

TITLE : RECIPIENT CAP**FIELD OF THE INVENTION**

- 5 The present invention relates to an improved cap for the closure of recipients, and, more in particular, it relates to a cap for the closure of bottles, flasks, jars, demijohns, tanks and the like.

BACKGROUND OF THE INVENTION

10

The closure of recipients (where recipient means any container intended for containing a fluent material having a neck through which the fluent material can be poured, such as, for example, bottles, flasks, jars, demijohns, tanks and the like) is usually done by means of caps. Recipients and caps are usually made of plastic, such as, for example, polypropilene and polyethylene. The end portion of the recipient neck is usually threaded for allowing the coupling with a threaded cap. In order to avoid unwanted opening or tampering of the recipient content, the threaded cap is usually provided with an antitamper ring connected to the cap by means of breakable plastic teeth. The antitamper ring is hold by a crest made in the proper position on the recipient neck. When the cap is removed, these breakable plastic teeth are broken so giving to the consumer a clear indication that the recipient has been already opened. Even if this solution provides the advantage that does not requires tools for the opening (recipient opener or corkscrew), it still has several disadvantages and drawbacks.

- 25 First of all, the need of breaking the breakable plastic teeth requires a certain force by the consumer, such a force being increased in case the recipient contains carbonated beverage, due to the gas pressure which acting against the cap makes its rotation and opening more and more difficult.

30 Additionally, the manufacturing of cap and recipient requires a careful study of the quotes, requires quite expensive manufacturing apparatus, and when the cap is made of a resin different from that of the recipient, this creates a recycling problem as the ring must be cut off the recipient before it can be recycled. Furthermore it is

occasionally possible to remove such a cap without separating it from its antitamper ring.

Further, dirty particles, residues, and any other kind of dust can accumulate in the little space formed by the breakable plastic teeth between the cap and the anti tampering ring and this increase the risk of contamination of the content of the recipient.

Last but not least, practical experience has demonstrate that the present system is not fully safe as some times, and in particular having regard recipient containing plain water or other non carbonate beverage, both cap and anti-tampering ring can be jointly removed without the rupture of the breakable plastic teem.

SUMMARY OF THE INVENTION

In accordance with an aspect of the present invention, there is provided a closing cap for recipients comprising an inner cap and an outer cap, said inner cap comprising on its upper face retaining means, breakable holding means, and ending stroke means, and said outer cap comprising on its lower face a relief arm comprising relief cutting means and retaining means, the inner and the outer cap being arranged such that a) in an initial opening phase, the relief arm is trapped between a retaining means and the breakable holding means and b) in a final opening phase, after relative rotation of the inner and outer caps has resulted in breaking the holding means, the relief arm is trapped between a retaining means and the end stroke means.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 and 2 represent a plant view of closing cap according to a first embodiment of the present invention.

Fig. 3 comprises an upper (A) and lower (C) plant view and a section view (B) of the

inner cap according to a second embodiment of the present invention.

Fig. 4 comprises an upper (A) and lower (C) plant view and a section view (B) of the outer cap according to a second embodiment of the present invention.

Fig. 5 represents a section view of the closing cap according to a third embodiment of the present invention.

Fig. 6 comprises an upper plant view of the closing cap according to the present invention during the initial (A), intermediate (B) and final (C) phase of the opening.

Fig. 7 comprises an axonometric view of the inner cap 10 and of the outer cap 20 of the closing cap of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

5

With reference to figures 1 to 6, the closing cap of the present invention comprises an inner cap 10 and an outer cap 20.

With reference to figure 3, the inner cap 10 comprises, inside its side walls, holding means 12 for holding said inner cap 10 to the recipient neck for closing the recipient
10 itself. According to a preferred aspect of the present invention said holding means 12 are represented by a proper thread (12a, 12b). Other kind of holding means can be provided by the man skilled in the art, such as, for example, bayonet coupling.

The inner cap 10 comprises on its upper face 13 retaining means 14 and 15, breakable holding means 16, and ending stroke means 17. According to a preferred embodiment
15 of the present invention, the retaining means 14 and 15 consist of relief teeth having a face 31 perpendicular to the upper face 13 and a face 32 forming an angle lower than 80° , preferably lower than 45° , with the upper face 13. According to a preferred embodiment of the present invention, the breakable holding means 16 consist in a
20 shaped plastic element protruding from the plane represented by the upper face 13 and closing a hole made through the upper face 13 of the inner cap 10. The breakable holding means 16 are preferably colored in order to allow an easy identification by the user. According to a preferred embodiment of the present invention the ending stroke means 17 consist in a semicircular barrier comprising an arm 17a and an arm 17b
25 linked together and forming an angle preferably in the range of from 30° to 100° between each other.

With reference to figure 4, the outer cap 20 comprises on its lower face 21 the relief arm 22 comprising relief cutting means 23 and retaining means 24. The cutting means are preferably represented by a semi-circular relief blade 23. The retaining means 24 are similar to retaining means 14 and 15 of the inner cap 10. The relief arm 22 can
30 preferably comprise a projection having shape and dimension corresponding to the shape and dimension of the hole formed by removing the holding means 16. The outer cap 20 can have different external shapes for allowing a better grip by the user. An

octagonal shape is showed in figures 1 and 2, a circular shape is showed in figures 3 to 6. Other shapes, such as, for example, hexagonal shape, can be provided by a man skilled in the art, as well as a knurled surface can be provided in order to further improve the grip by the user. The outer cap 20 is preferably made with transparent material to allow the observation of the inner cap 10.

The outer cap 20 and/or the inner cap 10 are provided with holding means for allowing the assembling and the holding of the outer cap 20 on the inner cap 10.

With reference to figure 4, the holding means are preferably represented by a inner projection 40 made on the whole inner end circular portion of the outer cap 20 and able to hold the inner cap 10 after the insertion of the inner cap 10 into the outer cap 20. With reference to figure 4 again, the holding means can be alternatively or at the same time represented by a projection 43 made on the inner cap 10 that, during assembling of the cap, runs at first in a vertical groove 44 made within of the outer cap 20 and then, during the rotation of the outer cap 20 on the inner cap 10, in an horizontal groove 45 forming a L shape with the vertical groove 44.

With reference to figure 5, the holding means are alternatively represented by a groove 18 made for the whole circumference in the middle of the outer wall of the inner cap 10 and by a corresponding groove 26 made for the whole circumference in the middle of the inner wall of the outer cap 20.

Sliding means can be preferably made on the upper face 13 of the inner cap 10 and on the lower face 21 of the outer cap 20 to allow a better smoothness during the rotation of the outer cap on the inner cap.

With reference to figure 5, such sliding means are preferably represented by a circular projection 25 made on the lower face 21 of the outer cap 20 coupled with a circular groove 19 made on the upper face 13 of the inner cap 10.

With reference to figure 6, the working operation of the closing cap according to an embodiment of the present invention will be described hereinbelow.

In figure 6a is represented the starting position of the cap as settled to the end of the packaging line. The relief arm 22 comprising the relief semi-circular blade 23 and the retaining means 24 is held by the retaining means 14 and by the breakable holding means 16.

In figure 6.b is represented the intermediate position of the cap after the starting of the rotation (in clockwise direction) of the outer cap 20. The relief semi-circular blade has cut the breakable holding means 16 so opening the hole 41 from which the excess of carbonate present in the recipient can exit. The opening of the hole 41 and the consequent exit of the excess of carbonate contained in the recipient reduces the pressure of the inner of the recipient, so further reducing the force required for the rotation and the opening of the cap.

In figure 6c is represented the end position of the cap when the opening operation is concluded. The semicircular blade 23 has reached the ending stroke means 17 entrapping the breakable holding means 16 within the so formed cavity 42. The retaining means 24 of the relief arm 22 has stepped over the retaining means 15 and prevent further rotation of the outer cap 20. Accordingly, the outer cap 20 becomes joint with the inner cap 10. The back portion of the relief arm 22 has covered the hole 41 preventing any accidental pouring of the fluid contained in the recipient. The presence of a projection on the relief arm 22 in correspondence of the hole 41 further improves the held of the cap of the present invention.

Even if the present invention has been described in detail with reference to preferred embodiments, obvious modifications realized by the man skilled in the art are intended to be comprised within the spirit and scope of the present invention as claimed hereinbelow.

CLAIMS

1. A closing cap for recipients comprising an inner cap and an outer cap, said inner cap comprising on its upper face retaining means, breakable holding means, and ending stroke means, and said outer cap comprising on its lower face a relief arm comprising relief cutting means and retaining means, the inner and the outer cap being arranged such that

a) in an initial opening phase, the relief arm is trapped between a retaining means and the breakable holding means and

b) in a final opening phase, after relative rotation of the inner and outer caps has resulted in breaking the holding means, the relief arm is trapped between a retaining means and the end stroke means.

2. The closing cap for recipients according to claim 1 characterized in that said retaining means on the inner cap are represented by relief teeth having a face perpendicular to the upper face and a face forming an angle lower than 80° with the upper face.

3. The closing cap for recipients according to claim 1 characterized in that said breakable holding means are represented by a shaped plastic element protruding from the plane represented by the upper face and closing a hole made through the upper face of the inner cap.

4. The closing cap for recipients according to claim 1 characterized in that said ending stroke means are represented by a semicircular barrier comprising a first arm and a second arm.

5. The closing cap for recipients according to claim 4 characterized in that said first arm and said second arm are linked together and form an angle in the range of from 30° to 100° between each other.

6. The closing cap for recipients according to claim 1 characterized in that said relief cutting means are represented by a semi-circular relief blade.

7. The closing cap for recipients according to claim 1 characterized in that said retaining means on the outer cap are represented by relief teeth having a face perpendicular to the lower face and a face forming an angle lower than 80° with the lower face.

8. The closing cap for recipients according to claim 1 characterized in that said inner cap comprises, inside its side walls, holding means for holding said inner cap to the recipient neck.

9. The closing cap for recipients according to claim 8 characterized in that said holding means are represented by a thread.

10. The closing cap for recipients according to claim 1 characterized in that said inner cap and said outer cap are held together by holding means.

11. The closing cap for recipients according to claim 1 characterized in that said inner cap and said outer cap are provided with sliding means.