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A closure cap provided with a gasket and a sealing ring from an olefin polymer.

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References cited :
EP-A- 0 034 997
WO-A-84/00346
FR-A- 2 378 996
GB-A- 0 818 418

References cited :
GB-A- 1 327 583
GB-A- 1 592 222
GB-A- 2 051 660
GB-A- 2 116 529
US-A- 4 244 481

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Description

The invention relates to a method for making a container closure cap made of polypropylene and comprising an end wall and a circumferential side wall, the cap comprising a pilfer-proof device, the cap being provided with a gasket made from a plastisol material arranged to seal on the edge of the container neck, the cap being obtained starting from a combination of the closure cap with the pilfer-proof device and adding an amount of the plastisol material, the gasket being formed by heating the closure cap after addition of the plastisol to a chosen temperature and by subsequently exposing the resulting plastisol shaped into the gasket configuration to electro-magnetic energy until the plastisol has completely fluxed,

the pilfer-proof device being designed as a sealing ring with which the container can be sealably closed in conjunction with a locking collar disposed around the neck of the container, said sealing ring being integrally connected with the side wall of the closure cap via frangible bridges capable of being broken on first opening of the container, said frangible bridges extending in the axial direction of the closure cap,

the end wall being internally provided with an annular space bounded by an outer undercut,

the plastisol material being added to that annular space.

Such a method and the closure cap made with such method is known from WO-A-84/00346. The method according to the invention is characterized in that said space is also bounded by an inner undercut,

the end wall has a wall thickness decreased by 20-50% at the gasket,

the heating of the cap is to a temperature of 50-110°C, and

the electro-magnetic energy has a frequency of 10-200 MHz.

The method according to the invention has several advantages over the prior art method. The heating-up of the plastisol can take place in a shorter time interval. A more efficient use of the energy is made. Furthermore, simple and cheap apparatus for generating the electro-magnetic energy can be used.

It is noted that from the mentioned prior art reference, WO-A-84/00346, the use of an inner undercut is per se known. Such inner undercut, however, is not disclosed in combination with the pilfer-proof device.

It should furthermore be noted that GB-B-1 592 222 mentions the fluxing of a plastisol in a closure by dielectrically heating the plastisol with exposure to a source of radio frequency electrical energy having a frequency in the range of 1-200 MHz and then allowing the fluxed plastisol to cool and form the gasket. From this prior art reference, however, this single feature of the invention is known only in isolation.

Conveniently the fluxing operation is carried out

by heating the closure cap after addition of the plastisol to 100°C within 15-30 s and completely fluxing the plastisol shaped into the gasket configuration by 3-15 s exposure to electro-magnetic energy having a frequency to 27,10-27,15 MHz. This frequency is permitted for industrial uses in the whole world.

The invention will be further illustrated by means of the drawing which shows an example of embodiment of the closure cap and the method of sealing it. In the drawing

Fig. 1 schematically shows an axial cross-section of a container closed with the closure cap;

Fig. 2 schematically shows an axial cross-section of a container closed with the closure cap and provided with a sealing ring, in the pre-sealed state;

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

Fig. 4 shows, in cross-section, the assembly of closure cap and container according to Fig. 2 during sealing with the use of a so-called clamp; and Fig. 5 shows a cross-section along the line V-V in Fig. 4, without the clamp and the container.

In Fig. 1 the wall of the neck of a container made of glass is indicated by 1, and 2 shows the closure cap of polypropylene. On the inside the closure cap is provided with an annular space formed by the two circumferential undercuts 3 and 4, which annular space comprises the gasket 5. The inner undercut 3 is crescent-shaped and is resilient due to the outwardly decreasing thickness of the material. The crescent-shaped construction permits the inner undercut to rest on a part of the edge of the neck opening of the container. As a result thereof a part of the higher unscrewing torsion of the gasket is absorbed and reduced by the undercut. Moreover, the crescent-shaped undercut 3 ensures that in case of pasteurization of the contents of the container the expanded air generated in that process flows out between the undercut 3, which is thereby resiliently deflected somewhat, and the edge of the neck whereby the deflected undercut simultaneously causes an additional clamping force to be exerted on the gasket and the gasket is retained in position.

Figs. 2-5 show the closure cap of polypropylene at 10, comprising side wall 11 and sealing ring 13 which is connected with side wall 11 via a frangible bridge 12. The neck portion of the container is shown at 14, which neck portion 14 is provided with locking collar 17.

In Figs. 2-5 it is shown by way of an example below a closure cap according to the invention may be sealed after closed a container with it. As shown in Fig. 2 in the state before sealing. The side wall 11 with frangible bridges 12 and sealing ring 13 is clear of the container.

Fig. 4 shows the situation in which the frangible bridge 12 with the sealing ring 13, which where previously

exposed to the action of hot air having a temperature of 400°C for 2 sec., has been grasped by the clamp 15 moving towards the container. The frangible bridge 12 is then overstretched over and under the locking collar 17 and flattened, the sealing ring 13 also being flattened simultaneously between the clamp 15 and the neck portion 14 of the container. Fig. 5 shows, in comparison with Fig. 3, the deformation experienced by the frangible bridge 12 and the sealing ring 13, which has resulted in that the sealing ring has a diameter smaller than the largest diameter of the locking collar 17. When the closure cap 10 is blocked by abutment of the sealing ring 13 against the locking collar 17. When the unscrewing movement is continued, the increasing force exerted by the locking collar 17 on the combination of sealing ring 13 and frangible bridge 12 will result in that the frangible bridge 12 weakened by overstretching and flattening, which is made of the per se tough polypropylene, is broken along the line of fracture 16 (Fig. 5).

Claims

1. A method for making a container (1) closure cap (2) made of polypropylene and comprising an end wall and a circumferential side wall, the cap comprising a pilfer-proof device (12, 13), the cap (2) being provided with a gasket (5) made from a plastisol material arranged to seal on the edge of the container neck (14), the cap (2) being obtained starting from a combination of the closure cap (2) with the pilfer-proof device (12, 13) and adding an amount of the plastisol material, the gasket (5) being formed by heating the closure cap (2) after addition of the plastisol to a chosen temperature and by subsequently exposing the resulting plastisol shaped into the gasket (5) configuration to electro-magnetic energy until the plastisol has completely fluxed,

the pilfer-proof device (12, 13) being designed as a sealing ring (13) with which the container (1) can be sealably closed in conjunction with a locking collar (17) disposed around the neck (14) of the container (1), said sealing ring (13) being integrally connected with the side wall of the closure cap (2) via frangible bridges (12) capable of being broken on first opening of the container (1), said frangible bridges (12) extending in the axial direction of the closure cap (2),

the end wall being internally provided with an annular space bounded by an outer undercut (4),

the plastisol material being added to that annular space,

characterized in that

said space is also bounded by an inner un-

dercut (3),

the end wall has a wall thickness decreased by 20-50% at the gasket,

the heating of the cap is to a temperature of 50-110°C, and

the electro-magnetic energy has a frequency of 10-200 MHz.

2. The method of claim 1

characterized in that

the method is carried out in a way such that the inner undercut (3) is tapered in cross-section and resilient and has a largest diameter to have the sealing of the gasket (5) on the edge of the container neck (1) partly in combination with the said undercut (3).

3. The method of claim 1 or 2

characterized in that

the method is carried out in a way such that the inner diameter of the closure cap (10) is up to 100 mm.

Patentansprüche

1. Verfahren zum Herstellen einer Verschlusskappe (2) aus Polypropylen für einen Behälter (1), der eine Endwand und eine Umfangs-Seitenwand aufweist, wobei die Kappe mit einer eingriffsverhindernden Einrichtung versehen ist (12, 13), und die Kappe (2) eine Dichtung (5) aus Plastisolmaterial aufweist, die den Rand des Behälterhalses (14) abdichtet, während man die Kappe (2) erhält beginnend von einer Kombination der Verschlusskappe (2) mit der eingriffsverhindernden Einrichtung (12, 13) und durch Einbringen einer Plastisol-Materialmenge, so daß die Dichtung (5) gebildet wird durch Erwärmen der Verschlusskappe (2) nach Zusetzen des Plastisols auf eine ausgewählte Temperatur und indem man das zu der Dichtungsanordnung (5) geformte Plastisol anschließend einer elektro-magnetischen Energie aussetzt, bis das Plastisol vollständig geschmolzen ist,

wobei die eingriffsverhindernde Einrichtung (12, 13) als Dichtungsring (13) konstruiert ist, mit dem der Behälter (1) in Verbindung mit einem Verriegelungsrand (17), der sich um den Hals (14) des Behälters (1) erstreckt, dicht verschlossen werden kann, so daß der Dichtungsring (13) integral mit der Seitenwand der Verschlusskappe (2) über zerbrechliche Brücken (12) verbunden ist, die beim ersten Öffnen des Behälters (1) aufbrechbar sind, wobei sich die zerbrechlichen Brücken (12) in axialer Richtung zur Verschlusskappe (2) erstrecken,

wobei die Endwand innen mit einem Ring-

raum versehen ist, der von einer äußeren Hinterschneidung (4) begrenzt ist,

wobei das Plastisolmaterial dem Ringraum zugeführt werden kann,

dadurch gekennzeichnet,

daß der Raum ebenfalls durch eine innere Hinterschneidung (3) begrenzt ist,

daß die Endwand eine Wandstärke hat, die an der Dichtung um 20 - 50 % reduziert ist,

daß die Kappe auf 50 - 110° C erwärmt wird und

daß die elektro-magnetische Energie eine Frequenz von 10 - 200 MHz hat.

2. Verfahren nach Anspruch 1,

dadurch gekennzeichnet,

daß es in einer Weise durchgeführt wird, daß die innere Hinterschneidung (3) im Querschnitt verjüngt und nachgiebig ist und einen größten Durchmesser besitzt, um das Abdichten der Dichtung (5) auf dem Rand des Behälterhalsses (1) zum Teil in Kombination mit der Hinterschneidung (3) zu bewirken.

3. Verfahren nach Anspruch 1 oder 2,

dadurch gekennzeichnet,

daß es in einer Weise durchgeführt wird, daß der Innendurchmesser der Verschlusskappe (10) bis 100 mm beträgt.

Revendications

1. Un procédé de fabrication d'une capsule de bouchage (2) pour un récipient (1), faite en polypropylène et comprenant une paroi d'extrémité et une paroi latérale périphérique, la capsule comprenant un dispositif antiviol (12, 13), la capsule (2) étant munie d'un joint (5) fait en une matière de plastisol agencé pour faire étanchéité sur la bordure du col (14) du récipient, la capsule (2) étant obtenue en partant d'une combinaison de la capsule de bouchage (2) avec le dispositif antiviol (12, 13) et en ajoutant une quantité de la matière de plastisol, le joint (5) étant formé en chauffant la capsule de bouchage (2), après addition du plastisol, jusqu'à une température choisie et en exposant ultérieurement le plastisol résultant, façonné suivant la configuration de joint (5), à une énergie électromagnétique jusqu'à ce que le plastisol soit complètement fluidifié, le dispositif antiviol (12, 13) étant conçu sous forme d'une bande de garantie (13) par laquelle le récipient (1) peut être fermé de manière pouvant être rendue étanche en conjonction avec un collet de verrouillage (17) disposé autour du col (14) du récipient (1), ladite bande de garantie (13) étant reliée

d'une seule pièce à la paroi latérale de la capsule de bouchage (2) par l'intermédiaire de ponts cassables (12) capables d'être rompus à la première ouverture du récipient (1), lesdits ponts cassables (12) s'étendant dans la direction axiale de la capsule de bouchage (2), la paroi d'extrémité étant munie intérieurement d'un espace annulaire limité par une contre-dépouille externe (4), la matière de plastisol étant ajoutée à cet espace annulaire,

caractérisé en ce que

ledit espace est également limité par une contre-dépouille interne (3),

la paroi d'extrémité a une épaisseur de paroi diminuée de 20-50% au joint,

le chauffage de la capsule est à une température de 50-110°C et

l'énergie électromagnétique a une fréquence de 10-200 MHz.

2. Le procédé de la revendication 1,

caractérisé en ce que

le procédé est mis en oeuvre de telle manière que la contre-dépouille interne (3) est conique en section transversale et résiliente et a un diamètre plus grand pour avoir le scellement du joint (5) sur le bord du col du récipient (1) partiellement en combinaison avec ladite contre-dépouille (3).

3. Le procédé de la revendication 1 ou 2,

caractérisé en ce que

le procédé est mis en oeuvre de telle manière que le diamètre intérieur de la capsule de bouchage (10) soit jusqu'à 100 mm.

