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(54) A capping system for bottles containing still water.

(57) The capping system for bottles containing still water comprises a bottle neck (5) on which an internally-threaded cap (2) is inserted, which neck develops truncoconically and in which a minimum angle α between a tangent of an upper surface (1a) of the thread (1) and a line perpendicular to a bottle axis, measured in an anticlockwise direction, is greater than an angle β between a tangent of a lower surface (1b) of the thread (1) and a line perpendicular to the bottle axis, measured in a clockwise direction.

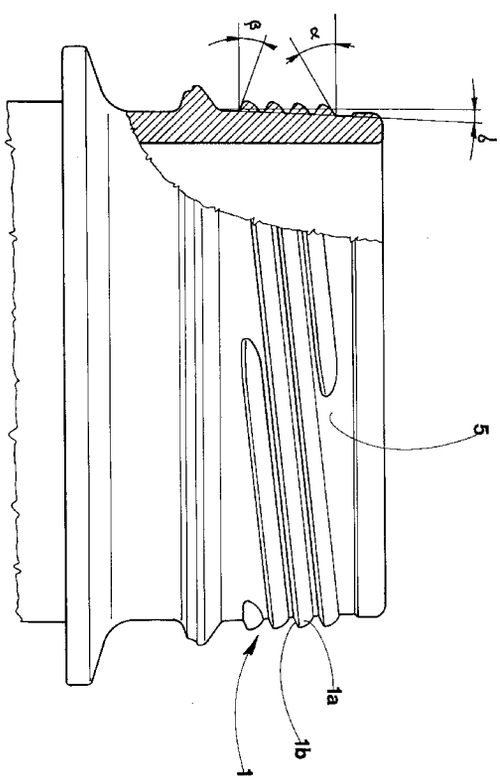


Fig.1

EP 0 645 318 A1

The invention relates to a capping system for bottles containing still water.

For some considerable time now plastic bottles capped with a plastic cap have been used for the above purpose. The caps used are of various types and almost all exhibit a safety collar, generally constituted by a detachable strip attached to the cap which is detached when the bottle is opened for the first time, thus guaranteeing that the bottle has not been tampered with in any way.

A first type of such caps is pressure-inserted on the bottle neck, closing the bottle mouth. This type is not a favourite with consumers since the bottle is both difficult to open and to close.

Another common type is the screw-on cap which couples with the bottle by means of one thread internal of the cap and another external of the bottle neck. Though much favoured by consumers, this type of cap causes problems in the bottling plant, since automatic machines have to be predisposed to perform the screwing-on operation and therefore have to incorporate more complex devices than those needed for a simple pressure-insertion of the cap on the bottle neck. Whereas a screw-cap represents a guarantee against loss of pressure for bottles containing gassy liquids, where still liquids are concerned this is not a problem, so the choice of using a screw-on cap for still liquids is made with the consumers' preference in mind.

The present invention aims to obviate the above-mentioned problems by providing a capping system for bottles containing still water which employs simple and rapid automatic machines for capping the bottles and which provides a simple screw-on and off operation for the consumer.

A further aim of the invention is to provide a capping system wherein the cap, like many known-type caps, is made in a single piece and exhibits a safety strip.

An advantage of the capping system is that the bottle can be capped by automatic machines both simply and rapidly and without the need to use lubricants which sometimes have to added to the plastic materials to enhance machine operability.

The use of such lubricants, especially for bottles containing still water, is not fully acceptable as they might infiltrate into the water and affect its taste.

These and other advantages besides are all attained by the invention, as it is characterised in the claims, which comprises a threaded bottled neck on which an internally-threaded cap is inserted, said bottle neck thread developing over a truncoconical tract and being such that a minimum angle between a tangent of the upper surface of the thread and a perpendicular line to the axis of the bottle (measured in an anticlockwise direction) is greater that an angle between the tangent of the lower surface of the thread and a perpendicular line to the bottle axis, measured in a clockwise direction.

Further characteristics and advantages of the present invention will better emerge from the detailed description that follows, of an embodiment of the invention, illustrated in the form of a non-limiting example in the accompanying drawings, in which:

- figure 1 is a partially-sectioned vertical elevation of the bottle neck of the present invention;
- figure 2 is a partially-sectioned vertical elevation smaller-scale view of the cap of the present invention;
- figure 3 is a partially-sectioned vertical elevation smaller-scale view of the cap of the present invention, inserted on the bottle neck.

With reference to the figures, the capping system is utilized for plastic bottles containing still water. The system comprises a neck 5 made together with the rest of the bottle and defining the bottle mouth itself. The neck is externally provided with a thread 1, preferably extending over four or more starts.

The external surface of the neck 5 is upwardly truncoconical with a cone angle δ of between 1 and 5 degrees; it is considered that the best results are obtained at an angle α of about 3 degrees.

The thread 1 exhibits an upper surface 1a, facing the mouth of the bottle, and a lower surface 1b, facing away from the bottle mouth: the two surfaces 1a and 1b are not symmetrical. The upper surface is curved and exhibits and angle α between the tangent of the upper surface and the perpendicular to the bottle axis (measured in an anticlockwise direction) which is smallest at the nearest point to the actual bottle neck and which grows outwardly until it is at its greatest at the end of the curve defining the upper surface 1a.

The lower surface 1b is more or less straight and exhibits an angle β between the tangent of the lower surface 1b and the perpendicular to the axis of the bottle, measured in a clockwise direction; this angle being constant over all of the length of the lower surface 1b.

The smallest angle α is always greater than angle β and the difference between the two angles is comprises between 5 degrees and 30 degrees. In particular, the thread illustrated in figure 1 exhibits a smallest angle α which is of about 30 degrees, and an angle β which is of about 20 degrees.

The above is a theoretically-based elucidation: in practice, given that bottles of this type have relatively small necks, and are manufactured by pressing, it is very possible that especially in the thread 1 area there will be small burrs and fins which do not perfectly conform to the above-described theoretical model. However, this phenomenon does not constitute a significant variation on said model.

The capping system further comprises an internally-threaded cap 2 provided with a safety ring 3 connected to the lower perimeter thereof by means of easy-break ribs 6. The internal suface of the cap,

bearing the thread 4, is truncoconical in the same way as the external surface of the bottle neck. The thread 4 exhibits symmetrical lower and upper surfaces.

A seal ring 7 is fashioned into the upper surface of the cap 2 and is coaxial thereto, in a position such as to insert into the bottle neck 5 when the cap 2 is associated to said neck 5. The maximum external diameter of the seal ring 7 is slightly greater than the internal diameter of the neck 5, so that when the ring 7 is inserted on to the bottle neck 5 a seal is obtained between the internal wall of the neck 5 and the external wall of the seal ring 7.

The cap 2 is about a third as long as its diameter, which is less than the usual ratio in normal caps utilized for plastic bottles containing either gassed or still water, and is possible because a long thread is rendered unnecessary by the absence of pressure inside the bottle, as well as by the fact that the seal ring 7 guarantees a seal.

In the factory, at the moment of cap application, the cap is applied by a usual-type automatic machine on the bottle neck 5, and thanks to the truncoconical shape of the neck 5 and cap, the cap is immediately correctly positioned and inserted up to a considerable length on the neck 5.

The special conformation of the upper surface 1a of the thread 1 means that a slight pressure on the cap to insert it on the bottle will cause the thread 4 to override the thread 1 on the bottle neck 5. Obviously, this operation is considerably facilitated by the curved shape and degree of angle α. Thus, during the capping operation, the cap behaves like a pressure cap.

The ease with which the above operation is carried out, thanks to the shape of the neck and the cap and to the perfect positioning of the cap on the bottle, obviates the need for lubricants in the whole process.

The shape of the lower surface 1b of the thread 1 does not, however, permit of easily overcoming the screw coupling to open the bottle by pulling: the consumer must unscrew the cap in order to open the bottle. Naturally, the bottle could then be reclosed by simple pressure, but also by screwing.

It should be noted that although the seal ring 7 is forced into the bottle mouth, the removal of the cap will not be rendered difficult due to the fact that it will be unscrewed: removal thereof by traction would be decidedly more difficult.

Claims

1. A capping system for bottles containing still water, of the type comprising:
   a neck (5) defining a bottle mouth, which neck (5) is externally provided with a thread (1) exhibiting an upper surface (1a) and a lower surface (1b);
   an internally threaded cap (2) incorporating a safety strip (3) coupling with the bottle neck (5) and detaching from the cap (2) when the bottle is first opened;
   characterised in that:
   a minimum angle between a tangent of the upper surface of the thread and a perpendicular line to the axis of the bottle (measured in an anticlockwise direction) is greater that an angle between the tangent of the lower surface of the thread and a perpendicular line to the bottle axis, measured in a clockwise direction.

2. A capping system as in claim 1, characterised in that a minimum difference between the angle α and the angle β is comprised between 5 degrees and 30 degrees.

3. A capping system as in claim 1, characterised in that: the upper surface (1a) of the thread (1) is curved and exhibits a minimum angle α of about 30 degrees at a connection point between the upper surface (1a) and a surface of the bottle neck (5); the angle β being constant and being of about 20 degrees.

4. A capping system as in claim 1, characterised in that: the surface of the bottle neck (5) whereat the thread (1) develops is upwardly truncoconical; the internal surface of the cap (2) whereat the thread of the cap developing truncoconically in a same way thereas.

5. A capping system as in claim 4, characterised in that the cone angle δ of the external surface of the neck (5) is between 1 degree and five degrees.

6. A capping system as in claim 1, characterised in that the thread (1) exhibits a plurality of starts.

7. A capping system as in claim 1, characterised in that the cap (2) exhibits a length which is about a third of a diameter thereof.

8. A capping system as in claim 1, characterised in that the cap (2) exhibits a sealing ring (7) arranged internally of an upper surface thereof and disposed such as to insert on the bottle neck (5); said sealing ring (7) being coaxial to the cap (2) and having a maximum external diameter which is slightly greater than an internal diameter of said bottle neck (5).

9. A capping system as in claim 1, characterised in that: the upper surface (1a) of the thread (1) is curved and exhibits a minimum angle α which is of about 30 degrees, ata connection between the upper surface (1a) and a bottle neck surface; angle β being constant and of about 20 degrees; the

surface of the bottle neck (5) whereat the thread (1) develops being upwardly truncoconical with a cone angle δ of about 3 degrees; the internal surface whereat the cap (3) thread develops being truncoconical to an equal degree as the cone angle δ of the bottle neck surface; the thread (1) exhibiting four thread starts; the cap exhibiting a length which is about a third as long as a diameter thereof; the cap (2) also exhibiting a sealing ring (7) arranged internally thererof in such a position as to insert in the bottle neck, and being coaxial to the cap (2), and exhibiting a maximum external diameter which is slightly greater than an internal diameter of the bottle neck (5).

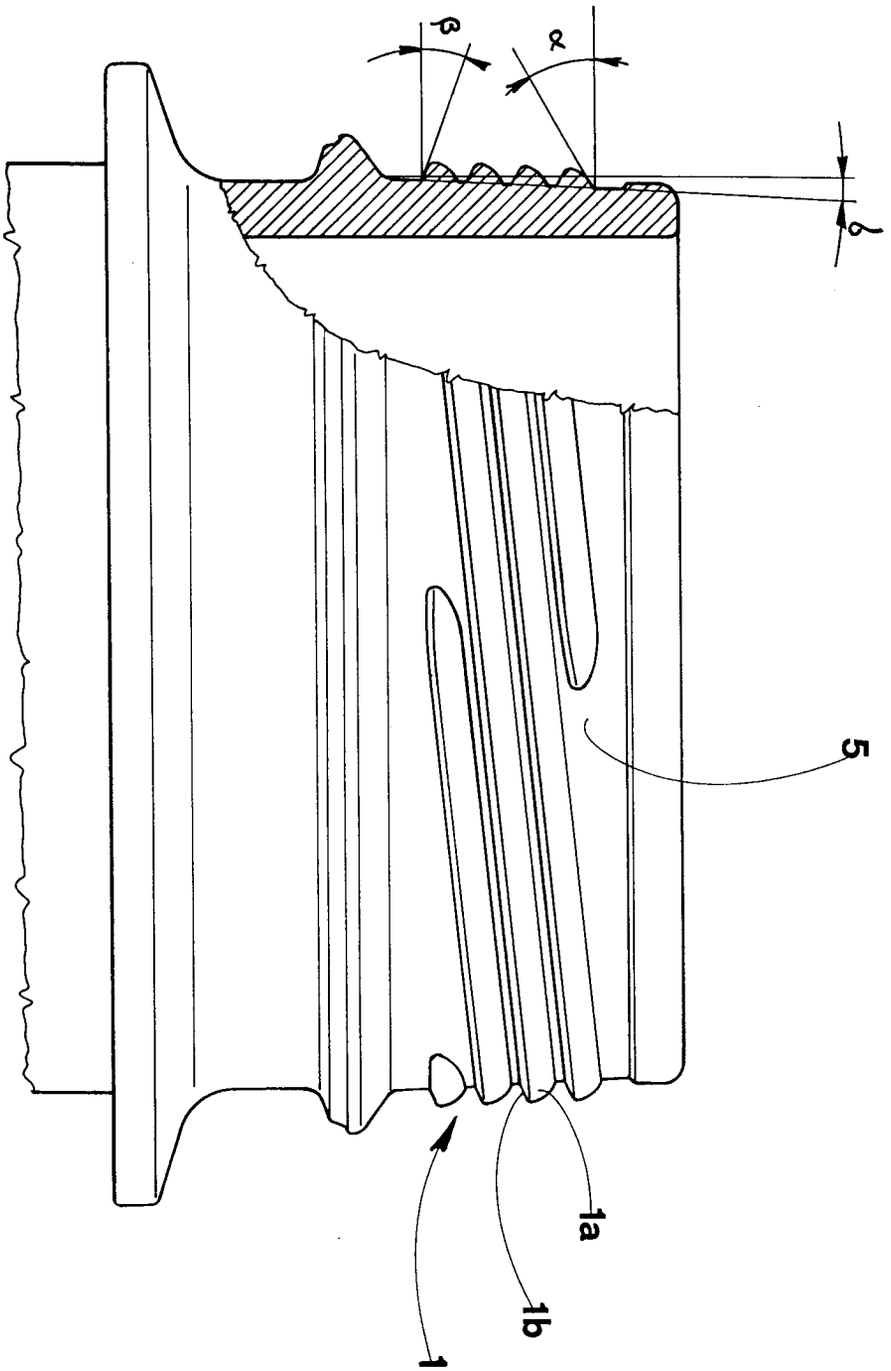


Fig.1

Fig.2

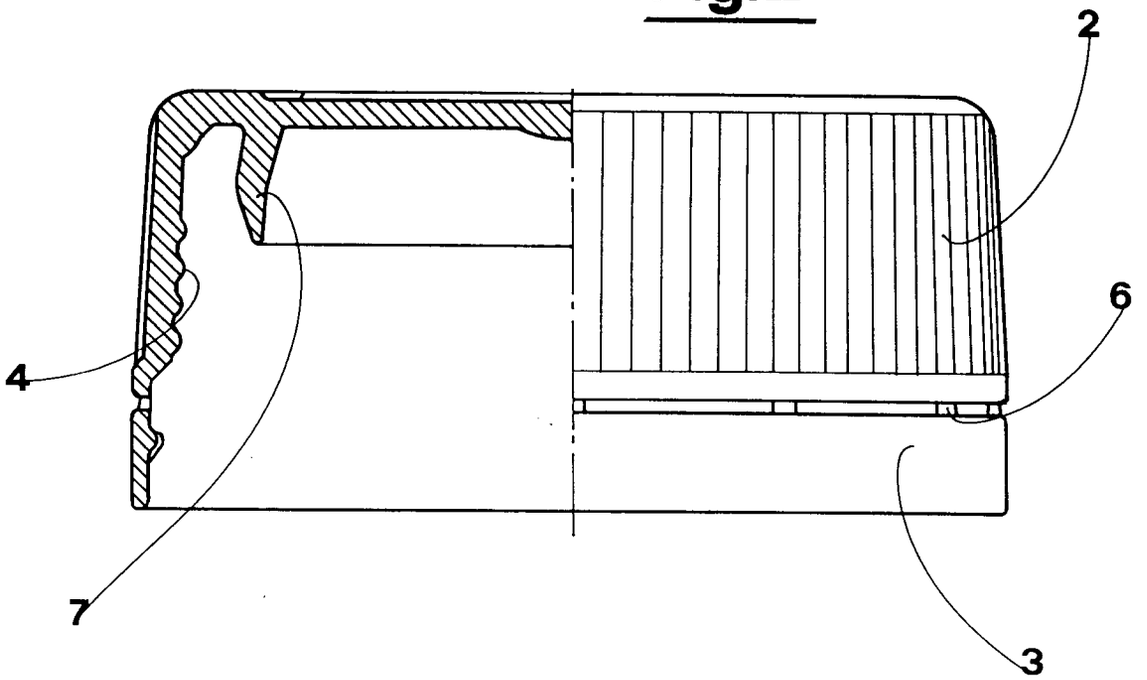
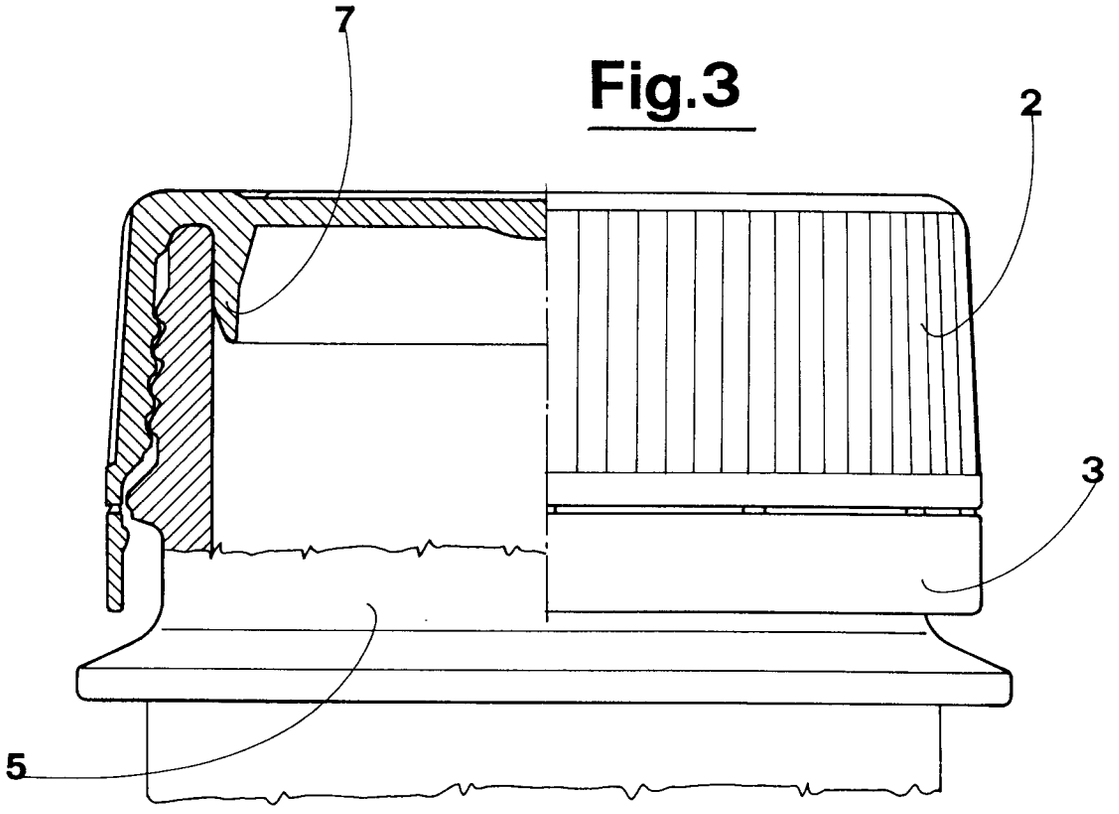


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0426

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 540 786 (CAP SNAP CO.) * the whole document *	1,2,6-8	B65D41/04
A		3	
A	WO-A-89 10313 (ALFATECHNIC AG) * abstract; figures *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 December 1994	Smith, C

CATEGORY OF CITED DOCUMENTS

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