(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 453 189 A1

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.05.2012 Bulletin 2012/20

(51) Int Cl.:
F25D 5/02 *(2006.01)*

(21) Application number: **10190930.7**

(22) Date of filing: **11.11.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Self-chilling container**

(57) The present invention consists of a self-chilling container comprising a receptacle capable of containing a liquid; a flexible sorption cooling element wrapping the receptacle and a casing surrounding both the receptacle and the flexible sorption cooling element. The sorption cooling element comprises an evaporation region defined by a first external multilayer film wrapping the peripheral walls of the receptacle, and a sorption region configured to evacuate heat from the evaporation region. The invention provides a highly efficient device capable of achieving cooling powers higher than 80 W for receptacles of 4 liters of carbonated drinks, ensuring the integrity of the user by isolating the sorption components which, during the cooling process, can acquire high temperatures. Additionally, the invention is able to provide a container which can be easily produced and stacked with a competitive cost for its components.

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Description

[0001] The present invention relates to a one-way self-chilling container comprising a liquid receptacle, a flexible sorption cooling element with a gas-tight film for cooling the liquid receptacle in which cold is generated by the evaporation of a working medium and the sorption of its vapour in a sorption agent under vacuum, and a casing devised for heat insulation and easy manipulation by the user.

BACKGROUND OF THE INVENTION

[0002] Sorption cooling elements are well known in the state of the art. In particular, flexible sorption cooling elements have been previously applied to the industry of refrigeration of liquids in, for example, United States patent applications US 2008/0314070, US 2006/0191287 and references contained therein. Said flexible sorption cooling elements comprise generally two sealing vacuum-tight multilayer films, being one the mirror image of the other, and forming a vacuum-tight envelope. In said elements, cooling is achieved by the evaporation under vacuum conditions of a liquid working agent that is distributed at an evaporation region of an absorbent fabric. Before the starting of the cooling process, a shut-off device prevents this liquid working agent to reach the evaporation region. During the cooling, vacuum is kept thanks to the sorption of vapour working agent at a sorption region by means of a sorption agent. Flexible sorption cooling elements further comprise structural layers at the evaporation region and at the connection from evaporation region to the sorption region, being preferably flexible plastic spacers that guarantee the adequate cross-section for the flow of the working agent vapour with insignificant pressure drop to the sorption region.

[0003] Although the known sorption cooling elements provide a successful tool for chilling liquid receptacles as cans or bottles, some important problems remain yet unsolved in the state of the art, specially from the user's point of view. On the one hand, known sorption cooling elements are not equipped with heat isolating mechanisms capable of not only providing a more efficient cooling process in terms of energy requirements and cooling power, but also ensuring the integrity for the user by isolating the sorption components which, during the cooling process, can acquire high temperatures, with the corresponding risk for the consumer.

[0004] On the other hand, when taking into account the application of known sorption cooling elements to the high-scale industry, none of them are able to provide containers which can be easily produced and stored with a competitive cost for the components.

[0005] The present invention is aimed to solve the above-referred problems of the state of the art by means of a self-chilling container based on a flexible sorption cooling element wrapping a liquid receptacle and surrounded by an inexpensive heat-insulating external casing.

SUMMARY OF THE INVENTION

[0006] One object of the invention is to provide efficient and inexpensive self-chilling containers for containing liquids and beverages.

[0007] Another object of the invention is to provide chilling containers capable of integrating the technology of flexible sorption cooling elements with a robust thermal insulation system in a simple and user-friendly device, capable of achieving high cooling powers while comprising successful heat dissipation.

[0008] Another object of the invention is to provide a simple self-chilling container capable of maximising the effective heat-exchange contact surface with a liquid receptacle by means of a flexible sorption cooling element, while thermally isolating the sorption elements from the user in a risk-free way.

[0009] Another object of the invention is to provide a specific flexible sorption cooling element configuration capable of achieving cooling powers higher than 80 W, using inexpensive materials, and that can be manufactured at a fully automated production line.

[0010] These and other objects are achieved by means of a self-chilling container comprising:

a) A receptacle capable of containing a liquid;
b) A flexible sorption cooling element, comprising said element an evaporation region defined by a first external multilayer film wrapping the peripheral walls of the receptacle, and a sorption region configured to evacuate heat from the evaporation region;
c) A casing surrounding the receptacle and the flexible sorption cooling element;

wherein the casing comprises a thermal insulation wall between the sorption region and the evaporation region and heat dissipation means for heat evacuation.

[0011] The specific configuration of the flexible sorption cooling element in the present invention is characterised in that the evaporation region contains a specific flexible structural configuration which can take on a curved shape under vacuum in a way that the evaporation region can be perfectly pressed onto the curved walls of the liquid receptacle to be cooled, minimising air gaps and hence maximising heat transfer to the receptacle, being such specific structural configuration, after the start of the cooling process, able to conduct a working agent vapour to the sorption agent with insignificant pressure drop while achieving cooling powers at the evaporation region higher than 80 W.

[0012] The liquid receptacle consists of a receptacle such as a can, party keg or bottle, having a curved peripheral wall that permits the evaporation region of flexible sorption cooling element to be pressed onto it maximising the surface of the container for heat exchange. The evaporation region of the flexible sorption cooling element wraps the container in its entire peripheral wall except the areas where access to the container is required, such as a tap inserted in a hole in the wall of the receptacle.

[0013] The casing comprises an inexpensive insulating material, such as expanded polystyrene (EPS), that surrounds the evaporation region and the sorption region of the flexible sorption cooling element, and that integrates access for initiating the cooling process by triggering a shut-off device via the opening of a working agent pouch within the flexible sorption cooling element. The aim of the casing is to give the user a friendly way to activate the cooling element, while isolating the evaporation region and providing active heat dissipation from the sorption area, wherein an upper sorption region and a lower sorption region of the flexible sorption cooling element form preferably an L-shape, allowing an efficient transportation and logistics of the self-chilling container.

[0014] In a preferred embodiment of the invention, the flexible sorption cooling element comprises at least one evaporator nonwoven on top of a first lattice layer, lying said lattice layer on the first external multilayer film. A nonwoven is a fabric-like material made of long fibers, bonded together by chemical, mechanical, heating or solvent means. The term nonwoven is used in the textile manufacturing industry to denote fabrics, such as felt, which are neither woven nor knitted. In a preferred embodiment of the invention, the evaporator nonwoven comprises a microfiber mat of polypropylene.

[0015] In a preferred embodiment of the invention, the first lattice layer comprises a plurality of spacings, so that when the evaporation region is pressed flat against the peripheral walls of the cylindrical liquid receptacle, the difference of diameter between the second external multilayer film and the first external multilayer film, due to the volume occupied by the structural material lattice layer and the absorbent fabric nonwoven, is tightly fitted at said spacings, preventing the shaping of wrinkles at the first multilayer film.

[0016] In a preferred embodiment of the invention, the evaporator nonwoven comprised in the flexible cooling element forms a connecting channel from a working agent pouch to the evaporation region.

[0017] In a preferred embodiment of the invention, the working agent pouch comprises a vacuum-tight film containing degassed water and a shut-off device comprising weak seals.

[0018] In a preferred embodiment of the invention, the flexible sorption cooling element further comprises a second external multilayer film forming a vacuum-tight envelope for the first external multilayer film.

[0019] In a preferred embodiment of the invention, at least a second, third and fourth network lattice layers form a sorption channel from the evaporation region to the sorption region.

[0020] In a preferred embodiment of the invention, the second and fourth network lattice layers are denser than the third network lattice layer, comprising said third lattice layer a cross section of, at least, 1.5 cm^2.

[0021] In a preferred embodiment of the invention, the first, second, third and fourth lattice layers conduct the working agent vapour to the sorption region at cooling powers of, at least, 80 W.

[0022] In a preferred embodiment of the invention, the sorption region is filled with zeolite granulate as sorption agent.

[0023] In a preferred embodiment of the invention, the sorption region comprises an upper sorption region and a lower sorption region formed into an L-shape.

[0024] In a preferred embodiment of the invention, the casing is thermally insulating.

[0025] In a preferred embodiment of the invention, the casing comprises a receiving space for the working agent pouch comprised in the flexible sorption cooling element.

[0026] In a preferred embodiment of the invention, the casing is wrapped by an external sleeve made of a shrinkable or stretchable plastic film, such as polyvinyl chloride (PVC) or polyethylene terephthalate (PET), and retracted to fit to every shape provided by the casing.

[0027] In a preferred embodiment of the invention, the external sleeve has a lateral opening that gives access for the consumer to the working agent pouch.

[0028] In a preferred embodiment of the invention, the external sleeve comprises a front opening to permit access to a tap for drink dispensing.

[0029] In a preferred embodiment of the invention, the casing comprises a plurality of heat dissipation chimneys configured to provide heat dissipation from the sorption region of the flexible cooling element.

[0030] In a preferred embodiment of the invention, the receptacle contains a volume of 4 litres.

[0031] In a preferred embodiment of the invention, the receptacle contains a carbonated drink.

[0032] Other characteristics and advantages of the present invention will arise from the detailed description of the embodiments that illustrate the object thereof in relation to the accompanying figures.

BRIEF DESCRIPTION OF THE FIGURES

[0033]

Figure 1 depicts a schematic diagram of the layer schema comprised in the flexible sorption cooling element of the present invention. The lower elements in the schema are closer to the contact surface of the liquid receptacle, while the upper elements correspond to the most external layers of the cooling element.

Figure 2 shows a perspective view of the liquid receptacle comprised in the present invention.

Figure 3 is a perspective view of the flexible sorption cooling element of the invention with the evaporation region wrapping the container and the sorption region defining an L-shape structure.

Figure 4 shows a perspective view of the casing of the present invention.

Figure 5 shows a lateral view of the casing of the present invention.

Figure 6 is a bottom and top view of the casing of the present invention.

Figure 7 is a view of the casing top cover of the invention.

Figure 8 shows the full assembly of the casing comprised in the chilling container of the invention.

Figure 9 shows an embodiment of the self-chilling container of the present invention covered by an external sleeve.

DETAILED DESCRIPTION OF THE INVENTION

[0034] The one way self-chilling container of the present invention comprises a disposable flexible sorption cooling element (1) (Figure 1) wrapping a liquid receptacle (2) (Figures 2 and 3) and surrounded by a casing (3, 4) (Figures 4, 5 and 6) that provides easy handle and activation for the consumer, high isolation at cooling regions and active heat dissipation at hot regions.

[0035] In a preferred embodiment of the invention, cooling is achieved by the flexible sorption cooling element (1) through the evaporation of a liquid working agent that is distributed over an evaporation region (5) (Figure 3) in an absorbent non-woven fabric, consisting said nonwoven preferably of an inexpensive microfiber mat of polypropylene. Before the activation of the cooling process, a shut-off device prevents said liquid working agent to reach the evaporation region (5). As depicted in Figure 1, the flexible sorption cooling element (1) comprises at least a first lattice layer (6) of a flexible structural material, made preferably of a polypropylene network of 2 mm thick, which is laid on a stamped-out piece of a first external multilayer film (7) that provides the evaporation region (5) devised to be in contact with the surface of the liquid receptacle (2). The flexible sorption cooling element (1) further comprises a connecting channel (8) from a working agent pouch (9) to an evaporator nonwoven (10). A second, third and fourth network lattice layers (11, 12, 13) form a sorption channel from the evaporator nonwoven (10) to an external sorption region (14, 15) (Figures 2 and 3). The third network lattice layer (12) is preferably made of a thicker structure than the second and fourth network lattice layers (11, 13). This third lattice layer (12) is devised as a spacer to provide the required cross section to the sorption channel in order to let the working agent vapour reaching the sorption region (14, 15), while comprising insignificant pressure drop. This cross section is preferably bigger than 1.5 cm^2 for cooling powers of 80 W. The second and fourth network lattice layers (11, 13) are made of a denser network than the third lattice layer (12), in order to prevent sorption particles to block the sorption channel. After the activation of the cooling process, the four network lattice layers (6, 11, 12, 13) are able to conduct the working agent vapour to a sorption agent contained in the external sorption region (14, 15), achieving cooling powers at the evaporation region (5), preferably equal or higher than 80 W.

[0036] Cooling is achieved through the evaporation of a liquid working agent that is distributed over the evaporation region (5) under strict vacuum conditions. Vapour working agent generated at the evaporation region (5) during the cooling process is adsorbed at the sorption region (14, 15), preserving said vacuum conditions. Moreover, in order to get a full cooling effect of working agent's vaporisation enthalpy, the working agent in its liquid phase has to be prevented form reaching the sorption region (14, 15). Thus, the connecting channel (8), preferably made of a nonwoven microfiber mat, prevents the liquid working agent from reaching the sorption region (14, 15) independently of the liquid working agent absorption capacity of the non-woven material. This is achieved by adjusting the channel (8) width to the speed of evaporation of the working agent at the evaporation region (5). For example, cooling powers at the starting of the cooling process can be particularly high, between 100 W and 150 W. According to an embodiment of the present invention, a cooling power of 150 W can be achieved through the evaporation of 240 grams of liquid water per hour under vacuum conditions at the evaporation region (5). In this situation, if a light-weight mat, with an absorption capacity at the evaporation region of, for instance, 100 grams of liquid water versus the required 240 grams of water to cool down 4 litres of a carbonated drink from 30°C to 5°C, the width of the connecting channel (8) is adjusted to bottleneck said liquid water from the working agent pouch (9) to reach evaporation region (5), so that the capacity to absorb liquid water at this region is not exceeded and, hence, liquid water is prevented from reaching the sorption region. In this example, the connecting channel (8) should be designed in order to allow a maximum flow of 400 grams per hour of liquid water in order to avoid liquid water to reach the sorption regions (14, 15).

[0037] A second mirror-image stamped external multilayer film (16) forms a vacuum-tight envelope for the first external multilayer film (7). Multilayer films according to the invention should guarantee pressure leakage rates below 10^{-8} mbarL/sec. Thus the shelf life of the self-chilling container can be longer than a year without impairing the cooling ability. The first structural lattice layer (6) at the evaporation region (5) comprises, preferably, a plurality of vertical spacings (17) so that when the evaporation region (5) is pressed flat against the peripheral walls of the cylindrical liquid receptacle (2), the difference of diameter between the second external multilayer film (16) and the first external multilayer film (7), due to the volume occupied by the structural material lattice layer (6) and the absorbent fabric nonwoven (10), is tightly fitted at said spacings (17), preventing the shaping of wrinkles at the first multilayer film (7) that would impair heat transfer from evaporation region (5) of the flexible sorption cooling element (1) to the walls of a cylindrical liquid receptacle (2) that is to be cooled.

[0038] The working agent pouch (9) is preferably made of an envelope formed by vacuum-tight multilayer films connected by a weak seal (intended said seal as a seal which can be opened by means of a pressure applied by the user through a suitable opening mechanism or procedure), acting the weak seal as a shut-off device and being coupled to the connecting channel (8). In a preferred embodiment of the invention, the pouch (9) contains degassed water and is positioned within an outer sealing pouch conformed by an extension of the first and second multilayer films (7, 16). By strong pressuring the agent pouch (9), the weak seal rips and the shutoff device is opened, thus releasing the working agent liquid and starting the cooling process.

[0039] In a preferred embodiment of the invention, the external sorption region (14, 15) is preferably filled with zeolite granulate as sorption agent. Zeolite is a crystalline mineral that contains silicon and aluminium oxides in a regular structure. In another preferred embodiment, wherein the working agent is degassed water, the working agent pouch (9) is filled with 280 ml of degassed water for the successful cooling of a liquid receptacle of 4 L from 30°C to, at least, 5°C. In order to achieve this cooling performance, sorption region (14, 15) is filled with 1.4 kg of Zeolite granulate.

[0040] The liquid receptacle (2) comprises a container such as a can, keg or bottle, having preferably a cylindrical peripheral wall that permits the evaporation region (5) of the flexible sorption cooling element (1) to be pressed onto it, maximising the contact surface between the receptacle (2) and the flexible cooling element (1) for heat exchange. The multilayer film (7) acting as the evaporation region (5) of the flexible sorption cooling element (1) wraps the receptacle (2) in its entire peripheral wall, except in the areas where access to the container is required, such as a tap (18) inserted into a hole in the wall of the receptacle (2). In a preferred embodiment of the invention, Figure 2 shows the receptacle (2) having a cylindrical peripheral wall and the tap (18). In another preferred embodiment of the invention, the container can contain a volume of 4 litres of carbonated drinks.

[0041] Figure 3 shows the cooling element structure depicted in Figure 1, wherein the external multilayer films (7, 16) are continuously sealed, wrapping the receptacle (2), and wherein the first multilayer film (7) acting as evaporation region (5) is pressed against the peripheral wall of the receptacle (2), allowing the evaporation region (5) to maximise the contact surface of the container for heat exchange. In a preferred embodiment of the invention, the flexible sorption cooling element (1) is evacuated at pressures lower than 1 mbar prior to the final sealing of the multilayer films (7, 16). The multilayer film (7) acting as an evaporation region (5) wraps the entire peripheral wall of the receptacle (2), except the tap (18) region. In a preferred embodiment of the invention, the evaporation region (5) is glued to the receptacle (2) prior to the evacuation of flexible sorption cooling element, so that better contact between the receptacle (2) and the flexible sorption cooling element (1) evaporation region (5) is achieved. The external sorption upper and lower regions (14, 15) are preferably filled with 1.4 kg of zeolite granulate with a water adsorption capacity of at least 18% as sorption agent. An upper sorption region (14) and a lower sorption region (15) are preferably formed into an L-shape, which minimises the total volume required to contain 1.4 kg of zeolite granulate, while maximising the surface for heat dissipation during the cooling process into a compact and easy-to-handle inexpensive self-chilling container.

[0042] As seen in Figures 4-5, the casing (3, 4) of the present invention surrounds the evaporation region (5) and the sorption region (14, 15) of the flexible sorption cooling element (1), further comprising an insulation wall (19) between them devised to provide thermal insulation between the evaporation (5) and sorption regions (14, 15). The casing provides heat insulation to the evaporation region (5) and active heat dissipation of the sorption regions (14, 15) comprised in the flexible sorption cooling element (1), being said casing (3, 4) preferably comprised by two assembled half-casings made of an inexpensive insulating material, such as expanded polystyrene (EPS). Additionally, the casing (3, 4) integrates a receiving space (20) for the working agent pouch (9) so that the shut-off device is properly protected during logistics and transportation of the self-chilling container until its consumption. For initiating the cooling process, the user can easily unfold the pouch (9) out from the casing by pulling it, and strong pressure said pouch (9) until the weak sealing comprised in it is ripped, letting the working agent flow through the connecting channel (8) towards the evaporation region (5). The aim of the casing (3, 4) is to give the user a friendly way to activate the cooling process while providing active heat dissipation in a compact frame. As it has been previously disclosed, the upper sorption region (14) and the lower sorption region (15) of the flexible sorption cooling element (1) form preferably an L-shape, allowing an efficient transportation and logistics of the one way self chilling container. In a preferred embodiment of the invention, the casing (3, 4) comprises dissipation means (21), preferably dissipation chimneys, for better heat dissipation from the sorption region (14, 15) of the flexible cooling element (1) during the cooling process.

[0043] Figure 6 shows the top and bottom view of the assembled half casings (3, 4) in a preferred embodiment of the invention. The top view depicts a plurality of receiving spaces (20, 22, 23) for receiving the main elements of the container, namely the receiving space (20) for the working agent pouch (9), a receiving space (22) for the sorption region (14, 15) and a receiving space (23) for the liquid receptacle (2). In the bottom view of the casing (3, 4), Figure 7 shows a plurality of bottom dissipation chimneys (21) for heat dissipation and supporting legs (24) for supporting the container.

[0044] Figure 7 shows a lateral, top and bottom view of the top cover (25) of the self-chilling container. Said top cover (25) is coupled to the container in a way that the weight load inside of the receptacle (2) is transferred from the top cover (25) to the structure of the casing (3, 4) comprised in the container. This makes it easier for the stacking and palletisation of a plurality of self-chilling containers. In a preferred embodiment of the invention, the top cover is assembled to the casing (3, 4) by means of fixing means (26), preferably mechanical fixings assembled by pressure. In another embodiment of the invention, the top cover (25) comprises a handle (27) and, at least, one top dissipation chimney (21).

[0045] Figure 8 depicts the self-chilling container comprising the elements shown in Figure 3 wrapped by the casing (3, 4) and top-covered by the top cover (25) of Figure 7, showing the receiving space (20) for the working agent pouch (9). Isolation of the evaporation region (5) is achieved by the assembled half-casings (3, 4), except at the front part of the liquid receptacle (2), in order to let access to tap (18).

[0046] Figure 9 shows the self-chilling container of Figure 8 wrapped by an external sleeve (28). Preferably, said external sleeve (28) consists of a film made of a shrinkable or stretchable plastic material, such as polyvinyl chloride (PVC) or polyethylene terephthalate (PET), retracted in order to fit to every shape provided by the insulating casing (3, 4). A front opening (29) and a lateral opening (30) are foreseen within the external sleeve (28) to permit access to the shut-off device of the working agent pouch (9) of the flexible sorption cooling element (1) for the activation of the cooling process and to the tap (18) for drink dispensing.

[0047] Having sufficiently described the nature of the present invention, as well as how to implement it, it is not considered necessary to extend the explanation for any expert in the field to understand its scope and the advantages that derive from it, but highlighting that, within its fundamental nature, it can be put into practice in other embodiments that differ in the details from that indicated though the examples, and which remain covered by the claimed protection providing that the fundamental nature is not altered, changed or modified.

DESCRIPTION OF NUMERICAL REFERENCES

[0048]

Reference	Description
1	Flexible sorption cooling element
2	Liquid receptacle
3	Casing, half-casing
4	Casing, half-casing
5	Evaporation region
6	First lattice layer
7	First external multilayer film
8	Connecting channel
9	Working agent pouch
10	Evaporator nonwoven
11	Second lattice layer

(continued)

Reference	Description
12	Third lattice layer
13	Fourth lattice layer
14	Upper sorption region
15	Lower sorption region
16	Second external multilayer film
17	Vertical spacings
18	Tap
19	Insulation wall
20	Receiving space for the working agent pouch
21	Heat dissipation means / chimneys
22	Receiving space for the sorption region
23	Receiving space for the liquid receptacle
24	Supporting legs
25	Top cover
26	Fixing means
27	Handle
28	External sleeve
29	Front opening
30	Lateral opening

Claims

1. Self-chilling container comprising:

a) A receptacle (2) capable of containing a liquid;
b) A flexible sorption cooling element (1), comprising said element an evaporation region (5) defined by a first external multilayer film (7) wrapping the peripheral walls of the receptacle (2), and a sorption region (14, 15) configured to evacuate heat from the evaporation region (5);
c) A casing (3, 4) surrounding the receptacle (2) and the flexible sorption cooling element (1);
wherein the casing (3, 4) comprises a thermal insulation wall (19) between the sorption region (14, 15) and the evaporation region (5) and heat dissipation means (21) for heat evacuation.

2. Self-chilling container according to claim 1, wherein the flexible sorption cooling element (1) comprises at least one evaporator nonwoven (10) on top of a first lattice layer (6), lying said lattice layer on the first external multilayer film (7).

3. Self-chilling container according to claim 2, wherein the evaporator nonwoven (10) comprises a microfiber mat of polypropylene.

4. Self-chilling container according to any of claims 2-3, wherein the first lattice layer (6) comprises a plurality of spacings (17).

5. Self-chilling container according to any of claims 2-4, wherein the evaporator nonwoven (10) comprised in the flexible cooling element (1) forms a connecting channel (8) from a working agent pouch (9) to the evaporation region (5).

6. Self-chilling container according to claim 5, wherein the working agent pouch (9) comprises a vacuum-tight film containing degassed water and a shut-off device comprising weak seals.

7. Self-chilling container according any of claims 1-6, wherein the flexible sorption cooling element (1) further comprises a second external multilayer film (16) forming a vacuum-tight envelope for the first external multilayer film (7).

8. Self-chilling container according to claims 2-6, wherein at least a second, third and fourth network lattice layers (11, 12, 13) form a sorption channel from the evaporation region (5) to the sorption region (14, 15).

9. Self-chilling container according to claim 8, wherein the second and fourth network lattice layers (11, 13) are a denser than the third network lattice layer (12), comprising said third lattice layer a cross section of, at least, 1.5 cm^2.

10. Self-chilling container according to any of claims 8-9, wherein the first, second, third and fourth lattice layers (6, 11, 12, 13) conduct the working agent vapour to the sorption region (14, 15) at cooling powers of, at least, 80 W.

11. Self-chilling container according to any of claims 1-10, wherein the sorption region (14, 15) is filled with zeolite granulate as sorption agent.

12. Self-chilling container according to any of claims 1-11, wherein the sorption region comprises an upper sorption region (14) and a lower sorption region (15) formed into an L-shape.

13. Self-chilling container according to any of claims 1-12, wherein the casing (3, 4) is thermally insulating, preferably made of expanded polystyrene (EPS).

14. Self-chilling container according to any of claims 5-6, wherein the casing (3, 4) comprises a receiving space (20) for the working agent pouch (9) comprised in the flexible sorption cooling element (1).

15. Self-chilling container according to any of claims 1-14, wherein the casing (3, 4) is wrapped by an external sleeve (28) made of a shrinkable or stretchable plastic film, such as PVC or PET, and retracted to fit to every shape provided by the casing (3, 4).

16. Self-chilling container according to claim 15 when depending on any of claims 5-6, wherein the external sleeve (28) has a lateral opening (30) that gives access for the consumer to the working agent pouch (9).

17. Self-chilling container according to any of claims 15-16, wherein the external sleeve (28) comprises a front opening (29) to permit access to a tap (18) for drink dispensing.

18. Self-chilling container according to claims 1-17, wherein the casing (3, 4) comprises a plurality of heat dissipation chimneys (21) configured to provide heat dissipation from the sorption region (14, 15) of the flexible cooling element (1).

19. Self-chilling container according to any of claims 1-18, wherein the receptacle (2) is a can, a keg or a bottle, preferably containing a volume of 4 litres, and more preferably consisting in a carbonated drink.

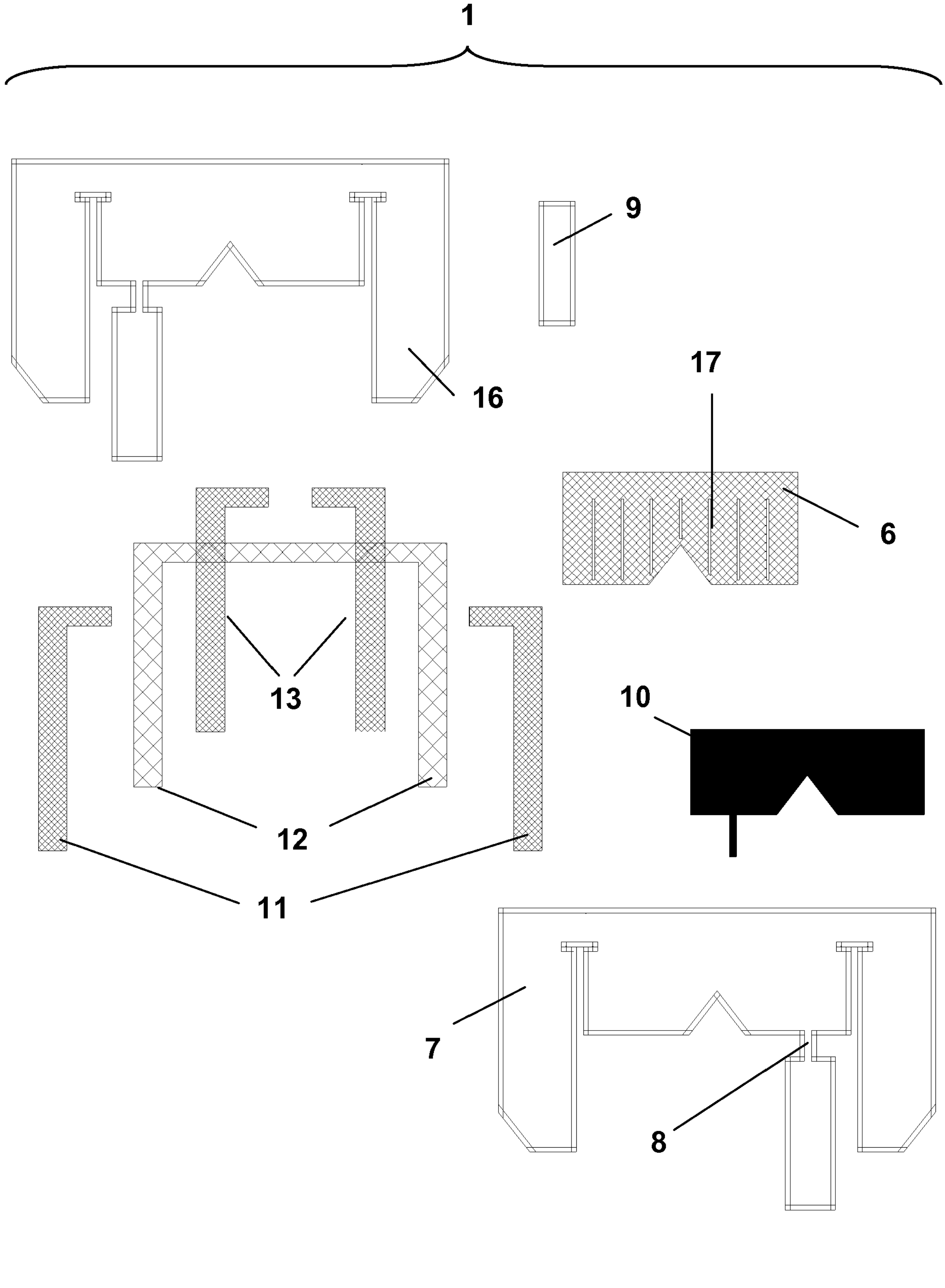

FIG. 1

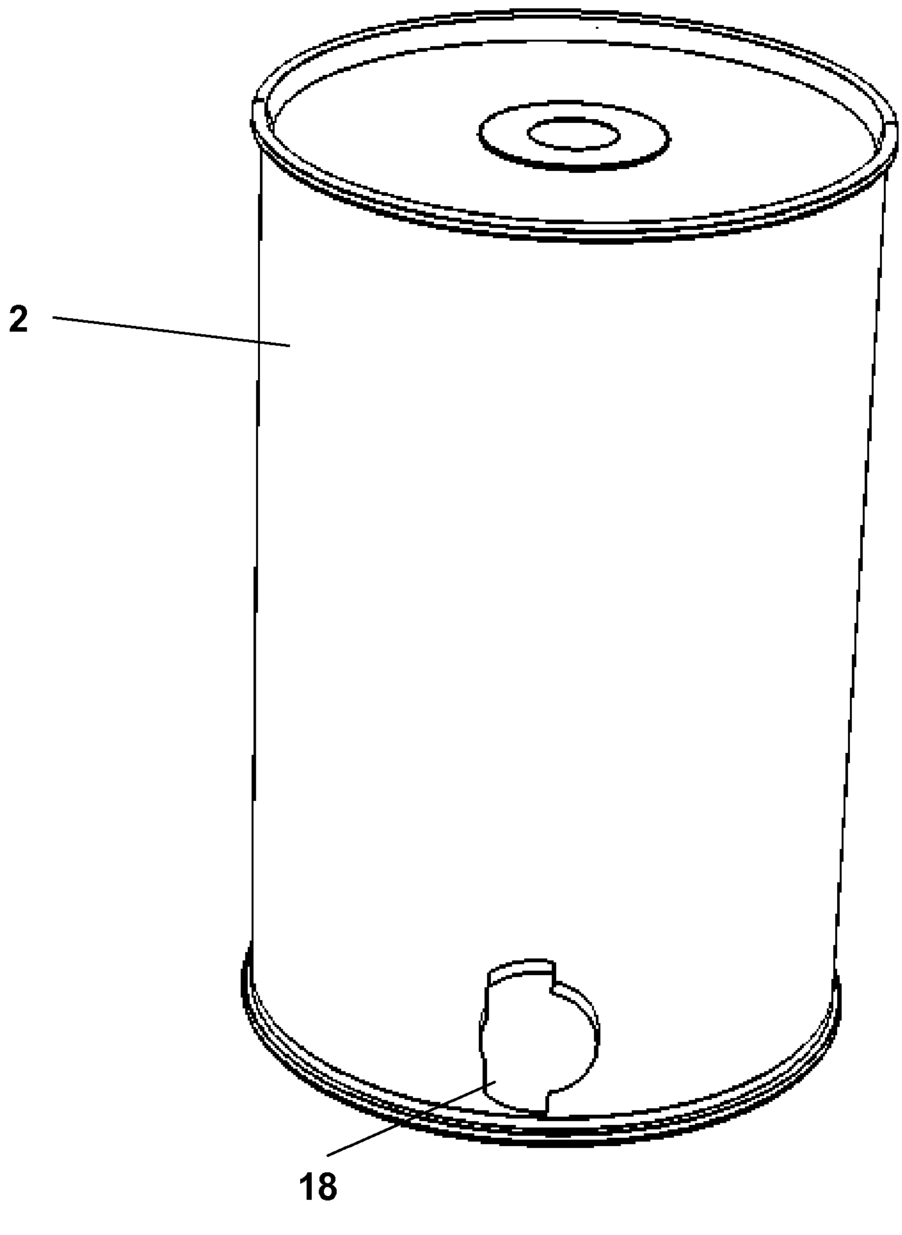

FIG. 2

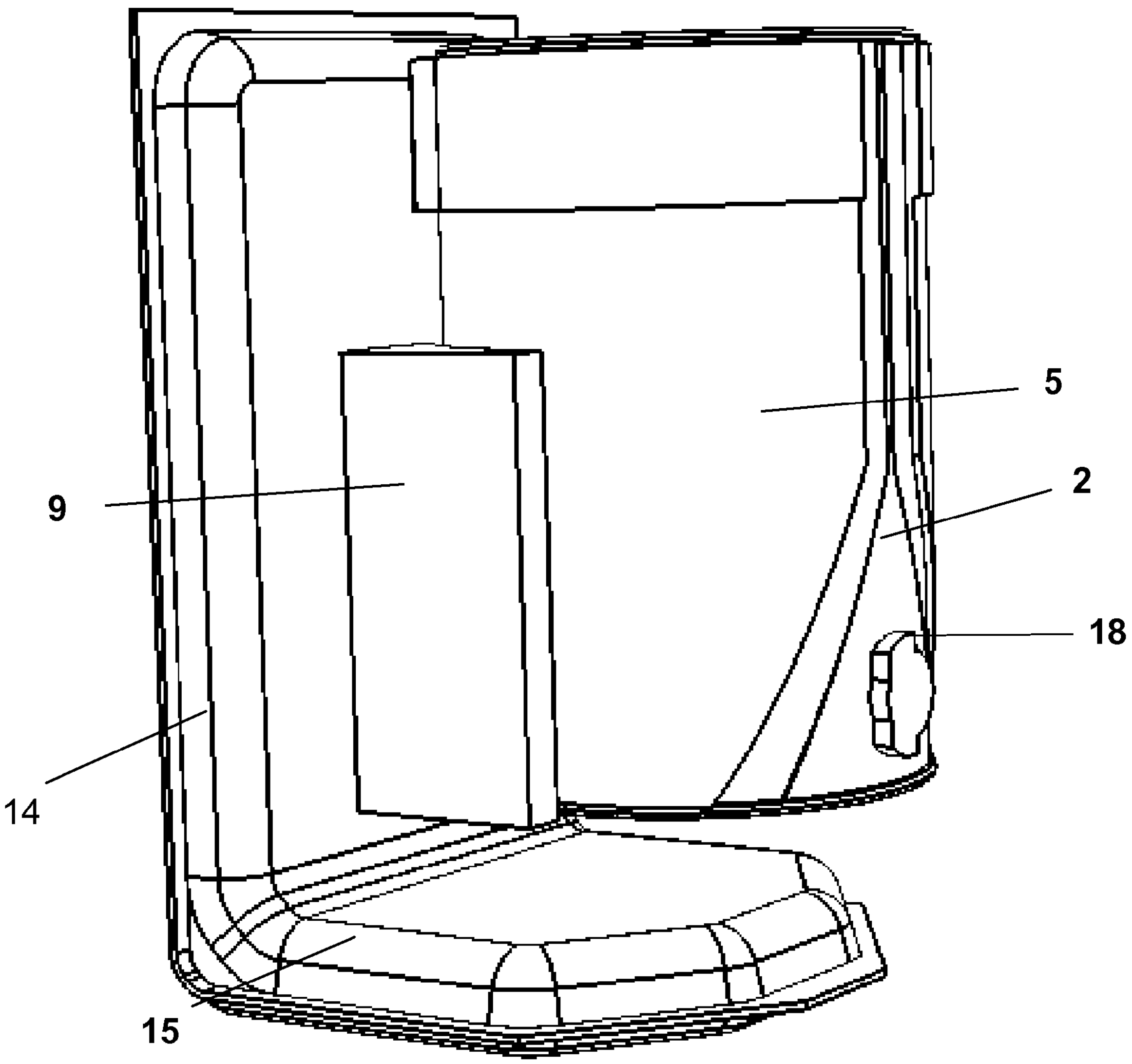

FIG. 3

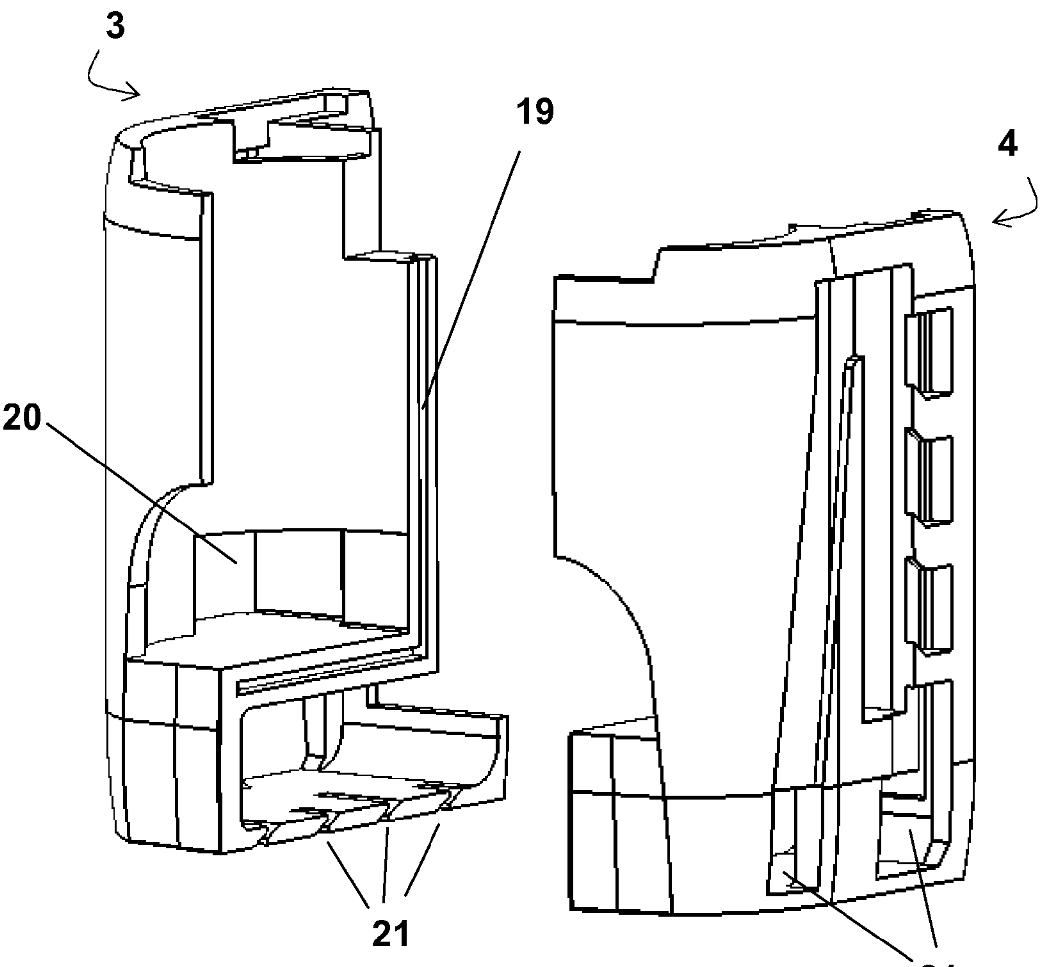

FIG. 4

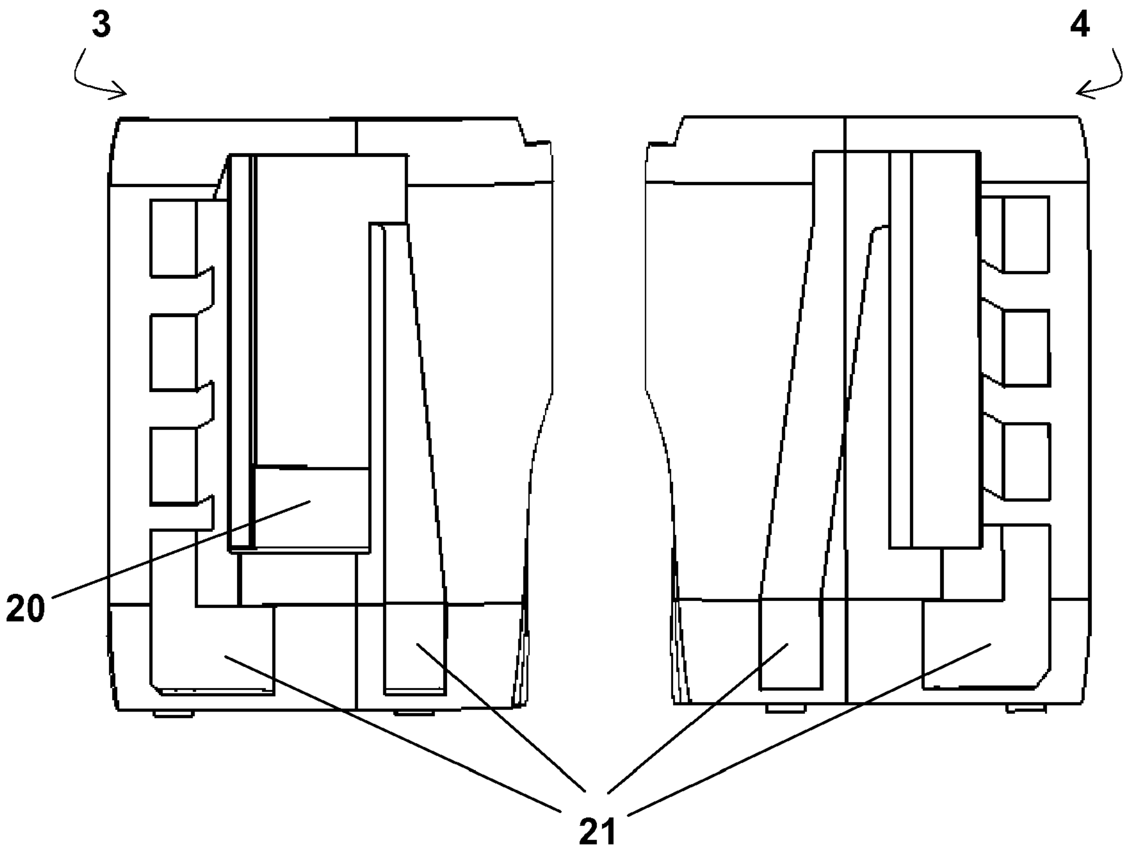

FIG. 5

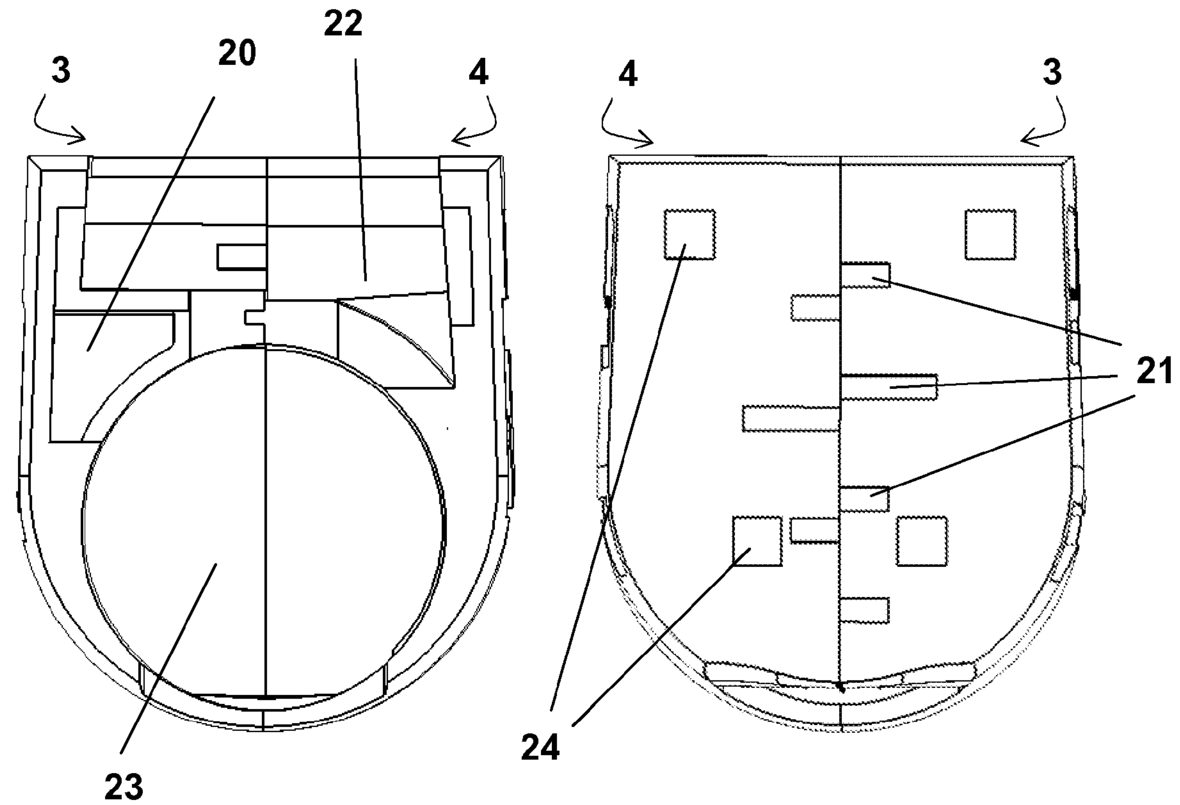

FIG. 6

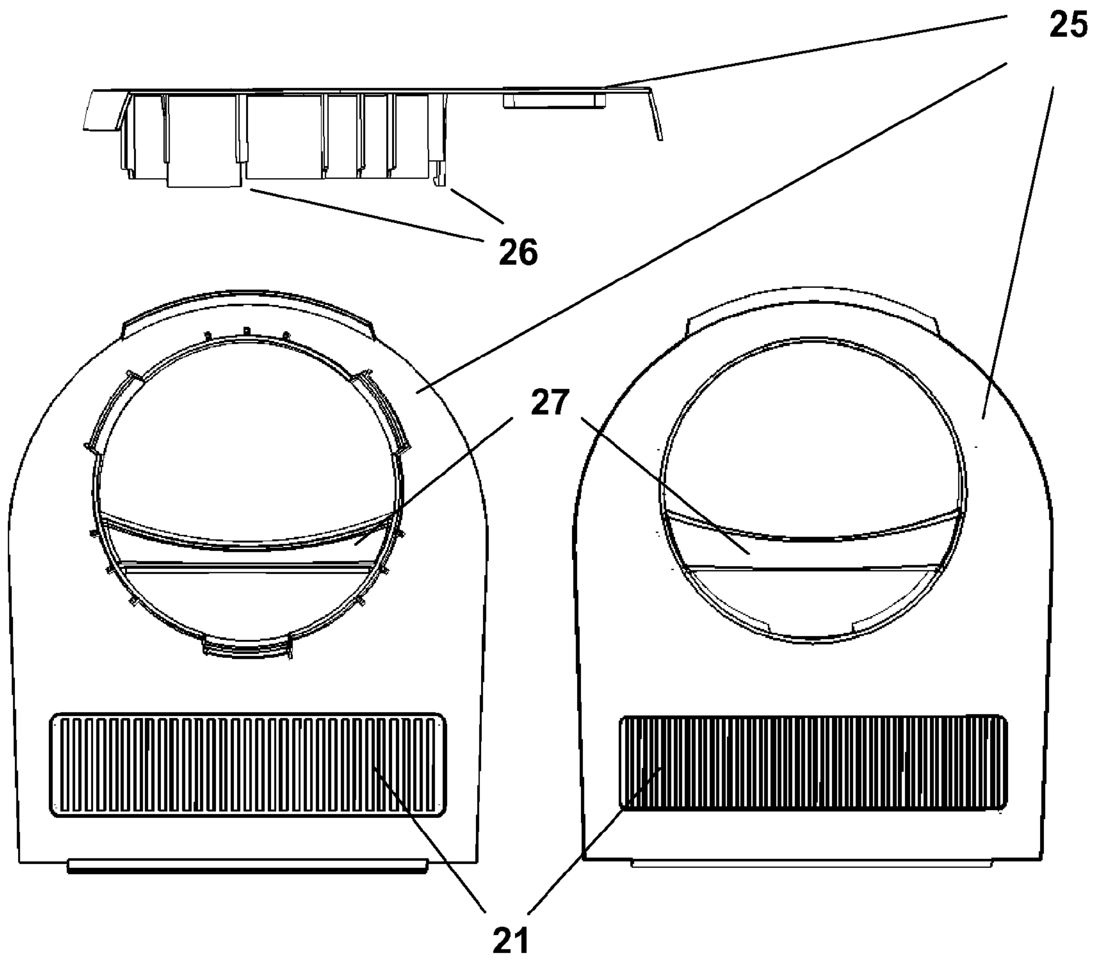

FIG. 7

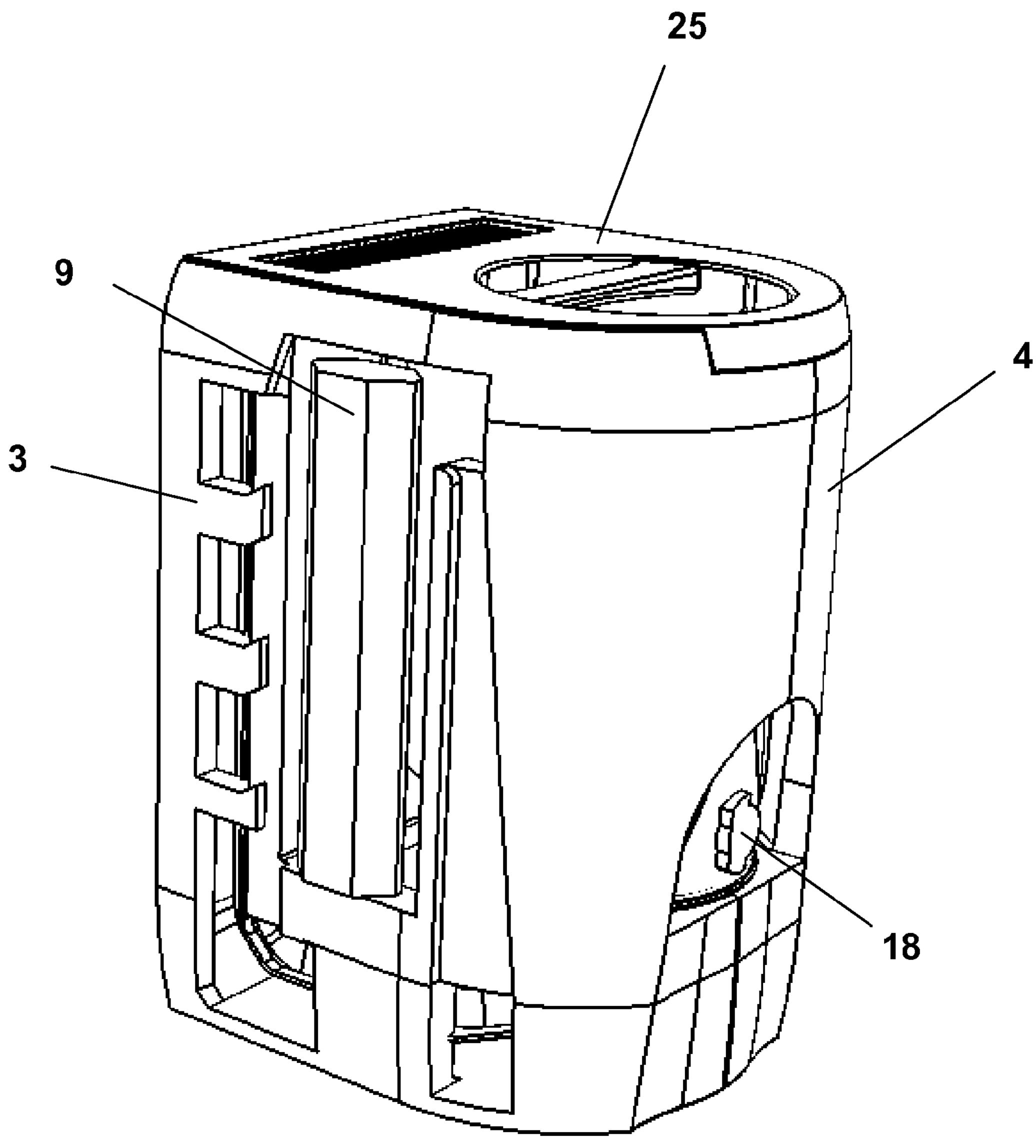

FIG. 8

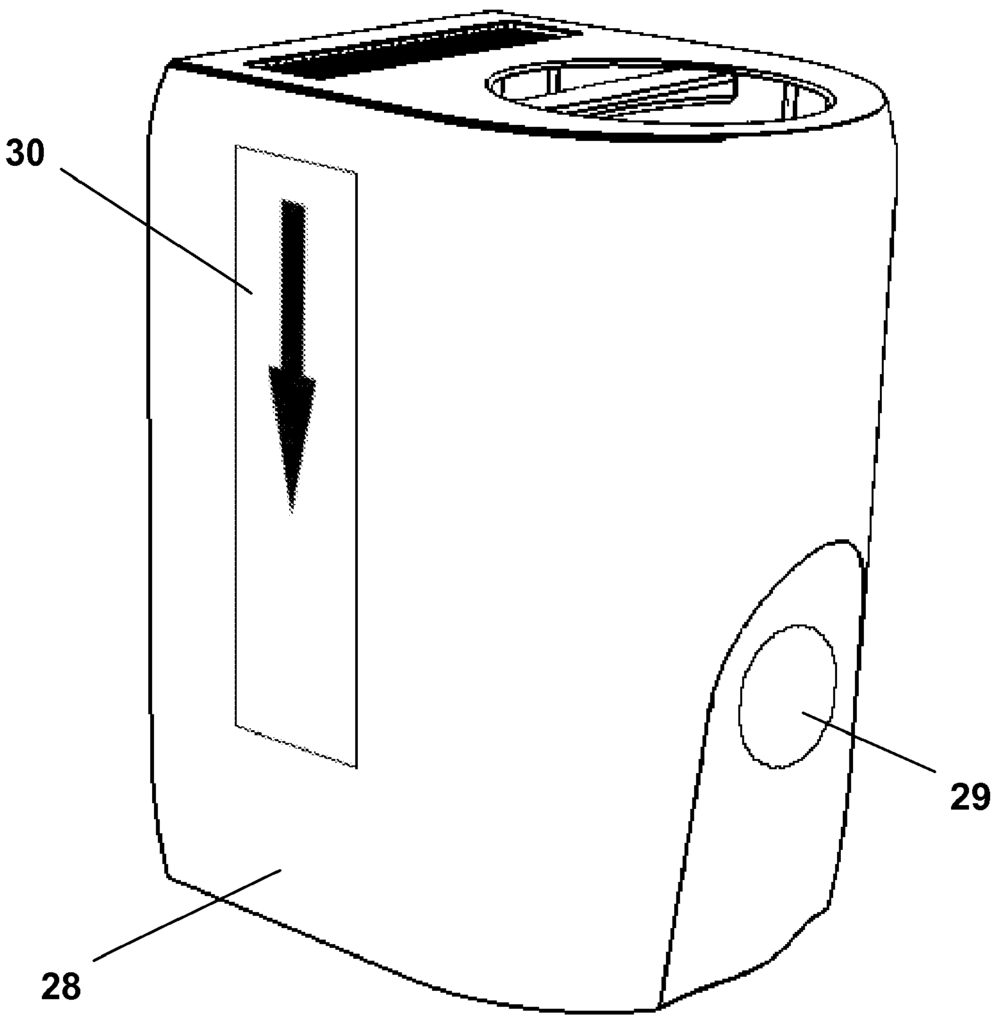

FIG. 9

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The present search report has been drawn up for all claims

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Place of search	Date of completion of the search	Examiner
The Hague	2 May 2011	Bejaoui, Amin

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