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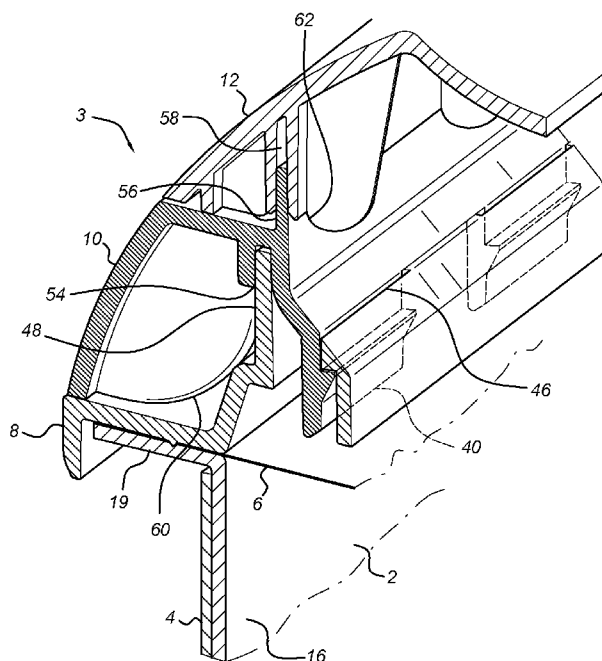
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(54) Title: LID STRUCTURE FOR CONTAINER

Fig. 4



(57) Abstract: A lid is disclosed for a container having a peripheral wall extending to an upper edge and defining a product containing space. The lid structure (3) comprises a lower frame (8), an upper frame (10) and a lid (12). The lower frame connects to the upper edge of the tub (2) and defines an access opening giving access to the product containing space. The upper frame is connectable to the lower frame in a snap-fit connection and forms a circumferential first seal therewith. The lid is arranged to close the opening, the lid and the upper frame forming a circumferential second seal. In this manner, an improved sealing connection can be achieved and the upper frame can be manufactured separately from the lower frame and joined thereto at a later stage of the production process.

LID STRUCTURE FOR CONTAINER

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to containers for the packaging and dispensing of products, in particular powdered products such as infant nutrition or milk formula. The invention relates in particular to a lid structure for such a container having a re-closable lid.

10 **Description of the Related Art**

 Powdered material, such as infant milk formula, has been sold in various forms of package for many years. Metal cans were initially the preferred container as they were relatively easy and cheap to produce and could be sealed for long term storage. The seal comprised an aluminium foil across the mouth of the container that was removed
15 on first use. As a single container would be used for an extended period, the containers were provided with re-closable plastic lids which gripped over the outer rim of the metal can. A measuring scoop was frequently included with the container, either packaged separately or within the can itself. Such cans are however relatively heavy and expensive to produce.

20 More recently, alternative packaging forms have become available which improve on the existing cans. These include laminate container bodies and plastic hinged lid and rim structures, which may be glued to the container body. One such package is described in US 2008041861, having a seal for initially closing the package and a space between the seal and an upper edge of the container for partially receiving
25 the scoop prior to use. The container part may consist of a laminate of carton, metal foil and plastic material. A further similar package is shown in WO2010071424.

 Sealing of such packages after initial opening is a major issue in the design of a lid structure. Packages to be used with infant formula or other comestibles should be sealed sufficiently to prevent ingress of mites or similar creatures. A maximum opening
30 of 70 microns has been considered desirable. In other situations, still better sealing may be required in order to prevent ingress of moisture. The conflicting requirements of a large opening for easy scoop access with a cost effective construction are difficult to reconcile. In particular, for a disposable package, the volume of material that can

economically be used in the lid construction limits its strength. A relatively deformable lid is also more difficult to effectively seal against a rim that also deforms. Existing structures, such as that shown in US2008041861, use lid and rim structures, sometimes referred to as toptainers, that connect to the free upstanding edge of the container body.

- 5 This connection is also critical in the sealing of the container. Another design shown in WO2008083141 uses an additional integral gasket to assist sealing.

In the light of these design requirements and constraints, it would be desirable to improve on the existing designs.

10 BRIEF SUMMARY OF THE INVENTION

- According to the invention, there is provided a lid structure for a container having a peripheral wall extending to an upper edge and defining a product containing space, the lid structure comprising: a lower frame for connection to the upper edge of the tub, the lower frame defining an access opening giving access to the product containing
15 space; an upper frame, connectable to the lower frame in a snap-fit connection and forming a circumferential first seal therewith; and a lid, arranged to close the opening, the lid and the upper frame forming a circumferential second seal. In this manner, an improved sealing connection can be achieved and the upper frame can be manufactured separately from the lower frame and joined thereto at a later stage of the production
20 process.

- In a preferred embodiment of the invention, the snap-fit connection is located radially inwardly of the first seal. This effectively means that the snap-fit connection is at an inside of the container with respect to the location of sealing. In the case that the snap fit connection passes through the lower rim, its location inwardly of the seal is of
25 no detriment to the overall sealing. This arrangement allows more convenient manufacturing processes to be applied in e.g. an injection moulding procedure.

- Preferably, the snap-fit connection is a permanent connection that cannot be released without otherwise damaging the container. Alternatively, the snap-fit connection may be releasable such that the upper frame and lid may be removed and
30 e.g. used again on another package. According to a further preferred embodiment, the snap fit connection comprises a plurality of downwardly extending barbs on the upper frame, which engage through detent openings in the lower frame.

The first and second seals according to the invention are preferably insect-tight seals. In the following, an insect-tight seal will be defined as a seal that avoids any opening of 70 microns or greater at any point of the seal. Experience in the field of food packaging in tropical climates has determined that this value is generally adequate to avoid ingress of the smallest insects that may be detrimental to food hygiene. By providing the first and second seals to be insect-tight, ingress of such insects to the interior of the container can be avoided, even after the container has been first opened and when powder particles are present around the lid and frames. The first and second seals may also be water-tight, preferably to at least 3 cm of water.

Preferably, the first seal comprises an upstanding first rim on the lower frame, which engages within a downward extending first groove of the upper frame, preferably in an interference fit. The first rim and first groove preferably continue uninterrupted around the full circumference of the first seal. A seal of this type has considerable advantage over a single sided seal. The rim and groove can easily be formed to have an interference fit and the insect-tightness described above can be readily achieved. For features produced by injection moulding techniques, their accuracy is dependent upon the dimension of the feature being formed. For a groove having a dimension of less than 2 mm, a 3 % manufacturing tolerance can be accepted without compromising the seal. In the case of a single sided seal, the critical size of the feature would be the overall diameter of the opening. For an opening of 10 cm diameter, the same tolerance would give a size variation of 3 mm, making an interference fit difficult to guarantee.

Preferably, the second seal also comprises an upstanding second rim on the upper frame, which engages within a downward extending second groove of the lid, preferably in an interference fit. The second rim and second groove preferably also continue uninterrupted around the full circumference of the second seal. This arrangement also benefits from the advantages of manufacture as indicated above and can thus easily achieve the insect-tightness required. As will be understood, the direction of the rims and the grooves can be reversed without affecting the sealing function. It is noted however that for use in this manner a downwardly extending groove is less likely to collect debris.

Most preferably, the first and/or second grooves are provided with lead-in structures that extend radially on both sides of the respective grooves by a distance at

least equal to a width of the respective first and second rims. As has been indicated above, manufacturing tolerances of injection moulded items must be taken into account and although the variation in the interference dimension may be slight, the positional variation of the groove with respect to the rim may be significantly greater. The lead-in structure is arranged to ensure that entry of the rim into the groove is achieved easily and without damage to either.

The lid is intended to be opened and closed frequently during use and, for this reason, the second seal must be robust enough to withstand such use without damage, wear or otherwise losing its insect-tightness. In one advantageous embodiment, the lead-in structure on the second groove comprises lead-in flanges. These may be arranged as perpendicular buttresses to the second groove that reinforce the second groove against sideways distortion. It will be understood that a defined position of the second groove may be important during closing of the lid to ensure correct entry of the second rim. Misalignment of these structures may cause damage to either the second rim or the second groove, making subsequent closure more difficult and impeding the insect-tight seal. To achieve their support function, the lead-in flanges may be present around the circumference of the second groove, preferably on both sides thereof. They may be present at intervals of less than 20 mm, preferably less than 15 mm and in the corner regions may even be more closely spaced. By providing support to the second groove, the walls of the second groove may be made more flexible, thereby better accommodating the second rim. To fulfil their lead-in function, the lead-in flanges may extend downwards to beyond the lowest extent of the second groove and be angled or curved smoothly towards this groove.

The first seal between the upper frame and the lower frame is generally intended to be assembled once and thereafter not to require resealing. Nevertheless, joining of these components may take place in an automated procedure and subsequent to manufacture and stress-relaxation of the respective components. For this reason, the first groove may also be provided with similar lead-in flanges at least at its outer periphery. This can assist in self centering the upper frame and lower frame during assembly.

According to one embodiment of the invention, the upper frame may have an external circumferential skirt and the lid may have an exterior surface, with the exterior surface and skirt being co-planar in the closed position of the lid. In this sense, co-

planar is not intended to be limited to flat planes and may also include a curved plane. As a result of this shape, the lid and upper frame may form a smooth transition without discontinuities.

According to a further aspect of the invention, the upper frame has an external circumferential skirt and the lower frame has a peripheral surface, the peripheral surface and skirt being co-planar when the upper frame and lower frame are connected together. As above, this allows a smooth transition between the upper frame and the lower frame.

The lid may be manufactured as a separate item to the upper rim and may be removable therefrom. Preferably however, the lid is pivotally connected to the upper frame. In one embodiment, the lid may be arranged to pivot about a hinge that is located radially inwardly from an external periphery of the upper frame. Prior designs have used hinge structures that allow a lid to pivot with respect to a rim at a position radially outwards from an external periphery of the rim. Such a protruding hinge structure may interfere with stacking and can be unsightly in the final product.

As a result of the pivotal closure of the lid, correct engagement of the second rim into the second groove is important if easy closure without damage to the second seal is to occur. A lead-in structure is important in achieving such closure. In order to further improve the closing action, the downward extending second groove of the lid may have a circumferential inner wall and a circumferential outer wall, wherein the circumferential outer wall extends downwards a distance greater than the circumferential inner wall in a region adjacent to the hinge. The inner wall may thus not be uniform in height around its full circumference and may curve gradually downwards from either end of the container towards the middle of the rear side of the container. The second rim may also be devoid of lead-in flanges in this regions, which may extend all along the hinge side of the lid. In the absence of lead-in flanges, the inner and outer walls are better able to flex as the second rim enters the second groove. On closing of the lid, this is the portion of the second rim that first engages with the second groove and it does so at a relatively large angle. In one embodiment the circumferential second seal commences engagement when the lid is at an angle of about 20° to the upper frame. Engagement of the second rim into the second groove continues progressively as the lid closes. This gradual engagement of the second seal and the frictional engagement between the inner wall and the second rim provides the

user with tactile feedback of the sealing action, which is quite different from snap-fit type seals which only provide feedback at the final point of snapping engagement.

According to a further advantageous embodiment of the invention, the upper frame may be formed of a material having a different hardness to that of the lower frame or the lid. In one embodiment, the upper frame is formed of a first plastic material that is relatively softer than a second plastic material used for the other two components. A relatively harder material for the lower frame and lid can ensure a greater overall stiffness of the lid structure. Alternatively, the upper frame may be slightly harder. Alternatively, all three components may be of different hardness. The variations in hardness may be slight and may be just sufficient to ensure good interference sealing between the respective seals. Preferred materials for the lid and upper and lower frames are polypropylene (PP), polyethylene (PE) and polyethylene terephthalate (PET) or combinations thereof, although the skilled person will be familiar with various alternatives which could provide similar engineering properties.

The lid and the upper or lower frame may be provided with appropriate catches and closure elements. They may also be provided with a tamper evident closure indication. The lower frame or upper frame may also be provided with a scoop holder and levelling portions. These may extend inwards into the access opening. It will be understood that a scoop holder may also be provided in the lid.

The invention further relates to a package comprising a lid structure as described above applied to a container having a peripheral wall extending to an upper edge and defining a product containing space, the lower frame being connected to the upper edge of the container. The package may have a generally square or rectangular outer profile with rounded corners. The volume of the package may be between 0.5 litre and 3 litres, preferably around 1.5 litres and the access opening preferably has a minimum dimension of at least 70 mm, more preferably around 100 mm and an area of at least 100 cm².

Preferably, the package comprises a membrane seal for sealing the product containing space prior to use. The membrane seal may comprise a metal or plastics-metal foil or may be a plastics-only foil. The membrane seal is a gas-tight seal. In this context, it will be understood that a gas-tight seal is a seal that substantially prevents passage of gas into or out of the container during prolonged periods of storage. Preferably, it is an oxygen barrier seal, preventing diffusion of oxygen into the sealed

container. The oxygen permeability of the seal may preferably be less than 2.0 cm³/m²/day and more preferably may be less than 0.5 cm³/m²/day. The membrane seal may be removed in its entirety prior to use or may comprises a weakened tear line defining an opening region, and a pull tab. The membrane seal may be provided at various locations but most preferably, the membrane is sealed across the upper edge of the container. In particular, it will be understood that thermoformed tubs generally have an outwardly extending flange forming the upper edge and the membrane may be sealed across the flange. In an alternative embodiment, the membrane may be sealed to the lower frame to close the opening. In that case, the skilled person will understand that the connection between the lower frame and the upper edge of the container must be a gas-tight sealed connection.

In a most preferred embodiment, the container is or comprises a thin-walled thermoformed tub having a wall thickness of less than 0.5 mm. By the use of a thin walled thermoformed tub, the amount of material required for forming the body of the container is limited. Furthermore, the lower frame of relatively thicker plastic material provides the required support to the relatively thin material of the peripheral wall, allowing effective connection to the upper frame. In this context, relatively thin is understood by the skilled person to be with respect to the frame material. The tub may be manufactured to have a wall thickness that is adequate to provide the barrier properties and strength required. The thickness of the wall may be between about 0.10 mm to 0.60 mm, preferably between 0.2 and 0.40 mm. It will be understood that the wall thickness may vary over the cross-section, being generally thicker at the rim and thinnest at side walls. The values given above for the thickness of the wall are intended to designate the thickness of the side walls, which is usually the point of minimum thickness. The lower frame may be significantly thicker, measured at its smallest dimension and may have a thickness sufficient to ensure a secure mechanical connection with the upper frame. The tub may be manufactured of any appropriate material capable of being thermoformed. A most suitable material is polypropylene. However, other polymer materials such as polyethylene terephthalate (PET) or polyethylene (PE) can be used as well. Multi layer materials may also be used, subject to the requirements of recycling. The lower frame may be permanently connected to the upper edge of the container, preferably by welding.

Advantageously, the package consists of a single material class for the purposes of recycling. This includes the tub, the upper and lower frames and the lid. The membrane seal may be of the same material although, given that it is removed on opening, it may also be recycled separately.

5 Additionally, the container may further comprise a carton sleeve enveloping and supporting the thermoformed tub. The carton sleeve may fit closely to the tub with an interference fit and may provide the necessary strength to the peripheral wall in order to be form stable. In other words, the thin plastic material of the peripheral wall may have insufficient strength alone to adequately maintain the shape of the tub e.g. when
10 stacking containers on each other. By combining this with a carton sleeve, improved strength may be achieved. The respective layers may be separated for recycling. The sleeve may comprise carton of 50 to 400 g/m², preferably 100 to 300 g/m². The sleeve may be open at the bottom but preferably extends under the base of the tub.

 According to one embodiment, the package may have a generally square or
15 rectangular outer profile with rounded corners. The volume of the package may be between 0.5 litre and 3 litres, preferably around 1.5 litres and the access opening preferably has a minimum dimension of at least 70 mm more preferably around 100 mm and an area of at least 100 cm². The overall length of the package may be between 150 mm and 250 mm, preferably about 185 mm. The width of the package may be
20 between 100 mm and 150 mm, preferably around 120 mm. The package may be available in multiple heights according to volume required, varying from 80 mm to 150 mm.

 The package as described is particularly suitable for containing a quantity of powdered nutritional product which can be effectively sealed within the product
25 containing space. Preferably the powdered nutritional product comprises infant milk formula.

 Preferably, a scoop is provided within the package and may be located above the membrane seal prior to use. It is also conceivable that a scoop is integrally formed with the lid construction and separated at first use.

30

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the invention will be further appreciated upon reference to the following drawings of a number of exemplary embodiments, in which:

Figure 1 shows a package according to the present invention in partly exploded perspective view;

Figure 2 shows a perspective view of the package of Figure 1 with closed lid;

Figure 3 shows a perspective view of the package of Figure 1 with opened lid;

5 Figure 4 shows a partial cross-section through the package of Figure 2 along line IV-IV;

Figures 5a to 5c show cross-sectional views similar to Figure 4 during connection of the upper frame; and

10 Figures 6a to 6c show cross-sectional views taken in direction VI-VI in Figure 3 during closure of the lid.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Figure 1 shows a partially exploded view of a package 1 having a lid structure 3 according to a first embodiment of the invention. The package 1 comprises a container
15 in the form of a tub 2, a sleeve 4 and a membrane seal 6 and the lid structure 3 includes a lower frame 8, an upper frame 10 and a lid 12.

The tub 2 is thermoformed of relatively thin polypropylene material and has a base 14 and a peripheral wall 16 defining a product containing space 20. The peripheral wall 16 extends to an upper edge 18 having an outwardly directed flange 19. The sleeve
20 4 is formed of carton and has wall 22 and a bottom 24. Lower frame 8 is an annular ring having an upstanding first sealing rim 48 surrounding an opening 26 of a similar dimension to the product containing space 20. Between the first rim 48 and the opening 26 are located detent openings 46, the function of which will be further explained below. The upper frame 10 is also in the form of a ring and is provided with barbs 40
25 extending downwardly. The lower frame 8 and upper frame 10 are also made of polypropylene although it will be understood that other appropriate materials could be employed. The membrane 6 includes a tear line 28 defining an opening region 30 and includes a pull tab 32.

Figure 2 shows a perspective view of the package 1 of Figure 1 in the assembled
30 state with the lid 12 closed. A catch 36 on the front edge of the lid 12, engages with a rib 38 on the upper frame 10 to maintain the lid 12 closed. The lid 12 and upper rim 10 are also made of polypropylene.

Figure 3 shows a perspective view of the package 1 of Figure 1 in the assembled state with the lid 12 open and the membrane removed to provide access to the product containing space 20. A scoop 42 is held within the lid 12 by clips 44 and can also be positioned in a scoop holder 50 integrally formed with the lower frame 8. Also visible are hinges 11 allowing pivoting connection between the lid 12 and the upper frame 10.

Figure 4 is a perspective cross-section along line IV-IV of Figure 2. As can be seen, the membrane 6 is attached across the flange 19 of the tub 2 and sandwiched by the lower frame 8 which overlies the flange 19. The flange 19, membrane 6 and lower frame 8 are all welded together to form a single relatively rigid rim structure. Upper frame 10 is mechanically engaged with the lower frame 8 by the downwardly extending barbs 40 that engage through the detent openings 46 in the lower frame 8. As can also be seen in this view, sleeve 4 closely engages against the peripheral wall 16 of tub 2, extending up to beneath the flange 19 to provide additional support. This allows the upper rim 10 to be snapped into the lower rim 8 without causing deformation or collapse of the tub 2.

According to an important aspect of the invention, the lid structure 3 is provided with two seals. A circumferential first seal is formed by the upstanding first sealing rim 48 which engages with a downwardly extending first groove 54 on an underside of the upper frame 10. A circumferential second seal is formed by an upstanding second sealing rim 56 on the upper side of the upper frame 10 which engages with a downwardly extending second groove 58 on the underside of the lid 12. Lead-in webs 60, 62 are located on either side of the first groove 54 and second groove 58 respectively.

Figures 5a to 5c show cross-sections at the location of Figure 4 with the upper frame 10 in the process of being connected to the lower frame 8. Figure 4a shows the upper frame 10 entering into initial engagement with the lower frame 8. The lead-in webs 60 of the first groove 54 engage against the upstanding first rim 48 and guide it towards the first groove 54. The barb 40 has entered into the detent opening 46.

In Figure 5b, the upper frame 10 has been pressed downwards onto the lower frame 8. This may be achieved by pressing on the lid 12. According to an important design consideration, on pressing on the lid 12, the force F is applied against the upper frame 10 by the lead-in webs 62 of the lid 12. In this manner, additional pressure or deeper engagement of the second rim 56 into the second groove 58 is avoided. As the

upper frame 10 is pressed downwards, the first rim 48 enters the first groove 54 and the barb 40 flexes into the detent opening 46.

Figure 5c shows the upper frame 10 fully engaged with the lower frame 8 and the barb 40 locked in the detent opening 46. At this stage removal of the upper rim 10 is not possible without application of considerable force and breakage of the package. It is noted that the barbs 40 protrude into the interior of the tub 2 and cannot therefore be accessed from outside the package 1. It may also be noted that in the fully assembled position, the first rim 48 has not bottomed out in the first groove 54. This ensures that due to manufacturing tolerances, the barb 40 will not be impeded from connecting.

In this view it can also be seen that the upper frame 10 has an external circumferential skirt 66 and the lid 12 has an exterior surface 64. The exterior surface 64 and the skirt 66 are co-planar in the closed position of the lid 12. In other words, both of the lid 12 and upper frame 10 have external surfaces that blend smoothly together at this location. Additionally, the lower frame 8 has a peripheral surface 68 and the peripheral surface 68 and skirt 66 are also co-planar when the upper frame 10 and lower frame 8 are connected together as shown in Figure 5c.

Figures 6a to 6c show cross-sections in the direction VI-VI of Figure 3 with the lid 12 in various stages of closure onto the upper frame 10. In Figure 6a, the lid 12 is in the open position supported by hinge 11. As can be seen, the position of the hinge 11 is at a radially inwards position with respect to the skirt 66 of the upper frame 10. This means that when packages 1 are stacked adjacent to one another, the hinge 11 does not protrude outwards and impede close stacking. It is also less likely to be caught or snag accidentally. It is also noted that at this position, there are no lead-in flanges 62 supporting the second groove 58 and an inner wall 58A is longer than an outer wall 58B of the second groove 58.

Figure 6b shows the lid 12 in a partially closed position with the upstanding second rim 56 engaging with the inner wall 58A of the second groove 58. This contact occurs when the lid 12 is still at an angle of around 20° with respect to the upper frame 10. The downward extent of the inner wall 58A beyond that of the outer wall 58B ensures that the second rim 56 is guided into the second groove 58. In this case, the extended inner wall 58A acts as a lead-in structure and for this reason, no lead-in flanges 62 are required in this region. In fact, the absence of lead-in flanges 62 allows the inner wall 58A to more easily flex as the angle between the lid 12 and the upper

frame 10 changes. Furthermore, the angular engagement on closing the lid 12 prevents the second rim 56 from entering into the second groove 58 in a linear manner. The lead-in webs 62 on the lid 12 assist in guiding this angled entry, ensuring a progressive engagement of the second rim 56 into the second groove 58, starting from the rear edge of the lid 12 adjacent to the hinge 11 and progressing around the circumference to the front edge of the lid 12 adjacent to the catch 36. In addition to assisting in guiding the second rim 56 into the second groove 58, the lead-in webs 62 also support the second groove 58 and help maintain its position. Because of the additional support provided by the lead-in webs 62, the structure forming the second groove 58 can be made more flexible allowing the closing action to be smoother. As discussed above, the manufacturing tolerances for the positions of these features is determined by the overall dimension of the opening 26.

Figure 6c shows the lid 12 in the closed position, with the upstanding second rim 56 engaged with the second groove 58. As described already above, full engagement of the second rim 56 into the second groove 58 is avoided and the closed position of the lid 12 is defined by abutment of the lead-in webs 62 with the upper frame 10 and the exterior surface 64 engaging onto the skirt 66.

Thus, the invention has been described by reference to certain embodiments discussed above. It will be recognized that many modifications in addition to those described above may be made to the structures and techniques described herein without departing from the spirit and scope of the invention. Accordingly, although specific embodiments have been described, these are examples only and are not limiting upon the scope of the invention.

Claims

1. A lid structure for a container having a peripheral wall extending to an upper edge and defining a product containing space, the lid structure comprising:
5 a lower frame for connection to the upper edge of the tub, the lower frame defining an access opening giving access to the product containing space;
an upper frame, connectable to the lower frame in a snap-fit connection and forming a circumferential first seal therewith; and
a lid, arranged to close the opening, the lid and the upper frame forming a
10 circumferential second seal.
2. Lid structure according to claim 1, wherein the snap-fit connection is located radially inwardly of the first seal.
- 15 3. Lid structure according to claim 1 or claim 2, wherein the snap fit connection comprises a plurality of downwardly extending barbs on the upper frame, which engage through detent openings in the lower frame.
4. Lid structure according to any preceding claim, wherein the first seal comprises
20 an upstanding first rim on the lower frame, which engages within a downward extending first groove of the upper frame.
5. Lid structure according to any preceding claim, wherein the second seal
25 comprises an upstanding second rim on the upper frame, which engages within a downward extending second groove of the lid.
6. Lid structure according to claim 4 or claim 5, wherein the first and/or second
30 grooves are provided with lead-in structures that extend radially on both sides of the respective grooves by a distance at least equal to a width of the respective first and second rims.

7. Lid structure according to any preceding claim, wherein the upper frame has an external circumferential skirt and the lid has an exterior surface, the exterior surface and skirt being co-planar in the closed position of the lid.
- 5 8. Lid structure according to any preceding claim, wherein the upper frame has an external circumferential skirt and the lower frame has a peripheral surface, the peripheral surface and skirt being co-planar when the upper frame and lower frame are connected together.
- 10 9. Lid structure according to any preceding claim, wherein the lid is pivotally connected to the upper frame.
10. Lid structure according to claim 9, wherein the lid is arranged to pivot about a hinge located radially inwardly from an external periphery of the upper frame.
- 15 11. Lid structure according to claim 9 or claim 10, wherein the second seal commences engagement when the lid is at an angle of more than 15° to the upper frame.
- 20 12. Lid structure according to any of claims 9 to 11, wherein the second seal comprises an upstanding second rim on the upper frame, which engages within a downward extending second groove of the lid having a circumferential inner wall and a circumferential outer wall, wherein the circumferential outer wall extends downwards a distance greater than the circumferential inner wall in a region
25 adjacent to the hinge.
13. Lid structure according to any preceding claim, wherein the first and second seals are insect-tight seals.
- 30 14. A package comprising a lid structure according to any preceding claim and a container having a peripheral wall extending to an upper edge and defining a product containing space, the lower frame being connected to the upper edge of the container.

15. Package according to claim 13, further comprising a membrane seal for sealing the product containing space prior to use.
- 5 16. Package according to claim 13 or claim 14, wherein the container is a thin-walled thermoformed tub having a wall thickness of between 0.1 and 0.6 mm, preferably between 0.2 mm and 0.4 mm.
- 10 17. Package according to any of claims 13 to 15, consisting of a single material class for the purposes of recycling.
18. Package according to any of claims 13 to 16, wherein the container further comprises a carton sleeve enveloping and supporting the thermoformed tub.
- 15 19. Package according to any of claims 13 to 17, wherein the lower frame is permanently connected to the upper edge of the container, preferably by welding.
20. Package according to any of claims 13 to 18, further comprising a quantity of powdered nutritional product sealed within the product containing space.
- 20 21. Package according to claim 19, wherein the powdered nutritional product comprises infant milk formula.

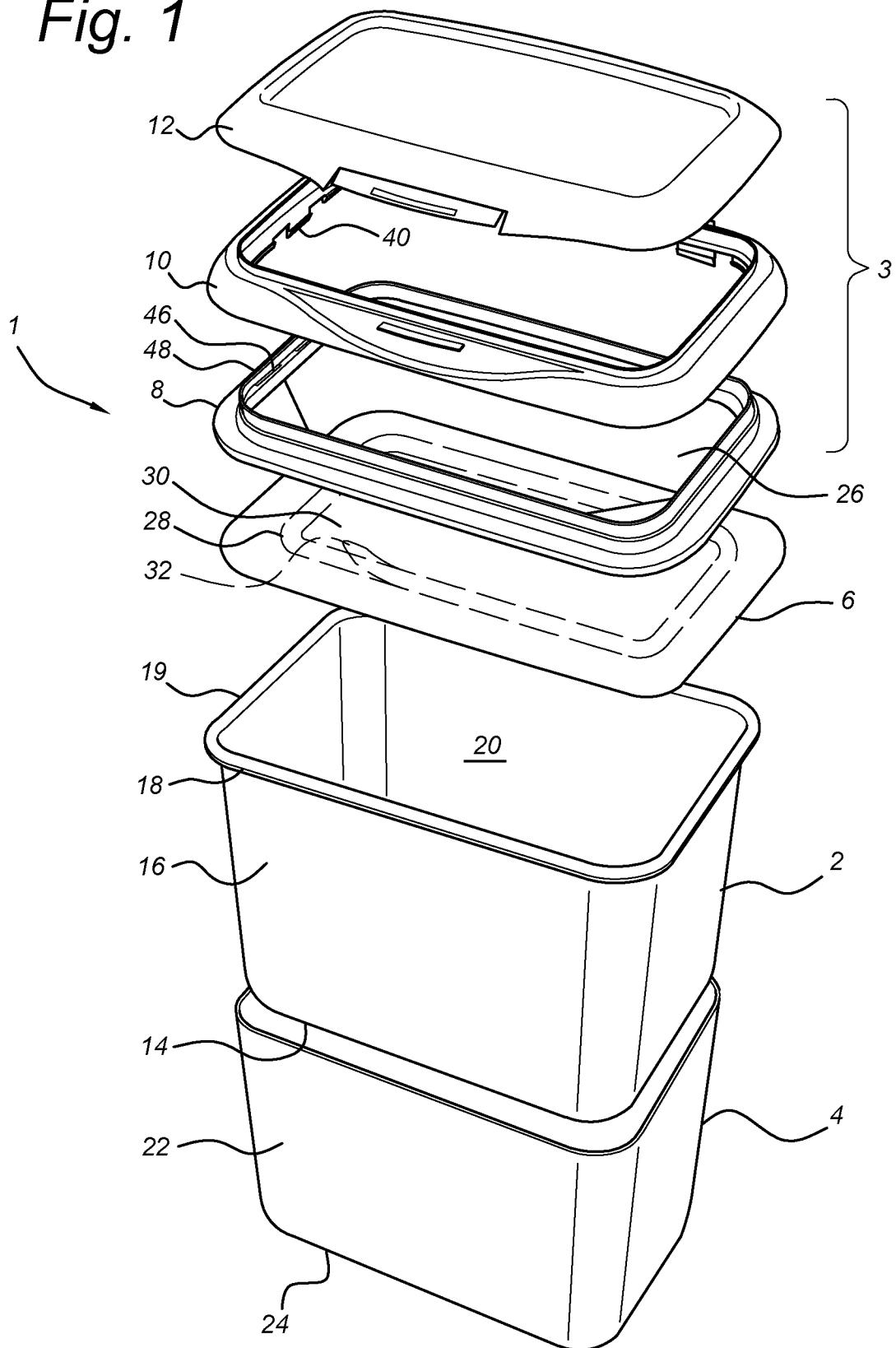
Fig. 1

Fig. 2

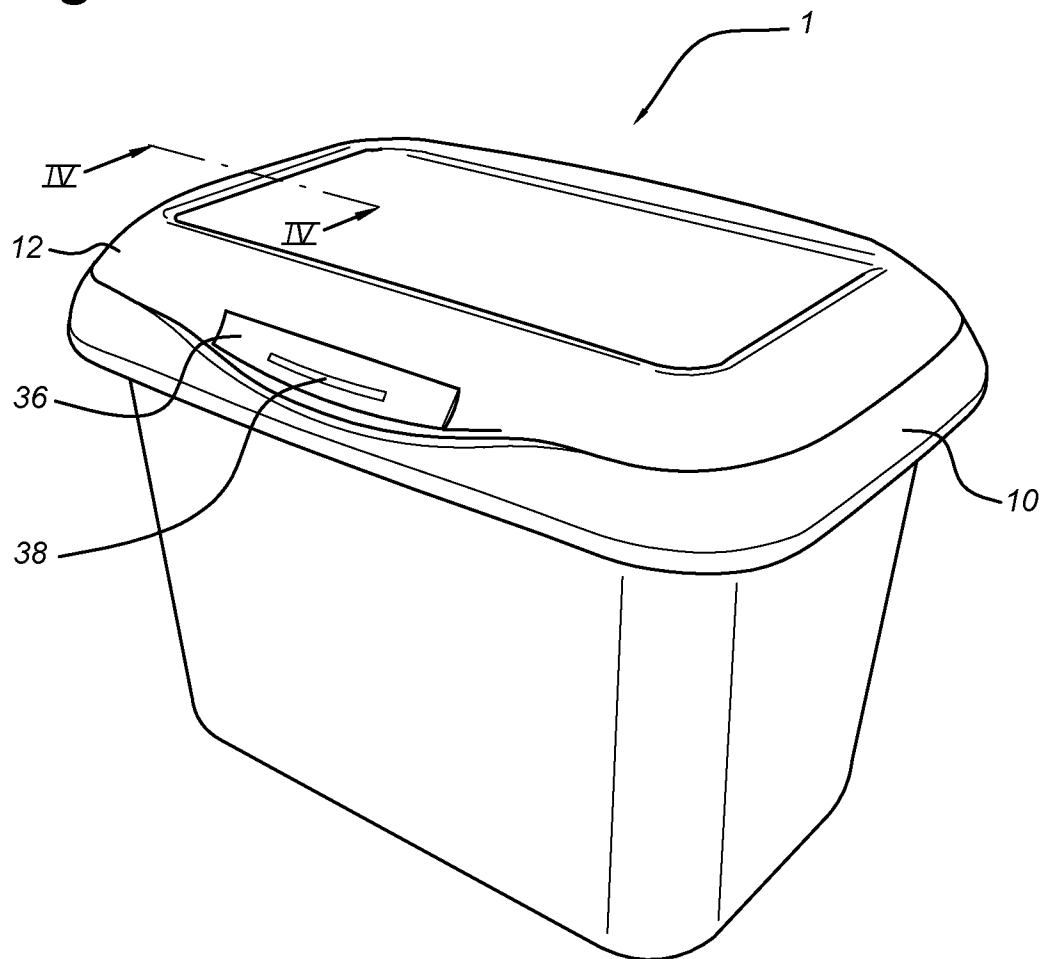


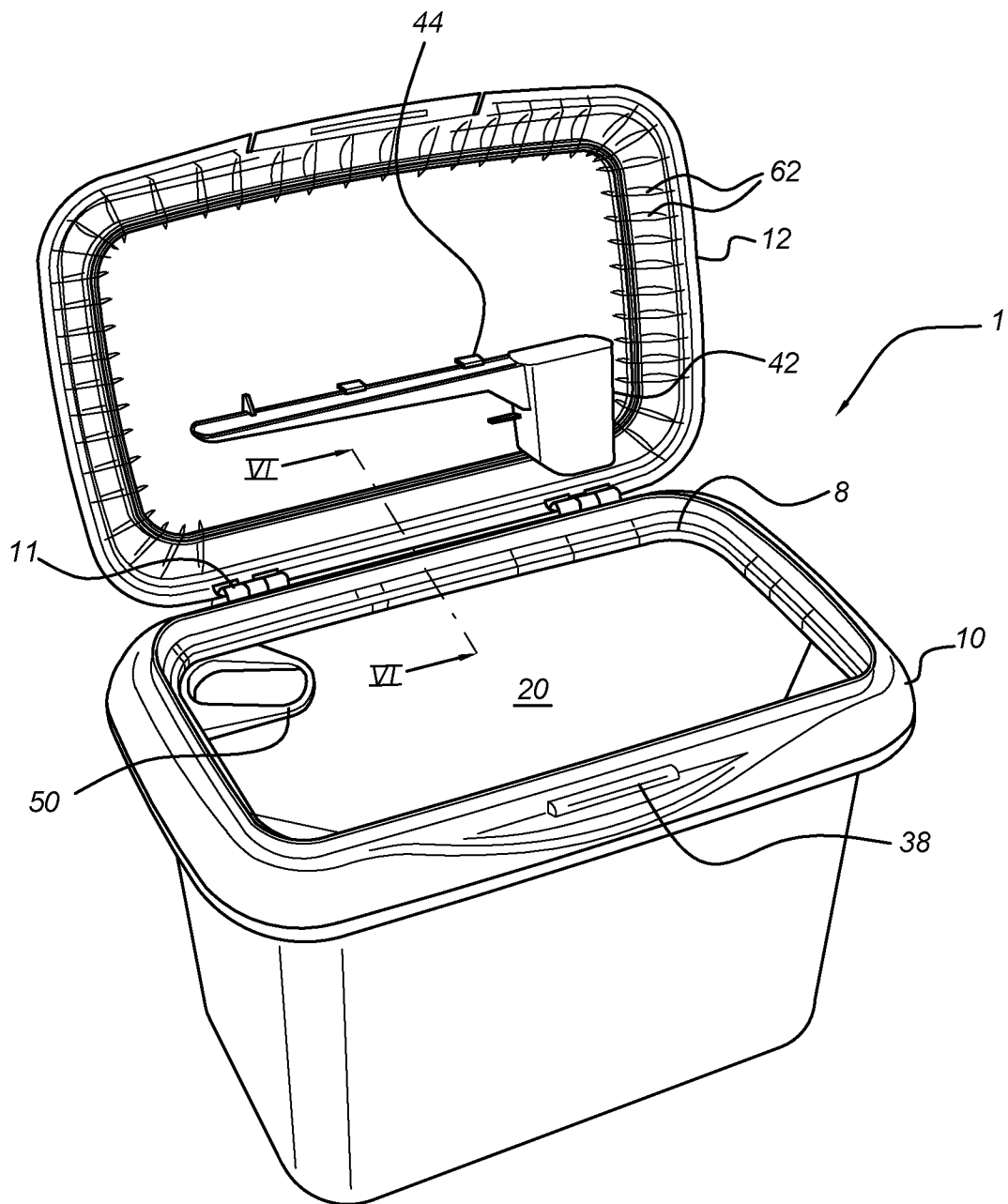
Fig. 3

Fig. 4

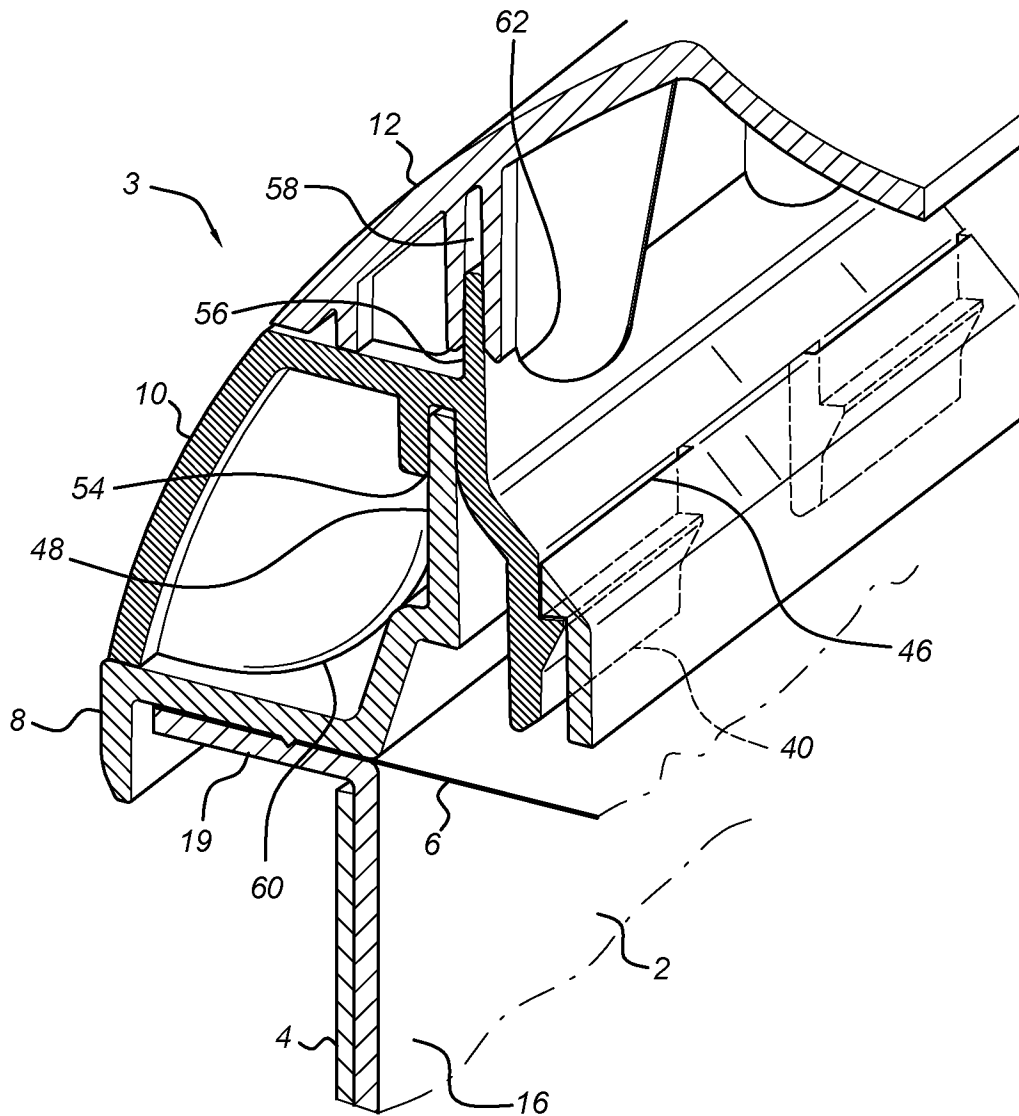


Fig. 5a

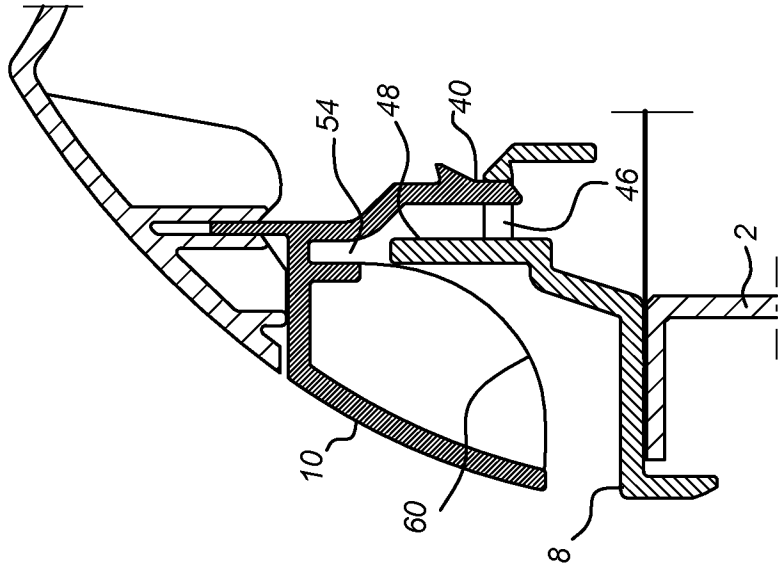


Fig. 5b

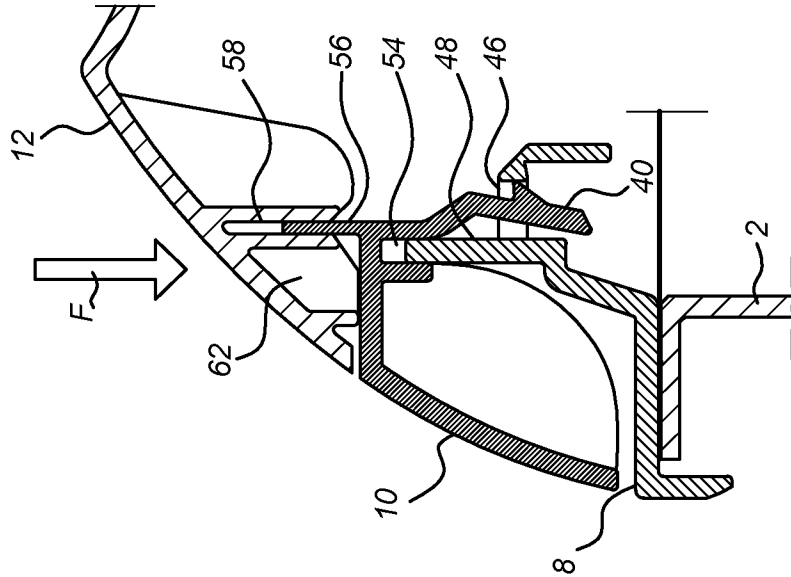


Fig. 5c

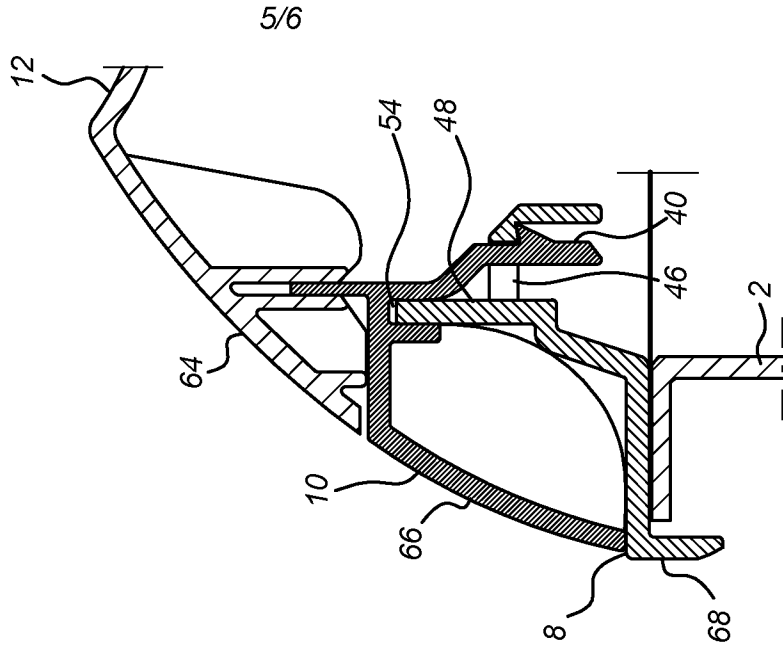


Fig. 6a

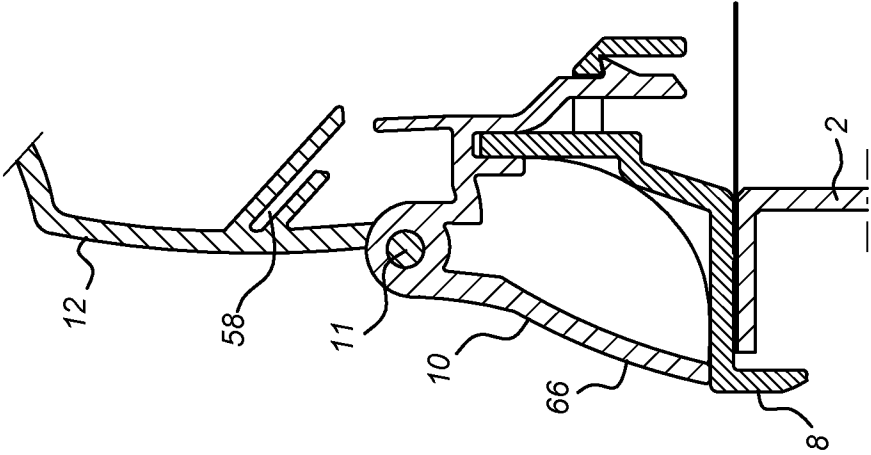


Fig. 6b

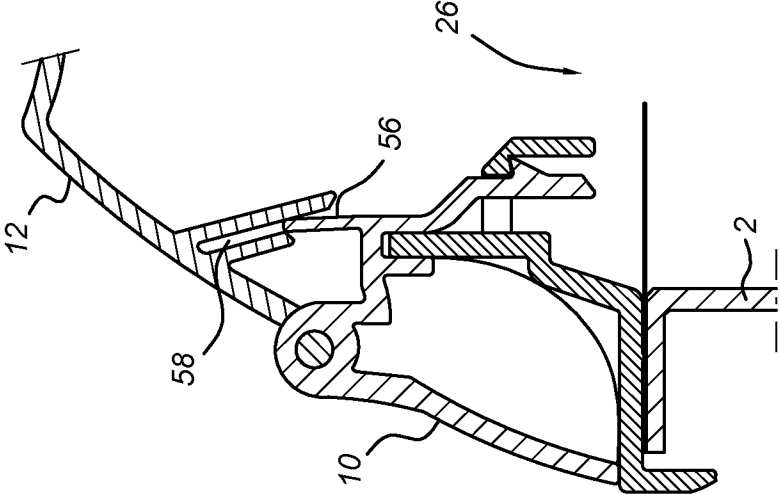
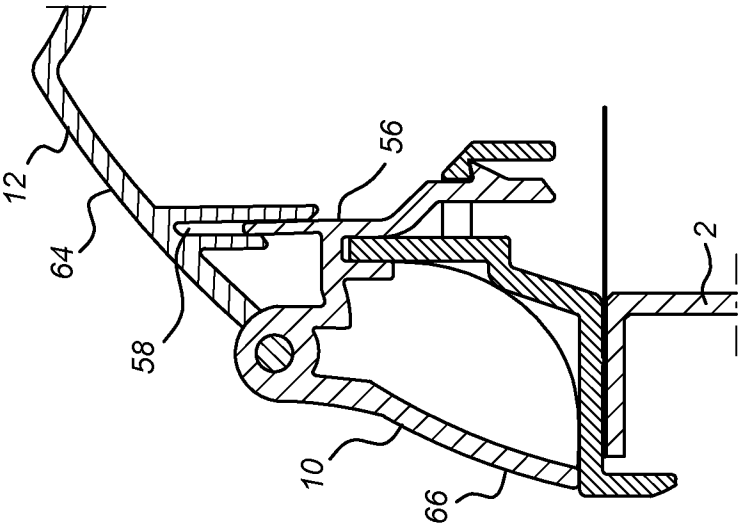


Fig. 6c



INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2014/050359

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D43/02 B65D43/16 B65D51/20 B65D51/24
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 975 346 A (IMPERATO ANTHONY JOSEPH [US] ET AL) 2 November 1999 (1999-11-02) column 2, line 48 - column 4, line 13; figures 5-7	1
A	----- WO 2010/040965 A1 (GERVAIS DANONE SA [FR]; VANDAMME PATRICK [FR]) 15 April 2010 (2010-04-15) page 7, line 31 - page 8, line 12 page 9, line 19 - page 11, line 22; figures 1-4	1
A	----- WO 2010/053952 A2 (CLARK J L INC [US]; CRONIN EDWARD P [US]) 14 May 2010 (2010-05-14) paragraph [0065] - paragraph [0079]; figures 13-23 ----- -/--	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

28 January 2015

Date of mailing of the international search report

05/02/2015

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INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2014/050359

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

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