

Description

[0001] The present invention relates to a flexible bag-like container for liquids or paste-like substances, in particular food substances, provided with a delivery spout.

[0002] Rigid, semi-rigid and flexible disposable containers are commonly used in the large-scale distribution of food products.

[0003] For example, semi-rigid brick-shaped containers made of composite material, cardboard, metal, or plastics material for the distribution of drinks and fruit juices are known.

[0004] These containers have a small opening sealed by a thin piece of aluminium or composite material.

[0005] For distribution, these containers are wrapped in thin plastics wrappers which enclose both the container and a drinking straw which is used by the user to perforate the closure seal and then to drink the contents of the package.

[0006] The outer wrapper is necessary to ensure that the straw cannot be lost up to the moment of use and to protect the straw from external contamination, as is required by hygiene standards.

[0007] A package of this type involves a fairly complex production cycle and an appreciable cost and is not very readily usable by the user.

[0008] Moreover, the operations that are necessary to open the wrapper preclude the use of the product during other activities, for example, whilst walking about, or at least make it very difficult.

[0009] Another type of disposable container for liquids and paste-like substances which has recently become very widespread and has found favour with consumers is constituted by a flexible bag made of composite films and provided with a rigid delivery spout closed by a screw cap, generally provided with a ring seal.

[0010] The cap, which is screwed onto the spout externally, ensures effective hygienic protection of the end of the spout.

[0011] An example of this type of container is described in greater detail in European patent EP751081 to which reference may be made.

[0012] Although this type of container permits easier and quicker use of the contents, it also has disadvantages.

[0013] The operation to close the container during the filling and sealing process requires the use of fairly complex machinery for screwing on the cap with a controlled tightening torque and involves a fixed plant cost which is added to the cost of the moulding of the screw cap and has a considerable effect on the overall cost of the package of the product, particularly for single-portion packages in which the function of the screw cap is purely to protect and preserve the product up to the time of use.

[0014] Although the product is easier to use in comparison with the containers described above, the unscrewing of the cap nevertheless involves some care and effort which is not compatible with performing other

activities.

[0015] The present invention overcomes these disadvantages and offers a low-cost, flexible container, the production of which is simplified and which is easier to use; the container is provided with a delivery spout which is hygienically protected and sealed by a membrane, preferably constituted by a multi-layer composite film, which is welded to the end of the spout and is pressed flat around the whole spout to form a hygienic protective skirt.

[0016] Welded membrane seals which can be peeled off for opening are well known on rigid and semi-rigid containers but the objective of protecting external surfaces of the container has not been proposed.

[0017] Moreover, to permit opening, they have a loose tab outside the welding, which provides a minimal grip and is particularly fragile.

[0018] The peeling operation is particularly awkward and, as a result of breakage of the tab, it is often necessary to break and remove the seal with a pointed or sharp implement.

[0019] This problem is also solved by the present invention since the peripheral skirt of the seal can easily be "stripped off" and is easy to grip once it has been opened out, enabling a peeling action to be exerted in several directions along the entire sealing region, ensuring the desired result without difficulty or particular effort.

[0020] The characteristics and the advantages of the present invention will become clearer from the following description of a preferred embodiment and of variants thereof, which is given with reference to the appended drawings, in which:

Figure 1 is an exploded view of a preferred embodiment of the flexible bag-like container with the delivery spout closed by a membrane seal according to the present invention,

Figure 2 shows, in a perspective view, the spout of the container of Figure 1 in a first stage of sealing with a membrane seal,

Figure 3 shows, in a perspective view, the spout of the container of Figure 1 in a second stage of sealing with a membrane seal,

Figure 4 shows, in a perspective view, the spout of the container of Figure 1 with the sealing operation completed,

Figure 5 shows, in a perspective view, a variant of the configuration of the seal with the sealing operation completed,

Figure 6 shows, in a perspective view, of a variant of the delivery spout for the container of Figure 1,

Figure 7 is a perspective view of a first variant of the flexible container with sealed delivery spout according to the present invention,

Figure 8 is a perspective view of a second variant of the flexible container with sealed delivery spout according to the present invention,

Figure 9 is a schematic front view of a third variant of the flexible container with sealed delivery spout according to the present invention,

Figure 10 is a schematic section through the container of Figure 9, taken on the line A-A of Figure 9,

Figure 11 is a perspective view of the container of Figure 9 from below, once it has been filled,

Figure 12 is a schematic front view of a fourth variant of the flexible container with sealed delivery spout according to the present invention,

Figure 13 is a schematic section through the container of Figure 12, taken on the line B-B of Figure 12,

Figure 14 is a schematic front view of a further variant of the flexible container with sealed delivery spout according to the present invention,

Figure 15 is a schematic section through the container of Figure 14, taken on the line C-C of Figure 14, and

Figure 16 is a perspective view of the container of Figure 14 from above, once it has been filled.

[0021] With reference to Figure 1, a preferred embodiment of the present invention comprises a flexible, bag-like container of a conventional type known *per se* (for example, from EP751081), the innovative aspect consisting of the closure system.

[0022] The container 1 is constituted, conventionally, by a pair of juxtaposed, front and rear sheets of composite material and by two lateral gussets which are folded like bellows and interposed between the two, front and rear sheets.

[0023] The two sheets and the lateral gussets are heat-sealed together at the periphery and, once the container has been filled, it adopts the shape indicated in the drawing in which the front sheet 2 and a lateral gusset 3 are visible.

[0024] The broken line 4 indicates the fold line of the gusset 3.

[0025] The strips between the edges of the container and the broken lines 5, 6, 7, and 8 and the continuous line 9 correspond to the heat-sealing regions.

[0026] A material commonly used to produce contain-

ers of this type is a composite film of polyester (PET) superimposed externally on an aluminium foil (A1) which is covered internally by a polyethylene film (PE), possibly with the interposition of a connecting film of nylon (N).

[0027] The heat-sealing material with a lower softening point is constituted by the polyethylene film.

[0028] The container is provided, conventionally, with a delivery spout constituted by a drinking straw made of plastics material, preferably polypropylene, with a portion 10 housed inside the container and an outer portion 11 in which there are marked, in order, an externally smooth end portion 12, an externally threaded portion 13, a toothed portion 14 provided for non-reversible engagement with a ring seal of a screw cap, and a flanged portion provided externally with at least one, generally two, polygonal flanges 15, 16 which serve for the relative positioning of the bag and of the spout during the assembly process and as a rigid gripping and locating element during the filling and closure process.

[0029] Unlike known containers of this type which are closed by screw caps, the container described is closed by a membrane seal 17 which is heat-sealed on the upper end of the spout by conventional techniques which are used for the production of the container (hot iron, ultrasound, high-frequency induction).

[0030] The seal 17 is preferably constituted by a composite, laminated piece of sheet comprising, basically, an outer polyester layer (optionally printed internally) which ensures the necessary mechanical tear strength, an intermediate aluminium layer, and a layer of highly adhesive varnish or plastics film which is united with the top of the spout.

[0031] By way of indication, the aluminium layer may have a thickness of 40µm, the polyester layer a thickness of 12µm, and the varnish layer a thickness of 5 µm.

[0032] The essential aspect of the invention is that the seal is constituted by a piece of sheet, which is preferably disc-shaped, with a diameter significantly greater than the outside diameter of the spout and preferably no less than the sum of the outside diameter of the cylindrical portion 12 of the spout and twice the axial extent thereof.

[0033] Figures 2 to 4 show this aspect clearly.

[0034] In Figure 2, which shows a first stage of the operation to seal the container (which, naturally, takes place immediately after the filling thereof), the seal 17, which is pressed onto the top portion 12 of the spout by conventional mechanical devices, is welded thereto by heating (with an annular hot iron, ultrasound or induction) which ensures perfect adhesion of the seal to the top of the spout.

[0035] The welding area is identified by the circular ring 18.

[0036] As shown in Figure 3, in the course of the same welding operation or immediately afterwards, a suitably shaped sleeve folds and presses flat the ring of the seal 17 disposed outside the welding region, wrapping it

closely around the cylindrical end portion of the spout, as shown in Figure 4.

[0037] The end of the spout is thus protected from any direct contact with the exterior during subsequent handling.

[0038] Although it is not essential, since the surface roughness of the pressed-flat seal enables it to be reopened easily, the seal 17 may be pressed flat in a manner such so as to form projecting tabs 19 as shown in Figure 5, which further facilitate the unfolding operation.

[0039] Naturally, the use of a disc-shaped seal 17 is merely preferred, mainly for aesthetic reasons; there is nothing to prevent the use, as seals, of polygonal or even square pieces which in any case have dimensions such as to include a circle with a diameter at least equal to that indicated above.

[0040] Figures 1 to 5 relate to a conventional container in which a threaded spout is provided and which can therefore be closed by a screw cap or, without modification, by means of a folded membrane seal as provided for by the present invention.

[0041] This permits considerable economies of scale at the production level since the same type of spout can be used just as well to produce containers for multiple servings, the contents of which are consumed at different times and which can be re-closed by screw closure caps, or single-portion containers in which the membrane seal is preferable.

[0042] It is clear, however, that the invention, in its simplicity, permits further diversification and simplification of the product.

[0043] For example, if the container of Figure 1 is arranged exclusively for closure by means of a membrane seal, it can use, in its structure, a spout such as that shown in Figure 6 in which the externally threaded portion is absent; if desired, this advantageously permits a longer axial extent of the smooth end portion which, amongst other things, can adopt an oval cross-section which can fit more comfortably in the mouth, since the constraint of circularity of the thread no longer applies.

[0044] Moreover, the flexible container with delivery spout closed by a membrane seal according to the present invention may clearly consist of an envelope-like container, as shown in Figure 7, formed simply by two juxtaposed sheets welded together at their periphery, rather than a bag-like container.

[0045] This leads to the consideration of a significant technical advantage offered by the invention.

[0046] In an envelope-like or bag-like container with a spout closed by a membrane seal, since it is not necessary to exert any torque to unscrew a cap, the spout structure shown in Figure 6 can be further simplified.

[0047] In known containers, the spout has two rigid fins 20, 21 which are interposed between the walls of the container and are welded thereto, basically to form a rigid structure for the gripping of the container, enabling a suitable unscrewing torque to be exerted between the container and the screw cap without thereby

risking damage to the flexible container.

[0048] If the spout is closed by a membrane seal, this is no longer necessary and a spout without one or both fins 20, 21 can be used.

5 **[0049]** It thus becomes possible to produce an extremely simple, very low-cost, envelope-like (or even bag-like) container such as that shown in Figure 8.

[0050] A single sheet, for example, a rectangular sheet of composite material (for example, PET, Al, PE) 10 folded onto itself along a fold line 28, forms an envelope with three sides 22, 23, 24 which are heat-sealed to one another, after the interposition, along the folded side, of a drinking straw 25 which is extended outside the envelope by a spout 26 provided with flanges for the handling 15 of the container.

[0051] Once the container has been filled with the product, the spout is closed with a membrane seal 27 such as that already described.

[0052] This type of container is suitable for mass production starting with a single strip of composite film 20 which, during the production process, is folded onto itself and cut into sections in the course of the edge-welding operation by extremely simple apparatus.

[0053] The empty containers can be stocked in large 25 quantities with an extremely small volume for distribution to the food-packaging industry where, upon completion of the filling operation, sealing with a membrane seal is performed by conventional means (hot iron, ultrasound, etc.).

30 **[0054]** Moreover, many further variations can clearly be introduced.

[0055] For example, as shown in the schematic front view of Figure 9 and in the cross-section of Figure 10, if a gusset 30 folded onto itself along the continuous line 31 (with the heat-sealable face arranged externally) 35 is interposed in the lower portions of two juxtaposed sheets 29A, 29B, and the two juxtaposed sheets and the interposed gusset are welded together along the peripheral line 32, shown by a broken line, it is possible to produce a combined envelope/bag-like container with a bellows-like expansion base which, after filling, opens out to form a relatively flat support surface which is clearly visible in the perspective view of Figure 11.

[0056] This constructional solution may be considered a variant of that shown in Figure 7.

[0057] A similar variant can be produced starting with the envelope of Figure 8, as shown in the front view of Figure 12 and in the respective cross-section of Figure 13.

50 **[0058]** In this case, the lower gusset 35 which is folded onto itself along the line 33 is interposed, diagonally relative to the vertical extent of the container, between the two juxtaposed faces of the single, folded sheet 34.

[0059] The heat-sealing of the various elements to one another, which is performed along the line 36, shown as a broken line, produces a combined envelope/bag-like container with a bellows-like expansion base 55 which opens out to form a support surface that is rela-

tively flat, although somewhat inclined relative to the vertical extent of the container.

[0060] However, the inclination of the support surface relative to the vertical extent of the container can clearly be reduced or completely cancelled out by tapering the container in its upper portion as shown in Figure 12.

[0061] In a further variant shown in the front view of Figure 14 and in the cross-section of Figure 15, each of the two faces of the sheet 37 which is folded onto itself along the fold line 38 is extended at the bottom by a scalene triangular appendage 39 with an obtuse-angled vertex 42 (preferably of 120°).

[0062] A gusset 40, folded onto itself along a line 41 intersecting the vertex 42 of the triangular appendage is interposed between the two faces, in the region of the edges remote from the fold line 38.

[0063] The fold line 41 may intersect the upper edge 43 of the folded sheet 37 at any point but preferably, as shown, at its end remote from the spout.

[0064] When the various elements have been heat-sealed along the line 44, shown as a broken line, a bag-like container is obtained in which the lower portion constituted by the triangular appendages and by the interposed portion of the gusset 40 is bent, when the container is filled, to form a triangular support surface.

[0065] The perspective view of Figure 16 shows a container of this type once it has been filled.

Claims

1. A flexible envelope-like or bag-like container (1) made of composite material, provided with a delivery spout (11) made of rigid plastics material heat-sealed to the composite material of the envelope or bag, the spout being extended outside the container by at least a smooth end cylinder (12) provided for insertion in a user's mouth, **characterized in that:**
 - the smooth cylinder (12) is closed by a membrane seal (17) made of composite material which is heat-sealed on the end of the cylinder and is pressed flat around the cylinder to cover its outer surface.
2. A container according to Claim 1 in which the cylinder (12) has a circular cross-section and the membrane seal is formed by a disk of composite material having a diameter no less than the sum of the diameter of the cylinder and twice the axial extent of the cylinder.
3. A container according to Claim 1 in which the cylinder (12) has an oval cross-section and the membrane seal is formed by a disk of composite material having a diameter no less than the sum of the major diameter of the oval cross-section and twice the axial extent of the cylinder.
4. A container according to any one of the preceding claims in which the portion of the membrane seal (17) which is pressed flat is folded onto itself to form at least one gripping tab (19).
5. A container according to any one of the preceding claims, formed by two sheets (29A, 29B) juxtaposed with the interposition, between the ends of the sheets remote from the delivery spout, of a gusset (30) which is folded onto itself to form an expansion bellows.
6. A container according to any one of preceding Claims 1 to 4, comprising a sheet of composite material folded onto itself along a fold line (28) to form two opposed walls of the container, and in which the delivery spout (25, 26) is inserted between the opposed walls in the region of the fold line.
7. A container according to Claim 6 in which a gusset (35) folded onto itself and forming an expansion bellows is interposed between the ends of the walls remote from the delivery spout.
8. A container according to Claim 6 in which the end of each wall (37) remote from the delivery spout is extended by a scalene triangular appendage (39) with an obtuse-angled vertex (42), and a gusset (40), folded onto itself along a fold line (41) approximately intersecting the vertex (42), is interposed between the walls (37), the gusset forming an expansion bellows and, together with the triangular appendages (39) of the walls, also forming a triangular support base of the container.

FIG. 2

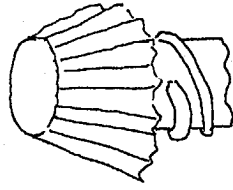
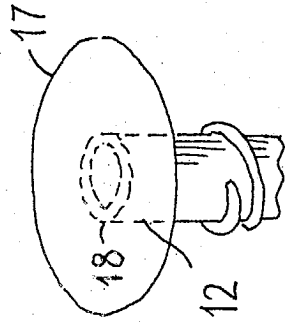


FIG. 4

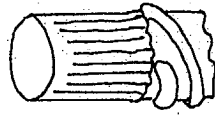


FIG. 5

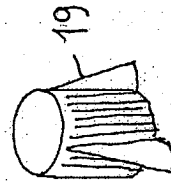


FIG. 6

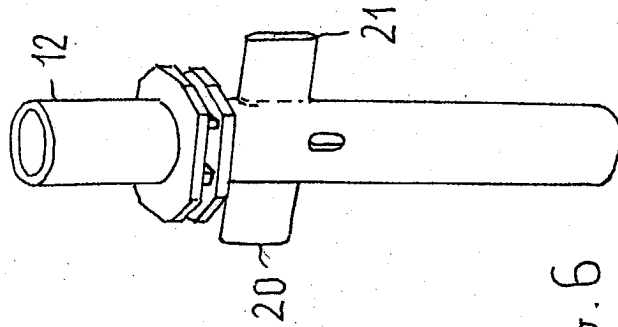
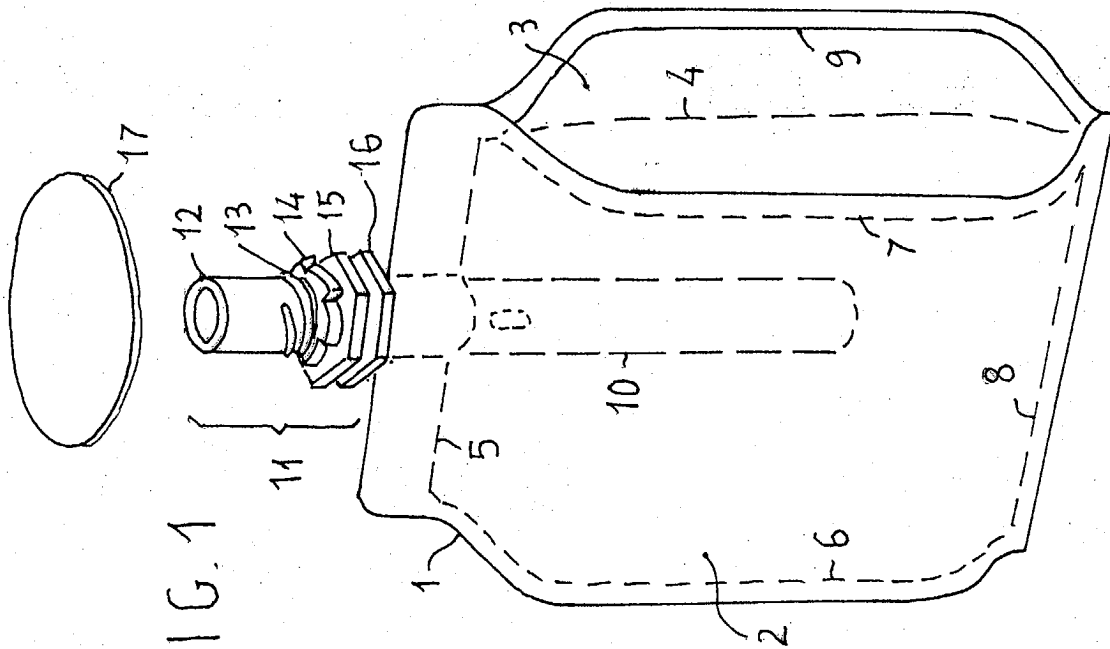


FIG. 1



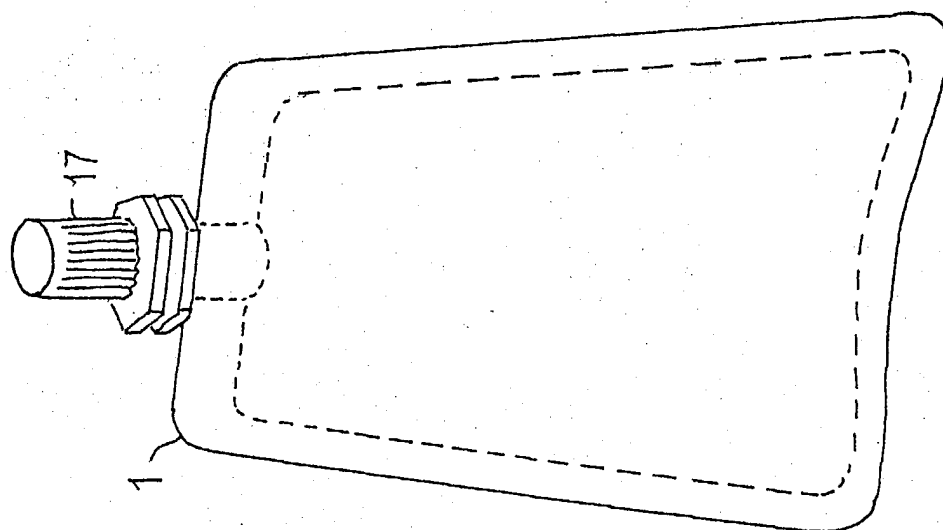


FIG. 7

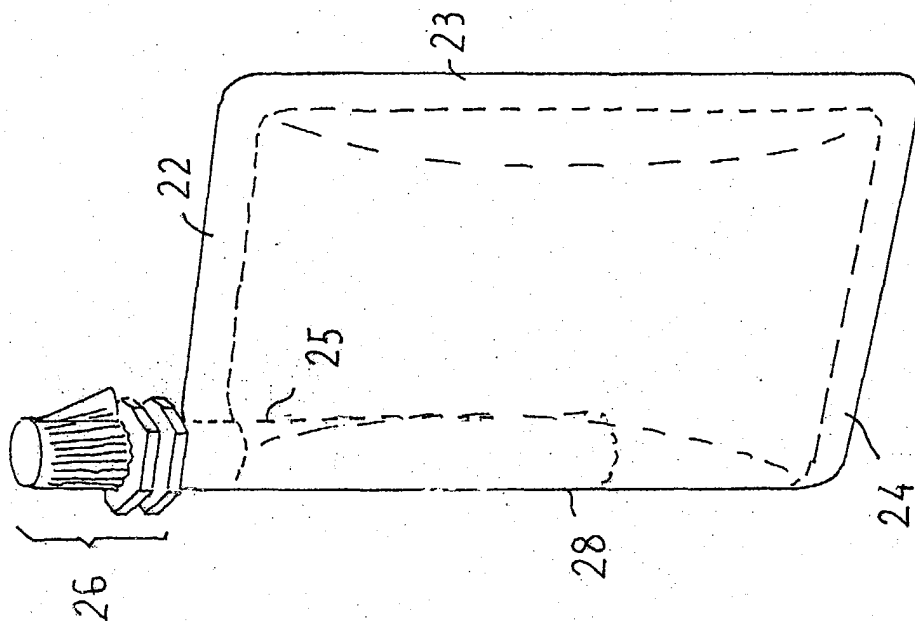


FIG. 8

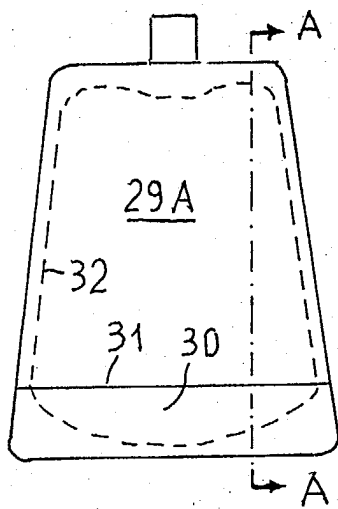


FIG. 9

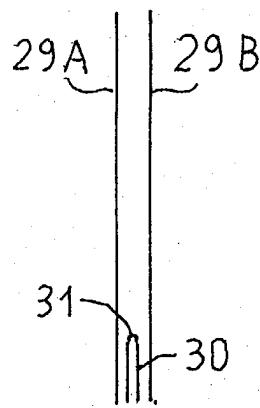


FIG. 10

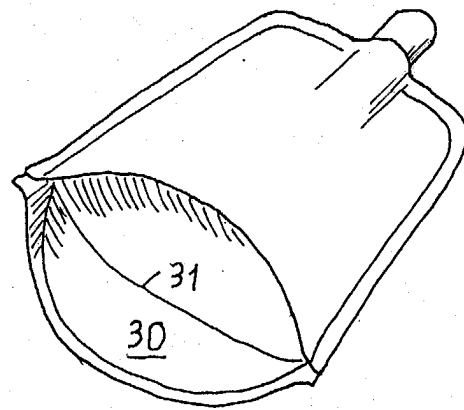


FIG. 11

FIG. 12

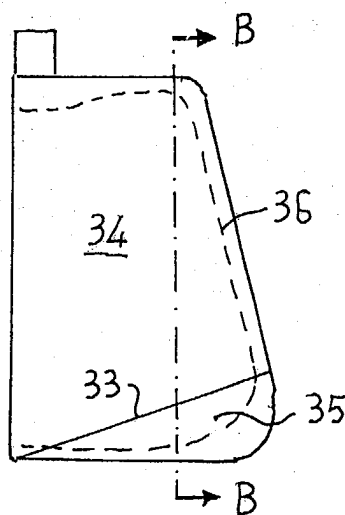


FIG. 13

FIG. 14

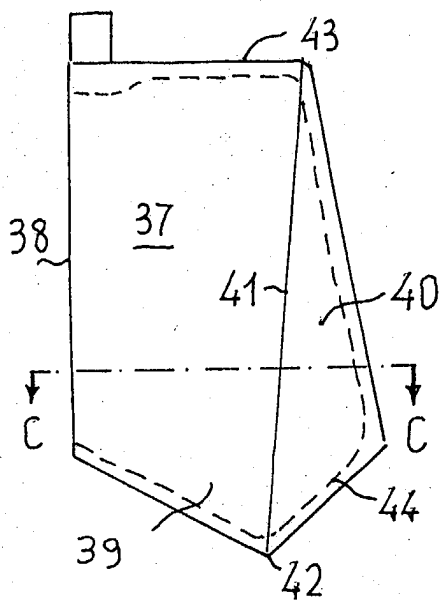


FIG. 15

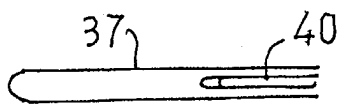
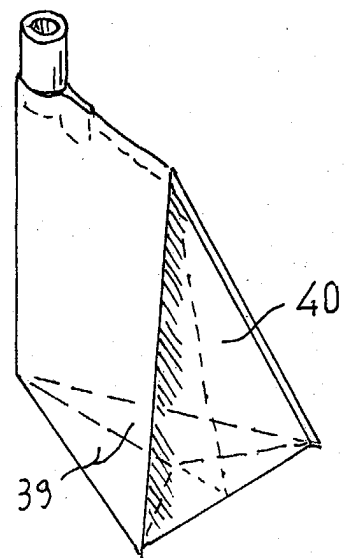


FIG. 16





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 5766

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 05, 14 September 2000 (2000-09-14) -& JP 2000 033958 A (DAINIPPON PRINTING CO LTD), 2 February 2000 (2000-02-02)	1	B65D75/58 B65D77/28
Y	* abstract; figures *	2,3	
Y	US 2 388 738 A (ARNE GUDHEIM) 13 November 1945 (1945-11-13) * page 1, left-hand column, line 38 - line 55 * * page 2, left-hand column, line 67 - right-hand column, line 9; figures *	2	
Y	US 6 241 132 B1 (MORRISON ADAM P) 5 June 2001 (2001-06-05) * column 4, line 66 - line 67; figure 2 *	3	
A	US 6 474 490 B1 (SEIBEL LAWRENCE P ET AL) 5 November 2002 (2002-11-05) * figure 4 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D
<p>1 The present search report has been drawn up for all claims</p>			
Place of search		Date of completion of the search	Examiner
The Hague		5 August 2004	Bridault, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03-82 (P04C01)



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Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-4



European Patent
Office

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 04 07 5766

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-4

container with a membrane seal

2. claims: 1, 5-8

flexible container

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 07 5766

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-08-2004

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