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

(11) **EP 1 905 906 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
11.11.2015 Bulletin 2015/46

(51) Int Cl.:
E03D 9/03 *(2006.01)*

(21) Application number: **06076793.6**

(22) Date of filing: **27.09.2006**

(54) **A dispensing unit for dispensing a freshening fluid**

WC-Körpchen

Dispositif de rafraichissement d'une cuvette de W.C.

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

(43) Date of publication of application:
02.04.2008 Bulletin 2008/14

(73) Proprietor: **The Procter & Gamble Company**
Cincinnati, OH 45202 (US)

(72) Inventors:
- **Bogerd, Caspar Barry**
  2761 GA Zevenhuizen (NL)
- **Lampe, Carolus Benediktus Wilhelmus**
  2498 AG Den Haag (NL)

(74) Representative: **Mather, Peter Geoffrey et al**
NV Procter & Gamble Services Company SA
100 Temselaan
1853 Strombeek-Bever (BE)

(56) References cited:
DE-A1- 19 944 318 **DE-C1- 19 915 322**

EP 1 905 906 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The invention relates to a dispensing unit for dispensing a freshening fluid. In particular, it relates to a device for delivering to a locus a fluid or vapour, for example a cleaning agent, a disinfecting agent, a deodorising agent, a fragrance, an insecticide, a miticide or an anti-allergenic agent.

[0002] In certain aspects the invention relates to the dispensing of a cleaning or disinfectant fluid into a toilet bowl or cistern, or a like vessel containing water or washed through with water.

[0003] Various toilet hygiene devices are known. Simple slow-dissolving disinfectant blocks are available, for placement in a cistern or toilet bowls. Also devices for releasing charges of a disinfectant or cleaning agent have been proposed. Such devices are comprised of a reservoir defining a volume for comprising the fluid and a mount for mounting the unit in a toilet bowl or the like. To provide a continuous and moderate outflow of fluid, often, such devices are often over-complicated. There is a need for a device which can deliver a fluid into a vessel over an extended period and which is simple and cost effective in construction.

[0004] In certain aspects the invention relates to the dispensing of a vapour into an airspace. Despite the plethora of devices available to dispense fragrances, insecticides and the like as vapours they all have drawbacks and there remains a need for a simple, reliable device for this purpose.

[0005] EP0878586 discloses a dripping device that uses dripping to dispense a fluid into a toilet bowl. The device is only effective per each flush of the toilet, since the fluid is collected in a collection tray. One of the problems of this device is that the dose rate will strongly depend on the fill level. Furthermore, a risk exists that the liquid is mixed with water since the aeration opening is unshielded from the flush water.

[0006] DE19915322 discloses a fluid delivery device having an aeration opening, a fluid delivery opening and a porous body. Through this arrangement, the fluid pressure on the porous body is kept substantially constant independent of a container fill level. However, this requires presence of a porous body and thus the arrangement of the dispenser is considerably complex.

[0007] In accordance with an aspect of the present invention there is provided a dispensing unit for dispensing a freshening fluid according to the features of claim 1. In particular, there is provided a dispensing unit for dispensing a freshening fluid, comprising: a mount for mounting the unit in a toilet bowl or the like; a reservoir defining a volume for comprising the fluid; the reservoir comprising a fluid delivery opening arranged at a lower part of the reservoir and dimensioned, in relation to the fluid contained in the reservoir, for providing a dripping action of the fluid when flowing out of the fluid delivery opening by gravity action; and an aeration opening providing aeration of an upper air volume of the reservoir wherein the reservoir is formed so that a larger part of the volume is provided in a higher part of the reservoir, so that a dosing ratio, defined as a height ratio of volume heights defining volumes for 100 %, 10 % fill ratio of the reservoir respectively, ranges between 1 and 4.0.

[0008] When the vessel is a toilet bowl or cistern the fluid may be any fluid useful in fragrancing and/or disinfecting and/or cleaning and/or descaling of and/or inhibiting the formation of scale in, the toilet bowl or cistern. The term "cleaning fluid" will be used herein to denote all such fluids.

[0009] In other embodiments the device may be such that the fluid is dispensed from the distal end as a vapour, for example an insecticidal, insect-repellent, miticidal, deodorising, fragrancing or anti-allergenic vapour. The liquid may be directed to an emanator pad or emanator device.

[0010] The rate of delivery from the device can be determined by one or more of the following: viscosity of the fluid; the size and design of the fluid delivery opening, in particular: a diameter and a channel length of the delivery opening; and a column height of the fluid.

[0011] In accordance with a second aspect of the invention there is provided a method of dispensing a fluid at a locus, using a device as defined above.

[0012] Accordingly, a cost effective and efficient means for continuous freshening can be provided.

Further features and benefits can be derived from the description, read in conjunction with the figures. In the figures:

Figure 1 shows a variety of bottle shapes, including conventional ones, and a bottle shape according to the invention;
Figure 2 shows additional bottle shapes according to the invention;
Figure 3 shows yet another shapes according to the invention; and
Figure 4 shows a chart indicating dose rates obtained from various bottle shapes relative to a calculated ideal dose rate.

[0013] Turning to the figures, Figure 1A shows a rectangular reservoir shape; Figure 1B shows a cylindrical reservoir shape having a cylinder axis oriented horizontally relative to a gravitational direction; and Figure 1C shows a reservoir shape according to the invention, by the applicant also indicated as "Bala shape".

[0014] The common denominators of these shapes are a reservoir 1 wherein a fluid 2 is contained, typically, a viscous fluid with a viscosity higher than 2 Pa.s. Due to the geometry of a fluid delivery opening 3 in the reservoir 1 arranged at

a lower part of the reservoir (seen in the direction of gravity), in correspondence to the fluid 2 contained in the reservoir 1, the reservoir empties by slowly dispensing of the fluid 2 out of the fluid delivery opening 3. Typically, an embodiment is dimensioned so that an amount of 35 ml is emptied in about 28 days. To prevent building up of underpressure in the reservoir, which would hinder the outflow of the fluid 2, an aeration opening 4 is provided above the liquid surface, in this preferred embodiment provided in a side wall 5 of the reservoir 1 common with the fluid delivery opening 3. The aeration opening 4 is provided to directly communicate with an upper air volume 6 of the reservoir above the fluid 2.

[0015] A desire exists in providing a moderate and steady outflow, which does not vary significantly over time, in particular, which is still of an acceptable level when the reservoir will be nearly empty. Otherwise, a freshening power of the dispensing device (of which only a reservoir 1 is depicted) will be very uneven, which means effectively that the device is impractical: an excessive amount of freshening liquid 2 will be outputted with a nearly full reservoir 1, while in the end, with a nearly empty reservoir, the amount of freshening liquid 2 may be insufficient to provide a desired freshening level.

[0016] However, one of the difficulties to overcome is a dispensing rate (expressed in ml/day) relationship, that exists with a column height H, a liquid density ρ and a liquid viscosity η of the fluid; and a channel length L and diameter r of the fluid delivery opening 3:

$$\text{Dosing} = \frac{p \cdot r^4 \cdot (\rho \cdot g \cdot H)}{8 \cdot \eta \cdot L} \qquad \text{Equation 1}$$

[0017] Thus, it can be seen that while a column height diminishes when a reservoir 1 empties, an outflow of fluid 2 will diminish, thus arriving at a lower dose rate.

[0018] A numeric value indicating the variance of dose-rate is a ratio of initial dose rate and a dose rate, obtained at a 100 %, 10 % fill ratio of the reservoir 1 respectively, as shown in the top views and bottom views of Figure 1A, B and C respectively. Assuming that the composition of the fluid 2 does not change (which will be further elaborated hereinbelow), this value is dependent on the reservoir 2 shape and can be expressed as a height ratio of volume heights defining volumes for 100 %, 10 % fill ratio of the reservoir 1 respectively. Ideally, with a dose rate remaining constant in time, independently of height, this value should be 1. Thus, where at a fill volume of 10%, for box-like volumes a fill height would also 10%, a more optimal characteristic is to have, for example, still 25% of fill height at 10% fill volume. In practice, an acceptable value would range between 1 and 4, preferably, between 1 and 3.3.

[0019] Turning now to Figure 1A, for a rectangular shape, a column height depends linearly on the amount of fluid contained in the container. Thus, a fill level of 10% will give rise to a height of 10%, amounting to a dosing ratio of 10. Accordingly, a rectangular shape amounts to a significant difference in dosing ratios during use of the device.

[0020] Figure 1B shows an alternative shape which may be suitable for dispensing purposes, in particular in a toilet, since this shape is easily clamped under a rim of a toilet bowl, and may be dimensioned in diameter to largely correspond to a width of a rim (not shown). Such a diameter may range from 20-50 mm, preferably around 35 mm. The reservoir of Figure 1B is cylindrical in shape having a cylinder axis oriented horizontally relative to a gravitational direction. Here a dosing ratio is 5.8, since a first height H1 is 34 mm, and a height H2 expressing a 10 % fill level is 5.9. Although this ratio is almost half better than the rectangular shape of Figure 1A, it still significantly differs from a calculated ideal value.

[0021] Figure 1C finally shows a shape according an aspect of the invention, wherein a dose rate is in a range of 1 - 4. In particular, the reservoir 1 depicted in Figure 1C is formed in a frustroconical shape with an inclined bottom wall. This shape generally causes a larger part of the volume provided in a higher part of the reservoir, providing a dosing ratio of typically less than 3.3, in particular for a 10% fill level height of 10.5, relative to an initial fill level height of 33.5, of 3.2. Thus, a more constant dose rate can be provided with the illustrated shape. In particular, due to the inclined bottom wall, a relatively large part of the volume is dispensed having a column height that is relatively high, since the volume at the bottom of the reservoir is relatively small compared to the rest of the volume, which implies a relative constant dose rate. Only in a later part of the dispensing cycle, when the volume approaches zero, the column height shrinks considerably and the dose rate drops.

[0022] Figure 2 shows another set of embodiments which are modifications of the frustro-conical shape illustrated in Figure 1C (Figure 2A and Figure 2A). The figures A and B each show three views, a top view in a 100% fill condition; a middle view in a 10% fill condition and a lower view illustrating the embodiment in cross-sectional view along a main axis of the reservoir. In particular, in Figure 2, embodiments are shown wherein a lower part of the reservoir is dimensioned to have an orientation that is more vertical than an orientation of the higher part of the reservoir. Thus, effectively, a smaller lower volume 7 is created than a larger volume 8 that is situated higher up, thus providing effectively, for the outflow of fluid 2 of that larger volume 8 a relative constant height along the vertically oriented lower volume 7. In effect, for Figure 2A this creates a step form 9, wherein a small part of the volume is oriented downwards, in order to create a height column that is still acceptable in terms of desired flow rate.

[0023] Similarly this lower volume is provided, with reference to Figure 2B, by an elongated channel 10, that is formed in the lower part of the reservoir 1, for instance, by providing a tongue form 11 in a lower half of the reservoir, the walls of which providing a channel 10 together with a side wall of the reservoir. Dosing ratios for these further embodiments are even more beneficial and are calculated to be about 2.5 for the step-form of Figure 2A and about 2.3 for the elongated channel of Figure 2B.

[0024] Figure 3 shows some additional reservoir shapes that are further modifications, that are more departed from a conical shape. In particular, the embodiments depicted in Figure 3A and Figure 3B have specially designed substantially vertical channels 12, defining a substantially constant column height for the most part of the fluid 2, that is mostly contained in the larger volume 8 situated above these channels 12. Dosing ratios for these embodiments are even closer to the ideal value of 1, thus providing almost constant dose rates. For the embodiment depicted in Figure 3A (having a first height H1 of 52 mm and a 10% fill level second height H2 of 25.25) a dosing ratio amounts to 2. For the embodiment in Figure 3B, the dosing ratio amounts to 1.2, having a first height of 50 mm and a second height of 41 mm.

[0025] Figure 4 shows a graph of a decreasing dose rate in arbitrary of the various shapes shown in Figure 1. In particular, for a lifetime of 28, the frustro-conical "Bala" shape in Figure 1C approaches the constant ideal shape relatively best, in that the dose rate is closest to 1 at substantially all times relative to the rectangular shape of Figure 1A and cylindrical shape of Figure 1B.

[0026] Figure 5 shows a schematic side view of an example of a dispensing device 13 wherein by proper tuning of the viscosity of the fluid 2 in relation to the fluid delivery opening 3, a dosing rate can be accurately determined. Flush water cannot contact the fluid 2 inside the reservoir 1, by proper shielding of an aeration opening 4 by for example a covering cap 14 as illustrated or some other shielding device. Both aeration opening 4 and fluid delivery opening 3 are provided in a common side wall 5, thus providing an elegant way of unsealing both outflow and aeration opening, for example, through use of a tear seal 15 that is pulled out of an downward opening 16 of the covering cap 14. The fluid delivery opening 3 is provided with a waterretaining structure in the form of a recess 17, dimensioned to provide a water film across or near the opening to prevent drying out of the fluid 2. Thus, in use, through flushing, water reaches the lower part of the side wall 5 and in particular, moisturizes the fluid delivery opening 3. Through adsorption, water is retained in the recess 17, so that the fluid is kept moist when dripping out of the fluid delivery opening 3. This mechanism provides a way to secure that the fluid 3 does not dry out, resulting in inadverted clogging of the release channel 18. Although generally this is thought as undesirable, this clogging can however also be used to (eventually) stop releasing when the toilet is not in use, and to release the fluid from channel 18 by using flush water to unclog the release channel 18. Although in this embodiment a recess is shown as water retaining structure, other embodiments, such as rib like protruding structures or capillary structures are also possible.

[0027] Although in Figure 5 only a side view is shown of the covering cap 14, preferably, the cap 14 preferably generally follows the contour of the reservoir 1 and covers side wall 5 for the most part, leaving a small downward opening for entering some flush water to moisturize the fluid delivery opening 3. The container preferably has a visual appearance that it contains a coloured cleaning fluid. However, it has been found that blue cleaning fluids tend to cause stains on the bowl, which are visually unattractive. Thus, on the one hand there is a desire to provide a container comprising a coloured substance, on the other hand, there is a desire not to be bothered by stains caused by said colored substance. To overcome this problem, preferably, the reservoir comprises transparant colored walls and wherein the fluid is of a non-coloured transparant nature. Accordingly, the visual appearance of the dispenser 13 is that it contains a coloured fluid, however, in use, the fluid does not provide stains because of it's neutral transparent nature.

[0028] While specific embodiments of the invention have been described above, it will be appreciated that the invention may be practiced otherwise than as described. In particular, the descriptions above are intended to be illustrative, not limiting. Thus, it will be apparent to one skilled in the art that modifications may be made to the invention as described without departing from the scope of the claims set out below.

Claims

1. A dispensing unit for dispensing a freshening fluid (2), comprising:

- a mount for mounting the unit in a toilet bowl or the like;
- a reservoir (1) defining a volume for comprising the fluid; the reservoir formed so that a larger part of the volume (8) is provided in a higher part of the reservoir, the reservoir comprising
- a fluid delivery opening (3) arranged at a lower part of the reservoir ; and
- an aeration opening (4) providing aeration of an upper air volume of the reservoir; **characterized in that**

the fluid delivery opening is dimensioned, in relation to the fluid contained in the reservoir, for providing a dripping action of the fluid when flowing out of the fluid delivery opening by gravity action and **in that** a dosing ratio, defined

as a height ratio of volume heights defining volumes for 100 %, 10 % fill ratio of the reservoir respectively, ranges between 1 and 4.0.

2. A dispensing unit according to claim 1, wherein the reservoir is formed as a frustroconical shape with an inclined bottom wall.

3. A dispensing unit according to any of the preceding claims 1 - 2, wherein a lower part of the reservoir (7) is dimensioned to have an orientation that is more vertical than an orientation of the higher part of the reservoir.

4. A dispensing unit according to claim 2, wherein the lower part of the reservoir (7) is dimensioned to provide a channel (10) between the fluid delivery opening and the higher part of the volume.

5. A dispensing unit according to claim 1, wherein the fluid delivery opening is provided with a water retaining structure (17) dimensioned to provide a water film across or near the opening (3) to prevent drying out of the fluid (2).

6. A dispensing unit according to claim 5, wherein the water retaining structure is provided as a recess (17) in the wall wherein the fluid delivery opening is provided.

7. A dispensing unit according to claim 1, wherein the aeration opening (4) is shielded by a covering cap and (14) is provided in a side wall (5) of the reservoir common with the fluid delivery opening (3), the aeration opening providing a direct aeration of the upper air volume of the reservoir, and the covering cap being provided with a downward opening for allowing flush water near the fluid delivery opening, and for shielding the aeration opening from falling flush water.

8. A dispensing unit according to claim 1, wherein the reservoir comprises transparant colored walls and wherein the fluid is of a non-coloured transparant nature.

Patentansprüche

1. Abgabeeinheit zum Abgeben eines Erfrischungsfluids (2), umfassend:

   - eine Halterung zum Befestigen der Einheit in einer Toilettenschüssel oder dergleichen;
   - einen Behälter (1), der ein Volumen zur Aufnahme des Fluids begrenzt, wobei der Behälter so geformt ist, dass ein größerer Teil des Volumens (8) in einem höheren Teil des Behälters vorgesehen ist, wobei der Behälter Folgendes umfasst:
   - eine Fluidzuführungsöffnung (3), die in einem unteren Teil des Behälters angeordnet ist; und
   - eine Belüftungsöffnung (4), die die Belüftung eines oberen Luftvolumens des Behälters bereitstellt; **dadurch gekennzeichnet, dass**

   die Fluidzuführungsöffnung im Verhältnis zu dem im Behälter enthaltenen Fluid so dimensioniert ist, dass durch die Wirkung der Schwerkraft ein Tropfvorgang des Fluids geschaffen wird, wenn dieses aus der Fluidzuführungsöffnung strömt, und dass ein Dosierungsverhältnis, definiert als ein Höhenverhältnis von Volumenhöhen, die Volumina für einen Füllungsgrad von 100 % bzw. 10 % des Behälters definieren, zwischen 1 und 4,0 beträgt.

2. Abgabeeinheit nach Anspruch 1, wobei der Behälter als Kegelstumpfform mit einer geneigten Bodenwand geformt ist.

3. Abgabeeinheit nach einem der vorangehenden Ansprüche 1 - 2, wobei ein unterer Teil des Behälters (7) so dimensioniert ist, dass er eine Ausrichtung aufweist, die stärker vertikal ist als eine Ausrichtung des höheren Teils des Behälters.

4. Abgabeeinheit nach Anspruch 2, wobei der untere Teil des Behälters (7) so dimensioniert ist, dass er einen Kanal (10) zwischen der Fluidzuführungsöffnung und dem höheren Teil des Volumens schafft.

5. Abgabeeinheit nach Anspruch 1, wobei die Fluidzuführungsöffnung mit einer Wasserrückhaltestruktur (17) versehen ist, die so dimensioniert ist, dass sie einen Wasserfilm über der oder nahe der Öffnung (3) schafft, um das Austrocknen des Fluids (2) zu verhindern.

6. Abgabeeinheit nach Anspruch 5, wobei die Wasserrückhaltestruktur als Vertiefung (17) in der Wand vorgesehen ist, in der die Fluidzuführungsöffnung vorgesehen ist.

7. Abgabeeinheit nach Anspruch 1, wobei die Belüftungsöffnung (4) durch eine Abdeckungskappe (14) abgeschirmt ist und in einer Seitenwand (5) des Behälters zusammen mit der Fluidzuführungsöffnung (3) vorgesehen ist, wobei die Belüftungsöffnung eine direkte Belüftung des oberen Luftvolumens des Behälters schafft und wobei die Abdeckungskappe mit einer abwärts gerichteten Öffnung versehen ist, um Spülungswasser in der Nähe der Fluidzuführungsöffnung zu ermöglichen und die Belüftungsöffnung vor fallendem Spülungswasser abzuschirmen.

8. Abgabeeinheit nach Anspruch 1, wobei der Behälter transparente, gefärbte Wände umfasst und wobei das Fluid von farbloser, transparenter Art ist.

Revendications

1. Unité de distribution pour distribuer un fluide rafraîchissant (2), comprenant :

- une monture pour monter l'unité dans une cuvette de toilettes ou similaire ;
- un réservoir (1) définissant un volume pour comprendre le fluide ; le réservoir étant formé de sorte qu'une plus grande partie du volume (8) est fournie dans une partie supérieure du réservoir, le réservoir comprenant
- une ouverture de libération de fluide (3) disposée au niveau d'une partie inférieure du réservoir ;
et
- une ouverture d'aération (4) fournissant une aération d'un volume d'air supérieur du réservoir ; **caractérisée en ce que**

l'ouverture de libération de fluide est dimensionnée, par rapport au fluide contenu dans le réservoir, pour fournir une action d'écoulement goutte-à-goutte du fluide lorsqu'il s'écoule hors de l'ouverture de libération de fluide par l'action de la gravité et **en ce qu'**un rapport de dosage, défini en tant que rapport de hauteur des hauteurs de volume définissant des volumes pour un rapport de remplissage de 100 % et 10 % du réservoir respectivement, est compris entre 1 et 4,0.

2. Unité de distribution selon la revendication 1, dans laquelle le réservoir est formé en tant que forme tronconique avec une paroi inférieure inclinée.

3. Unité de distribution selon l'une quelconque des revendications précédentes 1 à 2, dans laquelle une partie inférieure du réservoir (7) est dimensionnée pour avoir une orientation qui est plus verticale qu'une orientation de la partie supérieure du réservoir.

4. Unité de distribution selon la revendication 2, dans laquelle la partie inférieure du réservoir (7) est dimensionnée pour fournir un canal (10) entre l'ouverture de libération de fluide et la partie supérieure du volume.

5. Unité de distribution selon la revendication 1, dans laquelle l'ouverture de libération de fluide est pourvue d'une structure de rétention d'eau (17) dimensionnée pour fournir un film d'eau à travers ou près de l'ouverture (3) pour empêcher un assèchement du fluide (2).

6. Unité de distribution selon la revendication 5, dans laquelle la structure de rétention d'eau est fournie en tant que cavité (17) dans la paroi dans laquelle l'ouverture de libération de fluide est fournie.

7. Unité de distribution selon la revendication 1, dans laquelle l'ouverture d'aération (4) est protégée par une coiffe de couverture (14) et est fournie dans une paroi latérale (5) du réservoir commune à l'ouverture de libération de fluide (3), l'ouverture d'aération fournissant une aération directe du volume d'air supérieur du réservoir, et la coiffe de couverture étant pourvue d'une ouverture vers le bas pour autoriser l'eau de chasse près de l'ouverture de libération de fluide, et pour protéger l'ouverture d'aération de l'eau de chasse qui tombe.

8. Unité de distribution selon la revendication 1, dans laquelle le réservoir comprend des parois colorées transparentes et dans laquelle le fluide est d'une nature transparente non colorée.

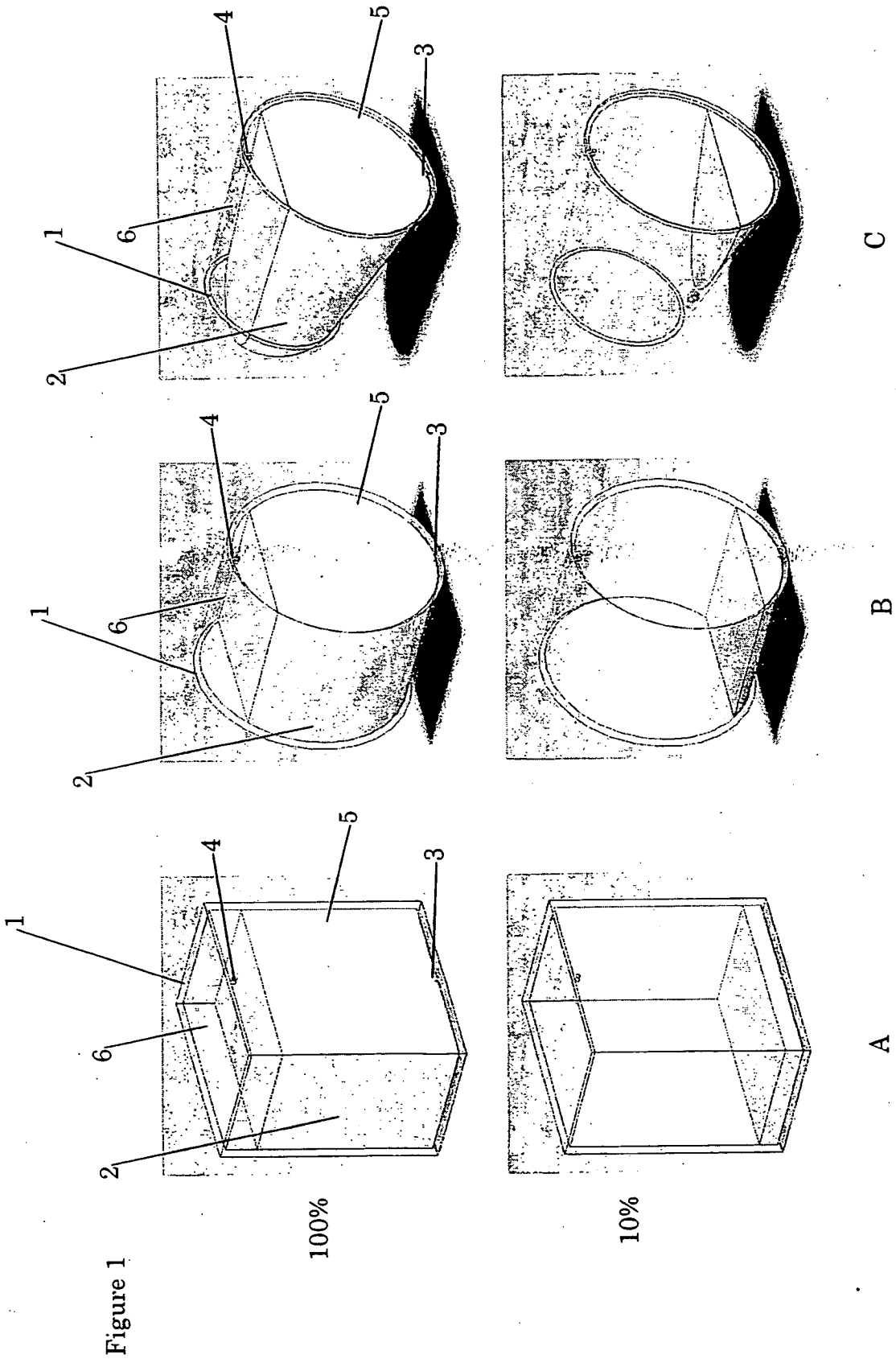


Figure 1

Figure 2

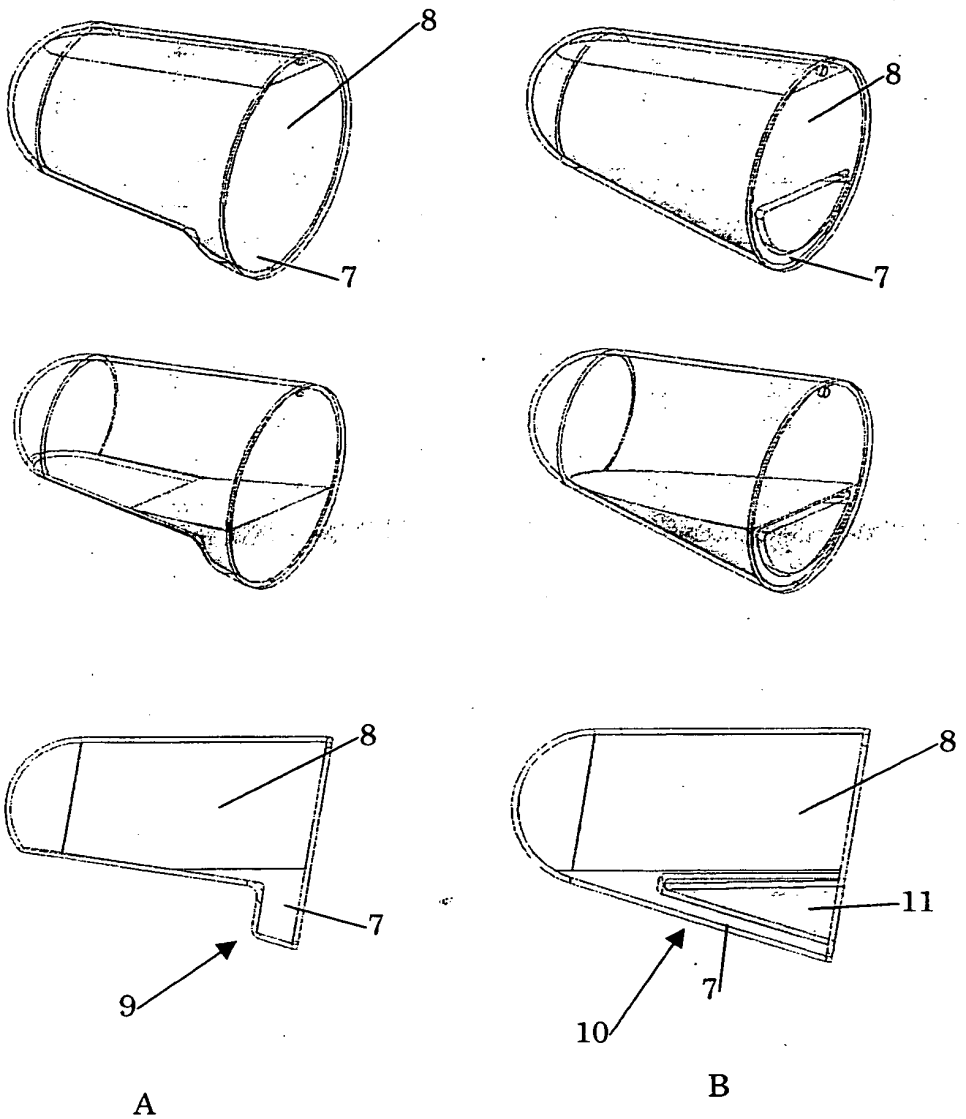
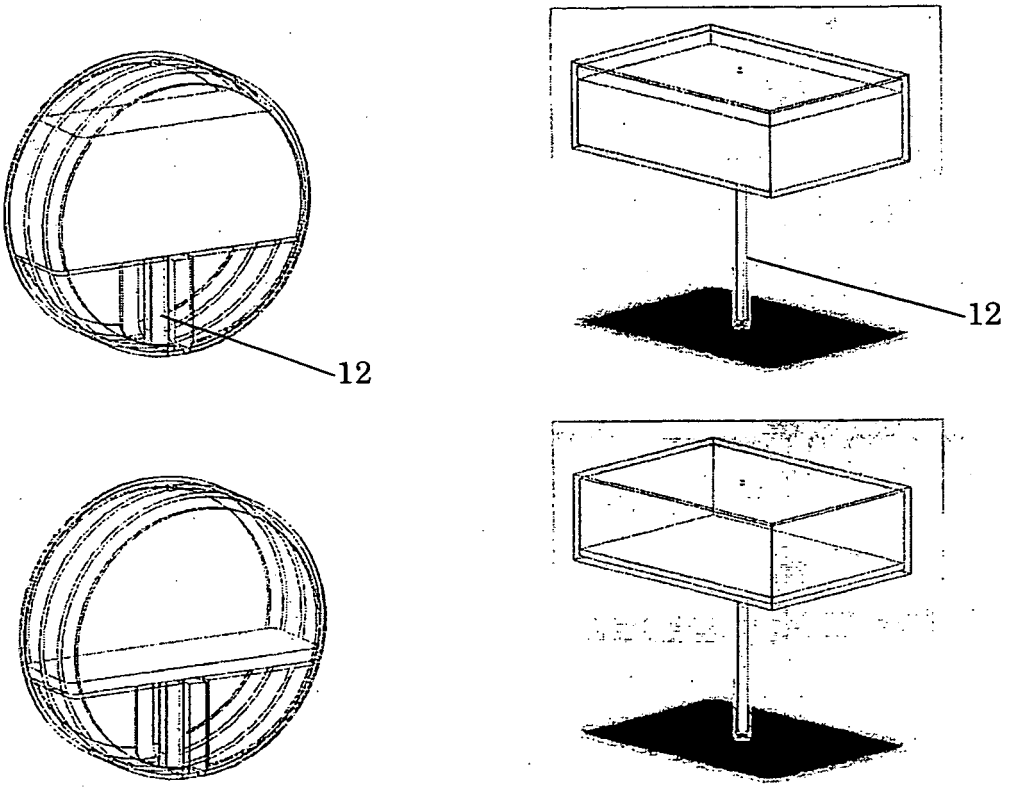


Figure 3



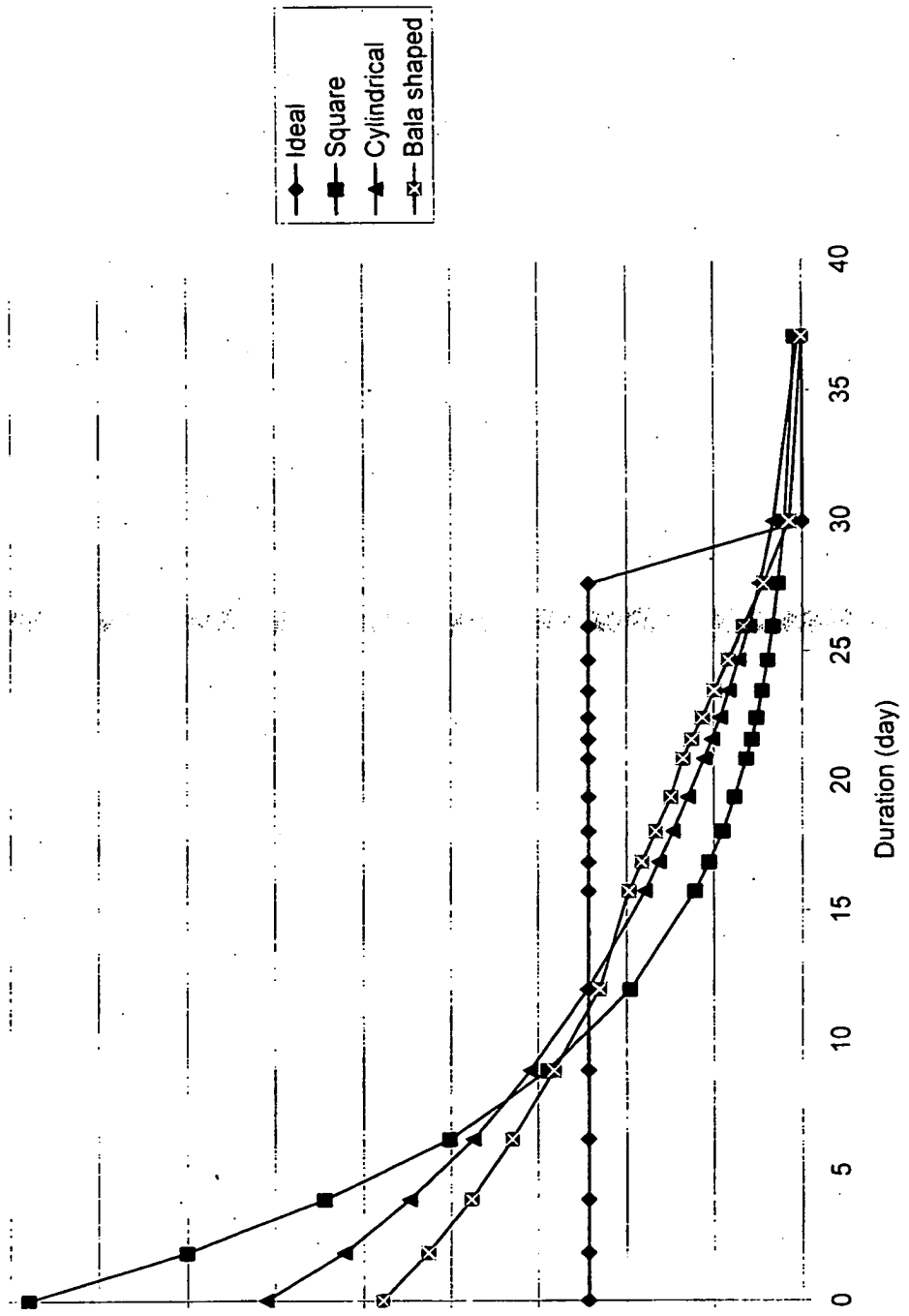

Ideal
Square
Cylindrical
Bala shaped
0
5
10
15
20
25
30
35
40
Duration (day)

Figure 4

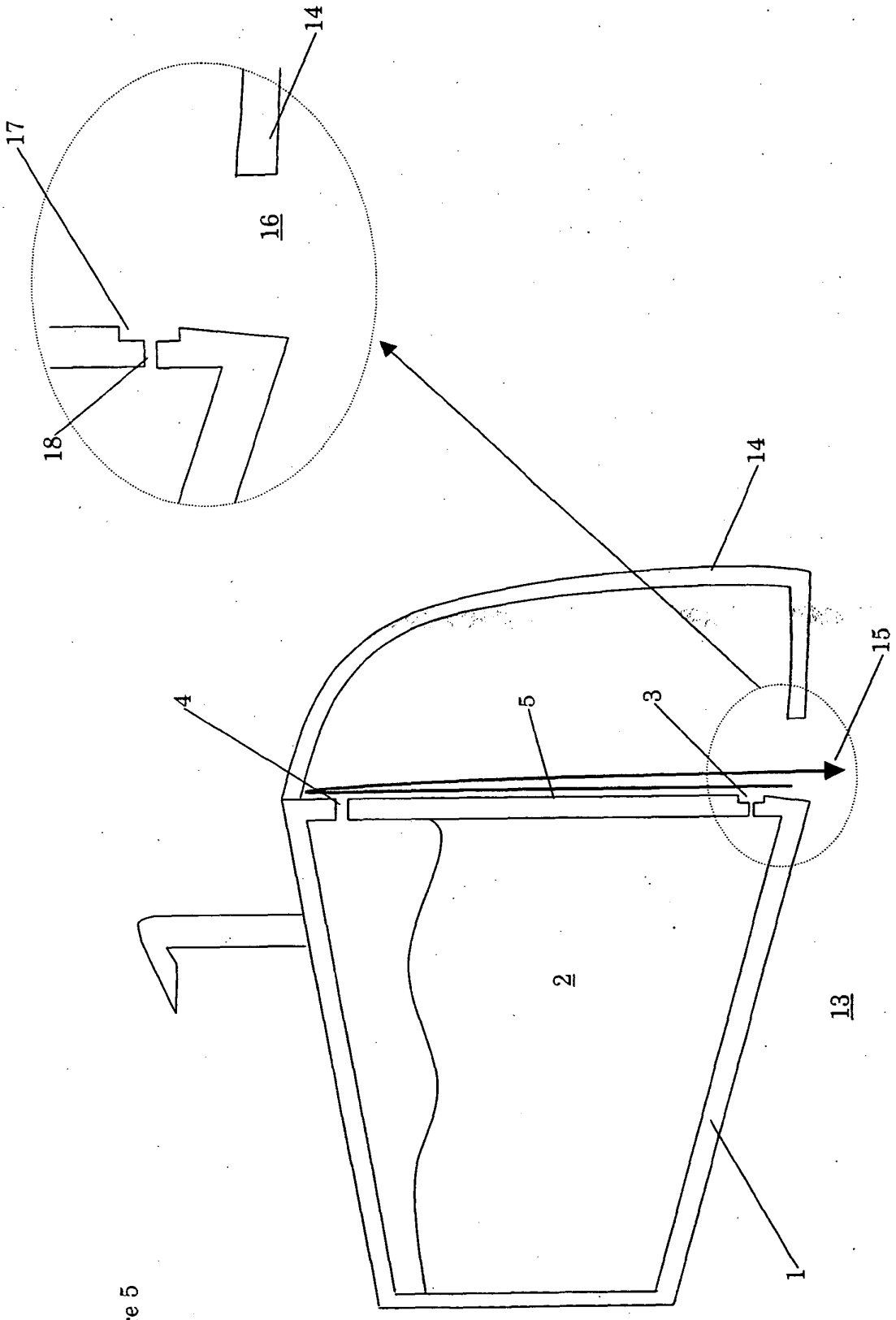


Figure 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0878586 A **[0005]**
- DE 19915322 **[0006]**