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(54) DEVICE FOR ALTERING A DRINKING LIQUID

(57) A device (1) for altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container (2) and wherein the device (1) comprises:
a) a first self-supporting element (3) comprising a functional material capable of altering the liquid;
b) a second element (4) provided with a first piece (5);
c) a second piece (6);
wherein both the first (5) and the second (6) piece comprise a solid ferromagnetic or ferrimagnetic material, wherein at least one of the first (5) and the second (6) piece is a permanent magnet, and wherein the first self-supporting element (3) and the second element (4) comprise connecting means (12, 13) suitable for releasably connecting the first self-supporting element (3) to the second element (4).

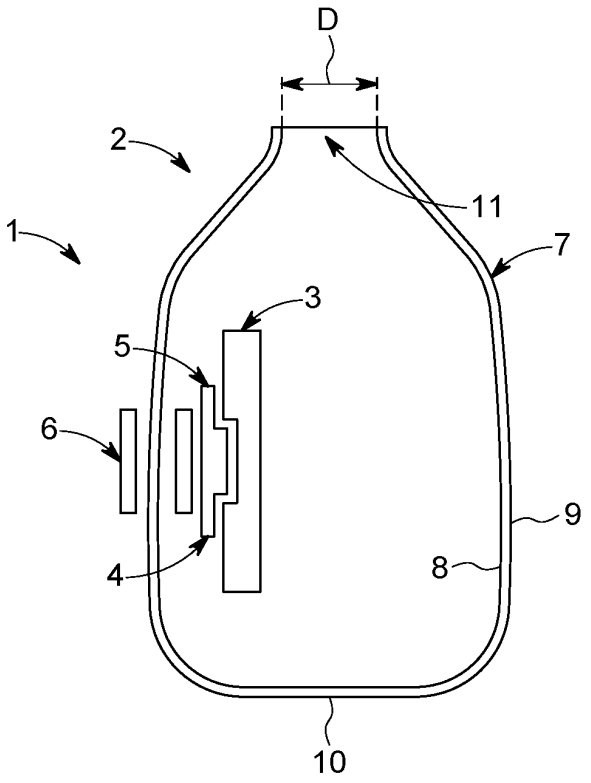

FIG. 1

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Description

Technical Field

[0001] The present disclosure relates generally to the field of devices and containers suitable for altering a liquid suitable for human consumption. The disclosure also relates to a method of altering a liquid suitable for human consumption.

Background

[0002] Healthy living and minimizing the impact on the environment have become major trends in the way people live and consume. These trends in combination with increased resource scarcity, in particular potable water, have led many people to engage into the so-called circular economy and consider reusability of products as part of their consuming habits.

[0003] Ways to alter drinking liquids, in particular products to affect or enhance the taste of a drinking liquid are well known in the art. Known solutions to enhance or modify the taste of drinking water include lyophilized powders or liquid concentrates. These solutions typically require engineered processes to ensure efficient incorporation into the liquid for consumption or make use of non-reusable parts. As part of known solutions for modifying drinking water, tea sachets suitable for preparing drinking tea has become very popular but typically produce non-reusable waste. Other more complex solutions for preparing tea-based beverages are described for example in CN111227590 (Yunlong), CN111184407 (Yunlong), CN111227589 (Yunlong) or in CN211673583 U (Huang).

[0004] Known solutions are not always satisfactory in terms of reusability of products and materials while trying to alter the properties of a liquid suitable for human consumption.

Summary

[0005] It is an object of the disclosure to provide a device for altering a liquid suitable for human consumption with enhanced characteristics in terms of reusability of products and materials, in particular for usage in outdoor activities.

[0006] According to one aspect, the present disclosure relates to a device for altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container and wherein the device comprises:

a) a first self-supporting element comprising a functional material capable of altering the liquid;
b) a second element provided with a first piece;
c) a second piece;

wherein both the first and the second piece comprise a solid ferromagnetic or ferrimagnetic material, wherein at least one of the first and the second piece is a permanent magnet, and wherein the first self-supporting element and the second element comprise connecting means suitable for releasably connecting the first self-supporting element to the second element.

[0007] According to another aspect, the present disclosure is directed to a drinking container comprising:

a) a handheld container as described above; and
b) a device as described above.

[0008] According to still another aspect, it is provided a method of altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container, and wherein the method comprises the step of using a device or a drinking container as described above.

Brief Description of the Drawings

[0009] These and further aspects of the disclosure will be explained in greater detail by way of examples and with reference to the accompanying drawings in which:

FIG.1 is a schematic representation of one exemplary device according to the present disclosure, wherein the device is arranged into a handheld container.
FIG.2 is a schematic representation of one exemplary second element connected to an exemplary first self-supporting element, wherein the second element is provided with one exemplary first piece which is an integral part of the second element.
FIG.3 is a cross-sectional view of **FIG.2** along the (A1-A2) axis.
FIG.4 is a schematic perspective view of a first self-supporting element according to an exemplary aspect of the disclosure.
FIG.5 is a schematic perspective view of a second element according to another exemplary aspect of the disclosure.
FIG.6 is a schematic perspective view of a second element according to still another exemplary aspect of the disclosure.
FIG.7 is a schematic side view of one exemplary first piece connected to one exemplary second element via a mechanical junction.
FIG.8 is a cross-sectional top view of a device according to one aspect of the disclosure arranged inside a handheld container, and wherein device further comprises one exemplary third element.
FIG.9 is a schematic side view of one exemplary third element arranged on the outer surface of a handheld container.

[0010] The drawings of the figures are neither drawn to scale nor proportioned. Generally, similar or identical components are denoted by the same reference numerals in the figures.

Detailed description

[0011] In a first aspect, the present disclosure relates to a device for altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container and wherein the device comprises:

a) a first self-supporting element comprising a functional material capable of altering the liquid;
b) a second element provided with a first piece;
c) a second piece;

wherein both the first and the second piece comprise a solid ferromagnetic or ferrimagnetic material, wherein at least one of the first and the second piece is a permanent magnet, and wherein (both) the first self-supporting element and the second element comprise (cooperating or complementary) connecting means suitable for releasably connecting the first self-supporting element to the second element.

[0012] A device as described above is particularly suitable for altering a liquid suitable for human consumption, wherein the device is provided with enhanced characteristics in terms of reusability of products and materials, in particular when such device is used for outdoor activities.

[0013] The described device is further characterized by one or more of the following advantageous benefits: a) easy and fast extraction of the first self-supporting element comprising a functional material from the handheld container; b) easy and fast release of the first self-supporting element from the second element; c) enhanced cleanability and accessibility of the various constituting parts; d) excellent adaptability of the device for liquid containers used in outdoor activities, in particular sport bottles; e) excellent reusability and/or recycling of the first self-supporting element and/or the second element; f) enhanced protection of the first self-supporting element from damages resulting from excessive shocks against the inner walls of the container; g) easy and cost-effective manufacturing method and minimized manufacturing steps; h) construction simplicity and versatility; i) excellent construction and design flexibility of the various constituting parts; and j) ability to fine-tune the desired alteration properties of the liquid for human consumption.

[0014] In the context of the present disclosure, the Applicant was faced with the technical challenge of designing a device for altering a liquid suitable for human consumption providing easy operability and excellent versatility, whilst preserving the overall construction simplicity.

[0015] Without wishing to be bound by theory, it is believed that these excellent characteristics and performance attributes are due in particular to the combination of the following technical features: a) the use of a first self-supporting element comprising a functional material capable of altering the liquid; b) the use of a second element provided with a first piece, wherein the first self-supporting element and the second element comprise connecting means suitable for releasably connecting the first self-supporting element to the second element; and c) the use of a second piece, wherein both the first and the second piece comprise a solid ferromagnetic or ferrimagnetic material, and wherein at least one of the first and the second piece is a permanent magnet.

[0016] In one advantageous aspect, the device as described above is (suitable) for altering any of the taste, color, purity, aroma or odor of the liquid. More advantageously, the device is for altering any of the taste or purity of the liquid. Even more advantageously, the device is for any of filtering or flavoring the liquid.

[0017] In a particular aspect, the device is suitable for altering the liquid by diffusion, in particular by diffusion of taste, color or aroma into the liquid.

[0018] In another particular aspect, the device is (not) suitable for medical use or for use in methods for treatment of the human or animal body by therapy.

[0019] According to a preferred aspect, the liquid suitable for human consumption is or comprises water.

[0020] Handheld containers for use herein are not particularly limited. Suitable handheld containers for use herein will be easily identified by those skilled in the art in the light of the present disclosure.

[0021] In an advantageous aspect, the handheld container is provided with an opening having a dimension D no greater than 80 mm, no greater than 75 mm, no greater than 70 mm, no greater than 65 mm, no greater than 60 mm, no greater than 55 mm, no greater than 50 mm, no greater than 45 mm, no greater than 40 mm, no greater than 35 mm, or even no greater than 30 mm.

[0022] In the context of the present disclosure, the term "dimension D" is meant to designate the size of the greatest dimension of the opening. For example, in the case where the opening of the handheld container has a shape substantially circular, dimension D would correspond the diameter d of the opening.

[0023] Advantageously, the opening of the handheld container has a shape selected from the group consisting of circular, elliptical, and any combinations thereof. More advantageously, the opening of the handheld container has a (substantially) circular shape having a diameter d no greater than 80 mm, no greater than 75 mm, no greater than 70 mm, no greater than 65 mm, no greater than 60 mm, no greater than 55 mm, no greater than 50 mm, no greater than 45 mm, no greater than 40 mm, no greater than 35 mm, or even no greater than 30 mm.

[0024] In a typical aspect, the container for use herein comprises a side wall having an inner surface and an outer surface and continuously connected to a bottom surface thereby forming the opening. Advantageously, the thickness of the side wall is no greater than 5, no greater than 4, no greater than 3, no greater than 2, or even no greater than 1 mm.

[0025] In an advantageous aspect of the disclosure, the container is made from a material selected from the group consisting of siliceous materials, ceramic materials, thermoplastic materials, and any combinations

thereof. More advantageously, the container is made from a translucent or transparent material. Even more advantageously, the container is made from a thermoplastic material, in particular polyethylene terephthalate (PET).

[0026] According to a beneficial aspect, the container is (re)closable and is provided in particular with a closing means, wherein the closing means takes, in particular, the form of a stopper having in particular a substantially right circular cylindrical shape.

[0027] First self-supporting elements for use herein are not particularly limited as long as they comprise a functional material capable of altering a liquid suitable for human consumption and they comprise a (mechanical) connecting means suitable for releasably connecting the first self-supporting element to the second element. Suitable first self-supporting elements for use herein will be identified by those skilled in the art in the light of the present disclosure.

[0028] In the context of the present disclosure, the term "self-supporting element" is meant to designate an element which has the ability to stand up or hold firm without any additional support. As such, the term "self-supporting element" is not meant to designate granular elements (such as powder), discrete elements (such as leaves) or liquids.

[0029] According to one advantageous aspect of the disclosure, the connecting means comprised in the first self-supporting element is selected from the group consisting of protrusions, protuberances, projections, stems, spindles, plugs, buttons, knobs, hooks, tracks, rails, grooves, channels, slots, recesses, apertures, and any combinations thereof. More advantageously, the connecting means comprised in the first self-supporting element is selected from the group consisting of grooves, channels, slots, recesses, apertures, and any combinations thereof.

[0030] In another advantageous aspect, the first self-supporting element comprises a functional material capable of altering any of the taste, color, purity, aroma or odor of the liquid. More advantageously, the functional material is capable of altering any of the taste or purity of the liquid. Even more advantageously, the functional material is capable of any of filtering or flavoring the liquid.

[0031] In a particular aspect, the functional material is capable of altering the liquid by diffusion, in particular by diffusion of taste, color or aroma into the liquid.

[0032] In another particular aspect, the functional material is (not) for medical use or (not) for use in methods for treatment of the human or animal body by therapy.

[0033] According to one advantageous aspect of the disclosure, the first self-supporting element for use herein comprises a support provided with the functional material. The use of a support advantageously impacts the reusability and recycling characteristics of the first self-supporting element, by allowing the support to be reloaded or reconditioned once the functional material has been totally released or discharged from the support.

[0034] According to one advantageous aspect, the support comprises a (food grade) porous material, which is in particular selected from the group consisting of inorganic materials, organic materials, and any combinations thereof. More advantageously, the porous material is selected from the group consisting of paper, ceramics, and any combinations thereof.

[0035] In one exemplary aspect, the support comprises a porous material impregnated or coated with the functional material.

[0036] In another exemplary aspect, the support comprises a non-porous material onto the surface of which the functional material is provided, in particular coated.

[0037] In an alternative aspect, the first self-supporting element comprises a support comprised (or made) of the functional material.

[0038] In an advantageous aspect, the first self-supporting element is integrally comprised (or made) of the functional material.

[0039] According to a beneficial aspect, the functional material for use herein is selected from the group consisting of filtration materials, food taste enhancers, food colorings, food aroma enhancers, absorbing materials, scavenging materials, and any combinations thereof.

[0040] According to one particularly beneficial aspect, the functional material is selected from the group consisting of filtration materials, in particular (binchotan) charcoal, more in particular active charcoal.

[0041] According to one preferred execution, the first self-supporting element is a hollow or non-hollow element having at least partially an overall (substantially) right cylindrical shape with a base having a shape selected from the group consisting of circular, elliptical, square, rectangular, triangular, diamond, star, polygonal, and any combinations thereof. More preferably, the first self-supporting element has at least partially an overall right cylindrical shape with a base having a shape selected from the group consisting of circular, elliptical, square, rectangular, and any combinations thereof. Even more preferably, the base of the right cylindrical shape has a circular shape.

[0042] In one advantageous aspect, the first self-supporting element has at least partially an overall cylindrical shape with a bottom base, a top base and a (dis)continuous solid side wall having an outer surface.

[0043] In one particularly advantageous aspect, the first self-supporting element takes the form of a cartridge.

[0044] In still another advantageous aspect, the first self-supporting element is a hollow element having at least partially an overall cylindrical shape with a bottom base, a top base and a (dis)continuous solid side wall, wherein the bottom base has a dimension M, the (dis)continuous solid side wall has a dimension J, and the first self-supporting element is characterized by an aspect ratio AR defined by the ratio of its dimension J to its dimension M.

[0045] In the context of the present disclosure, the term "dimension M" is meant to designate the size of the great-

est dimension of the bottom base. For example, in the case where the bottom base has a shape substantially circular, dimension M would correspond to the diameter d of the bottom base. The term "dimension J" of the side wall is meant is meant to designate the size of the greatest dimension of the side wall. For example, in the case where the side wall has a shape substantially cylindrical, dimension J would typically correspond to the height of the cylinder.

[0046] Advantageously, the aspect ratio AR of the first self-supporting element is greater than 0.5, greater than 1, greater than 1.5, greater than 2, greater than 2.5, greater than 3, greater than 3.5, greater than 4, greater than 4.5, greater than 5, greater than 6, greater than 7, greater than 8, greater than 9, greater than 10, greater than 11, greater than 12, greater than 13, greater than 14, greater than 15, greater than 16, greater than 17, greater than 18, greater than 19, or even greater than 20. More advantageously, the aspect ratio AR is in a range from 1 to 20, from 1 to 15, from 2 to 15, from 4 to 15, from 4 to 12, from 6 to 12, or even from 8 to 10. Advantageously still, the bottom base of the first self-supporting element has a dimension M in a range from 5 to 20 mm, from 5 to 15 mm, or even from 5 to 10 mm. Still advantageously, the side wall of the first self-supporting element has a dimension J in a range from 5 to 120 mm, from 5 to 100 mm, from 10 to 100 mm, from 10 to 90 mm, from 10 to 80 mm, from 15 to 80 mm, from 20 to 80 mm, from 20 to 70 mm, from 25 to 70 mm, from 30 to 70 mm, from 30 to 60 mm, or even from 30 to 50 mm.

[0047] According to one particular aspect, the first self-supporting element is dimensioned (and configured) such that it can releasably connect to the second element without requiring any elastic deformation of the first self-supporting element and/or elastic deformation of the second element, in particular elastic deformation of the connecting means.

[0048] According to another particular aspect, the first self-supporting element is dimensioned (and configured) such that it can releasably connect to the second element by elastic deformation of the second element and/or elastic deformation of the first self-supporting element, in particular by elastic deformation of the connecting means.

[0049] In still another particular aspect, the first self-supporting element for use herein is configured such that it is unable to releasably connect to the second element without the connecting means.

[0050] In a particularly advantageous execution, the first self-supporting element is dimensioned such that it can be inserted through the opening of the handheld container.

[0051] Second elements for use herein are not particularly limited as long as they comprise a (mechanical) connecting means suitable for releasably connecting the second element to the first self-supporting element. Suitable second elements for use herein will be identified by those skilled in the art in the light of the present disclosure.

[0052] In one advantageous aspect, the connecting means comprised in the second element is selected from the group consisting of protrusions, protuberances, projections, stems, spindles, plugs, buttons, knobs, hooks, tracks, rails, grooves, channels, slots, recesses, apertures, and any combinations thereof. More advantageously, the connecting means comprised in the second element is selected from the group consisting of protrusions, protuberances, projections, stems, spindles, plugs, buttons, knobs, hooks, tracks, rails, and any combinations thereof.

[0053] The connecting means comprised in both the first self-supporting element and second element will be suitably selected depending on the desired connection between these two elements and the targeted properties. Advantageously, the connecting means suitable for both the first self-supporting element and second element will be chosen for those to be complementary and work in cooperation. The selection of the connecting means is well within the reach of the skilled person in the light of the present disclosure.

[0054] In another advantageous aspect, the connecting means comprised in the second element are configured and designed such that they releasably connect the second element to the first self-supporting element without requiring the second element to be provided with an additional supporting surface to support the first self-supporting element, like a bottom surface in a basket or in a carrier.

[0055] According to a typical aspect, the second element for use herein comprises a body portion and the connecting means. Advantageously, the body portion of the second element has an inner surface and an outer surface, and wherein the connecting means is comprised in the inner surface, or projects from the inner surface.

[0056] According to one advantageous execution, the body portion of the second element is a hollow or non-hollow element having at least partially an overall (substantially) cylindrical shape with a base having a shape selected from the group consisting of circular, elliptical, square, rectangular, triangular, diamond, star, polygonal, and any combinations thereof. More advantageously, the body portion is a hollow element having at least partially an overall right cylindrical shape with a base having a shape selected from the group consisting of circular, elliptical, square, rectangular, and any combinations thereof. Even more advantageously, the body portion is a hollow element having at least partially an overall right cylindrical shape with a base having a circular shape.

[0057] The body portion for use herein may be a hollow element having at least partially an overall cylindrical shape with a bottom base, a top base and a (dis)continuous solid side wall having an inner surface and an outer surface.

[0058] According to one advantageous execution, the body portion is a hollow element taking the form of a housing, a cartridge, a casing, a canister, a sleeve, a ring, a clip, and any combinations thereof. More advantageously, the body portion of the second element is a

hollow portion taking the form of a ring or a clip.

[0059] In another advantageous aspect, the body portion of the second element is a non-hollow element having a (substantially) rectangular shape.

[0060] In one exemplary aspect, the second element is made from a (food grade) material selected from the group consisting of metals, thermoplastic materials, siliceous materials, ceramic materials, natural rubber, synthetic rubber materials, silicon-based materials, paper, wood, and any combinations thereof. Advantageously, the second element is made from a material selected from the group consisting of metals, thermoplastic materials, and any combinations thereof. Advantageously still, the second element is made from a material selected from the group consisting of flexible materials, semi-flexible materials, and any combinations thereof.

[0061] According to one particular aspect, the second element is configured such that it can releasably connect to the first self-supporting element without requiring any elastic deformation of the second element and/or elastic deformation of the first self-supporting element, in particular elastic deformation of the connecting means.

[0062] According to another particular aspect, the second element is configured such that it can releasably connect to the first self-supporting element by elastic deformation of the second element and/or elastic deformation of the first self-supporting element, in particular elastic deformation of the connecting means.

[0063] In still another particular aspect, the second element for use herein is configured such that it is unable to releasably connect to the first self-supporting element without the connecting means.

[0064] According to the disclosure, the second element for use herein is further provided with a first piece.

[0065] In one particular execution, the first piece for use herein is distinct from the second element. More particularly, the first piece may be distinct and adjacent to the second element.

[0066] According to one aspect of this particular execution, the second element is connected to the first piece by any of bonding (in particular adhesive bonding), heat welding, mechanical junction, and any combinations thereof.

[0067] According to another aspect of this particular execution, the second element is connected to the first piece by a mechanical junction, which enables the second element to at least partially pivot around the (axis formed by the) mechanical junction. Advantageously, the mechanical junction takes the form of a hinge. In the context of the present disclosure, it has been found that the presence of such mechanical junction advantageously impacts the insertion and extraction operations of the second element, and incidentally the first self-supporting element, from the handheld container by allowing the second element to advantageously pivot as it approaches the vicinity of the opening of the handheld container.

[0068] According to still another aspect of this particular execution, the first piece is distinct and at least partially embedded into the second element. More particularly, the first piece is distinct and fully embedded into the second element.

[0069] In an alternative execution, the second element is provided with a first piece which is not distinct from the second element and which forms an integral part of the second element.

[0070] In one particularly advantageous aspect, the second element for use herein is dimensioned such that it can be inserted through the opening of the handheld container.

[0071] In a typical aspect, the first piece is capable of forming a releasable magnetic bond with the second piece. This releasable magnetic bond enables motion of the first piece to (directly) control motion of the second piece through the side wall of the container, in particular when the first piece is adjacent to the inner surface of the side wall, and the second piece is placed adjacent to the outer surface of the side wall in the vicinity of the first piece. According to a typical aspect, the second piece may typically allow an ascending or descending translation motion of the first piece, which in turn directly controls the motion of the second element into the container. This ability greatly facilitates insertion and extraction of the second element, and incidentally the first self-supporting element, from the container.

[0072] The first and second pieces for use herein are not particularly limited and may be easily identified by those skilled in the art in the light of the present disclosure.

[0073] In one exemplary aspect, only the first piece is a permanent magnet. In another exemplary aspect, only the second piece is a permanent magnet. In an alternative and more advantageous aspect, both the first and the second piece are permanent magnets.

[0074] According to a typical aspect, the permanent magnet comprises a material selected from the group consisting of transition metals (in particular iron, nickel, cobalt), rare earth metals (in particular neodymium), and any alloys or combinations thereof. Advantageously, the permanent magnet comprises neodymium, and any alloys thereof.

[0075] In one beneficial aspect, the first and/or the second piece is at least partially embedded into a casing. In those executions where casings are used, the first piece is typically at least partially embedded into a first casing and/or the second piece is typically at least partially embedded into a second casing.

[0076] The use of a suitable a casing is particularly beneficial as it enables reducing unwanted frictions that may occur between the first and/or second piece against the side walls of the container, and which may result into damaging the pieces and/or the side walls of the container. The use of a suitable casing for the second piece may also beneficially impact its haptics, handling properties and ultimately its motion control.

[0077] According to an advantageous aspect, the casing is made from a (food grade) material selected from the group consisting of (flexible or semi-flexible) thermo-

plastic materials, ceramic materials, siliceous materials, silicon-based materials, natural rubber, synthetic rubber materials, paper, wood, non-ferrous metals, and any combinations thereof.

[0078] According to another advantageous aspect, the second piece is further provided with a handling portion which greatly enhances control of the second piece by an operator, especially with his/her fingers.

[0079] The handling portion may be at least partly bonded or attached to the second piece, in particular using conventional bonding techniques.

[0080] In another exemplary aspect, the handling portion may be at least partly embedded into the second piece, in particular fully embedded into the second piece.

[0081] In an alternative aspect, the handling portion is at least partly bonded or attached to the second casing. Advantageously, the handling portion is at least partly embedded into the second casing, in particular fully embedded into the second casing.

[0082] According to one advantageous aspect, any of the second element or the first piece is provided with suitable sensors to measure any suitable parameters of the drinking container, including for example the temperature or the pressure inside the container, or any suitable chemical parameters or constituents of the liquid contained in the handheld container. More advantageously, any of the second element or the first piece is configured or adapted to communicate (via suitable communicating means, in particular wireless communication means) the collected parameters of the drinking container to the second piece and/or to any other external device connected (via suitable communicating means, in particular wireless communication means) to those.

[0083] According to an optional but advantageous aspect, the device of the present disclosure is further provided with a third element which enables releasably securing the second piece to the container, in particular to the outer surface of the side wall of the container.

[0084] The third element for use herein is not particularly limited provided that it enables releasably securing the second piece to the container. The third element may take various forms, dimensions and configurations. Suitable third elements for use herein will be easily identified by those skilled in the art in the light of the present disclosure.

[0085] In an advantageous aspect, the third element may be designed and configured so that it can also function as a means to facilitate optimum handling of the container and positioning of the operator's hand.

[0086] According to one advantageous aspect, the third element is at least partly bonded or attached to the second piece, using technics commonly known in the art. More advantageously, the third element is at least partly embedded into the second piece, in particular fully embedded into the second piece.

[0087] According to a more advantageous aspect, the third element is at least partly bonded or attached to the second casing. More advantageously, the third element is at least partly embedded into the second casing, and even more advantageously fully embedded into the second casing.

[0088] In one particularly advantageous aspect, the third element takes the form of a belt, a clip, a tab, and any combinations thereof. According to this particular execution, the third element may be advantageously dimensioned such that it can extend over at least 50%, at least 60%, at least 70%, at least 75%, at least 80%, at least 90%, at least 95%, or even 100% of the circumference of the container along the greatest dimension of the third element, in particular its longitudinal dimension.

[0089] In one particular aspect, the third element is made from a (food grade) material selected from the group consisting of (flexible or semi-flexible) thermoplastic materials, textile materials, ceramic materials, siliceous materials, paper, wood, metals, and any combinations thereof.

[0090] Advantageously, the third element for use herein may be designed and configured such that it can facilitate the ascending and descending motion of the first piece, which in turn facilitates the motion of the second element into the container. This ability greatly enhances insertion and extraction operations of the second element and the first self-supporting element from the container.

[0091] According to one beneficial aspect, the device of the disclosure is adapted to be equipped or retrofit onto a handheld container, in particular a handheld container provided with an opening having a dimension D no greater than 80 mm, and wherein the container comprises in particular a side wall having an inner surface and an outer surface and continuously connected to a bottom surface thereby forming the opening.

[0092] According to a particularly beneficial aspect, the device is adapted such that the second element, and incidentally the first self-supporting element, are arranged inside the container (substantially) longitudinally along the inner surface of the side wall of the container. Without wishing to be bound by theory, it is believed that this particular positioning advantageously impacts one or more of the following benefits: a) easy and fast extraction of the first self-supporting element from the handheld container; b) enhanced accessibility of the various constituting parts; c) excellent adaptability of the device for liquid containers used in outdoor activities, in particular sport bottles; d) excellent reusability and/or recycling of the first self-supporting element and/or the second element; e) enhanced protection of the first self-supporting element from damages resulting from excessive shocks against the inner walls of the container; f) enhanced release and dispersion of the functional material from the first self-supporting element into the container; and g) reduced occurring of gradient of concentration of the functional material, in particular at the bottom of the container.

[0093] According to another aspect, the present disclosure is directed to a drinking container comprising:

a) a handheld container as described above; and
b) a device as described above.

[0094] In one advantageous aspect, the second element, and incidentally the first self-supporting element, are arranged inside the container (substantially) longitudinally along the inner surface of the side wall of the container.

[0095] One exemplary device is represented in **FIG.1,** wherein the device **1** is arranged into a handheld container **2** and comprises a first self-supporting element **3** connected to a second element **4,** a first piece **5,** a second piece **6,** and wherein the first piece is adjacent to the inner surface **8** of the side wall **7** of the container **2,** and the second piece **6** is adjacent to the outer surface **9** of the side wall **7** of the container **2.** The container **2** further comprises a bottom surface **10** and an opening **11** having a dimension D.

[0096] **FIG.2** is a schematic representation of another exemplary second element **4** connected to one exemplary first self-supporting element **3,** wherein the second element **4** is provided with one exemplary first piece **5** which is an integral part of the second element **4.**

[0097] **FIG.3** is a cross-sectional view of **FIG.2** along the (A1-A2) axis, wherein the connecting means **12** of the first self-supporting element **3,** and the connecting means **13** of the second element **4** are shown.

[0098] **FIG.4** is a schematic perspective view of another first self-supporting element **3** having an overall semi-cylindrical shape and provided with a connecting means **12** in the form of a longitudinal groove.

[0099] **FIG.5** is a schematic perspective view of another second element **4** having a body portion **14** and provided with a connecting means **13** in the form of a rounded rail.

[0100] **FIG.6** is a schematic perspective view of an alternative second element **4** having a body portion **14** and provided with a connecting means **13** in the form of a rectangular stem.

[0101] **FIG. 7** is a schematic side view of one exemplary first piece **5** connected to one exemplary second element **4** via a mechanical junction **15** taking the form of a hinge, and wherein the first self-supporting element **3** is connected to the second element **4** via suitable connecting means (not represented).

[0102] **FIG. 8** is a cross-sectional top view of a device **1** according to one aspect of the disclosure arranged inside a handheld container **2,** and wherein device further comprises one exemplary third element **20** taking the form of a clip and placed around part of the outer surface of the container **2.** The third element **20** is fully embedded into the second casing **17** which is provided with a handling portion **19,** and the second piece **6** is fully embedded into the second casing **17,** whereas the first piece **5** is similarly fully embedded into the first casing **16.**

[0103] **FIG. 9** is a schematic side view of one exemplary third **20** element provided with a handling portion **19** and arranged on the outer surface of a handheld container **2.**

[0104] According to still another aspect, it is provided a method of altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container, in particular a handheld container provided with an opening having a dimension D no greater than 80 mm, and wherein the method comprises the step of using a device or a drinking container as described above.

[0105] In one advantageous aspect, the method further comprises the step of arranging the second element, and incidentally the first self-supporting element, inside the container (substantially) longitudinally along the inner surface of the side wall of the container.

[0106] According to yet another aspect, the present disclosure relates to the use of a device or a drinking container as described above for altering a liquid suitable for human consumption, in particular when the liquid is comprised in a handheld container, more in particular in a handheld container provided with an opening having a dimension D no greater than 80 mm.

[0107] The present invention has been described in terms of specific embodiments, which are illustrative of the invention and not to be construed as limiting. More generally, it will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and/or described hereinabove.

[0108] Reference numerals in the claims do not limit their protective scope. Use of the verbs "to comprise", "to include", "to be composed of", or any other variant, as well as their respective conjugations, does not exclude the presence of elements other than those stated. Use of the article "a", "an" or "the" preceding an element does not exclude the presence of a plurality of such elements.

Claims

1. A device (1) for altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container (2) and wherein the device (1) comprises:

    a) a first self-supporting element (3) comprising a functional material capable of altering the liquid;
    b) a second element (4) provided with a first piece (5);
    c) a second piece (6);

    wherein both the first (5) and the second (6) piece comprise a solid ferromagnetic or ferrimagnetic material, wherein at least one of the first (5) and the second (6) piece is a permanent magnet, and wherein the first self-supporting element (3) and the second element (4) comprise connecting means (12, 13) suitable for releasably connecting the first self-supporting element (3) to the second element (4).

2. A device (1) according to claim 1, wherein the handheld container (2) is provided with an opening (11) having a dimension D no greater than 75 mm, no greater than 70 mm, no greater than 65 mm, no greater than 60 mm, no greater than 55 mm, no greater than 50 mm, no greater than 45 mm, no greater than 40 mm, no greater than 35 mm, or even no greater than 30 mm.

3. A device (1) according to any of claim 1 or 2, wherein the second element (4) is a hollow element having at least partially an overall cylindrical shape with a base (16) having a shape selected from the group consisting of circular, elliptical, square, rectangular, triangular, diamond, star, polygonal, and any combinations thereof.

4. A device (1) according to any of the preceding claims, wherein the second element (4) comprises a connecting means (13) suitable for releasably connecting the second element (4) to the first self-supporting element (3), and wherein the connecting means (13) is selected from the group consisting of protrusions, protuberances, projections, stems, spindles, plugs, buttons, knobs, hooks, tracks, rails, grooves, channels, slots, recesses, apertures, and any combinations thereof.

5. A device (1) according to any of the preceding claims, wherein the handheld container (2) is provided with an opening (11) and the second element (4) is dimensioned such that it can be inserted through the opening (11) of the handheld container (2).

6. A device (1) according to any of the preceding claims, wherein the first self-supporting (3) comprises a connecting means (12) suitable for releasably connecting the first self-supporting element (3) to the second element (4), and wherein the connecting means (12) is selected from the group consisting of protrusions, protuberances, projections, stems, spindles, plugs, buttons, knobs, hooks, tracks, rails, grooves, channels, slots, recesses, apertures, and any combinations thereof.

7. A device (1) according to any of the preceding claims, wherein the second element (4) is provided with a first piece (5) which is distinct from the second element (4).

8. A device (1) according to any of the preceding claims, wherein the second element (4) is connected to the first piece (5) by a mechanical junction (15), in particular via a hinge, which enables the second element (4) to at least partially pivot around the mechanical junction (15).

9. A device (1) according to any of claims 1 to 6, wherein the second element (4) is provided with a first piece (5) which forms an integral part of the second element 4).

10. A device (1) according to any of the preceding claims, wherein the first self-supporting element (3) comprises a functional material capable of altering any of the taste, color, purity, aroma or odor of the liquid.

11. A device (1) according to any of the preceding claims, wherein the first self-supporting element (3) is dimensioned such that it can be inserted through the opening (11) of the handheld container (2).

12. A device (1) according to any of the preceding claims, wherein the first piece (5) is capable of forming a releasable magnetic bond with the second piece (6).

13. A device (1) according to any of the preceding claims, which is further provided with a third element (20) which enables releasably securing the second piece (6) to the handheld container (2).

14. A drinking container comprising:

a) a handheld container (2) as described in any of the preceding claims; and
b) a device (1) according to any of the preceding claims.

15. A method of altering a liquid suitable for human consumption, wherein the liquid is comprised in a handheld container (2), and wherein the method comprises the step of using a device (1) according to any of claims 1 to 13 or a drinking container according to claim 14.

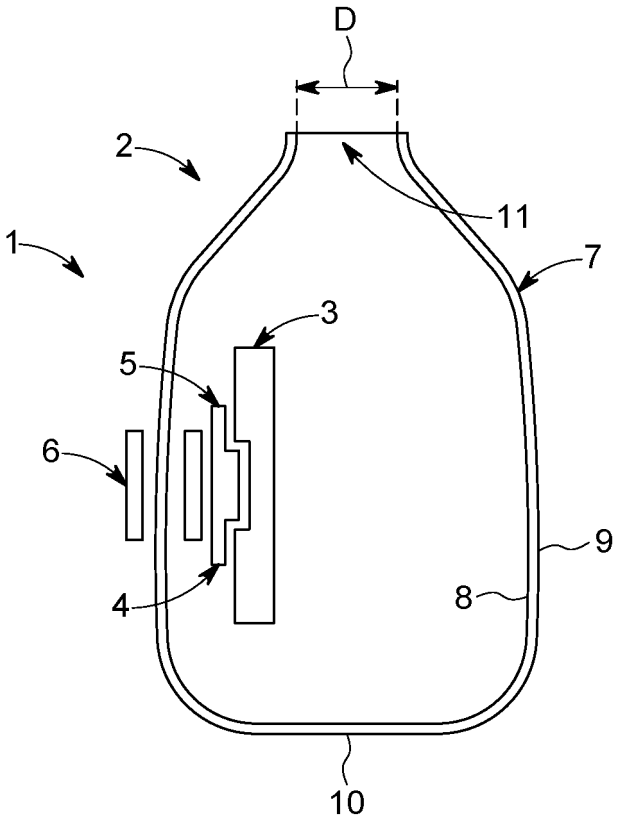

FIG. 1

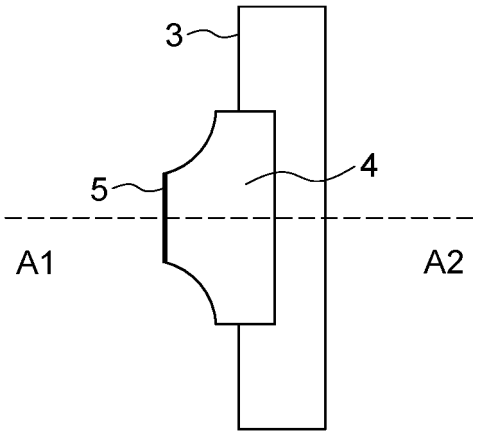

FIG. 2

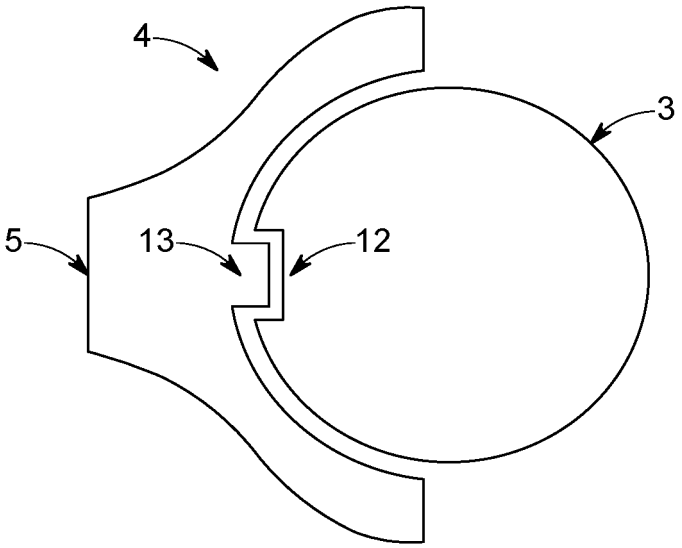

FIG. 3

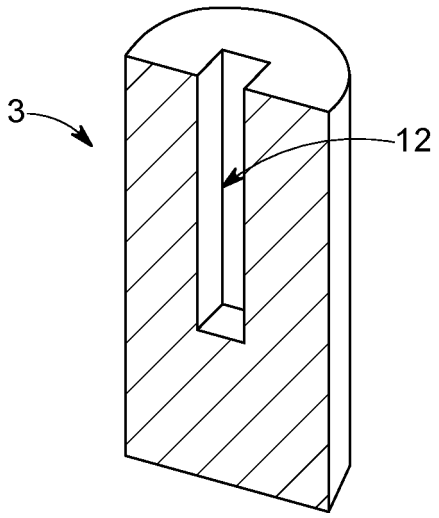

FIG. 4

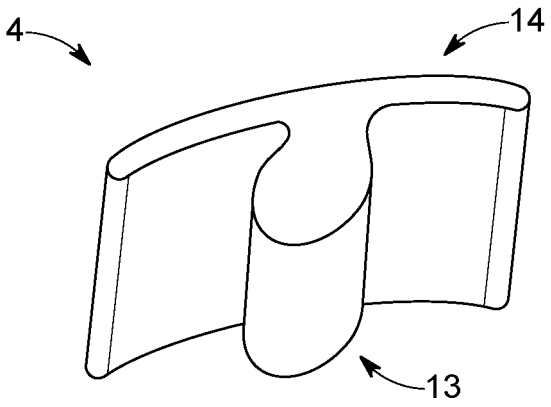

FIG. 5

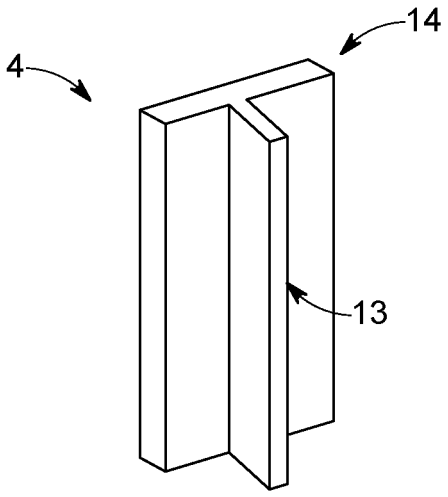

FIG. 6

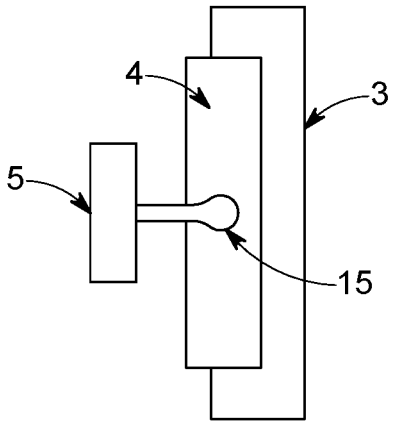

FIG. 7

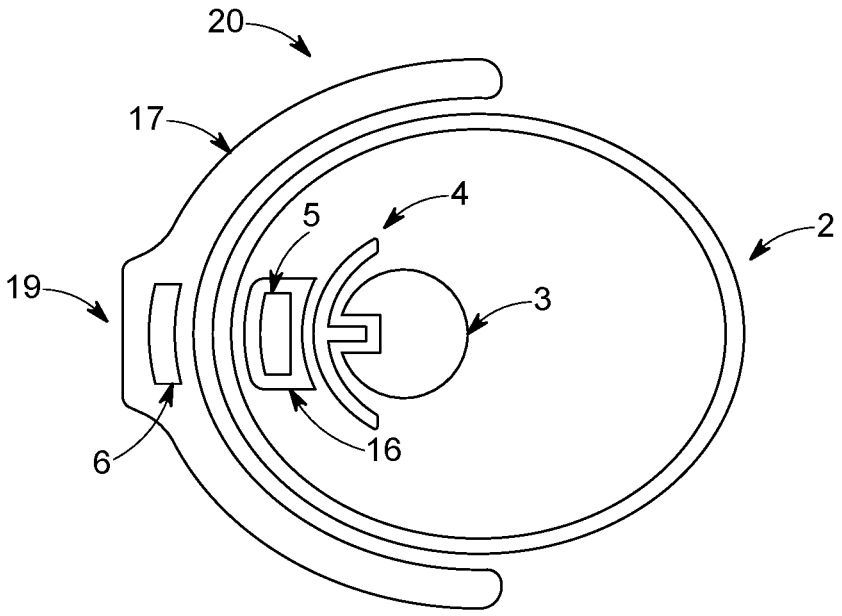

FIG. 8

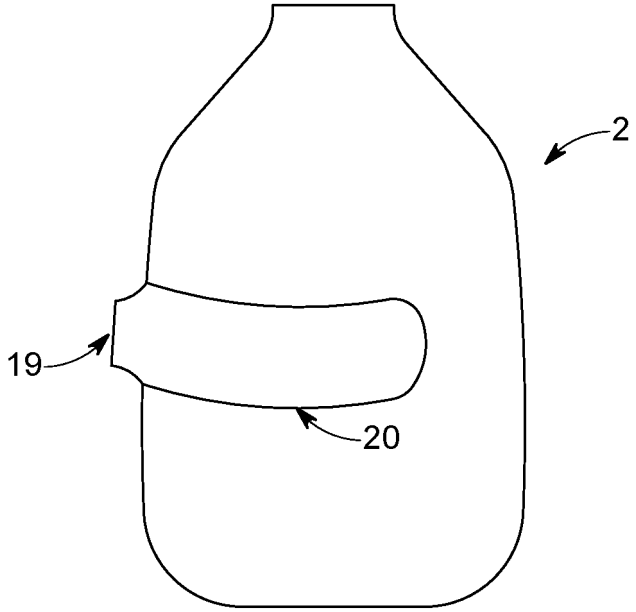

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 1303

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	CN 112 167 922 A (ZHANG XULI) 5 January 2021 (2021-01-05) * abstract; figures * * Further, the tea warehouse cup body 21 has a cylindrical shape, and the inner magnetic attraction block 222 has a circular arc sheet shape that fits the outer wall of the tea warehouse cup body 21. The tea warehouse cup body 21 may also adopt a square column shape or a prismatic shape or the like. The cup body 21 may also be formed with a clasp that locks the inner magnetic block 222, and the clasp is preferably a metal sheet with a certain elasticity, so that it is convenient to open and replace the inner magnetic block 222, and to facilitate cleaning *	1,2,5-15 3,4	INV. A47G19/22 B65D23/12
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A	WO 2013/010077 A1 (BENGTSSON LARS OLA [US]) 17 January 2013 (2013-01-17) * claims; figures *	1-15	TECHNICAL FIELDS SEARCHED (IPC) A47G B65D A45F
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 June 2021	Zattoni, Federico

CATEGORY OF CITED DOCUMENTS

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