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(54) Benævnelse: **Lågring med skrånende, fladt mellemstykke og fremstillingsfremgangsmåde**

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Description

[0001] The invention relates to a specific shaping of a lid ring for optimising the action of force of the closure layer, which acts as an archable membrane, the action of force being optimised in a bonding strip (preferably a sealing strip) in order to increase the load capacity of the seam (strip) with respect to an existing internal pressure in a closed package. Other actions of force can also be better absorbed.

[0002] In a claimed method for manufacturing, the lid ring is at first sealed with the closure layer (claim 16), which is supplied in this prefabricated form and the body is filled with the products at the filling plant in order to subsequently cover it jointly with the lid ring and the sealed closure layer and then to form the double seam at the edge.

[0003] Starting from the conventional design of a lid ring – see for example EP 408 268 A (CMB) or WO 1997/49510 A (Impress), Fig. 4 thereof, or GB 2 022 474 A (Swiss Aluminium), which comprises a lid rim externally and a horizontally orientated flat web internally – the hold (the bonding) of a membrane-like sealing film sealed onto this flat web is to be improved. In the normal state, the lid ring is at first closed internally with the sealing film (foil). A continuous sealing seam of a specific width is thus formed, which extends considerably on the flat web. The retaining forces for the closure layer are created here, which closure layer is slightly arched by a developing internal pressure, stressing the sealing seam at the bonding site starting from the inside in a notch-like manner, but preferably not so highly or strongly that a limit of cohesive forces is exceeded.

[0004] Inclined lid rims have also become known in other prior art thus far, in push-in lids, see DE 28 30 614 A (Officine Monfalconese) or WO 2000/21840 A (Brasilata Metallicas). EP 683 110 A (CarnaudMetalbox) shows a generic lid ring and in Fig. 6 and Fig. 7 two alternatives with different inner forms at the flat web, a triangular form ("curl") and a flat form ("flattened to a fold"), see page 4 thereof, lines 27 to 41.

[0005] The invention starts **from the technical problem** of increasing a retaining force on the flat web without having to implement additional changes in the consistency or strength or width of the sealing seam.

[0006] The invention suggests not orientating the flat web substantially horizontally, but having it extend in an inclined fashion at an angle, the plane which results when a closure layer is sealed on being used as the reference plane. As a result, the flat web is angled upwards, a broad range of angles is possible at first, between above 10° and up to substantially 90° based on said plane. In this instance, the closure layer has to be sealed already, so that the closure layer hypothetically acts as a measure for evaluation of which plane is used as comparative plane. This plane can also (claim 1) be considered as a "horizontal" if the lid ring is placed on a surface.

[0007] Ranges of the angular extension (of the inclined extension) of the flat web are preferably above 10°, in the range between 25° and 35° and between 40° and 60° or else substantially perpendicular or between 80° and 90° (claim 3).

[0008] If the flat web is inclined, a wedge-shaped groove is formed between a circumferential wall which, in its capacity as the chuck wall (Kernwand), leads to the lid border, and the inclined flat web. This wedge-shaped design has two walls that do not extend in parallel and a rounded base region which extends as a groove and forms the lowermost point of the lid ring, viewed in the axial direction (claim 7).

[0009] The lid border is a structure which extends peripherally, arches outwards and downwards, and is adapted for seaming the lid ring onto a body hook of a body. A double seam can be used as the seam.

[0010] Mostly, the lid ring is at first sealed with the closure layer (claim 16), which is supplied in this prefabricated form, and the body is filled with the products to be packaged at the filling plant in order to subsequently cover it jointly with the lid ring and the sealed closure layer and then to form the double seam at the edge.

[0011] At least one or more tabs may be provided at a suitable point on the edge of the closure layer, which tabs can be used to peel off and start to undo the sealing seam at this point. The entire sealing seam is continuously undone over the circumference and opens the inner space in order to grant access to the packaged product.

[0012] A rolling of the edge is provided on the inner face of the flat web, which is orientated in an inclined manner. It forms a deflection point for the closure layer, which is orientated from this inner roll in a planar position (without stress due to internal pressure), whereas the edge of this closure layer is inclined in accordance with the orientation of the flat web and extends thereon over the sealing seam (the bonding strip or sealing strip) in a peelably attached manner. Owing to the deflection, pressure forces inside the closed container, which act on the closure layer, are converted at least in part into forces which form as tensile forces in the extension direction of the sealing seam (of the sealing strip). A substantially greater force can be applied in this direction, since the entire width of the sealing seam withstands this tensile force. Pure tensile forces which are formed perpendicular to the sealing strip and which, for example, are present during the peeling-off or opening of the closure can be reduced for the closed state. As a result it is possible to delay the moment in time at which the cohesive effect of the sealing strip breaks, the so-called cohesive failure, which, instead of being at 25 N, can be shifted to higher ranges, up to 40 N. In the case of substantially 90°, 50 N may even be achieved before failure.

[0013] Metal films, but also plastics films, which are sealed in the edge region can be used as a closure layer. Compound films (a plurality of layers) or metallised films are likewise possible and are to be sealed on (claims 12 to 15).

[0014] An additionally applied sealing strip on the flat web provides a sealing surface if a metal closure layer is used as the film (claim 13). The sealing strip has a substantial width, which amounts to more than half, preferably substantially the entire extension, of the flat web (claim 11).

[0015] If a flat web orientated substantially perpendicular (to the horizontal plane of the closure layer) is used, the internal edge roll can even project axially above the upper face of the edge border for the seaming joint.

[0016] **Embodiments** explain and supplement the invention.

Fig. 1 illustrates a detail from a lid ring which is shown in an axial section;

Fig. 2 illustrates an alternative embodiment with a differently inclined flat web;

Fig. 3 illustrates a third embodiment with a flat web which again is differently inclined, and in this instance again extends with an even flatter inclination;

Figs 4a and 4b illustrate differences between tensile forces and shear forces with a pressure load from the interior onto the inner face of the closure layer 1, the pressure load being denoted as F_i.

[0017] **Fig. 1** shows a detail of a lid ring which is closed with a film 1 in the closed state, which film may be present in one of many alternative forms, i.e. it can be made of plastics material or metal or a composite of such layers.

[0018] An edge border 2 is provided in the edge region of the lid closed by the film, and is substantially U-shaped. A U-shaped design with a different orientation is found in a groove N_1 which is formed between the inner wall of the edge border as the chuck wall and a flat web 3a which extends upwards. The edge region of the closure layer 1 is closed with a sealing layer (not shown separately in this instance) on the axial outer face of the flat web. With regard to the design of the sealing layer reference is made by way of example to **Fig. 4b**, which shows this sealing layer 30 as an adhesive layer, for example formed of adhesive or another suitable, adhesive and food-compatible material.

[0019] The body is symbolically shown as a trough 20 which has an obliquely projecting edge 21 over which, upon closing, the lid rim 2 is pulled in order to be subsequently converted into a double seam by a closing machine and a seaming roller so as to seal the body 20. The container wall 22 of the body is shown projecting perpendicularly, and defines the height of the volume of the body 20 to be received.

[0020] An inner roll 4 is provided on the inner face of the flat web 3a, the exact form of which roll can also be inferred from **Figs 4a and 4b**. It avoids risks of cutting and provides a deflection u of the closure layer 1 between a sealing portion in the edge region 1b thereof and a plane portion which projects above the entire inner space within the edge border 4 in a self-supported manner and seals said inner space.

[0021] The inclination of the flat web 3a is given as approximately 90° as the angle α_1 in the embodiment of **Fig. 1**. The flat web is thus orientated substantially perpendicular to the plane which is given by the inner region of the closure layer 1. In this example the inner rim 4 projects axially slightly beyond the upper face of the external edge border 2, in such a way that the closure layer 1 projects upwards beyond this outer face.

[0022] An alternative inclination α_2 is shown for the flat web 3b in **Fig. 2**. This angle lies in the range between 40° and 60°, orientated by the described plane of the membrane 1 which is drawn very thin in this instance with the thickness d. The sheet metal in the lid ring is designed to be thicker than the thickness of this closure layer 1, in such a way that the shaped geometries are maintained during normal use with the exception of the reshaping of the lid edge 2 when forming the seamed joint with the body hook 21 of the body 20.

[0023] The inclination α_2 drawn in **Fig. 2**, which is smaller than in **Fig. 1** based on the flat web 3b, results in another cross-sectional shape of the circumferential groove N_2 which extends substantially in a wedge-shaped manner and has a rounded groove base. This groove base forms the lowermost point of the lid ring which, as such, can be round, oval, elongate oval or rectangular in shape with slightly rounded inner corners, the formation of an inner roll 4 also being made possible in these inner corner regions.

[0024] Another further design is shown in **Fig. 3**, where a flatter orientation α_3 of the flat web 3c is selected in the range between 25° and 35°. All other features of the preceding description of **Fig. 2** are also satisfied. In this case, too, the inner roll 4 serves as a deflection point for the membrane in the region between the sealing point 30, 1b, which extends peripherally, and the inner face for covering the opening inside the inner roll 4.

[0025] The angle α_3 can be further reduced in further designs, which are not shown separately, to about 10°, but should be above 0° and thereby provide an inclined (oblique) design with respect to the described plane of the closure membrane 1.

[0026] Owing to the different orientation of the flat web, which as its name suggests is not horizontally orientated, but is flat over a clear width in order to produce a flat sealing strip onto which the membrane can be attached sufficiently well and tightly, there are different designs for the shape of the peripheral groove N2, N3, with a more planar wall extending inwards in each case, but with a substantially equal slope of the chuck wall towards the edge border 2.

[0027] Owing to the inclination of the flat web, which is shown in an exemplary manner by way of examples α_1 and α_3, a system according to **Fig. 4b** is obtained. An internal pressure on the self-supporting inner face of the membrane 1 is deflected by the inner rim 4 and provides a tensile force in the sealing region of the sealing strip 30. The entire width of the sealing strip 30, the section of which is illustrated in **Fig. 4b**, can withstand this tensile force z, and more specifically can withstand it better than if a horizontal orientation of the flat web according to **Fig. 4a** were selected. The compressive force F_i acts on the membrane 1 in such a way that a notch effect x is formed at the point 31 of the sealing strip 30 due to a perpendicular tensile force X, which, due to the forces applied substantially perpendicular to the extension of the sealing strip 30, results in a loss of the cohesive effect and thus in a cohesive failure more easily than was described in **Fig. 4b**.

[0028] The greater the inclination of the flat web 3, the greater the conversion of the forces extending perpendicular to the sealing strip 30 according to **Fig. 4a** into forces which may be known as "shear forces" per se. Peeling forces (perpendicular tensile forces) are converted into forces, extending parallel to the sealing strip 30, which forces can be better absorbed by the entire width of the sealing strip 30 according to **Fig. 4b** than the tensile forces X according to **Fig. 4a**, which have a notch effect.

P A T E N T K R A V

1. Lågring til falsning på et legeme (20) og med et på randsiden derpå forseglet lukkeleje (1), som danner bro over et indre rum af lågringen, og i den derpå falsede tilstand lukker legemet (20), hvor

(i). lågringen omfatter et omløbende fladt mellemstykke (3a, 3b, 3c), som rdialt udadtil går over i en omløbende randkantning (2) af lågringen, hvor der mellem randkantningen og det flade mellemstykke forløber en omløbende not (N_1, N_2, N_3),

k e n d e t e g n e t ved, at

(ii). det flade mellemstykke forløber sådan skrånende opad fra et horisontalt plan, og er sådan forsynet med en inderrunding (4) ved sin radialt inderste ende, at et på det flade mellemstykke forseglet (30) lukkeleje (1) vendes ved inderrundingen (4), og at ved en trykkraft (F_i) vinkelret på udstrækningsplanet af lukkelejet (1) vendes en væsentlig kraftkomponent (z) over inderrundingen (4) og indledes sådan i forseglingssømmen (30), at den forløber i udstrækningsretningen af forseglingssømmen, og at en kohæsionsvirkning af forseglingssømmen (30) overføres til højere områder end 25 N til 40 N.

2. Lågring ifølge krav 1, hvor det flade mellemstykke tjener til forseglingen på randen af lukkelejet (1) og i forhold til et horisontalt plan forløber i en vinkel ($\alpha 3$) på mellem i det væsentlige 25° og 35°.

3. Lågring ifølge krav 1, hvor vinklen ($\alpha 1$, $\alpha 2$, $\alpha 3$) ligger på mellem i det væsentlige 10° og i det væsentlige 90°, navnlig mellem i det væsentlige 40° og 60° eller mellem i det væsentlige 25° og 35° eller mellem i det væsentlige 80° og 90°.

4. Lågring ifølge krav 1, hvor lukkelejet er forseglet på det flade mellemstykke (3a, 3b, 3c) over en rand af lukkelejet (1) og over en periferisk forløbende forseglingsstrimmel (30).

5. Lågring ifølge krav 1, hvor forseglingssømmen (30) er en hæftestrimmel.

6. Lågring ifølge krav 3, hvor kohæsionsvirkningen ved i det væsentlige 90° udstrækker sig indtil 50 N.

7. Lågring ifølge krav 1, hvor den omløbende not (N_1, N_2, N_3) er kileformet, og to ikke-parallelle vægge af kileformen er dannet af det skrånende, flade mellemstykke (3c) og en omløbende væg, der som kernevæg fører til randkantningen (2), og der er tilvejebragt et afrundet bundområde, der som bestanddel af den omløbende not set i aksial retning danner det dybeste sted af lågringen.

8. Lågring ifølge krav 7, hvor randkantningen (2) af lågringen er en struktur, som hvælver sig udadtil og nedadtil, og er egnet til falsning på en legemshage (21) af et beholderlegeme.

9. Lågring ifølge et foregående krav 1 til 6, hvor noten (N_1, N_2, N_3) omfatter en kileformet udformning med en afrundet bund, og er udformet mellem en kernevæg til låg-

kantningen (2) og det skrånende anbragte flade mellemstykke (3a, 3b, 3c).

10. Lågring ifølge et foregående krav, hvor lukkelejet forløber over inderrundingen (4) og derved bliver vendt (u) således, at der danner sig en randstrimmel (1b), som forløber i en vinkel forskellig fra nul i forhold til planet af lukkelejet (1) i inderområdet af lågringen.

11. Lågring ifølge et foregående krav, hvor forseglingssømmen (30) som en periferisk forløbende strimmel omfatter en væsentlig bredde på udstrækningen af det flade mellemstykke (3a, 3b, 3c), hvilken bredde er mere end halvdelen af en bredde af det flade mellemstykke.

12. Lågring ifølge et foregående krav, hvor lukkelejet er en folie af en metalfolie eller en kompositfolie som en lagdelt komposit.

13. Lågring ifølge ét af kravene 1 til 11, hvor lukkelejet (1) er en metallisk folie med en ekstra påført forseglingsstrimmel (30).

14. Lågring ifølge ét af kravene 1 til 11, hvor lukkelejet (1) er en kompositfolie ud af flere lejer eller lag.

15. Lågring ifølge ét af kravene 1 til 11, hvor lukkelejet er en metalliseret folie.

16. Fremgangsmåde til fremstilling af et låg ud af lågring og derpå forseglet lukkeleje (1), hvor lågringen forsegles med en lukkefolie og leveres i denne præfabrikerede form for ved fyldning at afdække et med påfyldningsmateriale fyldt legeme (20) og ved lågranden at udforme en dobbelt fals, hvor lågringen har en facon ifølge ét af de foregående krav.

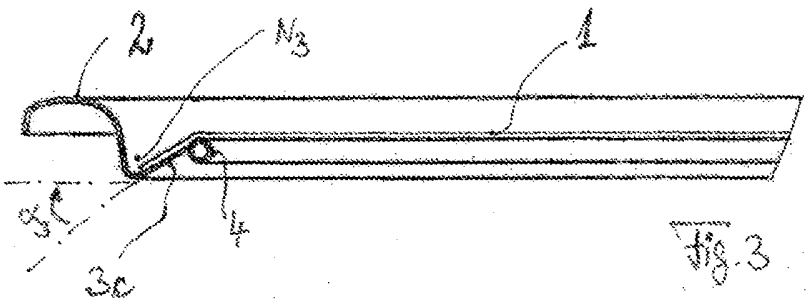

Fig.3

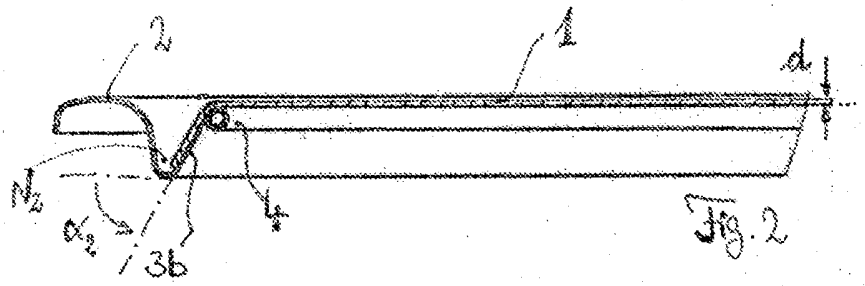

Fig.2

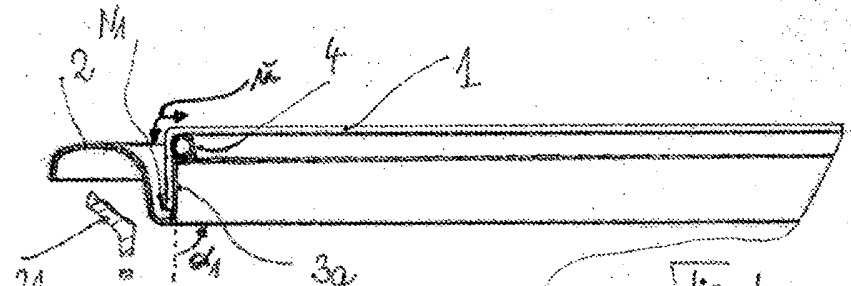

Fig.1

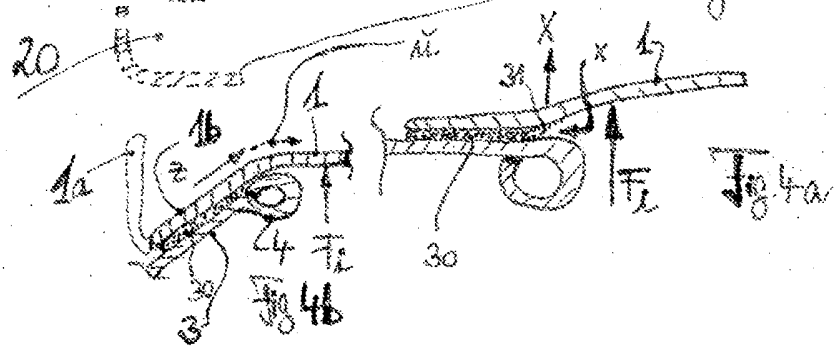

Fig.4a

Fig.4b