A Closing Element for Containers

Abstract: A closing element (100) made of a plastic material for containers (1) for liquids comprising a mouth (2) for dispensing the beverage and defined by the neck (3) of the container (1) with an annular bead (4). The element (100) comprises a first, outer body (5) with a circular - cylindrical shape, defined by an upper surface (6) and a lower annular liner (7) made as a single piece, plus a plurality of projecting pins (8), arranged evenly on the inner part of the annular liner (7); and a second, inner body (9) with a circular - cylindrical shape, which can be inserted in the first body (5) and has cams (10) on its own outer annular surface (11), being designed, in conjunction with the pins (8), to allow a stable minimum radial dimension configuration, or tightening, of the second body (9), by the radial thrust of the pins (8), and a maximum radial dimension configuration, by unique rotation of the first body (5) about the second body (9), with radial opening of the second body (9) relative to the first body (5).
Description

A closing element for containers

Technical Field

The present invention relates to a closing element made of plastic for containers for liquids, in particular for beverages.

Background Art

At present, the basic technical solutions in the known systems for closing containers, that is to say, "caps" for plastic and glass bottles, are the traditional metal crown cap or alternatively aluminium or plastic screw caps.

In the current beverage container market these two solutions are not enough to satisfy both the technical and marketing requirements of new products.

As a result, valid alternatives to the traditional caps are needed, above all for beverage containers, for example the latest containers for beer or soft drinks which normally need to or do allow excess gas pressure caused by handling the container to be relieved (an operation known as "venting" to experts in the field). Other requirements that have become standard for traditional caps, especially those made of plastic are "tamper evidence" or "tamper proofing", that is, a feature of the closure which, if breached or missing, provides evidence to consumers that tampering has occurred, and the feature of not damaging the neck of the container, so that the container can be re-used.

As already indicated, three types of closures are basically used to close such containers, two of which require threading on the bottle neck and one of which is applied by pressing onto the neck of the container, this being the traditional crown cap.

The latter type of cap, which can also be applied onto a threaded glass container to yield a twist-off crown cap, is the most widespread type of cap on the market thanks to its excellent
sealing properties and low cost not only in terms of machinery used to apply it, but also in terms of the product itself. The disadvantages of the crown cap applied using pressure are due to: the high axial loads on the neck of the container when the closure is applied, making it difficult (or impossible) to apply it to plastic containers owing to the risk of damaging or destroying the container itself during the capping process; the impossibility, or difficulty, of opening the container manually; the impossibility of re-using the container - if it is made of plastic - since the corrugations and the tightening force applied during capping irredeemably scratch the mouth of the container. Crown caps which can be screwed open have further disadvantages owing to the difficulty of gripping and moving them and, normally, the lack of tamper evidence which allows the consumer to check if the container seal is intact.

For this reason, the Applicant invented and designed a closing element made of plastic structured in a simple way and which can be applied using pressure on unthreaded containers of the type typically sealed by crown corks, creating an excellent seal, providing effective tamper evidence enabling consumers to check if the seal is intact before opening it for the first time, yet with opening functionality similar to that of threaded closures.

Disclosure of the Invention

The stated aim is fulfilled using a closing element made of plastic for containers for liquids. The element comprises a first, outer body with circular - cylindrical shape, defined by an upper surface and a lower annular liner made in a single piece and having a plurality of projecting pins, evenly arranged on the inside of the annular liner, and a second, inner body with circular - cylindrical shape, which can be inserted in the first body and which has cams on its outer surface designed to allow, in conjunction with the pins, a stable minimum radial dimension configuration, or tightening, of the second body, by the radial thrust of the pins, and a maximum radial dimension configuration, by unique rotation of the first body about the second body, with radial opening of the second body relative to the first body.
Brief Description of the Drawings

The technical characteristics of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

Figure 1 is a perspective view of a container closing element, made in accordance with the present invention;

Figure 2 is a perspective view of part of the closing element illustrated in Figure 1;

Figures 3, 4, 5 and 6 are front views with some parts cut away to better illustrate others, of the closing element in a succession of element closing steps on a container;

Figure 7 is a schematic front view of a detail of the closing element illustrated in the previous figures, that is to say, the cam means and pins, in a step of opening the container on which the closing element is applied.

Detailed Description of the Preferred Embodiments of the Invention

With reference to the accompanying drawings, and in particular, Figure 3, the closing element disclosed, labelled 100 as a whole, is made of a plastic material and is used to close containers 1 for liquids such as beer or soft drinks.

This type of container 1 comprises a mouth 2 for dispensing the beverage and defined by the neck 3 of the container 1 which has an annular bead 4.

As illustrated in Figure 1, the closing element 100 basically comprises a first and a second body 5 and 9.

The first, outer body 5, (see also Figure 2) has a circular - cylindrical shape and is defined by an upper surface 6 and a lower annular liner 7 made in a single piece.

The first body 5 also has a plurality of projecting pins 8, evenly arranged on the inside of the annular liner 7.

The second, inner body 9, also circular - cylindrical, can
be inserted in the first body 5 and has cam means 10 arranged on its outer annular liner 11, designed to allow, in conjunction with the pins 8: a stable minimum radial dimension configuration, or tightening, of the second body 9, by the radial thrust of the pins 8 (see Figure 6); and a maximum radial dimension configuration, by unique rotation of the first body 5 about the second body 9, with radial opening of the second body 9 relative to the first body 5.

The second body 9 also comprises an upper surface 12 and the lower annular liner 11, which is divided into a plurality of sectors 13 extending vertically, separated from one another, and each having cam means 10.

The number of above-mentioned vertical sectors 13 is equivalent to the number of pins 8 on the annular surface 7 of the first body 5.

More specifically, see Figures 3 to 6, the cam means 10 comprise an additional annular surface 14 on the outside of the annular liner 11, this extra surface defining a sliding zone for the pins 8 of the first body 5 and, at the lower end, an undercut 15 which engages with the pins 8: this allows the second body 9 to assume the minimum radial dimension configuration.

In particular, this additional annular surface 14 adapts to the shape of the annular liner 11 and allows the annular liner 11 to be "flattened" to form the minimum radial dimension configuration.

At the zone forming the undercut 15, the annular liner 11 has a plurality of protrusions 16 which guide the pins 8 and can be used during the unique rotation, the protrusions 16 forming a groove or slide for the pins 8 which ends with a seat 17 that holds and locks the pins 8 in place. This seat 17 is created in a through-space which also separates the sectors 13, so that the second body 9 stable maximum radial dimension configuration can be achieved.

More specifically (see Figure 7), the pins 8 have a pentagonal cross-section and the holding and locking seat 17 has a matching profile, for at least three sides of the pentagon and such that it allows the pin 8 to engage, following rotation of the first body 5, holding the pin 8 in a plane offset from the annular
liner 11 and so locking the first body 5 relative to the second body 9, that is to say, preventing a return to the minimum radial dimension configuration of the first body 5.

The second body 9 also has a seal 18 at the upper surface 12 in the zone opposite that facing the first body 5.

Returning to the first body 5, it has a central protrusion 19 in stable contact with the outer surface of the upper surface 12 of the second body 9 and a second, peripheral annular protrusion 20 in stable contact with the outer surface of the upper surface 12 of the second body 9 to achieve constant and even pressure on the second body 9 in the minimum radial dimension configuration.

As Figures 3 to 6 clearly show, the second body 9 has an inner annular tooth 21 which engages the annular bead 4 on the mouth 2 of the container 1.

The first body 5 may also have a plurality of beads 5a evenly arranged on the outer part of the upper surface 6 so that the first body 5 is easier to grip during rotation.

A container 1 for beverages may, therefore, have the closing element 100 described and is substantially closed by this element 100 by means of simple positioning of the two bodies 5 and 9 (see Figure 3) on the container mouth and a subsequent vertical thrust (see arrow F1 in Figure 4) on the first body 5, allowing the first body 5 to move towards the second body 9, with the second body 9 encompassing the mouth 2 of the container 1.

The thrust on the first body 5 stops at the moment when the pins 8 reach the undercut 15 and the second body 9 is locked on the mouth 2 of the container 1 by engagement of the annular tooth 21 with the annular bead 4 (see arrow F).

To open the container 1 with this type of closing element 100, the consumer must turn the first body 5 in the direction indicated by the arrow F2 in Figures 1 and 7, to allow the pins 8 to move along the protrusions 16 which allow the pins 8 to reach the seat 17 (see arrow F3 in Figure 7).

When each pin 8 reaches the seat 17, the pin 8 engages thanks to the separating zone between the sectors 13 at the seat 17, allowing the container 1 to open thanks to the radial
distancing of the second body 9 from the mouth 2 of the container 1 (see arrow P4 in Figure 6).

This is a unique opening action and, thanks to the architecture in which the pins 8 lock in the seats 17 in a plane which is offset relative to the rest of the annular liner 11 of the second body 9, prevents the whole closing element 100 from being returned to the original closing or minimum radial dimension position.

A closing element structured in this way, therefore, fulfils the preset aims thanks to an extremely rational construction architecture with many advantages.

One of these is the possibility of having a closing element which can be applied to containers for beverages in a simple way and with low machinery costs, since the process is similar to that for closing with crown caps.

The low level of force required to close the container means that this closing element can even be used on containers made of plastic without causing damage to the bottle finish.

The seal provided by this closing element is similar to that of traditional elements, whilst it can be opened by simply rotating the outer body without the aid of additional means and guaranteeing that the container cannot be closed again with the same closing element.

It will be understood that the invention can be subject to modifications and variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.
Claims

1. A closing element (100) made of plastic for containers for liquids, the container (1) comprising a mouth (2) for dispensing the beverage and defined by a neck (3) of the container (1), the neck (3) having an annular bead (4), the closing element being characterised in that it comprises:
   - a first, outer body (5) with a circular - cylindrical shape and defined by an upper surface (6) and a lower annular liner (7) made in a single piece, the first body (5) also having a plurality of projecting pins (8), evenly arranged on the inside of the annular liner (7);
   - a second, inner body (9) with a circular - cylindrical shape, which can be inserted in the first body (5) and has cams (10) on its own, outer surface (11) designed, in conjunction with the pins (8) of the first body (5), to allow a stable minimum radial dimension configuration, or tightening, of the second body (9), by the radial thrust of the pins (8), and a maximum radial dimension configuration, by unique rotation of the first body (5) about the second body (9), with radial opening of the second body (9) relative to the first body (5).

2. The element according to claim 1, characterised in that the second body (9) comprises an upper surface (12) and the lower annular liner (11) is divided into a plurality of sectors (13) extending vertically, separate from one another, and each having a cam (10).

3. The element according to claims 1 and 2, characterised in that the number of vertical sectors (13) is equal to the number of pins (8) on the annular surface (7) of the first body (5).

4. The element according to claim 1, characterised in that the cams (10) comprise at least one annular surface (14) on the outer part of the annular liner (11) designed to form a sliding zone for the pins (8) of the first body (5) and, at the lower end, an undercut (15) which engages the pins (8), allowing the minimum
radial dimension configuration of the second body (9) to be achieved.

5. The element according to claim 1, characterised in that the cams (10) comprise an annular surface (14) on the outer part of the annular liner (11) designed to form a sliding zone for the pins (8) of the first body (5) and, at the lower end, an undercut (15) which engages the pins (8), allowing the minimum radial dimension configuration of the second body (9) to be achieved; at the zone which forms the undercut (15), the annular liner (11) having a plurality of protrusions (16) for guiding the pins (8), during the unique rotation, with each protrusion (16) forming a sliding groove for the pins (8) terminating with a seat (17) for holding and locking the pins (8), to achieve the stable maximum radial dimension configuration of the second body (9).

6. The element according to claims 1 and 2, characterised in that the second body (9) has a seal (18) at the upper surface (12) in the zone opposite that facing the first body (5).

7. The element according to claim 1, characterised in that the first body (5) has a central protrusion (19) in stable contact with the outer surface of the upper surface (12) of the second body (9).

8. The element according to claim 1, characterised in that the first body (5) has a first, central protrusion (19) and a second, peripheral annular protrusion (20) which are in stable contact with the outer surface of the upper surface (12) of the second body (9).

9. The element according to claims 1 and 2, characterised in that the second body (9) has an inner annular tooth (21) which engages the annular bead (4) on the mouth (2) of the container (1).
10. The element according to claim 5, characterised in that the pins (8) have a pentagonal cross-section and the holding and locking seat (17) has a matching profile, for at least three sides of the pentagon, allowing the pin (8) to engage following rotation of the first body (5), holding the pin (8) in a plane offset from the annular liner (11), locking the first body (5) relative to the second body (9).

11. The element according to claim 1, characterised in that the first body (5) has a plurality of beads (5a) evenly arranged on the outer part of the upper surface (6), allowing the consumer to grip the first body (5).

12. A container (1) for liquids, comprising a mouth (2) for dispensing the liquid and defined by the neck (3) of the container (1), the neck (3) having an annular bead (4) and a closing element (100) made of a plastic material, the container being characterised in that the closing element (100) comprises:
   - a first, outer body (5) with a circular - cylindrical shape and defined by an upper surface (6) and a lower annular liner (7), made in a single piece, the first body (5) also having a plurality of projecting pins (8) arranged evenly on the inner part of the annular liner (7);
   - a second, inner body (9) with a circular - cylindrical shape, inserted between the first body (5) and the mouth (2) and having cams (10) on its outer annular surface (11), being designed, in conjunction with the pins (8) of the body (5), to allow a stable minimum radial dimension configuration, or closing of the mouth (2) by engagement of the annular bead (4) and an annular tooth (21) on the second body (9), by the radial thrust of the pins (8), and a maximum radial dimension configuration, or opening, of the mouth (2), by unique rotation of the first body (5) about the second body (9), distancing the second body (9) from the mouth (2).
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D45/32

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)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 940-2540, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

SERRANO GALARRAGA, J

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