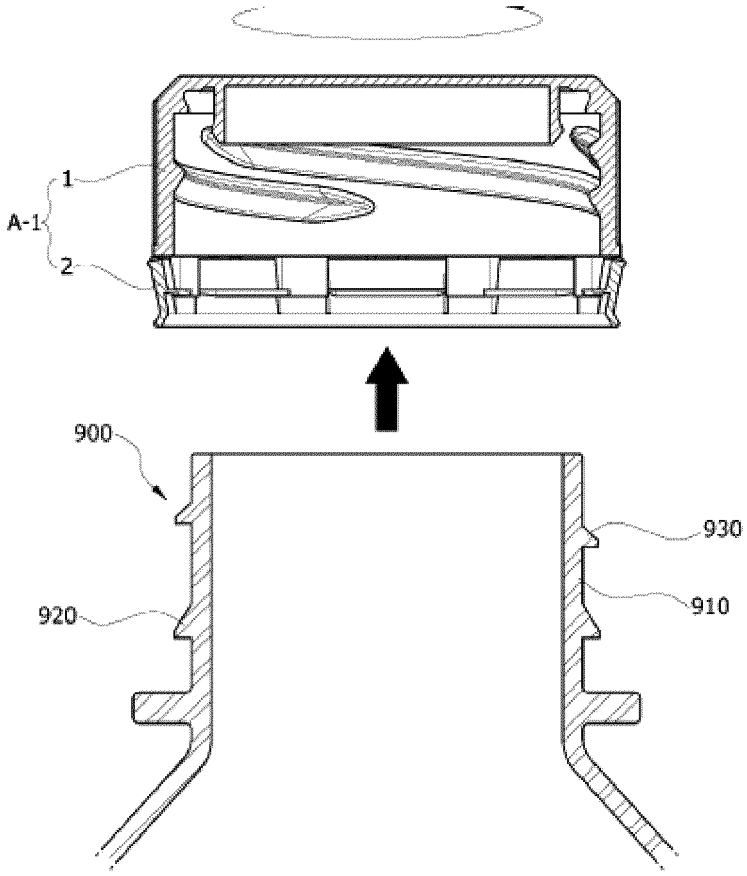

Fig.21

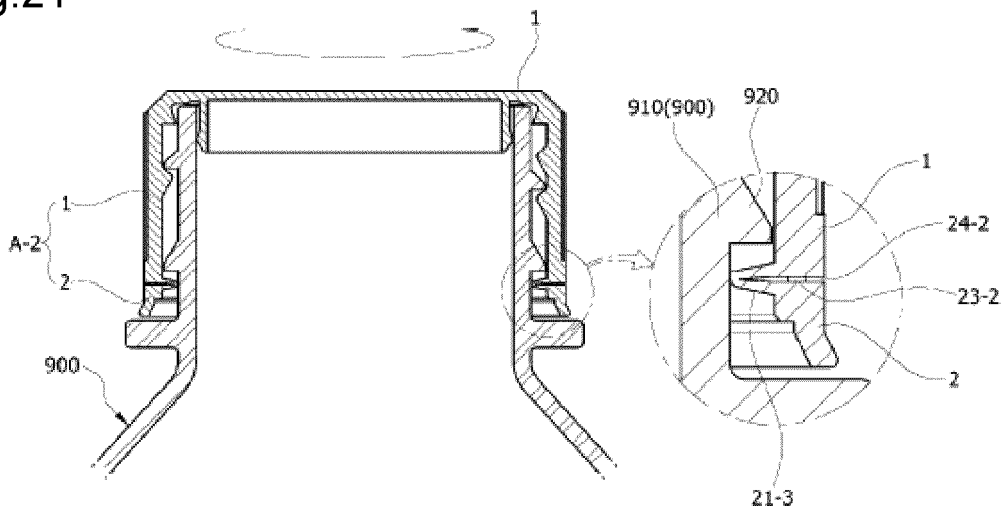
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Fig.22

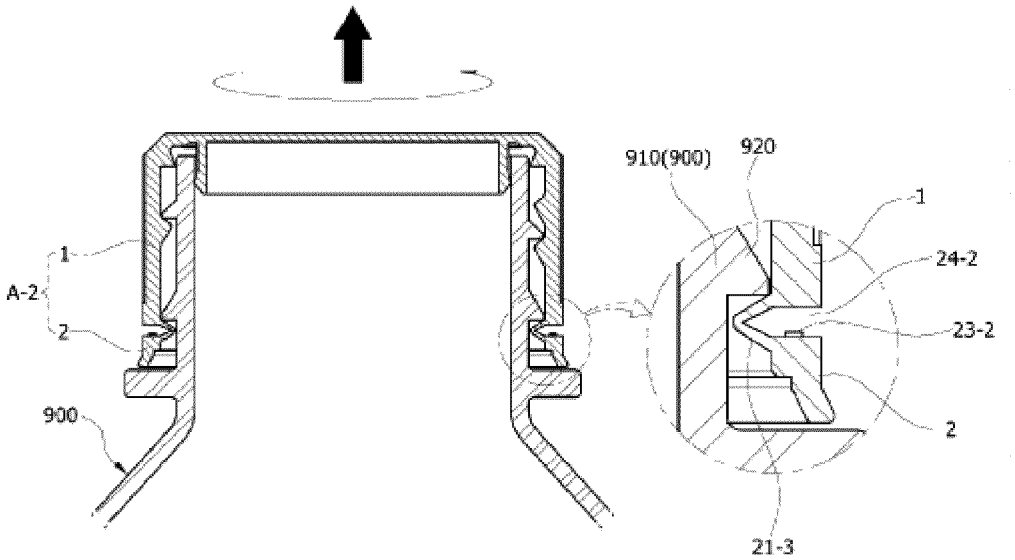
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Fig.23

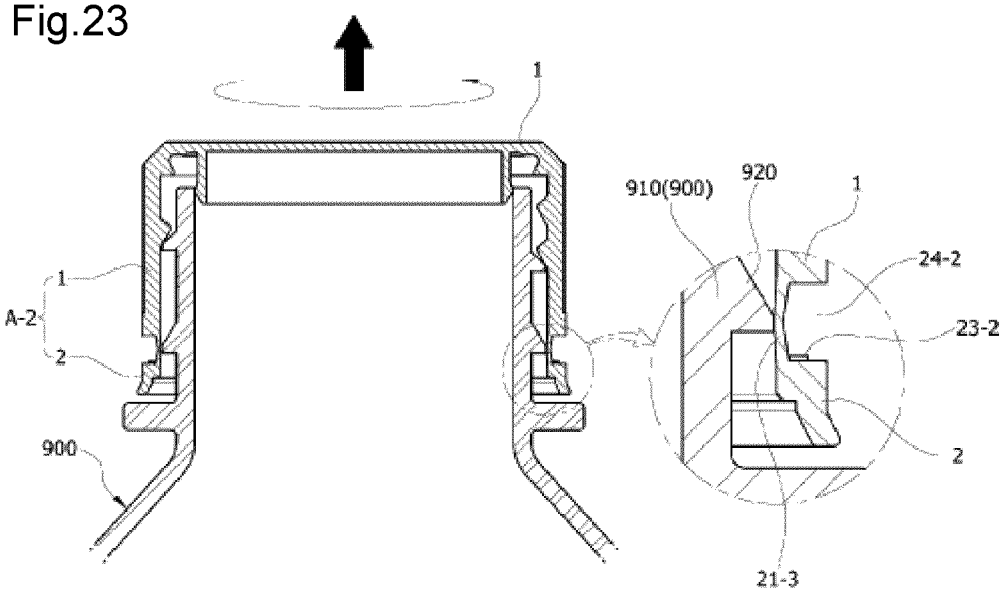
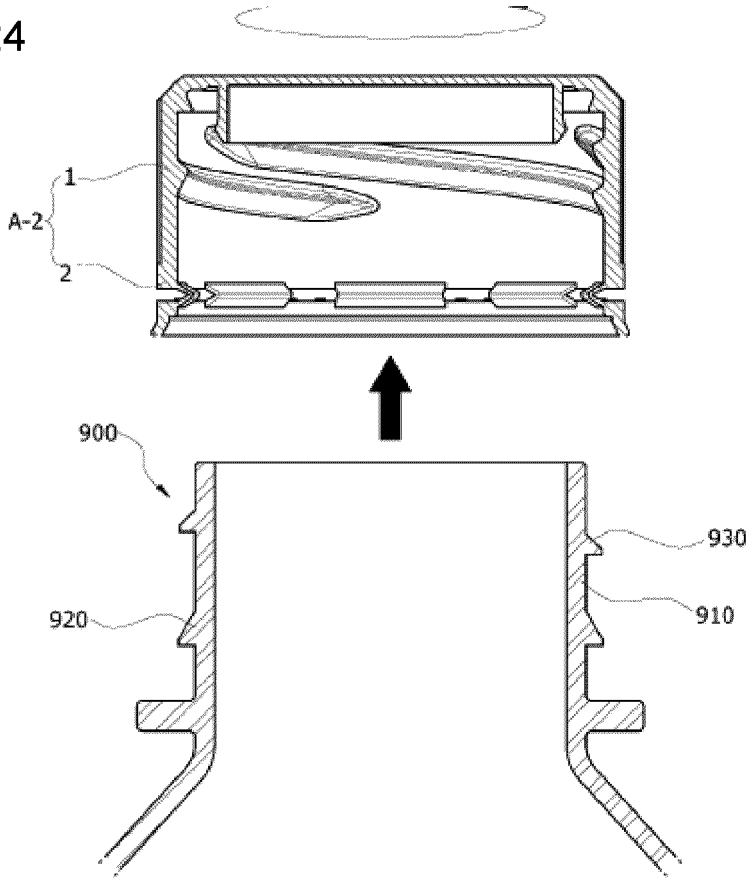


Fig.24



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2019/017152

A. CLASSIFICATION OF SUBJECT MATTER

B65D 41/34(2006.01)i, B65D 1/02(2006.01)i, B65D 43/08(2006.01)i

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 41/34; B65D 43/00; B65D 55/02; B65D 1/02; B65D 43/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: cap, end ring, separation, deformation, cut, rupture

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2003-200951 A (HORIE, Masao) 15 July 2003 See paragraphs [0005]-[0006] and figures 1-6.	1-6
Y		7-11
Y	US 4726482 A (BARRIAC, Jacques J.) 23 February 1988 See column 4, line 60-column 5, line 59 and figures 1-5.	7-9
Y	US 6102224 A (SUN et al.) 15 August 2000 See column 5, lines 15-54 and figures 2A-2D.	10-11
A	JP 06-336255 A (SAN BESUTO K.K.) 06 December 1994 See paragraphs [0013]-[0019] and figures 1-4.	1-11
A	JP 2002-037288 A (DAIWA CAN CO., LTD.) 06 February 2002 See paragraphs [0008]-[0014] and figures 1-4.	1-11

☐ 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	Date of mailing of the international search report
26 MARCH 2020 (26.03.2020)	**26 MARCH 2020 (26.03.2020)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
Government Complex Daejeon Building 4, 189, Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea
Facsimile No. +82-42-481-8578

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2019/017152

Patent document cited in search report	Publication date	Patent family member	Publication date
JP 2003-200951 A	15/07/2003	None	
US 4726482 A	23/02/1988	None	
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