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(54) Cover for a container with bent top edge

Deckel für einen Behälter mit gebogenem Umfangsrand

Couvercle pour un récipient ayant le bord supérieur plié

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Description

The invention relates to a cover for sealing a container which is bounded at the top side by an outward bent top edge, said cover being provided along the periphery with a downward opening groove which encloses the top edge and is bounded by an outside wall, an inside wall, and a top wall connecting said walls.

Such a cover is known from Patent Specification No. NL 162555. In this cover the entire inner surface of the groove walls is in contact with the outward bent top edge when the container is closed.

A disadvantage of this known construction is that considerable friction must be overcome for opening and closing of the cover, and that the material of groove and edge is exposed to considerable deformations, with the result that, after opening and closing a certain number of times, these parts can lose their shape and resilience, so that the sealing action is lost. On the other hand, an outward bent top edge is advantageous for a good sealing effect.

The object of the invention is to provide a cover in which the abovementioned disadvantage is eliminated or is found to a substantially lesser extent, but which cover does guarantee a good seal.

This object is achieved according to the invention through the fact that the width of the groove at the position of the top wall is less than the deflection of the top edge of the container, and in that the surface of the groove walls which adjoins the groove consists of a layer of an elastomeric material being another material than that of the rest of the cover which layer is firmly connected to said groove walls.

When the container is closed, the cover according to the invention, as a result of the abovementioned features, seals the container along two continuous lines running along the entire periphery of the top edge, one of the lines being situated along the outer periphery of the edge, and the other along the inner periphery. If forces are now exerted on the edge of the cover in a direction which would lead to the seal along one of the two abovementioned lines becoming looser, said force will in general contribute towards the other actually being pressed down more forcefully. The cover consequently continues to seal the container, even if forces are exerted on the cover, and the sealing effect remains largely unaffected when cover and container are deformed. This effect is significantly reinforced through the fact that the insides of the walls of the groove are made of an elastic material, and consequently the forces arising through the fact that the groove is narrower than the deflection of the top edge of the container to some extent produce a certain compression of the elastic material and an improved seal. Due to the fact that the inner surface of the groove is in contact with the top edge only along two peripheral lines or, through the compression of the elastic material, along narrow bands, the friction occurring when the cover is being put on or removed is also considerably lower than that occurring in the case of the known cover, partly as a result of the deformability of the elastic material.

From FR-A-2 305 366 a cover for a container is known having a similar groove as that of the cover according to the invention. This known cover entirely consists of one and the same material, which is similar to the material of the cover according to the invention. It is neither taught nor contemplated to cover the inside walls of the groove with a layer of an elastomeric material.

What is meant by the deflection of the top edge of the container is the distance between the continuation of the inside of the container wall directly below the bend where the outside edge begins and the tangent line parallel to said continuation at the outermost point of the outward bent top edge. The deflection depends on the angle through which the top edge is bent relative to the container wall and the length of the top edge. The angle through which the top edge is bent preferably is between 5 and 15°, and more preferably between 8 and 11°. Larger angles make it more difficult to put on the cover, while in the case of smaller angles the force which the groove can exert upon the edge is too low to guarantee a good seal.

The groove consists essentially of an outside wall, an inside wall and a connecting top wall, the inner surface of which is made of a layer of elastomeric material. The width of the groove at the position of the top wall, in particular where the outermost point of the top edge of the container is resting against the inside of the outside wall of the groove when the cover is closed, is less than the deflection of the top edge. The difference must be at least so great, even with the maximum dimensional variations occurring in the production of container and cover, that the width of the groove is smaller at the abovementioned place than the deflection of the top edge. A difference of at least 0.15 mm is suitable, and the difference is preferably at least 0.2 mm. The width of the groove at the abovementioned place is preferably at least the wall thickness of the top wall plus 0.15 mm.

The width of the groove at the bottom, i.e. in the vicinity of the open end of the groove, is preferably less than it is at the top, i.e. at the position of the top wall, but is at least equal to the wall thickness of the top wall plus 0.15 mm. As a result, the cover is constantly forced towards the closed position when it has come slightly out of that position, so that the cover is prevented from sliding spontaneously off the container. The width preferably runs uniformly from top to bottom, and this is achieved more preferably through the fact that the inside of the outside wall of the groove runs inwards, viewed from the top towards the bottom. It has been found that the user of a container which is sealed with a cover according to the invention during opening thereof clearly feels the cover coming off the container at the moment when the bend between wall and top edge of the container comes out of the groove. The user will

then automatically reduce the force which he or she is exerting on the cover. If the cover comes off the container unexpectedly, there is a very great risk of uncontrolled and accidental escape of the contents from the container. As the cover is closed, the user also feels when the cover has reached its sealing position.

The inside wall is preferably of uniform thickness over its full length, apart from possible rounded parts at the end of the wall, and preferably runs in a direction at right angles to the cover face. However, a variation of the order of 0.3 - 1° for easier unmoulding during the manufacture is acceptable. Greater variations make the opening and closing more difficult. The angle formed by the direction of the inside of the outside wall with the direction of the inside of the inside wall preferably is between 2 and 7°, and more preferably is between 3 and 6°. The range of 4 - 5° is most preferable. The same preferences apply to the angle between the direction of the inside of the outside wall and the angle through which the top edge of the container is bent. It is also possible to design the construction described above mutatis mutandis in a mirror image, in which case the top edge of the container is bent inwards and then, for example, the inside of the inside wall of the groove runs inwards.

The length of the bent top edge is selected in such a way in relation to the depth of the groove that the bend point situated on the inside of the container is preferably at least 0.2 mm and at most 2.5 mm, and more preferably at least 0.4 and at most 1.6 mm, above the bottom end of the inside of the inside wall when the cover is placed on the container in a sealing manner. The wall of the container also preferably has directly below this inner bend point a part which runs vertically or, as indicated above, virtually vertically at a slight angle which is necessary for easier unmoulding. The inner peripheral line consequently becomes a band whose width lies between the limits indicated above. If the bend point is situated closer to the bottom end of said inside, the corresponding sealing peripheral line lies too close to said end, with the result that when only a slight deformation occurs or when the cover is not pressed down fully during closing, there is a risk of the seal failing. A greater distance than the upper limit indicated, in combination with the length of said vertical part, produces undesirably great friction during the opening and closing.

On account of, for example, use or aesthetic considerations, the wall below can run in a different position or direction. The length of such a vertical part is preferably at least 0.2 mm, and more preferably at least 0.4 mm, and can extend in the vertical direction to the bottom if desired.

The dimensions and angles specified in this application are related to the height of the top edge of the container or, corresponding thereto, the depth of the groove in the cover. The above figures apply for a groove depth of 4 to 7 mm. At greater depths it is permissible in particular to have a smaller angle of the top edge relative to the vertical part of the container wall. However, it is always essential to meet the abovementioned requirement that the difference in the width of the groove and the variation of the top edge of the container must be at least 0.15 mm at the dimensional variations determined by the production process.

The cover can be made of the synthetic materials commonly used for this purpose, polyethylene, polypropylene and polyvinyl chloride being known examples. The elastomeric material can be selected from the known elastomeric materials, thermoplastic elastomers being suitable examples. The elastomeric material preferably has a compression set, measured at 100° according to ASTM standard D395, of 20 - 100% and an application range of -30 to 140°. The elastomeric material is preferably compatible with the material from which the remainder of the cover is made, as regards the usual manufacturing techniques. In particular, the elastomeric material and the remaining material of the cover can be processed by injection moulding, and the cover is manufactured by a process known to one skilled in the art as two-component injection moulding. This ensures that the elastomeric material is integral with the material of the groove situated further outwards. The advantage of this is that the elastomeric material will not come out of the groove when the cover is in use, a risk which does exist when the elastomeric material lies in the groove as a loose inner ring. The thickness of the layer of elastomeric material lies between 0.5 and 3 mm, and is preferably between 0.8 and 2 mm. Suitable combinations of elastomeric material and remaining material are, for example, polyethylene and a thermoplastic elastomer containing polyolefins, preferably polyethylene or polypropylene.

The layer of elastomeric material preferably does not stop at the open end of the groove, but extends beyond the groove until past the end of the outside wall, and in particular to the underside thereof. In this way, the edge of the cover which is gripped during opening is covered with the elastomeric material, which gives the cover a good grip for the fingers during opening. The outside wall of the groove can be extended in the horizontal direction at one or more corner points to form a lip, the underside of which is then also covered with the elastomeric material. The elastomeric material extending beyond the end of the outside wall preferably has a flank running from the underside thereof inwards and upwards and connecting at an angle to the inside of the outside wall, which flank guides the top edge of the container into the groove.

Further advantages of the cover according to the invention are reduced susceptibility to and risk of damage ("burrs") on the top edge of the container and less force applied to the edge of the container by the cover on deformation thereof. Moreover, even at low temperatures, the cover remains more readily deformable for opening, without great force being exerted, which is advantageous because food containers, for which the

cover according to the invention is eminently suitable, are generally stored in a refrigerator or freezer. Furthermore, the advantages of the cover according to the invention can be achieved virtually regardless of the peripheral shape or size of the cover, so that the cover is suitable for containers of a wide variety of shapes and sizes. Finally, it is found that the selected groove construction permits relatively large dimensional differences without the quality of the seal and the ease of putting on and removing the cover being adversely affected, which significantly simplifies the production and assembly process, because greater tolerances can be permitted therein than in such processes for the known cover.

The invention will be explained with reference to the following drawing, in which:

Fig. 1 is part of a vertical section of an embodiment of a cover according to the invention;
Fig. 2 is part of a vertical section of a container with outward bent top edge; and
Fig. 3 is part of a vertical section of a container with the cover of Fig. 1 thereon.

Fig. 1 shows a cover 1 with cover face 2 and edge part 3, in which a downward opening groove 4 is present, with outside wall 5, inside wall 6 and connecting top wall 7. The inner surface of the groove 4, which comprises, inter alia, the insides 8 and 9 of outside wall 5 and inside wall 6 respectively, is covered with an elastomeric material 10. The elastomeric material extends beyond and below the end of the outside wall 5 and there forms an outside edge 11 with sloping flank 12. The inside 9 of inside wall 6 runs at an angle of 0.5° (release angle) to the vertical, while inside 8 of outside wall 5 runs at an angle α, in this embodiment 4°, to the direction of inside 9.

Figure 2 shows a container wall 20 which at the bend 21 passes into the outward bent top edge 22. Said top edge is truncated at the top outside. Line 23 is the continuation of inside 24 of container wall 20, while line 25 is the line parallel to 24 through the outermost point 26 of top edge 22. The distance 27 between the lines 23 and 25 is the deflection of the top edge. β indicates the angle caused by the deflection, in this embodiment 9°.

In Fig. 3 the container wall from Fig. 2 is shown with its top edge 22 in the groove 4 of the cover according to Fig. 1. The top edge 22 with its outermost point 26 is in contact with the inside 8 of outside wall 5 of the groove 4 and with the inside 9 of inside wall 6 of said groove at the position of the vertical part 31 connecting to the innermost point of bend 21 from Fig. 2. Point 26 and vertical part 31 each form part of a continuous line or band running around the entire periphery of the container and sealing the container.

Claims

1. Cover (1) for sealing a container which is bounded at the top side by an outward bent top edge (22), said cover being provided along the periphery with a downward opening groove (4) which encloses the top edge (22) and is bounded by an outside wall (5), an inside wall (6), and a top wall (7) connecting said walls (5,6), characterized in that the width of the groove (4) at the position of the top wall (7) is less than the deflection of the top edge (22) of the container, and in that the surface (8,9) of the groove walls (5,6) which adjoins the groove consists of a layer of an elastomeric material (10) being another material than that of the rest of the cover which layer (10) is firmly connected to said groove walls (5,6).

2. Cover according to Claim 1, in which the elastomeric material (11,12) is also present on the underside of the outside wall (5) of the groove.

3. Cover according to one of Claims 1-2, manufactured by a two-component injection moulding process.

4. Cover according to Claim 3, in which the width of the groove (4) increases uniformly from the open bottom end of the groove towards the opposite, top end.

5. Cover according to Claim 4, in which the inside (8) of the outside wall (5) of the groove runs inwards, viewed from the top end towards the bottom end.

6. Cover according to Claim 5, in which the angle between the inside (8) of the outside wall (5)and the inside (9) of the inside wall (6) lies in the range from 3 to 6° inclusive.

7. Cover according to Claim 6, in which the angle lies in the range from 4 to 5° inclusive.

Patentansprüche

1. Deckel (1) zum Dichten eines Behälters, welcher an der Oberseite durch eine nach außen gebogene Oberkante (22) begrenzt ist, wobei der Deckel entlang der Peripherie mit einer nach unten mündenden Rille (4) bereitgestellt ist, welche die Oberkante (22) umgibt und begrenzt ist durch eine Außenwand (5), eine Innenwand (6) und eine Oberwand (7), welche die Wände (5, 6) verbindet,
dadurch gekennzeichnet, daß die Breite der Rille (4) an der Position der Oberwand (7) geringer als die Ablenkung der Oberkante (22) des Behälters ist, und daß die Fläche (8, 9) der Rillenwände (5, 6), der Rille benachbart, eine Lage aus einem elasto-

meren Material (10) aufweist, welches ein anderes Material als jenes des Restes des Deckels ist, welche Lage (10) fest mit den Rillenwänden (5, 6) verbunden ist.

2. Deckel nach Anspruch 1, bei welchem das elastomere Material (11, 12) ebenfalls an der Unterseite der Außenwand (5) der Rille vorliegt.

3. Deckel nach einem der Ansprüche 1 bis 2, hergestellt mittels eines Zwei-Komponenten-Spritzguß-verfahrens.

4. Deckel nach Anspruch 3, bei welchem die Breite der Rille (4) gleichförmig von dem offenen unteren Ende der Rille hin zu dem gegenüberliegenden oberen Ende ansteigt.

5. Deckel nach Anspruch 4, bei welchem die Innenseite (8) der Außenwand (5) der Rille nach innen verläuft, wenn gesehen von dem oberen Ende hin zu dem unteren Ende.

6. Deckel nach Anspruch 5, bei welchem der Winkel zwischen der Innenseite (8) der Außenwand (5) und der Innenseite (9) der Innenwand (6) in einem Bereich von 3 bis 6° einschließlich liegt.

7. Deckel nach Anspruch 6, bei welchem der Winkel in dem Bereich von 4 bis 5° einschließlich liegt.

Revendications

1. Couvercle (1) pour assurer l'étanchéité d'un récipient qui est limité, du côté supérieur, par un bord supérieur (22) plié vers l'extérieur, ledit couvercle comportant, le long de la périphérie, une rainure (4), ouverte vers le bas, qui enclôt le bord supérieur (22) et qui est limitée par une paroi extérieure (5), une paroi intérieure (6) et une paroi supérieure (7) reliant lesdites parois (5, 6), caractérisé par le fait qu'à la position de la paroi supérieure (7), la largeur de la rainure (4) est inférieure à l'écartement du bord supérieur (22) du récipient et que la surface (8, 9) des parois (5, 6) de la rainure qui jouxte la rainure est constituée d'une couche d'un matériau élastomère (10) qui est un matériau autre que celui du reste du couvercle, couche (10) qui est solidement reliée auxdites parois (5, 6) de la rainure.

2. Couvercle selon la revendication 1, dans lequel le matériau élastomère (11, 12) est également présent sur la face inférieure de la paroi extérieure (5) de la rainure.

3. Couvercle selon l'une des revendications 1-2, fabriqué par un processus de moulage par injection à deux composants.

4. Couvercle selon la revendication 3, dans lequel la largeur de la rainure (4) croît uniformément, depuis l'extrémité inférieure ouverte de la rainure, en direction de l'extrémité supérieure, opposée.

5. Couvercle selon la revendication 4, dans lequel l'intérieur (8) de la paroi extérieure (5) de la rainure va vers l'intérieur, vu de l'extrémité supérieure en direction de l'extrémité inférieure.

6. Couvercle selon la revendication 5, dans lequel l'angle entre l'intérieur (8) de la paroi extérieure (5) et l'intérieur (9) de la paroi intérieure (6) se situe sur la plage allant de 3 à 6°, limites comprises.

7. Couvercle selon la revendication 6, dans lequel l'angle se situe sur la plage allant de 4 à 5°, limites comprises.

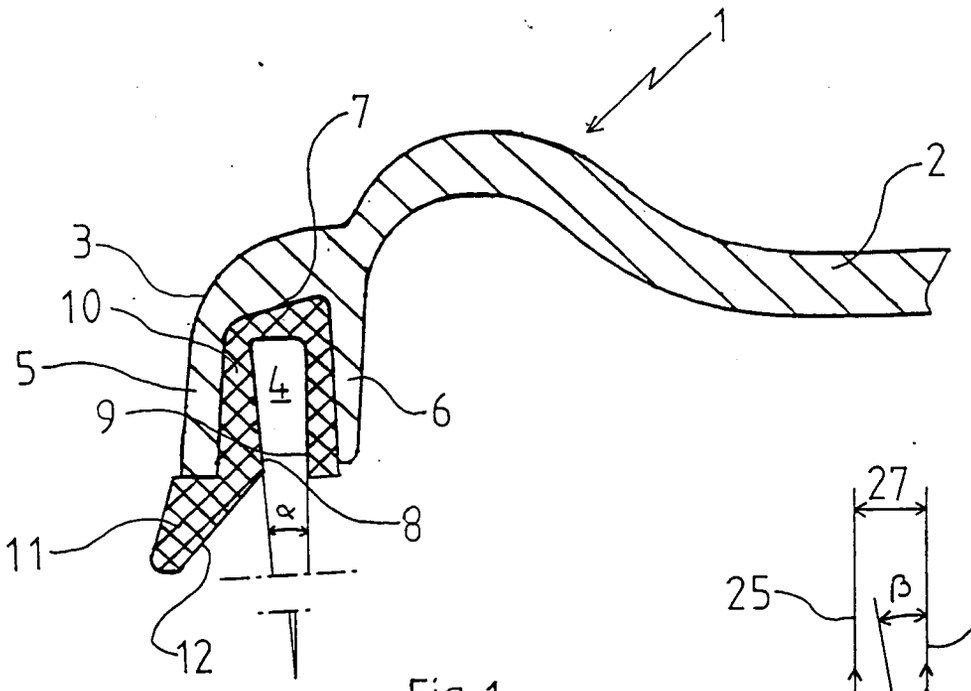


Fig. 1

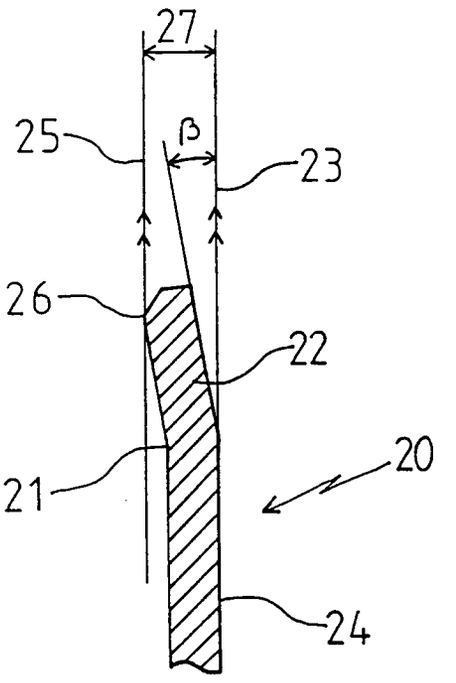


Fig. 2

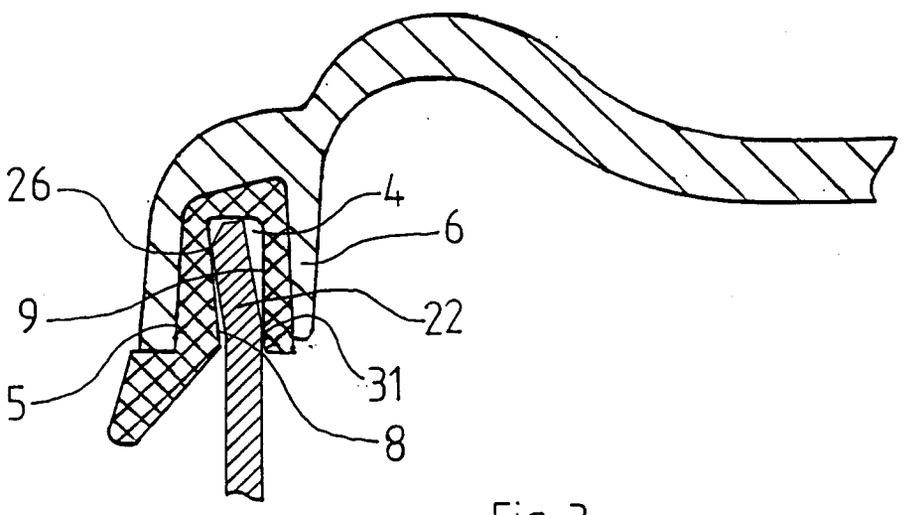


Fig. 3