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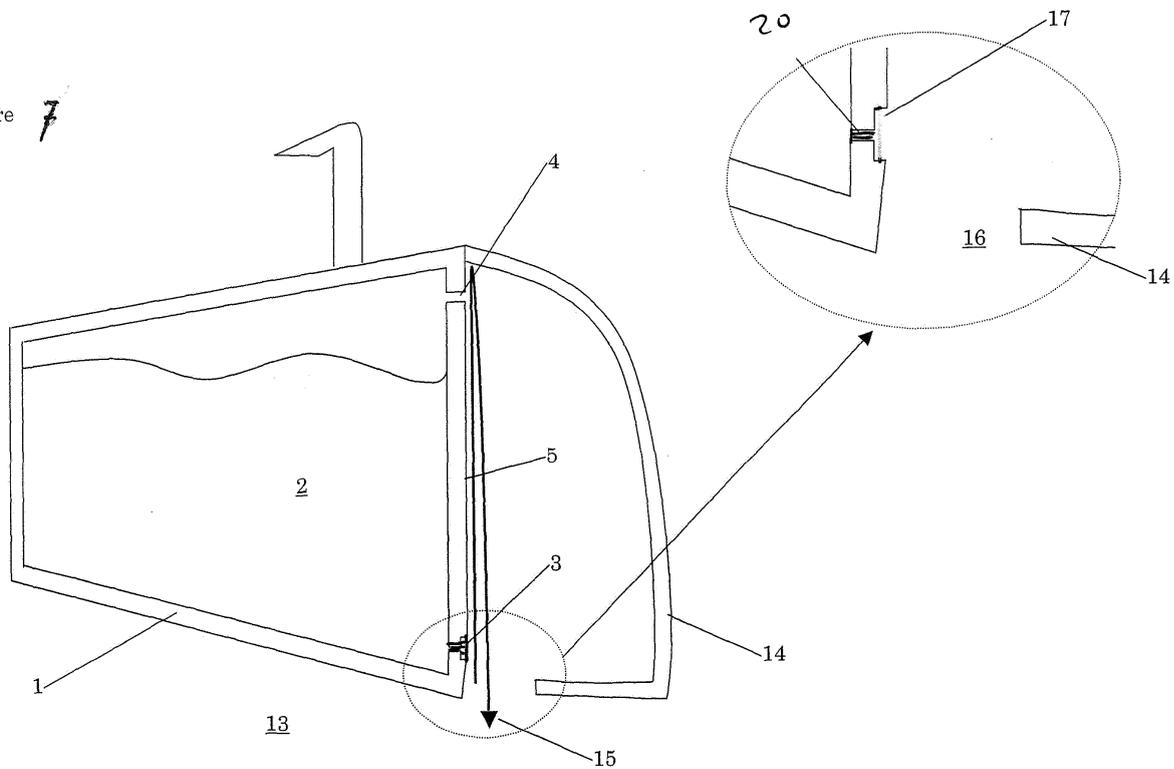
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(54) **Dispensing unit**

(57) A dispensing unit for dispensing a freshening fluid, comprising a reservoir defining a volume for comprising the fluid; the reservoir comprising; a fluid delivery means arranged at a lower part of the reservoir and dimensioned, in relation to the fluid contained in the res-

ervoir, for providing a fluid flowing out of the fluid delivery means by gravity action; and an aeration opening providing aeration of an upper air volume of the reservoir; wherein the fluid delivery means comprises multiple fluid delivery openings, wherein each fluid delivery opening is of predetermined size.

Figure 7



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Description

[0001] The invention relates to a dispensing unit for dispensing a fluid, preferably a freshening fluid. In particular it relates to a device for dispensing fluid, vapour or the like

[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 comprise 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, such devices are often over-complicated.

[0004] For a continuous and moderate outflow such devices may be provided with a dispensing opening and equipped with a plate for absorbing as well as dispensing the fluid. This plate may for example comprise capillary openings that draw the fluid via the dispensing opening into the capillary openings through capillary action. These openings may for example be in the form of grooves in a plate. When the capillary openings are filled, the fluid therein may release a continuous scent, while every time the toilet is flushed, water flushes along said fluid such that the fluid is spread in the flushed water. At every flushing the water may prevent the fluid from drying out, i.e. clogging the openings. The plate with capillary openings may also prevent water and/or debris from entering the opening. In other known devices filters or wicks are used instead of capillary openings.

[0005] Amongst others, there is a need for a device which can deliver controlled amounts of fluid into a vessel, preferably over a predetermined period, and which is simple and cost effective in construction.

[0006] 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.

[0007] It has been found that using multiple openings of predetermined size may offer a better controllability and predictability of the dispensing rate (i.e. outflow) of the liquid contained in the reservoir, such that better dosing is obtained.

As compared to only one fluid delivery opening, multiple fluid delivery openings may have the advantage of having at least one channel available when another channel is clogged. Also, the diameter of each channel can be adjusted to be relatively small, e.g. such that the multiple openings together may have approximately the same outflow as would be achieved with one opening. Against expectations, it also appeared that a relatively small opening may mean that less debris is capable of clogging the opening, while relatively larger openings may result in the opening being clogged.

[0008] A feature of each opening can be that it is of predetermined size and construction. For example, the dimensions of each opening or channel may be determined on the basis of a dispensing rate that is desired. Preferably, each opening or channel of the dispensing unit according to the invention is substantially straight and/or has a relatively smooth wall.

[0009] The size of the openings or channels, for example the diameter and length of the openings or channels, can be engineered according to predetermined parameters, to be able to deliver an approximate dispensing rate that is desired. For example, the dispensing unit may be arranged to have an outflow of approximately 35 millilitres in approximately 28 days, wherein the outflow is relatively continuous during that period, at least as compared to similar devices in the prior art.

[0010] In further elucidation of the invention, embodiments thereof will be further elucidated with reference to the drawing. In the drawing:

Figure 1 shows a variety of bottle shapes;

Figure 2 shows a fluid delivery means comprising multiple channels;

Figure 3 shows another fluid delivery means comprising multiple channels;

Figure 4 shows additional bottle shapes according to the invention;

Figure 5 shows another shape according to the invention; and

Figure 6 shows a chart indicating dose rates obtained from various bottle shapes relative to a calculated desired dose rate;

Figure 7 shows a dispensing unit.

[0011] In this description, identical or corresponding parts have identical or corresponding reference numerals. The exemplary embodiments shown should not be construed to be limitative in any manner and serve merely as illustration.

[0012] 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".

[0013] 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 means 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 means 3. An embodiment can be

dimensioned such that an amount of 35 ml is emptied in a predetermined period of about 28 days.

[0014] To prevent building up of underpressure in the reservoir, which would hinder the outflow of the fluid 2, an aeration opening 4 can be provided above the liquid surface, in this embodiment provided in a side wall 5 of the reservoir 1 common with the fluid delivery means 3. The aeration opening 4 is provided to directly communicate with an upper air volume 6 of the reservoir above the fluid 2.

[0015] As shown in a front and side sectional view of the side wall 5 in figures 2A and 2B, respectively, in an embodiment, the fluid delivery means 3 comprises multiple through openings in the form of fluid delivery channels 20 of predetermined size and/or shape, arranged in a side wall 5 of the fluid reservoir 1, which can in principal be any type of suitable reservoir 1, or for example a reservoir 1 as illustrated one of the figures 1A - C. Without being bound to any definition, 'predetermined' may mean, in the context of this description, that the channel 20 has at least one wall defining said opening or channel 20, wherein said at least one wall is predesigned and is manufactured according to said predesigned dimensions with relatively low tolerances, which tolerances may for example be determined by tolerances that are common in molding, preferably injection molding, of plastic articles having approximately the same size as the channel 20 concerned and/or hole drilling. Preferably, said at least one wall has at least a substantial part that is substantially straight.

[0016] Without being bound to any theory, it seems that channels that are provided in commonly used filters are not each of predetermined size or construction, as opposed to the invention. Such filters may for example comprise sintered plastic wherein the sizes and construction of openings, i.e. channels is more or less random, and the sizes and shapes of the openings or channels vary greatly amongst each other.

[0017] Tests with the invention have shown that multiple openings of predetermined size may lead to better control and predictability of the outflow as compared to the use of known filters. Without being bound to any theory, it seems that the predetermined shape of the walls of the opening may lead to better predictability of the outflow. Also, tests have shown that when one opening, or a few openings is/are clogged, also one or multiple openings will remain open, leading to a longer period of usage without defects of the dispensing unit.

[0018] Without being bound to any theory, it seems that debris such as relatively long fibres tends to get caught in a filter, i.e. in the channel(s) thereof, while these fibres may cover and clog multiple openings. Also, since the size of the filter channels have a more or less random shape, the outflow of fluid may vary for each filter. For these reasons, and also for other reasons, filters have a relatively poorly predictable outflow as compared to the multiple openings of predetermined size according to the invention.

[0019] The fluid delivery means 3 may for example comprise substantially parallel channels 20 A-F, in a particular embodiment (see figures 2A, B) arranged in a mouthpiece 21. The mouthpiece 21 may be arranged in the side wall 5 of the reservoir 1. The fluid delivery means 3 need not be arranged at a side wall 5 of the reservoir 1 but may be arranged at any suitable place near the bottom of the reservoir 1, for example.

[0020] The mouthpiece 21 may for example comprise a molded article. The mouth piece 21 may for example have cut out sections at the side thereof, which in use form the channels 20A-F. In use, the mouthpiece 21 is inserted in a hole 22 in the wall 5, such that the cut out sections/side channels 20A-F of the mouthpiece 21 are covered by the wall 5. As shown, the mouthpiece 21 may be cylindrically shaped, more particularly may comprise a plug, and/or in a sectional view the mouthpiece 21 may have a T-shape, such that when it is fully inserted in the opening 22 of the side wall 5, it abuts the edge 22A of said side wall 5 (see figure 2B).

[0021] Other embodiments of fluid delivery means 3 are shown in a front view and a sectional side view in figure 3A and B, respectively. Figure 3A and B show a fluid delivery means 3 wherein the multiple openings comprise channels 20 that are shaped as holes in the side wall 5. These holes can be premolded, for example, or can for example be cut out by drilling, cutting or using needles in a manufacturing process. The skilled person will recognize multiple alternatives. Optionally, the side wall may have an edge 23 extending from the side wall 5 surface to the inside of the reservoir 1 such that the channels 20 (as shown in figures 2A,B and 3A,B) may have a length 1 that is larger than the thickness t of the side wall 5. This edge 23 may also aid in supporting a plug shaped mouthpiece 21 as is the case in figure 2A, B, for example.

[0022] In an embodiment, the length 1 of the channels is smaller than, or equal to approximately 30 millimeters, preferably less than, or equal to approximately 20 millimeters, more preferably less than, or equal to approximately 10 millimeters. In a practical embodiment, the length 1 of the channels is for example approximately 5 millimeter, or at least smaller than 10 millimeter. Each channel 20 may have a diameter d of less than or equal to approximately 3 millimeter, preferably less than or equal to approximately 1 millimeter, more preferably less than or equal to approximately 0,5 millimeter. These sizes may permit the channels 20 to be manufactured with relatively low cost and good results, at relatively low risk of failure. For example, using these dimensions the mold and/or the fluid delivery means 3 will not become too fragile, while fitting problems of the product in the mold may be prevented, during manufacture and/or assembly. Also with relatively small channel sizes, the risk of clogging a channel during manufacture may exist. Using said preferred sizes may be advantageous for the reproducibility of the channel dimensions, i.e. length 1 and diameter d , and hence to better dosing. In an exemplary embodiment, the length 1 and diameter d of a channel 20 are 2,4 and 0,35 millimeters, respectively.

[0023] The sizes of each channel 20 can for example be predetermined, e.g. by the size of the mould parts, and/or the cut out tools. Tolerances of and variations between the shapes of the channels 20 can be kept relatively small, at least as compared to channels in known filters for example, which are inherently randomly shaped, i.e. inherently vary in shape and size amongst each other.

[0024] Preferably, the sizes, i.e. respective diameters and lengths, and/or shapes of at least two of the channels 20 are the same so that each channel 20 is equally favored by the fluid, e.g. in the sense of pressure, surface friction, etc. In this way the fluid in the reservoir may, at least initially, be dispensed at a substantially equal rate among each channel 20. In this description, the 'diameter' of the channel 20 may be understood as e.g. the width of the channel 20, wherein the channel 20 may e.g. have a round or cornered cross section. Above explained equal favoring' of the fluid can also be achieved by the channels having approximately the same cross sectional surface, i.e. each channel having the same outflow, but not necessarily having the same shape.

[0025] In an embodiment, the fluid delivery means 3 has between two and twenty channels 20. The number of channels 20 may be related to the intended dispensing rate and/or the viscosity of the fluid, the intended use of the dispensing unit, etc. An embodiment of a fluid delivery means 3 comprises two, three, four, five, six, seven, eight, nine or ten channels 20, for example. Such fluid delivery means 3 may for example be advantageous for an amount of fluid 2 of between 10 and 200 milliliters, to be emptied in about 10 to 200 days, more particularly for an amount of approximately 35 milliliters to be emptied in approximately 28 days. An advantageous amount of channels 20 (not shown in the test) is six.

[0026] The following table shows test results of different dosing systems, i.e. dispensing units, having different fluid delivery means.

Dosing system	pcs	Samples blocked	Blockage length	acceptable
Filter + single channel	500	10	> 1 wk	NO
4 multi channel	500	0	-	YES
8 multi channel	500	1	1 day	YES

Table: blockage rates for different dosing systems, tested with 500 samples

[0027] As can be seen from the test, a first tested dosing system was equipped with a filter and a single channel, a second dosing system comprised four channels 20, and a third dosing system was equipped with eight channels 20. For each dosing system 500 samples were tested until the reservoir was empty, i.e. during 28 days or longer. 500 samples of the four channel fluid delivery means 3 showed no blocking at all during the testing period, and the eight channel fluid delivery means 3 was blocked for only one day amongst all of the 500 tested samples. Both the four and eight channel 20 dosing systems, as well as dosing systems having other numbers between four and eight channels 20, could be found acceptable. As shown, the dosing system using a filter showed 10 blockings of more than a week.

[0028] Moreover, it can be advantageous if the channels 20 are arranged close to each other. In this way for example a mouthpiece 21 can be arranged, or at least the fluid dispensing means 3 is arranged over a small area near a bottom of the reservoir 1, for example. Therefore, the fluid dispensing means 3 said openings may be arranged at a close distance D from each other, the distance D being the distance between the edges of two neighboring channels 20. For example, the distance D between two neighboring channels 20 of a fluid delivery means 3 is smaller than, or equal to approximately three millimeter, preferably smaller than, or equal to approximately one millimeter, or at least between five and 0,20 millimeters.

[0029] Further embodiments are described in the following description, which is essentially taken from non-published European patent application number 06076793.6, filed 27 September 2006, of which the entire content can be advantageously combined with the dispensing unit according to the invention. With the application of the fluid delivery means according to the invention in a dispensing unit as described in the European application 06076793.6 controllability and predictability of the outflow of fluid over certain predetermined periods of time can be improved.

[0030] 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.

[0031] 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 means 3:

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

5

10 [0032] 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.

[0033] 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 herein below), 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.

20 [0034] 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.

[0035] 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.

25 [0036] 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.

30 [0037] Figure 4 shows another set of embodiments which are modifications of the frustro-conical shape illustrated in Figure 1C (Figure 4A and Figure 4B). 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 4, 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 4A 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.

35 [0038] Similarly this lower volume is provided, with reference to Figure 4B, 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 4A and about 2.3 for the elongated channel of Figure 4B.

40 [0039] Figure 5 shows some additional reservoir shapes that are further modifications, that are more departed from a conical shape. In particular, the embodiments depicted in Figure 5A and Figure 5B 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 5A (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 5B, the dosing ratio amounts to 1.2, having a first height of 50 mm and a second height of 41 mm.

45 [0040] Figure 6 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.

5 [0041] Figure 7 shows a schematic sectional 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 means 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 the fluid delivery means 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 means 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 means 3. Through adsorption, water is retained in the recess 17, so that the fluid is kept moist when dripping out of the fluid delivery channels 20. This mechanism provides a way to secure that the fluid 3 does not dry out, resulting in inadvertent clogging of the channels 20. 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.

10 [0042] Although in Figure 7 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 means 3, in particular the end openings of the channels 20. 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 transparent colored walls and wherein the fluid is of a non-coloured transparent 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 its neutral transparent nature.

15 [0043] 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.

20 [0044] In particular, an embodiment of a dispensing unit may be arranged so that 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. Other embodiments may be arranged as follows. The reservoir may be formed as a frustroconical shape with an inclined bottom wall; a lower part of the reservoir may be dimensioned to have an orientation that is more vertical than an orientation of the higher part of the reservoir; the lower part of the reservoir may be dimensioned to provide channels between the fluid delivery means and the higher part of the volume; the fluid delivery means may be provided with a waterretaining structure dimensioned to provide a water film across or near the opening to prevent drying out of the fluid; the water retaining structure may be provided as a recess in the wall wherein the fluid delivery means is provided; the aeration opening may be shielded by a covering cap and is provided in a side wall of the reservoir common with the fluid delivery means, 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 means, and for shielding the aeration opening from falling flush water; the reservoir may comprise transparent coloured walls and wherein the fluid is of a non-coloured transparent nature.

25 [0045] 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, fragancing or anti-allergenic vapour. The liquid may be directed to an emanator pad or emanator device.

30 [0046] In certain aspects the embodiments may also relate to the dispensing of a vapour into an air space. Despite the plethora of devices available to dispense fragrances, insecticides and the like as vapours they all have drawbacks and the abovementioned embodiments may provide for a simple, reliable device for this purpose.

35 [0047] The rate of delivery from the device can be determined by one or more of the following variables: viscosity of the fluid; the size and design of the fluid delivery means, in particular: a diameter d and a channel length l of at least one of each fluid delivery channel 20; the number of channels 20; and a column height of the fluid. Advantageously, these variables can be predetermined in an interdependent manner. For example a fluid having a relatively high viscosity can be chosen in combination with channels 20 having relatively large diameters.

40 [0048] In certain embodiments, the viscosity of the fluid may be 20 Pays or less, preferably 10 Pays or less, more

preferably around 6 Pays. Such viscosity was found to provide advantageous flow and dispensing characteristics, in particular for dispensing at a relatively continuous rate for a predetermined amount of time, e.g. for approximately 28 days. The column height of the dispensing unit could for example be 200 millimeters or less, preferably 100 millimeters or less, more preferably 50 millimeters or less. Such a column heights was found to provide advantageous dispensing characteristics, in particular for dispensing at a relatively continuous rate within a predetermined amount of time, e.g. within approximately 28 days. Also, such a column height may provide for a practical volume of the reservoir 1, e.g. for pending the dispensing unit under the rim of a toilet bowl.

[0049] The fluid may for example comprise a cleaning agent, a disinfecting agent, a deodorising agent, a fragrance, an insecticide, a miticide or an anti-allergenic agent. Certain embodiments of the dispensing unit could be applied as an oil dispensing unit, or a fluid dispensers for plants or the like. The dispensing unit could for example be disposed near a bath and/or shower, and/or above shoes, and/or in closets or cabins e.g. for clothes.

[0050] In an embodiment, the dispensing unit is arranged with an element for interrupting the continuous delivery of fluid from the fluid delivery means 3. For example, such an interruption element may comprise a means for moving the reservoir 1 and/or the channels 20 so that the fluid and the channels 20 are separated and the fluid does not flow into the channels 20. More particularly, this interruption element may comprise a turning element for turning the reservoir 1 such that the top fluid level ends below the channels 20. The interruption element may also comprise a blocking element for blocking the channels 20. Also, the mouth piece 21 can be arranged to be turned such that the ends of the channels 20 are blocked and fluid is prevented from flowing in or out. In another exemplary embodiment, the aeration opening 4 can be blocked by an interruption element so that the fluid is prevented from flowing out of the channels 20, i.e. by under pressure in the reservoir.

[0051] 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, comprising:

- a reservoir defining a volume for comprising the fluid; the reservoir comprising
- a fluid delivery means arranged at a lower part of the reservoir and dimensioned, in relation to the fluid contained in the reservoir, for providing a fluid flowing out of the fluid delivery means by gravity action; and
- an aeration opening providing aeration of an upper air volume of the reservoir; wherein the fluid delivery means comprises multiple fluid delivery openings, wherein each fluid delivery opening is of predetermined size.

2. Dispensing unit according to claim 1, wherein the openings comprise channels, preferably arranged substantially parallel to each other.

3. Dispensing unit according to claim 1 or 2, wherein the openings are of substantially the same size and/or shape.

4. Dispensing unit according to any of the preceding claims, wherein the length of the channels is smaller than, or equal to 20 millimeters.

5. Dispensing unit according to any of the preceding claims, wherein the fluid delivery means comprises between three and ten openings, preferably between three and ten openings.

6. Dispensing unit according to any of the preceding claims, wherein each opening has a diameter of less than 1 millimeter.

7. Dispensing unit according to any of the preceding claim, wherein said openings are arranged near the bottom of the reservoir.

8. Dispensing unit according to any of the preceding claims, wherein the fluid delivery means comprises a mouthpiece comprising said multiple openings.

9. Dispensing unit according to claim 8, wherein the mouthpiece is arranged in a wall of the reservoir, wherein the mouthpiece comprises side channels being closed off by said wall.

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10. Dispensing unit according to any of the preceding claims, wherein the dispensing unit comprises a toilet hygiene device, wherein the mount is a mount suitable for mounting the unit in a toilet bowl or the like

5 11. Dispensing unit according to any of the preceding claims, wherein the aeration opening is shielded by a covering cap and is provided in a side wall of the reservoir common with the fluid delivery opening, 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.

10 12. Dispensing unit according to any of the preceding claims, 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.

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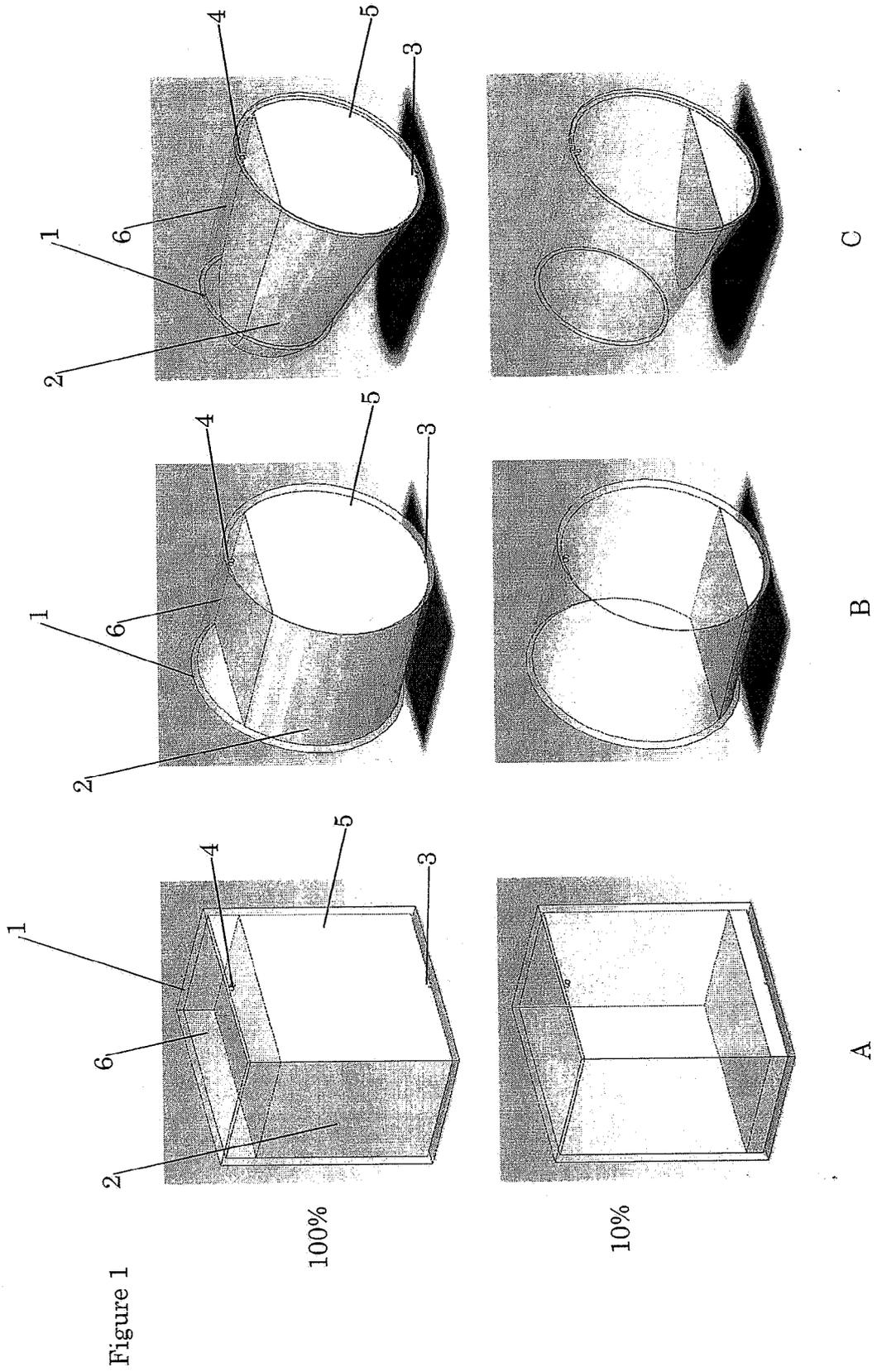
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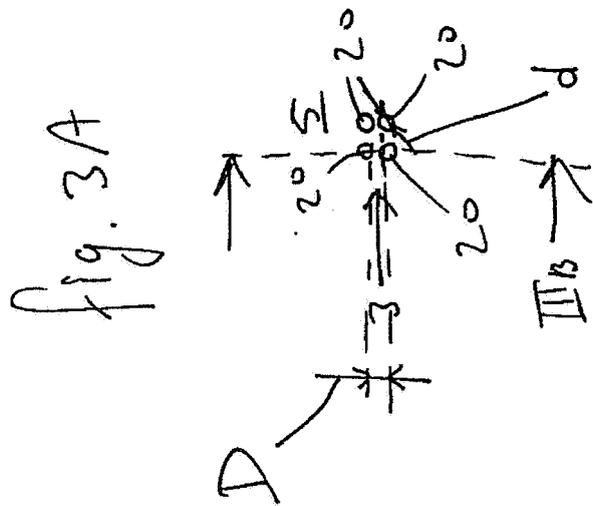
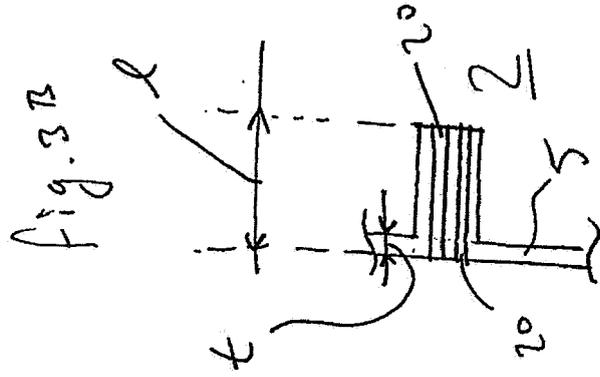


Figure 4

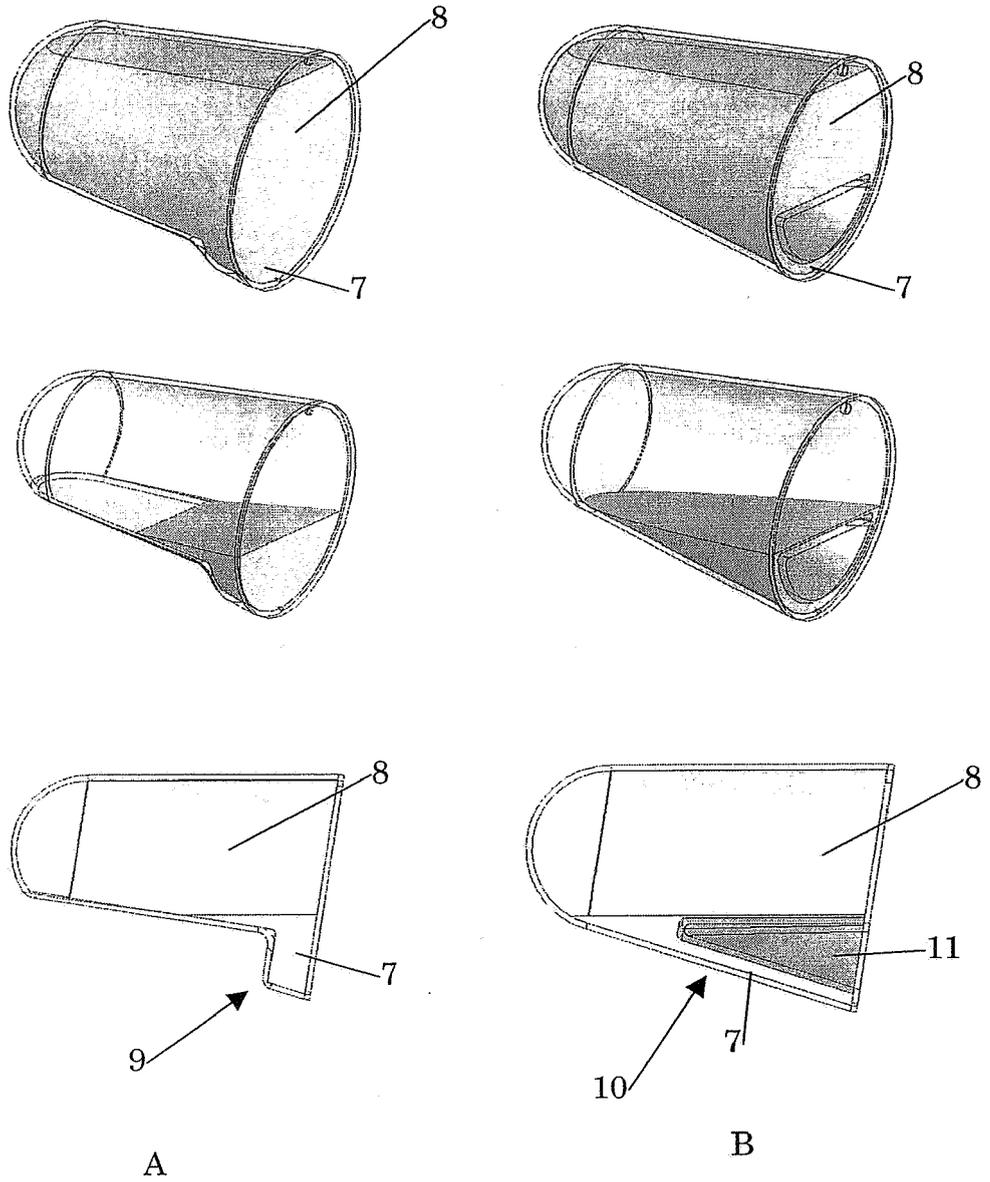
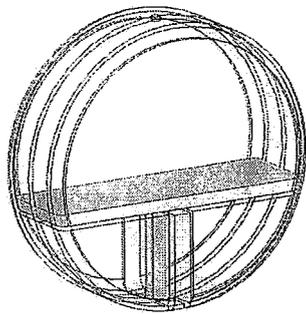
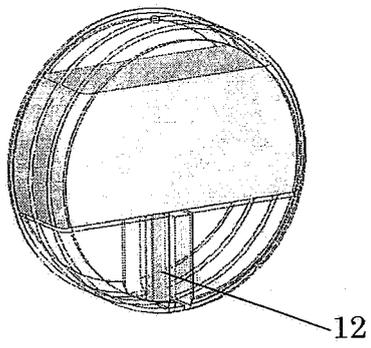
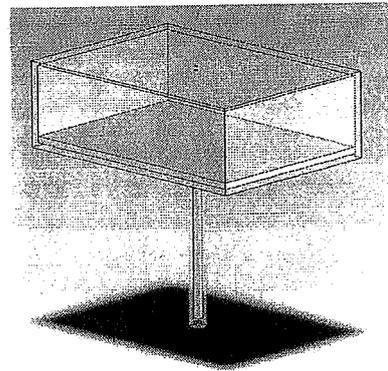
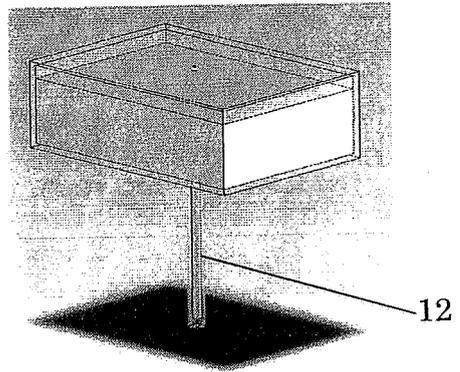


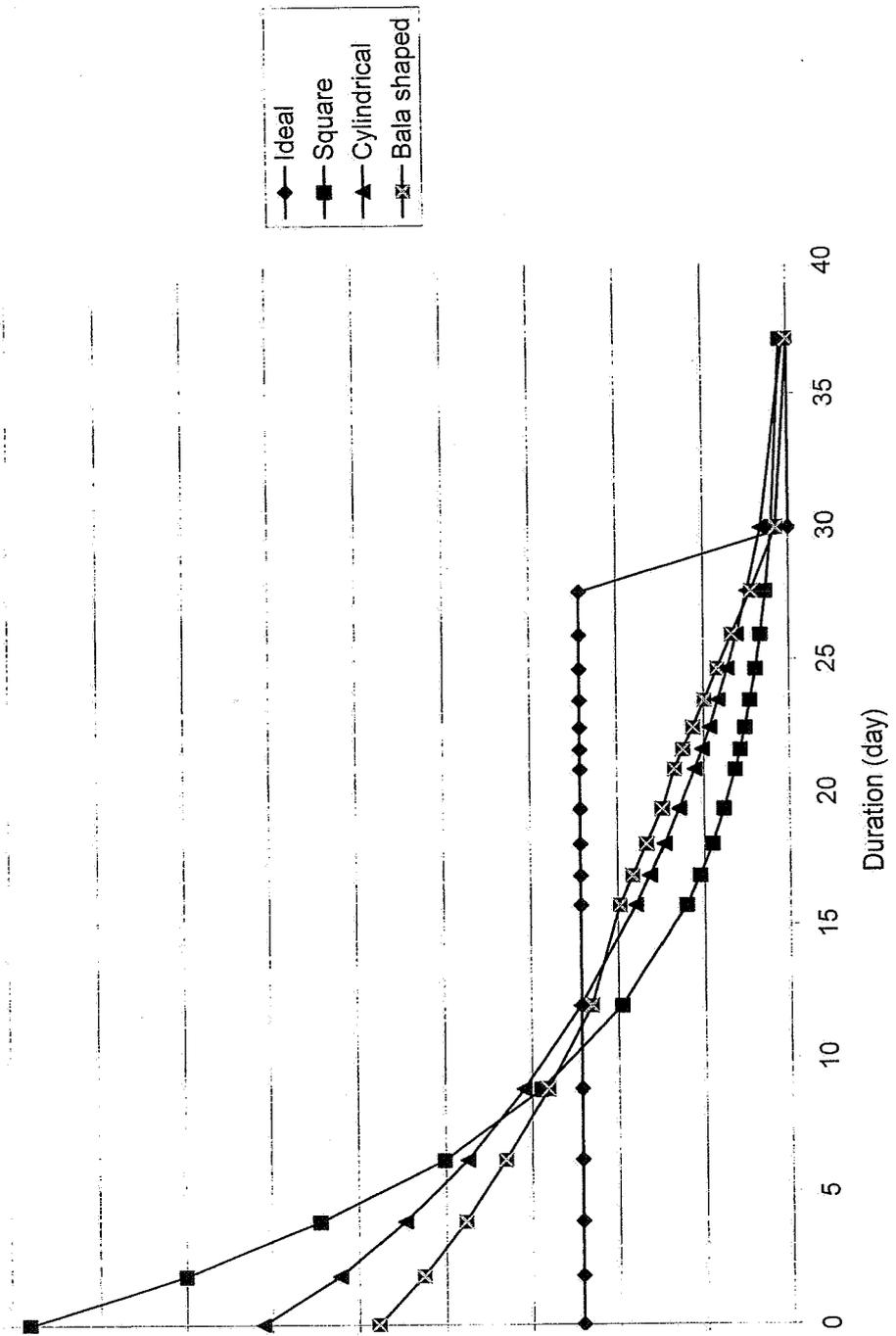
Figure 5



A



B



Figure, 6

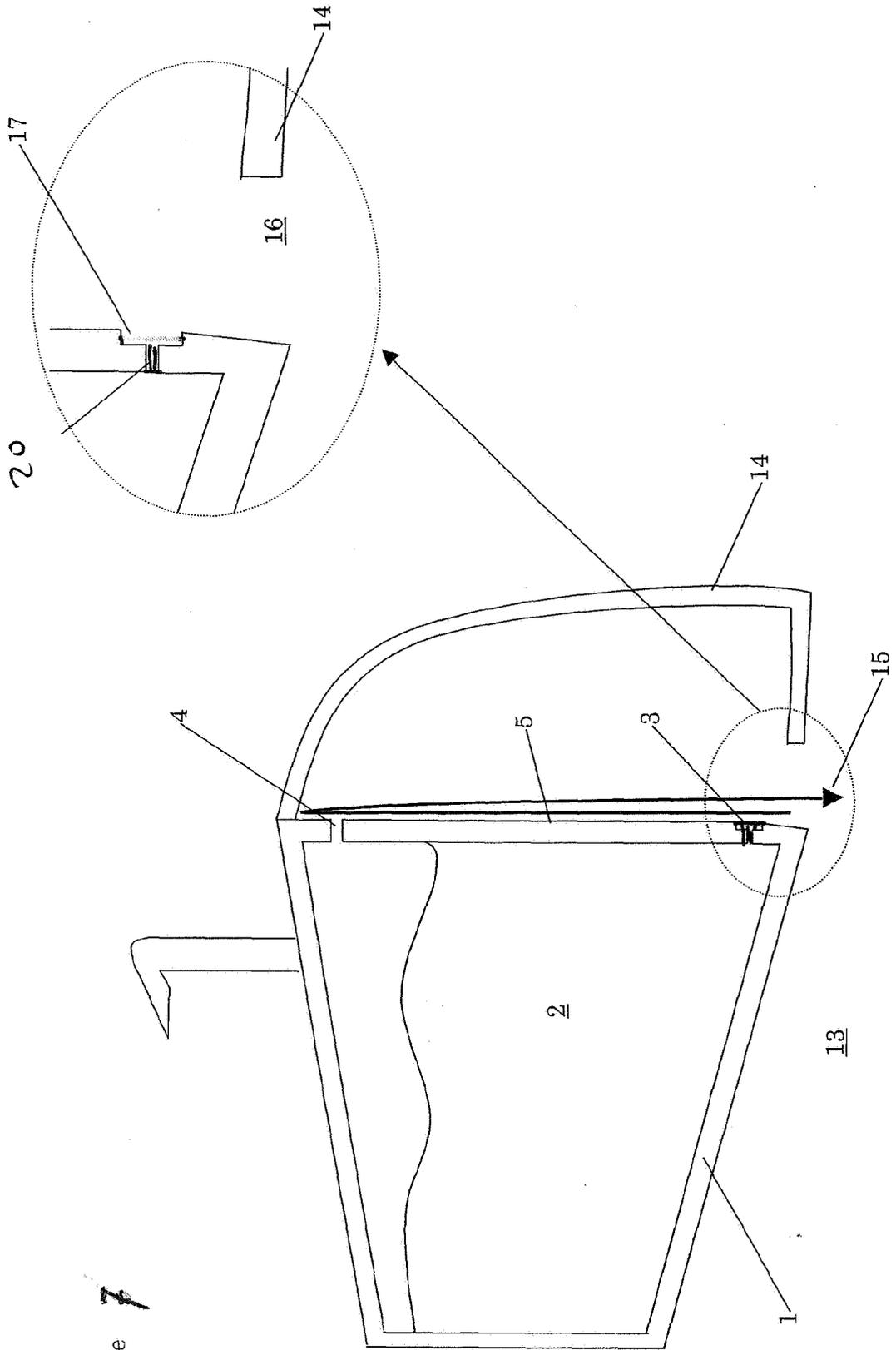


Figure 7



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 92/20876 A (BROOKLINE ALPHA LIMITED [GB]) 26 November 1992 (1992-11-26) * page 4, line 16 - page 7, line 10; figures 3,4 *	1-12	INV. E03D9/00
X	DE 84 00 011 U1 (SCHNEIDER, HANS, DIPL.-ING., 6393 WEHRHEIM, DE) 14 June 1984 (1984-06-14) * figure 3 *	1	
A	GB 2 367 567 A (MCBRIDE ROBERT LTD [GB]) 10 April 2002 (2002-04-10) * page 1, last paragraph; figures *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E03D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		27 August 2008	De Coene, Petrus
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

1
EPO FORM 1503 03.82 (P04C01)

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

EP 08 15 3247

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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27-08-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9220876	A	26-11-1992	AU 1789792	A 30-12-1992
			CA 2103249	A1 18-11-1992
			EP 0584172	A1 02-03-1994
			FI 935079	A 18-11-1993
			JP 7503767	T 20-04-1995
			NO 934143	A 16-11-1993

DE 8400011	U1	14-06-1984	NONE	

GB 2367567	A	10-04-2002	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 06076793 A [0029] [0029]