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54 **LID FOR A CONTAINER.**

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## Description

The invention relates to a container with a lid of the kind indicated in the preamble of claim 1.

5 Plastic lids of this kind are used for closing containers, preferably plastic containers, which on the outside below the rim have a wholly or partly encircling flange for securing the lid.

Such lids normally have to fit closely and it is demanded that it should be possible to remove the lid without recourse to tools. Furthermore the lid has to be designed in such a way that it may be put back in place in order for the container to be reclosed. It must be possible to open and reclose the container a certain number of times until the container is empty, without reduction of the strength and tightness.

10 Several container lids are known by which the above mentioned qualities are aimed at, f. inst. from DK - B- 145.194 and 154.549.

The object of the invention is to indicate a container with a lid of the above mentioned kind in which the desired qualities with regard to tightness and reclosability are achieved in a new way without risk of undesired by-effects.

15 This object will be achieved by designing the container with a lid according to the invention as indicated in the characterizing part of claim 1. By dividing the flange of the lid into at least three encircling areas the opening and the reclosing is made possible without stretching the flange of the lid in the area of the edge. The opening and closing is effected by a movement in a vertical direction, i. e. in the axial direction of the container so that the edge of the flange will not be stretched resulting in a very great annular tension, as is often the case in the conventional constructions. Especially in the case of reclosing, the special advantages of the invention are remarkable, as the stretching of the outer edge of the lid is avoided immediately before the flange is to engage with the locking rim of the container.

20 The container with a lid according to the invention is easy to produce and the lid flange functions as a kind of multi hinge. It is generally known to produce easily bendable areas by narrowing down the thickness of material in such a way that a weakened area is created, f. inst. if the lid is injection molded from polypropylene or similar plastic materials.

It is obvious for a person skilled in the art that the easily bendable areas or parts can be made or produced in other ways, f. inst. by reducing the stiffness of the material by perforations or similar means, but they are preferably produced by reducing the thickness of the material.

30 By designing the container with a lid according to the invention, it is rendered possible to remove the lid by a comparatively small movement of the encircling, downwards protruding flange of the lid and with a correspondingly small bending of the weakened areas. Besides, mounting and remounting of the lid on the container is possible without any substantial deformation of the lid, so that the desired complete tightness is achieved immediately.

35 By designing the container with a lid according to the invention as indicated in the characterizing part of claim 2, an embodiment of the weakened areas is achieved which assists in making the flange parts move as desired and in such a way that the lower flange part substantially forms the same angle to the plane of the lid, both when the lid is removed and when it is on and during the intervening movement.

40 If the container with a lid is designed as indicated in the characterizing part of claim 3, the outer part of the flange of the lid will rock a little outwards at the outer weakened area, i. e. approximately at the middle of the lid flange or the jacket, and this further assists in facilitating the removal of the lid. The locking bead of the lid only has to be free of the outer edge of the container flange for the lid to be removed freely.

45 If the container with a lid according to the invention is designed as indicated in the characterizing part of claim 4, it is achieved that one of the weakened areas is situated exactly where the moment is the greatest during the removal of the lid, and the encircling upper edge of the lid will also be moved a little upwards during the removal of the lid so that the necessary movement of the flange of the lid will be distributed to all the parts. Hereby the removal of the lid is facilitated and simplified.

The invention is explained further in relation to the drawing, in which

50 fig. 1 shows the upper part of a known container with a lid, partly as a side view and partly as a sectional view,

fig. 2 is a radial part section through the edge of the known container and the lid on a larger scale,

fig. 3 is a radial part section through the edge of a container and a lid according to the invention, and

fig. 4 shows the same as fig. 3, but with the lid free of the container.

55 In fig. 1 a container lid 1 is put on a plastic container 2 which has an encircling, annular flange 5, which is engaging the flange of the lid which in the embodiment shown comprises two encircling flange parts 8 and 9, the lower flange part having an internal encircling locking bead 10 which may be snapped under the lower edge of the container flange.

The function of the container with a lid is explained more closely in the following with reference to fig. 2

which shows a radial part section through the edge on a larger scale. Fig. 2 shows in a full line the container lid on the container 2 and in a dot-dash-dot line the container lid when the flange is free of the container.

The container 2 comprises a comparatively sharp sealing edge 3 at the mouth of the container, and an annular flange 5 below this which is cast integral with the container and which flange is terminated downwards by a locking edge 6. To impart a suitable stiffness to the flange 5, evenly spaced radial ribs 14 are cast integral with the container.

A container lid 1 of elastically deformable plastic has an encircling flange part which comprises an upper edge part 7 and in continuation hereof two flange parts, i. e. an upper flange part 8 and a lower flange part 9, connected by narrowed down parts or weakened lines 11, 12. The lid is injection molded as an integral unit.

The edge area 6 is provided with a downwards turned, axial guiding rib 4 which is contacting the outer surface of the container, and which together with the part of the container lid 1, which is contacting the inner surface of the container, forms the closure and seal between the lid and the container.

The upper narrowed down part 11 is formed from the inside, so that the upwards turned sealing edge area has an even, smooth surface, and the lower narrowed down part 12 is formed from the outside as shown in the drawing. The lower flange part 9 ends in a peripheral terminal edge 13 which is rounded and, as shown, turned slightly outwards so that it forms a gripping edge which is easy to grip with the fingers when the lid has to be removed.

The area between the edge part 7 and the part of the container lid, which is placed inside the container, preferably has a rounded edge 15. Hereby the area 15 may be used during the removal of the lid, as f. inst. the thumb is placed against the area 15 and the rest of the fingers are gripping under the edge 13 of the lid. The edge of the lid is then lifted so that the locking bead 10 is freed from the flange edge 6 and the lid is slipped from the position, which is shown in a full line, to the position, which is shown in a dot-and-dash line. This parallel displacement of the flange of the lid results in that only the upper flange part 8 and the two weakened lines 11 and 12 are deformed. The lower flange part 9 is by and large not deformed, neither when opening the lid, nor when closing it. Stretching of the edge area 13 during the closing proces is hereby avoided, and the annular tension built into the flange part 9 is preserved fully so that the locking bead 10 will engage the locking edge 6 without problems.

Both during opening and reclosing of the container lid the angle  $\alpha$  between the lower flange part and the plane of the lid is maintained, while the part of the flange, which is constituted by the upper flange part 8, rocks around the weakened line 11. The upper flange part 8, however, has no other purpose than to function as a kind of double hinge, as the tightening and securing of the lid is established by other parts of the container lid. In this way the tightening, rocking and securing of the lid has been distributed to different parts of the edge of the lid. This makes it possible to maintain the qualities of the lid even after having opened and closed it repeatedly.

Figs. 3 and 4 show the container with a lid according to the invention.

The lid flange is divided into three encircling, annular areas; a first substantially radially extending encircling area 8, a second substantially axially extending encircling area 16 and a third substantially axially extending encircling area 9. The lid flange is connected to the lid edge to edge by a first encircling weakened area 11' and the annular flange areas are connected edge to edge to each other by a second 17 and a third 12 weakened area, as shown in figs. 3 and 4.

The flange of the lid is in this embodiment divided into three encircling areas. I. e. in one substantially radial area 8 and two areas 9 and 16 which are substantially axial in relation to the container 2. The three areas are hinged together and hinged to the edge part 7 of the lid proper 1 by means of intergral hinges or encircling weakened areas, 11', 17, 12, of which the weakened areas closest to the lid proper, i. e. 11' and 17, are formed on the surface of the flange of the lid which is turned inwards towards the container, and the outermost weakened area 12 is formed on the outwards turned surface of the flange of the lid.

Otherwise the same references have been applied as in the previous figures.

Fig. 3 shows that the flange of the lid during the removal of the container lid makes a much smaller movement than shown in fig. 2, as the movement is distributed among all three encircling parts. As soon as the bead 10 has been shifted to the upper side of the locking edge 5 the lid may be freely removed.

Fig. 4 shows the lid free of the container 2. The lid is molded in this shape and therefore fig. 4 also shows the lid during its application. The lid is snapped on the container 2 by pressing the upper surface of the lid lightly, as the locking bead 10 without violent deformations or great increases of the annular tension in the bead 10 is pushed down under the locking edge 6, thereby ensuring full tightness immediately after the mounting of the lid.

It is apparent from figs. 3 and 4 that the narrowed down part 11' is placed where the moment in the flange of the lid will be the greatest when the lid is actuated for removal, i. e. as close to the reinforcement rib 4 as possible.

Furthermore, it is apparent from fig. 3 that no regular parallel displacement of the outer flange part 9 takes place, but that the flange part is rocked slightly outwards during the removal which helps to reduce the energy consumption required to lift the locking bead 10 free of the locking edge 6. This is achieved without on the other hand making the lid too easily removable, f. inst. due to shock impacts or during transport.

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### Claims

1. Container with a lid (1) of elastic, deformable plastic, the mouth of said container having a rim (3) which is provided with an external container flange (5) pointing in the opposite direction relatively to the mouth of the container said lid (1) having an encircling lid flange (8, 9, 16) which is designed to engage around the external container flange (5) of the mouth of a container (2), the lid flange clasp the container flange under tension when the lid is mounted on the container, and the lid having an encircling reinforcement rib (4) which is placed axially extending at the underside of the lid are arranged so as to clasp the rim (3) of the mouth of the container on the outside thereof, **characterized** in the combination of
  - a) the container lid flange being divided into at least three encircling, annular areas (8, 9, 16) comprising a first substantially radially extending encircling area (8), a second substantially axially extending encircling area (16) and a third substantially axially extending encircling area (9) which are connected to the container lid edge to edge by a first encircling weakened area (11') and to each other by a second (17) and a third (12) encircling weakened area;
  - b) the third encircling area (9) having an encircling, inwards turned locking bead (10) which is placed in the vicinity of that edge of the encircling area which is opposite the weakened area (12) which connects the third encircling area (9) with the second encircling area, and
  - c) the first weakened area (11') being provided immediately outside the encircling reinforcement rib (4).
2. Container with a lid according to claim 1, **characterized** in that the first encircling weakened area (11') is formed on the inside of the lid flange.
3. Container with a lid according to claim 1 or 2, **characterized** in that the third encircling weakened area (12) is formed on the outside of the lid flange.
4. Container with a lid according to claim 1 and in which the lid flange, when the lid (1) is mounted on the container (2), comprises a first substantially radial, encircling area (8) and a second and a third substantially axial, encircling area (9, 16), **characterized** in that the inwards turned first and second weakened areas (11', 17) are placed in the radial area and in the connecting area between the radial and the axial areas.

### Patentansprüche

1. Behälter mit einem Deckel (1) aus elastischem deformierbarem Plastikmaterial wobei die Öffnung des Behälters einen Ringansatz (3) aufweist, der mit einem äußeren Behälterflansch (5) versehen ist, der bezüglich der Behälteröffnung in die entgegengesetzte Richtung zeigt, wobei der Deckel (1) einen umlaufenden Deckelflansch (8,9,16) aufweist, der dafür ausgebildet ist, den äußeren Behälterflansch (5) der Behälteröffnung (2) zu umgreifen, wobei der Deckelflansch den Behälterflansch unter Spannung umklammert, wenn der Deckel auf dem Behälter angebracht ist, und wobei der Deckel eine umlaufende Versteifungsrippe (4) aufweist, die axial verlaufend an der Unterseite des Deckels angeordnet und so angebracht ist, daß sie den Ringansatz (3) der Behälteröffnung an dessen Außenseite umklammert, gekennzeichnet durch die Kombination, daß
  - a) der Behälterdeckel geteilt ist in wenigstens drei umlaufende ringförmige Bereiche (8,9,16), die einen ersten, sich im wesentlichen in radialer Richtung erstreckenden, umlaufenden Bereich (8), einen zweiten, sich im wesentlichen in axialer Richtung erstreckenden, umlaufenden Bereich (16) und einen dritten, sich im wesentlichen in axialer Richtung erstreckenden, umlaufenden Bereich (9) umfassen, die mit dem Behälterdeckel Kante an Kante durch einen ersten, umlaufenden, verjüngten Abschnitt (11') und untereinander durch einen zweiten (17) und dritten (12), umlaufenden, verjüngten Abschnitt verbunden sind;

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- b) der dritte umlaufende Bereich (9) einen umlaufenden, nach innen gerichteten Schließwulst (10) aufweist, der in der Nähe der Kante des umlaufenden Bereichs angeordnet ist, die dem verjüngten Abschnitt (12) gegenüberliegt, der den dritten umlaufenden Bereich (9) mit dem zweiten umlaufenden Bereich verbindet, und
- 5 c) der erste verjüngte Abschnitt (11') unmittelbar an der Außenseite der umlaufenden Versteifungsrippe (4) vorgesehen ist.
2. Behälter mit einem Deckel nach Anspruch 1, dadurch gekennzeichnet, daß der erste, umlaufende, verjüngte Abschnitt (11') in die Innenseite des Deckelflansches geformt ist.
- 10 3. Behälter mit einem Deckel nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der dritte, umlaufende, verjüngte Abschnitt (12) in die Außenseite des Deckelflansches geformt ist.
- 15 4. Behälter mit einem Deckel nach Anspruch 1 und in dem der Deckelflansch, wenn der Deckel (1) auf dem Behälter (2) angebracht ist, einen ersten, im wesentlichen radial verlaufenden, umlaufenden Bereich (8) sowie einen zweiten und einen dritten, im wesentlich axial verlaufenden, umlaufenden Bereich (9,16) umfaßt, dadurch gekennzeichnet, daß die nach innen gerichteten ersten und zweiten verjüngten Abschnitte (11',17) in dem radial verlaufenden Bereich und in dem Verbindungsabschnitt zwischen den radial verlaufenden und axial verlaufenden Bereichen angeordnet sind.
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### Revendications

1. Récipient pourvu d'un couvercle (1) en matière plastique élastique, déformable, l'ouverture dudit récipient ayant un rebord (3) qui est pourvu d'une collerette extérieure (5) de récipient tournée dans le sens opposé par rapport à l'ouverture du récipient, ledit couvercle (1) étant encerclé d'une collerette (8, 9, 16) de couvercle qui est conçue pour s'engager autour de la collerette extérieure (5) de l'ouverture d'un récipient (2), la collerette du couvercle agrafant la collerette du récipient sous tension lorsque le couvercle est monté sur le récipient, et le couvercle étant encerclé d'une nervure (4) de renfort qui est placée axialement en saillie à la face inférieure du couvercle et qui est agencée de façon àagrafer le rebord (3) de l'ouverture du récipient sur son côté extérieur, caractérisé en ce que, en combinaison,
- 25 a) la collerette du couvercle du récipient est divisée en au moins trois zones annulaires, encerclantes (8, 9, 16), comprenant une première zone encerclante (8) s'étendant sensiblement radialement, une deuxième zone encerclante (16) s'étendant sensiblement axialement et une troisième zone encerclante (9) s'étendant sensiblement axialement, qui sont reliées bord à bord au couvercle du récipient par une première zone encerclante affaiblie (11') et, entre elles, par des deuxième (17) et troisième (12) zones encerclantes affaiblies ;
- 30 b) la troisième zone encerclante (9) comporte un talon encerclant (10) de verrouillage, tournée vers l'intérieur, qui est placé au voisinage du bord de la zone encerclante qui est opposé à la zone affaiblie (12) qui relie la troisième zone encerclante (9) à la deuxième zone encerclante, et
- 35 c) la première zone affaible (11') est prévue immédiatement à l'extérieur de la nervure encerclante (4) de renfort.
2. Récipient pourvu d'un couvercle selon la revendication 1, caractérisé en ce que la première zone encerclante affaible (11') est formée sur le côté intérieur de la collerette du couvercle.
- 40 3. Récipient pourvu d'un couvercle selon la revendication 1 ou 2, caractérisé en ce que la troisième zone encerclante affaible (12) est formée sur le côté extérieur de la collerette du couvercle.
4. Récipient pourvu d'un couvercle selon la revendication 1 et dans lequel la collerette du couvercle, lorsque le couvercle (1) est monté sur le récipient (2), comporte une première zone encerclante sensiblement radiale (8) et des deuxième et troisième zones encerclantes sensiblement axiales (9, 16), caractérisé en ce que les première et troisième zones affaibles (11', 17), tournées vers l'intérieur, sont placées dans la zone radiale et dans la zone de liaison entre les zones radiale et axiales.
- 50

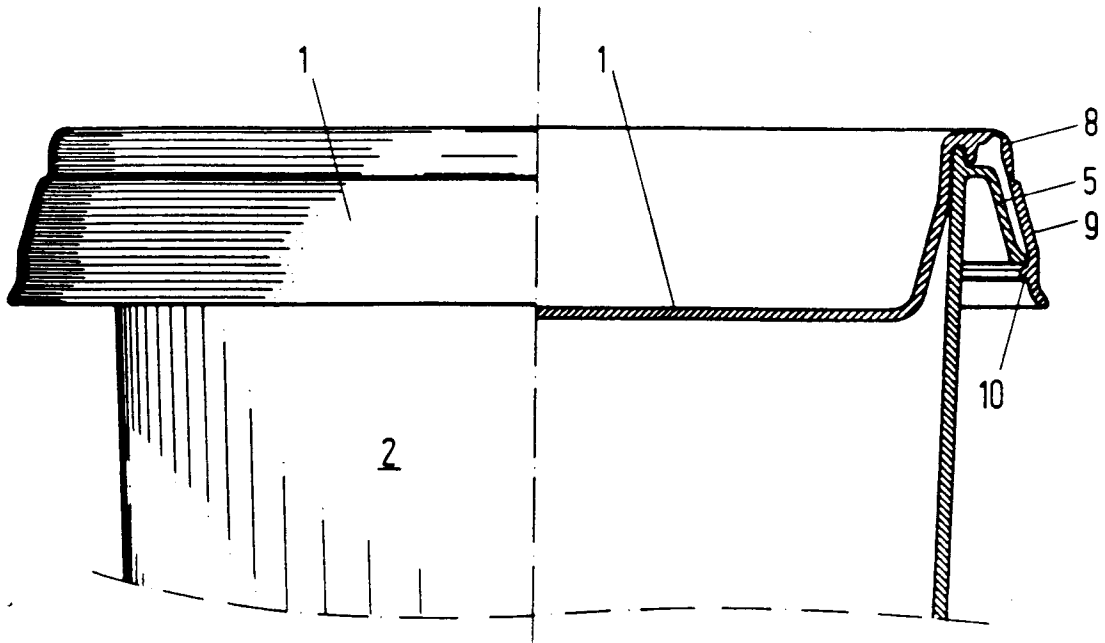


Fig. 1

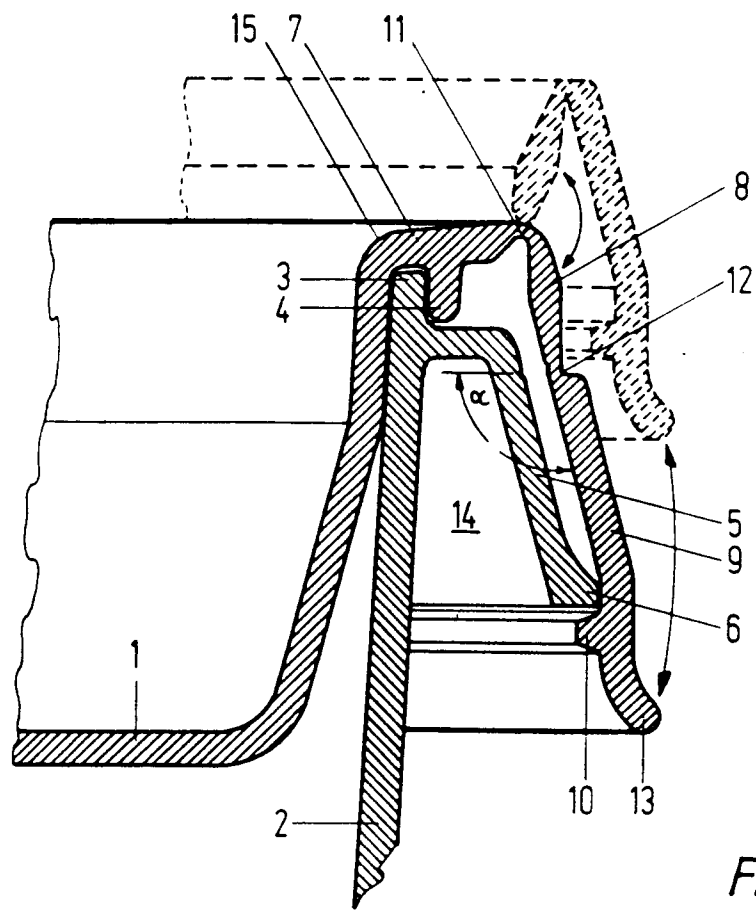


Fig. 2

