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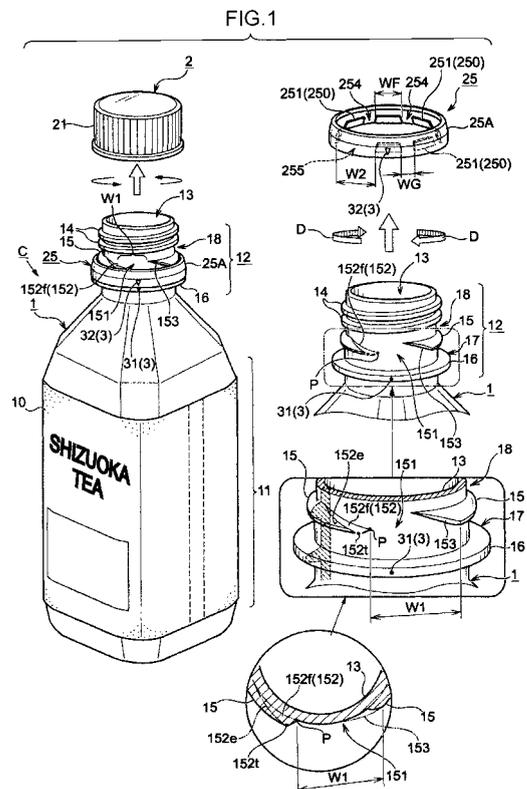
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(54) **STRUCTURE FOR REMOVING END-RING OF RESIN BOTTLE CAP, AND CONTAINER PROVIDED WITH THE SAME**

(57) A resin bottle cap end-ring removal structure is provided for easily removing from a bottle body an end-ring that remains on the bottle body side when opening a bottle cap such as on a PET bottle, and a container provided with the same. A barbed body 250, which is formed to an end-ring 25 that remains on a bottle body 1, is divided by a non-barbed guidance section 255 formed over one partial section where the barbed body 250 is not formed. A guidance flange cut-out section 151 is formed in a portion of a ring stopper upper flange 15. An effective guidance zone Z, in which restriction on the end-ring from the ring stopper upper flange 15 is released in a partial section, is secured by setting a removal initiation set position state in which the non-barbed guidance section 255 and the guidance flange cut-out section 151 are disposed adjacent to each other. A removal guiding inclined orientation of the end-ring 25 is then achieved for removal initiation of the end-ring 25 at this position.



EP 2 447 179 A1

Description

Technical Field

[0001] The present invention relates to a resin bottle cap end-ring removal structure for easy removal from a bottle body of an end-ring that remains on the bottle body side when a bottle cap is opened, such as on a PET bottle, and to a container provided with the same.

Background Art

[0002] Recently PET bottles with a primary material of polyethylene terephthalate (PET) have become widely employed as drink containers. It is preferable that, as far as possible, when such PET bottles are collected for material recycling collection is made as a single material. As a result of awareness in the community, collection is being made of PET bottles that have been brought in a state in which at least the easily-removed different material components, the cap body and the wrapper film, have been removed. However, caps are provided with end-rings joined by a weakened portion such that the end-ring remains on the bottle body side when the lid is opened, so as to enable a previously-opened state to be ascertained. In most cases bottle bodies are currently collected in a state in which these end-rings are still attached thereto since removal of such members is extremely difficult to achieve. In consideration of the above circumstances there are proposals for hand tools to facilitate removal of the end-rings, and proposals for mutual structures of caps and bottle bodies. However it is not realistic to expect the level of awareness required for ordinary households to equip themselves with such hand tools and so such measures are not being adopted. Further, there are not many proposals for realistic improvements in the configuration of containers themselves that also enable the current mass production facilities for current products to be maintained, and proposals are not actually being implemented in the market place.

[0003] An example of prior art related to the present invention is the "Bottle Type Resin Container With Cap, Which is Capable Of Easily Removing Cap Circumferential Band From Bottle Mouth" of Japanese Patent Application Laid-Open (JP-A) No. 2006-232392. The technical configuration seen therein is: a ring stopper upper flange (bottle opening circumferential direction projection 8) that restricts the end ring (cap circumferential band) from detaching and has a portion formed with a cut-out formed in a slope shape, and a protrusion 13 for guiding an end-ring barbed flap (protrusion tab 7) formed at the slope shaped cut-out. The end-ring is removed from the ring stopper upper flange by rotating the end-ring with the cut-out as the start position. However, in this prior technology, due to overall deformation of the end-ring being restricted by sandwiching between the upper and lower ring stopper flanges, in practice there is doubt as to whether or not a sufficiently deformed state can actu-

ally be obtained for guiding in the cut-out, or even if such as state were to be achieved, the operation force required could be likened to the strength of Hercules, and as a result the object is not completely achieved.

[0004]

Patent Document 1: JP-A No. 2006-232392

DISCLOSURE OF INVENTION

Technical Problem

[0005] In consideration of the above circumstances, an object of the present invention is to propose a novel end-ring removal structure that, when removing an end-ring, enables easy and reliable removal simply by tilting the orientation of the end-ring, without requiring the end-ring itself to be deformed, and to a container provided with the same.

Solution to Problem

[0006] A first aspect of the present invention is resin bottle cap end-ring removal structure, configured by a structure for removing from a bottle body an end-ring that is provided attached to a bottle cap that is fitted to a lid closure portion of the bottle body and that then separates from a cap body during lid opening so as to remain below a ring stopper upper flange on the bottle body, wherein: the inner peripheral side of the end-ring includes a barbed body used for preventing the end-ring from detaching so as to leave the end-ring below the ring stopper upper flange; the barbed body is configured so as to be divided by a non-barbed guidance section in which a barbed body is not formed over a partial range; a guidance flange cut-out section is formed in a portion of the ring stopper upper flange; an effective guidance zone in which restriction of the end-ring by the ring stopper upper flange is released in a partial range is secured by setting a removal initiation set position state in which the non-barbed guidance section and the guidance flange cut-out section are disposed adjacent to each other; and a removal guiding inclined orientation of the end-ring is achieved for removal initiation of the end-ring at this position.

[0007] A second aspect of the present invention is the resin bottle cap end-ring removal structure of the first aspect wherein a pair of cut out end faces for configuring the guidance flange cut-out section are configured with a guiding inclined face facing towards a removal operation direction side on at least the cut out end face on the removal operation direction side.

[0008] A third aspect of the present invention is the resin bottle cap end-ring removal structure of the second aspect wherein the removal operation direction is the opposite direction to a bottle cap loosening direction.

[0009] A fourth aspect of the present invention is the resin bottle cap end-ring removal structure of any one of the first to the third aspects wherein the effective guid-

ance zone is set in a range of 50° to 100° in a circumferential direction range of a bottle lid closure portion.

[0010] A fifth aspect of the present invention is the resin bottle cap end-ring removal structure of any one of the first to the fourth aspects wherein a dimension of the non-barbed guidance section is set as the same dimension or a shorter dimension than a dimension of the guidance flange cut-out section.

[0011] A sixth aspect of the present invention is the resin bottle cap end-ring removal structure of any one of the first to the fifth aspects wherein an indicator is formed to indicate achievement of the removal initiation set position state between the end-ring and the bottle body.

[0012] A seventh aspect of the present invention is the resin bottle cap end-ring removal structure of the sixth aspect wherein the indicator includes a cut-out alignment recess portion formed in a portion of a ring stopper lower flange provided below the ring stopper upper flange and an alignment recess portion correspondingly formed in the end-ring.

[0013] An eighth aspect of the present invention is the resin bottle cap end-ring removal structure of any one of the first to the seventh aspects wherein at initial closure of the bottle cap when the bottle body is manufactured, a stop position of the end-ring integrated with the bottle cap at the initial closure is configured such that an end-ring side indicator is displaced further toward a bottle cap loosening side than a bottle cap side indicator.

[0014] A ninth aspect of the present invention is a container with a resin bottle cap end-ring removal structure, including the resin bottle cap end-ring removal structure of any one of the first to the eighth aspects.

[0015] A tenth aspect of the present invention is the container with the resin bottle cap end-ring removal structure of the ninth aspect wherein the container further includes an operation instruction for removing the end-ring.

Advantageous Effects of Invention

[0016] According to the first aspect of the present invention, only when the end-ring is placed in the removal initiation set position state is effective guidance zone for removal operation sufficiently secured, and the removal guiding inclined orientation of the end-ring can be reliably achieved, enabling easy and reliable removal of the end-ring. However, the non-barbed guidance section and the guidance flange cut-out section are not adjacent to each other when opening at a previous stage. And with respect to restriction between the end-ring and the ring stopper upper flange, these components have non-restriction ranges in mutually disparate locations, resulting in the end-ring not being able to adopt the removal guiding inclined orientation unless the removal initiation set position state is achieved. Consequently, the retained state of the end-ring is in practice the same as conventionally, and the presence of the end-ring removal structure is neither detrimental to the process for closing the lid during manufacture, nor to opening the lid by a consumer.

[0017] According to the second aspect of the present invention, after the removal guiding inclined orientation has been achieved, removal initiation operation can be performed without substantially deforming the end-ring, and the end-ring can be rotated smoothly so as to perform an easy and reliable end-ring removal operation.

[0018] According to the third aspect of the present invention, a situation in which the end-ring is inadvertently removed during operation to open the cap body can be reliably prevented from occurring.

[0019] According to the fourth aspect of the present invention, due to the effective guidance zone being a range of about 1/4 a complete turn of the bottle lid closing section, sufficient rotation range can be secured for separating the end-ring from the cap body during opening, and as a result opening can be achieved while avoiding a situation in which the end-ring is inadvertently removed.

[0020] According to the fifth aspect of the present invention, sufficient effective guidance zone can be secured in practice by setting the respective dimensions for the guidance flange cut-out section and the non-barbed guidance section.

[0021] According to the sixth aspect of the present invention, when removing the end-ring, the removal initiation set position state in which the non-barbed guidance section and the guidance flange cut-out section are disposed adjacent to each other can be easily achieved by appropriate aligning marks of the indicator, and end-ring removal operation can be easily initiated.

[0022] According to the seventh aspect of the present invention, the indicator is formed by a recess portion, making the indication of the indicator even clearer, and also enabling operation by touch alone. This means that operation can be reliably performed even, for example, by a person with a visual impairment, thereby providing a product complying with what is referred to as universal design.

[0023] According to the eighth aspect of the present invention, the end-ring is not inadvertently removed during initial opening of the bottle cap.

[0024] According to the ninth aspect of the present invention, a container equipped with one of the above end-ring removal structures is provided, enabling the functionality of the container to be raised, and enabling what is referred to as ecological disposal to be achieved.

[0025] According to the tenth aspect of the present invention, due to the end-ring removal method being displayed on the side of the bottle, a consumer can be positively encouraged to remove the end-ring when collecting PET bottles and the like.

BRIEF DESCRIPTION OF DRAWINGS

[0026]

Figs. 1 are partial cross-section perspective views illustrating partial enlargements of a container to which the present invention is applied.

Figs. 2 are perspective views illustrating an enlargement of the closure section of the above container, showing a state in which an end-ring is housed on a bottle body and a state in which it has been separated therefrom.

Figs. 3 are vertical cross-sections of the above illustrating a state in which the bottle cap is fitted to the bottle body and a state in which it has been separated.

Figs. 4 are diagrams of the end cap, the bottle body and the end-ring, and cross-sections indicating enlargements of states of engagement thereof.

Figs. 5 are side views illustrating progressive removal states of the end-ring from the bottle body.

Figs. 6 are side views illustrating guidance flange cut-out sections on bottle bodies of other exemplary embodiments.

Figs. 7 are diagrams of an indicator for positional alignment when removing an end-ring from a bottle body in another exemplary embodiment.

Fig. 8 is a partial enlargement perspective view illustrating an exemplary embodiment in which operation instructions for removing the end-ring from the container are displayed.

DESCRIPTION OF EMBODIMENTS

[0027] Embodiments for implementing the present invention include preferable exemplary embodiments described below, and also various embodiments obtained by improvements and modifications within the scope of the present invention.

<Exemplary Embodiments>

[0028] Specific explanation of the present invention follows with reference to the exemplary embodiments of the drawings. The present invention is applied to a container C, which can be broadly divided into a configuration of a bottle body 1 and a bottle cap 2. An indicator 3 is also provided across the two components, acting as a sign for removing an end-ring 25, described later, that separates from the bottle cap 2. The bottle body 1 is a resin container such as, for example, a container referred to as a transparent PET bottle having polyethylene terephthalate (PET) as a principle material. A separate wrapper 10 is attached thereto so as to wrap around a body section 11. Note that normally a different type of resin material from that configuring the bottle body is applied to the wrapper 10 and the bottle cap 2, and when the bottle body 1 is collected it is desirable for these items to have been removed therefrom.

[0029] Further, explanation first follows regarding the bottle body 1. The body section 11 of the bottle body 1 is a shape such as an angular cylindrical shape, circular cylindrical shape, or hexagonal cylindrical shape having a suitable capacity of about 100 to 2000cc. A lid closure section 12 is formed at the apex portion of the body sec-

tion 11. The lid closure section 12 referred to here is a broad closure section in a range substantially covered by the bottle cap 2 from shoulder portions of the body section 11 upwards. A pouring opening 13 is open at the top end of the lid closure section 12, and a male thread section 14 is appropriately formed from the vicinity of the pouring opening 13 downwards. The male thread section 14 is formed with an appropriate profile, such as a continuous spiral male thread profile, or with an interrupted portion as appropriate. A ring stopper upper flange 15 is formed further down than the male thread section 14. A ring stopper lower flange 16 is also formed below and facing the ring stopper upper flange 15, and normally these are formed with diameters such that the diameter of the ring stopper lower flange 16 is larger. A container-side indicator 31 of the indicator 3 is provided by utilizing, for example, a location where the ring stopper lower flange 16 is formed. Due to the ring stopper upper flange 15 and the ring stopper lower flange 16, an indentation dip is effectively formed between the two flanges, and this portion is referred to a ring housing portion 17. The dimension of the ring housing portion 17 in the height direction is set as a dimension allowing the end-ring 25 to move up and down by a certain amount with the end-ring 25, described later, in a retained state allowing some freedom, referred to as play. A region above the ring stopper upper flange 15 and below the male thread section 14 is a target region from which to first remove the end-ring 25, described later, referred to as a ring removal section 18.

[0030] The ring stopper upper flange 15, which is a characteristic portion of the present invention, adopts the following configuration. As shown in the enlargements of the ring stopper upper flange 15 in Fig. 1 and Fig. 4, a portion of the ring stopper upper flange 15 is formed with a guidance flange-cut-out portion 151. With respect to a pair of cut-out end faces 152, 153 configuring the guidance flange-cut-out portion 151, at least the cut-out end face 152 on the end-ring 25 removal operation direction side is configured with a guiding inclined face 152f that faces for example towards the removal operation direction side of the end-ring 25 (indicated by arrow D). The removal operation direction D, as explained below, refers to the rotation direction for rotating and removal operation, after placing the end-ring 25 in a removal guiding inclined orientation, described later. In the present exemplary embodiment this direction is for example the clockwise direction (the arrow towards the left hand side in Fig. 5); however it may be set as the anticlockwise direction. In the present exemplary embodiment the other, facing, cut-out end face 153 is also formed with an inclined face substantially parallel to the cut-out end face 14 on the removal operation direction side. Each of the cut-out end faces 152, 153, as shown in the exemplary embodiment of Fig. 1 to Fig. 5, are not facing each other as in the faces themselves being parallel to each other, but rather are profiled to open out somewhat towards the outside. In particular the cut-out end face 152 is config-

ured by a guiding edge 152e that is a ridge portion, and an apex edge portion 152t at the outermost end portion thereof. The opening width of the guidance flange-cut-out portion 151 is a cut-out portion dimension W1, and the vicinity of the bottom end of the cut-out end face 152 at the removal operation direction side configures a guiding start point P for removing the end-ring 25. The container-side indicator 31 on the ring stopper lower flange 16 referred to above is provided at the location where the guidance flange-cut-out portion 151 is formed.

[0031] Explanation now follows regarding the bottle cap 2 for fitting onto the bottle body 1. The bottle cap 2 is configured by a cap body 21 with a female thread section 22 formed on the inside thereof. The bottle cap 2 is fastened and fixed by meshing the female thread section 22 with the male thread section 14. The cap body 21 is formed integrated with the end-ring 25 through a weak portion 23. Specifically, the weak portion 23 is integrally formed to the two components so as to be present at plural connection locations intermittently at fixed intervals from each other. During operation, when the cap body 21 is rotated in the loosening direction, the end-ring 25 is stopped by the ring stopper upper flange 15 and prevented from rising, however the cap body 21 rises, breaking the weak portion 23 due to the rising action such that the cap body 21 is opened in a state in which the end-ring 25 is left behind. The structure for separating the end-ring 25 from the cap body 21 is obviously not limited thereto; configurations exist in which a state is achieved during opening that prevents rotation of the end-ring 25, and the two components are then separated from each other at the weak portion 23 due to the twisting opening operation of the cap body 21.

[0032] Explanation follows regarding an example of the end-ring 25. The end-ring 25 is equipped with a circular ring shaped ring body 25A with a barbed body 250 provided on the inside of the ring body 25A to prevent the ring body 25A from detaching, and in the example of the present exemplary embodiment the barbed body 250 is configured by plural tabs of barbed flaps 251. Namely, as shown in Fig. 1, Fig. 2 and Fig. 3, for example the barbed flaps 251 are formed at seven locations out of eight equal segments around the circumferential direction at the inside of the ring body 25A, with the free ends 252 of the barbed flaps 251 facing upwards, and maintaining a state somewhat inclined towards the inside when in their natural state. The base end sides of the barbed flaps 251 are integrally formed to the ring body 25A in a radiating shape.

[0033] The barbed flaps 251 each have a barbed flap width dimension WF, and are provided adjacent to each other while securing an inter-barbed flap gap 254 to the respective adjacent barbed flap 251. A non-barbed guidance section 255 is formed at one section, as if one of the barbed flaps 251 has been removed. The width of the non-barbed guidance section 255 is a non-barbed section dimension W2, and in the present exemplary embodiment the non-barbed section dimension W2 is a di-

mension arrived at by adding twice the inter-barbed flap gap dimension WG to the barbed flap width dimension WF. The pitch dimension per barbed flap 251 is referred to as the barbed flap pitch dimension WP and is in effect the sum of the barbed flap width dimension WF and the inter-barbed flap gap dimension WG. Note that in the explanation of the removal operation of the end-ring 25, the barbed flaps 251 are also expressed together with the demarcations f1, f2 to fn, in sequence following on from the non-barbed guidance section 255, and in particular the barbed flap 251 immediately following on from the non-barbed guidance section 255 is also sometimes expressed as guide initiation flap f1. An end-ring side indicator 32 of the indicator 3 referred to above is provided at a location where the guide initiation flap f1 is formed.

[0034] Note that types of divided configurations of the barbed body 250 included configurations in which there are many fixed projections present, rather than moveable types such as the barbed flaps 251 described above, or movable type configurations having what is referred to as a choke shape with a pivoting (moving) direction along the circumferential direction of the ring housing section 17. There are also configurations in which the barbed body 250 is not divided and there is a continuous rib profile around the inner peripheral face of the ring body 25A with an upper end edge that is in a free state. However, in all of these cases the provision of the non-barbed guidance section 255 enables operation to achieve the object of the present invention.

[0035] A first exemplary embodiment of the present invention has the configuration described above, and is operated as described below, however explanation will first be given regarding the capabilities required of the bottle cap 2. The bottle cap 2 has different capabilities required according to the circumstances at each of the stages from manufacturing to disposal, and needs to satisfy these different capabilities as a whole. These capabilities are: (1) capabilities during initial closure (during manufacture); (2) capabilities during transportation and exhibition; (3) capabilities during initial opening; (4) capabilities during drinking; (5) capabilities during re-closure; (6) capabilities during re-opening; (7) capabilities during disposal.

[0036] First, as the (1) capabilities during initial closure (during manufacture), required structure and capabilities include the ability of the bottle cap 2 to be quickly and reliably installed to the bottle body 1 together with the end-ring 25, and in particular the ability for the end-ring 25 to smoothly enter into the ring housing portion 17. As the (2) capabilities during transportation and exhibition, there is a requirement for the capability to reliably maintain closure and the capability to retain the end-ring 25. As the (3) capabilities during initial opening, there is a requirement for the capability to separate the end-ring 25 from the cap body 21 and reliably leave the end-ring 25 remaining in the ring housing portion 17. As the (4) capabilities during drinking, there is the requirement for the capability to leave the end-ring 25 remaining in the

ring housing portion 17 so as not to change its orientation in such a manner that would make contact with the lips of the drinker. Furthermore, as the (5) capabilities during re-closure, there is a requirement for the capability for the end-ring 25 to be disposed roughly in the vicinity of the bottom end peripheral face of the cap body 21 so as to prevent such occurrences as contamination or damage at this location. As the (6) capabilities during re-opening, there is a requirement for the capability to completely prevent the end-ring 25 from detaching with opening operation of the cap body 21. As the (7) capabilities during disposal, there is a requirement for the capability to enable the end-ring 25, which was hitherto required to be reliably installed, to then be rendered extremely easily removed from the bottle body 1.

[0037] The present invention is provided with the removal structure of the end-ring 25 of the bottle cap 2 to furnish the (7) capabilities during disposal, while still satisfying each of the other capabilities described above. In other words, configurations have been implemented that achieve all of the above capabilities except for the capability during disposal, and so the essential feature of the present invention is to exhibit the new capability during disposal while not impeding achievement of any of the previously realized capabilities. Namely, the configuration completely prevents the end-ring 25 from detaching during normal circumstances, yet renders the end-ring 25 easily removable using the following operation when the need arises for the end-ring 25 to be removed on disposal.

[0038] As shown in Fig. 5, first for the initial state, the indicator 3 is employed for positional alignment of the container-side indicator 31 and the end-ring side indicator 32 (see Fig. 5(a-1) to Fig. 5(a-5)). Note that Fig. 5(a-1) to Fig. 5(a-5) are diagrams for explanation purposes illustrating a state in which the side face of the circular ring shaped lid closure section 12 is opened out and shown from face on.

In the initial preparation state, a removal initiation set position state is adopted in which the guidance flange-cut-out portion 151 and the non-barbed guidance section 255 are adjacent to each other. In this state, looking from the perspective of the end-ring 25, a state is achieved in which there is no restriction of moving upwards from the ring stopper upper flange 15. Namely, as shown in Fig. 5(a-1), although the barbed flap 251 is still present, upward movement of the end-ring 25 is permitted in the range provided with the guidance flange-cut-out portion 151. However, on the end-ring 25 side at the location where the ring stopper upper flange 15 is present at the removal operation direction side adjacent to the guidance flange-cut-out portion 151, the end-ring 25 is also permitted to move upwards due to the presence of the non-barbed guidance section 255.

[0039] This range is referred to as effective guidance zone Z, with the dimension thereof indicated as effective guidance zone dimension W3. The effective guidance zone dimension W3 is the sum of the cut-out portion di-

mension W1 and the non-barbed section dimension W2, and a state in which the effective guidance zone dimension W3 is formed is only achieved when the container-side indicator 31 and the end-ring side indicator 32 are aligned with each other in the removal initiation set position state.

A removal guiding inclined orientation of the end-ring 25 is readily obtained when the effective guidance zone dimension W3 has been secured in this manner. Namely, when a portion at the indicator 3 is pushed up as shown in Fig. 5(a-2) and Fig. 4(b-2), such as with a finger, upward movement is permitted at this location due to the ring stopper upper flange 15 not being present there to restrict the end-ring 25. Furthermore, the non-barbed guidance section 255 is provided and there are no barbed flaps 251 present on the removal operation direction side at the end-ring 25 side adjacent to this location, and so upwards movement of the end-ring 25 is also permitted at this position even though the ring stopper upper flange 15 is present. As a result, as shown in Fig. 4 and Fig. 5, the end-ring 25 is still retained in the ring housing portion 17, and, by also utilizing the dimensional play present in the up-down direction of the ring housing portion 17, although there may be a minute amount of deformation, an orientation is readily achieved, namely a removal guiding inclined orientation, in which the end-ring 25 is basically merely inclined.

[0040] Explanation follows regarding tilting of the end-ring 25. Normally, as shown in Fig. 4(b-1) to Fig. 4(b-6), and Fig. 4(c-1) to Fig. 4(c-2), the end-ring 25 is in a mounted state at the ring stopper lower flange 16, with an inclination angle of 0° . The end-ring 25 normally has a small amount of play (up-down direction movement space) due to tolerance in the up-down direction inside the ring housing portion 17, and as shown by the broken line in Fig. 4(b-1), an inclination angle of β_0 is achieved by the end-ring 25 making use of this rattle space. However, in the removal guiding inclined orientation an inclination angle β_1 is achieved that is even larger than inclination angle β_0 . As a removal operation of the end-ring progresses, as shown in Fig. 4(b-2) to Fig. 4(b-5), the inclination angle increases further to inclination angles β_2 , β_3 , β_4 , β_5 , with explanation regarding operations states following. Note that in Fig. 4 the inclination angles β_0 to β_5 are shown in an exaggerated state from reality in order to ease understanding.

[0041] Namely, when the removal guiding inclined orientation has been achieved as described, if the end-ring 25 is then moved by further finger manipulation in the clockwise direction indicated by arrow D in Fig. 5(a-3) (the arrow D points towards the left hand side when illustrated face-on), and the first guide initiation flap f1 among the barbed flaps 251, namely the guide initiation flap f1 following on from the non-barbed guidance section 255, rides over the guiding start point P at the cut-out end face 152 of the ring stopper upper flange 15, so as to be gradually displaced upwards as guided by the guiding inclined face 152f (and slightly by the guiding edge

152e) (see Fig. 5(a-3), Fig. 4(b-3) to Fig. 4(b-4)). By this action continuing, as shown in Fig. 5(a-4) to Fig. 5(a-5) and Fig. 4(b-2) to Fig. 4(b-5), the subsequent barbed flaps f2, f3 to fn (f7 in this exemplary embodiment) on the barbed flaps 251 move so as to diagonally cross the ring stopper upper flange 15, in succession from the ring housing portion 17 to a ring removal section 18. When this occurs, the boundary position at which the end-ring 25 itself naturally moves from the ring housing portion 17 to face the ring removal section 18 side is located at the apex edge portion 152t on the guiding edge 152e and, as shown in Fig. 5(a-1) to Fig. 5(a-3), a movement inclination towards the ring removal section 18 side is obtained by only a slight rotation from the removal initiation set position state.

Looking in more detail, in the enlarged cross-section on III-III of Fig. 5(a-3), if the maximum diameter portion of the ring stopper upper flange 15, namely, the location where the apex edge portion 152t is passed, is indicated as an apex edge line 125tL, and a line passing through the free ends 252 on the barbed flaps 251 is indicated as a free end line 252L, then as long as the free end line 252L of the barbed flaps 251 passes the apex edge line 152tL then the end-ring 25 can be imparted with an inclination in the direction of arrow A in the drawing sufficient for being slid off. As a result, the end-ring 25 can be reliably removed simply by tilting the orientation thereof, with hardly any deformation. This can be referred to as having removed the end-ring 25 from out of the ring housing portion 17 side, and a state is exhibited in which the inner periphery of the end-ring 25 is covered from below by the ring stopper upper flange 15, and appears, as diagrammatically illustrated in Fig. 5(a-5), as if the end-ring 25 is in a state in which it has not been completely removed. Removal is subsequently made possible by, for example, rotating backwards in an anticlockwise direction so as to follow the loosening direction of the male thread section 14. By providing an operation explanation instruction 4 about this removal method, like the one shown in Fig. 8, either on the bottle body 1 or on the wrapper 10, a consumer is reliably imparted with knowledge regarding the removal process for the end-ring 25, promoting separate recycling collection.

[0042] Explanation is given above regarding the removal operation of the end-ring 25, this being an important point of the present invention; however, explanation next follows regarding the capabilities required of the bottle cap 2 in each circumstance mentioned above, and the relationship to the removal structure of the end-ring 25. First, during design, the respective profile and positions of the male thread section 14 and the female thread section 22 are designed in advance so as enable initial closure such that the removal initiation set position state does not arise. In addition, in consideration of the rotation of the cap body 21 accompanying separation of the cap body 21 and the end-ring 25, the stop position of the end-ring 25 at initial closure, namely the closure completion position of the bottle cap 2, needs to position the end-

ring side indicator 32 that accompanies the cap body 21 so as to be displaced to the loosening side of the bottle cap 2 at an appropriate angle with respect to the container-side indicator 31. Such a state and positional relationships are respectively referred so as the initial closure state and the initial closure position. The initial displacement setting angle between the container-side indicator 31 and the end-ring side indicator 32 is referred to as initial displacement setting angle θ_S . Although theoretically there is no problem in having the initial displacement setting angle θ_S at the initial closure state shown in Fig. 3(c) set at about 1° , in practice the initial displacement setting angle θ_S is set in a range of about 5° to 90° . Then, even supposing the end-ring 25 becomes separated part-way through rotation of the bottle cap 2 from the initial closure position in the loosening direction (anticlockwise), the end-ring 25 that was rotated with the bottle cap 2 then still has an angle available until the end-ring 25 achieves the removal initiation set position state, referred to as the opening lid allowable angle θ_M . In such a case the opening lid allowable angle θ_M of about 270° to 355° is secured. With most specifications of bottle cap 2 separation of the end-ring 25 from the cap body 21 is completed within the range of the opening lid allowable angle θ_M .

[0043] This situation satisfies the previously mentioned requirements for a bottle cap of (1) capabilities during initial closure (during manufacture), (2) capabilities during transportation and exhibition and (3) capabilities during initial opening; closure is reliably executed, maintained and occurrences such as the end-ring 25 falling off at initial opening are also avoided. Once open, then subsequently only in extremely limited circumstances, referred to as the removal initiation set position state, are conditions for the end-ring 25 to come off, i.e., the removal guiding inclined orientation, obtainable, namely when the relationship between the bottle body 1 and the end-ring 25 is such that displacement state within a full turn of 360° falls within the range from 0° to about 1° to 2° , to allow for loose fitting error. Accordingly conditions are achieved that satisfy the requirements of the bottle cap 2 of (4) capabilities during drinking, (5) capabilities during re-closure, and (6) capabilities during re-opening; and the end-ring 25 reliably remains in the ring housing portion 17.

<Other Exemplary Embodiments>

[0044] The present invention has a preferable exemplary embodiment as described above, however the following configurations may also be obtained. First the exemplary embodiment illustrated in Fig. 6(a-1) and Fig. 6(a-2) illustrates a state of a cut-out end face of a ring stopper upper flange 15 having a comparatively thin thickness dimension. In such a case, although there is a guiding inclined face 152f formed, it is not formed with an inclination as viewed face on. Furthermore, Fig. 6 illustrates another exemplary embodiment of a guidance

flange-cut-out portion 151. The guidance flange-cut-out portion 151 is an exemplary embodiment in which the cut-out end face 152 does not always have to be configured at an inclination. Namely, configuration may be made by simple forming in a direction orthogonal to the direction the ring stopper upper flange 15 is formed along, namely in the vertical direction. It can be seen that because such an exemplary embodiment is possible, in the present invention the guidance flange-cut-out portion 151 does not have to be provided with a cut-out end face 152 that is inclined. Accordingly the present invention is characterized by requiring the guidance flange-cut-out portion 151 to be present and by provision of the non-barbed guidance section 255 on the end-ring 25 side, such that the removal guiding inclined orientation can be achieved for removing the end-ring 25, making the end-ring 25 easily removable.

[0045] Furthermore, the exemplary embodiment illustrated in Fig. 7 is another exemplary embodiment of the indicator 3, being another exemplary embodiment of an indicator 3R formed as a recess. Namely, a section of the ring stopper lower flange 16 is cut out to form a container-side indicator 31R, and a section of the end-ring 25 is also cut out to form an end-ring side indicator 32R, such that the operation initial state for removal, namely the removal initiation set position state, is achieved by aligning these two indicators. According to such a configuration, the operation initiation state for removing the end-ring 25 is readily obtained by finger touch, enabling easy operation by visually impaired people and thereby obtaining a so-called universal design compatible product. Preferably the end-ring side indicator 32R has a profile of recess that curves up to the upper side when viewed from face on, and is an upward extending profile (shield shape) in lateral cross-section. When such a configuration is adopted a finger used to align the indicator 3R in the removal initiation set position state is then readily applied from that position to the end-ring 25 to move the end-ring 25 upwards, and a removal operation can commence immediately when the end-ring 25 is placed in the removal guiding inclined orientation. Note that with respect to the indicator 3, while each of the above exemplary embodiments are preferable embodiments, a configuration may be made such that these are merely employed as guides to the removal initiation set position state, and a separate position is employed as the position for pushing up the end-ring 25 at removal initiation.

[0046] Furthermore, the exemplary embodiment in Fig. 8 illustrates a notice for informing consumers of the removal structure of the end-ring 25 of the present invention, prompting more enthusiastic material separation and collection by complying with the notice. In addition, while in the above explanation the most widely used PET bottle has been given as an example for the bottle body 1, the present invention can be applied to another material, such as for example to a conventional glass container or the like.

Explanation of the Reference Numerals

[0047]

5	1	BOTTLE BODY
	10	WRAPPER
	11	BODY SECTION
	12	LID CLOSURE SECTION
	13	POURING OPENING
10	14	MALE THREAD SECTION
	15	RING STOPPER UPPER FLANGE
	151	GUIDANCE FLANGE-CUT-OUT PORTION
	152	CUT-OUT END FACE
	152e	GUIDING EDGE
15	152f	GUIDING INCLINED FACE
	152t	APEX EDGE PORTION
	152tL	APEX EDGE LINE
	153	CUT-OUT END FACE
20	16	RING STOPPER LOWER FLANGE

Claims

1. A resin bottle cap end-ring removal structure, configured by a structure for removing from a bottle body an end-ring that is provided attached to a bottle cap that is fitted to a lid closure portion of the bottle body and that then separates from a cap body during lid opening so as to remain below a ring stopper upper flange on the bottle body, wherein:

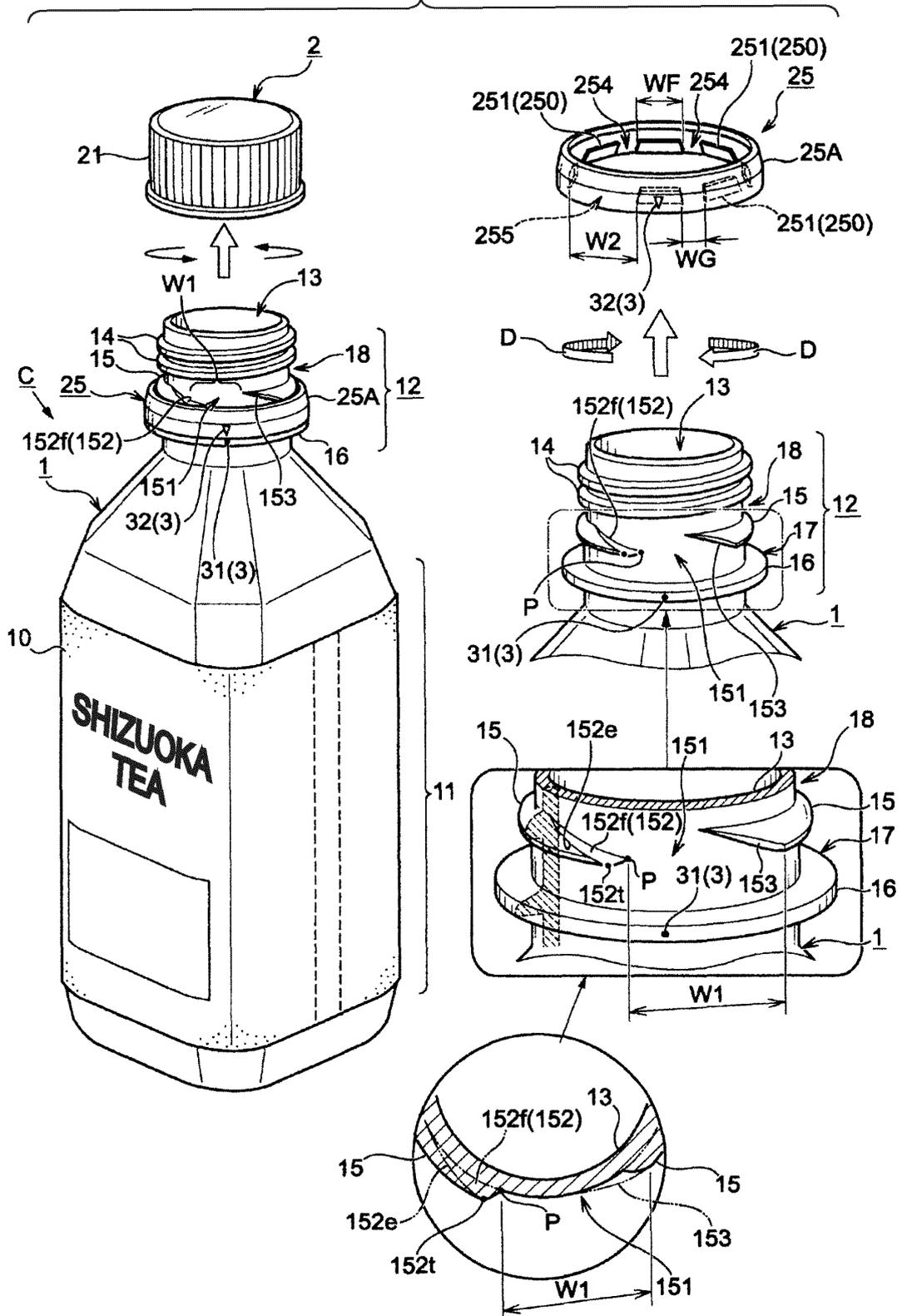
the inner peripheral side of the end-ring comprises a barbed body used for preventing the end-ring from detaching, so as to leave the end-ring below the ring stopper upper flange; the barbed body is configured so as to be divided by a non-barbed guidance section in which a barbed body is not formed over a partial range; a guidance flange cut-out section is formed in a portion of the ring stopper upper flange; an effective guidance zone in which restriction of the end-ring by the ring stopper upper flange is released in a partial range is secured by setting a removal initiation set position state in which the non-barbed guidance section and the guidance flange cut-out section are disposed adjacent to each other; and a removal guiding inclined orientation of the end-ring is achieved for removal initiation of the end-ring at this position.
2. The resin bottle cap end-ring removal structure of claim 1, wherein a pair of cut out end faces for configuring the guidance flange cut-out section are configured with a guiding inclined face facing towards a removal operation direction side on at least the cut out end face on the removal operation direction side.

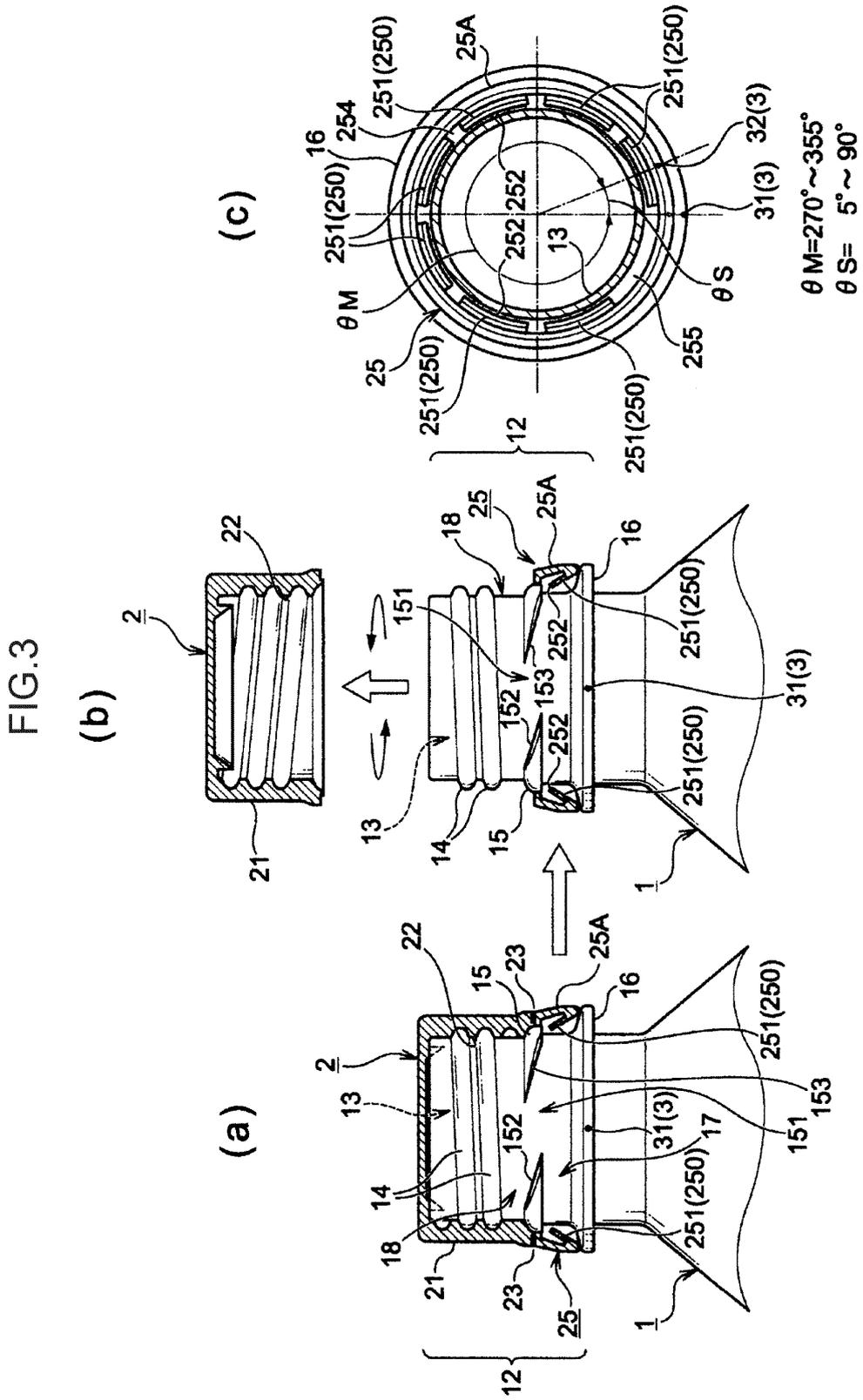
3. The resin bottle cap end-ring removal structure of claim 2, wherein the removal operation direction is the opposite direction to a bottle cap loosening direction. 5
4. The resin bottle cap end-ring removal structure of claim 1, claim 2 or claim 3, wherein the effective guidance zone is set in a range of 50° to 100° in a circumferential direction range of a bottle lid closure portion. 10
5. The resin bottle cap end-ring removal structure of claim 1, claim 2, claim 3 or claim 4, wherein a dimension of the non-barbed guidance section is set as the same dimension as or a shorter dimension than a dimension of the guidance flange cut-out section. 15
6. The resin bottle cap end-ring removal structure of claim 1, claim 2, claim 3, claim 4 or claim 5, wherein an indicator is formed to indicate achievement of the removal initiation set position state between the end-ring and the bottle body. 20
7. The resin bottle cap end-ring removal structure of claim 6, wherein the indicator comprises a cut-out alignment recess portion formed in a portion of a ring stopper lower flange provided below the ring stopper upper flange and an alignment recess portion correspondingly formed in the end-ring. 25
30
8. The resin bottle cap end-ring removal structure of claim 1, claim 2, claim 3, claim 4, claim 5 or claim 6, wherein at initial closure of the bottle cap when the bottle body is manufactured, a stop position of the end-ring integrated with the bottle cap at the initial closure is configured such that an end-ring side indicator is displaced further toward a bottle cap loosening side than a bottle cap side indicator. 35
9. A container comprising the resin bottle cap end-ring removal structure of any one of claim 1 to claim 8. 40
10. The container of claim 9 further comprising an operation instruction for removing the end-ring. 45

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FIG. 1





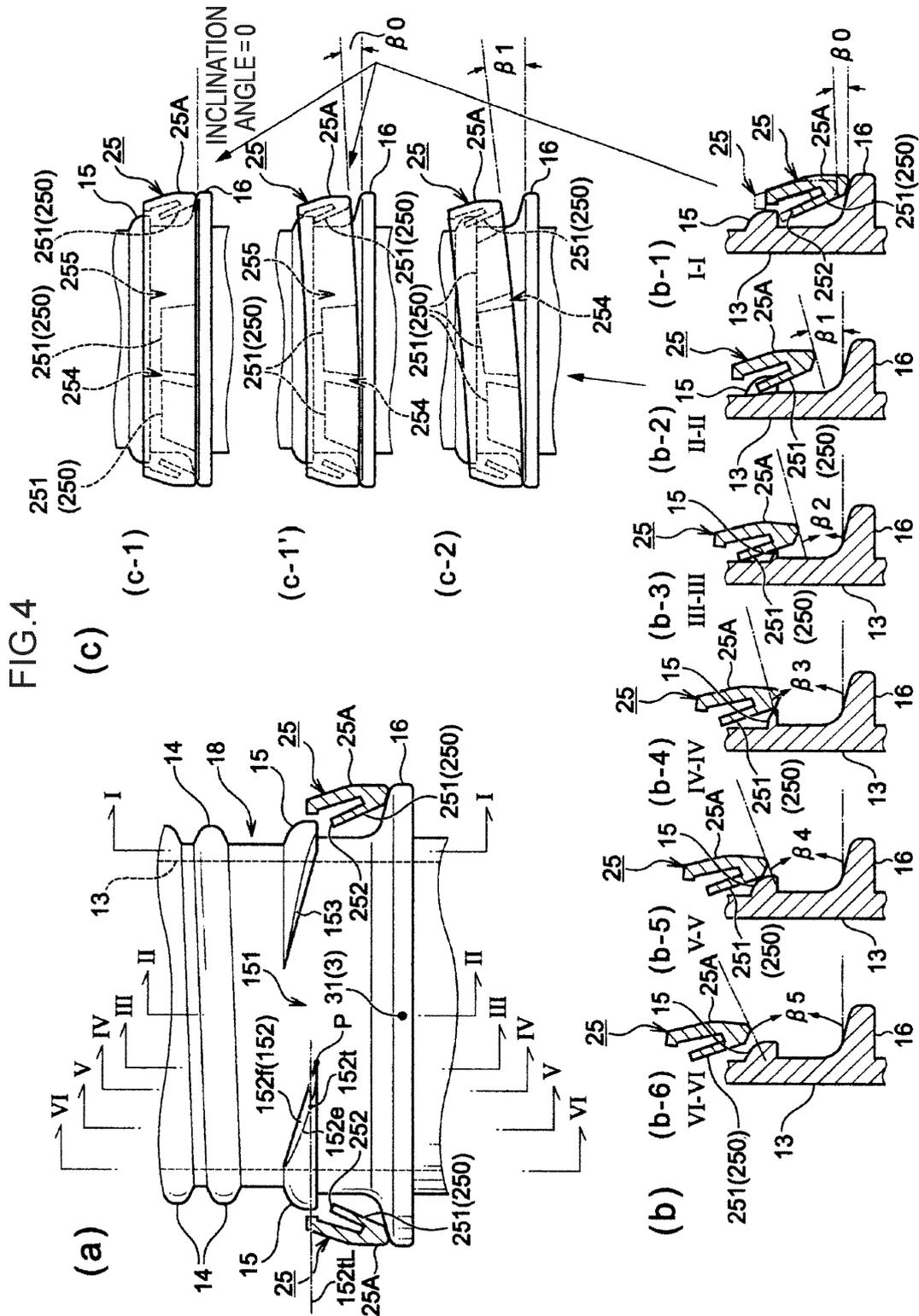
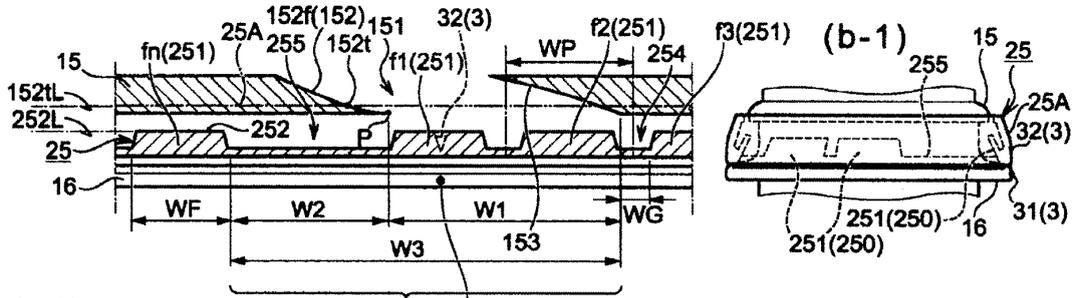


FIG.5

(a-1) REMOVAL INITIATION
SET POSITION STATE



(a-2) REMOVAL GUIDING
INCLINED ORIENTATION

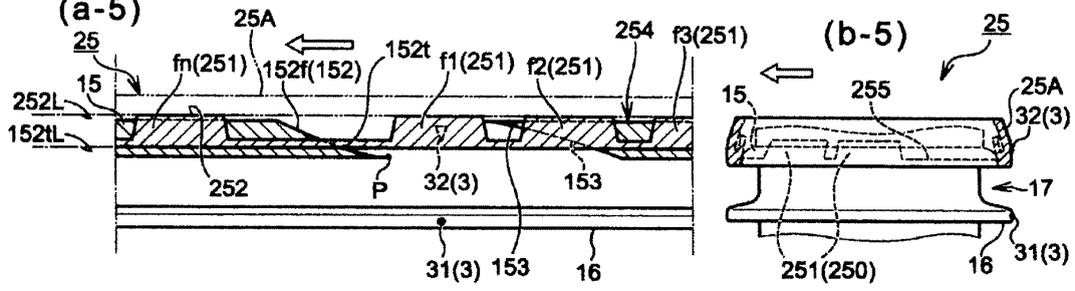
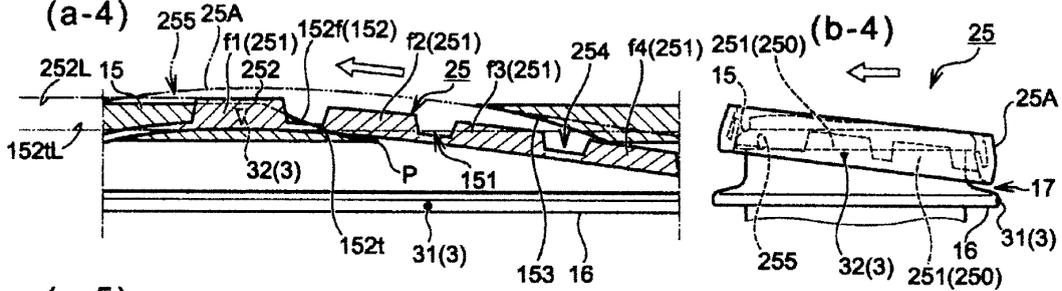
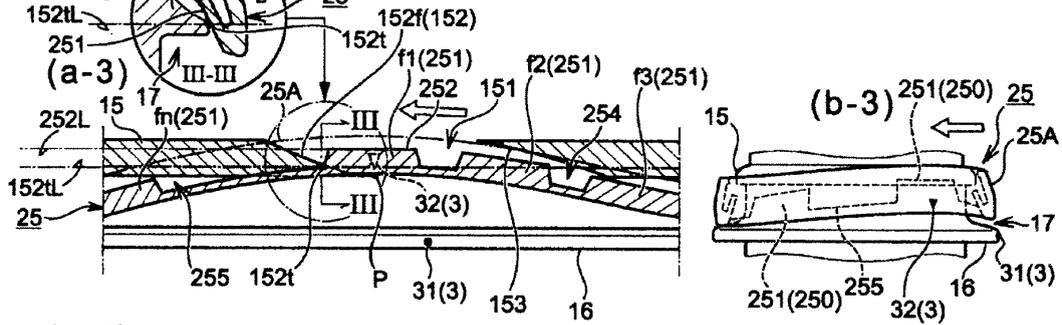
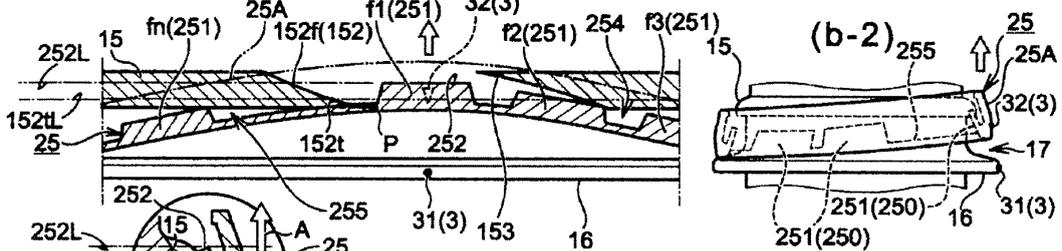


FIG.6

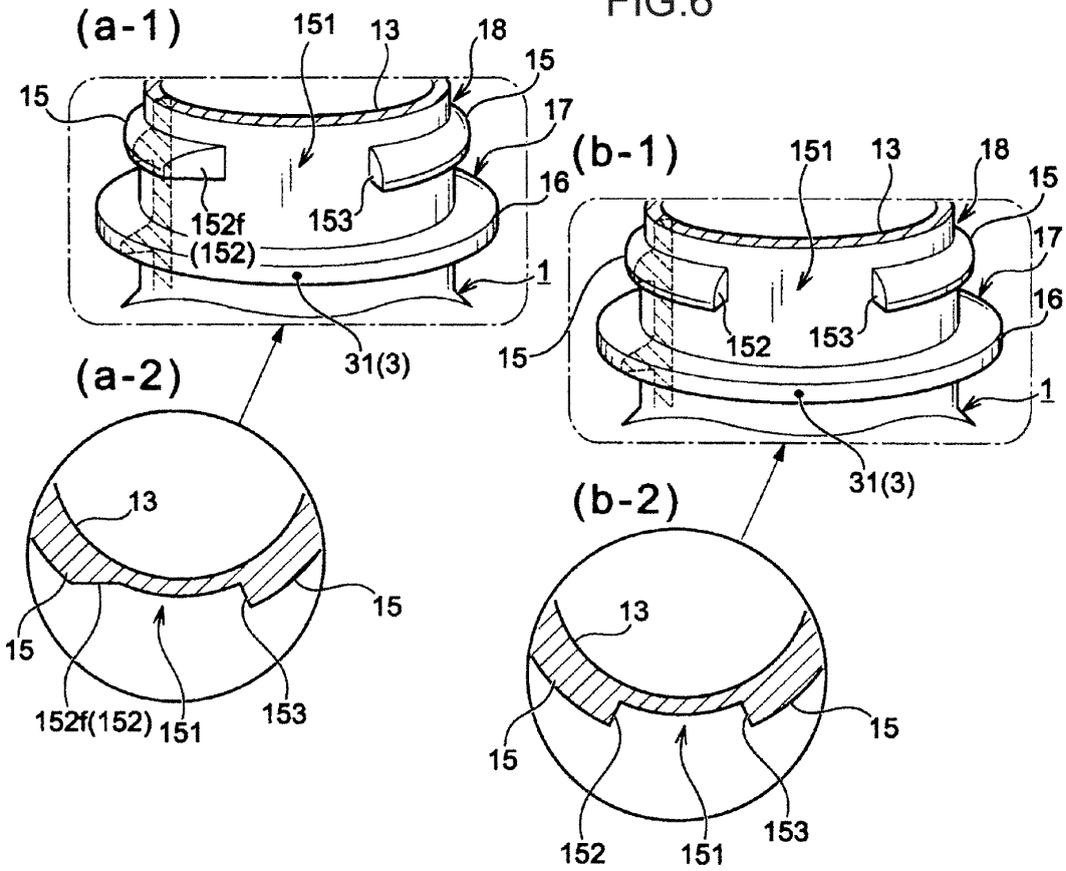


FIG.7

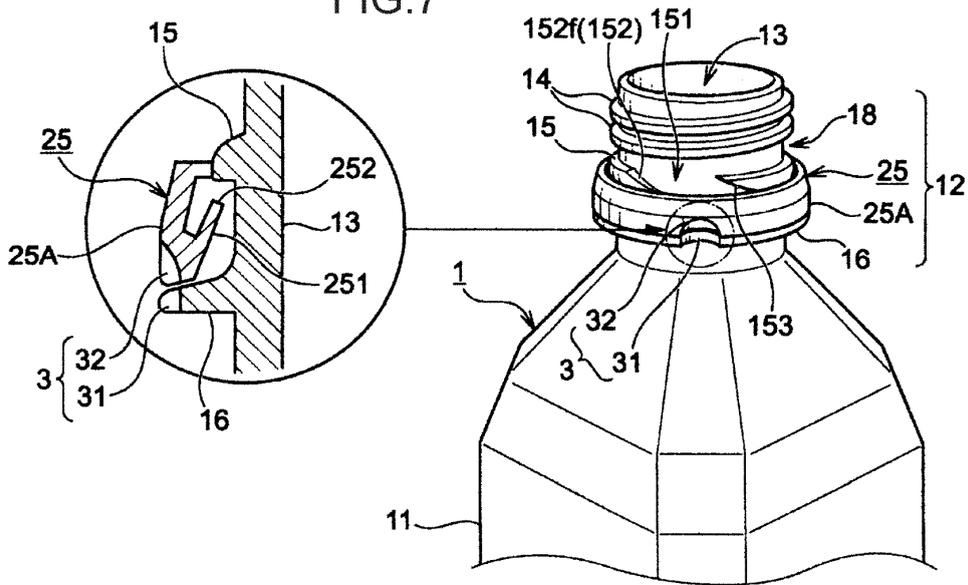
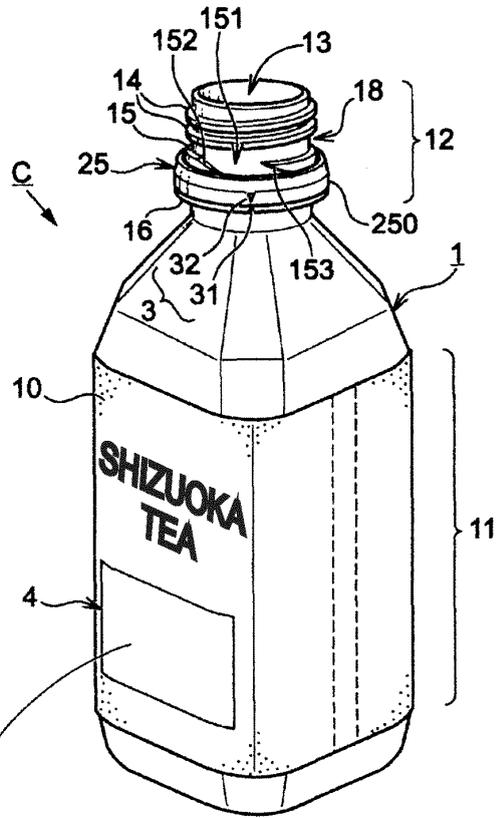


FIG.8



PLEASE SEPARATE FOR EFFICIENT RECYCLING

TO REMOVE THE END-RING:

- 1 ALIGN THE ALIGNMENT MARKS
- 2 PUSH UP THE END-RING AT THE ALIGNMENT MARKS
- 3 MAINTAIN THIS STATE AND ROTATE IN THE DIRECTION OF THE CLOCKWISE ARROW
- 4 REMOVE THE END-RING BY A SINGLE ROTATION

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/058012

A. CLASSIFICATION OF SUBJECT MATTER B65D41/34(2006.01) i, B65D1/02(2006.01) i, B65D23/00(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) B65D41/34, B65D1/02, B65D23/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010 Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2006-232392 A (Shin'ichi FUJII), 07 September 2006 (07.09.2006), paragraphs [0003], [0012], [0013]; fig. 1 to 6 (Family: none)	1-5, 9, 10 6-8
Y	JP 11-292112 A (Hiroshi UENO), 26 October 1999 (26.10.1999), paragraph [0033]; fig. 6, 13 (Family: none)	6-8
Y	JP 2002-019884 A (Japan Crown Cork Co., Ltd.), 23 January 2002 (23.01.2002), paragraph [0014]; fig. 1 (Family: none)	6-8
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 26 May, 2010 (26.05.10)		Date of mailing of the international search report 15 June, 2010 (15.06.10)
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Facsimile No.		Telephone No.

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- JP 2006232392 A [0003] [0004]