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(54) Title: ASSEMBLY ADAPTED FOR DISPENSING A FOOD SUPPLEMENT COMPOSITIONS INTO A CONTAINER

(57) Abstract: The present invention concerns an assembly (10) which is adapted for dispensing a food supplement composition into a container. This assembly generally comprises an outer cap (12) and an inner cap (20). Within the assembly, a food and/or food supplement product is contained in powder, granule or pellet form. This product can be manually discharged after removing a seal from the bottom of the outer cap and applying pressure to its top surface. Typically, the discharge of the product is effected after screwing the assembly on a suitable beverage container for water or a water based product.

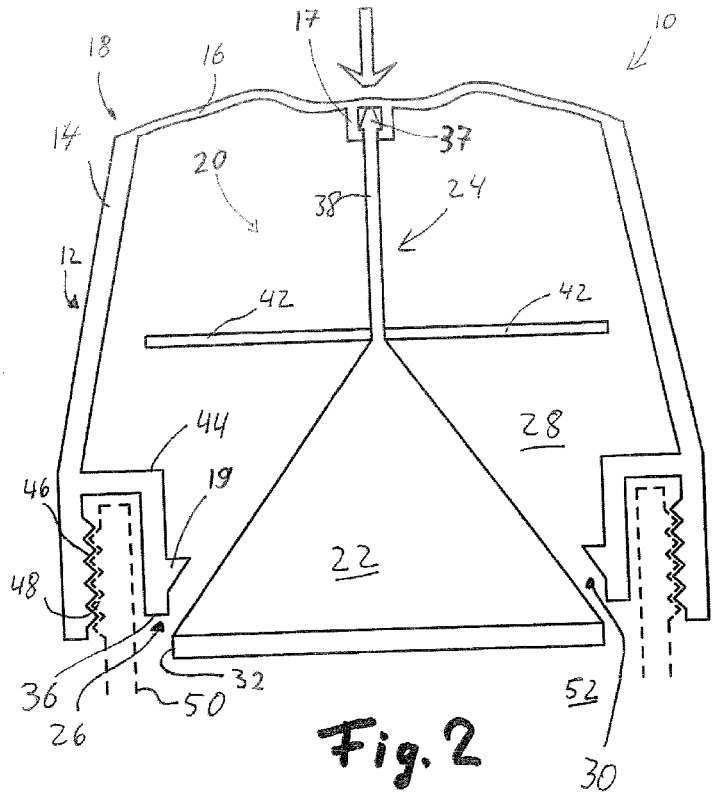

Fig. 2

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Assembly adapted for dispensing a food supplement compositions into a container

The present invention concerns an assembly which is adapted for dispensing a food supplement composition into a container. This assembly generally comprises an outer cap and an inner cap as described herein. Within the assembly, a food and/or food supplement product is contained in powder, granule or pellet form. This product can be manually discharged after removing a seal from the bottom of the outer cap and applying pressure to its top surface. Typically, the discharge of the product is effected after screwing the assembly on a suitable beverage container for water or a water based product.

Prior art

Assemblies constructed to provide a dispensing means into another container are generally known from the prior art. Such assembly or a dispensing closure is disclosed in WO 2005/023667 A1. A dispensing closure for a container, such as a beverage container, allows to selectively dispense a product carried by the closure into a container. Such closure may be provided with a compartment to contain the product to be dispensed. Such compartment may be formed by a cylindrical side wall, a top wall and a frangible bottom wall. A cutting blade is moveable relative to the side wall and the bottom wall to break open the frangible bottom wall to selectively dispense the contents into the container.

Document US 2011/000800 A1 discloses an inverted dome for supplying dosing means to an attached main vessel. The inverted dome comprises an inverted dome dispensing closure having a housing, which housing comprises a septum, a thinner convex dome and an end plate seal.

Further prior art is disclosed in document US 2008/0073307 A1. The document describes an infusion cap that can be screwed onto the threaded neck of a bottle. The infusion cap comprises a portion that can be pressed toward the bottle to discharge a substance into the bottle.

Document GB 2 501 755 A discloses a storing and mixing device, comprising a first and a second chamber. The opening between the two chambers is sealed by a plug

which is moveable between a storing position and a mixing position. The plug may be moved via a deformable membrane.

The problem

There is still a need to provide an assembly which would be applicable to contain for instance a food supplement composition, wherein the dispensing of the product can be achieved easily. Moreover, it is very often desired that the manufacturing costs of such dispensing device are kept minimum. Moreover, it is very often necessary that certain hygiene standards are met. In particular, it has to be ensured that the physicochemical and microbiological stability of the products is not affected. Thus, it is also necessary to safeguard that this physicochemical and microbiological stability is not unintentionally disturbed.

Such assembly should further provide for an easy adaption to commercially available beverage containers. Thus, one particular assembly can be used with various containers.

The assembly should further be capable to be filled with any solid food or food supplement product having the ability to free-flow.

The invention

With the above aims and problems in mind, the assembly as described herein has been developed. This assembly comprises:

- a semi-rigid container having the shape of a closure, hereinafter referred to as "outer cap", containing a food or food supplement product in powder, granule or pellet form. The top part of the outer cap is flexible, yet impermeable, in order to move under moderate pressure. The bottom part of the outer cap is open to facilitate filling. All other parts of the cap are rigid and completely impermeable.
- a separator valve, hereinafter referred to as "inner cap". The inner cap's bottom part may be conically shaped in order to seal the bottom part of the outer cap after the later has been filled and yet facilitate the free flow of the contained formulation. When interlocked the inner and outer caps form an impermeable compartment having a nominal volume of 5 mL that secures the

cap ingredients. The top part of the inner cap comes into direct contact with the flexible top part of the outer cap. Application of moderate external pressure on the top of the outer cap thus relocates the inner cap and releases the product. The middle part of the inner cap may be rod shaped and its diameter is such that does not allow the inner cap to be dispensed together with the cap contents.

- A seal – typically an aluminum or plastic foil – is securing the bottom of the outer cap. The foil can also be comprised of any composite material suitable for food packaging provided that it is air impermeable.

The dispensing closure described above can be adapted on many commercially available beverage containers. In this way, several caps can be sold separately lowering manufacturing and commercialization costs. Furthermore, the cap which may be stored separate from a beverage container is protected from the beverage humidity.

The cap can be filled with any solid food or food supplement product having the ability to free-flow. Preferable dosage forms are powder, granules or pellets for oral solution. All materials used must be compatible to international food and food supplement law. In addition all materials must be water soluble.

Accordingly, the present invention concerns an assembly adapted for dispensing a food supplement composition into a container, the assembly comprised of:
- an outer cap having a generally inverse U-shaped cross-section with a substantially cylindrical or conical wall section and a generally dome-shaped top section,
- the outer cap being adapted to engage with an aperture of the container, and the outer cap being adapted to deform upon a force or pressure being exerted thereon from an outside;
- an inner cap generally provided inside the outer cap and comprising a disk and a link, wherein the disk is shaped and dimensioned to form a closure of the cylindrical or conical wall section at a second end region thereof, and wherein the link connects the disk and the outer cap and is adapted to displace the disk relative to the second end region of the cylindrical or conical wall section when a force or pressure is exerted on the outer cap, such that a gap is formed between the cylindrical or conical wall section and the disk;
- wherein the second end region of the cylindrical or conical wall section and a rim of the disk form a valve comprising a valve seat and a valve member, respectively.

The valve seat and the valve member can be formed complementary to each other. Thus, a form-fit connection between the valve seat and the valve member can be provided, when the assembly is in a rest position, respectively in a non-operated state. This form-fit connection can easily but tightly close the compartment formed by the outer cap. Thereby, the valve can prevent the food supplement composition inside the compartment from flowing out of the compartment.

In particular, the valve seat and the valve member can have a conically tapered form. Hence, a closure can be achieved which is relatively tolerant regarding possible manufacturing and/or assembling inaccuracies.

The valve seat can be formed as a ring or protrusion which is arranged on the inner surface of the second end region of the cylindrical or conical wall section. In particular, the valve seat can protrude from the inner surface of the second end region of the wall section. Further, the protruding valve seat can have a substantially triangle-shaped cross section. Thereby, the valve seat can be provided with a smaller inner perimeter on an end that is closer to the top section and a larger inner perimeter on an end that is further spaced from the top section. In particular, the end of the valve seat being further spaced from the top section can have the same inner perimeter as the second end region of the wall section adjacent to this spaced end section. Further, the valve seat can preferably be formed integrally with the second end region of the cylindrical or conical wall section of the outer cap.

The complementary valve member can be formed by the rim of the disk. The disk can have a substantially conical form with a cylindrical base portion attached to the conical portion in the direction averted from the top section. Thereby, the apex of the disk can be pointing towards the top section of the outer cap. Thus, the portion of the disk having the largest outer perimeter is oriented towards the main vessel. To allow a form-fit closure between the valve member (disk) and the valve seat (protrusion of the second end region) the largest outer perimeter of the disk is larger than the smallest inner perimeter of the valve seat (protrusion). Further, the largest outer perimeter of the disk can match the largest inner perimeter of the valve seat (protrusion).

A valve seat and valve member connection only allows movement of the inner cap, in particular the disk, in one direction. Here, a movement of the disk towards the top

section can be blocked by means of the form-fit connection of the valve. In other words, a movement of the inner cap towards the inside of the compartment can be inhibited. This prevents the assembly from forming a gap and losing food supplement composition through unintentional movement of the disk towards the inside of the compartment.

The assembly can further comprise a seal which is provided at the second end region of the conical or cylindrical wall section adapted to protect the food supplement composition in the compartment from moisture, air or contaminants. Such a seal can be removably attached to a rim of the second end region of the conical or cylindrical wall section.

Regarding an assembly comprising a seal, the afore-mentioned limitation of movement can be seen as an additional safety feature. By limiting the movement of the disk in the direction towards the top section the risk of an unintended damage of the seal can be reduced. An unintentional local high pressure on the seal from the outside of the assembly in the direction towards the top section usually involves the risk of breaking the seal. Yet, by means of positively supporting the seal through the disk, which is not moveable in the direction towards the top section, this risk can be reduced to a minimum.

In addition to that, the seal itself can inhibit unintended movement of the disk in the direction of the main vessel and thus can prevent the forming of a gap which would allow the release of the food supplement composition. When pushing the end cap downwards in such an assembly, the pressure is distributed over the whole surface of the disk which is in contact with the seal. Hence, a relatively high pressure would be needed to break the seal whereby the risk of unintended damage can be reduced.

Thus, by means of such an assembly, unintended movement in both directions, towards the main vessel and towards the end cap, can be avoided during transportation, storage or screwing the dispensing assembly to a main vessel.

The invention is set forth in greater detail in the claims.

Brief description of the drawings

Fig. 1 is a schematic longitudinal section view from a side of an assembly described here in a rest position with a composition provided in a compartment inside the assembly; and

Fig. 2 is a schematic longitudinal section view from a side of the assembly of Fig. 1, where the composition is released from the compartment inside the assembly.

Detailed description of the drawings

Fig. 1 is a side view of an assembly 10 adapted for dispensing a food supplement composition 40 into a (partly shown) container 50. The assembly 10 has an outer cap 12 having a generally inverse U-shaped cross-section with a substantially conical wall section 14 and a generally dome-shaped top section 16 closing or terminating a first end region 18 of the conical wall section 14. The conical wall section 14 can also have a generally cylindrical shape. Both of the latter alternatives can either have a circular cross-section or a polygonal (e.g. hexagonal or octagonal) cross-section. The outer cap 12 is provided with an internal thread 46 at a second end region 26 of the conical or cylindrical wall section 14 to engage with a corresponding external 48 thread provided at an aperture 52 of the container 50.

The outer cap 12 is made of a plastic material such as Polyethylene (PET). Therefore the outer cap 12 can be deformed by a force or pressure being exerted thereon from an outside. More specifically (and as depicted by the arrow A shown in Fig. 2), the dome-shaped top section 16 can be depressed in a generally longitudinal direction of the assembly 10.

An inner cap 20 is generally provided inside the outer cap 12 and comprises a disk 22 and a link 24. The inner cap 20 is formed separately from the outer cap 12, so that the assembly 10 is designed in a two-part form. The link 24 has a rod 38 which is attached to the inside of the top section 14 through plugging means 17, 37. Thereby, the disk 24 is connected to the outer cap 12. Two complementary plugging means 17, 37 are provided. A receptive plugging means 17 is attached to the inside of the top section of the outer cap, in particular in the center of the top section. The receptive plugging means 17 points downwards, being able to receive a respective plugging means 37 for engaging contact. The respective inserting plugging means 37

is attached to the rod 38 of the link at an end of the rod 38 opposite to the disk 22. The inserting plugging means 37 points towards the top section. As shown in the Figures, the plugging means 17, 37 are in engaging contact. When brought into engaging contact, the plugging means 17, 37 perform a locking engagement, in particular a barbed engagement.

The disk 22 is shaped and dimensioned to form a closure of the cylindrical or conical wall section 14 at a second end region 26 thereof. Thereby, a food supplement composition compartment 28 is formed and limited by the top surface section 16, the cylindrical or conical cylindrical wall section 14 and the disk 22.

The link 24 connects the disk 22 and the outer cap 12 and is adapted to displace the disk 22 relative to the second end region 26 of the cylindrical or conical wall section 14 when a force or pressure is exerted on (the dome-shaped top section 16 of) the outer cap 12. Thereby a gap 30 is formed between the cylindrical or conical wall section 14 and the disk 22. Essentially, the second end region 26 of the cylindrical or conical wall section 14 and the rim of the disk 22 form a valve comprising a valve seat 19 and a valve member 22, respectively. The valve seat 19 and the valve member 22 are formed complementary to each other. This valve prevents, in its rest position (Fig. 1), the composition from leaving the compartment and allows, in its operated position (Fig. 2), the composition to flow out of the compartment.

The valve seat 19 is formed as a protrusion which is arranged on the inner surface of the second end region 26 of the cylindrical or conical wall section 14. The protruding valve seat 19 has a triangle-shaped cross section and is provided with a smaller inner perimeter on an end that is closer to the top section 16 and a larger inner perimeter on an end that is further spaced from the top section 16.

The complementary valve member 22 is formed by the rim of the disk 22. The disk 22 has a conical form with a cylindrical base portion attached to the conical portion in the direction averted from the top section 16. The apex of the disk 22 points towards the top section 16 of the outer cap 18. Thus, the portion of the disk 22 having the largest outer perimeter is oriented towards the main vessel. The largest outer perimeter of the disk 22 substantially matches the largest inner perimeter of the valve seat 19 and thus allows a closing, form-fitting engagement between the valve seat 19 and valve member 22, when the assembly is in a rest position.

As an additional feature of the assembly, a seal 34 is provided at the second end region 26 of the conical or cylindrical wall section 14. This seal 34 is provided and adapted to protect the food supplement composition 40 in the compartment 28 from moisture, air and contaminants. The seal 34 comprises a foil, including a plastic, metal (e.g. aluminium) or metal-plastic composite material removably attached to the second end region of the conical or cylindrical wall section 14. More specifically, the seal 34 is removably attached to a rim 36 of the second end region of the conical or cylindrical wall section.

The top section 16 of the outer cap 12 has a generally convex shape viewed from the outside and is formed of a flexibly or plastically deformable material adapted to be deformed by applying pressure thereon from the outside. The link 24 comprises a rod 36 to rigidly connect the disk 22 and the top section 16. When pressure is exerted on the top section from the outside, the top section 16 is deformed, the rod of the link is pushed towards the second end region of the conical or cylindrical wall section. Thereby, the compartment 28 is opened by forming the gap 30 between the conical or cylindrical wall section 14 and the outer edge 32 of the disk 22.

The disk 22 has a surface limiting the compartment having a generally inverse V-shaped cross-section to facilitate the food supplement composition flowing out of the compartment 28 via the gap 30 formed between the conical or cylindrical wall section 14 and the disk 22. The food supplement composition to be used in the presently described assembly is provided in powder, granule or pellet form.

The disk 22 and the link 24 are shaped and dimensioned relative to the conical or cylindrical wall section 14 and the top surface section 16 such that the seal 34, when attached to the second end region of the conical or cylindrical wall section 14 prevents the disk 22 to be displaced relative to the second end region of the conical or cylindrical wall section 14 upon a force or pressure being exerted on the outer cap 12.

The inner cap 20 comprises a plurality (3, 4, or 5) of essentially radially oriented spokes 42 that are adapted to engage with a flange 44 provided along an inside of the outer cap 12 to prevent the inner cap 20 from being released or falling out from the outer cap 12 when the top section 16 is depressed from the outside.

Several food supplement compositions may be preferably utilized with an assembly of the present invention. In this regard, the inventors have identified various embodiments which are particularly suitable to be used in connection with the assembly of the invention.

First embodiment

Example 1 (Table 1) describes a food supplement composition intended to contribute to the normal function of the immune system. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of Vitamin B1 selected from the group consisting of thiamin hydrochloride, thiamin mononitrate, thiamin monophosphate chloride and thiamin pyrophosphate chloride.
- A source of Vitamin B2 selected from the group consisting of riboflavin and the sodium salt of riboflavin 5-phosphate.
- A source of niacin selected from the group consisting of nicotinic acid, nicotinamide and inositol hexanicotinate.
- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- D-biotin.
- Folic acid or a source of folate selected from the group consisting of pteroylmonoglutamic acid and calcium-L-methylfolate.
- A source of Vitamin B12 selected from the group consisting of cyanocobalamin, hydroxobalamin, 5-deoxyadenosylcobalamin and methylcobalamin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- A source of Vitamin E selected from the group consisting of D-alpha-tocopherol, DL-alpha-tocopherol, D-alpha-tocopheryl acetate, DL-alpha-tocopheryl acetate, D-alpha-tocopheryl acid succinate, mixed tocopherols and tocotrienol tocopherol.

- A source of selenium selected from the group consisting of L-selenomethionine, selenium enriched yeasts, selenious acid, sodium selenate, sodium hydrogen selenate and sodium hydrogen selenite.
- A source of zinc selected from the group consisting of zinc acetate, zinc L-ascorbate, zinc L-aspartate, zinc bisglycinate, zinc chloride, zinc citrate, zinc gluconate, zinc lactate, zinc L-lysinate, zinc malate, zinc mono-L-methionine sulphate, zinc oxide, zinc carbonate, zinc L-pidolate, zinc picolinate and zinc sulphate.
- A standardized botanical extract of echinacea.

Second embodiment

Example 2 (Table 1) describes a food supplement composition intended to contribute to the protection of cells from oxidative stress, and the maintenance of normal skin and hair. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- D-biotin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- A source of Vitamin E selected from the group consisting of D-alpha-tocopherol, DL-alpha-tocopherol, D-alpha-tocopheryl acetate, DL-alpha-tocopheryl acetate, D-alpha-tocopheryl acid succinate, mixed tocopherols and tocotrienol tocopherol.
- A source of zinc selected from the group consisting of zinc acetate, zinc L-ascorbate, zinc L-aspartate, zinc bisglycinate, zinc chloride, zinc citrate, zinc gluconate, zinc lactate, zinc L-lysinate, zinc malate, zinc mono-L-methionine sulphate, zinc oxide, zinc carbonate, zinc L-pidolate, zinc picolinate and zinc sulphate.
- One or more standardized botanical extracts of high antioxidant action like for example green tea leaf and ginseng extracts.

Third embodiment

Example 3 (Table 1) describes a food supplement composition intended to contribute to normal energy-yielding metabolism. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of Vitamin B1 selected from the group consisting of thiamin hydrochloride, thiamin mononitrate, thiamin monophosphate chloride and thiamin pyrophosphate chloride.
- A source of niacin selected from the group consisting of nicotinic acid, nicotinamide and inositol hexanicotinate.
- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- A source of Vitamin B12 selected from the group consisting of cyanocobalamin, hydroxobalamin, 5-deoxyadenosylcobalamin and methylcobalamin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- One or more standardized botanical extracts having an effect on metabolism rate like, for example, guarana, yerba mate, green tea, black tea, kola nut, coffee bean, green coffee bean yohimbe and ginseng extracts.
- One or more substances having an effect on metabolism rate like, for example, taurine, caffeine, synephrine, theobromine and inositol.

Fourth embodiment

Example 4 (Table 1) describes a food supplement composition intended to contribute to weight loss in the context of an energy restricted diet. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of Vitamin B2 selected from the group consisting of riboflavin and the sodium salt of riboflavin 5-phosphate.
- A source of niacin selected from the group consisting of nicotinic acid, nicotinamide and inositol hexanicotinate.

- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- One or more standardized botanical extracts having an effect on weight loss like, for example, veldt grape, green tea, black tea, kola nut, coffee bean, green coffee bean elder, asparagus, asam gelugo and ginger extracts.
- One or more substances having an effect on aiding weight loss like, for example, taurine, caffeine, coenzyme Q10 and carnitine.

Fifth embodiment

Example 5 (Table 1) describes a food supplement composition intended to contribute to the protection of cells from oxidative stress caused by acute sun exposure. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- One or more carotenoids selected from the group consisting of lycopene, retinol, retinyl acetate, retinyl palmitate and beta-carotene.
- A source of Vitamin B1 selected from the group consisting of thiamin hydrochloride, thiamin mononitrate, thiamin monophosphate chloride and thiamin pyrophosphate chloride.
- A source of Vitamin B2 selected from the group consisting of riboflavin and the sodium salt of riboflavin 5-phosphate.
- A source of niacin selected from the group consisting of nicotinic acid, nicotinamide and inositol hexanicotinate.
- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- D-biotin.
- Folic acid or a source of folate selected from the group consisting of pteroylmonoglutamic acid and calcium-L-methylfolate.

- A source of Vitamin B12 selected from the group consisting of cyanocobalamin, hydroxobalamin, 5-deoxyadenosylcobalamin and methylcobalamin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- A source of Vitamin E selected from the group consisting of D-alpha-tocopherol, DL-alpha-tocopherol, D-alpha-tocopheryl acetate, DL-alpha-tocopheryl acetate, D-alpha-tocopheryl acid succinate, mixed tocopherols and tocotrienol tocopherol.
- A source of selenium selected from the group consisting of L-selenomethionine, selenium enriched yeasts, selenious acid, sodium selenate, sodium hydrogen selenate and sodium hydrogen selenite.
- A source of zinc selected from the group consisting of zinc acetate, zinc L-ascorbate, zinc L-aspartate, zinc bisglycinate, zinc chloride, zinc citrate, zinc gluconate, zinc lactate, zinc L-lysinate, zinc malate, zinc mono-L-methionine sulphate, zinc oxide, zinc carbonate, zinc L-pidolate, zinc picolinate and zinc sulphate.

Sixth embodiment

Example 6 (Table 1) describes a collagen containing food supplement composition intended to contribute to the normal function of epithelia and connective tissue. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of collagen peptides of porcine, bovine or marine origin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.

Seventh embodiment

Example 7 (Table 1) describes a food supplement composition intended to contribute to normal cognitive function and mental performance. All materials of the composition are selected in a manner as to be compatible with water such that they present good water solubility and do not precipitate or react or sediment when dissolved. A preferred embodiment contains:

- A source of Vitamin B1 selected from the group consisting of thiamin hydrochloride, thiamin mononitrate, thiamin monophosphate chloride and thiamin pyrophosphate chloride.
- A source of Vitamin B2 selected from the group consisting of riboflavin and the sodium salt of riboflavin 5-phosphate.
- A source of niacin selected from the group consisting of nicotinic acid, nicotinamide and inositol hexanicotinate.
- A source of pantothenic acid selected from the group consisting of calcium D-pantothenate, sodium D-pantothenate, dexpanthenol and pantethine.
- A source of Vitamin B6 selected from the group consisting of pyridoxine hydrochloride, pyridoxine 5-phosphate and pyridoxal 5-phosphate.
- D-biotin.
- Folic acid or a source of folate selected from the group consisting of pteroylmonoglutamic acid and calcium-L-methylfolate.
- A source of Vitamin B12 selected from the group consisting of cyanocobalamin, hydroxobalamin, 5-deoxyadenosylcobalamin and methylcobalamin.
- A source of Vitamin C selected from the group consisting of L-ascorbic acid, sodium L-ascorbate, calcium L-ascorbate, potassium L-ascorbate, L-ascorbyl 6-palmitate, magnesium L-ascorbate and zinc L-ascorbate.
- A source of Vitamin E selected from the group consisting of D-alpha-tocopherol, DL-alpha-tocopherol, D-alpha-tocopheryl acetate, DL-alpha-tocopheryl acetate, D-alpha-tocopheryl acid succinate, mixed tocopherols and tocotrienol tocopherol.
- A source of iodide selected from the group consisting of sodium iodide, sodium iodate, potassium iodide and potassium iodate.
- A standardized botanical extract of ginkgo biloba leaves.

All above embodimentss may contain a polyol selected from the group consisting of erythritol, xylitol, mannitol, sorbitol, galactitol, isomalt, maltitol, inositol, lactitol and polyvinyl alcohol. The polyol is intended as a filler and taste enhancer.

Other ingredients that may be added in the composition include taste improvers like organic acids (preferably citric acid), aromatic materials of natural or synthetic origin, sweeteners and colouring substances.

Preferred materials are selected in a manner as to have good flow charecteristics, low humactancy, cold water solubility and good taste, chemical, thermal and microbiological stability.

The ingredients are mixed in a drum mixer under low humidity conditions. Filling of the caps is also performed under low humidity conditions using a cap filling machine.

Table 1: Food supplement compositions

Ingredient	Content (mg)						
	Example 1	**Example 2**	**Example 3**	**Example 4**	**Example 5**	**Example 6**	**Example 7**
Vitamin B1 (as thiamine mononitrate)	1,1	-	0,165	-	1,1	-	0,330
Vitamin B2 (as riboflavin)	1,4	-	-	0,7	1,4	-	0,42
Niacin (as nicotinamide)	16,0	-	2,4	8,0	16,0	-	4,8
Pantothenic acid (as calcium D-pantothenate)	8,0	5,0	0,9	4,0	8,0	-	1,8
Vitamin B6 (as pyridoxine hydrochloride)	1,4	0,42	0,21	0,7	1,4	-	0,42
D-biotin	0,05	0,025	-	-	0,05	-	0,015
Folic acid anhydrous	0,33	-	-	-	0,33	-	0,06
Vitamin B12 (as cyanocobalamin)	0,0025	-	0,000375	-	0,0025	-	0,00075
Vitamin C (as ascorbic acid)	80,0	100,0	22,0	200,0	80,0	200,0	24,0
Vitamin E (as D-alpha-tocopheryl acetate)	12,0	6,0	-	-	12,0	-	3,6
Selenium (as sodium selenate)	0,055	-	-	-	0,055	-	-
Zinc (as zinc sulphate)	10,0	4,5	-	-	10,0	-	-
Iodine (as potassium iodide)	-	-	-	-	-	-	0,045
Echinacea angustifolia dry	200,0	-	-	-	-	-	-

Ingredient	Content (mg)						
	Example 1	**Example 2**	**Example 3**	**Example 4**	**Example 5**	**Example 6**	**Example 7**
hydroalcoholic extract							
Panax ginseng dry extract IDB	-	200,0	100,0	-	-	-	-
Green tea dry extract (epigallocatechin gallate)	-	80,0	-	60,0	-	-	-
Panax ginseng dry extract	-	-	-	-	-	-	200,0
Taurine	-	-	80,0	-	-	-	-
Caffeine	-	-	40,0	40,0	-	-	-
Inositol	-	-	20,0	-	-	-	-
L-carnitine	-	-	-	200,0	-	-	-
Coenzyme Q10	-	-	-	5,0	-	-	-
Lycopene	-	-	-	-	16,0	-	-
Collagen peptides	-	-	-	-	-	2500,0	-
Choline	-	-	-	-	-	-	82,5
Mannitol DC	Q.S. to 2500 mg	Q.S. to 2500 mg	Q.S. to 2500 mg	Q.S. to 2500 mg	Q.S. to 2500 mg	Q.S. to 3700 mg	Q.S. to 2500 mg
Citric acid anhydrous	200,0	200,0	200,0	200,0	200,0	200,0	200,0
Orange flavor	180,0	180,0	180,0	180,0	180,0	180,0	180,0
Tangerine Flavor	240,0	240,0	240,0	240,0	240,0	240,0	240,0
Sucralose	30,0	30,0	30,0	30,0	30,0	30,0	30,0
Steviol glucosides	25,0	25,0	25,0	25,0	25,0	25,0	25,0

Thus, in a particular aspect of the present invention, a stable food supplement composition is provided to be used in combination with the assembly as claimed herein. Such a food supplement composition may be preferably contributing to the normal function of the immune system, and may comprise the following:

A product containing a combination of: 1,2 – 24,0 mg of vitamin E, 0,11 – 2,20 mg of thiamine, 0,14 – 2,80 mg of riboflavin, 0,14 – 2,80 mg of vitamin B6, 8 – 160 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 20 – 472 µg of folic acid, 5,5 – 110,0 µg of selenium, 1,0 – 20,0 mg of zinc, 1,6 – 32,0 mg of niacin, 5 – 100 µg of biotin, 0,25 – 5,0 µg of cyanocobalamin and 100 – 1000 mg of a standardized Echinacea angustifolia extract;

a product as above preferably containing a combination of: 10,8 – 14,4 mg of vitamin E, 1,0 – 1,4 mg of thiamine, 1,3 – 2,0 mg of riboflavin, 1,3 – 1,7 mg of vitamin B6, 72 – 160 mg of vitamin C, 7,2 – 12,8 mg of pantothenic acid, 300 – 472 µg of folic acid, 50 – 60 µg of selenium, 9 – 11 mg of zinc, 14,4 – 19,2 mg of niacin, 45 – 60 µg of biotin, 2,25 – 3,8 µg of cyanocobalamin and 200 – 500 mg of a standardized Echinacea angustifolia extract.

Alternatively, the present invention provides as a combination with the assembly as claimed a stable food supplement composition which is intended to contribute to the protection of cells from oxidative stress, and the maintenance of normal skin and hair; such as the following products:
A product containing a combination of: 1,2 – 24,0 mg of vitamin E, 0,14 – 2,80 mg of vitamin B6, 8 – 160 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 1,0 – 20,0 mg of zinc, 5 – 100 µg of biotin, 10 – 300 mg of a standardized green tea extract and 100 – 1000 mg of a standardized Panax ginseng extract;
preferably a product containing a combination of: 5,4 – 7,2 mg of vitamin E, 0,38 – 0,50 mg of vitamin B6, 90 – 150 mg of vitamin C, 4,5 – 6,5 mg of pantothenic acid, 4,0 – 5,0 mg of zinc, 22 – 28 µg of biotin, 72 – 108 mg of a standardized green tea extract and 200 – 500 mg of a standardized Panax ginseng extract.

The stable food supplement composition to be used in combination with the assembly as claimed herein may serve the purpose to contribute to normal energy-yielding metabolism; for instance a product containing a combination of: 72 – 88 mg of taurine, 0,11 – 2,20 mg of thiamine, 36 – 44 mg of caffeine, 0,14 – 2,80 mg of vitamin B6, 8 – 160 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 18 – 22 mg of inositol, 1,6 – 32,0 mg of niacin, 0,25 – 5,0 µg of cyanocobalamin and 100 – 1000 mg of a standardized Panax ginseng extract. Such product may preferably contain a combination of: 72 – 88 mg of taurine, 0,15 – 0,21 mg of thiamine, 36 – 44 mg of caffeine, 0,19 – 0,27 mg of vitamin B6, 20 – 29 mg of vitamin C, 0,8 – 1,0 mg of pantothenic acid, 18 – 22 mg of inositol, 2,2 – 2,9 mg of niacin, 0,34 – 0,41 µg of cyanocobalamin and 200 – 500 mg of a standardized Panax ginseng extract.

Alternatively, the present invention may be understood to provide a stable food supplement composition which is used in combination with the assembly as claimed herein and is intended to contribute to weight loss (i.e. in the context of an energy restricted diet). Such product may contain a combination of: 180 – 220 mg of L-carnitine, 36 – 44 mg of caffeine, 0,14 – 2,80 mg of riboflavin, 0,14 – 2,80 mg of

vitamin B6, 8 – 220 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 4,5 – 5,5 mg of coenzyme Q10, 1,6 – 32,0 mg of niacin and 10 – 300 mg of a standardized green tea extract.
Preferably, such a product may contain a combination of: 180 – 220 mg of L-carnitine, 36 – 44 mg of caffeine, 0,63 – 0,98 mg of riboflavin, 0,63 – 0,98 mg of vitamin B6, 180 – 220 mg of vitamin C, 3,6 – 6,1 mg of pantothenic acid, 4,5 – 5,5 mg of coenzyme Q10, 7,2 – 9,6 mg of niacin and 50 – 70 mg of a standardized green tea extract.
Alternatively, the stable food supplement composition to be used in combination with the assembly as claimed herein may be intended to contribute to the protection of cells from oxidative stress caused by acute sun exposure.
Such product may contain a combination of: 1,2 – 24,0 mg of vitamin E, 0,11 – 2,20 mg of thiamine, 0,14 – 2,80 mg of riboflavin, 0,14 – 2,80 mg of vitamin B6, 8 – 160 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 20 – 472 µg of folic acid, 5,5 – 110,0 µg of selenium, 1,0 – 20,0 mg of zinc, 1,6 – 32,0 mg of niacin, 5 – 100 µg of biotin, 0,25 – 5,0 µg of cyanocobalamin and 1,6 – 32 mg of lycopene.
Preferably, such product may contain a combination of: 10,8 – 14,4 mg of vitamin E, 1,0 – 1,4 mg of thiamine, 1,3 – 2,0 mg of riboflavin, 1,3 – 1,7 mg of vitamin B6, 72 – 160 mg of vitamin C, 7,2 – 12,8 mg of pantothenic acid, 300 – 472 µg of folic acid, 50 – 60 µg of selenium, 9 – 11 mg of zinc, 14,4 – 19,2 mg of niacin, 45 – 60 µg of biotin, 2,25 – 3,8 µg of cyanocobalamin and 14,4 – 17,6 mg of lycopene.

An assembly as claimed herein may also comprise a stable food supplement composition which contributes to the normal function of epithelia and connective tissue.
Such product may contain a combination of: 8 – 220 mg of vitamin C and 2.500 mg of collagen peptides.
Preferably, such product may comprise 180 – 220 mg of vitamin C.

Finally, the present invention concerns a stable food supplement composition which is used in combination with the assembly as claimed herein such that the composition contributes to normal cognitive function and mental performance.
Such product may contain a combination of: 1,2 – 24,0 mg of vitamin E, 0,11 – 2,20 mg of thiamine, 0,14 – 2,80 mg of riboflavin, 0,14 – 2,80 mg of vitamin B6, 8 – 160 mg of vitamin C, 0,6 – 12,8 mg of pantothenic acid, 20 – 472 µg of folic acid, 1,5 – 300,0 µg of iodine, 74 – 91 mg of choline, 1,6 – 32,0 mg of niacin, 5 – 100 µg of

biotin, 0,25 – 5,0 µg of cyanocobalamin and 100 – 1000 mg of a standardized Ginkgo biloba extract.

In particular, such product may contain a combination of: 3,2 – 4,0 mg of vitamin E, 0,30 – 0,37 mg of thiamine, 0,38 – 0,46 mg of riboflavin, 0,38 – 0,46 mg of vitamin B6, 22 – 27 mg of vitamin C, 1,6 – 2,0 mg of pantothenic acid, 54 – 66 µg of folic acid, 40,5 – 49,5 µg of iodine, 74 – 91 mg of choline, 4,3 – 5,3 mg of niacin, 13 – 17 µg of biotin, 0,67 – 0,77 µg of cyanocobalamin and 200 – 500 mg of a standardized Ginkgo biloba extract.

Claims

1. An assembly (10) adapted for dispensing a food supplement composition (40) into a container (50), the assembly (10) comprised of:
- an outer cap (12) having a generally inverse U-shaped cross-section with a substantially cylindrical or conical wall section (14) and a generally dome-shaped top section (16) closing a first end region (18) of the cylindrical or conical wall section (14), the outer cap (12) being adapted to engage with an aperture (52) of the container (50), and the outer cap (12) being adapted to deform upon a force or pressure being exerted thereon from an outside;
- an inner cap (20) generally provided inside the outer cap (12) and comprising a disk (22) and a link (24), wherein
the disk (22) is shaped and dimensioned to form a closure of the cylindrical or conical wall section (14) at a second end region (26) thereof, such that a food supplement composition compartment (28) is formed and limited by the top surface section (16), the cylindrical or conical cylindrical wall section (14) and the disk (22), and wherein the link (24) connects the disk (22) and the outer cap (12) and is adapted to displace the disk (22) relative to the second end region (26) of the cylindrical or conical wall section (14) when a force or pressure is exerted on the outer cap (12), such that a gap (30) is formed between the cylindrical or conical wall section (14) and the disk (22),
characterized in that
the second end region (26) of the cylindrical or conical wall section (14) and a rim of the disk (22) form a valve comprising a valve seat (19) and a complementary valve member (22).

2. The assembly (10) of claim 1, wherein the valve seat (19) is a protrusion on an inner surface of the second end region (26) of the cylindrical or conical wall section (14).

3. The assembly (10) of claim 1 or 2, wherein the valve seat (19) forms a form-fitting engagement with the rim of the disk (22), when the assembly (10) is in a rest position.

4. The assembly (10) of any of the preceding claims, wherein the outer cap (12) and the inner cap (20) are formed separately from each other.

5. The assembly (10) of any of the preceding claims, wherein a seal (34) is provided at the second end region (26) of the conical or cylindrical wall (14) section adapted to protect the food supplement composition (40) in the compartment (28) from moisture, air or contaminants.

6. The assembly (10) of claim 5, wherein the seal (34) is removably attached to a rim (36) of the second end region (26) of the conical or cylindrical wall section (14).

7. The assembly (10) of any of the preceding claims, wherein the top surface section of the outer cap (12) has a generally convex shape viewed from the outside and is formed of a flexibly or plastically deformable material adapted to be deformed by applying pressure thereon from the outside, and / or wherein the link (24) comprises a rod (36) to rigidly connect the disk (22) and the top section (16) to open the compartment (28) by forming the gap (30) between the conical or cylindrical wall section (14) and an outer edge (38) of the disk (22).

8. The assembly (10) of any of the preceding claims, wherein the disk (22) has a surface limiting the compartment having a generally inverse V-shaped cross-section to facilitate the food supplement composition flowing out of the compartment (28) via the gap (30) formed between the conical or cylindrical wall section (14) and the disk (22), wherein the food supplement composition is provided in powder, granule or pellet form.

9. The assembly (10) of any of the preceding claims 5 to 8, wherein the seal (34) comprises a foil, including a plastic, metal or metal-plastic composite material removably attached to the second end region of the conical or cylindrical wall section (14).

10. The assembly (10) of any of the preceding claims 5 to 9, wherein the disk (22) and the link (24) are shaped and dimensioned relative to the conical or cylindrical wall section (14) and the top surface section (16) such that the seal (34), when attached to the second end region of the conical or cylindrical wall section (14) prevents the disk (22) to be displaced relative to the second end region of the conical

or cylindrical wall section (14) upon a force or pressure being exerted on the outer cap (12).

11. The assembly (10) of any of the preceding claims, wherein the rod (38) of the link (24) is attached to the inside of the top section (14).

12. The assembly (10) of claim 11, wherein the rod (38) of the link (24) is attached to the inside of the top section (14) via plugging means (17, 37) which perform a barbed engagement.

13. The assembly (10) of any of the preceding claims, wherein the inner cap (20) comprises a plurality of essentially radially oriented spokes (42) that are adapted to engage with a flange (44) provided along an inside of the outer cap (12) to prevent the inner cap (20) from being released from the outer cap (12).

14. The assembly (10) of any of the preceding claims, wherein an internal or external thread (46) is provided at the second end region (26) of the cylindrical wall section (14) to engage with a corresponding external or internal thread (48), respectively, provided at the aperture (52) of the container (50).

15. A container filled with a potable liquid and closed with an assembly according to any one of the preceding claims, wherein the assembly contains a food supplement composition in powder, granule or pellet form.

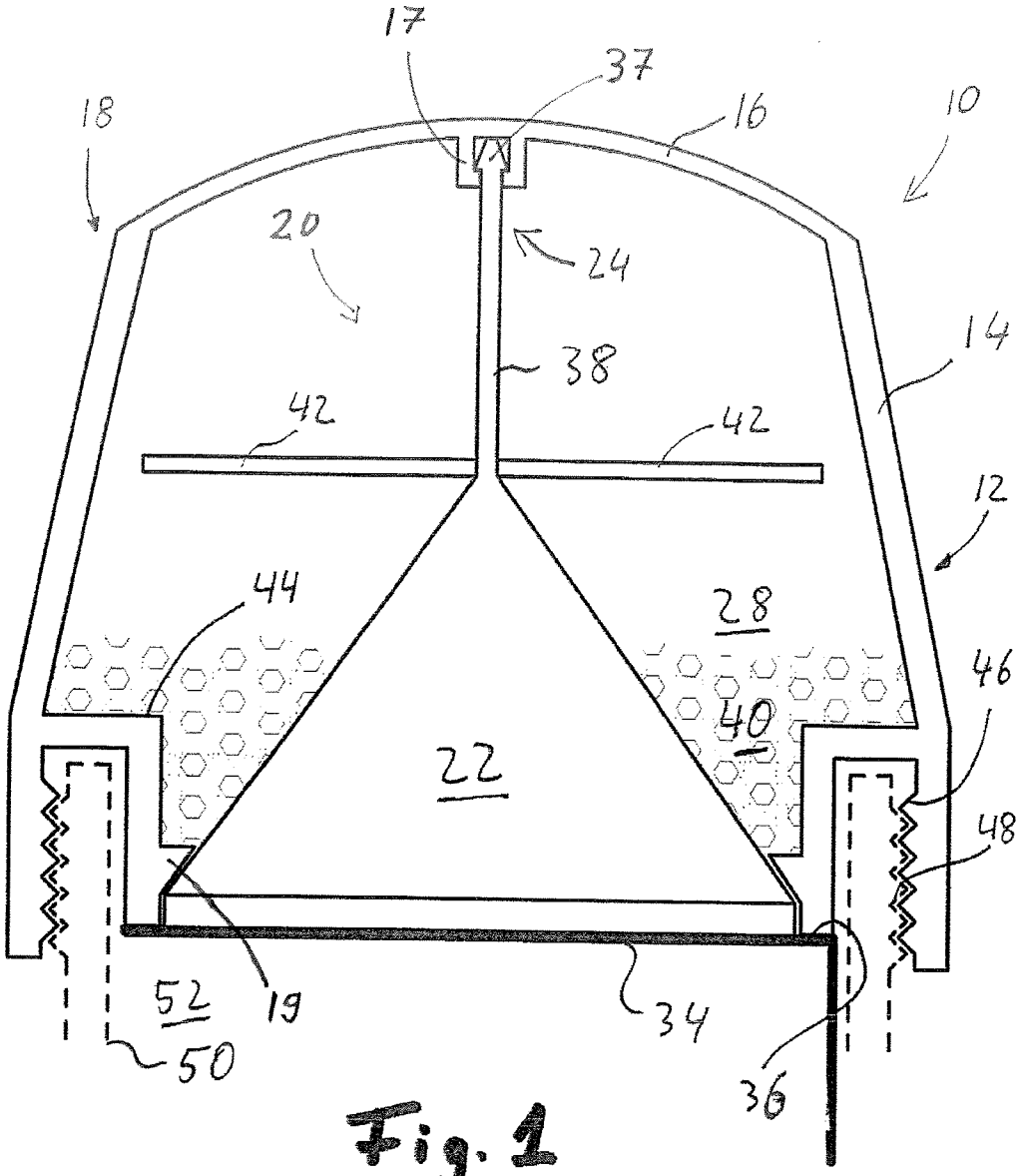

Fig. 1

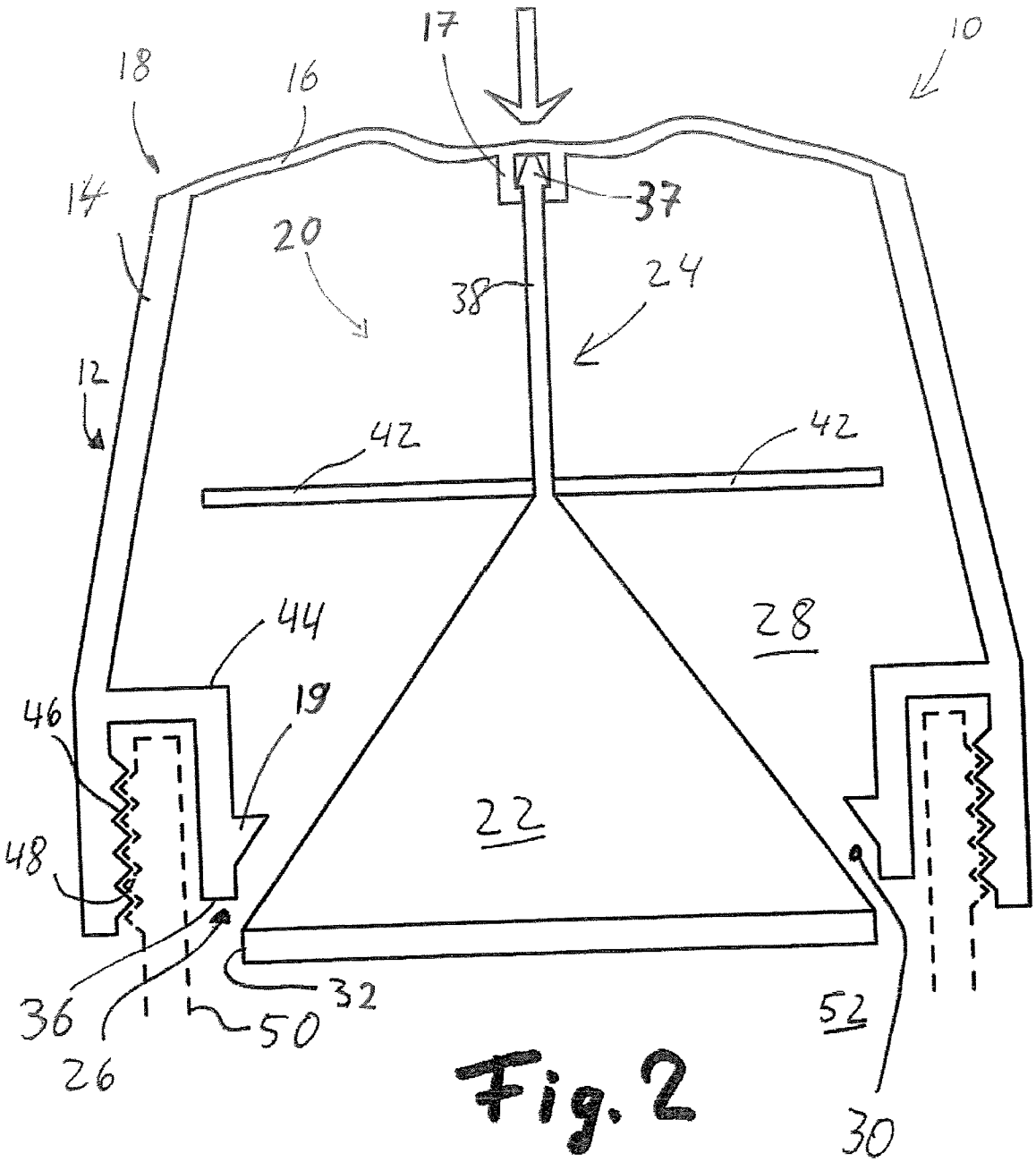

Fig. 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/078686

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D51/28
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.
X	US 6 435 341 B1 (NOBBIO ALESSIO [IT]) 20 August 2002 (2002-08-20) column 1, line 9 - line 15; figures 4,5	1-4,7,8, 13-15
X	US 2011/000800 A1 (ROHR ROBERT DALE [US] ET AL) 6 January 2011 (2011-01-06)	1,5-11, 14,15
Y	paragraphs [0007], [0026]; figure 8	12,13
Y	US 2008/073307 A1 (SWEENEY THEODORE J [US] ET AL SWEENEY JR THEODORE J [US] ET AL) 27 March 2008 (2008-03-27) figures 2,3	13
Y	GB 2 501 755 A (REZA DEWAN SYED AHSANUR [GB]) 6 November 2013 (2013-11-06) page 8, line 14 - line 19; figures 5,6	12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 February 2015	13/03/2015

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Sundell, Olli

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2014/078686

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