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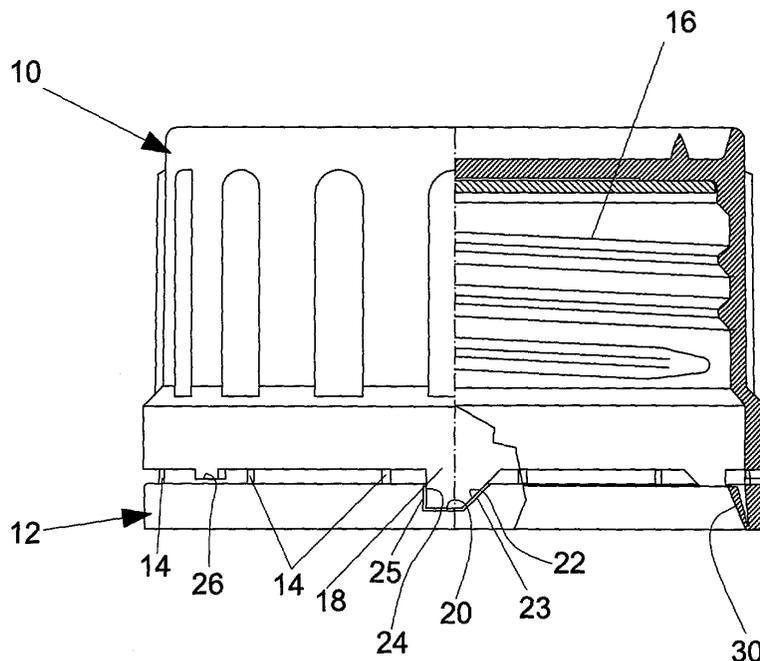
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(54) **Screw cap with safety ring of improved reliability**

(57) Screw cap (10) with safety ring (12) of improved reliability, of the type in which the safety ring (12) in its upper part is connected to a lower end of screw cap (10) by frangible bridge elements (14), the cap (10) having on its lower part at least one dragging tooth (18), in correspondence of which, on the upper part of the safety

ring (12), a recess (20) is provided for each dragging tooth (18); this safety ring (12) is provided with, at an internal lower end, an annular appendage (30) of frustoconical shape with lower, broader base, the broader base being united to the lower end of the safety ring (12).

Fig. 1



Description

[0001] The present invention concerns a screw cap with safety ring of improved reliability.

[0002] To close containers of different type, various kinds of closing devices have been developed over time.

[0003] In particular, closing devices equipped with safety elements, which prevent a fraudulent refilling or removal of the product enclosed in the container have been achieved.

[0004] Generally, the container is provided with a dispensing mouth serving as a conveyor element. The dispensing mouth, externally threaded, is closed with a closing device such as a covering screw cap.

[0005] The cap is connected to one its lower parts by frangible bridge elements, whose integrity is a guarantee that the package has not been opened: for this reason such lower part is called a safety ring.

[0006] It is important that these frangible bridge elements remain intact until the end user endeavours to break them in order to open the screw cap and thus access the fluid present in the container for the first time.

[0007] This may not take place, as some of these bridge elements may break in the processes between the moulding of the screw cap and its assembly on the dispensing mouth of the container.

[0008] In particular, the screw caps are generally produced in a moulding plant and are subsequently transported to another plant where the filling and closing of the containers actually takes place.

[0009] During the transport, the caps are likely to be subjected to substantially radial squashing and deformation, which may cause the breaking of some bridge element. A careful selection phase is therefore necessary before the assembly of the screw cap on the filled containers, if it is wished to avoid the risk of supplying the end user with containers with damaged caps.

[0010] In addition, the actual assembly operation of the screw taps on the filled containers causes a certain stress on the cap and safety ring, such that the breaking of some bridge element may occur, which among other things is not detectable in a rapid and economical manner.

[0011] The object of the present invention is therefore to overcome the aforementioned drawbacks and in particular to make a screw cap with safety ring of improved reliability that minimises the possibility of inopportunistically breaking bridge elements, either during the transport stage or during the assembly of the cap on the container.

[0012] Another object of the present invention is to make a screw cap with safety ring of improved reliability that may be easily assembled on the container.

[0013] A further object of the present invention is to make a particularly simple and functional screw cap with safety ring of improved reliability, also with relatively-contained moulding costs.

[0014] These and other objectives according to the present invention are attained by making a screw cap

with safety ring of improved reliability as described in claim 1.

[0015] Further characteristics are provided in the following claims.

[0016] The characteristics and advantages of a screw cap with safety ring of improved reliability according to the present invention will be made more evident by the following exemplifying and non-limiting description concerning the attached schematic drawing in which:

figure 1 is a partially-sectioned, elevated side view of a screw cap with safety ring of improved reliability, according to the present invention.

[0017] With reference to figure 1, a screw tap is exhibited, entirely indicated with 10, with a safety ring 12 of improved reliability.

[0018] In the illustrated example, according to the present invention, the safety ring 12, of substantially cylindrical crown shape, is set in place below the screw tap 10 itself and its upper end is precisely connected to a lower end of screw cap 10 itself by way of frangible bridge elements 14.

[0019] The screw cap 10 is clearly internally provided with a threading 16 and has at least one dragging tooth 18 lower down: generally they are more than one, preferably distributed in a uniform manner along the circumference.

[0020] Corresponding with the dragging teeth 18, recesses 20 are provided on the upper part of the safety ring 12 for the teeth 18 themselves.

[0021] More precisely, the dragging teeth 18 have a slanted side 22, with respect to the axis of cap 10, while the other side 24 is substantially parallel to the axis of cap 10.

[0022] The recesses 20 have a slanted side 23, with respect to the axis of the cap 10 with a slope approximately equal to that of the slanted side 22 of the dragging teeth 18, while the other side 25 is substantially parallel to the axis of cap 10. The dimensions of the recesses 20 are larger than those of the dragging teeth 18, such that when the cap 10 is made, connected with the safety ring 12 by the bridge elements 14, there exists a clearance between the dragging teeth 18 and the grooves 20.

[0023] Below the cap 10, or above the safety ring 12, a spacing element 26 is also provided. Generally such spacing elements 26 are uniformly distributed along the circumference.

[0024] The safety ring 12 is provided with, at an internal lower end, with an annular appendage 30. The appendage 30 has a frustoconical shape with lower, broader base, such broader base joined to the lower end of the safety ring's cylindrical crown.

[0025] The slope of the appendage 30 side surfaces with respect to the safety ring 12 axis is low, such that the recesses 20 of the safety ring 12 are located a short radial distance from the external side surface of the ap-

pendage 30, the height of the frustocone of the appendage 30 being approximately equal to that of the cylindrical crown of the ring 12.

[0026] It should be pointed out how the bridge elements 14 connect the cap 10 to an upper end of the cylindrical crown of the safety ring 12 and are preferably distributed in a uniform manner along the circumference.

[0027] The above-described shape of the safety ring 12 allows the production, for example using a mould provided with internal movement, of a screw cap 10 connected only through the frangible bridge elements 14. In fact, the dragging teeth 18 remain disjoined both from the cylindrical crown of the safety ring 12 and the appendage 30.

[0028] The operation and most specific characteristics of the screw cap 10 with safety ring 12 of improved reliability according to the invention are clear from the above description with reference to the figure, and in brief is the following.

[0029] The screw cap 10 is produced by plastics moulding.

[0030] The connection elements 14 between cap 10 and the cylindrical crown of the safety ring 12 are able to quite sufficiently resist axial and radial stress.

[0031] Regarding axial stress, the spacing elements 26 prevent an excessive approach between cap 10 and the cylindrical crown of the safety ring 12, precisely where these spacing elements 26 are formed: in this manner there is a very limited risk of some bridge element 14 breaking.

[0032] Regarding radial stress, the appendage 30 of the safety ring 12, joining with the dragging teeth 18 of the cap 10, prevents an excessive movement in the transverse sense between cap 10 and safety ring 12: in this manner there is a very limited risk of some bridge element 14 breaking. In practice, this important result is obtained when an internal surface of the dragging tooth 18 comes into contact with an area of the external side surface of the appendage 30, preventing that such movement is that which causes the breaking of some bridge element 14.

[0033] It is also noted that the dragging teeth 18 have as objective, when the cap 10 is opened by rotation, to separate in the most uniform manner possible the safety ring 12 from the cap 10, in consequence breaking the bridge elements 14. This is achieved by their slanted side 22 which during the rotation slides over slanted sides 23 of the grooves 20 of the safety ring 12.

[0034] From the above description the characteristics of the screw cap 10 with safety ring 12 of improved reliability, the object of the present invention, are evident, as are evident the related advantages, among which we mention:

- simple and reliable use;
- easy and safe assembly;
- contained moulding costs, with respect to the known art.

[0035] Finally, it is clear that the screw cap 10 with safety ring 12 of improved reliability thus conceived is susceptible to numerous modifications and variations, all forming part of the invention; in addition all of the details are interchangeable by technically equivalent elements. In practice any material may be used, of any size or dimension, according to the technical requirements.

[0036] The scope of protection of the invention is consequently defined by the attached claims.

Claims

1. Screw cap (10) with safety ring (12) of improved reliability, of the type in which said the safety ring (12) in its upper part is connected to a lower end of said screw tap (10) by frangible bridge elements (14), said cap (10) having in its lower part at least one dragging tooth (18), in correspondence of which, in the upper part of said safety ring (12), a recess (20) is foreseen for each dragging tooth (18), **characterised in that** said safety ring (12) is provided, at an internal lower end, with an annular appendage (30) of frustoconical shape with lower, broader base, said broad base being united to said lower end of said safety ring (12).
2. Screw tap (10) according to claim 1, **characterised in that** a slope of said appendage (30) side surfaces, with respect to the axis of said safety ring (12), is low.
3. Screw cap (10) according to claim 1, **characterised in that** said safety ring (12) is of substantially cylindrical crown shape.
4. Screw cap (10) according to claim 3, **characterised in that** a height of said frustocone of said annular appendage (30) is approximately equal to that of said cylindrical crown of said safety ring (12).
5. Screw cap (10) according to claim 3, **characterised in that** said bridge elements (14) connect said cap (10) to an upper end of said cylindrical crown of said safety ring (12).
6. Screw cap (10) according to claim 5, **characterised in that** said bridge elements (14) are uniformly distributed along the circumference.
7. Screw cap (10) according to claim 1, **characterised in that** at least one said dragging tooth (18) has a slanted side (22) with respect to the axis of said cap (10), while the other side (24) is substantially parallel to the axis of said cap (10).
8. Screw cap (10) according to claim 7, **characterised in that** said recess (20) has a slanted side (23) with

respect to the axis of said cap (10) with a slope approximately equal to that of said slanted side (22) of said dragging tooth (18), while the other side (25) is substantially parallel to the axis of said cap (10).

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9. Screw cap (10) according to claim 8, **characterised in that** the dimensions of said recess (20) are larger than the dimensions corresponding to said dragging tooth (18), such that when said cap (10) is connected with said safety ring (12) by said bridge elements (14), there exists a clearance between dragging tooth (18) and groove (20). 10
10. Screw cap (10) according to claim 1, **characterised in that** below said cap (10), or above said safety ring (12), there is foreseen at least one spacing element (26). 15
11. Screw cap (10) according to claim 10, **characterised in that** said spacing elements (26) are more than one and are uniformly distributed along the circumference. 20
12. Screw cap (10) according to claims 3 and 10, **characterised in that** said spacing elements (26) are formed on said cylindrical crown of said safety ring (12). 25
13. Screw cap (10) according to claim 1, **characterised in that** said dragging teeth (18) are more than one and are distributed in a uniform manner along the circumference. 30
14. Screw cap (10) according to claim 1, **characterised in that** said screw cap (10) is internally provided with a threading (16). 35
15. Screw cap (10) according to claim 1, **characterised in that** it is produced through plastics moulding. 40

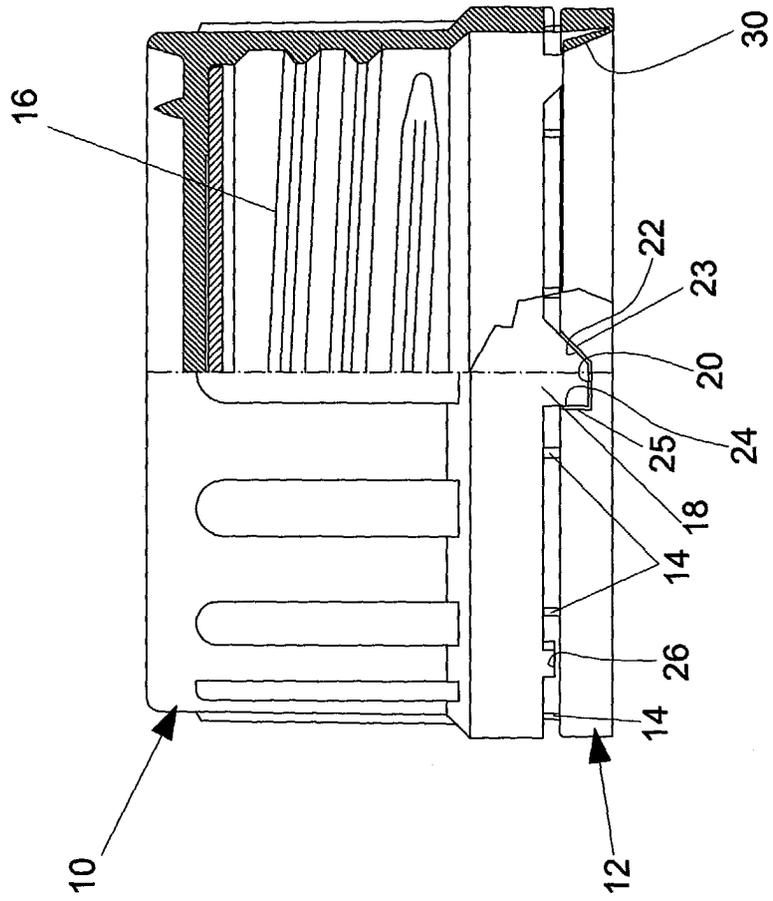
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Fig. 1





European Patent
Office

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Application Number
EP 04 07 5363

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 24, 11 May 2001 (2001-05-11) -& JP 2001 199459 A (DAIWA CAN CO LTD), 24 July 2001 (2001-07-24) * abstract; figures 1-3 *	1-15	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D
Place of search MUNICH		Date of completion of the search 8 April 2004	Examiner Derrien, Y
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 04 07 5363

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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