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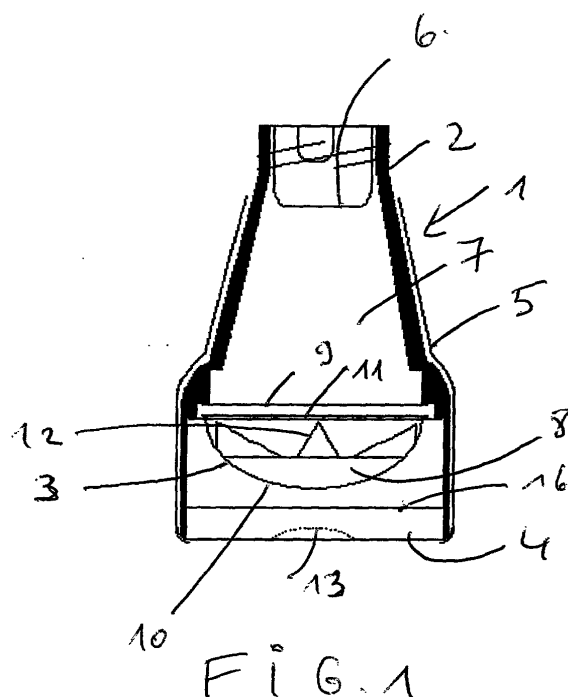
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(54) **An assembly for two products to be mixed prior to use**

(57) The present invention concerns an assembly
 (1) for two products to be mixed just prior to use comprising

- a first container (2) comprising lateral walls,
- a base product (7) filled in said container and completely sealed with a first membrane (6) on the top of the container and a second membrane (9) on the inside and near the bottom of said first container,
- a second container (3) containing a supplement (7) and comprising a flexible formed bottom (10), a third membrane (11) sealing the periphery of the flexible bottom and cutting means (12) inside said container, said second container (3) being in the internal space of the first container (2) and near the second membrane (9) and
- a piston (4) disposed below the second container (3) and at the bottom and inside the first container, for pushing the flexible bottom (10) of the second container (3) to pierce the third membrane (11) of the second container and the second membrane (9) of the first container.



Description

[0001] The present invention concerns an assembly for two products to be mixed just prior to use.

[0002] The primary object of the invention is to keep separated an additive from the main part of the product filled in a separate container until the product has to be consumed, at which time the additive is released into the base product. Such solutions are already known, for example in the patent application WO 01/05675. This patent concerns an assembly for two products to be mixed just prior to use comprising

- a container comprising an upper part with a cap, a lateral wall and a bottom,
- an aseptic, UHT, sterilised or pasteurised product filled in said container and completely sealed on the upper part with a membrane and
- a supplement disposed in a second container.

There are several different embodiments in this patent application for the disposition of said second container. The problem with this solution is that the mixing of both components is not efficient enough.

[0003] The present invention concerns an assembly, wherein by the mixing of both components, the consumer has an efficient mixing with a normal shaking of the assembly. Furthermore, the present invention is more convenient and safer.

[0004] The present invention concerns an assembly for two products to be mixed just prior to use comprising

- a first container comprising lateral walls,
- a base product filled in said container and completely sealed with a first membrane on the top of the container and a second membrane on the inside and near the bottom of said first container,
- a second container containing a supplement and comprising a flexible formed bottom, a third membrane sealing the periphery of the flexible bottom and cutting means inside said container, said second container being in the internal space of the first container and near the second membrane and
- a piston disposed below the second container and at the bottom and inside the first container, for pushing the flexible bottom of the second container to pierce the third membrane of the second container and the second membrane of the first container.

[0005] One of the great advantages in having both products separately sealed is that up to the end of shelf-life both products are good for consumption without any physical or chemical changes, which would not be the case if they had been mixed at time of product filling in the same package and stored over a certain shelf-life.

[0006] Another great advantage of the invention is that the two products are each completely sealed and closed and packaged together as one entity but kept to-

tally separate up to time of consumption.

[0007] Finally, it is possible according to the invention to use any type of packaging for the liquid product and the supplement according to the barrier requirements of each individual product type.

[0008] The assembly according to the invention is furthermore very convenient for the consumer: he has to push the piston, so that the bottom of the second container with the cutting means moves to pierce both membranes of the first and the second container. The cutting means are sufficient in dimension to operate a really large opening to allow the supplement to be easily mixed with the base product. After the shaking of both components, the consumer can then open the first membrane of the first container and the product is ready to use.

[0009] According to a first embodiment of the invention, the inside of the first container presents a shoulder increasing the diameter of said container from the top to the bottom. This embodiment will be better explained herunder in relation with the figures.

[0010] According to this first embodiment, different possibilities are to be taken in consideration concerning the disposition of the second container with the first container. According to a first solution, the second membrane of the first container is sealed inside and on the shoulder of said container and the second container is sealed on said second membrane. In this case, there are two possibilities: either the third membrane of the second container has a smaller diameter than the formed bottom, so that the formed bottom is sealed against the second membrane of the first container or the third membrane of the second container has the same diameter as the formed bottom and in this case, the third membrane is sealed against the second membrane of the first container. According to a second solution, the second membrane has a smaller diameter, so that it is sealed also on the shoulder of the first container, but in this case, the second container is directly sealed on the shoulder of said first container: in this case, there are two possibilities. Either, the third membrane of the second container has the same diameter as the flexible bottom and in this case the third membrane is sealed on the shoulder or the third membrane has a smaller diameter than the flexible bottom and in this case, it is the periphery of said flexible bottom which is sealed to the shoulder of the first container.

[0011] Instead of sealing, it is also possible to carry out a welding of the membranes.

[0012] According to a second embodiment of the invention, the inside of the first container is substantially cylindrical and the second and third membranes are sealed substantially near to each other on the inside wall of said container.

[0013] According to a third embodiment of the invention, the inside of the first container presents an annular rim on which the second and third membranes are sealed.

[0014] When the consumer pushes the piston for

piercing the second container, there is a pressure increase inside of the first container, which blocks the movement of the bottom of the second container. It is therefore necessary that the first membrane sealed on the top of the first container is made from a compressible material or a material with collapsible shape for pressure release during the piercing process.

[0015] Concerning the cutting means in the second container, it is possible either to have said cutting means integral or not integral with the flexible bottom of said second container. In the case of the cutting means not integral with the flexible bottom, the inside of the first container must include means for stopping the cutting means to fully enter the filled part of the first container.

[0016] The base product in the first container is normally a powder, liquid or viscous product. The supplement can be a powder, a liquid, a viscous or a compacted product.

[0017] There are at least three great advantages in the present invention. The first is that the shelf life can be extended. The second is that it is possible to fill new products, which are normally unstable and because of the mixing just prior to use, it is possible to consider a packaging of said products. And the third is already mentioned above and concerns the product quality of separated packaged products.

[0018] Concerning the filling of the base product and the supplement, there is no criticality and it is only dependent on the type of product which is considered. For example, it is possible to carry out an aseptic filling, or proceed to UHT treatment, sterilisation, pasteurisation or no heat treatment at all. The base product and the supplement can be used per se, or filtered or chemically treated.

[0019] The base product can be of any kind of food, petfood, nutritional, clinical and medicine products, like products taken from the group consisting of a milk-based product, juice, fruit product, mineral water, stilldrink, enteral feeding, parenteral feeding, petfood, soup, sauce, dressing and mayonnaise.

[0020] Concerning the supplement, it can be any type of supplement, which provides an added value to the basic product. The supplement is taken from the group consisting of a foodstuff, minerals, vitamins, flavours, prebiotic, probiotic, energetics, like natural ingredients and functional ingredients, supplement for infant feeding, like hypoallergenic powder, alone or in combination.

[0021] The cutting means present in the second container are not critical. These means are either blades or needles or any other tools having a piercing functionality. Preferably, the piercing means are in the form of blades extending radially, for example 2 to 10 blades.

[0022] The first container can be rigid or semi-rigid. As rigid or semi rigid package, it is possible to use bottles, cups or jars. The material of this container could be molded or injected plastic. For example, polypropylene (PP), polyethylene (PE), Polyethylene terephthalate (PET), mixtures with other materials or multi-layer struc-

tures can be used. The piston is from a rigid material, like molded or injected plastic. This material could be PP or HDPE (high density polyethylene). The cutting means are also rigid material, like PP, HDPE or PS (polystyrene). The flexible bottom material and the membranes used could be mono-materials, laminates or co-extruded materials. It is possible to take any type of material known in the art for example aluminium laminate, PE, Polyamide, PP, PS, polyethylene terephthalate.

[0023] All materials used for either container could incorporate barrier properties with regard to gas and/or vapour transmission rates and/or oxygen transmission rates.

[0024] The ready to drink product can be foreseen for babies, for infants, for adults, for old persons and for pets.

[0025] The present invention concerns further a tamper-evident device comprising

- a main container with an upper rim and a bottom or a lower rim and a top,
- a closure on the top of the container or a piston on the bottom of the container with radial tabs extending either on the upper rim or on the lower rim of said container and
- a shrink or stretch sleeve covering the tabs of either the closure or piston.

[0026] Besides the container seen open by opening the closure or moving the piston to obvious visible differences, tamper evidence could be seen in the following way :

[0027] If the tamper evident device is on the closure, the radial tabs are on said closure : you can then see if the package has been opened if the radial tabs are above the shrink or stretch sleeve.

[0028] If the tamper evident device is on the piston, the radial tabs are on said piston : you can then see if the package has been opened if the radial tabs are above the shrink or stretch sleeve. This is better shown on figure 4.

[0029] The invention is now illustrated, by way of example, in the attached drawings, in which

Fig. 1 represents a schematic view of the assembly according to the invention in the first embodiment,

Fig. 2 is an exploded view of the assembly of figure 1,

Fig. 3 is a top view of the cutting means and

Fig. 4 is a schematic view of the tamper evident device according to the invention.

[0030] The assembly (1) presents a first container (2), a second container (3) and a piston (4) having radial tabs (15). A shrink sleeve (5) covers the assembly. This

shrink sleeve is made with a plastic material, like PVC. The second container (2) is placed in the inside of container (1). The top of container (2) has a first membrane (6) of a compressible material and a second membrane (9) near the bottom, both membranes being sealed on the container. The container (2) is filled with a liquid (7) and the second container (3) with a powder (8). The second container comprises a flexible bottom (10) and a third membrane (11) sealed on the periphery of the flexible bottom : this membrane is close to the second membrane of the first container. This second container comprises further cutting means (12) inside said container. The cutting means (12)(Fig. 3) are six blades (31) extending radially from the center (33) : The blades have such a geometry that they have six piercing points (32) and one piercing point (33) at the center. A cover (14) can be screwed on the top of the first container.

[0031] When the consumer wants to use the assembly, he operates as follows. He pushes the piston (4) with a finger in the recess (13), so that the radial elements (16) of said piston goes upwards to deform the flexible bottom (10). The cutting means (12) are therefore put into action, the piercing points (32) and (33) pierce the membranes (9) and (11) and the blades (31) cut then said membranes. The powder (8) is then allowed to mix with the liquid (7): The consumer has then to shake the assembly and the product is ready to be used. It is important that membrane (6) is made with a compressible material, because of the increase of pressure inside the first container by the pushing of the piston and the second container.

[0032] Figure 4 shows the tamper evident device according to the invention. The container (20) is represented with the lateral wall (21) and its bottom (26). The piston (23) is inserted in the inside of the wall (21). The piston presents radial tabs (26). Part (a) of the figure shows the packaging with the tamper evident device in its original state, that means that the shrink sleeve (22) covers the radial tabs (26). With this state, the consumer is sure that the package has not been violated.

[0033] If the consumer pushes the piston (23) with his finger in the recess (24) according to (b), the movement is given according to the arrow.

[0034] If somebody would then want to come back to the original state according to (c) in the direction of the arrow, then the shrink sleeve would be below the radial tabs, meaning then that the package has been already opened once.

Claims

1. An assembly for two products to be mixed just prior to use comprising
 - a first container comprising lateral walls ,
 - a base product filled in said container and completely sealed with a first membrane on the top

- of the container and a second membrane on the inside and near the bottom of said first container,
- a second container containing a supplement and comprising a flexible formed bottom, a third membrane sealing the periphery of the flexible bottom and cutting means inside said container, said second container being in the internal space of the first container and near the second membrane and
- a piston disposed below the second container and at the bottom and inside the first container, for pushing the flexible bottom of the second container to pierce the third membrane of the second container and the second membrane of the first container.

2. An assembly according to claim 1, wherein the inside of the first container presents a shoulder increasing the diameter of said container from the top to the bottom.
3. An assembly according to claim 1, wherein the inside of the first container is substantially cylindrical and the second and third membranes are sealed substantially near to each other on the inside wall of said container.
4. An assembly according to claim 1, wherein the inside of the first container presents an annular rim on which the second and third membranes are sealed.
5. An assembly according to any of claims 1 or 2, wherein the second container is sealed to the second membrane of the first container, said second membrane being sealed on the shoulder of said first container.
6. An assembly according to any of claims 1 or 2, wherein the second container is sealed directly on the shoulder of the first container.
7. An assembly according to any of claims 1 to 6, wherein the first membrane sealed on the top of the first container is made from a compressible material or a material of collapsible shape for pressure release during the piercing process.
8. An assembly according to any of claims 1 to 7, wherein the cutting means in the second container are integral or not integral with the flexible bottom of said second container.
9. An assembly according to any of claims 1 to 8, wherein the base product is powder, liquid or viscous and the supplement is a powder, a liquid or a viscous product.

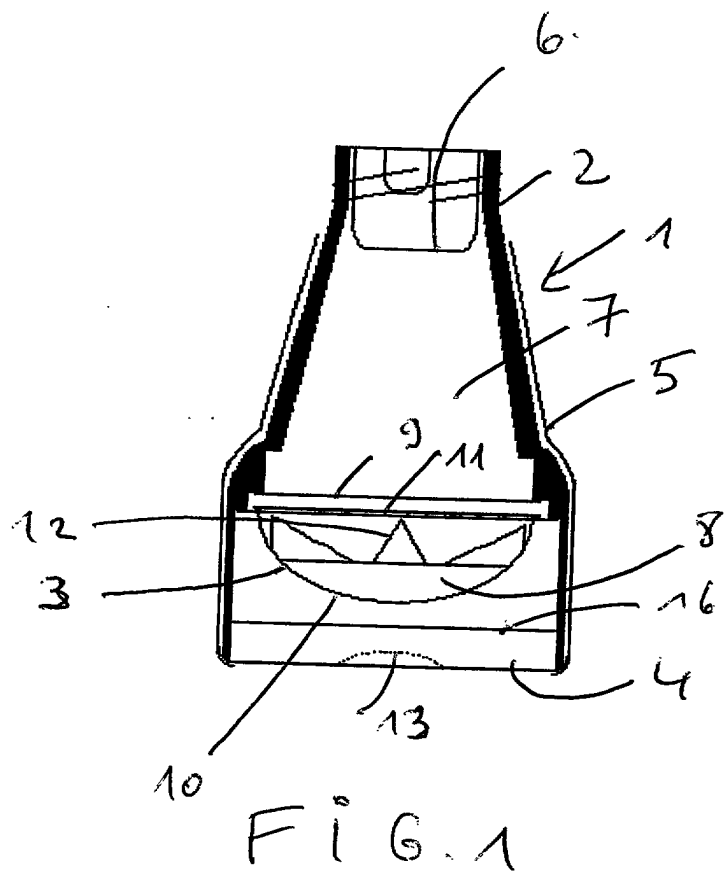
10. An assembly according to any of claims 1 to 9, wherein the base product and the supplement are taken from the group consisting of an aseptic, UHT, sterilised, pasteurised, filtered, chemically treated and untreated product. 5
11. An assembly according to any of claims 1 to 10, wherein the base product is taken from the group consisting of a milk-based product, juice, fruit product, mineral water, stilldrink, enteral feeding, parenteral feeding, petfood, soup, sauce, dressing and mayonnaise. 10
12. An assembly according to any of claims 1 to 11, wherein the supplement is taken from the group consisting of a foodstuff, minerals, vitamins, flavours, prebiotic, probiotic, energetics, natural ingredients, functional ingredients, supplement for infant feeding, alone or in combination. 15
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13. An assembly according to any of claims 1 to 12, wherein the cutting means are in the form of blades extending radially or needles.
14. A tamper-evident device comprising 25
- a main container with an upper rim and a bottom or a lower rim and a top ,
 - a closure on the top of the container or a piston on the bottom of the container with radial tabs extending either on the upper rim or on the lower rim of said container and 30
 - a shrink sleeve covering the tabs of either the closure or piston. 35

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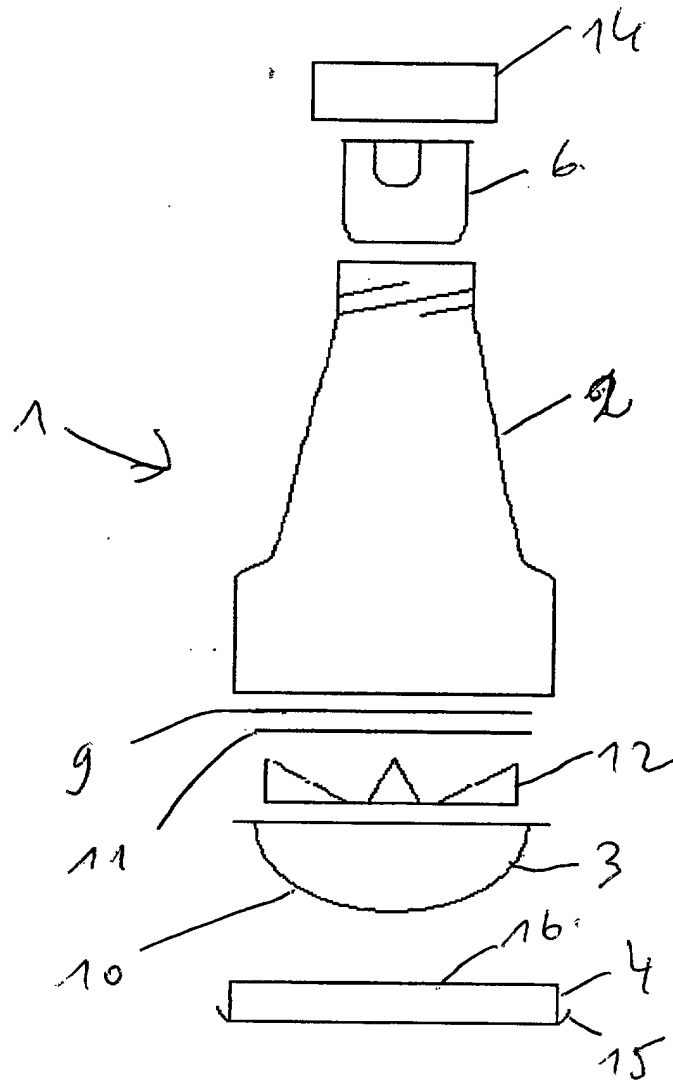
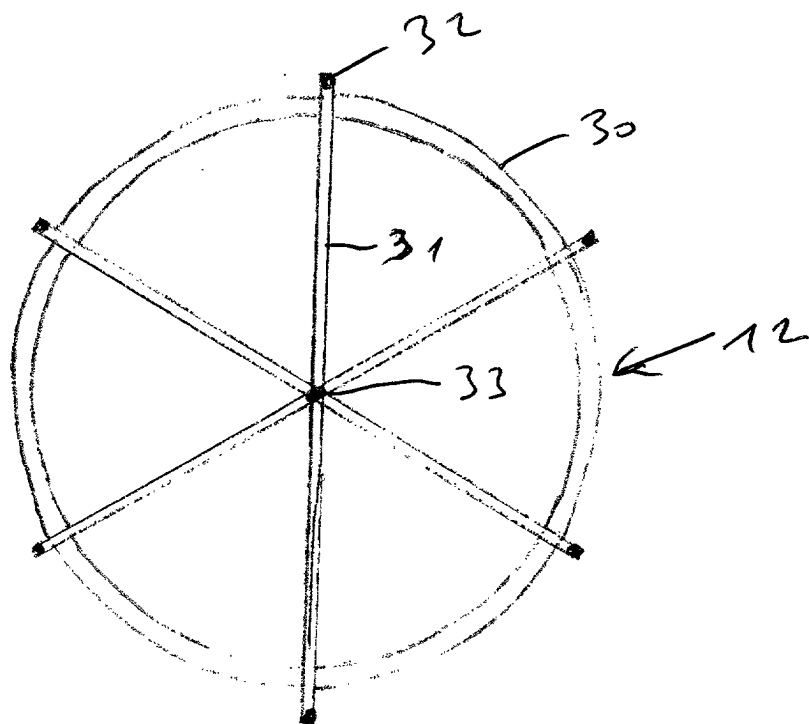


FIG. 2



F i G. 3

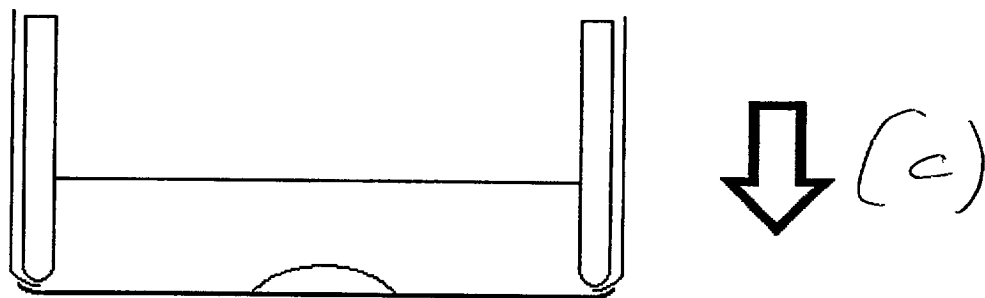
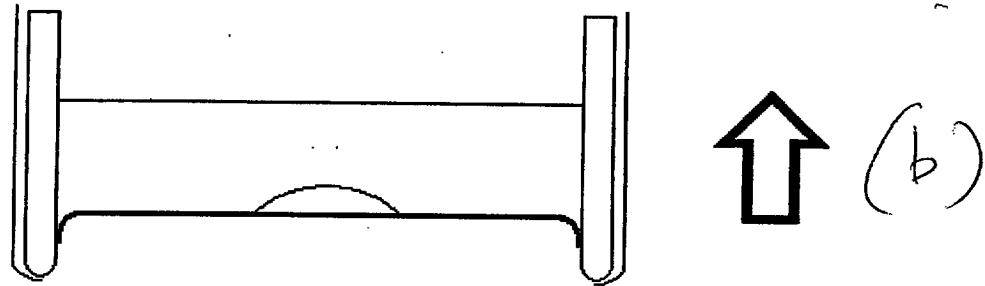
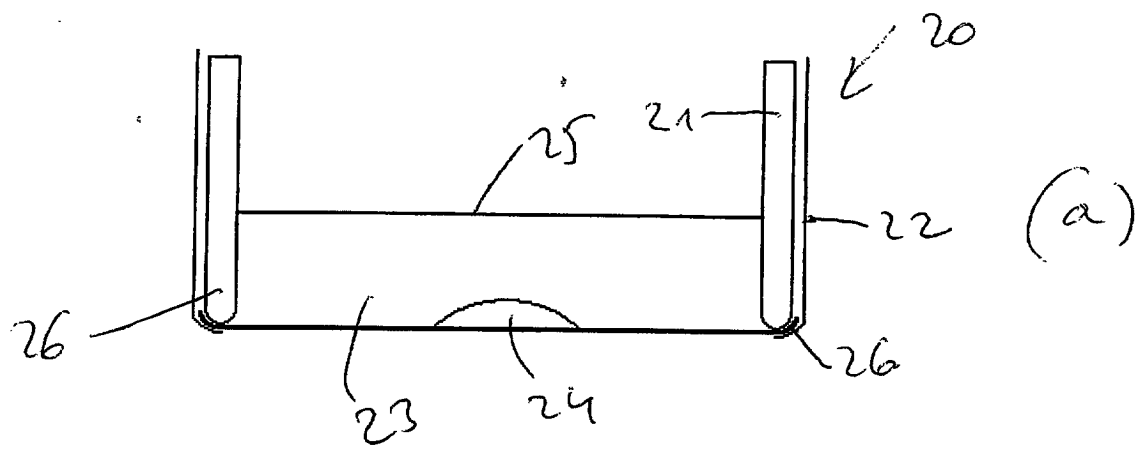


FIG. 4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 11 7010

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)
D,A	WO 01 05675 A (NESTLÉ) 25 January 2001 (2001-01-25) * page 6, line 32 - page 7, line 10 * * page 12, line 10 - line 33; figures 16,17; example 1 *	1,9-12	B65D81/32
A	GB 1 334 712 A (IVOCLAR) 24 October 1973 (1973-10-24) * page 7, line 7 - line 50; figure 3 *	1	
A	FR 91 607 E (MAUPAS) 6 December 1968 (1968-12-06) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D A61J
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 December 2001	MARTENS, L
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03.82 (PC4C01)



European Patent
Office

Application Number
EP 01 11 7010

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:

1-13



European Patent
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LACK OF UNITY OF INVENTION
SHEET-B

Application Number
EP 01 11 7010

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: 1-13

Assembly comprising two containers and means for mixing their contents.

2. Claim : 14

A tamper-evident device comprising a container, a closure or a piston with radial tabs and a shrink sleeve covering the tabs.

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

EP 01 11 7010

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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