(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 200111549 B2
(10) Patent No. 776897

(54) Title
Closure cap

(51)6 International Patent Classification(s)
B65D 041/04

(21) Application No: 200111549

(22) Application Date: 2000.11.01

(87) WIPO No: WO01/34491

(30) Priority Data

(31) Number	(32) Date	(33) Country
99122306	1999.11.08	EP

(43) Publication Date : 2001.06.06
(43) Publication Journal Date : 2001.08.02
(44) Accepted Journal Date : 2004.09.23

(71) Applicant(s)
Crown Packaging Technology, Inc.

(72) Inventor(s)
Udo Bosl; Erich Simmen

(74) Agent/Attorney
Davies Collison Cave,Level 15,1 Nicholson Street,MELBOURNE VIC 3000

(56) Related Art
WO 1990/010581
US 5871111
US 5133471

AU 200111549

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 May 2001 (17.05.2001)

PCT

(10) International Publication Number
WO 01/34491 A1

(51) International Patent Classification?: B65D 41/04

(21) International Application Number: PCT/GB00/04179

(22) International Filing Date:
1 November 2000 (01.11.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
99122306.6 8 November 1999 (08.11.1999) EP

(71) Applicant *(for all designated States except LS. US)*: CROWN CORK & SEAL TECHNOLOGIES CORPORATION [US/US]; 11535 S. Central Avenue, Alsip, IL 60803-2599 (US).

(71) Applicant *(for LS only)*: CARNAUDMETALBOX PLC [GB/GB]; Downsview Road, Wantage, Oxfordshire OX12 9BP (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: BÖSL, Udo [DE/DE]; Dorfstrasse 13, 79591 Eimeldingen (DE).

SIMMEN, Erich [CH/CH]; Baumgartenweg 3, CH-4447 Kanerkinden (CH).

(74) Agent: SMITH, Debra, Jane, Clare; Carnaudmetalbox plc, Downsview Road, Wantage, Oxfordshire OX12 9BP (GB).

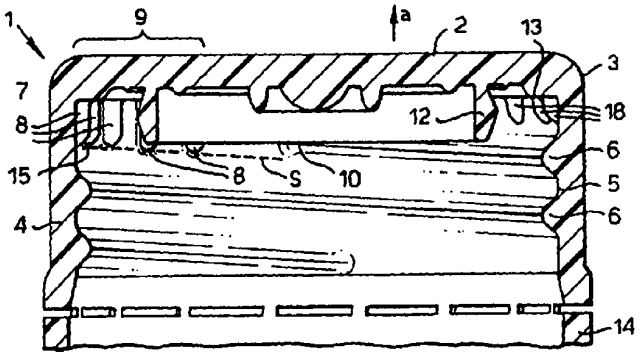
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CLOSURE CAP



(57) Abstract: A closure cap for a container containing carbonated beverages has a head plate (2) and a substantially cylindrical cap skirt (4) extending from the edge (3) of the head plate (2). A cap thread (6) is provided on the inside (5) of the cap skirt (4). In the transition region (7) between the head plate (2) and the cap skirt (4) reinforcing ribs (8) are provided, which extend up to the head plate (2).

WO 01/34491 A1

CLOSURE CAP

The invention concerns a closure cap, in particular a closure cap for a container containing carbonated beverages and having the features of the characterising clause of Claim 1.

A large number of different embodiments of screw closure caps made of plastics material are used today for the closing of containers, such as e.g. beverage bottles.

The final position, when the closure cap is in its fully screwed-on state, is determined on the one hand by the screwing-on, twisting moment and on the other hand, by the relationship between geometry of the closure cap and the container mouth. In particular, in the case of closure caps with internal lip seals, the final position of the closure cap is reached, when the inside of the cap top plate rests against the front side of the container mouth in the manner of a stop.

One problem with such known closure caps consists in so-called overturning. If a user mistakenly tries to twist a mounted closure in the wrong direction using force (i.e. continuing to screw-on instead of unscrewing) there is a danger that the threads of the closure cap may snap over the threads of the container mouth. Thus, the closure cap may temporarily become disengaged from the container mouth. In particular, in the case of bottles with contents held under pressure, such as carbonated beverages for example, there is a danger that at the same

time, the closure may fly off the bottle i.e. missiling. Such missiling can injure the user.

Overturing safeguards have already been suggested, which prevent such overturning or in the event of overturning lead to a controlled gas blow-off. In WO95/21095 a braking element is described, which is arranged outside the thread path used to mount the closure and which, in the event of attempted overturning, engages with the thread of the container mouth. Overturning is thereby avoided.

This solution has the disadvantage that the closure cap is greatly deformed in the radial direction in the event of overturning.

Braking elements are also known, which define the end of the screwing-on process; thus from WO 90/10581 a braking element acting in the axial direction or in the circumferential direction is known, which towards the end of the screwing-on process engages with the start of the thread of the container mouth and so limits the screwing-on process.

An aim of the present invention is to avoid the disadvantages of the known overturn protection arrangements. In particular, an aim of the invention is to create a closure cap, which effectively prevents overturning when the closure cap is mounted on the container mouth and at the same time effectively prevents deformation of the cap in the event of an attempt at

overturning. The closure cap according to the invention, may be produced easily and can be used on conventional closure mouths.

According to the invention these aims are solved by a closure cap having the features of the characterising part of Claim 1.

As in conventional closure caps, the closure cap consists of a head plate and a more or less cylindrical cap skirt, which extends from the edge of the head plate. On the inside of the cap skirt a thread is provided, which can be brought into engagement with a complimentary thread on the container mouth.

In the transition zone between the head plate and the cap skirt, reinforcing ribs, which extend up to the head plate, are arranged on the inside of the cap skirt. In the case of a closure cap having an outer seal arranged in the transition zone between cap skirt and head plate, the reinforcing ribs can only extend below the outer seal.

The closure cap according to the invention has no additional braking elements, which limit the screwing-on movement. The end of the screwing-on movement is therefore determined by the fact that the inside of the head plate rests against the front side of the container mouth.

The reinforcing ribs between the head plate and the cap skirt effectively counteract the overturning of the closure cap, even when increased force is applied. The reinforcing ribs stiffen the cap skirt and head plate in the transition zone, so that radial bulging of the cap skirt or excessive spreading between the head plate and cap skirt is avoided.

According to a preferred embodiment of the invention, the reinforcing ribs are arranged in an area towards the head plate-side of the cap thread, as seen in the circumferential direction.

Advantageously, the reinforcing ribs extend in the axial direction downwards at least as far as an imaginary screwing line, which corresponds more or less to the continuation of the cap thread. The reinforcing ribs thereby form an extension of the cap thread.

Where the reinforcing ribs extend below the imaginary screwing line, a braking effect and an additional overturning safeguard is produced at the end of the screwing-on process.

Advantageously, the reinforcing ribs extend more or less around an angular sector of 90°, which seen in the circumferential direction lies next to the end of the cap thread.

In a further preferred embodiment additional, second reinforcing ribs can be provided in the transition region

between head plate and cap skirt. These second reinforcing ribs are arranged outside the angular sector over which the reinforcing ribs extend. The length of the second reinforcing ribs in the axial direction is more or less equal. The second reinforcing ribs thus have a stiffening function and do not form any continuation of the cap thread. The second reinforcing ribs moreover, run on and so likewise limit the screwing-on movement.

The reinforcing ribs and/or the second reinforcing ribs advantageously extend sufficiently inwards in the radial direction that their inner faces lie on an imaginary cylindrical section. The imaginary cylindrical section essentially corresponds to more or less the cylindrical outer face of the container mouth. In this way, the reinforcing ribs (and if necessary the second reinforcing ribs) additionally have a centring effect.

The reinforcing ribs are particularly advantageous, where the closure cap is provided with a stop face on the inside of the head plate, which engages with the front side of the container mouth when the closure cap is mounted on the container. In this way, the screwing-on position is defined exactly. Forces acting on the head plate, which would normally result in a deformation of the head plate, are directed into the cap wall through the reinforcing ribs. Because of the reduced deformability of the head plate, the reinforcing ribs give both an exactly defined end position of the closure cap and also an overturning safeguard. In addition, an overturn safeguard such as that described in WO 095 /2105

can be used particularly advantageously. In this arrangement, the reinforcing ribs are arranged opposite the braking element e.g. two sets of reinforcing ribs can be provided. The content of WO 95/2105 is expressly incorporated by reference in the present application.

The invention is described below in more detail by means of example embodiments explained by means of the drawings. They show:

Figure 1 a cross section through a closure cap according to the invention along the plane A-A indicated in Figure 4,

Figure 2 a schematic perspective representation of a cut-open closure cap mounted on a container mouth,

Figure 3 an enlarged representation of the transition zone between head plate and cap skirt of a closure cap according to the invention mounted on a container mouth,

Figure 4 an underneath view of the closure cap according to the invention,

Figure 5 an enlarged representation of the cut-out section C from Figure 4,

Figures 6a and 6b schematic representations of further embodiments of the invention, and

Figure 7 a schematic representation of an embodiment with an outer seal.

In Figure 1 a closure cap 1 is shown in cross section. The closure cap 1 has a head plate 2. From the edge 3 of the head plate 2 extends a substantially cylindrical cap skirt 4. The cap skirt 4 is provided on its inside 5 with a cap thread 6. The cap thread 6 is used for screwing the closure cap 1 on to a container mouth 21 having a mouth thread 26 (see Figure 2).

The closure cap 1 is provided with a conventional inner seal 12. The closure cap 1 may also have a guarantee band 14.

On the inside of the head plate 2 is a stop 13, which comes into engagement with the front side 23 of the container mouth 21 (see Figure 3) when closure cap 1 is mounted on the container.

In the transition zone 7, between the head plate 2 and the cap skirt 4, reinforcing ribs 8 are provided on the inside 5. The reinforcing ribs 8 extend in the axial direction up to the head plate 2 and up to the stop 13 respectively. The reinforcing ribs 8 stiffen the head plate 2 and the cap skirt 4 in the transition zone 7. Because of this stiffening, overturning of the closure cap is avoided.

The reinforcing ribs 8 are arranged in a region 9, which lies next to the end 10 of the cap thread 6, when

viewed in the circumferential direction. The term the end of the thread is used here, and below, to describe the head plate-side end 10 of the cap thread 6.

The length l of the reinforcing ribs 8 has been chosen so that the lower edge 15 of the reinforcing ribs 8 follow an imaginary screwing line S, which forms an extension of the cap thread 6.

Figure 2 is shows a perspective representation of a cut-open closure cap 1 mounted on a container mouth 21. The same reference symbols as used in Figure 1 denote the same parts.

Figure 2 shows that the reinforcing ribs 8 form an extension of the screw thread 6 of the closure cap 2 and follow the mouth thread 26 of the container mouth 21.

Moreover, in the right half of Figure 2 second reinforcing ribs 18 are shown, which extend over a circumferential area of somewhat less than 180° and which are arranged diametrically opposite the reinforcing ribs 8. The second reinforcing ribs 18 are all of equal length l'. The second reinforcing ribs 18 have only a stiffening function and form no extension of the cap thread 6 of the closure cap 1.

Figure 3 shows an enlarged representation of a cross section through a cut-out of the closure cap 1 in the transition zone 7.

The closure cap 1 is in the screwed-on position. The stop 13 rests against the front side 23 of the container mouth 21. The reinforcing ribs 8 each have a different length l. The length l has been chosen so that with closure cap screwed on (i.e. with abutment of the front side 23 on the stop 13) the lower edge 15 of the reinforcing ribs 8 lies against the mouth thread 26. In Figure 3 the stiffening effect of the reinforcing ribs 8 is clear. When the stop 13 lies against the front face 23, a further twisting of the closure cap 1 is avoided, because the head plate 2 cannot move in relation to the cap skirt 4.

The reinforcing ribs 8 also have a centring function. The reinforcing ribs 8 extend inwardly in the radial direction r, such that their inner face 11 lies on an imaginary cylindrical cut-out Z. The cylindrical cut-out Z corresponds more or less to the cylindrical face Z`, which is defined by the container mouth 21.

Figure 4 shows an underneath view of the closure cap of Figure 1. Figure 1 corresponds to a section along the plane A-A in Figure 4. According to Figure 4, six reinforcing ribs 8 are arranged in a region 9, which follows immediately after the end 10 of the cap thread 6. Looking in the circumferential direction U, the region 9 adjoins the end 10 of the cap thread 6. Diametrically opposite second reinforcing ribs 18 are arranged. Ten second reinforcing ribs 18 extend through an angular

region of about 150°. The second reinforcing ribs 18 have the same length L` in each case (see also Figure 2).

Figure 5 shows an enlarged representation of the cut-out C from Figure 4. The inner faces 11 of the reinforcing ribs 8 follow an imaginery cylindrical face Z. Seen in the circumferential direction U, the reinforcing ribs 8 are arranged towards the end 10 of the cap thread 6.

Of course, other configurations of the reinforcing ribs are also possible. For example, it is possible to distribute a plurality of equally long reinforcing ribs evenly over the circumference of the closure cap. Moreover, it is conceivable to provide reinforcing ribs, which extend from the cap thread up to the head plate. Figure 6a represents an embodiment, in which a large number of equally long reinforcing ribs 38 are arranged evenly over the whole circumference of the closure cap. The length l` of all reinforcing ribs is identical. The lower end of the reinforcing ribs 6 is arranged above the cap thread 6. Represented schematically in Figure 6b are reinforcing ribs 48, which extend from the lower edge of the cap thread 6 up to the head plate 2. The reinforcing ribs 48 are thereby arranged so that they lie outside the thread region used by the mouth thread 26 of the container.

The reinforcing ribs 38, 48 of Figures 6a and 6b also result in the desired stiffening between cap skirt 4 and head plate 2.

Figure 7 shows a further alternative embodiment. The same reference symbols denote the same parts as in the previous Figures.

The reinforcing ribs 58 extend up to the underside of an outer seal 32. The stop between the container mouth 21 and the closure cap 1 takes place via a front seal 33.

Second reinforcing ribs 18 are arranged diametrically opposite the reinforcing ribs 58. The reinforcing ribs 18 abut on the start of the thread and thereby likewise have a braking effect. Because of the stiffening ribs 18, 58, any axial force applied in the event of overturning in the circumferential direction is evenly distributed.

The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that that prior art forms part of the common general knowledge in Australia.

The reference numerals in the following claims are not to be construed as imposing any limitations on the claims.

CLAIMS

1. Closure cap (1), in particular for a container containing carbonated beverages,

having a head plate (2) and a substantially cylindrical cap skirt (4) extending from the edge (3) of the head plate (2), which skirt is provided on its inner side (5) with a cap thread (6), adapted for engagement with a mouth thread (26) of a container mouth (21),

characterised in that

reinforcing ribs (8; 38; 48; 58), which extend up to the head plate (2) or up to an outer seal (32) are provided on the inside (5) of the cap skirt (4) in the transition region (7) between the head plate(2) and the cap skirt (4).

2. Closure cap according to Claim 1, characterised in that the reinforcing ribs (8; 38; 48) are arranged in a region (9) towards the head plate-side end (10) of the cap thread (6) as viewed in the circumferential direction (U).

3. Closure cap according to Claim 1 or claim 2, characterised in that the reinforcing ribs (8; 38; 48) extend axially downwards at least as far as an imaginary screwing line (S), which corresponds more or less to a continuation of the cap thread (6).

4. Closure cap according to Claim 3, characterised in that the reinforcing ribs (8) extend in the axial

direction downwards beyond the imaginary screwing line (S).

5. Closure cap according to one of the Claims 1 to 4, characterised in that the reinforcing ribs (8) are arranged in a region, which extends over an angular sector (α) of about 90°.

6. Closure cap according to one of the Claims 1 to 5, characterised in that additional, second reinforcing ribs (18) are arranged in the transition region (7) between the head plate (2) and the cap skirt (4), outside the region (9), in which the reinforcing ribs (8) are situated.

7. Closure cap according to Claim 6, characterised in that the second reinforcing ribs (18) each have the same length (l`) in the axial direction (a).

8. Closure cap according to one of the Claims 1 to 7, characterised in that the reinforcing ribs (8) and/or the second reinforcing ribs (18) extend in the radial inwardly in the direction r so that their inner faces (11) lie on an imaginary cylindrical cut-out (Z), which corresponds essentially to the cylindrical outer face (Z`) of the container mouth (21).

9. Closure cap according to one of the Claims 1 to 8, characterised in that the head plate (2) is provided with a stop face (13), which can be brought into engagement with the front side (23) of the container mouth (21).

10. Closure cap according to one of the Claims 1 to 9, characterised in that a braking element is arranged opposite the reinforcing ribs, outside the thread region used with closure cap mounted.

11. Closure cap substantially as hereinbefore described with reference to the accompanying drawings.

DATED this 4th day of August 2004

CROWN CORK & SEAL TECHNOLOGIES CORPORATION
By its Patent Attorneys
DAVIES COLLISON CAVE

Fig.1.

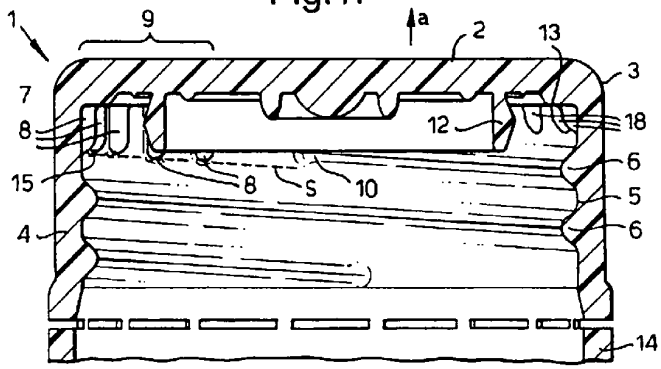


Fig.2.

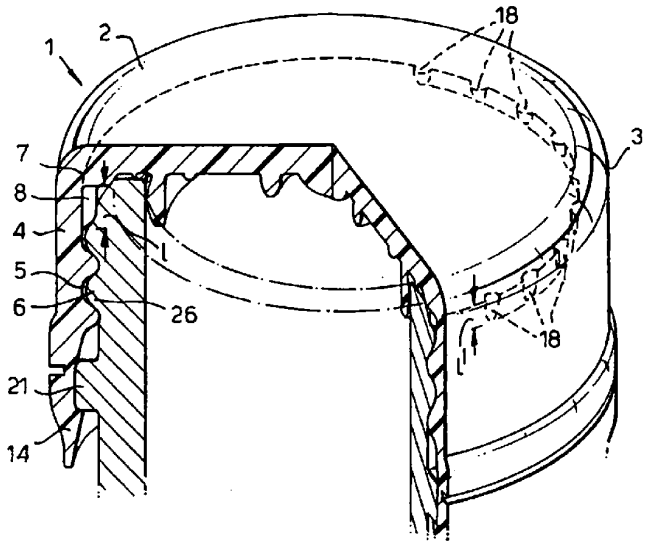


Fig.3.

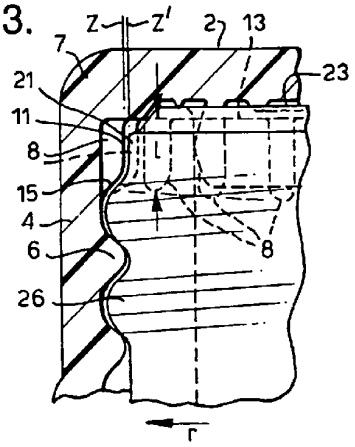


Fig.4.

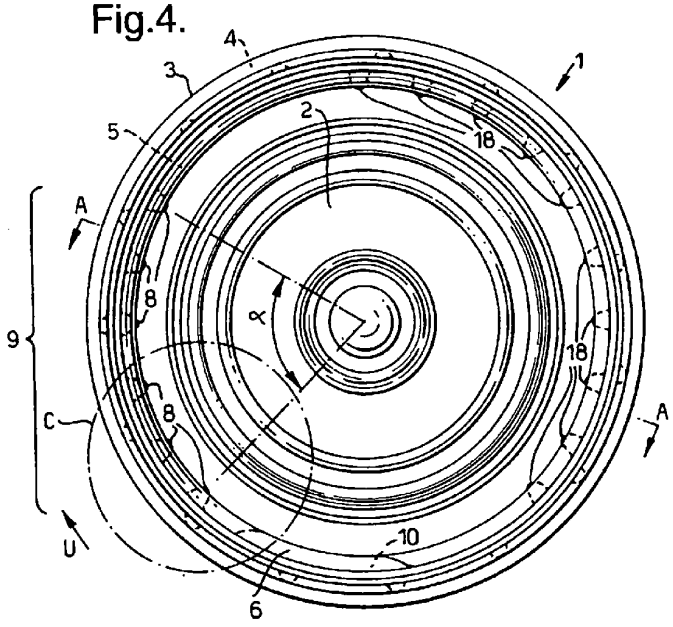


Fig.5.

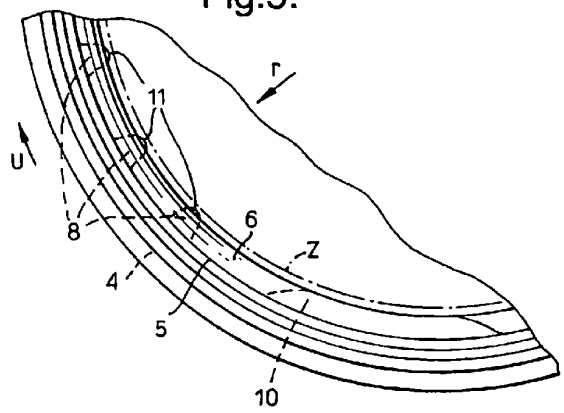


Fig.6a.

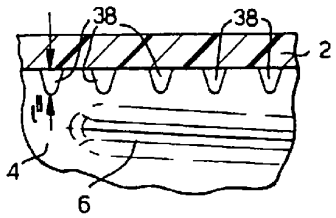


Fig.6b.

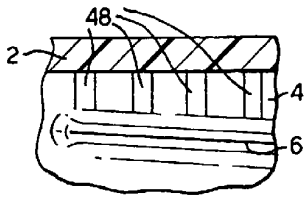


Fig.7.

