

(19)



(11)

**EP 1 606 463 B2**

(12)

**NEW EUROPEAN PATENT SPECIFICATION**

After opposition procedure

(45) Date of publication and mention of the opposition decision:  
**15.01.2014 Bulletin 2014/03**

(51) Int Cl.:  
**E03D 9/02 (2006.01)**

(45) Mention of the grant of the patent:  
**18.05.2011 Bulletin 2011/20**

(86) International application number:  
**PCT/GB2004/001051**

(21) Application number: **04719516.9**

(87) International publication number:  
**WO 2004/081303 (23.09.2004 Gazette 2004/39)**

(22) Date of filing: **11.03.2004**

**(54) IMPROVED DISPENSING DEVICE**

VERBESSERTE AUSGABEVORRICHTUNG

DISPOSITIF DE DISTRIBUTION PERFECTIONNE

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

• **MCLELLAN, Anthony,**  
**Reckitt Benckiser Inc**  
**Montvale, NJ 07645 (US)**

(30) Priority: **14.03.2003 US 454859 P**  
**04.04.2003 GB 0307816**

(74) Representative: **Hodgetts, Catherine Dawn et al**  
**Reckitt Benckiser**  
**Corporate Services Limited**  
**Legal Department - Patents Group**  
**Dansom Lane**  
**Hull HU8 7DS (GB)**

(43) Date of publication of application:  
**21.12.2005 Bulletin 2005/51**

(73) Proprietor: **Reckitt Benckiser LLC**  
**Parsippany, NJ 07054 (US)**

(56) References cited:  
**DE-A- 3 817 373 DE-A- 19 901 457**  
**DE-A1- 1 930 773 DE-C- 2 916 385**  
**DE-T2- 60 008 729 DE-T2- 60 215 465**  
**GB-A- 2 339 210 GB-A- 2 339 214**  
**GB-A- 2 339 214 US-A- 1 091 265**  
**US-A- 4 777 670**

(72) Inventors:  
• **LOVE, Michael David,**  
**Reckitt Benckiser Inc**  
**Montvale, NJ 07054 (US)**  
• **NGUYEN, Lamson,**  
**Reckitt Benckiser Inc**  
**Montvale, NJ 07645 (US)**

**EP 1 606 463 B2**

**Description**

5 [0001] The present invention is related to devices which are used to dispense an active substance, to the interior of a container. More particularly the present invention is related to devices which are useful in dispensing a cleaning and/or sanitizing composition to a toilet bowl.

10 [0002] Since the advent of sanitary appliances, particularly toilet bowls, there is has been a continuing need in the art to provide effective ways to maintain these appliances in a satisfactory condition between uses. The art is replete with devices which are intended to be used as "in the bowl" (or ITB) in order to provide a cleaning and/or fragrancing and/or sanitizing effect. While many of these devices are known and widely used they are not without drawbacks. One common technical problem is to ensure the effective delivery of a treatment agent, especially a cleaning and/or sanitizing agent to the interior of a toilet bowl.

15 [0003] US 1,091,265 discloses a sanitary attachment for toilet bowls wherein a treatment composition such as antiseptic balls are held in a compartment on a perforated tray through which flush water flows before enetring the toilet bowl via the outlets on the bottom of the compartment. The device comprises a first chamber and a second chamber, a hanger and a second fragrance chamber. Water flows into the first chamber containing the active ingredient, dissolves it and passes on into the second chamber from where it flows into the toilet bowl.

[0004] The present invention, in it various aspects, provides an ITB device useful for the delivery of a cleaning and/or sanitizing agent, and optionally the provision of a fragrancing effect to a toilet bowl.

20 [0005] According to one aspect of the invention there is provided a device useful in conjunction with a toilet bowl which device provides for the delivery of a cleaning and/or sanitizing composition, delivered in the form of an aqueous treatment composition which contains one or more active agents such as a cleaning agent, disinfecting agent, fragrance agent, and/or an anti-lime scale agent or a mixture of two or more agents, and optionally provides a fragrancing effect to the toilet bowl, wherein the device includes at least one treatment agent such as a cleaning agent, disinfecting agent, fragrance agent, and/or an anti-lime scale agent or a mixture of two or more thereof said treatment agent which may be  
25 in a liquid, gel or solid form which is released into flushing water when the toilet is flushed, and further optionally a fragrance composition desirably not being in contact with the flushing water, wherein the device comprises a covered housing comprising:

30 a) a first chamber and

b) a second chamber, said first chamber for containing said treatment composition, the first chamber having a cover and defined by an exterior wall, a back wall and the cover, and having at least one water inlet opening and at least one outlet opening into the second chamber, said second chamber, defined by two chamber sidewalls, which are bridged by a roof and by a portion of the exterior wall which is present between the two sidewalls, and having at least one device outlet opening,

35 wherein the respective ratio of the volume of the first chamber, and the second chamber is about 150 - 5:1;

(c) a hanger for removably hanging the device from the rim of a sanitary appliance, preferably the rim of a toilet bowl such that when the device is suspended in the toilet bowl the at least one water inlet opening of the first chamber is in the path of flushing water, and

40 (d) optionally, a third (optionally covered) fragrance chamber for containing said fragrance composition, and wherein the said fragrance chamber is most desirably not in the path of flushing water

and further wherein (e) the cover is slideable with respect to the first chamber, and includes a dependant skirtwall which contains at least one recess or aperture which may be used to define the dimensions of the one water inlet opening, and thereby provide a degree of control over the rate of ingress of flushed water into the first chamber.

45 [0006] Preferably the respective ratios of the volume of the first chamber, and the second chamber is about 100 - 10:1, and most preferably about 100 - 50:1.

[0007] Further contemplated aspects of the invention include the following further variations of the device of which one or more variations may be present within the device and are considered to form part of the inventive principles taught herein:

50 (f) the at least one water inlet opening is placed in the first chamber and/or the cover thereof with variations including the inlet placed in the first chamber, the inlet placed in the cover of the first chamber, and an inlet is placed both in the first chamber and in the cover of the first chamber;

55 (g) the cover includes one or more raised ribs depending from the interior face of the cover, which raised rib(s) extend into the interior of the first chamber containing the treatment composition when the device is assembled and/or used;

(h) the device includes a second slideable cover (optionally integrated with the fragrance chamber) which includes a dependant skirtwall which contains at least one

recess or aperture which may be used to define the dimensions of the device outlet opening, and thereby provide a degree of control over the rate of egress of material exiting the device and into the bowl of the toilet.

**[0008]** Although optional, when fragrance chamber is present it contains a fragrancing composition. The fragrance composition may be a gelled fragrance composition and the second chamber does not enclose the perfume. If a liquid fragrance composition is used, then the second chamber is advantageously covered to enclose the perfume and the cover on the second chamber contains at least one opening to allow emanation of the perfume.

**[0009]** In a further aspect the present invention also comprises a process for delivering a cleaning and/or sanitizing composition which process contemplates providing a device as described hererin and installing the device within the interior of a toilet bowl.

Figures 1 to 6, 8 and 9 illustrate not-claimed embodiments of ITB devices.

Figure 1 illustrates a partially exploded view of an embodiment of an ITB device, including the placement of a treatment composition in a solid form within the device.

Figure 2 illustrates a frontal, planar view of the ITB device of Figure 1.

Figure 3 illustrates a side planar view of the ITB device of Figure 1.

Figure 4 illustrates a planar view of the bottom section of the ITB device of Figure 1.

Figure 5 illustrates a perspective view of a portion of an ITB device similar to that depicted on Figure 1, but which further includes a fragrance chamber.

Figure 6 depicts an alternative embodiment of a cover, which may be used in conjunction with any embodiment of the ITB device described herein.

Figure 7 illustrates a perspective view of a portion of an ITB device according to the invention having a cover which may be used in conjunction with any embodiment of the ITB device described herein.

Figure 7A depicts a planar view of the top of the portion of an ITB device according to the invention having a cover in a first opened position.

Figure 7B depicts a planar view of the top of the portion of an ITB device according to the invention having a cover in a second opened position.

Figure 8 depicts a further embodiment of the of the ITB device in a partially exploded view, including the placement of a treatment composition in a solid form within the device.

Figure 9 illustrates a planar view of the bottom section of the ITB device of Figure 8.

Figure 10 depicts a still further not claimed embodiment of the of a portion of the inventive ITB device in a partially exploded view, including the placement of a treatment composition in a solid form within the device, and further including a second slideable cover.

Figure 10A illustrates planar view of the bottom of the portion of an ITB device depicted on Figure 10 illustrating the arrangement of the second slideable cover in a first opened position.

Figure 10B illustrates planar view of the bottom of the portion of an ITB device depicted on Figure 10 illustrating the arrangement of the second slideable cover in a second opened position.

Figure 10C illustrates planar view of the bottom of the portion of an ITB device depicted on Figure 10 illustrating the arrangement of the second slideable cover in a third opened position.

**[0010]** The devise according to the invention is used to deliver a cleaning and/or sanitizing composition, delivered in the form of an aqueous treatment composition which contains one or more active agents such as a cleaning agent, disinfecting agent, fragrance agent, anti-lime scale agent, or a mixture of two or more agents, which aqueous treatment compositions are formed when the agent(s) present in the first chamber of the device is contacted with flush water entering the device, and after passing through the first chamber and second chamber, the aqueous treatment composition is released into the toilet bowl. The treatment agent which may be in a liquid, gel or solid form, but is conveniently in a solid form, such as in the form of dissolvable block which provides for the long term release of an active agent during sequential contacts with the flush water entering the device.

**[0011]** The cleaning agent can be any cleaning composition known to those of ordinary skill in the relevant art, and without limitation exemplary cleaning compositions include one or more deterative surfactants selected from anionic, cationic, nonionic as well as amphoteric or zwitterionic surfactants. Certain deterative surfactants may also provide a dual role in providing detergency as well as a disinfecting effect, viz, certain cationic surfactants, which are described hereinafter as a disinfecting agent.

**[0012]** By way of non-limiting example, useful anionic surfactants include the watersoluble salts, particularly the alkali metal, ammonium and alkylolammonium (e.g., monoethanolammonium or triethanolammonium) salts, of organic sulfuric reaction products having in their molecular structure an alkyl group containing from about 10 to about 20 carbon atoms and a sulfonic acid or sulfuric acid ester group. (Included in the term "alkyl" is the alkyl portion of aryl groups.) Examples of this group of synthetic surfactants are the alkyl sulfates, especially those obtained by sulfating the higher alcohols (C<sub>8</sub>-C<sub>18</sub> carbon atoms) such as those produced by reducing the glycerides of tallow or coconut oil; and the alkylbenzene

sulfonates in which the alkyl group contains from about 9 to about 15 carbon atoms, in straight chain or branched chain. Exemplary useful are linear straight chain alkylbenzene sulfonates in which the average number of carbon atoms in the alkyl group is from about 11 to 14.

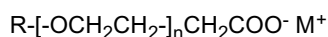
**[0013]** Further exemplary useful anionic surfactants herein are the water soluble salts of: paraffin sulfonates containing from about 8 to about 24 (preferably about 12 to 18) carbon atoms; alkyl glyceryl ether sulfonates, especially those ethers of C<sub>8-13</sub> alcohols (e.g., those derived from tallow and coconut oil); alkyl phenol ethylene oxide ether sulfates containing from about 1 to about 4 units of ethylene oxide per molecule and from about 8 to about 12 carbon atoms in the alkyl group; and alkyl ethylene oxide ether sulfates containing about 1 to about 4 units of ethylene oxide per molecule and from about 10 to about 20 carbon atoms in the alkyl group.

**[0014]** Still further exemplary useful anionic surfactants herein include the water soluble salts of esters of  $\alpha$ -sulfonated fatty acids containing from about 0 to 20 carbon atoms in the fatty acid group and from about 1 to 10 carbon atoms in the ester group; water soluble salts of 2-acyloxy-alkane-1-sulfonic acids containing from about 2 to 9 carbon atoms in the acyl group and from about 9 to about 23 carbon atoms in the alkane moiety; watersoluble salts of olefin sulfonates containing from about 12 to 24 carbon atoms; and  $\beta$ -alkyloxy alkane sulfonates containing from about 1 to 3 carbon atoms in the alkyl group and from about 8 to 20 carbon atoms in the alkane moiety.

**[0015]** A further class of anionic surfactants which may be used include carboxylates such as alkyl carboxylates which include those which may be represented by the general formula:



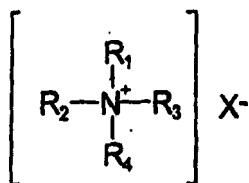
wherein R is a straight or branched hydrocarbon chain containing from about 9 to 21 carbon atoms, and M is a metal or ammonium ion; polyalkoxycarboxylates, representative of which are polyethoxycarboxylates which may be represented by the general formula:



wherein R is a straight chained or branched hydrocarbon chain which may include an aryl moiety, but is desirably a straight chained or branched hydrocarbon chain; and n is an integer value of from 1 - 24.

**[0016]** Preferred anionic surfactants are those anionic surfactants typically used in toilet cleaning compositions. Examples include sulfonates, sulfates, carboxylates, phosphates, and mixtures of the above compounds. Suitable cations in this case are alkali metals such as, for example, sodium or potassium, or alkaline earth metals such as, for example, calcium or magnesium, and ammonium, substituted ammonium compounds, including mono-, di- or triethanolammonium cations and mixtures of the cations. The following types of anionic surfactants are of particular interest: alkyl ester sulfonates, alkylsulfates, alkyl ether sulfates, alkylaryl sulfates and sulfonates, and secondary alkanesulfonates, alkenyl sulfonates. Examples of suitable anionic surfactants include alpha olefin sulfonates, dodecylbenzene sulfonates, lauryl ether sulfates, lauryl monethanol amides.

**[0017]** Exemplary useful cationic surfactants include quaternary ammonium compounds and salts thereof include quaternary ammonium germicides which may be characterized by the general structural formula:



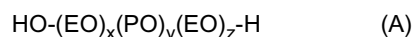
where at least one or R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is a alkyl, aryl or alkylaryl substituent of from 6 to about 120 carbon atoms. The alkyl substituents may be long-chain alkyl, long-chain alkoxyaryl, long-chain alkylaryl, halogen-substituted long-chain alkylaryl, long-chain alkylphenoxyalkyl, arylalkyl, etc. The remaining substituents on the nitrogen atoms other than the abovementioned alkyl substituents are hydrocarbons desirably containing no more than 12 carbon atoms. The substituents R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> maybe straight-chained or may be branched, but are preferably straight-chained, and may include one or more amide, ether or ester linkages. The counterion X may be any salt-forming anion which permits water solubility of the quaternary ammonium complex. Exemplary counterions include halides, for example chloride, bromide or iodide, or methosulfate.

**[0018]** Exemplary nonionic surfactants which may find use in the present invention include known art nonionic surfactant compounds. Practically any hydrophobic compound having a carboxy, hydroxy, amido, or amino group with a free

hydrogen attached to the nitrogen can be condensed with ethylene oxide or with the polyhydration product thereof, polyethylene glycol, to form a water soluble nonionic surfactant compound. Further, the length of the polyethylenoxy hydrophobic and hydrophilic elements may vary. Exemplary nonionic compounds include the polyoxyethylene ethers of alkyl aromatic hydroxy compounds, e.g., alkylated polyoxyethylene phenols, polyoxyethylene ethers of long chain aliphatic alcohols, the polyoxyethylene ethers of hydrophobic propylene oxide polymers, and the higher alkyl amine oxides.

**[0019]** A particularly useful class of nonionic surfactants include alkoxy block copolymers which include nonionic surfactants in which the major portion of the molecule is made up of block polymeric C<sub>2</sub>-C<sub>4</sub> alkylene oxides. Such nonionic surfactants, while preferably built up from an alkylene oxide chain starting group, and can have as a starting nucleus almost any active hydrogen containing group including, without limitation, amides, phenols, thiols and secondary alcohols.

**[0020]** One group of such useful nonionic surfactants containing the characteristic alkylene oxide blocks are those which may be generally represented by the formula (A):



where

EO represents ethylene oxide,

PO represents propylene oxide, y equals at least 15,

(EO)<sub>x+z</sub> equals 20 to 80% of the total weight of said compounds, and,

the total molecular weight is preferably in the range of about 2000 to 15,000.

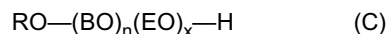
**[0021]** Another group of nonionic surfactants appropriate for use in the new compositions can be represented by the formula (B):



wherein R is an alkyl, aryl or aralkyl group, where the R group contains 1 to 20 carbon atoms, the weight percent of EO is within the range of 0 to 45% in one of the blocks a, b, and within the range of 60 to 100% in the other of the blocks a, b, and the total number of moles of combined EO and PO is in the range of 6 to 125 moles, with 1 to 50 moles in the PO rich block and 5 to 100 moles in the EO rich block.

**[0022]** Further nonionic surfactants which in general are encompassed by Formula B include butoxy derivatives of propylene oxide/ethylene oxide block polymers having molecular weights within the range of about 2000-5000.

**[0023]** Still further useful nonionic surfactants containing polymeric butoxy (BO) groups can be represented by formula (C) as follows:



wherein

R is an alkyl group containing 1 to 20 carbon atoms,

n is about 5-15 and x is about 5-15.

**[0024]** Also useful as the nonionic block copolymer surfactants, which also include polymeric butoxy groups, are those which may be represented by the following formula (D):



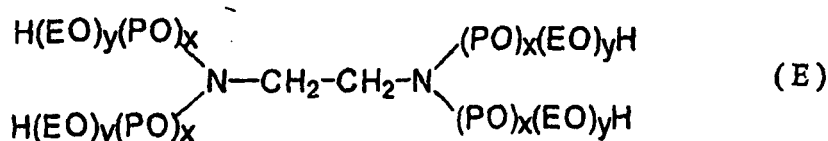
wherein

n is about 5-15, preferably about 15,

x is about 5-15, preferably about 15, and

y is about 5-15, preferably about 15.

**[0025]** Still further useful nonionic block copolymer surfactants include ethoxylated derivatives of propoxylated ethylene diamine, which may be represented by the following formula:



where

(EO) represents ethoxy,

(PO) represents propoxy,

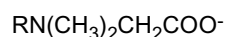
the amount of (PO)<sub>x</sub> is such as to provide a molecular weight prior to ethoxylation of about 300 to 7500, and the amount of (EO)<sub>y</sub> is such as to provide about 20% to 90% of the total weight of said compound.

**[0026]** Further exemplary useful nonionic surfactants which may be used in the present invention include certain alkanolamides including monoethanolamides and diethanolamides, particularly fatty monoalkanolamides and fatty dialkanolamides. Commercially available monoethanol amides and diethanol amides include those marketed under the trade names Alakamide® and Cyclomide® by Rhône-Poulenc Co., (Cranbury, NJ).

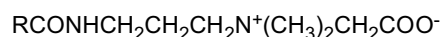
**[0027]** Preferred nonionic surfactants which may be used are those selected from primary and secondary alcohol ethoxylates and alkoxy block copolymers based on ethylene oxide, propylene oxide, and/or butylene oxide and mixtures thereof. For the alcohol ethoxylates, the alkyl chain of the aliphatic alcohols can be linear or branched, primary or secondary, and generally contains from about 8 to about 22 carbon atoms. The alkyl chain can be saturated or unsaturated. The alcohol ethoxylates can have a narrow ("narrow range ethoxylates") or a broad ("broad range ethoxylates") homolog distribution of the ethylene oxide. Examples of commercially available nonionic surfactants of this type are available under the tradenames Tergitol®, Genapol®, and Neodol®. Preferably, the alcohol ethoxylates are mixed C9/11 or C11/15 alcohol ethoxylates, condensed with an average of from 6 to 15 moles, preferably from 6 to 12 moles, and most preferably from 6 to 9 moles of ethylene oxide per mole of alcohol. Preferably the ethoxylated nonionic surfactant so derived has a narrow ethoxylate distribution relative to the average.

**[0028]** Further particularly preferred nonionic surfactants which may be used are nonionic surfactants based on block copolymers represented by formula (A) specific examples of which include those materials presently commercially available under the tradename Pluronic® (ex. BASF). Of those of formula (A), block copolymers having an average molecular weight between 7000 to 11,000 are preferred. Examples of such components include Pluronic® 87, described as EO<sub>61</sub> PO<sub>41.5</sub> EO<sub>61</sub>, having an average molecular weight of about 7700 and Pluronic® 88, described as EO<sub>98</sub> PO<sub>41.5</sub> EO<sub>98</sub>, having an average molecular weight of about 10800.

**[0029]** Non-limiting examples of exemplary useful amphoteric surfactants include alkylbetaines, particularly those which may be represented by the following structural formula:



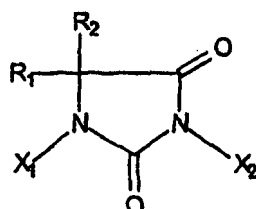
wherein R is a straight or branched hydrocarbon chain which may include an aryl moiety, but is preferably a straight hydrocarbon chain containing from about 6 to 30 carbon atoms. Further exemplary useful amphoteric surfactants include amidoalkylbetaines, such as amidopropylbetaines which may be represented by the following structural formula:



wherein R is a straight or branched hydrocarbon chain which may include an aryl moiety, but is preferably a straight hydrocarbon chain containing from about 6 to 30 carbon atoms.

**[0030]** The disinfecting agent can be any disinfectant composition known to those of ordinary skill in the relevant art, and without limitation exemplary disinfectant compositions include materials containing alkyl halohydantoin, alkali metal haloisocyanurates, essential oils, non-quaternary ammonium based germicidal, as well as quaternary ammonium germicidal.

**[0031]** Examples of materials which can be used as disinfectants in the solid block include the halohydantoin which may be represented by the general structure:



wherein:

X<sub>1</sub> and X<sub>2</sub> are independently hydrogen, chlorine or bromine; and,

R<sub>1</sub> and R<sub>2</sub> are independently alkyl groups having from 1 to 6 carbon atoms.

**[0032]** Examples of halohydantoins include, for example, N,N'-dichloro-dimethyl-hydantoin, N-bromo-N-chloro-dimethyl-hydantoin, N,N'-dibromo-dimethyl-hydantoin, 1,4-dichloro, 5,5-dialkyl substituted hydantoin, wherein each alkyl group independently has 1 to 6 carbon atoms, N-monohalogenated hydantoins such as chlorodimethylhydantoin (MCD-MH) and N-bromo-dimethylhydantoin (MBDMH); dihalogenated hydantoins such as dichlorodimethylhydantoin (DCD-MH), dibromodimethylhydantoin (DBDMH), and 1-bromo-3-chloro-5,5,-dimethylhydantoin (BCDMH); and halogenated methylethylhydantoins such as chloromethylethylhydantoin (MCMEH), dichloromethylethylhydantoin (DCMEH), bromomethylethylhydantoin (MBMEH), dibromomethylethylhydantoin (DBMEH), and bromochloromethylethylhydantoin (BCMEH), and mixtures thereof. These materials are more fully discussed in United States Patent Nos. 4,560,766; 4,537,897; and 4,564,424, the contents of which are incorporated by reference.

**[0033]** Other disinfectants include sodium dichloroisocyanurate (DCCNa) and sodium dibromoisocyanurate.

**[0034]** Examples of essential oils include pine oil, Anethole 20/21 natural, Aniseed oil china star, Aniseed oil globe brand, Balsam (Perui), Basil oil (India), Black pepper oil, Black pepper oleoresin 40/20, Bois de Rose (Brazil) FOB, Bomneol Flakes (China), Camphor oil, White, Camphor powder synthetic technical, Canaga oil (Java), Cardamom oil, Cassia oil (China), Cedarwood oil (China) BP, Cinnamon bark oil, Cinnamon leaf oil, Citronella oil, Clove bud oil, Clove leaf, Coriander (Russia), Counmarin 69°C. (China), Cyclamen Aldehyde, Diphenyl oxide, Ethyl vanillin, Eucalyptol, Eucalyptus oil, Eucalyptus citriodora, Fennel oil, Geranium oil, Ginger oil, Ginger oleoresin (India), White grapefruit oil, Guaiacwood oil, Gurjun balsam, Heliotropin, Isobornyl acetate, Isolongifolene, Juniper berry oil, L-methyl acetate, Lavender oil, Lemon oil, Lemongrass oil, Lime oil distilled, Litsea Cubeba oil, Longifolene, Menthol crystals, Methyl cedryl ketone, Methyl chavicol, Methyl salicylate, Musk ambrette, Musk ketone, Musk xylol, Nutmeg oil, Orange oil, Patchouli oil, Peppermint oil, Phenyl ethyl alcohol, Pimento berry oil, Pimento leaf oil, Rosalin, Sandalwood oil, Sandenol, Sage oil, Clary sage, Sassafras oil, Spearmint oil, Spike lavender, Tagetes, Tea tree oil, Vanilin, Vetyver oil (Java), and Wintergreen oil.

**[0035]** Many of these essential oils may also function as a fragrance agent, which fragrance agent which may be a substance or mixture of such substances including those which are naturally derived (i.e., obtained by extraction of flower, herb, blossom or plant), those which are artificially derived or produced (i.e., mixture of natural oils and/or oil constituents), and those which are synthetically produced substances (odiferous substances). Generally fragrance agents are complex mixtures or blends various organic compounds including, but not limited to, certain alcohols, aldehydes, ethers, alamic compounds and varying amounts of essential oils such as from about 0 to about 85% by weight, usually from about 10 to about 70% by weight, the essential oils themselves being volatile odiferous compounds and also functioning to aid in the dissolution of the other components of the fragrance agent. In the present invention, the precise composition of the fragrance agent desirably emanates a pleasing fragrance.

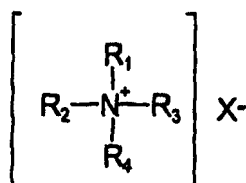
**[0036]** It is to be understood that in certain embodiments of the invention the fragrance agent may be contained in the first chamber of the device, especially where it may be one of one or more treatment agents, while in certain preferred embodiments of the invention the fragrance agent, when present, is contained only in the fragrance chamber of the ITB device according to the invention.

**[0037]** Examples of non-quaternary ammonium based germicidals include from pyrithiones, dimethyldimethylol hydantoin, methylchloroisoithiazolinone/methylisothiazolinone sodium sulfite, sodium bisulfite, imidazolidinyl urea, diazolidinyl urea, benzyl alcohol, 2-bromo-2-nitropropane-1,3-diol, formalin (formaldehyde), iodopropenyl butylcarbamate, chloroacetamide, methanamine, methyl dibromonitrile glutaronitrile, glutaraldehyde, 5-bromo-5-nitro-1,3-dioxane, phenethyl alcohol, o-phenylphenol/sodium o-phenylphenol, sodium hydroxymethylglycinate, polymethoxy bicyclic oxazolidine, dimethoxane, thimersal dichlorobenzyl alcohol, captan, chlorphenenesin, dichlorophene, chlorbutanol, glyceryl laurate, halogenated diphenyl ethers, phenolic compounds, mono- and poly-alkyl and aromatic halophenols, resorcinol and its derivatives, bisphenolic compounds, benzoic esters (parabens), halogenated carbanilides, 3-trifluoromethyl-4,4'-dichlorocarbanilide, and 3,3',4-trichlorocarbanilide. More preferably, the non-cationic antimicrobial agent is a mono- and poly-alkyl and aromatic halophenol selected from the group p-chlorophenol, methyl p-chlorophenol, ethyl p-chlorophenol, n-propyl p-chlorophenol, n-butyl p-chlorophenol, n-amyl p-chlorophenol, sec-amyl p-chlorophenol, n-hexyl p-chlorophenol, cyclohexyl p-chlorophenol, n-heptyl p-chlorophenol, n-octyl p-chlorophenol, o-chlorophenol, methyl o-chlorophenol, ethyl o-chlorophenol, n-propyl o-chlorophenol, n-butyl o-chlorophenol, n-amyl o-chlorophenol, tert-amyl o-chlorophenol, n-hexyl o-chlorophenol, n-heptyl o-chlorophenol, o-benzyl p-chlorophenol, o-benzyl-m-methyl p-chlorophenol, o-benzyl-m, m-dimethyl p-chlorophenol, o-phenylethyl p-chlorophenol, o-phenylethyl-m-methyl p-chlorophenol, 3-methyl p-chlorophenol, 3,5-dimethyl p-chlorophenol, 6-ethyl-3-methyl p-chlorophenol, 6-n-propyl-3-methyl p-chlorophenol, 6-iso-propyl-3-methyl p-chlorophenol, 2-ethyl-3,5-dimethyl p-chlorophenol, 6-sec-butyl-3-methyl p-chlorophenol, 2-iso-propyl-3,5-dimethyl p-chlorophenol, 6-diethylnethyl-3-methyl p-chlorophenol, 6-iso-propyl-2-ethyl-3-methyl p-chlorophenol, 2-sec-amyl-3,5-dimethyl p-chlorophenol 2-diethylnethyl-3,5-dimethyl p-chlorophenol, 6-sec-octyl-3-methyl p-chlorophenol, p-chloro-m-cresol, p-bromophenol, methyl p-bromophenol, ethyl p-bromophenol, n-propyl p-bromophenol, n-butyl p-bromophenol, n-amyl p-bromophenol, sec-amyl p-bromophenol, n-hexyl p-bromophenol, cyclohexyl p-bromophenol,

o-bromophenol, tert-amyl o-bromophenol, n-hexyl o-bromophenol, n-propyl-m,m-dimethyl o-bromophenol, 2-phenyl phenol, 4-chloro-2-methyl phenol, 4-chloro-3-methyl phenol, 4-chloro-3,5-dimethyl phenol, 2,4-dichloro-3,5-dimethylphenol, 3,4,5,6-terabromo-2-methylphenol, 5-methyl-2-pentylphenol, 4-isopropyl-3-methylphenol, para-chloro-meta-xyleneol, dichloro meta xyleneol, chlorothymol, and 5-chloro-2-hydroxydiphenylmethane.

**[0038]** Quaternary ammonium based disinfecting agents include any cationic surfactant which is known or may be found to provide a broad antibacterial or sanitizing function. Any cationic surfactant which satisfies these requirements may be used and are considered to be within the scope of the present invention, and mixtures of two or more cationic surface active agents, viz., cationic surfactants may also be used. Cationic surfactants are well known, and useful cationic surfactants may be one or more of those described for example in McCutcheon's Functional Materials, Vol.2, 1998; Kirk-Othmer, Encyclopedia of Chemical Technology, 4th Ed., Vol. 23, pp. 481-541 (1997), the contents of which are herein incorporated by reference. These are also described in the respective product specifications and literature available from the suppliers of these cationic surfactants.

**[0039]** Exemplary cationic surfactant compositions useful in the practice of the instant invention are quaternary ammonium compounds and salts thereof, which may be characterized by the general structural formula:



where at least one of  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  is a alkyl, aryl or alkylaryl substituent of from 6 to 26 carbon atoms, and the entire cation portion of the molecule has a molecular weight of at least about 165. The alkyl substituents may be long-chain alkyl, long-chain alkoxyaryl, long-chain alkylaryl, halogen-substituted long-chain alkylaryl, long-chain alkylphenoxyalkyl, arylalkyl, etc. The remaining substituents on the nitrogen atoms other than the abovementioned alkyl substituents are hydrocarbons usually containing no more than 12 carbon atoms. The substituents  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  may be straight-chained or may be branched, but are preferably straight-chained, and may include one or more amide, ether or ester linkages. The counterion X may be any salt-forming anion which permits water solubility of the quaternary ammonium complex. Such quaternary compounds are available under the BARDAC®, BARQUAT®, HYAMINE®, LONZABAC®, BTC®, and ONYXIDE® trademarks, which are more fully described in, for example, McCutcheon's Functional Materials (Vol. 2), North American Edition, 2001, and the respective product literature from the suppliers identified below. For example, BARDAC® 205M is described to be a liquid containing alkyl dimethyl benzyl ammonium chloride, octyl decyl dimethyl ammonium chloride; didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 208M)); described generally in *McCutcheon's* as a combination of alkyl dimethyl benzyl ammonium chloride and dialkyl dimethyl ammonium chloride); BARDAC® 2050 is described to be a combination of octyl decyl dimethyl ammonium chloride/didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (also available as 80% active (BARDAC® 2080)); BARDAC® 2250 is described to be didecyl dimethyl ammonium chloride (50% active); BARDAC® LF (or BARDAC® LF-80), described as being based on dioctyl dimethyl ammonium chloride (BARQUAT® MB-50, MX-50, OJ-50 (each 50% liquid) and MB-80 or MX-80 (each 80% liquid) are each described as an alkyl dimethyl benzyl ammonium chloride; BARDAC® 4250 and BARQUAT® 4250Z (each 50% active) or BARQUAT® 4280 and BARQUAT® 4280Z (each 80% active) are each described as alkyl dimethyl benzyl ammonium chloride/alkyl dimethyl ethyl benzyl ammonium chloride. Also, HYAMINE® 1622, described as diisobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride (available either as 100% actives or as a 50% actives solution); HYAMINE® 3500 (50% actives), described as alkyl dimethyl benzyl ammonium chloride (also available as 80% active (HYAMINE® 3500-80)); and HYAMINE® 2389 described as being based on methyl dodecyl benzyl ammonium chloride and/or methyl dodecyl xylene-bis-trimethyl ammonium chloride. (BARDAC®, BARQUAT® and HYAMINE® are presently commercially available from Lonza, Inc., Fairlawn, NJ). BTC® 50 NF (or BTC® 65 NF) is described to be alkyl dimethyl benzyl ammonium chloride (50% active); BTC® 99 is described as didecyl dimethyl ammonium chloride (50% active); BTC® 776 is described to be myristalkonium chloride (50% active); BTC® 818 is described as being octyl decyl dimethyl ammonium chloride, didecyl dimethyl ammonium chloride, and dioctyl dimethyl ammonium chloride (50% active) (available also as 80% active (BTC® 818-80%)); BTC® 824 and BTC® 835 are each described as being of alkyl dimethyl benzyl ammonium chloride (each 50% active); BTC® 885 is described as a combination of BTC® 835 and BTC® 818 (50% active) (available also as 80% active (BTC® 888)); BTC® 1010 is described as didecyl dimethyl ammonium chloride (50% active) (also available as 80% active (BTC® 1010-80)); BTC® 2125 (or BTC® 2125 M) is described as alkyl dimethyl benzyl ammonium chloride and alkyl dimethyl ethylbenzyl ammonium chloride (each 50% active) (also available



as 80% active (BTC® 2125-80 or BTC® 2125 M)); BTC® 2565 is described as alkyl dimethyl benzyl ammonium chlorides (50% active) (also available as 80% active (BTC® 2568)); BTC® 8248 (or BTC® 8358) is described as alkyl methyl benzyl ammonium chloride (80% active) (also available as 90% active (BTC® 8249)); ONYXIDE® 3300 is described as n-alkyl dimethyl benzyl ammonium saccharinate (95% active). (BTC® and ONYXIDE® are presently commercially available from Stepan Company, Northfield, IL).

**[0040]** The anti-lime scale agent composition can virtually any known anti-lime scale agent compositions known to those of ordinary skill in the relevant art. For example, compositions containing anionic and/or nonionic surfactants together with typical anti-lime-scale agents, for example, amidosulfonic acid, bisulfate salts, organic acids, organic phosphoric salts, alkali metal polyphosphates, and the like. Examples of anti-lime scale agent compositions can be found in, for example, United States Patent No. 5,759,974; United States Patent No. 4460490; and United States Patent No. 4578207, the contents of which are herein incorporated by reference. Further examples of anti-lime scale agents include organic acids (for example, citric acid, lactic acid, adipic acid, oxalic acid and the like), organic phosphoric salts, alkali metal polyphosphates, sulfonic, and sulphamic acids and their salts, bisulfate salts, EDTA, phosphonates, HEDP and the like.

**[0041]** It will be appreciated by those of ordinary skill in the art that several of the components that form a cleaning, disinfecting, or anti-lime scale agent can be blended into one composition with the additional appreciation that potential blending of incompatible components will be avoided. For example, those of ordinary skill in the art will appreciate that certain anionic surfactants may have to be avoided as some may be incompatible with some of the disinfecting agents and anti-lime scale agents mentioned herein. Those of ordinary skill in the art will appreciate that the compatibility of the anionic surfactant and the various disinfecting and anti-lime scale agents can be easily determined and thus incompatibility can be avoided in the situations.

**[0042]** When formed into solid blocks, such blocks can consist entirely of one or more of the active agents described above but such blocks may also contain effective amounts of one or more active agents with one or more inactive adjuvants known to the art to be useful in such compositions including, without limitation, fillers, colorants, dyes, and the like. Such may be included in art recognized amounts.

**[0043]** Preferably when the composition is in a solid block form, the solid composition according to the invention is made up into a block of from about 25 to about 75g, more preferably from about 25 to about 55g, and more preferably from about 30 to about 45g.

**[0044]** The solid block can be made by conventional means from the known compounds. One method of making the block is to melt the components making up the compositions of interest and then pouring the molten mass into the first chamber of the housing and allowing the mass to cool to room temperature (about 25°C). Another method is to place the components of interest into an appropriate extrusion device and extrude an appropriately sized mass that will fit into the first chamber of the housing. If the solid is to be made by extrusion, then processing aids are needed.

**[0045]** As noted, an optional component of the ITB device according to the invention is the presence of a fragrance. While a fragrance agent may be included as an active agent and be present in the first chamber of the device, desirably however the fragrance agent is a gel system which is then deposited in the fragrance chamber of the device. The gel system can be formed by a variety of components known to those of ordinary skill in the art. For example, it can be formed from absorbents, starch based systems, modified celluloses, natural gums and other materials which can form a gel when the fragrance agent, aforementioned gel components, and water or hydrophilic solvents are mixed together. According to certain particularly advantageous embodiments of the invention when a fragrance chamber is present, is that in such embodiments the fragrance agent contained in the fragrance chamber is not exposed to the path of the flushing water of the toilet so the present device may provide an excellent lasting fragrance and deodorizing or odor-masking effect. Most desirably the gel system for the perfume is preferably that which is described in United States Patent No. 5,780,527, the contents of which are hereby incorporated by reference.

**[0046]** Examples of cleaning compositions which can be used with the present invention are shown in the table below.

Component	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Dodecyl Benzene Sulfonate Na <sup>1</sup>	25	10	40	35	35
Alfa Olefine Sulfonate Na <sup>2</sup>	25	10	5	32	32
Lauryl monoethanolamide <sup>3</sup>	10	8	5	2	5
Sodium Lauryl Ether Sulfate <sup>4</sup>	10	-	-	4.5	5
Pluronic 68 <sup>5</sup>	10	-	-	3	-
Na Sulfate	20	-	-	21.5	21
Pluronic 87 or 88 <sup>6</sup>	-	70	50	-	-
Alcohol ethoxylate C <sub>9</sub> -C <sub>11</sub> 6EO <sup>7</sup>	-	2	-	-	-

**EP 1 606 463 B2**

(continued)

Component	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Silica	-	-	-	2	2
<sup>1</sup> Dodecyl Benzene Sulfonate Sodium (80-90% active) -- anionic <sup>2</sup> Alpha Olefin Sulfonate Sodium -- anionic <sup>3</sup> Lauryl Monoethanolamide -- non-ionic <sup>4</sup> Sodium Lauryl Ether Sulfate (70% active) -- anionic <sup>5</sup> Polyoxyethylene (160) polyoxypropylene (30) glycol - non-ionic <sup>6</sup> Pluronic 87 E <sub>61</sub> P <sub>41.5</sub> E <sub>61</sub> -- Molecular Weight 7700 -- HLB 24 -- non-ionic Pluronic <sup>88</sup> E <sub>98</sub> P <sub>41.5</sub> E <sub>98</sub> -- Molecular Weight 10800 -- HLB 28-- non-ionic <sup>7</sup> Alcohol ethoxylate C <sub>9</sub> -C <sub>11</sub> 6EO -- non-ionic					

**[0047]** The above examples can be made either by melting the various components together and placing the melt into the first chamber of the housing or by placing the components into a suitable extruder and extruding out a block having a desired shape and size.

**[0048]** Exemplary disinfecting compositions for use in the present invention include compositions having the general compositions described as follows:

**[0049]** A hydantoin tablet containing 94 wt. % Dantochlor powder (about 86% 1,3-dichloro-5,5-dimethylhydantoin) and 6.0 wt. % of an inert binder, comprising a 5 wt. % solution of laponite can be made by extrusion (with a die diameter and shape suited to the proposed first chamber) at a temperature of from about 80 to 90°F and a pressure at the end of the extruder barrel ranging from about 50 to about 350 psi. An appropriate sized block can then be cut from the extrudate and allowed to cool to room temperature. Another example can use a 2 wt. % solution of laponite was used. Yet other examples can replace the 5 wt. % solution of laponite with sodium stearate and water (respectively representing 5 wt. % and 4 wt. % of composition prior to drying; respectively representing 10 wt. % and 6 wt. % of the final composition prior to drying; and respectively representing 6 wt. % and 7.5 wt. % of the composition, prior to drying). Yet other examples can use a binder that contain a 2 wt. % laponite solution and sodium stearate (the laponite solution representing 3 wt. % of the composition and the sodium stearate representing 7.5 wt. % of the composition, prior to drying; a 5 wt. % laponite solution and sodium stearate (respectively representing 3 wt. % and 7.5 wt. % of the composition, prior to drying).

**[0050]** An example of a bleach composition suitable for use in the present invention include compositions having the general ranges as follows:

Component	Range Percentage w/w
Alpha olefin sulfonate	0- 35
Sodium lauryl ether sulfate	3.0-6.0
Bleaching agent (e.g., DCCNa or Hydantoin)	0.5 - 25
Lauryl monoethanolamide	2.0-5.0
Dodecyl benzene sulfonate Na	50-70
Na sulfate anhydrous	15-25
Silica	1.0-2.0

An example of a anti-lime scale agent composition is as follows:

Description	Qty
Spary dried silica	9.46
Na sulfate	10.81
Na dodecylbenzenesulfonate (80%)	74.05
Na <sub>4</sub> HEDP	1.62
Alcohol C <sub>13</sub> /C <sub>15</sub>	1.08
Dye	2.97

**[0051]** In the accompanying figures, like elements are indicated using the same numerals throughout the figures.

**[0052]** Turning now to the figures, Figure 1 illustrates a partially exploded view of an embodiment of an ITB device, including the placement of a treatment composition in a solid form within the device. The device 100 comprises a first

chamber 105, having a first chamber volume, defined by an exterior wall 110, a back wall (not shown) and the cover 115 which is shown here as a separate element, however when the device 100 is assembled it is attached to form a liquid-tight seal with the exterior wall 110. In this view is also seen a treatment agent 120 here in the form of a generally cylindrical block, positioned in the interior of the first chamber 105 and resting upon the second chamber 125. The second chamber 125, having a second chamber volume, is defined by two chamber sidewalls 130, 135 which are which are bridged by a roof 140, and by a portion 145 of the exterior wall 110 which is present between the two chamber sidewalls 130, 135. It is to be understood that when the device 100 is in its assembled form that the cover 115 forms a liquid tight seal with the portions of the two chamber sidewalls 130, 135, the roof 140 and the portion 145 of the exterior wall 110 which it contacts.

**[0053]** The first chamber of the device 100 also comprises at least one water inlet opening 150 here in the form of an elongated, generally rectangular aperture in the near proximity of a connector 155 which may be removably affixed to a hanger 160. In desired embodiments however, the hanger 160 and the cooperating connector 155 are designed and dimensioned such that it is very difficult to disassemble these two elements once they are assembled. The hanger 160 is depicted in a folded configuration, it to be understood that when unfolded, that it is suitably dimensioned to be used to hang the device 100 such that the cover 115 is directed to the sloping interior wall of the toilet bowl. Such an installation also ensures that water, when flushed from the toilet, is in the path of flushing water and thereby enters the first chamber 105 through the water inlet opening 150 wherein it contacts the treatment agent 120 before passing out from the first chamber through an outlet opening and into a second chamber, which has at least one device outlet opening 170 as illustrated on Figure 1.

**[0054]** Figure 2 illustrates a frontal, planar view of the ITB device of Figure 1, albeit with the omission of the hanger 160. As can now be more clearly seen, the treatment agent 120 occupies a significant amount of the first chamber volume. Further, the size of the first chamber volume (absent the treatment agent) is many times larger than the size of the second chamber volume. In the embodiment illustrated in Figure 2, the volume of the empty first chamber is approximately 50 cubic centimeters, and the volume of the second chamber is approximately 0.6 cubic centimeters, a respective volume ratio of about 83:1.

**[0055]** Figure 3 illustrates a side planar view of the ITB device 100 of Figure 1, including the hanger 160 and with the cover 115 in a liquid tight seal with the exterior wall 110. Further illustrated, in dotted lines, is a representation of a further water inlet opening 175 which may be present with, or in lieu of the water inlet opening 150. Back wall 180, present in the device 100 is now visible.

**[0056]** Figure 4 illustrates a planar view of the bottom section of the ITB device of Figure 1, absent the treatment agent, viewed downward from the line A-A depicted on Fig.1. In this view, the roof 140 of the second chamber is visible in plan view and at one end adjacent to the cover 115 includes an outlet opening 185 into a second chamber, and which provides for fluid communication between the first and second chambers of the device 100. Also depicted on the figure is a device outlet opening 170, which however is depicted in dotted line format as it is not normally visible through the roof 140 of the second chamber.

**[0057]** It will be realized then that water entering the first chamber of the device necessarily must contact the treatment agent and thus form a treatment composition, before exiting the first chamber via the outlet opening 185, and then into the second chamber before ultimately exiting the device via the device outlet opening. In many cases the amount or residence time is a key to ensuring that effective concentrations of a treatment agent are combined with the flush water passing through the device and forming the treatment composition. Such may be particularly important wherein the amount of a disinfecting agent such as a bleach or a quaternary ammonium compound is to be eluted and provided to the toilet bowl. Increasing the residence time in the device typically also increases the ultimate concentration of a treatment agent in the treatment composition provided to the toilet bowl. Careful selection of the relative dimensions of the first and second chambers and particularly their respective volumes, as well as for the size and number of outlet opening(s) between the first and second chambers, as well as the size and number of device outlet opening(s) will permit for the production of an ITB device 100 which has a long residence time of the flush water contacting the treatment agent, as well as a longer or delayed delivery period of the delivery of the treatment composition to the toilet bowl following the flush of the toilet bowl. The various dimensions of the first and second chambers can be varied to adjust the residence time of the flush water in the first chamber and/or to adjust the rate of delivery of the treatment composition. Additionally or alternately the residence time of the flush water in the first chamber can be increased by reducing the cross-sectional area or diameter of the outlet opening 185. The rate of delivery of the treatment composition can be slowed or delayed by reducing the cross-sectional area or diameter of the device outlet opening 170.

**[0058]** Further, increasing and/or decreasing the volumes of the first fill chamber, and of the second fill chamber may also be used to vary the flowrate of the treatment composition exiting the device. For example wherein a long delay may be desired after the flush of water in the toilet, but prior to release of treatment composition into the toilet bowl, the respective volumes of the of the first chamber, and the second chamber is about may be reduced, such as to about 20-5:1. The larger volume of the second chamber permits for a longer residence time of the treatment composition in the second chamber particularly in the instance wherein the device outlet opening is relocated to a position other than

at the bottom or lowest portion of the second chamber. This effect can be increased also by reducing the cross-sectional area or diameter of the outlet opening 185 which would delay the rate of filling of the second chamber by the treatment composition entering from the first chamber.

5 [0059] Figure 5 illustrates a perspective view of a portion of an ITB device 200 similar to that depicted on Figure 1, but which further includes a fragrance chamber 210. The fragrance chamber 210, in this embodiment, is integrally formed into the device 200 such that a cavity containing a quantity of a fragrance agent 215 here in a gel form disposed within said cavity. The device 200 includes a back wall 180 (depicted in dotted line) which separates the first chamber and second chamber, from the fragrance chamber 210. Figure 5 further includes as a water inlet opening two cover apertures 220, 225 which provide for passage of flush water through the plate 115 and into the interior of the first chamber when the device 220 is hung by the hanger 160 (only a portion depicted) in a toilet bowl as described generally with reference to Figure 1. As such, it will be evident that the fragrance chamber will be oriented away from the flush water.

10 [0060] Figure 6 illustrates an alternative embodiment of a cover 230 which includes one or more raised ribs 235 depending from the interior face 240 of the cover 230. When the cover 230 is used with an ITB device, the raised rib(s) extend into the interior of the first chamber containing the treatment agent. The incorporation of one or more raised ribs 235 adds to the stiffness of the cover 230, and when used in an device wherein the outlet opening between the first and second chambers is adjacent to the cover, the presence of the one or more raised ribs 235 minimizes the likelihood that the treatment agent, particularly when in solid or "block" form does not obscure the outlet opening between the first and second chambers and deny passage of the treatment composition from the first chamber and into the second chamber of the device.

20 [0061] Figure 6 also depicts as a water inlet opening two cover apertures 220, 225 which provide for passage of flush water through the plate 230, and entry into the interior of the first chamber as described with reference to Figure 5.

25 [0062] Figure 7 illustrates a perspective view of a portion of an ITB device 100 similar to that of Figure 1 comprising a cover 250. The cover 250 is slideable with respect to at least the first chamber, and includes a dependant skirtwall 255 which contains at least one recess or aperture 260 which may be used to define the effective dimensions of the one water inlet opening, and thereby provide a degree of control over the rate of ingress of flushed water into the first chamber of the device 100. The slideable cover 250 depicted on Figure 7 includes an elongated, generally rectangular aperture which is intended to coincide with the water inlet opening 150, here an elongated, generally rectangular aperture 150 of the device 100. The slideable cover 250 can be rotated to thus define and to vary the effective cross sectional area of the water inlet opening, and thereby the fill rate of the first chamber. This relationship is more clearly depicted with reference to Figures 7A and 7B. Figure 7A illustrates the slideable cover 250 in an eclipsing position wherein while all of the cover aperture 260 is exposed, only part of the water inlet opening 150 is exposed, with the part obscured or eclipsed by the slideable cover is indicated in dotted lines. Figure 7B illustrates the slideable cover 250 in a non-eclipsing position wherein while all of the cover aperture 260 is exposed, and all of the water inlet opening 150 is exposed as well.

30 [0063] It is to be understood that the embodiment of the cover 250 shown on Fig.7 may be used in conjunction with any embodiment of the ITB devices described herein.

35 [0064] Figure 8 depicts a further embodiment of an ITB device 100 in a partially exploded view, including the placement of a treatment agent 120 in a solid form within the device. The depicted device in Figure 8 is similar in many respects to the device depicted on Figure 1, except for the absence of the roof (140). In Fig. 8, the second chamber is a weir defined by a first weir sidewall 270, a second weir sidewall 275 and a portion 145 of the wall 110 between the first and second weir sidewalls 270, 275. In a configuration according to Figure 8 any fluid passage formed by gaps between the treatment agent 120 and the first and second weir sidewalls 270, 275 and/or between the treatment agent 120 and the cover 115 and/or the back wall 180 defines at least one outlet opening into the second chamber.

40 [0065] Figure 9 illustrates a planar view of the bottom section of the ITB device 100, absent the treatment agent, viewed downward from the line A'-A' depicted on Fig. 8. In this figure, the first weir sidewall 270, the second weir sidewall 275 and a portion 145 of the wall 110 between the first and second weir sidewalls 270, 275 are visible and labeled. In this view, the device outlet opening 170 is depicted.

45 [0066] Figure 10 depicts a still further embodiment of the ITB device 100 in a partially exploded view, including the placement of a treatment composition 120 in a solid form within the device, and further including a second slideable cover 280 which includes a tapered aperture 285. When the device 100 is assembled, the second slideable cover 280 engages at least a portion of the exterior of the sidewall 110 of the device, and forms a moveable but liquid tight fit therewith. The tapered aperture 285 has two ends, a length and preferably has a varying width along its length so that it has a greater width or near one end thereof, and a narrower width at the other end thereof. Desirably the maximum width of the tapered aperture 285 is at least as great as the cross sectional area of the device outlet opening 170. The operation of the second slideable cover 280 in defining the effective dimensions of the device outlet opening 170, and thereby providing a degree of control over the rate of egress of material exiting the device and into the bowl of the toilet is illustrated more specifically on Figures 10A, 10B and 10C.

50 [0067] Figure 10A illustrates planar view of the exterior of a portion of the bottom of the ITB device 100 depicted on Figure 10 illustrating the arrangement of the second slideable cover 280 in a first opened position. As may be seen, the

aperture 285 of the second slideable cover 280 is located with respect to the sidewall 110 such that the aperture 285 partially eclipses, or obscures a portion of the device outlet opening 170. In this embodiment the device outlet opening 170 is approximately midway between the narrow end 290 and the wide end 295 of the aperture 285. This configuration provides for reduced egress of treatment composition from the device 100.

5 **[0068]** Figure 10B illustrates planar view of the exterior of a portion of the bottom of the ITB device 100 depicted on Figure 10 illustrating the arrangement of the second slideable cover 280 in a second opened position. As may be seen, the aperture 285 of the second slideable cover 280 is located with respect to the sidewall 110 such that the narrow end 290 substantially eclipses, or obscures the device outlet opening 170. This configuration provides for minimal egress of treatment composition from the device 100.

10 **[0069]** Figure 10C illustrates planar view of the exterior of a portion of the bottom of the ITB device 100 depicted on Figure 10 illustrating the arrangement of the second slideable cover 280 in a third opened position. As may be seen, the aperture 285 of the second slideable cover 280 is located with respect to the sidewall 110 such that the wide end 295 does not obscure the device outlet opening 170. This configuration provides for maximal egress of treatment composition from the device 100.

15 **[0070]** As will be realized from the foregoing discussion regarding Figures 10, 10A, 10B and 10C, the placement and rotation of the second slideable cover 280 permits for variable control over the egress of treatment composition from the ITB device 100. Indeed, it should be apparent that further rotation of the second slideable cover 280 may be used to totally eclipse the device outlet opening 170 and block the egress of treatment composition from the device 100.

20 **[0071]** While not depicted it is clearly to be understood that the second slideable cover 280 may also include a fragrance chamber such as described with reference to Figure 5. In such a contemplated embodiment the fragrance chamber is conveniently a cavity formed integrally with the second slideable cover and containing a quantity of a fragrance agent 215 here in a gel form disposed within said cavity.

**[0072]** It is to be clearly understood that any of the embodiments of the ITB device 100 described herein may be modified to include a second slideable cover described with reference to Figure 10.

25 **[0073]** The device according to the invention can be formed out of any of a variety of materials with synthetic polymers being preferred. Exemplary Suitable synthetic polymers include polyethylene, polypropylene, and the like; the only criteria being that the selected synthetic polymers is not affected by the components of the block or fragrance agent, particularly when in a gel form such as described with reference to Fig.5.

30 **[0074]** The device according to the invention may also have a different geometry and appearance than the embodiments described in the Figures, *supra*. For example while a device having a substantially circular cross-section is described and depicted in the Figures, articles having different cross-sectional geometries and indeed different arrangements of the first and second chambers may also be constructed in accordance with the present inventive teaching.

Bleach Delivery:

35 **[0075]** The following example describes operation of a preferred embodiment of the invention, a device as depicted in Figure 1, and its performance against a comparative device, "Harpic® 2in1" (ex. Reckitt Benckiser plc, United Kingdom).

40 **[0076]** A block containing 25%wt. of sodium dichloroisocyanurate, 68%w. of an anionic surfactant, 5%wt. of a nonionic surfactant and the balance to 100%wt. minors was inserted into the first chamber of a device according to Figure 1, and the cover 115 was installed and sealed. A like block was inserted into the comparative device. Both devices were installed in the same position on the rim of identical toilets.

45 **[0077]** A series of ten "flush cycles" was practiced with each toilet, wherein the respective toilet was flushed, and five minutes later the water in the bowl was stirred for 10 seconds and an aliquot of the water contained in the bowl was removed and analyzed to determine the concentration of available free chlorine (reported in parts per million) in the toilet bowl. At the conclusion of ten minutes, the toilet was flushed again and the above process repeated until 10 flush cycles were practiced. The results of this testing is reported on the table, below.

Flush cycle	Example	Comparative
1	5.05	0.9
2	1.9	0.6
3	2.4	0.65
4	2.9	1.65
5	3.85	1.95
6	5.2	1.55

(continued)

Flush cycle	Example	Comparative
7	4.4	2.45
8	5.7	1.8
9	3.15	1.55
10	4.2	1.4
Average:	3.88	1.45

**[0078]** As can be seen from the foregoing table, the device according to the invention consistently delivered a greater dosage of bleach to the toilet bowl, as evidenced by the concentration of available free chlorine (reported in parts per million) in the toilet bowl water following each flush.

#### Drain Time:

**[0079]** In a separate test the comparative time to drain a device according to Fig. 1 of the invention was compared to a commercially available product, "Harpic® 2in1" (ex. Reckitt Benckiser plc, United Kingdom) used in the prior example. Both devices had the same exterior dimensions and both contained a treatment composition in a solid tablet form contained within of identical size and mass. Each device was filled with water and the time to drain the water from each device was evaluated.

**[0080]** It was observed that the average time required to drain the liquid from the comparative device not more than 3 seconds, while the average time to drain the liquid from the device according to the invention was about 8 -11 seconds.

**[0081]** While the invention is susceptible of various modifications and alternative forms, it is to be understood that specific embodiments thereof have been shown by way of example in the drawings which are not intended to limit the invention to the particular forms disclosed; on the contrary the intention is to cover all modifications, equivalents and alternatives falling within the scope and spirit of the invention as expressed in the appended claims.

#### **Claims**

1. A device useful in conjunction with a toilet bowl, which device provides for the delivery of a cleaning and/or sanitizing composition, delivered in the form of an aqueous treatment composition which contains one or more active agents such as a cleaning agent, disinfecting agent, fragrance agent, and/or an anti-lime scale agent or a mixture of two or more agents, and optionally provides a fragrancing effect to the toilet bowl, wherein the device includes at least one treatment agent (120) such as a cleaning agent, disinfecting agent, fragrance agent, and/or an anti-lime scale agent or a mixture of two or more thereof said treatment agent which may be in a liquid, gel or solid form which is released into flushing water when the toilet is flushed, and further optionally a fragrance composition desirably not being in contact with the flushing water, wherein the device comprises a covered housing (110) comprising:

a) a first chamber and

b) a second chamber, said first chamber (105) for containing said treatment composition, the first chamber having a cover (115) and defined by an exterior wall, a back wall and the cover, and having at least one water inlet opening (150) and at least one outlet opening (185) into the second chamber (125) said second chamber, defined by two chamber sidewalls (130, 133), which are bridged by a roof (140) and by a portion of the exterior wall which is present between the two sidewalls, and having at least one device outlet opening (170), wherein the respective ratio of the volume of the first chamber, and the volume of the second chamber is about 150 - 5:1;

(c) a hanger (160) for removably hanging the device from the rim of a sanitary appliance, preferably the rim of a toilet bowl such that when the device is suspended in the toilet bowl the at least one water inlet opening of the first chamber is in the path of flushing water, and

(d) optionally, a third, optionally covered, fragrance chamber for containing said fragrance composition, and wherein the said fragrance chamber is most desirably not in the path of flushing water, and further wherein:

(e) the cover is slideable with respect to the first chamber, and includes a dependant skirtwall which contains at least one recess or aperture which may be used to define the dimensions of the one water inlet opening, and thereby provide a degree of control over the rate of ingress of flushed water into the first chamber.

5 2. The device according to claim 2 wherein the respective ratios of the volume of the first chamber, and the volume of the second chamber is about 100 - 10: 1.

3. The device according to claim 2 wherein the respective ratios of the volume of the first chamber, and the volume of the second chamber is about 100 - 50:1.

10 4. The device according to claim 1 wherein:  
the at least one water inlet opening is placed in the first chamber and/or the cover thereof with variations including the inlet placed in the first chamber, the inlet placed in the cover of the first chamber, and an inlet is placed both in the first chamber and in the cover of the first chamber.

15 5. The device according to claim 1 wherein:  
the cover includes one or more raised ribs depending from the interior face of the cover, which raised rib(s) extend into the interior of the first chamber containing the treatment composition when the device is assembled and/or used.

20 6. The device according to claim 1 wherein:  
the device includes a second slideable cover (optionally integrated with the fragrance chamber) which includes a dependant skirtwall which contains at least one recess or aperture which may be used to define the dimensions of the device outlet opening, and thereby provide a degree of control over the rate of egress of material exiting the device and into the bowl of the toilet.

25 7. A process for delivering a cleaning and/or sanitizing composition which process comprises the steps of providing a device according to any previous claim and installing the device within the interior of a toilet bowl.

### 35 Patentansprüche

35 1. Vorrichtung, die in Verbindung mit einer WC-Schüssel nützlich ist, wobei die Vorrichtung die Zufuhr einer Reinigungs- und/oder Desinfektionszusammensetzung vorsieht, die in Form einer wässrigen Behandlungszusammensetzung zugeführt wird, die einen oder mehrere Wirkstoffe, zum Beispiel ein Reinigungsmittel, ein Desinfektionsmittel, ein Duftmittel und/oder ein Mittel gegen Kalbablagerungen, oder eine Mischung aus zwei oder mehreren Mitteln enthält, und die der WC-Schüssel optional eine Duftnote verleiht, wobei die Vorrichtung zumindest ein Behandlungsmittel (120), zum Beispiel ein Reinigungsmittel, ein Desinfektionsmittel, ein Duftmittel und/oder ein Mittel gegen Kalkablagerungen, oder eine Mischung aus zwei oder mehreren davon, wobei das Behandlungsmittel, das in flüssiger, Gel- oder fester Form vorliegen kann, in das Spülwasser freigesetzt wird, wenn das WC gespült wird, und ferner wahlweise eine Duftzusammensetzung enthält, die vorzugsweise nicht mit dem Spülwasser in Kontakt gelangt, wobei die Vorrichtung umfasst:

ein abgedecktes Gehäuse (110), umfassend

50 a) eine erste Kammer und  
b) eine zweite Kammer,  
wobei die erste Kammer (105) zum Enthalten der Behandlungszusammensetzung vorgesehen ist, wobei die erste Kammer eine Abdeckung (115) aufweist und von einer Außenwand, einer Rückwand und der Abdeckung definiert ist, und zumindest eine Wassereinflussöffnung (150) und zumindest eine Auslassöffnung (185) in die zweite Kammer (125) hat, wobei die zweite Kammer, die von zwei Kammerseitenwänden (130, 133) definiert ist, die von einem Dach (140) und einem Teil der Außenwand, die zwischen den beiden Seitenwänden vorhanden ist, überbrückt sind, und zumindest eine Vorrichtungsauslassöffnung (170) aufweist,  
55 wobei das jeweilige Verhältnis des Volumens der ersten Kammer und des Volumens der zweiten Kammer

ungefähr 150 - 5:1 beträgt;

c) eine Aufhängeeinrichtung (160) zum entfernbaren Hängen der Vorrichtung vom Rand einer Sanitäreinrichtung, vorzugsweise vom Rand einer WC-Schüssel, so dass die zumindest eine Wassereinlassöffnung der ersten Kammer im Weg des Spülwassers liegt, wenn die Vorrichtung in die WC-Schüssel eingehängt ist, und

d) wahlweise eine dritte, optional abgedeckte Duftkammer zum Enthalten der Duftzusammensetzung, und wobei die Duftkammer am meisten bevorzugt nicht im Weg des Spülwassers liegt, und wobei ferner:

e) die Abdeckung in Bezug auf die erste Kammer schiebbar ist und eine herabhängende Schürzenwand ("skirtwall") aufweist, die zumindest eine Ausnehmung oder eine Öffnung enthält, die verwendet werden kann, um die Dimensionen der einen Wassereinlassöffnung zu definieren und dadurch einen Grad an Kontrolle über die Eintrittsrate von Spülwasser in die erste Kammer zu bieten.

2. Vorrichtung nach Anspruch 2, wobei die jeweiligen Verhältnisse des Volumens der ersten Kammer und des Volumens der zweiten Kammer ungefähr 100 - 10:1 betragen.

3. Vorrichtung nach Anspruch 2, wobei die jeweiligen Verhältnisse des Volumens der ersten Kammer und des Volumens der zweiten Kammer ungefähr 100 - 50:1 betragen.

4. Vorrichtung nach Anspruch 1, wobei:

Die zumindest eine Wassereinlassöffnung in der ersten Kammer und/oder in der Abdeckung davon mit Variationen platziert ist, einschließlich des Platzierens des Einlasses in der ersten Kammer, des Platzierens des Einlasses in der Abdeckung der ersten Kammer und des Platzierens des Einlasses sowohl in der ersten Kammer als auch in der Abdeckung der ersten Kammer.

5. Vorrichtung nach Anspruch 1, wobei:

Die Abdeckung je nach Innenfläche der Abdeckung eine oder mehrere erhobene Rippen aufweist, wobei sich die erhobene Rippe bzw. die erhobenen Rippen in das Innere der ersten Kammer erstreckt bzw. erstrecken, die die Behandlungszusammensetzung enthält, wenn die Vorrichtung zusammengebaut ist und/oder benutzt wird.

6. Vorrichtung nach Anspruch 1, wobei:

Die Vorrichtung eine zweite schiebbare Abdeckung enthält (optional in die Duftkammer integriert), die zumindest eine herabhängende Schürzenwand enthält, die zumindest eine die zumindest eine Ausnehmung oder eine Öffnung enthält, die verwendet werden kann, um die Dimensionen der Vorrichtungsauslassöffnung zu definieren und dadurch einen Grad an Kontrolle über die Austrittsrate von Material, das die Vorrichtung verlässt und in die WC-Schüssel gelangt, zu bieten.

7. Verfahren zum Zuführen einer Reinigungs- und/oder Desinfektionszusammensetzung, wobei das Verfahren die Schritte des Bereitstellens einer Vorrichtung nach einem vorherigen Anspruch und des Installierens der Vorrichtung in einer WC-Schüssel umfasst.

## Revendications

1. Dispositif utile conjointement avec une cuvette de toilettes, lequel dispositif propose la distribution d'une composition de nettoyage et/ou désinfectante, distribuée sous la forme d'une composition de traitement aqueuse qui contient un ou plusieurs agents actifs tels qu'un agent de nettoyage, un agent désinfectant, un agent de fragrance et/ou un agent anticalcaire ou un mélange de deux ou de plusieurs agents, et fournit facultativement un effet consistant à parfumer la cuvette des toilettes, dans lequel le dispositif comprend au moins un agent de traitement (120) tel qu'un agent de nettoyage, un agent désinfectant, un agent de fragrance et/ou un agent anticalcaire ou un mélange de deux ou de plusieurs de ses agents, ledit agent de traitement peut se présenter sous une forme liquide, en gel ou solide qui est libérée dans l'eau de la chasse d'eau lorsque l'on tire la chasse d'eau des toilettes, et en outre facultativement une composition de fragrance qui n'est pas, de manière souhaitable, en contact avec l'eau de la chasse d'eau, dans lequel le dispositif comprend :



## EP 1 606 463 B2

un boîtier recouvert (110) comprenant :

(a) une première chambre, et

(b) une deuxième chambre,

ladite première chambre (105) étant prévue pour contenir ladite composition de traitement, la première chambre ayant un couvercle (115) et définie par une paroi extérieure, une paroi arrière et le couvercle, et ayant au moins une ouverture d'entrée d'eau (150) et au moins une ouverture de sortie (185) dans la deuxième chambre (125), ladite deuxième chambre étant définie par deux parois latérales de chambre (130, 133) qui sont reliées par un toit (140) et par une partie de la paroi extérieure qui est présente entre les deux parois latérales et ayant au moins une ouverture de sortie (170) du dispositif, dans lequel le rapport respectif du volume de la première chambre et du volume de la deuxième chambre est de l'ordre d'environ 150-5:1 ;

(c) un crochet de suspension (160) pour accrocher de manière amovible le dispositif au bord d'un appareil sanitaire, de préférence le bord d'une cuvette de toilettes, de sorte que lorsque le dispositif est suspendu dans la cuvette des toilettes, la au moins une ouverture d'entrée d'eau de la première chambre est dans la trajectoire de l'eau de la chasse d'eau, et

(d) facultativement, une troisième chambre de fragrance, facultativement recouverte, pour contenir ladite composition de fragrance, et dans lequel ladite chambre de fragrance, n'est pas, de la manière la plus souhaitable possible, dans la trajectoire de l'eau de la chasse d'eau, et en outre dans lequel:

e) le couvercle peut coulisser par rapport à la première chambre, et comprend une paroi de jupe dépendante qui contient au moins un évidement ou ouverture qui peut être utilisé(e) pour définir les dimensions de la une ouverture d'entrée d'eau, et fournir ainsi un degré de contrôle sur la vitesse d'entrée de l'eau évacuée dans la première chambre.

2. Dispositif selon la revendication 2, dans lequel le rapport respectif du volume de la première chambre et du volume de la deuxième chambre est de l'ordre de 100-10:1.

3. Dispositif selon la revendication 2, dans lequel le rapport respectif du volume de la première chambre et du volume de la deuxième chambre est de l'ordre de 100-50:1.

4. Dispositif selon la revendication 1, dans lequel :

La au moins une ouverture d'entrée d'eau est placée dans la première chambre et/ou son couvercle avec des variations comprenant l'entrée placée dans la première chambre, l'entrée placée dans le couvercle de la première chambre, et une entrée est placée à la fois dans la première chambre et dans le couvercle de la première chambre.

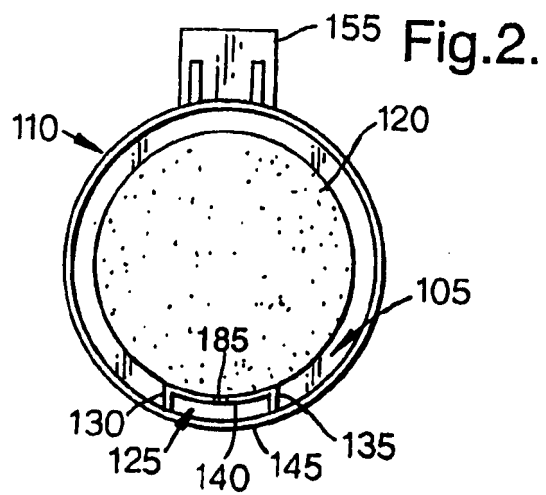
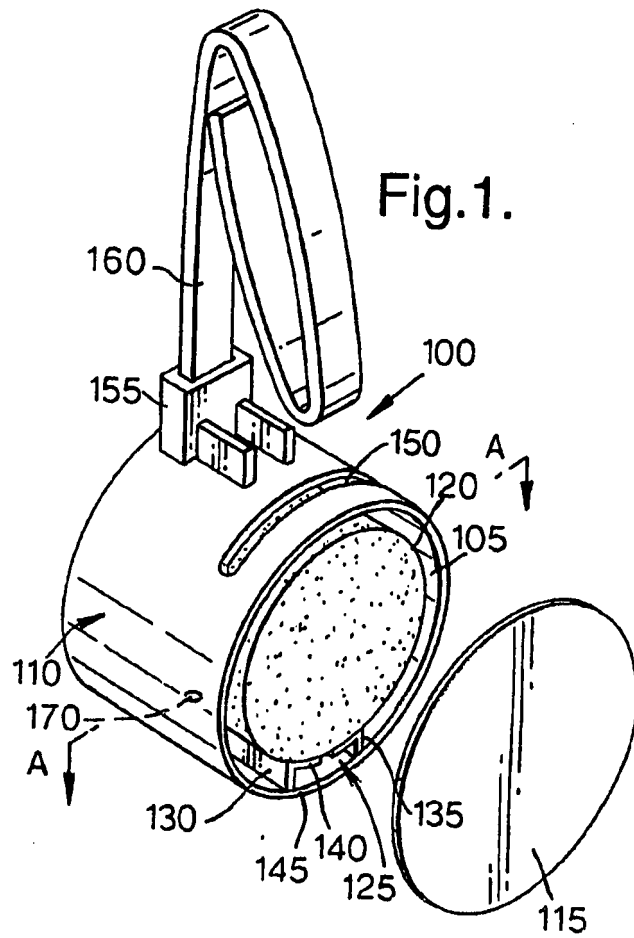
5. Dispositif selon la revendication 1, dans lequel :

Le couvercle comprend une ou plusieurs nervures relevées dépendant de la face intérieure du couvercle, laquelle (lesquelles) nervure(s) relevée(s) s'étend (s'étendent) dans l'intérieur de la première chambre contenant la composition de traitement lorsque le dispositif est assemblé et/ou utilisé.

6. Dispositif selon la revendication 1, dans lequel :

Le dispositif comprend un deuxième couvercle pouvant coulisser (facultativement intégré avec la chambre de fragrance) qui comprend une paroi de jupe dépendante qui contient au moins un évidement ou ouverture qui peut être utilisé(e) pour définir les dimensions de l'ouverture de sortie du dispositif, et fournir ainsi un degré de contrôle sur la vitesse de sortie de la matière sortant du dispositif et dans la cuvette des toilettes.

7. Procédé pour distribuer une composition de nettoyage et/ou désinfectante, lequel procédé comprend les étapes consistant à prévoir un dispositif selon l'une quelconque des revendications précédentes et installer le dispositif à l'intérieur d'une cuvette de toilettes.



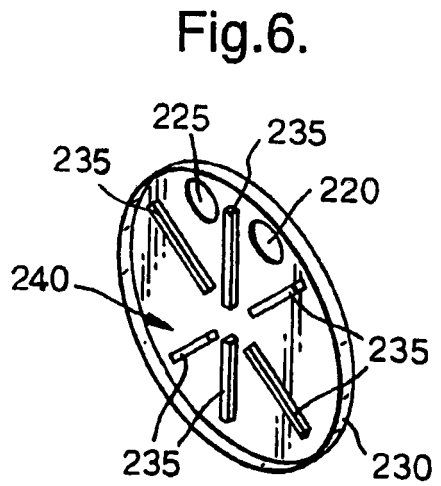
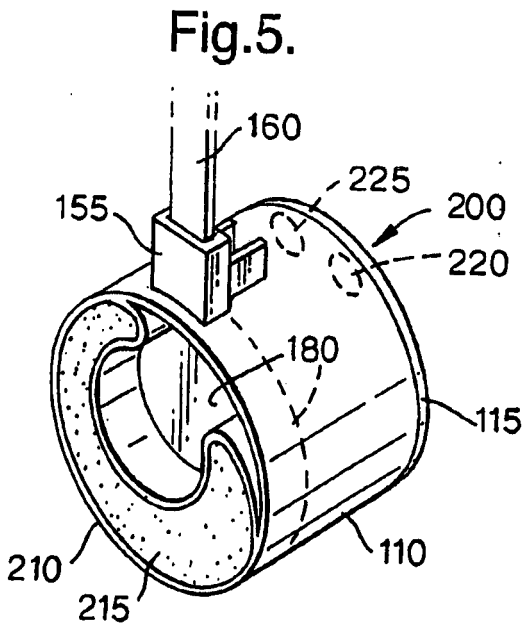
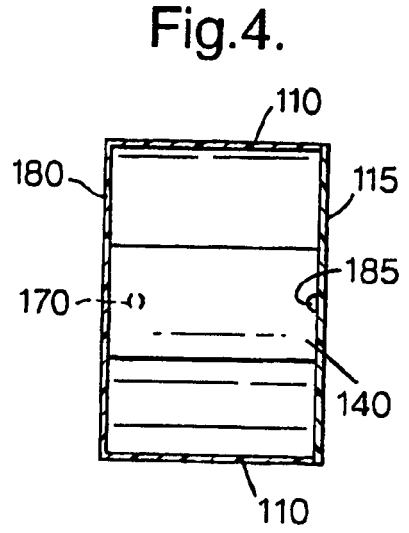
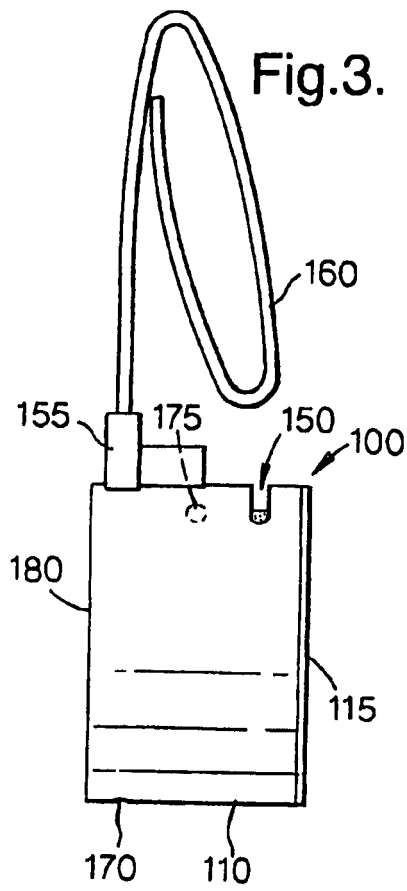


Fig.7.

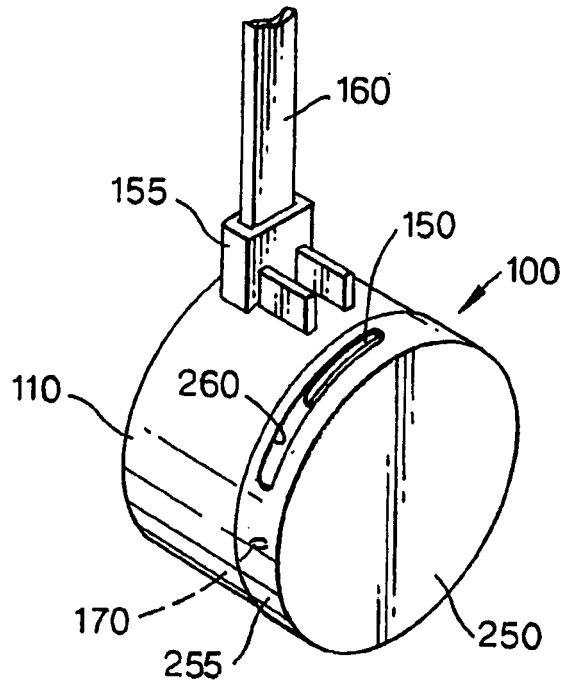


Fig.7A.

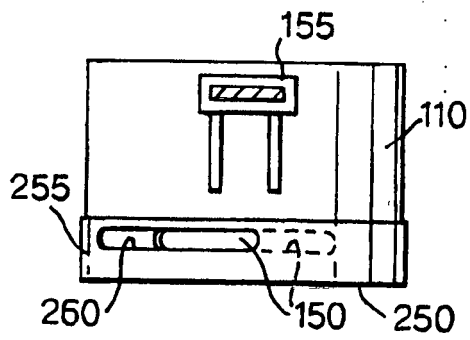


Fig.7 B.

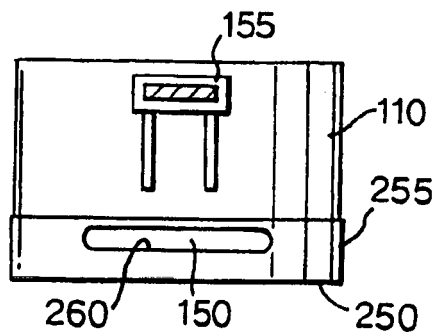




Fig.10.

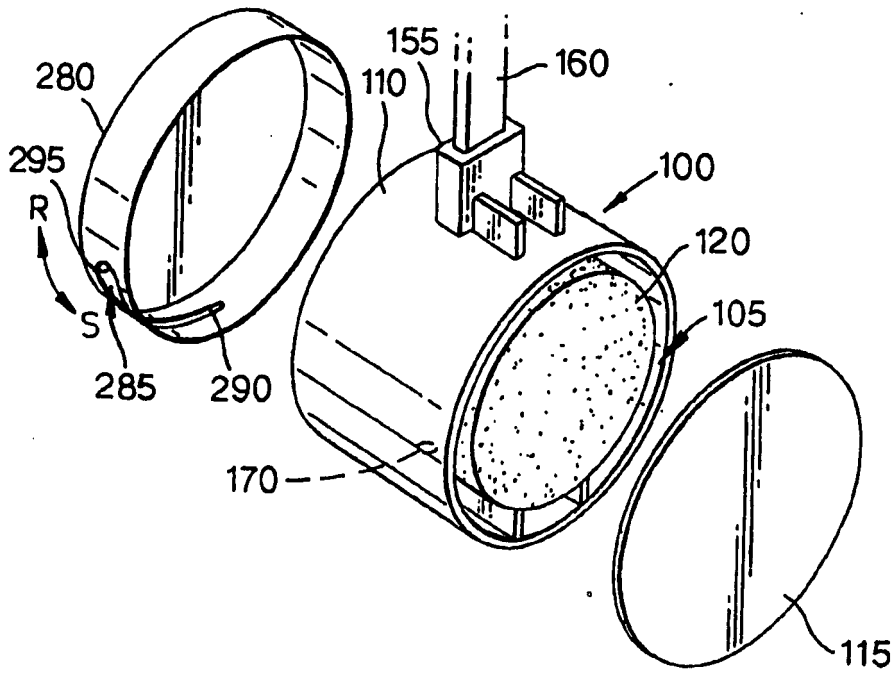


Fig.10A.

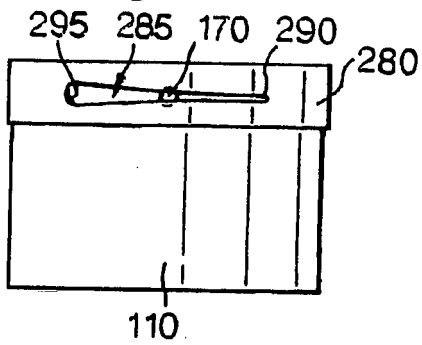


Fig.10B.

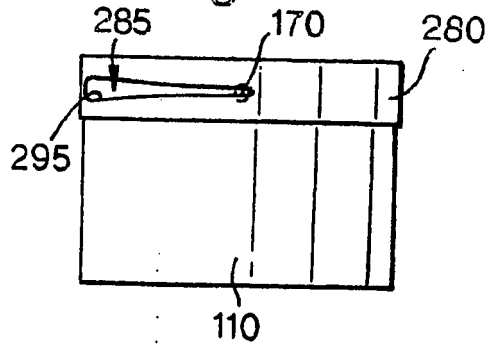
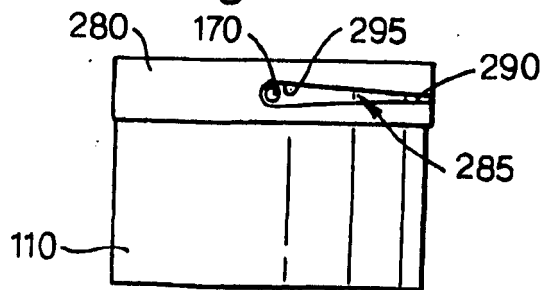


Fig.10C.



**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**

- US 1091265 A [0003]
- US 4560766 A [0032]
- US 4537897 A [0032]
- US 4564424 A [0032]
- US 5759974 A [0040]
- US 4460490 A [0040]
- US 4578207 A [0040]
- US 5780527 A [0045]

**Non-patent literature cited in the description**

- *McCutcheon's Functional Materials*, 1998, vol. 2 [0038]
- **KIRK-OTHMER**. Encyclopedia of Chemical Technology. 1997, vol. 23, 481-541 [0038]
- *McCutcheon's Functional Materials*. 2001, vol. 2 [0039]