O.S.I.M. **P3**

EXAMEN PENTRU ATESTAREA CONSILIERILOR

BREVETE DE INVENȚIE

14.05.2008

Obiectul: **Brevete de invenție**

Domeniul tehnic de specialitate: **Mecanică**

Proba practică **2**

- Redactarea unei întâmpinări la o cerere de revocare a unui brevet de invenție.

- Sunteți, în conformitate cu art.39 din Legea 64/1991 republicată, privind brevetele de invenție, mandatarul autorizat în fața OSIM al titularului Firma1 din străinătate, pentru brevetul EPxxx123 cu titlul "*Capsulă de siguranță*". Acest brevet este atacat pentru neîndeplinirea condiției de noutate conform cu art.10 din Legea 64/1991 republicată, prin brevetul US 5725115 cu titlul "*Capsulă de închidere cu reținerea capacului*", deținut de către firma Firma2, tot din străinătate, ce aplică brevetul la îmbutelierea băuturilor răcoritoare în ambalaje tip PET cu desfacere și în România.Firma2 consideră că îi sunt încalcălcate drepturile coferite de brevet. Se consideră că revocarea a fost depusă în termenul legal și că sunt respectate toate prevederile procedurale.
- Sunteți în poziția de a apăra titularul brevetului EPxxx123 în fața Comisiei de Reexaminare, OSIM. Astfel, titularul brevetului (Firma1) vă solicită să depuneți o întâmpinare la motivele de revocare formulate de Firma2.

▸ Aveți la dispoziție dispoziție materialele:

- brevetul EPxxx1234 tradus;
- brevetul US 5725115 al firmei Firma2, opus în revocare şi;
- motivele revocării (1filă) pentru neîndeplinirea condiției de noutate stabilită de art.10 din Legea 64/1991 republicată.

Vi se cere:

▸ Să redactați o întâmpinare la cerea de revocare a brevetului EPxxx1234, care să conțină argumentele tehnice aduse de dumneavoastră în susținerea elementelor de noutate ale invenției din brevetul EPxxx1234 acordat clientului dumneavoastră.

CAPSULĂ DE SIGURANȚĂ

Invenția se referă la o capsulă care este utilă în cadrul tuturor tipurilor de ambalaje în care este necesară asigurarea unei deschideri protejate împotriva accesului copiilor.

Stadiul tehnicii cuprinde capsule de siguranță destinate să împiedice deschiderea de către copii, în cadrul cărora deschiderea poate fi obținută doar urmând o succesiune de mişcări coordonate care sunt dificil de realizat de către un copil sub o anumită vârstă.

Din documentul **GB1529999** se cunoaşte o capsulă cuprinzând un capac exterior şi un capac interior, filetat, introdus în interiorul capacului exterior. Capacul exterior este prevăzut cu nişte proeminențe care cooperează cu proeminențele de pe capacul interior atunci când capacul exterior este presat axial peste capacul interior, filetat, fiind astfel posibilă rotirea împreună a celor două capace şi deschiderea recipientului.

Deşi asigură un anumit grad de protecție, dezavantajul acestei soluții tehnice constă în faptul că aceasta nu prezintă un element de siguranță suplimentar care să indice dacă recipientul pe care este montat capacul a fost desigilat sau nu.

Problema tehnică pe care o rezolvă capsula conform invenției constă în evidențierea rapidă a primei deschideri a recipientului concomitent cu păstrarea caracteristicilor de siguranță împotriva deschiderii accidentale de către copii.

- figura 1 este o vedere plană cu secțiune parțială verticală a invenției;
- figura 2 este un detaliu la o scară mărită a capsulei din figura 1.

În cadrul figurilor din desene, semnul de referință **1** desemnează un container având o gură şi un gât **2**, care este închis cu ajutorul unei capsule de siguranță **3** conform invenției, cuprinzând un capac interior **4** având un filet interior **6** destinat înfiletării pe un filet **7** corespondent realizat pe gâtul **2** al containerului **1**. Un capac exterior **5** este aplicat pe capacul interior **4**.

În poziția ilustrată în cadrul figurilor din desene, şi anume în situația de siguranță în care este împiedicată deschiderea de către un copil, capacul exterior **5** se află într-o primă poziție, în care acesta este liber să se rotească în jurul capacului interior **4**. Această poziție poate fi obținută în funcție de pozițiile axiale relative ale capacului exterior **5** şi capacului interior **4** – o poziție care este menținută cu ajutorul mijlocului **8** care menține elastic capacul exterior **5** într-o poziție ridicată în raport cu capacul interior **4**.

Mijlocul elastic **8** cuprinde o proeminență care se extinde între capacul exterior **5** şi capacul interior **4**, aşa cum este revendicat pe parcursul revendicării **1**. Întreaga proeminență se extinde în jurul unei axe centrale a capsulei şi este distanțată de axa centrală a capsulei. Proeminența înconjoară şi atinge o proeminență a capacului interior **4**, aşa cum este revendicat.

Atunci când este exercitată o presiune pe capacul exterior **5**, în direcția indicată prin săgeata **13**, capacul exterior **5** se deplasează în jos într-o a doua poziție, neilustrată, iar un element de antrenare interior **9** poziționat pe porțiunea superioară a suprafeței interioare a capacului exterior **5** se conjugă cu un element de antrenare exterior **10** poziționat pe suprafața exterioară superioară a capacului interior **4**. În această a doua poziție nu se poate obține o rotire reciprocă între capacul exterior **5** şi capacul interior **4**; este astfel posibil, prin apăsarea pe capacul exterior **5**, desfiletarea sau înfiletarea capacului interior **4** de pe gâtul **2** al containerului **1**.

Capsula conform invenției cuprinde o bandă de siguranță **12** ce face corp comun cu capacul interior **4**, mai precis sub forma unei proeminențe de capăt pe muchia periferică **4a** a acesteia, îndreptată către containerul **1**.

Banda de siguranță **12** prezintă o formă inelară cu o secțiune în V, cu un prim braț **12a** care este conectat, într-o zonă de conectare, cu muchia periferică **4a** a capacului interior **4**; şi un al doilea braț **12b** care este liber şi se cuplează, atunci când capsula este montată pe containerul **1**, cu o proeminență inelară **15** care este prevăzută pe exteriorul gâtului **2** al containerului **1**.

Zona de conectare dintre banda de siguranță **12** şi muchia periferică **4a** a capsulei prezintă o multitudine de decupări circumferențiare, care nu sunt unite unele cu altele, şi care ocupă întreaga zonă de conectare dintre banda de siguranță **12** şi muchia periferică **4a** a capsulei. Decupările **16** sunt de fapt nişte incizii realizate mecanic în zona de conectare dintre muchia periferică **4a** a capsulei şi banda de

siguranță **12** şi sunt separate de nişte zone nedecupate **17**, având o grosime cuprinsă între 0,1 şi 1 mm.

În acest fel, este creată o line (sau mai precis o circumferință) de rupere facilă în zona de conectare dintre muchia periferică **4a** a capsulei şi banda de securitate, care se va rupe atunci când este solicitată, aşa cum va fi descris mai clar în cele ce urmează, şi care astfel determină detaşarea benzii **12** de capacul interior **4**.

Capsula conform invenției cuprinde suplimentar o proeminență inelară **18** care este prevăzută pe porțiunea superioară interioară a capacului interior **4** şi este coaxială cu capacul interior **4**. Proeminența inelară **18** este poziționată astfel încât să interacționeze, atunci când capsula este montată pe un container **1**, cu peretele interior al gâtului **2** al containerului **1**; în acest fel proeminența inelară **18** garantează o închidere etanşă a containerului **1** atunci când capsula este montată pe acesta. Acest lucru înseamnă că nu mai este necesară includerea unei garnituri, care în cadrul capsulelor cunoscute este constituită dintr-un mic disc care realizează o etanşare „superioară" pe gura containerului, şi care în general este introdusă fie ca un element individual, fie ca un element lipit prin presare pe partea superioară a peretelui interior al capacului interior **4**.

Capsula conform invenției, prevăzută cu proeminența inelară **18**, este realizată doar din două piese, care sunt asamblate prin presarea capacului interior **4** în capacul exterior **5**. Dacă trebuie adăugat un disc de etanşare, acesta este introdus sau admis în interiorul capacului interior **4** înainte ca şi capacul interior **4** să fie introdus presat în capacul exterior **5**.

Aşa cum a fost menționat anterior în cadrul de față, în poziția din figura 1, capacul exterior **5** este liber să se rotească în jurul capacului interior **4**, deoarece elementele de antrenare **9** şi **10** nu sunt conjugate. Prin exercitarea unei presiuni în direcția indicată prin săgeata **13** pe capacul exterior **5**, capacul exterior **5** este deplasat axial către în jos iar elementul de antrenare **9** se cuplează cu celălalt element de antrenare **10**. În această situație, deoarece este împiedicată orice mişcare de rotație relativă între capacul interior **4** şi capacul exterior **5**, prin înfiletarea sau desfiletarea capacului exterior **5**, capacul **4** se va înfileta pe, sau se va desfileta de pe gâtul **2** al containerului **1**.

La prima deschidere a containerului **1**, ridicarea capacului interior **4** determină o diferență între brațul liber **12b** al benzii de siguranță şi proeminența inelară **15** de pe exteriorul gâtului **2** al containerului **1**, determinând ca zonele nedecupate **17** să se

rupă şi detaşarea benzii de siguranță de pe capacul interior **4**, semnificând faptul că, containerul **1** a fost deschis.

Atunci când banda de siguranță este fixată rigid pe capacul interior **4**, o apăsare accidentală, care nu este destinată să deschidă containerul **1**, nu determină o solicitare pe zonele nedecupare **17** şi astfel banda de siguranță nu poate fi detaşată în mod accidental. Banda poate fi detaşată de pe capacul interior **4** doar când, după coborârea capacului exterior **5**, există o rotire intenționată a acestuia determinând capacul interior **4** să se desfileteze de pe gâtul **2**, şi anume atunci când există o intenție de a deschide containerul **1**.

REVENDICĂRI

1. Capsulă de siguranță (**1**) cuprinzând un capac interior (**4**), prevăzut cu un filet interior (**6**) care permite introducerea detaşabilă a acestuia pe un gât filetat (**2**) al unui container (**1**), capac interior (**4**) peste care este poziționat un capac exterior (**5**), fixat pe capacul interior (**4**) astfel încât se pot cupla reciproc şi se pot roti împreună prin intermediul elementelor de antrenare (**10** şi respectiv **9**), **caracterizată prin aceea că**, acest capac exterior (**5**) are o libertate de rotire axială prin intermediul unei protuberanțe (**8**) interioare, cilindrică şi elastică, putând aluneca la rotire pe partea superioara a capacului interior (**4**) şi roti liber în raport cu acesta, iar capacul interior (**4**) mai are o muchie periferică (**4a**) ce se extinde cu o bandă de siguranță (**12**) sub formă de V prezentând un braț fix (**12a**) conectat la muchia periferică (**4a**) şi un braț liber (**12b**) aflat în contact cu o proeminență inelară (**15**) a capacului interior (**4**), zona de conectare dintre brațul fix (**12a**) şi muchia periferică (**4a**) prezentând nişte decupări circumferențiare (**16**) separate de nişte zone nedecupate (**17**).

2. Capsulă conform revendicării 1, **caracterizată prin aceea că** zonele nedecupate (**17**) ce separă decupările circumferențiare (**16**) au o lățime cuprinsă între 0,1 şi 1 milimetru.

4. Capsulă conform revendicării 1, **caracterizată prin aceea că**, capacul interior (**4**) este realizat din material plastic, prin presare.

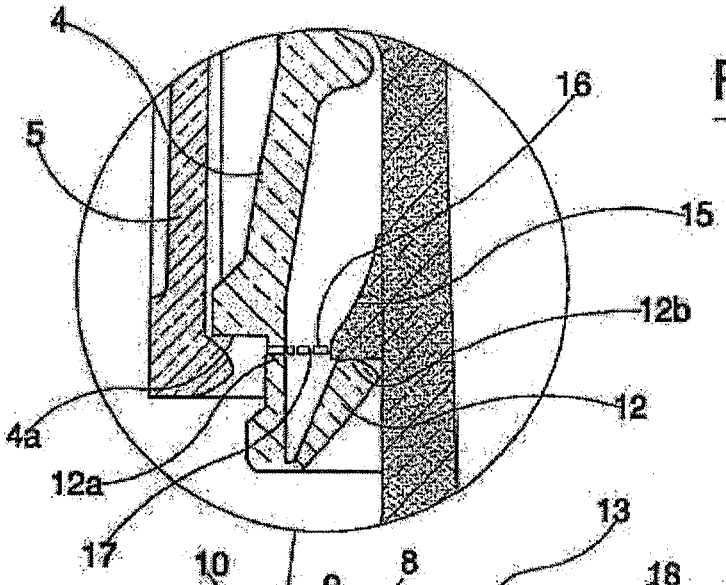

Fig. 2

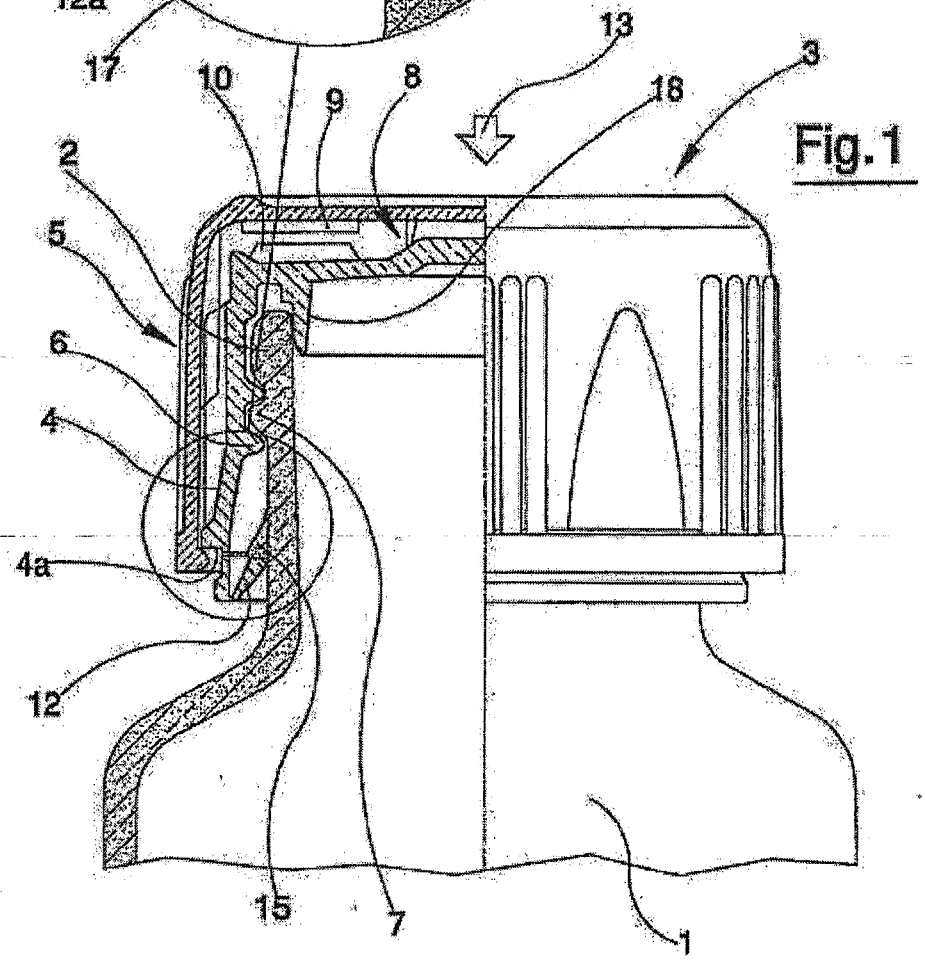

Fig. 1

Extras din Cererea de revocare a BI EP1501740

Motive de nerespectare a Criteriului Noutății

Sunteți mandatarul/reprezentantul firmei Firma1 din străinătate, care deține brevetul de invenție EPxxx1234 cu titlul "*Capsulă de siguranță* ", ce are şi România desemnata ca țară în care brevetul îşi produce efectele.

Astfel că pentru acest brevet a fost formulată o cerere de revocare la OSIM de către firma Firma2, din străinătate, ce imbuteliază băuturi răcoritoare în peturi cu desfacere şi în România, ce consideră că îi sunt încalcălcate drepturile de proprietate industrială câştigate prin brevetul .

Firma Firma2, atacă lipsa de noutate a brevetului EPxxx1234/02.05.2002 cu titlul "*Capsulă de siguranță* ", în raport cu brevetul său de invenție US5725115/05.01.1996 cu titlul "Closure cap with trther" ("*Capsulă de închidere cu reținere capac*"), cuprins în stadiul tehnicii.

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În conformitate cu prevederile art.10 din Legea 64/91 republicată, menționăm că ambele brevete fac parte din acelaşi domeniu tehnic de realizare şianume închiderea prin sigilare a recipientelor cu lichide pentru consumul uman.

Obiectul brevetului de invenție EPxxx1234, cuprins în revendicarea principală este identic cu obiectul brevetului US5725115, astfel inelul de siguranțță inferior şi corespunzător partea inferioară a capacului interior în ambele brevete este identică, fiind prevăzute cu o muchie periferică ce se extinde cu o bandă de siguranță cu secțiunea în "V", prezentând un braț fix conectat la muchia periferică a capacului şi de asemenea un braț liber aflat în contact cu o proeminență inelară a gâtului containerului (sticlei), zona de conectare dintre brațul fix şi muchia periferică se face în mod identic, prezentând nişte decupări pe circumferință separate de nişte zone nedecupate.

Mai mult soluția adoptată în brevetul EPxxx1234 reprezintă o simplificare a soluției noastre din brevetul US5725115 prin renunțarea la elementul de legătură dintre capac şi inelul inferior de siguranță al capacului.

Mai menționăm că dimensionarea găurilor nu este justificată tehnic în nici un fel şi

că această dimensionare a decupărilor este creată artificial, iar realizarea capacului din material plastic prin presare este la îndemâna oricărui specialist în domeniu.

Totodată elementul de distanțare al capacului exterior (protuberanța (8)) se regăseşte şi la soluția noastră la partea superioară a capacului la interiorul acesteia având tot rol de ghidare axială acționând la rotirea capacului şi totodată rezolvând şi etanşarea sticlei.

Astfel brevetul de invenție US5725115 a fost acordat pe baza cererii de brevet nr.582356 din data de 05.01.1996, şi face astfel parte din stadiul cunoscut al tehnicii în raport cu brevetul EPxxx1234, a cărei dată de depozit este 02.05.2002.

Revendicarea nr. 1 din brevetul EPxxx1234 este lipsită de noutate în raport cu brevetul US5725115, care acoperă soluția tehnica reprezentată de *Capsula de siguranță*, astfel că revendicarea 1 nu mai este nouă conform celor menționate mai sus dovedind astfel că elementele tehnice cuprinse în partea caracteristică a revendicării 1 erau parte a stadiuliui tehnicii la data 02.05.2002.

Din compararea celor două soluții tehnice, a brevetului EPxxx1234 şi a brevetul US5725115, în lumina prevederilor legale, cu precădere Reg. 37 A (7) si A (11) rezulta că funcția celor două capsule (din brvetele analizate) este identică încadrându-se în acelaşi domeniu tehnic de aplicare.

Întrucât partea esențială/caracteristică a revendicării independente nu îndeplineşte condiția noutății, celelalte elemente ce urmează a fi evidențiate prin dependență nu mai au obiect.

În concluzie, revendicarea nr. 1 din brevetul EPxxx1234 nu prezintă noutate conform prevederilor art.10 şi astfel nu îndeplineşte nici condițiile de brevetabilitate de la art.7 din Legea 64/91 republicată, întrucât soluția tehnică era dezvăluită încă din brevetul US5725115, fapt pentru care cerem Comisiei de Reexaminare a OSIM revocarea in tot a brevetului EPxxx1234.

US005725115A

United States Patent [19]

Bösl et al.

[11] Patent Number: 5,725,115

[45] Date of Patent: Mar. 10, 1998

[54] **CLOSURE CAP WITH TETHER**

[75] Inventors: **Udo Bösl**, Eimeldingen; **Michael Kirchgessner**, Egringen, both of Germany

[73] Assignee: **Crown Cork AG**, Reinach, Switzerland

[21] Appl. No.: **582,356**

[22] Filed: **Jan. 5, 1996**

[30] **Foreign Application Priority Data**

Feb. 21, 1995 [CH] Switzerland 502/95

[51] **Int. Cl.**^{6} **B65D 41/32**

[52] **U.S. Cl.** **215/252**; 215/258; 215/306

[58] **Field of Search** 215/252, 258, 215/306

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Primary Examiner—Stephen Cronin

Attorney, Agent, or Firm—Woodcock Washburn Kurtz Mackiewicz & Norris LLP

[57] **ABSTRACT**

A closure cap that is connected captively with the neck of a container. To this end, a retaining ring is used to engage beneath a bead on the container mouth when the cap is in position on the container mouth. The cap wall is firmly connected with this retaining ring by the tether. The retaining ring at the same time serves as an anti-tamper security for the closure. In its original condition, the tether runs between the cap wall and the retaining ring along the circumference of the closure cap and is connected by nominal rupture bridge pieces not only with the retaining ring but also with the lower edge of the cap wall. In order to avoid the risk of destruction of these nominal rupture bridge pieces during fitting of the closure cap, and at the same time ensure that the retaining ring holds firmly to the container mouth with the closure cap in position on the container mouth, the retaining ring is equipped with a plurality of tongues protruding radially inwards from its inner surface, the tongues being aligned upwards towards the cap base and engaging beneath the bead on the container mouth when the closure cap is in position on the container mouth.

11 Claims, 5 Drawing Sheets

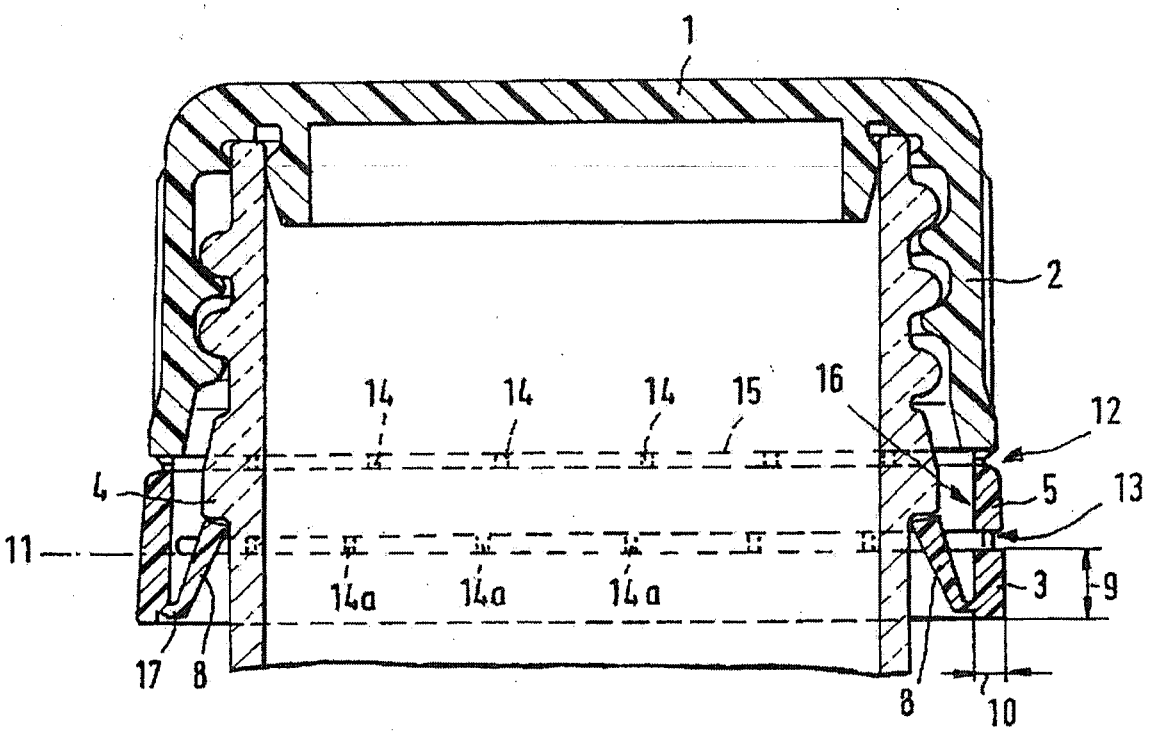


FIG.1

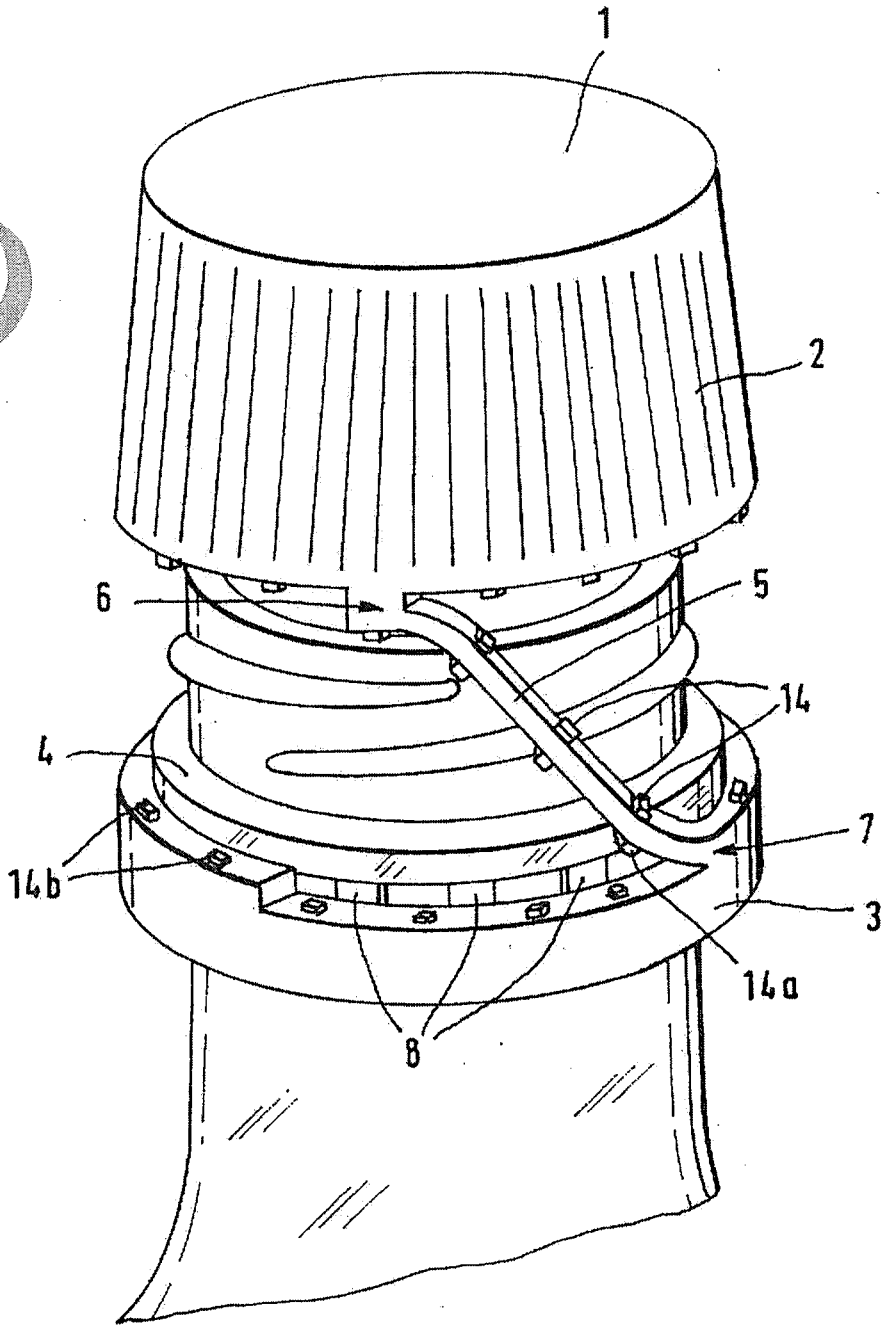


FIG. 2

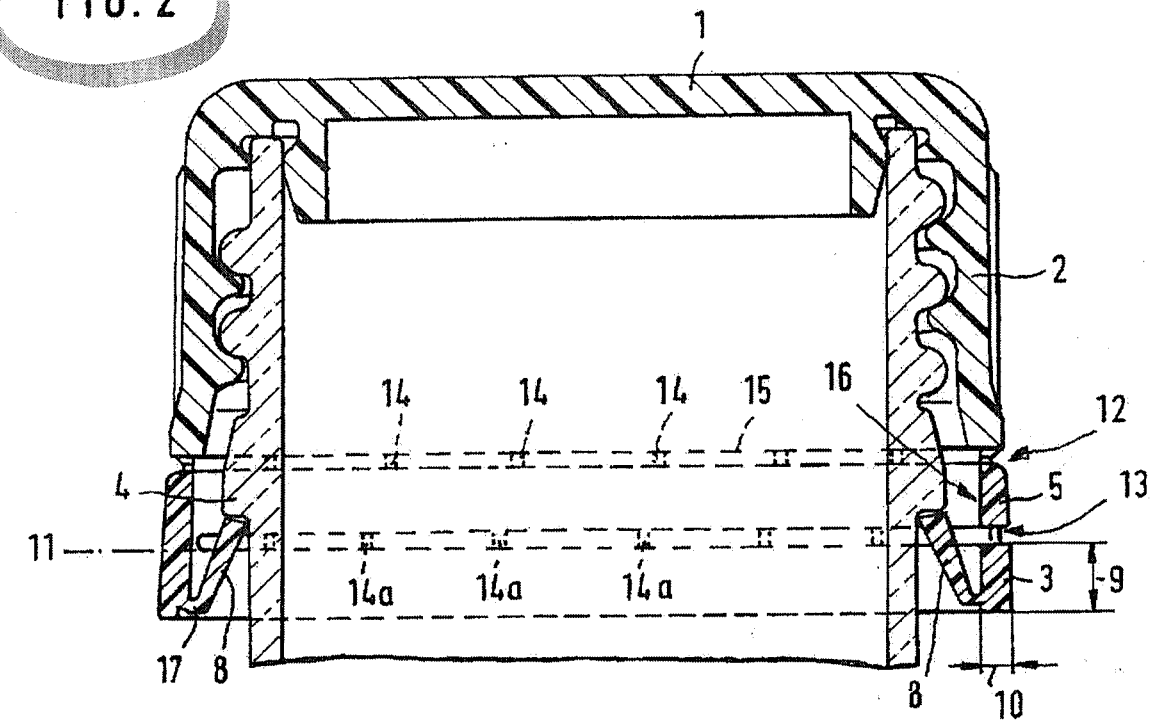


FIG. 3

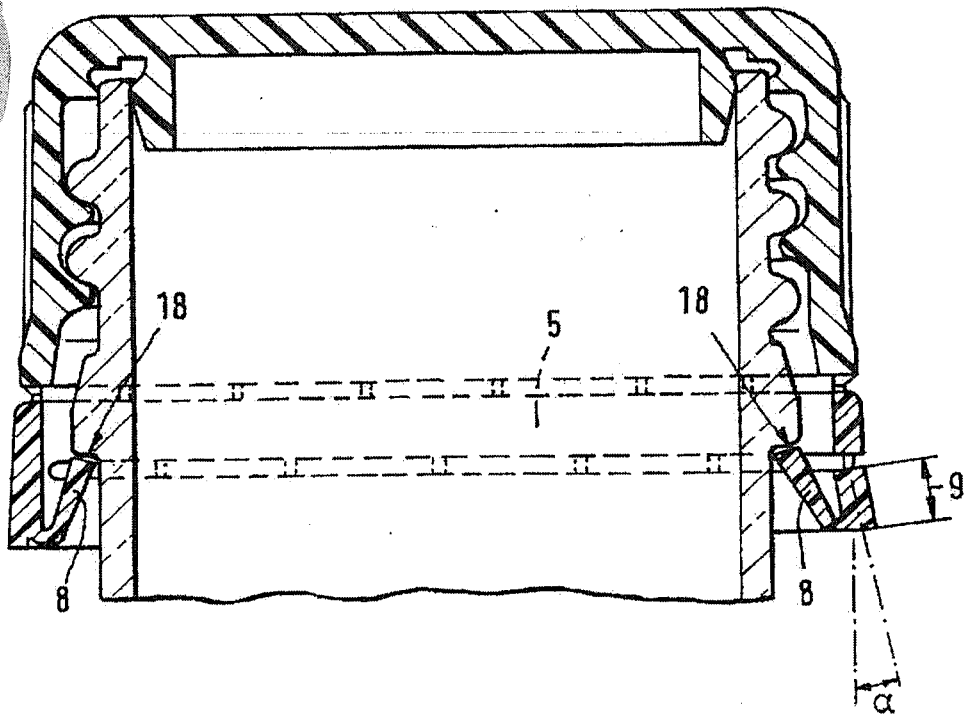


FIG. 4

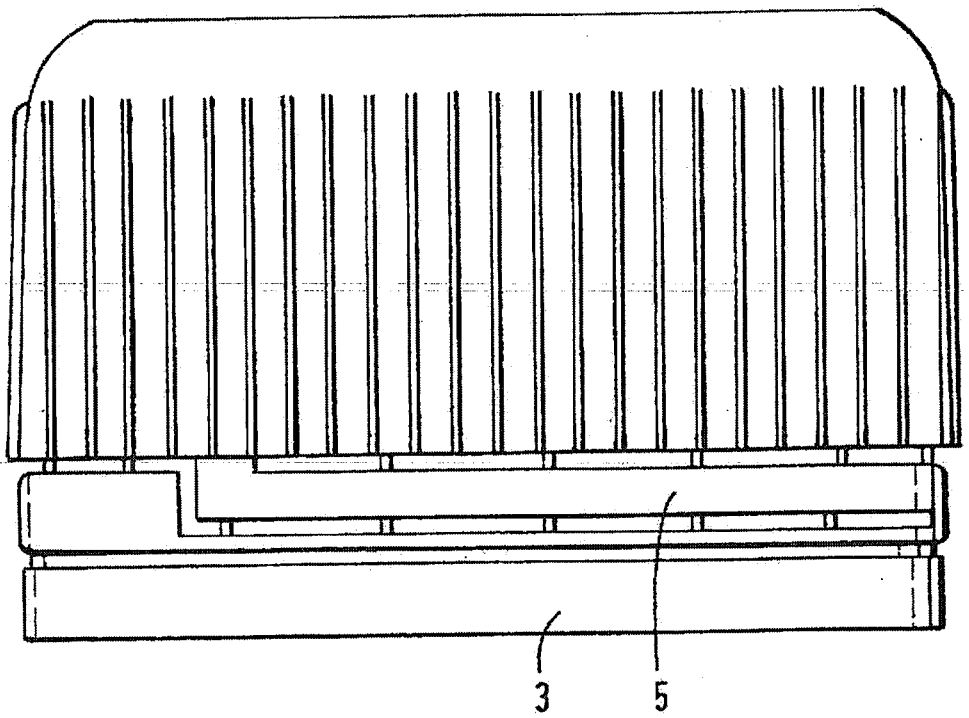


FIG.5

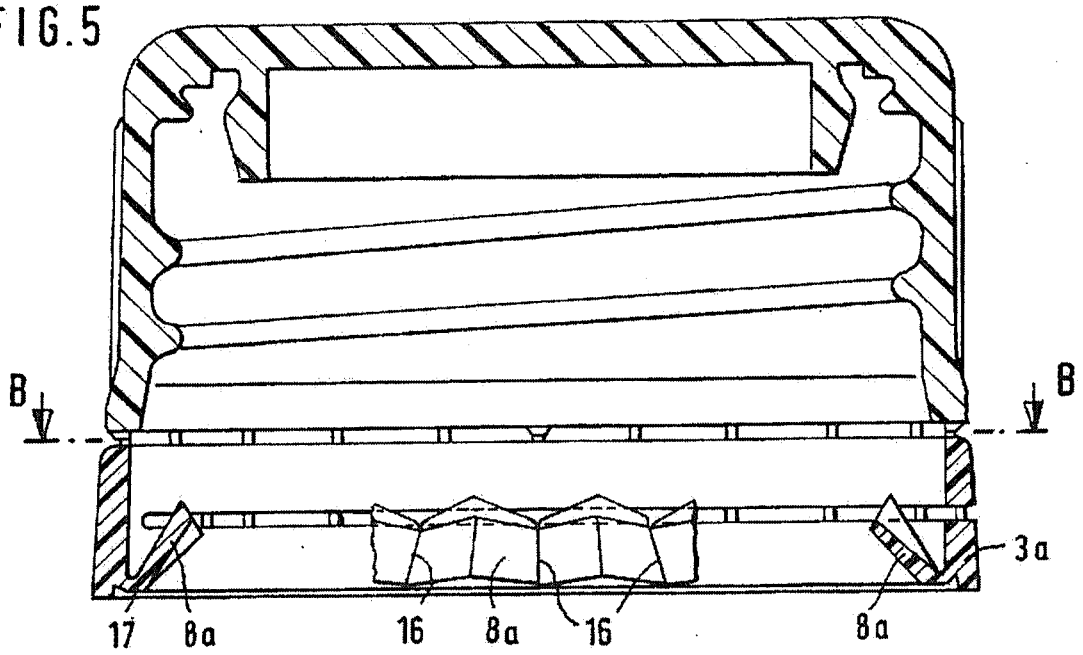


FIG.6

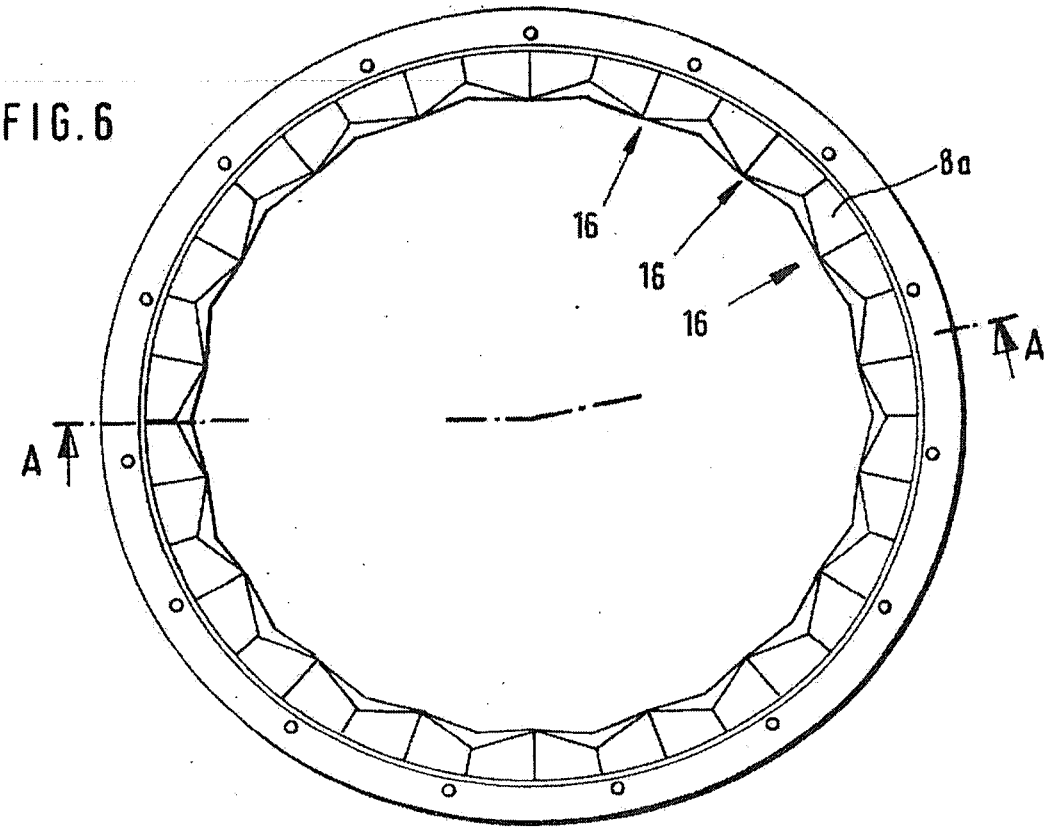


FIG.7

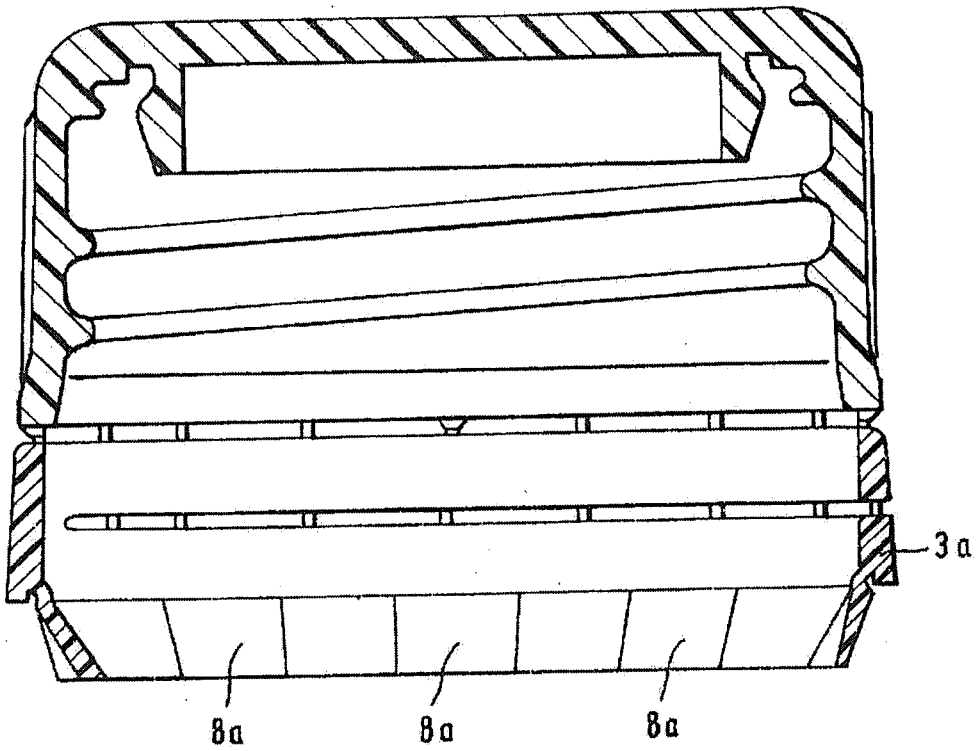
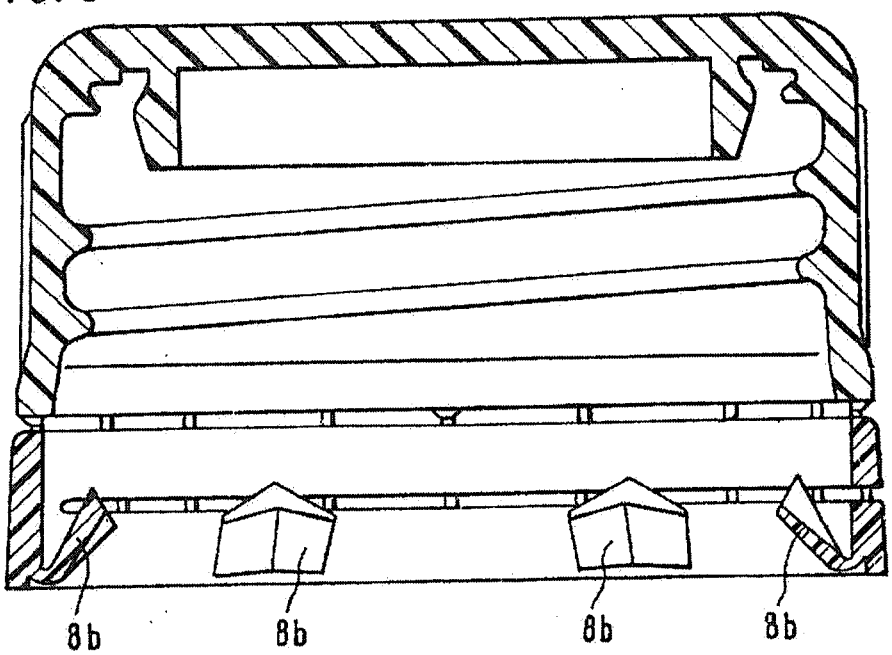


FIG.8



CLOSURE CAP WITH TETHER

BACKGROUND OF THE INVENTION

The invention concerns a tethered closure cap. Arranged on the lower edge of the cap wall of closure caps of this type is a retaining ring that engages beneath a bead on the container mouth when the closure cap is in position. On opening the container, only the upper cap portion is removed, while the lower retaining ring remains firmly connected to the container mouth. A longitudinal tether connects the retaining ring with the lower edge of the cap wall so that the cap will remain connected with the container and cannot be mislaid, also after the container has been opened.

As a rule, such tethers are used in order to connect screw closures to the container so that they cannot be mislaid. However, other types of closure cap, such as snap closures, can be provided with a tether in order to avoid loss of the closure cap. By means of the tether, the risk of injury associated with pressing off the closure cap will, at the same time, be considerably reduced. In the case of a screw cap, such a situation can arise, for example, when the cap is mistakenly turned in the wrong direction when opening the container, thus causing the thread to jump. If the container is under pressure, such as is the case with beverages containing carbon dioxide, for example, the closure cap can be forced directly off the container mouth when the thread jumps. Because of the tether, however, the closure cap cannot fly off or will at least be restricted in its acceleration, even if the tether should tear. The risk of injury will thus be clearly reduced.

The longer the tether, the easier that the removable cap portion can be moved from the area of the mouth orifice when opening the container, so that handling of the container, for example during pouring of the container contents, will not be impeded. Apart from that, in the case of screw caps, a certain length to the tether is required in order to anyway permit opening of the container, since the screw cap must be moved vertically upwards during opening. The tether is so arranged that, with the closure cap in position on the container, said tether will run along the circumference between the cap wall and the retaining ring. With this arrangement, the maximun length of the tether will be limited by the circumference of the closure cap.

The retaining ring is simultaneously used as an anti-tamper ring for the display of initial opening of the container. To this end, the retaining ring is connected by means of nominal rupture bridge pieces with the lower edge of the cap wall. These nominal rupture bridge pieces will be destroyed on opening the container for first time, so that prior opening of the container will be visible from outside. To this end, provision is made in the area of the tether for preferably two rows of nominal rupture bridge pieces, a first row between the retaining ring and the lower edge of the tether, and a second row of nominal rupture bridge pieces between the upper edge of the tether and the lower edge of the cap wall. As a rule, the tether possesses an upper and a lower lateral surface, the upper lateral surface being connected with the lower edge of the cap wall by means of nominal rupture bridge pieces, and the lower lateral surface being connected by means of nominal rupture bridge pieces with the retaining ring. Normally, the tether is of uniform height along its entire length, and the lateral surfaces are gently inclined only in the radial direction in order to facilitate removal of the closure cap from the mold during manufacture.

DE-A1-24 30 775 shows a captive bottle cap of the aforementioned type. The cap comprises a screw-threaded upper portion and a lower collar, said collar engaging beneath a bead on the container mouth. The upper threaded portion of the cap is connected with the lower collar by means of an easily tearable, cylindrical tongue. This tongue extends around the entire circumference and is connected by means of two rows of connecting teeth with the upper portion and the lower collar. This cylindrical tongue is interrupted at one circumferential position so that it obtains two ends, of which one end is connected firmly to the screw-threaded portion of the cap and the other is connected firmly with the lower collar (retaining ring). The upper portion of the cap cannot therefore be mislaid, since the lower collar is held firmly on the container.

Closure caps with a tether are frequently used in place of the commonly used standard closure caps for the closure of container types that have long been state of the art. The construction and dimensions of the tethered closure cap is therefore in principle dictated by such state of the art container types. This in particular also applies to the procedure for placing the closure cap on the container, wherein the anti-tamper strip and, as in the case in question, the retaining ring must be pressed over either a bead, individual protrusions or other retaining elements. Because of the given dimensions of the retaining ring, with state of the art closure caps with a tether, the risk is not to be discounted that the retaining ring can be pushed over the bead on the container mouth when opening the container for the first time and removed from the container, along with the upper portion of the cap. There is therefore a risk that the function of the retaining ring is not reliably ensured, both in relation to the anti-tamper function, and the retaining function in combination with the tether. A further problem is the additional nominal rupture line arising through the arrangement of the tether between the retaining ring and the lower edge of the cap wall. The generally known risk with anti-tamper rings of breakage of the nominal rupture bridge pieces when screwing on the cap for the first time will, with that, be additionally increased.

SUMMARY OF THE INVENTION

It is a purpose of the invention to create a closure cap with a retaining ring and a tether, the retaining ring of said cap being able to slide over the bead on the container mouth on initial fitting of the closure cap without risk to the nominal rupture bridge pieces, and subsequently holding securely on the container mouth. According to the invention, this purpose is fulfilled by a closure cap possessing the following features.

The retaining ring of such a closure cap possesses a plurality of tongues protruding radially inwardly on its inside surface, said tongues being aligned towards the cap base and engaging beneath the bead on the container mouth when the closure cap is in position on the container mouth. These tongues are connected only at one end with the retaining ring, and their free end is able to pivot in a radial direction in relation to the anti-tamper strip. On initial fitting of the closure cap, these tongues can therefore be pivoted outwards in the radial direction when they slide over the bead onto the container mouth. The loads thus arising on the retaining ring, and on the tearable connection of said retaining ring with the cap wall, can in this way be considerably reduced.

Also in relation to the retaining function, these tongues have an advantage over state of the art retaining elements

used in combination with tethers and rigidly connected with the retaining ring. If the closure cap of a container is lifted, the retaining elements of the retaining ring will be pressed against the bead on the container mouth, and this will lead to loading and deformation of the retaining ring. This is particularly pronounced with closure caps with a tether since the retaining ring of these closure caps possesses a relatively slight height. In particular, the load on the retaining elements will impart a cross-sectional rotation to the ring, and in the case of retaining elements connected rigidly to the retaining ring, this will lead to said retaining elements tilting away downwards to thus release the retaining ring, or at least assist the retaining ring to slip off. Although inwardly directed tongues will also not completely prevent deformation of the retaining ring, the tongues do have the advantage that their free end can, to a considerable degree, move independently in relation to the retaining ring, so that the tongues will then securely take up a position against the bead when the retaining ring is subjected to deformation.

In order to obtain sufficient space for the tether with the least possible constructional height, preferably a retaining ring is used, the vertical height of which at the most amounts to three times its radial thickness. A retaining ring with such a low cross section will indeed have the disadvantage that it will deform more easily. Nevertheless, by using the aforementioned retaining elements in the form of tongues protruding radially inwards, the anti-tamper function can be reliably ensured. Through a further reduction of the height of the retaining ring, additional savings in material can be made and at the same time more space for the arrangement of the tether can be created. Particularly preferred, therefore, is the use of a retaining ring, the vertical height of which amounts, at most, to double its radial thickness in the area of the tether. Even a retaining ring with an approximately square cross section is reliably held on the container mouth by means of the inwardly aligned tongues, and the corresponding low constructional shape of the retaining ring on the one hand permits savings in material and, on the other hand, more space for the tether arrangement.

A further advantage of the low constructional shape of the retaining ring is that, with the closure cap in position, the tongues directed towards the cap base can extend upwards beyond the upper edge of the retaining ring. By means of a suitable dimension and arrangement of the tongues, an arrangement is even possible wherein the tongues, pointing steeply upwards, extend upwards beyond the lower lateral surface of the tether arranged around the cap circumference. During initial fitting of the closure cap on the container mouth, a steeply upwardly oriented position is assumed by the tongues as they slide over the bead on the container mouth. With that, they will be pressed radially outwards by the bead. If the tongues extend into the area of the tether, this will have the advantage that the tongues will make contact on the inside surface of the tether during the critical phase of the screwing-on procedure when they slide over the bead on the container mouth. In the case of screw caps, the maximum load on the nominal rupture bridge pieces will arise in this critical phase, since the retaining ring is subjected to a braking effect by the tongues making contact with the bead on the container mouth, and with that must transmit a relatively high torque from the cap wall to the retaining ring. In making contact on the inside of the tether, the said tongues will bridge the gap between the tether and the retaining ring and thus relieve the nominal rupture bridge pieces arranged between these two elements, since a portion of the torque is transmitted via the tongues themselves.

The tongues can be arranged along the retaining ring in various ways. In particular, the distance between adjacently arranged tongues can be selected differently. With one of the preferred embodiments of the invention, the tongues are arranged tightly adjacent along the retaining ring. The lateral edges of the adjacently arranged tongues are, with that, connected by a flexible bridge of material acting as a linkage. A longitudinal tongue strip comprising a plurality of tongues will thus arise, and the tongues will in this case be mutually held in their respective positions so that they can no longer be pivoted with such ease. This is of advantage when the closure cap is cast in a shape wherein the tongues are directed downwards, away from the cap base. This position of the tongues is preferred when casting the closure caps because this shape for the cap will then facilitate removal from the mold after casting. However, the tongues must subsequently be pivoted inwards from their downwardly aligned position, and this is preferably carried out in a separate working step, prior to fitting of the closure cap onto the container mouth. Basically, however, the tongues will tend to return to their original cast position. One possibility of avoiding such a situation is to now connect the adjacent tongues with one another as has been described in the above.

The tongues will therefore mutually hold themselves in their inner position, directed towards the cap base.

If individual tongues are used, arranged at a distance from one another, these can be fixed in their position aligned towards the cap base in another way, for example by a brief application of heat after pivoting into this position. A possible further alternative is, by means of the container mouth, to directly pivot the tongues inwards during fitting of the closure cap. To this end, a specially designed container mouth is normally required, however.

BRIEF DESCRIPTION OF THE DRAWINGS

Examples and embodiments of the invention are more closely described in the following, illustrated by the drawings: namely,

FIG. **1** a container mouth with closure cap in the unscrewed position,

FIG. **2** a cross section of a container mouth with closure cap in position,

FIG. **3** the container mouth according to FIG. **2** at commencement of the opening sequence,

FIG. **4** a side view of the closure cap with retaining ring and tether,

FIG. **5** a cross section of a screw cap along the plane A—A in FIG. **6**,

FIG. **6** a horizontal section of the retaining ring of the screw cap shown in FIG. **5**, through the plane B—B,

FIG. **7** a cross section of the screw cap according to FIG. **5** with tongues directed downwards, and

FIG. **8** a cross section of a further screw cap with a plurality of tongues arranged at a distance from one another.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT(S)

FIG. **1** shows a container mouth with a closure cap in the screwed-off position. The removable cap portion comprises a cap base **1** and an cap wall **2** abutting said cap base. The cap wall **2** is connected by means of a tether **5** with the retaining ring **3**. The retaining ring **3** possesses on its inside surface tongues **8** that protrude radially inwards, said tongues engaging beneath a bead **4** on the container mouth. It is obvious that the screw cap cannot simply float into the

position shown, but must be held by a hand not shown here. After opening, the screw cap is removed from the area of the container mouth and will then hang beneath the retaining ring 3 in a position not shown. One end 6 of the tether 5 is firmly connected with the lower edge of the cap wall 2 and the other end 7 is firmly connected with the retaining ring 7. Prior to tearing of the retaining ring, the tether runs around the circumference of the closure cap, between the cap wall and the retaining ring. The tether 5 shown here only extends around a portion of the cap circumference. The upper lateral surface of the tether 5 is connected by nominal rupture bridge pieces 14 with the lower edge of the cap wall, and the lower lateral surface of the tether 5 is connected with the retaining ring 3 by means of the nominal rupture bridge pieces 14*a*. Beyond the area of the tether, the retaining ring 3 is connected by nominal rupture bridge pieces 14*b* directly with the lower edge of the cap wall.

FIG. 2 shows a cross section of a container mouth with closure cap in position. The retaining ring 3 of this closure cap possesses a plurality of tongues 8 directed radially inwards towards the cap base 1, of which only two can be seen in this representation, however. These tongues engage beneath a bead 4 on the container mouth. The tongues 8 are connected with the retaining ring 3 only at one end by a linkage connection 17. This linkage connection 17 enables the free end of the tongues 8 to pivot in the radial direction and thus deflect outwards, in particular when fitting the closure cap for the first time when the free end will slide over a bead on the container mouth. The linkage connection 17 is preferably arranged on the lower edge of the retaining ring 3, although in principle it is also conceivable for the retaining ring to extend downwards beyond the connection point of the linkage connection 17.

A tether 5, possessing two approximately parallel lateral surfaces 13, is arranged between the retaining ring 3 and the cap wall 2. Both the lateral surfaces 12, 13 are normally gently inclined (not shown) toward each other in the radial direction only, in order to facilitate removal from the mold during manufacture. The upper lateral surface 12 of the tether 5 is connected by means of nominal rupture bridge pieces 14 with the lower edge 15 of the cap wall and the lower lateral surface 13 of the tether 5 is connected by nominal rupture bridge pieces 14*a* with the retaining ring 3. In the area of the tether 5, the vertical height 9 of the retaining ring 3 is less than three times its radial thickness 10. Through the slight height of the retaining ring 3, space is gained for the arrangement of the tether 5 between the retaining ring and the cap wall 2.

The tongues 8 extend upwards beyond the lower lateral surface 13 of the tether 5. If the tongues 8 are pressed radially outwards by a bead 4 on the container mouth when the closure cap is being fitted for the first time, they will thus make contact with the inside surface 16 of the tether 5, and this will lead to a relief of the load on the lower nominal rupture bridge pieces 14*a* connecting the tether 5 to the retaining ring 3.

The relatively slight cross-sectional height 9 of the retaining ring 3 will lead to the retaining ring being deformed when load is applied to the tongues 8. This can be seen in FIG. 3, in which the container mouth according to FIG. 2 is shown at the commencement of the opening procedure. On screwing off the closure cap, the tongues 8 are placed under load by the force 18. This force 18 takes effect on the retaining ring 3 which, because of its relatively slight cross-sectional height 9, will rotate especially in the area of the tether 5 and be bent outwards. The cross-sectional rotation of the retaining ring through the angle α would, with retaining elements connected firmly to the retaining ring 3, lead to said retaining elements being pivoted away downwards. Through the use of the movable tongues 8, this can be effectively hindered so that the retaining ring 3 is reliably held on the container mouth in spite of its relatively slight ring cross section. In FIG. 4, a side view of a closure cap is shown with retaining ring 3 and tether 5. With this embodiment, too, the tether 5 extends solely over a partial area of the circumference of the cap. Basically, a longer tether could also be used, however, extending practically around the entire circumference of the closure cap.

In FIG. 5, a cross section of a screw cap according to the section through,the plane A—A in FIG. 6 is shown. The tongues 8*a* shown in this embodiment are symmetrically folded inwards at the centre of the tongue, thus granting them greater resistance to pressure compared with flat tongues. The tongues 8*a* are arranged to be tightly adjacent and are connected by flexible bridge pieces of material 16 to form a circumferential, inner tongue strip. This is also easily recognisable in FIG. 6, in which the retaining ring of the screw cap shown in FIG. 5 is shown from above, according to the sectional plane B—B. The connecting bridge pieces 16 can, however, be foregone, so that the adjacently arranged tongues are independent from one another.

FIG. 7 shows the screw cap already shown in FIG. 5 with tongues directed downwards, away from the cap base. The tongues are preferably cast in this position and subsequently folded into their inner position, directed towards the cap base. In this respect, it is advantageous if the tongues are arranged tightly adjacent, as shown in this example. After pivoting inwards, such tightly adjacent tongues can mutually maintain this position. If the tongues were arranged at a greater distance from one another, they would tend to return to their original downward-pointing position (as created through casting). This can be avoided in a particularly effective way if the lateral edges of the adjacently arranged tongues are connected together by a flexible material 16 in the form of a linkage (FIG. 5).

FIG. 8 shows the cross section of an alternative embodiment wherein the individual tongues 8*b* are arranged to be distributed at equal distance along the circumference of the anti-tamper ring. The tongues 8*b* can be cast either in the position shown or in a downwards position similar to FIG. 7, subsequently having to be folded inwards prior to fitting the closure cap. With the example shown here, only six tongues are arranged around the circumference. Preferably, a greater number of tongues are used, said tongues then being correspondingly more densely distributed around the circumference, in other words at lesser distances.

Inasmuch as the invention is subject to modifications and variations, the foregoing description and accompanying drawings should not be regarded as limiting the invention, which is defined by the following claims and various combinations thereof.

What is claimed:

1. Closure cap for the closure of a container mouth, the closure comprising:

a cap base;

a cap wall abutting said cap base;

a retaining ring being arranged on the lower edge of said cap wall, said retaining ring engaging beneath a retaining element when the closure cap is in position on the container mouth; and

a tether, one end of said tether being connected firmly with the lower edge of the cap wall and the other end of said tether being connected firmly to the retaining

ring, wherein the tether runs between the cap wall and the retaining ring along the circumference of the closure cap, characterized in that the retaining ring possesses on its inside surface a plurality of tongues protruding radially inwards, said tongues being directed upwards towards the cap base in order to engage beneath the retaining element on the container mouth and extending upwards beyond the upper edge of the retaining ring when the closure cap is in position on the container mouth.

2. Closure cap according to claim 1, characterized in that the tether is connected by nominal rupture bridge pieces with the lower edge of the cap wall.

3. Closure cap according to claim 1, characterized in that the tongues are arranged to be tightly adjacent along the retaining ring and the edges of the adjacently arranged tongues are connected together by a flexible material bridge piece acting as a linkage.

4. Closure cap according to claim 1, characterized in that the retaining ring is connected by means of nominal rupture bridge pieces with the lower edge of the cap wall.

5. Closure cap according to claim 1, characterized in that the retaining ring is connected by means of nominal rupture bridge pieces with the tether.

6. Closure cap according to claim 1, characterized in that the vertical height of the retaining ring amounts at the most to three times the radial thickness of said retaining ring.

7. Closure cap according to claim 6, characterized in that the retaining ring possesses an approximately square cross section.

8. Closure cap according to claim 1, characterized in that the retaining ring is connected by means of nominal rupture bridge pieces with the tether and the lower edge of the cap wall.

9. Closure cap according to claim 8, characterized in that the upwardly directed tongues extend upwards beyond the lower lateral surface of the tether arranged along the circumference of the cap so that, during fitting of the closure cap, said tongues are able to be pressed against the inside surface of the tether and the cap wall and with that at least partially cover the nominal bridge pieces.

10. Closure cap according to claim 8, characterized in that the upwardly directed tongues extend upwards beyond the lower lateral surface of the tether arranged along the circumference of the cap so that, during fitting of the closure cap, said tongues are able to be pressed against the inside surface of the cap wall and with that at least partially cover the nominal bridge pieces.

11. Closure cap according to claim 8, characterized in that the upwardly directed tongues extend upwards beyond the lower lateral surface of the tether arranged along the circumference of the cap so that, during fitting of the closure cap, said tongues are able to be pressed against the inside surface of the tether and with that is least partially cover the nominal bridge pieces.

* * * * *

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[54] **TWO-PART PLASTIC BOTTLE-CAP**

[75] Inventor: Emilio Morini, Colorno, Italy

[73] Assignee: Bormioli Metalplast S.P.A., Parma, Italy

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[51] Int. Cl.[5] B65D 41/34

[52] U.S. Cl. 215/252; 215/258

[58] Field of Search 215/252, 258, 274

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Primary Examiner—Stephen Marcus
Assistant Examiner—Paul A. Schwarz
Attorney, Agent, or Firm—Laff, Whitesel, Conte & Saret

[57] ABSTRACT

The invention relates to a plastic bottle cap in two parts. The first part (1) of said cap is annular-shaped and exhibits on its external lateral surface a plurality of projections (5), while the second part comprises a screw-up (2) inferiorly to which is connected a breakable seal (4) by means of easy-breaking webs (6); the cap exhibits a plurality of teeth (7), arranged parallel to the webs (6), which, on first screwing-on of the cap on to the bottle, are inserted between the projections (5) of the first part (1) and bear the forces which are generated during the screwing-on; since the teeth (7) are not connected to the breakable seal, the teeth (7) do not obstruct the detachment between the bottle-top and the breakable seal (4) when the cap is first unscrewed.

4 Claims, 1 Drawing Sheet

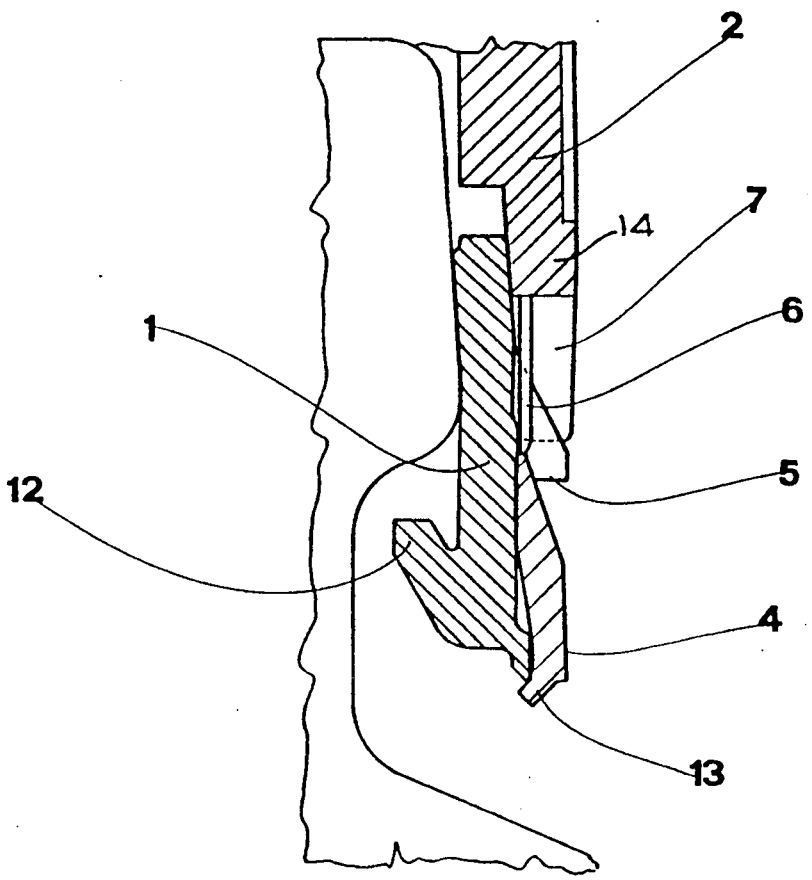
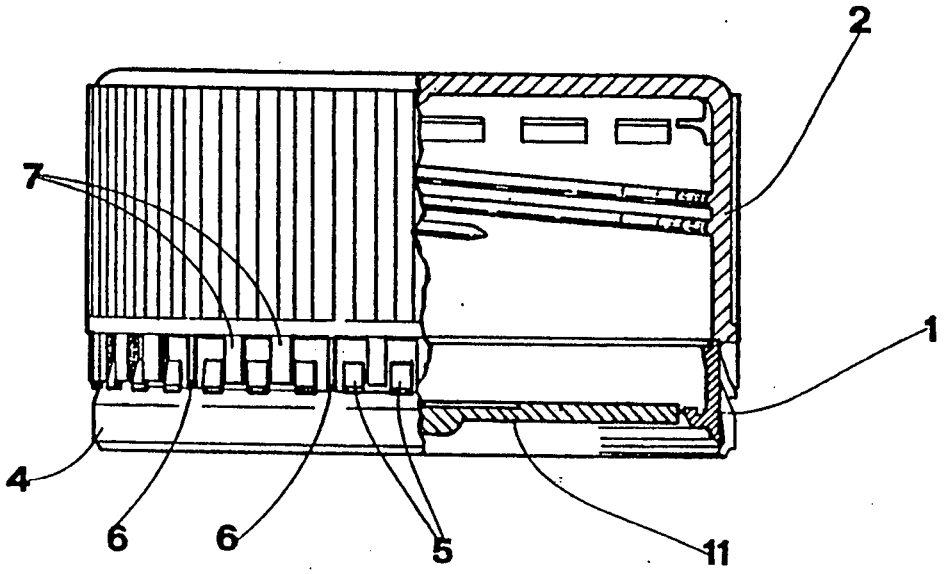


fig.1



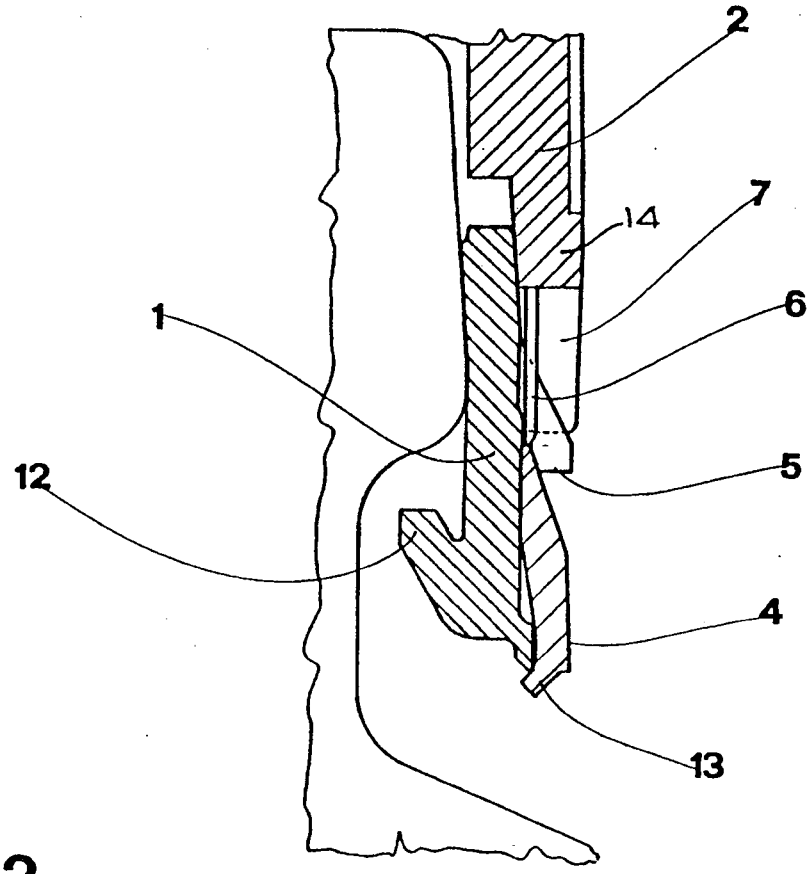


fig.2

TWO-PART PLASTIC BOTTLE-CAP

BACKGROUND OF THE INVENTION

The invention relates to a two-part plastic bottle-cap.

In bottle-caps of the type in question, apart from the problem of maintaining simplicity of construction, there exists the problem of permitting the screwing-on of the caps by means of fast automatic machines; also, there is the problem which is common to all caps which are equipped with a breakable seal, that of guaranteeing the consumer that the bottle has not been fraudulently opened.

One often satisfactory solution to this problem is obtained for example with the cap described in No. GB 2172273 by the same applicant. In that patent a cap is described which is equipped with a first, annular part which is inserted on the neck of the bottle and which exhibits, on its external lateral surface, a plurality of projections arranged in a ring; the second part of this cap comprises a screw-top inferiorly to which an annular breakable seal is attached by means of easily-broken webs. During the assembly phase of the cap, the second part is inserted on the first part in such a way that each strand of the web is arranged between two projections. When the cap is unscrewed for the first time, the web is broken by effect of traction in that the breakable seal, which on first screwing-up has been forced into a position below the lip of the bottle, is not able to follow the cap in its upward movement.

With respect to caps of this type, it has been noted that if the machines used for the first screwing-on of the caps on the bottles are particularly fast, and especially if the user of the caps allows wide margins with regard to the nominal diameter of the bottlenecks, the following can happen: if the bottlenecks are much wider than the nominal diameter, the web is broken on first screwing-on; if the neck is much narrower than the nominal diameter, there is the possibility of fraudulent opening due to the poor level of interference between the bottleneck and the cap.

Evidently it is not possible to strengthen the webs by thickening them, nor increase interference between the cap and the bottleneck; each of these solutions would address one of the problems while neglecting the other. It is therefore necessary to adopt web thicknesses and interference values which represent a compromise with regard to the solution of the above-described problems, even if by so doing, in the cases where the real diameter of the bottle is near to the maximum or minimum values permissible, one or the other of drawbacks may be encountered.

Another drawback encountered in caps of this type is that of the possibility of unscrewing the cap fron the bottle without breaking the webs, by levering beneath the cap itself using an appropriater tool. Although this operation is rather difficult to perform, the very fact that it is possible means that protection against fraudulent opening cannot be guaranteed.

Aim of the present invention is to eliminate the above-described drawbacks by providing a cap which is of simple construction, which permits of correct functioning with regard to both the first screwing-on phase and the unscrewing phase, with bottles that allow of an adequate tolerance of the nominal diameter and which is not removable from the bottleneck without one of its parts breaking.

An advantage of the present cap is that it permits of obtaining the desired results without any increase in production costs and without any further application complications.

SUMMARY OF THE INVENTION

These aims and advantages and others besides are attained by the invention as characterised in the claims which follow, which, as with the prior art cap illustrated in GB 2172273, is of the type in which the first annular-shaped part inserts on the neck of the bottle and exhibits on its external lateral surface a plurality of projections, arranged in a ring, and in which the second part, comprising a screw-top inferiorly to which is connected a breakable seal by means of easy-breaking webs arranged on an annular collar, inserts on the first part in such a way that each web is inserted between two projections so that the breakable seal ring stays axially slidingly solid to the first part. The invention further comprises resisting means, different from the said projections and being a part of the cap and aimed at resisting the forces which are generated between cap and seal ring during the first screwing-on phase of the cap on to the bottle; said resisting means being furthermore conformed and arranged in such a way as not to hinder the detachment of the cap from the breakable seal during the first unscrewing of said cap.

BRIEF DESCRIPTION OF THE ILLUSTRATIONS

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

FIG. 1 shows a partially-sectioned vertical elevation of the cap;

FIG. 2 shows, in enlarged scale, a section of a particular of the cap.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The first part 1 of the cap is of annular shape and inserts on the bottleneck; said first part 1 exhibits, on its external lateral surface, a plurality of projections 5 arranged regularly in a ring around all the lateral surface of the first part 1. Internally to the first part 1 there is an angled rim 12 which, when the cap is inserted on the neck of the bottle, is forced to enter under said neck and thus prevents any further removing of the cap with the seal attached.

Usually the rim 12 is connected to an element such as, for example as illustrated in FIG. 1, a disc 11, which is made during production of the first part 1 of the cap and which, according to its nature, can have different functions; for example, the disc 11, once the cap has been inserted on the bottleneck, acts as a seal. Evidently, the element indicated by 11 can also have different functions, and in any case it is not a characteristic element of the invention in question.

The second part of the cap comprises a screw-top 2 inferiorly to which an annular breakable seal 4 is connected by means of easily-breaking webs 6. The webs 6 are arranged on an annular collar 14 which is the lower end of the screw top 2.

When the first and the second parts of the cap are coupled, the web 6 are inserted each between two of the projections 5 present on the first part of the capsule 1: a

pairing is envisaged wherein the first part 1 of the cap and the breakable seal 4 are solid to axial sliding, in particular upwards axial sliding.

The second part, that is, the screw-top 2, also comprises teeth 7, which are arranged parallel to the webs 6 and on the same annular collar 14; the teeth 7 have a greater width with respect to the width of the webs 6 and are connected only to the screw-top 2. The lower ends of the teeth 7 are in fact free and therefore not connected to the breakable seal 4.

When the two parts 1 and 2 are assembled, each of the teeth 7 inserts between two projections 5. In FIG. 1 a cap is illustrated in which it is envisaged that in the annular collar 14 containing the teeth 7 and the projections 5 a sequence of two teeth 7 to one projection 5 is established; this conformation has been shown, as will be better described below, to be particularly efficient with regard to the good functioning of the cap. The width of the teeth 7 is equal to or slightly inferior to the distance between two projections 5, to provide for co-rotation of the first part one and the screw-up or second part two when the cap is first being placed on the bottle and for reasons that will be better described below.

The lower edge 13 of the breakable seal 4 has an internal diameter which is slightly smaller than the external diameter of the first part 1; in this way, when the two parts of the cap are assembled, the lower edge 13 overlaps the lower edge of the first part in such a way as to close it and make it externally inaccessible.

For reasons that will be better described below, the minimum internal diameter of the first part of the cap 1 can be made of such a diameter that a notable inferference is created on the bottleneck, even with bottlenecks having a diameter equal to the smallest diameter with respect to the nominal diameter. Furthermore, the rim 12 can be of considerable thickness, and consequently be highly rigid, so that the removal of the first part 1 from the bottleneck is prevented after first screwing-on has been achieved.

The cap in question functions as described below. At the moment of the first screwing-on to the bottleneck, the cap, which has been previously assembled, is forced and screwed on to the bottleneck itself; during this operaiton, the teeth 7 and projections 5 interact to have the first part 1 and the second part 2 co-rotate and, differently from prior art procedures, the forces which are generated in the annular zone, containing the teeth 7, the webs 6 and the projections 5, forces generated by the friction which is created by the forcing of the rim 12 on to the bottleneck, are all borne by the teeth 7, and are not unloaded on to the webs 6; in this way, even when these forces are of notable strength, the webs 6 are not at all subject to them and therefore do not break. This permits of maintaining a high interference between the rim 12 and the bottleneck as well as a high rigidity of the rim 12, which ensures that the cap stays very firmly on the bottle once the screwing-on procedure has been carried out.

During the first unscrewing phase, the screw-top 2 is unscrewed from the bottleneck; the teeth 7 draw the first part of the cap 1 into rotation, which is in any case free to rotate about the bottleneck; contemporaneously the cap lifts. While the lifting of the second part of the cap, and in particular of the bottletop itself, is not prevented by any other element, the lifting of the first part 1 and of the breakage seal 4 which is axially slidably solid to it is prevented by the rim 12. When the unscrewing operation is continued, the breaking by traction of the webs 6 occurs, confirming that opening of the cap has taken place.

Obviously, according to the necessities of construction the thickness of the webs 6 can be kept very small since, as stated above, the webs 6 do not bear any force during the phase of screwing-on but have only to break easily during the first unscrewing phase. The particular shape of the lower edge of the breakable seal 4 prevents any attempt at opening it with a tool by levering between the breakable seal 4 and the first part 1 of the cap; it is also worthy of note that the webs 6, being of very small thickness, at least partially break at any attempt at tampering with the cap.

It is to be noted that the same function of the lower edge 13 of the breakable seal 4 might be obtained for example by glueing or soldering the breakable seal 4 and the first part 1; the system utilised for the prevent cap, however, is simpler and does not require the use of glues and solders.

What is claimed:

1. A two part plastic cap for bottles having
   a first annular-shaped part, said first part having an external lateral surface with a plurality of projections arranged in a ring around said external lateral surface.
   a second part, said second part having a screw-top, a breakable seal, and a plurality of easy-breaking webs arranged on an annular collar of said screw top, each of said webs is inserted between two of said plurality of projections,
   a plurality of teeth arranged parallel to said webs and on the annular collar, said teeth having a greater width with respect to the width of said webs, said teeth having one free end and being connected to the lower end of the screw-top at the other end; said teeth being conformed in such a way as to be inserted each between two of said plurality of projections when the second part of the cap is inserted on the first part; and the width of each said teeth is equal to or slightly smaller than the distance existing between two of said plurality of projections.

2. A two part plastic cap for bottles having a first annular-shaped part, said first part having an external lateral surface with a plurality of projections arranged in a ring around said external lateral surface.
   a second part, said second part having a screw-top, a breakable seal, and a plurality of easy-breaking webs arranged on an annular collar of said screw top each of said webs is inserted between two of said plurality of projections,
   a plurality of teeth arranged parallel to said webs and on the annular collar, said teeth having a greater width with respect to the width of said webs, said teeth having one free end and being connected to the lower end of the screw-top at the other end; said teeth being conformed in such a way as to be inserted each between two of said plurality of projections when the second part of the cap is inserted on the first part; and wherein there are equal sequences of two of said plurality of teeth and one of said plurality of webs.

3. A two part plastic cap for bottles having
   a first annular-shaped part, said first part having an external lateral surface with a plurality of projections arranged in a ring around said external lateral surface,
   a second part, said second part having a screw-top, a breakable seal, and a plurality of easy-breaking

webs arranged on an annular collar of said screw top, a lower edge of the breakable seal has an internal diameter which is slightly smaller than an external diameter of the first part; each of said plurality of webs is inserted between two of said plurality of projections, and

resisting means different from the said projections, said resisting means being a part of the cap to corotate the first part and the second part during the first screwing on phase and to resist the forces which are generated between the screw top and the breakable seal during the first screwing-on phase of the cap on to the bottle; said resisting means being furthermore conformed and arranged in such a way as not to hinder the detachment of the screw top from the breakable seal during the first unscrewing of said cap.

4. A cap as in claim 3 wherein the resisting means is a plurality of teeth on the lower end of the screw cap and each of said plurality of teeth extending between two of said plurality of projections.

* * * * *

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(72) Inventor: Jochen Koehn

(19)

(54) CHILD-RESISTANT PRESS-AND-TURN CLOSURE

(71) We, ZELLER PLASTIK, Koehn, Grabner & Co., a German Kommanditgesellschaft organised and existing under the laws of the Germany, of D-5583 Zell/Mosel, Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to child-resistant closures of the type called press-and-turn closures suitable for closing necks of containers and especially bottles. The closures are made from plastics material.

A closure of this kind, sold in West-Germany, has a screw-cap which holds an overcap with an axial free motion. Both caps have projections which can interlock and unlock within the axial free motion. Alternatively there can be provided projections at one of the caps and recesses at the other cap.

In such closures spring elements are provided between overcap and screw-cap. The spring elements are formed at the inner face of the screw-cap. They are holding both caps in a certain distance within the axial free motion. Hereby is achieved that the projections or projections and recesses of both caps do not interengage by themselves during an unscrewing motion. An axial force is to be exerted, i.e. the overcap is to be pressed against the container in order to overcome the spring force and to make the projections or projections and recesses interengage.

Known types of such closures have matching sets of projections at their caps, one of the sets being used for screwing-on, the other set being used for unscrewing. In a further known type of such closures the spring elements themselves are used as driving elements in screwing-on. The known closures mentioned above have the following disadvantages:

1) The choice of plastics materials is limited because of the necessary elasticity of the spring elements. However, to introduce an independent spring element would make production and assembly of the closure unduly expensive.

2) Forming cap and spring elements in one piece would require complicated and expensive injection tools and consequently increased production cost.

3) The spring elements weaken under continuous strain. This may already occur when the closures are stapled for shipment from producer to packer, i.e., the person who fills the containers and applies the closures thereto; more so, however, when the filled and closed containers are stapled. Weakened springs, however, do not provide the desired child resistance.

It is an object of the invention to provide a child resistant press-and-turn closure without spring elements and therefore without the disadvantages outlined above.

The present invention provides a child resistant press-and-turn closure for a container having an externally screw-threaded neck, the closure being made from plastics material and comprising a screw cap and an overcap, the screw cap being contained within the overcap and the screw cap and overcap being relatively movable both axially and angularly, projections on one of said caps and co-operating projections or recesses on or in the other of said caps, said projections or recesses having first faces on one side thereof which co-operate to transmit rotational movement from the overcap to the screw cap when the overcap is rotated in a direction to screw the closure onto the neck of a said container and second faces on the opposite sides thereof, the second face of each projection or recess of one of said caps being a cam face whereby, in use, the overcap will rotate relative to the screw cap with said projections or recesses of the different cap camming past one another when the overcap is rotated in a direction to unscrew the closure from the neck of a said container unless the overcap is moved axially relative to the screw

cap so that each said cam faces is engaged by an edge of the second face of a projection or recess of the other cap with a force sufficient to overcome the cam action.

By the invention not only the spring elements are eliminated but, in comparison with the known closures mentioned above, also one set of projections at the overcap and one set of projections at the screw-cap. According to the invention the same set of projections is used for screwing on as well as for unscrewing. When screwing on, a filled container, especially a bottle, is normally standing upright. The projections or projections and recesses of both caps are then interengaging, and the screw-cap is automatically diven when the overcap is turned. For screwing-off, however, it is necessary to exert an axial force, thus pressing the overcap against the container. The cam action tends to separate the projections of both caps or the projections of one cap from the recesses of the other cap in axial direction, so that the overcap only cams past the screw-cap but does not drive the screw-cap in unscrewing direction. Only if the overcap is pressed with sufficient force onto the screw-cap, is there generated sufficient friction to overcome the cam action so that the screw-cap is driven in unscrewing direction.

An embodiment of the invention will now be illustratively described with reference to the accompanying drawings in which:—

Figure 1 shows an overcap of a closure according to the invention, at its left hand side in an axial section and at its right hand side in a sideview,

Figure 2 shows a screw-cap in a similar representation,

Figure 3 is a partial view of the overcap according to figure 1 seen from below, i.e. from its inner side, and

Figure 4 is a partial view of the screw-cap according to figure 2, seen from its upper and outer side.

Overcap 1 and screw-cap 3 are produced separately and are made from plastics material. Their dimensions are such that the screw-cap can be inserted into the overcap. The lower rim 5 of the screw-cap 3 snaps over and thereafter rests on a snapring 7 of the overcap 1. The two caps are thus captive each with the other. The screw-cap can move axially within the overcap and can be turned freely in relation to the overcap as long as projections—which are still to be described—do not interlock.

The screw-cap 3 has at its outer face 9 six projections 11 which are arranged radially (figure 4) and show a nearly square cross section. Their edges 13 are slightly rounded-off (figure 2).

The overcap 1 has six projections 17 at its inner face 15. Each of these projections has a first face 19 on one side thereof which lies in an axial radial plane and an inclined cam face 21 on the opposite side thereof. The cam face 21 of each projection 17 lies in a radial plane which is inclined with respect to said axial radial plane by an angle β which is 45 degrees in the embodiment shown, but which may, however, be from substantially 30 degrees to substantially 60 degrees. According to the material employed the angle β has to be sufficiently large to safely produce an axial force tending to lift the overcap during an unscrewing movement. The larger the angle is made the greater becomes in general the lifting force until—if desired—considerable axial force has to be applied by the user between the screw cap and overcap in order to unscrew the screw cap. The projections 11 of the screw-cap 3 described above have first and second faces 29 and 31, respectively which, like the faces 19, lie in axial radial planes. The faces 29 cooperate with the faces 19 of projections 17 when the overcap is rotated in one direction whilst the edges 13 of the faces 31 cooperate with the cam faces 21 when the overcap is rotated in the opposite direction.

The screw-cap is inserted into the overcap during the production process. Both thus reach the packer, i.e., the person who fills a container and applies the closure thereto, captive each with the other. If a press-and-turn closure consisting of both caps 1 and 3 is put onto the neck of an upright standing container; e.g., bottle, the overcap falls down onto the screw-cap so that the projections 17 of the overcap project into the interspaces between the projections 11 of the screw-cap. If now the overcap is turned for closing, in this case in a clockwise direction, the axial faces 19 of the projections 17 of the overcap bear against the axial faces 29 of the projections 11 of the screw-cap, exert a clockwise torque onto the screw-cap and thus turn it until the closure is tightly closed on the container.

If a child tries to open the closure, the cam faces 21 cam over the rounded-off edges 13 of the projections 11, thus lifting the overcap axially from the screw-cap and preventing unscrewing thereof.

If the closure is to be opened by an adult person, he or she has to exert an axial force on the overcap which is sufficient to overcome the cam action between the cam faces 21 and the edges 13 so that the unscrewing torque exerted by the user will effectively drive the screw-cap in an unscrewing direction to enable the closure to be removed from the container.

The user as well as the packer can close the closure in the normal way. If, as usual, the container, e.g., bottle is held upright, the faces 19 and 29 interengage automatically. If not, the interengagement can be achieved by a slight pressure exerted on the overcap.

The interlocking projections or projections and recesses may be arranged at the sidewalls of the screw-cap and overcap instead of as shown at their faces 9 and 15.

WHAT WE CLAIM IS:—

1. A child resistant press-and-turn closure for a container having an externally screw-threaded neck, the closure being made from plastics material and comprising a screw cap and an overcap, the screw cap being contained within the overcap and the screw cap and overcap being relatively movable both axially and angularly, projections on one of said caps and co-operating projections or recesses on or in the other of said caps, said projections or recesses having first faces on one side thereof which co-operate to transmit rotational movement from the overcap to the screw cap when the overcap is rotated in a direction to screw the closure onto the neck of a said container and second faces on the opposite sides thereof, the second face of each projection or recess of one of said caps being a cam face whereby, in use, the overcap will rotate relative to the screw cap with said projections or recesses of the different caps camming past one another when the overcap is rotated in a direction to unscrew the closure from the neck of a said container unless the overcap is moved axially relative to the screw cap so that each said cam face is engaged by an edge of the second face of a projection or recess of the other cap with a force sufficient to overcome the cam action.

2. A closure according to claim 1, wherein said first faces are arranged in axial radial planes.

3. A closure according to claim 2, wherein said cam faces are arranged in radial planes which are inclined with respect to said axial radial planes by an angle of from 30 to 60 degress, particularly 45 degrees.

4. A closure according to any one of the preceding claims, wherein said caps each comprise, in the normal position of use, a top wall and a depending peripheral wall and said projections or recesses are provided on or in the top walls thereof.

5. A closure according to any one of claims 1 to 3, wherein said caps each comprise a peripheral wall and said projections or recesses are provided on or in the peripheral walls thereof.

6. A closure according to any one of the preceding claims, wherein each of said caps has an equal number of said projections or recesses and wherein said projections or recesses are evenly spaced circumferentially of said caps.

7. A closure according to any one of the preceding claims, wherein each cap has projections thereon, the projections on one of said caps each comprising a said first face and a said cam face and the projections on the other of said caps each comprising first and second faces which are substantially parallel to one another.

8. A closure according to claim 7, wherein each said edge is located at the junction of the second face and a surface extending between the first and second faces of a projection of said other cap.

9. A closure according to any one of the preceding claims, wherein said edges are rounded edges.

10. A closure for a container having an externally screw-threaded neck, the closure being substantially as herein described with reference to the accompanying drawings.

ERIC POTTER & CLARKSON,
Chartered Patent Agents,
5, Market Way,
Broad Street,
Reading.

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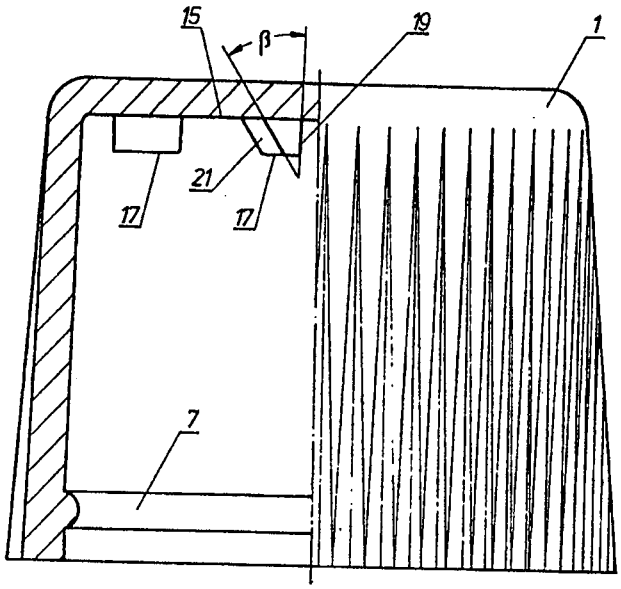

Fig.1

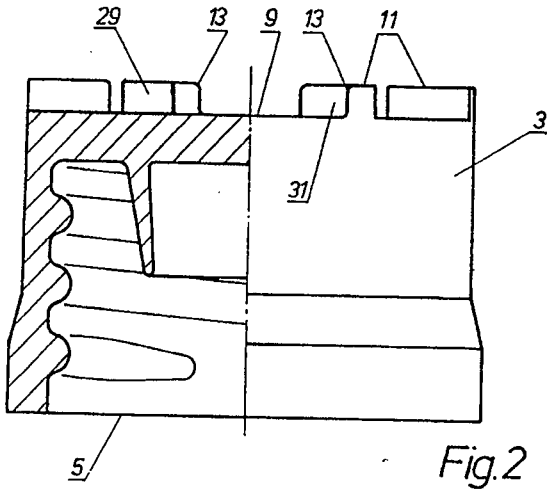

Fig.2

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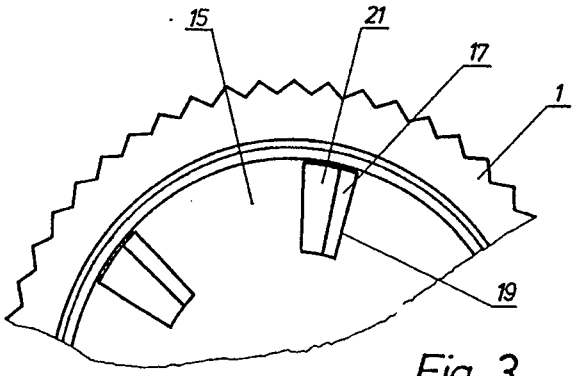

Fig. 3

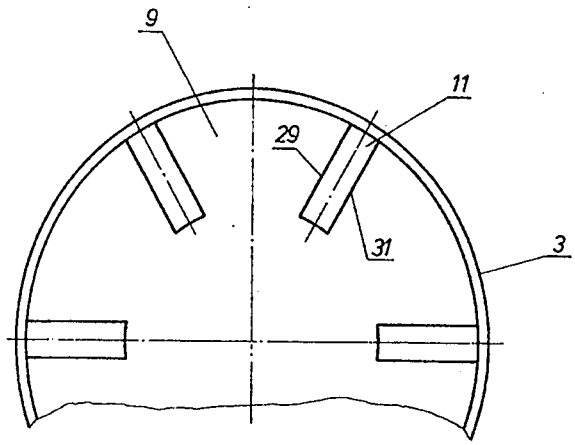

Fig. 4