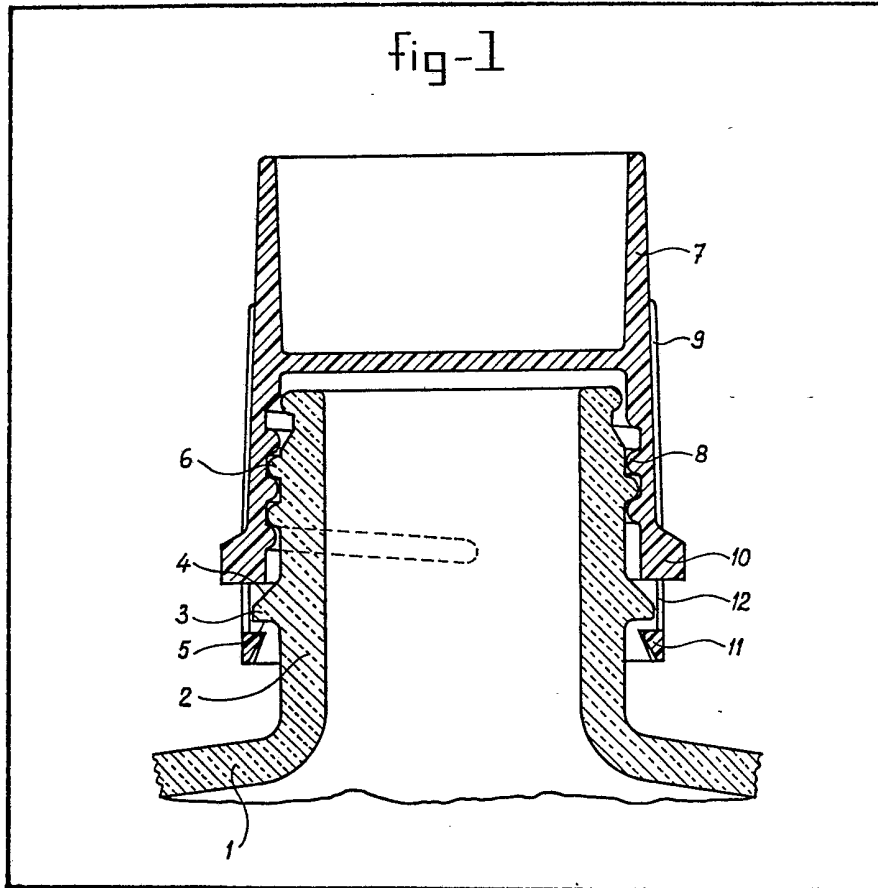


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- (71) Applicant
Koninklijke Emballage
Industrie Van Leer B.V.,
Amsterdamseweg 206,
Amstelveen, Netherlands
- (72) Inventor
Frans Arnold Willem
Tasseron
- (74) Agent
A. A. Thornton & Co.

(54) **A Cap for a Bottle or Other Container**

(57) A screw cap 7, for a bottle or other container having a threaded neck with a bead 3, which cap has a locking part in the form of cam portions 11 connected to the main

part of the cap by bridge pieces 12. When the cap is screwed on to the neck the cam portions 11 snap over the bead 3. When the cap is unscrewed, the locking part may remain integral with the cap or become separated from it due to the bridge pieces 12 fracturing.



The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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fig-1

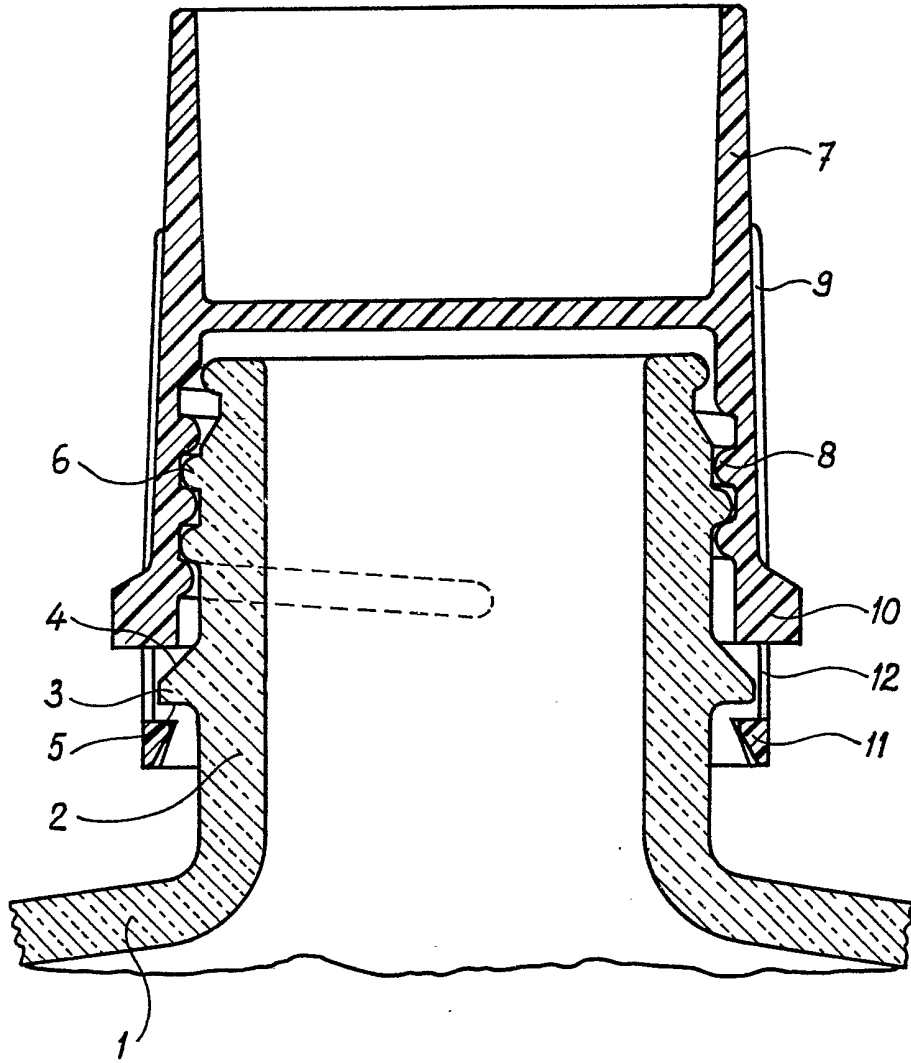


fig-2

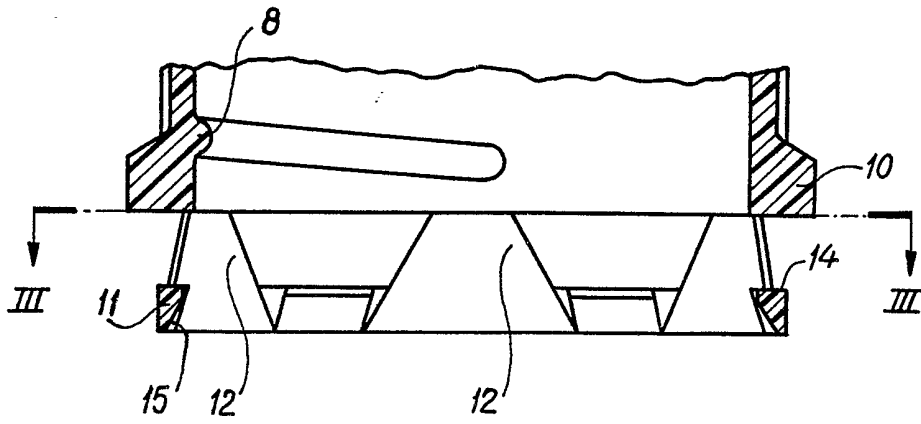
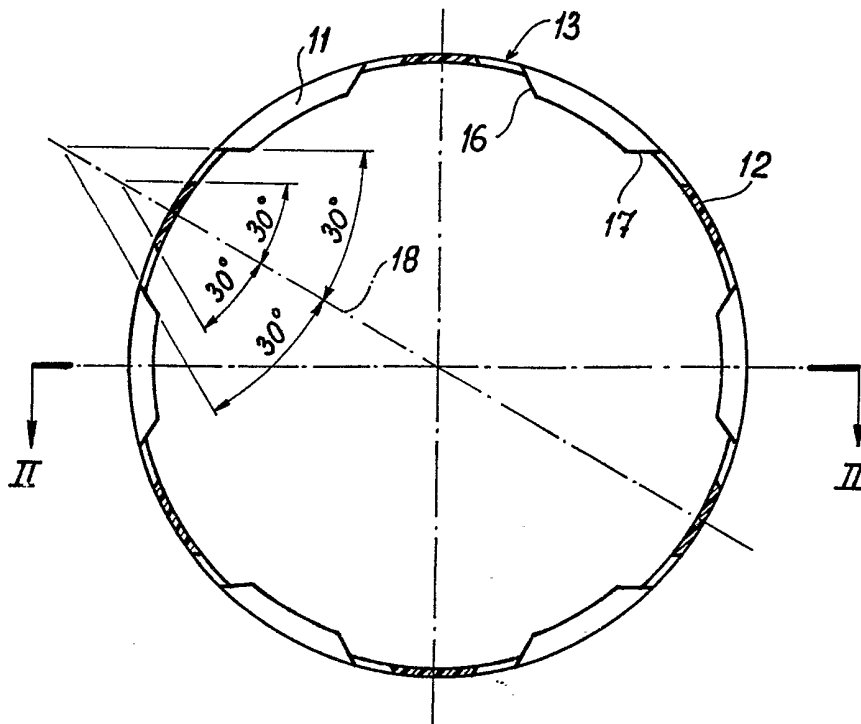


fig-3



SPECIFICATION

A Cap for a Bottle or Other Container

The invention relates to a screw cap having a locking edge for a threaded neck of a bottle or container, said neck being provided with an outwardly directed circumferential bead and said locking edge being suited to be caught below said bottle or container bead and being connected to the lower edge of said cap by means of circumferentially spaced connecting bridges.

A screw cap of this type is known in general. In the known screw caps made of metal or a plastic material there are employed thin connecting bridges between the locking edge and the cap.

These thin connecting bridges may rather easily be severed upon loosening the screw cap and serve therefore only to show either that the screw cap has already been loosened before or that the closure still rests unsevered. No safeguard is thereby provided against unwanted opening by children.

In case of metal screw caps the locking edge has an inner diameter that may be slipped over the bottle or container bead when placing the screw cap on the bottle or container, which locking edge is then pressed inwardly by means of rollers.

In case of plastic screw caps the locking edge is made to shrink by heating the same and optionally by having rollers acting thereon.

Hence in both cases an additional treatment is required in order to attain the locking condition of the screw cap.

An object of the invention is to provide a screw cap not requiring this additional treatment and by means of which a better locking is obtained and higher forces within a predetermined range are required for loosened the screw cap.

This object is obtained in accordance with the invention in that said locking edge has been provided with a number of circumferentially regularly distributed inwardly directed cams capable of locking below said bottle or container bead and said locking edge being constructed so ruggedly and elastically that said locking edge by way of its cams may snap over the bottle or container bead when screwing the cap onto said bottle or container. In this way there is obtained a screw cap having a locking edge snapping over the bottle or container bead when screwing the cap onto said bottle or container so that an additional treatment is superfluous, whereas upon positioning the screw cap the inwardly directed cams positively lock below the bottle or container bead.

The locking edge including the cams and the connecting bridges should allow for the expansion when screwing the cap in its place which expansion should be within the elastic range and should occur without damaging the locking edge and the connecting bridges. This means that the said parts have to be moreover of a sufficiently strong and elastic construction in order to convey the torque exerted on the cap when screwing the

65 same onto the bottle or container to the ring subject to resistance when passing the bottle or container bead in such a manner that the bridges remain undamaged.

This results in a much higher strength than in case of the known screw caps so that also when loosening a much higher torque has to be exerted generally having a value of more than 1.5 Nm (15 kgcm) and preferably about 2 Nm (20 kgcm), i.e. a torque that cannot be exerted anymore by the hand of a child.

The dimension of the connecting bridges may thereby be chosen such that the bridges are severed when loosening but also such that they will remain intact so that even after opening one time the closure remains suitable for use as a safe closure for children.

The cams may be provided between the bridges but also on the bridges per se in which case the bridges are connected by means of a locking edge having a height equal to the height of the cams and thickness equalling the thickness of the bridges. Particularly in case frangible connecting bridges are used the cams are provided with a flat upper surface. Preferably the bottle or container bead has a flat lower edge.

Bottle or container beads are often provided when manufacturing the bottle or container in order to supply a point of application for means by means of which the produced bottle or container may be removed from the production unit. In case of containers made of a plastic material beads may however also be present.

Furthermore it is preferred that the cams have an inner surface running obliquely from top to bottom in order to induce a gradual expansion when screwing the cap onto the bottle or container.

At the location where merging into the locking edge the bridges are preferably broader in circumferential direction than where joining the lower edge of the cap. A severing will then occur at the thinnest location so that the cap itself will keep a sound lower edge. A shape appropriate for this purpose is obtained when the bridges have trapezoidal shape when viewed in side elevation.

When the cap is made of a plastic material one has to take care that this plastic material is not too brittle but not too soft either. The tensile strength should preferably be between 200 and 300 MN/m², whereas the elongation at break may amount to most 200%. Polypropylene is a suitable plastic material for the production of a cap having frangible bridges and/or locking ring. Certain types of polyvinyl chloride may however also be used. Polyethylene may be considered for the production of a cap having non-severable bridges and/or locking ring.

When using a plastic material the production may be performed in a known way by injection moulding. In view of the cams on the locking edge special measures will then be required in order to render the release from the mould possible. According to the invention it is therefore preferred to employ a locking edge possessing 6 cams the

side surfaces of which make an angle of 30° with respect to a plane running through the axis of the cap and through the middle of the bridge in case the cams are present between the bridges. The

5 the cams possess alternately parallel side surfaces so that a core having slidable plates may be used.

Moreover side surfaces in such an arrangement provide a gradual transition from the cam to the annular part of the locking edge present between

10 the cams.
The invention will now be described in detail with reference to the drawings.

Fig. 1 shows a screw cap according to the invention positioned on the neck of a container.

15 Fig. 2 shows a cross section of the lower part of the screw cap according to the invention along the line II—II in Fig. 3 and

Fig. 3 shows a cross section along the line III—III in Fig. 2.

20 In Fig. 1 there has been shown a container 1 having a neck 2 said neck being provided with a bottle or container bead 3 having an oblique top surface 4 and a horizontal bottom surface 5.

The neck has furthermore been provided with a

25 screw thread 6.
On this neck there has been positioned a plastic screw cap 7 provided with an internal screw thread 8.

At the outer surface this screw cap possesses a

30 milled profile 9 in order to assure a good grip when replacing and loosening the screw cap whereas the cap furthermore possesses a thickened lower edge 10.
In accordance with the invention the screw cap

35 has been provided with a locking edge 11 connected to the edge 10 by way of bridging pieces 12. As regards the shape and position said locking edge and bridging pieces have been more clearly shown in Figs. 2 and 3.

40 As will be apparent from Figs. 2 and 3 the locking edge consists of an annular body 13 that has been provided at a number of places, for instance six, with inwardly directed cams 11 having a flat top surface 14 and an oblique inner

45 surface 15. This inner surface merges through side surfaces 16, 17 into the annular part said surfaces preferably making an angle of 30° with the plane 18 indicated by the dot and dash line through the middle of a bridge 12 and the axis of

50 the cap. This feature not only simplifies the production but provides also a gradual transition from the major mass of material of the cams 11 to the thin ring 13.
Between the cams 11 the ring 13 has been

55 provided with bridging pieces 12 having a trapezoidal shape as most clearly can be seen in Fig. 2. By means of this shape it is attained that upon severing this will occur at the places where the bridges merge into the bottom surface of the

60 edge 10 so that this edge will remain as smooth as possible.
It will be clear that also other shapes for these connecting bridges may be considered.
The locking edge has been constructed in such

65 a manner that upon screwing the cap on the neck

the cams 11 of the cap move across the outer surface 4 of the bottle or container bead 3 whereby the ring 13 including the bridges 12 and the cams 11 is expanded. Upon passing the lower

70 edge of the bottle or container bead 3 the ring snaps elastically inward whereas the cams lock below the bottle or container bead. The material of the ring thus has to be capable of elastic elongation to a sufficient degree and rather at the

75 yield strength of at least 10%.
In the shown embodiment the cams engage the bottom surface of the bottle or container bead by means of the flat top surface. In this

embodiment a severing of the bridging pieces will be most plausible when loosening the cap. Cams having a flat top surface like shown in the drawing may also be used in combination with a bottle or

80 container bead having a rounded lower side, whereas in that case it is also conceivable to use cams having an inclined top surface. In these embodiments it is then preferred that no severing of the connecting bridges occurs but that for opening a similar expansion of the ring has to take place as upon closing, this requiring the exertion

85 of a torque of such a magnitude that it will be possible for the hand of a child to open the closure.

Claims

1. A cap for a bottle or other container having

95 an external screw thread and a peripheral bead, the cap comprising an upper part with an internal screw thread, and a lower, locking part connected to the upper part by a plurality of bridge pieces spaced apart around the cap, the locking part

100 comprising a plurality of cam portions spaced apart in the circumferential direction and projecting inwardly for said cam portions to pass over and engage behind the neck bead with a snap action when the cap is screwed on to the

105 neck.
2. A cap as claimed in claim 1, wherein the cam portions are located between the bridge pieces.
3. A cap as claimed in claim 1 or 2, wherein

110 the cam portions have top surfaces lying in a plane substantially normal to the cap axis.
4. A cap as claimed in claim 1, 2 or 3, wherein the cam portions have inner surfaces inclined to the cap axis and diverging from the axis from top

115 to bottom.
5. A screw cap as claimed in any one of the preceding claims wherein at their point of connection to the locking part the bridge pieces are greater in circumferential width than at their point of connection to the upper part of the cap.

6. A screw cap as claimed in claim 5 wherein each of the bridge pieces has a trapezium shape when viewed in side elevation.

7. A screw cap as claimed in any one of the preceding claims wherein the cap is made of a plastics material having a tensile strength of from

125 200 to 300 MN/m² and an elongation at break of not greater than 200%.

8. A cap as claimed in claim 7, wherein the plastics material is polypropylene.

9. A cap as claimed in claim 7 wherein the plastics material is polyethylene.

5 10. A cap as claimed in any one of the preceding claims wherein bridge pieces are so constructed and arranged that a torque of more than 1.5 Nm must be applied to the upper part to
10 by the locking port.

11. A cap as claimed in any one of the preceding claims wherein the locking port

includes six cam portions uniformly spaced apart and having side surfaces each lying in plane
15 which make an angle of 30° to a plane containing the axis of the cap and the centre of the connecting bridge adjacent to said side surface.

20 12. A cap for a bottle or other container substantially as herein described with reference to the accompanying drawings.

13. A bottle or other container having a neck with an external screw thread and a peripheral bead and equipped with a cap as claimed in any one of the preceding claims.