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(54) CLEANING SYSTEM COMPRISING A SPRAYER BOTTLE AND A CLEANING COMPOSITION

REINIGUNGSSYSTEM MIT EINER SPRÜHFLASCHE UND EINER
REINIGUNGSZUSAMMENSETZUNG

SYSTÈME DE NETTOYAGE COMPRENANT UN FLACON PULVÉRISATEUR ET UNE
COMPOSITION DE NETTOYAGE

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Description

TECHNICAL BACKGROUND

5 **[0001]** The present invention concerns a cleaning system comprising a sprayer bottle and a cleaning composition.

STATE OF THE ART

10 **[0002]** Cleaning systems comprising sprayer bottles provided with a sprayer assembly and used for cleaning domestic surfaces have been known for decades and are available in many forms and use various cleaning compositions.

[0003] Sprayer bottles represent the most recognisable packaging for spray cleaning products, regardless of whether they are for residential or industrial use. They comprise a bottle and a sprayer assembly.

[0004] The bottles are sold by numerous distributors and are usually produced by blow moulding in HDPE, in polypropylene or PET, transparent or opaque, and comprise a label.

15 **[0005]** The label is usually obtained with the in-mould method, by screen printing, from paper / laminate die-cut and glued or heat-shrink plastic or by means of a combination of these methods.

[0006] The bottle is almost always disposable and non-reusable and for this reason many sprayer assemblies are irreversibly attached to the bottle opening, thus making re-use of the bottle impossible.

20 **[0007]** The sprayer assemblies were developed decades ago by companies like AFA Corp, Owens and Calmar and are now traditional and available at low cost from many distributors.

[0008] The conventional combination of bottle with narrow neck and threaded hole joined to the sprayer assembly with a trigger also called "trigger " and provided with a thin pipe or priming tube positioned in the bottle is the most widely used and perhaps most recognisable packaging of all cleaning articles.

25 **[0009]** The cleaning compositions used differ greatly from one another and include concentrated or diluted solutions, for example for the specific cleaning of kitchens or bathrooms. Sprayer bottles comprising detergents that emulsify air and form foams which collapse after a short time are also known.

[0010] Generally the cleaning compositions must ensure maximum cleaning effect. For said purpose, research efforts have concentrated on how to vary the type and quantity of the various elements that make up the cleaning composition to obtain maximum cleaning effect without ruining the surface being cleaned.

30 **[0011]** The cleaning compositions for cleaning the house can be liquid or also in the form of gel, but generally the compositions used inside the sprayer bottles are liquid.

[0012] Generally, however, it is very difficult to clean certain surfaces with said liquid solutions, in particular smooth vertical surfaces or surfaces that are difficult to access or even upturned surfaces such as the lower edge of the WC.

35 **[0013]** The use of sprayer bottles which spray in a down-up direction has also been proposed to solve said problem. Sprayer bottles of this type are available on the market, but they do not solve the problem of cleaning surfaces on which the product does not remain long enough, for example vertical smooth surfaces or the lower part of the edge of the WC.

[0014] The majority of the sprayer assemblies comprise a valve which operates to close the intake of the priming tube and simultaneously open an inlet for the liquid on the bottom of the sprayer when the bottle is inverted.

40 **[0015]** A further possible solution to this problem has been to use bottles with angled neck which are widely used to deliver detergent in gel below the edge of a WC.

[0016] An additional problem of cleaning vertical or very slippery surfaces is that, in addition to being difficult to reach, the cleaning composition tends to fall or slide off by gravity and therefore remains on the surface to be cleaned for too short a time to be effective.

45 **[0017]** To solve this problem, cleaning compositions in the form of gel are used to ensure that the cleaning composition remains longer in contact with the surface to be cleaned.

[0018] However, it is not generally possible to use said cleaning compositions in the form of gel with sprayer bottles since they are too viscous to be sprayed.

50 **[0019]** It is therefore necessary to find a technical solution for a cleaning system that simultaneously offers the advantages deriving from the use of a sprayer bottle with the use of a cleaning composition having a high cleaning capacity and which is also able to effectively clean difficult points like slippery, vertical or even upturned surfaces.

[0020] EP1103308 shows a sprayer comprising an outlet orifice for a liquid and a chamber into which the outlet orifice leads. The chamber is delimited laterally by an annular wall. The annular wall does not have any openings.

55 **[0021]** EP0709143 shows a sprayer comprising an outlet orifice for a liquid and a chamber into which the outlet orifice leads. The chamber is part of a dual chamber foam generation device not otherwise defined and appears to be added to the outside of the sprayer.

[0022] JP08299865 describes a bottle provided with a sprayer assembly comprising an orifice communicating with a first chamber. The first chamber is located inside an outer chamber.

[0023] EP24333 shows a sprayer assembly comprising an orifice. The orifice can be closed with a closing device 60

which can form a chamber around the orifice and this chamber is provided with openings.

SUMMARY OF THE INVENTION

- 5 **[0024]** The object of the invention is a cleaning system which is able to solve the problems described above and which in particular also effectively cleans surfaces which are difficult to reach or difficult to clean.
[0025] The above-mentioned object is achieved by a cleaning system according to claim 1.

BRIEF DESCRIPTION OF THE FIGURES

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[0026]

- figure 1 is a side view of a sprayer bottle 1 according to the present invention;
- figure 2 is a side section view of a sprayer assembly 3 of the sprayer bottle of figure 1; and
- 15 - figure 3 is a perspective view from below of the sprayer assembly 3 of figure 2.

DISCLOSURE OF THE INVENTION

20 **[0027]** According to the present invention a cleaning system is provided comprising a sprayer bottle 1 comprising a bottle 2, a sprayer assembly 3 and a liquid cleaning composition contained inside the bottle.

[0028] The sprayer assembly 3 is manually operable to expel the liquid cleaning composition by means of a spray which forms a foam.

[0029] The foam occupies a volume equal to at least 15 times the volume of liquid cleaning composition sprayed and, 30 seconds after spraying, the foam occupies a second volume equal to at least 50% of the first volume.

25 **[0030]** Advantageously the foam obtained is compact and therefore does not collapse and remains on the surface at length, in particular on vertical surfaces, and is furthermore easy to remove.

[0031] Preferably the second volume is equal to at least 75% of the first volume.

[0032] More preferably, the second volume is equal to at least 90% of the first volume. Even more preferably, the second volume is equal to at least 95% of the first volume.

30 **[0033]** Even more preferably, the first volume is equal to at least 20 times the volume of liquid cleaning composition sprayed.

[0034] Preferably the first volume is equal to at least 25 times the volume of liquid cleaning composition sprayed.

35 **[0035]** The cleaning system of the present invention has proved to be particularly suitable for cleaning domestic surfaces, in particular for cleaning bathrooms, tiles and in any case particularly suitable for cleaning vertical and/or slippery surfaces. The cleaning system of the present invention has also proved particularly suitable for cleaning plastic food containers, porcelain cups and fabrics.

[0036] Figure 1 illustrates a sprayer bottle 1 comprising a bottle 2 and a sprayer assembly 3.

[0037] The bottle 2 can have different shapes and is preferably made of thermoplastic material, for example HDPE, and is preferably obtained by blow moulding.

40 **[0038]** The bottle 2 comprises, as typically occurs in the conventional sprayer bottles, a lower region 4 to house the cleaning composition and an upper region 5, also called grip or neck, having a diameter section smaller than the lower region 4.

[0039] The upper region 5 has an upper opening 6 comprising a fastening portion 7 for fastening the sprayer assembly.

45 **[0040]** The upper opening 6 is preferably circular as in the embodiment illustrated in the figures and preferably has a diameter smaller than the upper region 5.

[0041] The upper opening 6 of the bottle 2 can preferably have a diameter ranging from 0.5 cm to 3 cm.

[0042] The fastening portion 7 is preferably threaded as in the embodiment illustrated in the figures, but alternatively can also allow fastening by bayonet, by ramp, with tabs or similar known means that accept finishes complementary to those present in a corresponding fastening portion present on the sprayer assembly 3 so as to allow the removable or 50 non-removable fastening of said sprayer assembly.

[0043] Simple threads are commonly used as means for fastening a sprayer assembly 3 to a bottle 2 and said threads are preferred.

[0044] The sprayer assembly 3 can also be irreversibly fastened on the neck of the bottle, preventing the collar from rotating in the reverse direction, for example by means of locking teeth.

55 **[0045]** Alternatively, for example, the sprayer assembly 3 is locked on the bottle 2 by means of a bayonet device, as is known in the art. Bayonet connectors of this type are described for example in the patent US7478739.

[0046] The upper region 5 or neck of the bottle 2 can have very different shapes and, for example, can also be an angled neck or have a duck-neck shape to facilitate spraying in difficult situations and against surfaces that are difficult

to reach.

[0047] The upper region 5 of the bottle 2 can also be shaped so as to have recesses for positioning the user's fingers to facilitate gripping of the bottle by the user.

[0048] Preferably the upper region 5 has a diameter section smaller than the lower region 4 as in the embodiment illustrated in the figures, but coaxial with the lower region and serving essentially to allow optimal gripping of the bottle.

[0049] Vice versa when the bottle has an "angled neck" the upper region of the bottle has a more restricted diameter but is inclined with respect to the vertical so as to facilitate spraying on surfaces that are difficult to reach.

[0050] The bottle comprises a bottle body 8, which preferably has a parallelepipedal section with rounded vertexes.

[0051] This approximately parallelepipedal section is maintained also in the upper region where the bottle body 8 narrows.

[0052] Clearly the bottle body 8 can also have a very different shape and also present a combination of different shapes.

[0053] The volume of cleaning composition contained in the bottle generally ranges from 250 ml to 2 litres, more preferably from 500 ml to 1000 ml, for example 750 ml.

[0054] The sprayer assemblies are generally designed to spray in a controlled direction with a relatively compact jet.

Examples of sprayer assemblies are described in the patent US4527741.

[0055] When the sprayer assembly 3 is coupled to the bottle 2 as in figure 1, the sprayer assembly 2 will be substantially horizontal and the spray coming from the sprayer assembly 2 will be generally horizontal.

[0056] The spray coming from the sprayer assembly will preferably have a conical shape.

[0057] Alternatively the form of the spray can be flat, pyramidal or also in the form of a narrow jet stream.

[0058] The sprayer assembly 3 shown in section in figure 2 and in perspective in figure 3 comprises a sprayer body 10 comprising a seat 11 engaged by a priming tube 13, which extends inside the bottle 2 and through which, in use, the cleaning fluid or composition to be sprayed flows.

[0059] The sprayer body 10 supports a piston mechanism 14 operated by a trigger 15 or lever, which moves along a forward stroke under the manual action of a user and along a return stroke under the action of elastic means when said manual action ceases.

[0060] The piston mechanism 14 is of known type and not described in detail and is configured so as to suck liquid from the priming tube through the upper end 16 of the seat into a chamber 17, when the trigger 15 performs the return stroke, so as to prevent reflux of the liquid sucked into the priming tube 13, and compress it towards an outlet channel 18 when the trigger performs the forward stroke, compressing the liquid to a pressure value greater than 2 bar, preferably greater than 2.5 bar, even more preferably between 2 and 5 bar, for example 3 bar, and is adapted to compress a valve 33 which, when a predetermined pressure is reached, allows the opening of an inlet orifice 34 into a supply channel 18.

[0061] From the inlet orifice 34 the liquid flows into a supply channel 18 of the nozzle 20.

[0062] The supply channel 18 communicates via a distribution chamber with an outlet orifice 22.

[0063] In the embodiment illustrated the supply channel 18 is therefore not in line with the outlet orifice 22; the liquid reaches the outlet orifice only via an annular distribution chamber.

[0064] The nozzle 20 comprises a rear connecting portion 21 in particular of truncated pyramid shape mounted on the sprayer body 10 at the end of the outlet channel 18. The nozzle 20 comprises an outlet orifice 22 through which the cleaning composition can flow to the outside, forming a spray.

[0065] The nozzle 20 is generally rotatable between a first STOP position in which the passage of the cleaning composition from the outlet channel to the outlet orifice is blocked and a second position in which the spray is allowed.

[0066] There are many ways to perform this spray locking function in the known art, as described for example in the patents US3843030, US4161288, US4227650, US4247048, US4730775 and US5664732.

[0067] Advantageously the nozzle 20 further comprises a front terminal portion 24 which defines a chamber 25 into which the outlet orifice 22 leads.

[0068] The chamber 25 is laterally delimited by an annular wall 26 which is coaxial with the outlet orifice 22 and which protrudes from the rear portion 21. Preferably the annular wall 26 is a circular collar.

[0069] A front end 27 of the chamber is completely open and the rear end 28 of the chamber is delimited by a rear wall 28 in which the outlet orifice 22 is provided.

[0070] Preferably this wall 28 has an annular groove 29 which extends around the outlet of the outlet orifice 22.

[0071] The annular wall 26 has at least one opening 30, preferably a first 30 and a second 31 opening for the passage of air. Preferably the opening(s) are made along the edge that connects the annular wall 26 to the rear portion 29. Preferably the opening or the openings are slits elongated in a circumferential direction.

[0072] Said area has an angular extension ranging from 45° to 180°, preferably from 90° to 180°.

[0073] Preferably the opening(s) occupy between 10% and 75% of the axial extension of the annular wall, more preferably between 10% and 50%, preferably between 10% and 30%, even more preferably between 10% and 20%, alternatively between 25% and 50%.

[0074] The bottle 2 contains a liquid cleaning composition which consists of an aqueous solution.

[0075] The cleaning composition comprises at least one surfactant comprising an alkyl sulfate.

[0076] The surfactant (s) are added in a quantity sufficient to give the desired cleaning effectiveness.

[0077] In the ambit of the present invention by surfactant we mean a substance which is able to lower the surface tension of the water.

[0078] Preferably, the total level of surfactants varies from 0.05 to 20% by weight on weight of the total quantity of aqueous solution, more preferably from 0.1 to 10%, even more preferably 0.5 to 5%, even more preferably 1 to 5%.

[0079] Here and below the quantities will always be expressed in terms of percentages by weight of the component out of the total weight of the solution.

[0080] The surfactant or the mixture of surfactants contained in the liquid composition of the present invention comprise an alkyl sulfate surfactant, such as alkoxylate and/or non-alkoxylate alkyl sulfate surfactant. Examples of alkoxylate alkyl sulfates comprise ethoxylated, propoxylated, ethoxylated/propoxylated and butoxylated alkyl sulfate surfactants.

[0081] Preferably the alkyl group contains approximately 7 to approximately 20 atoms of carbon.

[0082] Additional optional surfactants are preferably anionic, non-ionic, cationic, zwitterionic, amphoteric, ampholytic surfactants or mixtures thereof.

[0083] Below, a brief and non-comprehensive description of the various classes of additional surfactants that can be used in the present invention is provided, merely by way of example.

Anionic surfactants

[0084] Non-exhaustive examples of anionic surfactants suited to the present invention comprise the conventional anionic surfactants. For example sulfonated surfactants, for example, alkyl benzene sulfonates, and their hydrosoluble salts.

[0085] Preferably the alkyl group contains approximately 7 to approximately 20 atoms of carbon.

[0086] Other anionic surfactants that can be used for the present invention are the water-soluble salts of paraffin sulfonates and secondary alkane sulfonates containing approximately 7 to approximately 20 atoms of carbon; alkyl glyceryl ether sulfonates, especially the alcohol ethers from C7 to C20. Alternatively it is possible to use mixtures of alkyl benzene sulfonates with the paraffin sulfonates described above, secondary alkane sulfonates and alkyl glycerin ether sulfonates.

[0087] Other anionic surfactants useful for the present invention are the water-soluble salts of carboxylic acid, for example lauroyl sarcosinate or myristoyl sarcosinate.

[0088] The anionic surfactants are preferably hydrosoluble salts of alkali metals, ammonium salts and alkylammonium.

Non-ionic surfactants

[0089] Non-exhaustive examples of non-ionic surfactants suited to the present invention comprise fatty alcohol alkoxylates and alkyl amine oxides.

[0090] The fatty alcohol alkoxylates can be chosen from the alcohol alkoxylates and the alkylphenol alkoxylates with formula RO(E)and(P)pH, in which

- R is chosen from the group consisting of linear or branched aliphatic hydrocarbon radicals containing approximately 8 to approximately 20 atoms of carbon and linear or branched alkyl phenyl radicals in which the alkyl groups contain approximately 8 to approximately 20 atoms of carbon,
- 'E' is ethylene oxide and 'P' is propylene oxide
- 'e' and 'p' represent the mean degree of ethoxylation and propoxylation respectively and are between 0 and 24 (with the sum of e + p equal at least to 1).

[0091] The alkyl amine oxides preferably have the formula R1R2R3NO, in which each R1, R2 and R3 group is independently a C1-C30 group, preferably a C1-C20 group, more preferably a C1-C18 hydrocarbon chain. More preferably R1 and R2 are methyl groups, and R3 is a C8-C18 hydrocarbon chain.

Cationic surfactants

[0092] Non-exhaustive examples of cationic surfactants suited to the present invention comprise the quaternary ammonium surfactants, which can have up to 26 atoms of carbon, the alkoxylated surfactants of quaternary ammonium, comprise hydroxyethyl dimethyl quaternary ammonium, hydroxyethyl lauryl dimethyl ammonium chloride.

Zwitterionic surfactants

[0093] Non-exhaustive examples of zwitterionic surfactants suited to the present invention comprise derivatives of

secondary and tertiary amines, derivatives of heterocyclic secondary and tertiary amines, or derivatives of quaternary ammonium, quaternary phosphonium or compounds of tertiary sulphonium.

Ampholytic and/or amphoteric surfactants

[0094] Non-exhaustive examples of ampholytic and/or amphoteric surfactants suited to the present invention include derivatives of secondary or tertiary aliphatic amines, or heterocyclic aliphatic derivatives of secondary and tertiary amines in which the aliphatic radical can be linear or branched. One of the aliphatic substituents can contain at least 8 atoms of carbon, for example 8 to 18 atoms of carbon, and at least one contains an anionic water-solubilising group, for example carboxyl, sulfonate or sulfate.

[0095] The presence of at least one surfactant chosen from the group consisting of soluble salts of alkyl sulfates (primary or secondary), soluble salts of alkyl sulfonates (primary or secondary), paraffin sulfonates and secondary alkane sulfonates, linear or branched ethoxylated alcohols, amine alkyl oxides or quaternary ammonium surfactants is particularly preferred.

[0096] Preferably the cleaning composition further comprises at least one base and/or at least one acid and/or mixtures of bases and/or acids.

[0097] The base is preferably a strong base.

The base is preferably chosen from the group consisting of sodium hydroxide, potassium hydroxide, magnesium hydroxide, monoethanolamine, diethanolamine or triethanolamine and mixtures of the same.

[0098] The base is preferably present in a quantity ranging from 0 to 5%.

[0099] The acid is preferably an organic or inorganic acid.

[0100] The acid is more preferably selected from the group consisting of sulphuric, amidosulphuric, phosphoric, formic, acetic, oxalic, maleic, acrylic, succinic, citric and lactic acid.

[0101] The cleaning composition further preferably comprises a whitener.

[0102] Preferably the whitener is chosen from the group consisting of sodium hypochlorite or hydrogen peroxide.

[0103] If present, the sodium hypochlorite is in a quantity ranging from 0.1 to 5% by weight, even more preferably from 0.5 to 2% by weight.

[0104] The pH of the formulations containing sodium hypochlorite is above 10, more preferably above 11, even more preferably above 12.

[0105] If present, the hydrogen peroxide is present in a quantity ranging from 0.1 to 10% by weight, even more preferably from 0.5 to 7% by weight.

[0106] The pH of the formulations containing hydrogen peroxide is below 7, more preferably below 6, even more preferably between 2.5 and 5.5.

[0107] The cleaning composition further comprises preferably a fatty acid used as an antifoaming agent during use of the composition, more preferably a fatty acid with a high saturated fatty acid content.

[0108] The fatty acid is generally added in a quantity ranging from 0.01 to 1.0%, more preferably from 0.05% to 0.5%.

[0109] Even more preferably the cleaning composition comprises a fatty acid with a mean chain length between C8 and C18.

[0110] Preferably the cleaning composition also comprises one or more organic solvents selected from the group of the alcohols, diols, polyols and their ethers or alkyl derivatives, including the mono, di or poly glycol ethers or glycerol ethers.

[0111] The organic solvents are generally added in a total quantity ranging from 0.1 to 10.0%, more preferably from 0.1% to 5%.

[0112] Non-exhaustive examples of organic solvents that can be advantageously used include ethanol, propanol, isopropanol, butanol, isobutanol, tert-butanol, ethoxy-ethanol, propoxy-ethanol, butoxy-ethanol, ethoxy-ethoxy-ethanol, methoxypropanol, ethoxy-propanol, propoxy-propanol, butoxy-propanol, methoxy-propoxy-propanol, propoxy-propoxy-propanol, butoxy-propoxy-propanol, ethanediol, propanediol, butanediol, pentanediol, propanetriol, butanetriol, and all possible mixtures.

[0113] Preferably the cleaning composition also comprises a sodium silicate to improve the shine of the surfaces treated.

[0114] Preferably the sodium silicate is present in the cleaning composition in a quantity ranging from 0.02 to 1.0%, more preferably from 0.05 to 0.5%.

[0115] The cleaning composition may further also comprise a defoaming agent used to reduce the foam during filling of the bottles. Preferably the defoaming agent is a silicone, more preferably an emulsion of silicone in water.

[0116] The defoaming agent is preferably added in a quantity ranging from 0.0001 to 0.01%, even more preferably from 0.0005 to 0.005%.

[0117] It is generally expedient to add a fragrance in a sufficient quantity to be perceived during cleaning and to impart at least a scent temporarily after cleaning has been performed.

[0118] In particular, the cleaning composition preferably includes a fragrance.

[0119] In the preferred embodiment the fragrance is added for example in a quantity ranging from 0.01 to 2% by weight, more preferably from 0.1 to 0.3% by weight.

[0120] Preferably the fragrance(s) can be added pure or encapsulated.

[0121] The cleaning composition can also contain one or more dyes.

[0122] Dyes used can comprise pigments or other types of dyes chosen so that they are compatible with the other ingredients in the cleaning composition.

[0123] For example, a dye can be added in a quantity preferably ranging from 0.0005 to 0.01%, more preferably from 0.001 to 0.003%.

[0124] Preferably the cleaning compositions of the present invention have a density ranging from 0.9 to 1.1. More preferably the cleaning compositions comprising a whitener such as sodium hypochlorite, for example, have a density ranging from 1.0 to 1.07. More preferably the cleaning compositions comprising hydrogen peroxide have a density ranging from 0.99 to 1.04. More preferably the acid cleaning compositions have a density ranging from 0.99 to 1.04 and the alkaline cleaning compositions have a density ranging from 0.97 to 1.03.

[0125] Some examples of cleaning composition according to the present invention are given below, without limiting the invention to them.

EXAMPLES 1-20

[0126] The compositions were produced according to the invention of tables 1 to 4 and it was verified that they all allow a foam to be obtained which occupies a first volume equal to at least 15 times the volume of liquid cleaning composition sprayed, and 30 seconds after spraying, the foam occupies a second volume equal to at least 50% of the first volume.

Table 1 - Sodium hypochlorite-based products

Component	Example 1 % by weight	Example 2 % by weight	Example 3 % by weight	Example 4 % by weight	Comparative Example 5 % by weight
Sodium hypochlorite	0.7	1.0	1.5	1.2	0.8
Sodium C9 alkyl sulfate	-	-	-	3.0	-
Sodium C7-C9 alkyl sulfate		1.0	0.5		-
Sodium C12-C14 alkyl 3 ethoxy sulfate	2.0	1.5	-	-	-
Sodium lauroyl sarcosinate	-	-	-	-	1.5
Amine oxide C12/14	0.1		3.0	0.2	0.1
C12-C14 benzalkonium chloride	0.2	-	-		-
Fatty acid C12-C14- C16	0.3	0.4	0.2	0.1	0.2
Sodium silicate	0.1	0.2	0.05	0.1	0.05
Sodium hydroxide	1.0	0.8	1.0	1.0	0.7
Fragrance/Min or components*	traces	traces	traces	traces	traces
Silicone	0.001	0.002	0.005	0.001	0.0005
Water	To 100%				
All the examples have a pH above 11. * For example it is possible to add dyes, stabilisers, including merely by way of example chelators for transition metals (for example substances such as amino trimethylene phosphonic acid) and/or antioxidants (for example substances such as trimethoxybenzoic acid). Said components could also be added in higher quantities.					

Table 2 - Hydrogen peroxide-based products

Component	Example 6 % by weight	Comparative Example 7 % by weight	Comparative Example 8 % by weight	Comparative Example 9 % by weight	Comparative Example 10 % by weight
Hydrogen peroxide	2.0	7.0	5.0	4.0	3.5
Sodium C9 alkyl sulfate	3.0	-		-	-
Sodium C9-C11 alkyl benzene sulfonate	-	2.0	1.0	-	-
C12-C14 alcohol 7 ethoxylate	-	-	2.0	-	1.5
C12-C14 alcohol 3 ethoxylate	-	-	1.0	1.0	1.5
Amine oxide C12/14	0.1	-	-	2.0	0.1
Fatty acid C12-C14-C16	0.3	0.4	0.2	0.1	0.2
Chelator *	0.1	0.2	0.05	0.2	0.5
Sodium hydroxide or sulphuric acid	to pH between 2 and 6				
Fragrance/Minor components	traces	traces	traces	traces	traces
**					
Silicone	0.001	0.002	0.005	0.001	0.0005
Water	Up to 100%				
* Chelators for example belonging to the group consisting of etidronic acid, amino-trismethylenephosphonic acid, diethylene-triamine-penta methylenephosphonic acid, or any of their salts, or any of their mixtures of acids and/or salts can be added. Said components could also be added in higher quantities. ** For example dyes or stabilizers of hydrogen peroxide taken for example from the group of the phenolic antioxidants, for example BHT (butylhydroxytoluene). Said components could also be added in higher quantities.					

Table 3 - Acid products

Component	Example 11% by weight	Example 12% by weight	Comparative Example 13% by weight	Example 14% by weight	Comparative Example 15% by weight
Formic acid	2.0	2.5	1.0	-	-
Acetic acid	-	0.75		1.0	-
Citric acid	3.5	4.0	5.0	3.0	-
Phosphoric acid	-	-		-	1.0
Maleic acid	-	-	1.0	-	2.0

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(continued)

Component	Example 11% by weight	Example 12% by weight	Comparative Example 13% by weight	Example 14% by weight	Comparative Example 15% by weight
Amidosulphuric acid	-	-		-	2.5
Sodium C9-C11 alkyl benzene sulfonate	-	0.8	1.0	-	1.5
Sodium C9 alkyl sulfate	1.0	0.5	-	1.5	-
C9-C11 alcohol 8 ethoxylate	2.0	1.5	2.0	2.5	1.5
Sodium hydroxide or potassium hydroxide	to pH between 2 and 4				
Fragrance/Minor components **	traces	traces	traces	traces	traces
Water	Up to 100%				
* Dyes, preservatives such as substances that prevent microbial proliferation, e.g. Proxel TM GXL, can be added for example. Said components could also be added in higher quantities relevant in percentage terms without affecting achievement of the desired technical effect.					

Table 4 - Alkaline products

Component	Comparative Example 16 % by weight	Example 17 % by weight	Comparative Example 18 % by weight	Example 19 % by weight	Example 20 % by weight
C9-C11 alcohol 5 ethoxylate	2.0	-	-	0.5	0.75
C9-C11 alcohol 6 ethoxylate	-	2.0	-	1.0	0.75
C12-C14 alcohol 5 ethoxylate		-	2.0	0.5	-
Sodium C9 alkyl sulfate	-	1.0	-	0.8	0.5
Amine oxide C12/14	0.5	-	-	0.2	1.0
C12-C14 benzalkonium chloride			0.5		
Butoxypropanol	2.5	-	2.0	2.0	1.0
Butoxypropoxypropanol	-	3.5	1.0	2.0	1.5
Monoethanolamine, diethanolamine, triethanolamine	to pH between 8 and 12				
Fragrance/Minor components **	traces	traces	traces	traces	traces
Water	Up to 100%				
* Dyes, preservatives that prevent microbial proliferation such as Proxel [™] GXL for example. Said components could also be added in higher quantities relevant in percentage terms without affecting achievement of the desired technical effect.					

EXAMPLES 21-22

[0127] To measure the persistence of the composition of the present invention sprayed by the sprayer assembly of the present invention compared with that of the known compositions and using known sprayer assemblies, tests were performed and the persistence of the foam and the quantity of volume produced by spraying one ml of composition was measured.

[0128] The volume of foam was measured via the use of a graduated cylinder. For example, a 50 ml +/- 0.5 graduated cylinder having a height of 20 cm and an internal diameter of 2.1 cm.

[0129] The measurement was performed recording the weight of the bottle, spraying once into the cylinder, recording the height of the foam in the cylinder and the weight of the bottle after spraying, and lastly calculating the difference between the first volume and the second volume.

[0130] The difference in weight between the initial and final weight provides the quantity in grams of liquid cleaning composition sprayed. Knowing the density of the liquid, the volume in ml of the cleaning composition sprayed is calculated.

[0131] The volume of foam per ml of foam sprayed is calculated by dividing the height of the foam by the ml of product sprayed. The result of the test is the mean of 4 measurements performed with the same composition and the same bottle.

[0132] The table below shows for the present invention and for a commercial product the volumes of foam per ml of product sprayed, measured immediately after the spraying, and the percentage of foam remaining after 30 seconds using both a sprayer assembly according to the invention and a known one.

[0133] The compositions of Table 6 were used.

Table 5

Component	formulation 1 % by weight	Formulation 2 % by weight
Sodium hypochlorite	1.0	1.2
Sodium C9 alkyl sulfate	-	3.0
Secondary sodium C14-C17 alkyl sulfonate	2.0	
Amine oxide C12/14	-	0.2
Fatty acid C12-C14-C16	-	0.1
Sodium silicate	0.1	0.1
Sodium hydroxide	0.2	1.0
Fragrance/Minor components *	traces	traces
Silicone	0.001	0.001
Water	to 100%	
* Present in a quantity that does not influence the technical effect.		

[0134] The compositions in the table have a density of 1.03.
The results reported in Table 6 were obtained.

Table 6

Composition	Sprayer assembly	Volume of foam generated per ml sprayed t = 0 seconds	% of residual foam t = 30 seconds
Composition example 4 - Formulation 2 Table 5	As figure 2	28 ml	> 95%
Formulation 1 Table 5	Traditional*	< 5 ml	~ 80%
Formulation 1 Table 5	As figure 2	5 ml	~ 80%

(continued)

Composition	Sprayer assembly	Volume of foam generated per ml sprayed t = 0 seconds	% of residual foam t = 30 seconds
Formulation 2 Table 5 Composition example 4	Traditional *	9 ml	> 95%
* By traditional sprayer assembly used for the comparison we mean a sprayer assembly without chamber into which the outlet orifice leads, as in the present invention. For example, a sprayer assembly commercially available and sold for example by the producer Calmar in combination with the cleaning composition known under the brand CIF was used. In detail the sprayer therefore comprises a rear portion mounted on a sprayer body and an outlet orifice (22) through which a cleaning composition can flow to the outside, forming a spray. In front of the nozzle, however, there is no annular wall provided with a chamber as in the sprayer assembly of the present invention.			

[0135] It was ascertained that the persistence of the foam obtained with the cleaning system of the present invention allows optimal cleaning of surfaces that are difficult to clean and vertical surfaces.

[0136] From an examination of the characteristics of the cleaning system produced according to the present invention, the advantages it provides are evident.

[0137] In particular, the cleaning system according to the present invention allows also difficult surfaces to be cleaned such as vertical or very slippery surfaces.

[0138] Furthermore, the fact that the foam is persistent, i.e. maintains its volume over time, but at the same time is easy to rinse, offers an effective cleaning action with an easy-to-use product.

[0139] Furthermore the cleaning system is easy to produce and requires only small modifications with respect to the traditional cleaning systems.

Claims

1. A cleaning system comprising a bottle (2), a sprayer assembly (3) and a liquid cleaning composition contained inside said bottle (2), said sprayer assembly being fixed to said bottle (2) and comprising a priming tube (13), a trigger (15) and a nozzle (20), said sprayer assembly (3) being manually operable to expel said liquid cleaning composition from said nozzle, said liquid cleaning composition comprising at least one surfactant comprising an alkyl sulfate, **characterized in that** said cleaning system produces a spray which forms a foam, said foam occupying a first volume equal to at least 15 times the sprayed liquid cleaning composition, and **in that** said foam occupies a second volume equal to at least 50% of said first volume 30 seconds after said spraying, and **in that** said nozzle (20) comprises a rear portion (21) mounted on a sprayer body (10), an outlet orifice (22) through which said cleaning composition may flow out forming a spray, and a front portion (24), which defines a chamber (25) into which said outlet orifice leads, said chamber being laterally delimited by an annular wall (26) protruding from said rear portion (21) and said chamber comprising at least one opening (30) and said at least one opening (30) occupying a zone having an angular extension comprised between 45° and 180°.
2. A cleaning system according to claim 1, **characterized in that** said second volume is equal to at least 75% of said first volume.
3. A cleaning system according to claim 1, **characterized in that** said second volume is equal to at least 90% of said first volume.
4. A cleaning system according to any one of the claims from 1 to 3, **characterized in that** said first volume is equal to at least 20 times the volume of the sprayed liquid cleaning composition.
5. A cleaning system according to any one of the claims from 1 to 3, **characterized in that** said first volume is equal to at least 25 times the volume of the sprayed liquid cleaning composition.
6. A cleaning system according to any one of the preceding claims, **characterized in that** the total weight of the surfactant present in said cleaning composition is comprised between 0.5 and 5% by weight.
7. A cleaning system according to any one of the preceding claims, **characterized in that** it comprises a whitener.

8. A cleaning system according to claim 7, **characterized in that** said whitener comprises a sodium hypochlorite.
9. A cleaning system according to any one of the preceding claims, **characterized in that** it comprises hydrogen peroxide.
10. A cleaning system according to any one of the preceding claims, **characterized in that** it comprises sodium hydroxide.
11. A cleaning system according to any one of the preceding claims, **characterized in that** it comprises an organic solvent.
12. A cleaning system according to any one of the preceding claims, **characterized in that** it comprises an acid.
13. A cleaning system according to claim : 12, **characterized in that** said chamber (25) comprises a first (30) and a second opening (31).
14. A cleaning system according to claim 13, **characterized in that** said at least one opening (30) occupies from 10% to 75% of the axial extension of said annular wall (26).

Patentansprüche

1. Ein Reinigungssystem aufweisend eine Flasche (2), eine Sprüheinrichtung (3) und eine im Inneren der Flasche (2) enthaltene Reinigungszusammensetzung, wobei die Sprüheinrichtung an der Flasche (2) befestigt ist und ein Ansaugrohr (13), ein Auslöser (15) und eine Sprühdüse (20) aufweist, und die Sprüheinrichtung (3) manuell betätigbar ist, um die Reinigungszusammensetzung aus der Sprühdüse auszustößen, wobei die Reinigungszusammensetzung mindestens einen oberflächenaktiven Stoff aufweisend ein Alkylsulfat aufweist, **dadurch gekennzeichnet, dass** das Reinigungssystem ein Spray produziert, das einen Schaum bildet, wobei der Schaum ein erstes Volumen einnimmt, das mindestens dem 15-fachen der versprühten Reinigungszusammensetzung entspricht, und dass der Schaum 30 Sekunden nach dem Sprühen ein zweites Volumen einnimmt, das mindestens 50% des ersten Volumens entspricht, und dass die Sprühdüse (20) ein rückwärtiges Teil (21), das an einem Sprühkopf (10) befestigt ist, eine Auslassöffnung (22), durch die diese Reinigungszusammensetzung ein Spray bildend herausströmen kann, und ein vorderes Teil (24), das eine Kammer (25) bildet, in die diese Auslassöffnung übergeht, aufweist, wobei die Kammer lateral durch eine ringförmige Wand (26) unterteilt ist, die sich von dem rückwärtigen Teil (21) erstreckt, und diese Kammer mindestens eine Öffnung (30) aufweist und die mindestens eine Öffnung (30) einen Bereich einnimmt, der einen Winkelbereich hat, der zwischen 45° und 270° liegt.
2. Ein Reinigungssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Volumen mindestens 75% des ersten Volumens entspricht.
3. Ein Reinigungssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** das zweite Volumen mindestens 90% des ersten Volumens entspricht.
4. Ein Reinigungssystem nach irgendeinem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** erste Volumen mindestens dem 20-fachen des Volumens der versprühten Reinigungszusammensetzung entspricht.
5. Ein Reinigungssystem nach irgendeinem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** erste Volumen mindestens dem 25-fachen des Volumens der versprühten Reinigungszusammensetzung entspricht.
6. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Gesamtgewicht des in dieser Reinigungszusammensetzung enthaltenen oberflächenaktiven Stoffs zwischen 0,5 und 5 Gewichtsprozent liegt.
7. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses einen Weißmacher aufweist.
8. Ein Reinigungssystem nach Anspruch 8, **dadurch gekennzeichnet, dass** der Weißmacher ein Natriumhypochlorit aufweist.

9. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses Wasserstoffperoxid aufweist.
10. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses Natriumhydroxid aufweist.
11. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses ein organisches Lösungsmittel aufweist.
12. Ein Reinigungssystem nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dieses eine Säure aufweist.
13. Ein Reinigungssystem nach Anspruch 13, **dadurch gekennzeichnet, dass** die Kammer (25) eine erste (30) und eine zweite Öffnung (31) aufweist.
14. Ein Reinigungssystem nach Anspruch 14, **dadurch gekennzeichnet, dass** die mindestens eine Öffnung (30) zwischen 10 und 75% der axialen Ausdehnung dieser ringförmigen Wand (26) einnimmt.

Revendications

1. Système de nettoyage comprenant une bouteille (2), un ensemble pulvérisateur (3) et une composition de nettoyage liquide contenue à l'intérieur de ladite bouteille (2), ledit ensemble pulvérisateur étant fixé à ladite bouteille (2) et comprenant un tube d'amorçage (13), une gâchette (15) et une buse (20), ledit ensemble pulvérisateur (3) pouvant être actionné manuellement pour expulser ladite composition de nettoyage liquide de ladite buse, ladite composition de nettoyage liquide comprenant un sulfate d'alkyle, **caractérisé en ce que** ledit système de nettoyage produit un spray qui forme une mousse, ladite mousse occupant un premier volume égal à au moins 15 fois la composition de nettoyage liquide pulvérisée, et **en ce que** ladite mousse occupe un deuxième volume égal à au moins 50% dudit premier volume 30 secondes après ladite pulvérisation, et **en ce que** ladite buse (20) comprend une partie arrière (21) montée sur un corps de pulvérisateur (10), un orifice de sortie (22) à travers lequel ladite composition de nettoyage peut s'écouler en formant un spray, et une partie avant (24), qui définit une chambre (25) dans laquelle ledit orifice de sortie conduit, ladite chambre étant délimitée latéralement par une paroi annulaire (26) faisant saillie de ladite partie arrière (21) et ladite chambre comprenant au moins une ouverture (30) et ladite au moins une ouverture (30) occupant une zone ayant une extension angulaire comprise entre 45 ° et 180 °.
2. Système de nettoyage selon la revendication 1, **caractérisé en ce que** ledit deuxième volume est égal à au moins 75% dudit premier volume.
3. Système de nettoyage selon la revendication 1, **caractérisé en ce que** ledit deuxième volume est égal à au moins 90% dudit premier volume.
4. Système de nettoyage selon l'une des revendications 1 à 3, **caractérisé en ce que** ledit premier volume est égal à au moins 20 fois le volume de la composition de nettoyage liquide pulvérisée.
5. Système de nettoyage selon l'une des revendications 1 à 3, **caractérisé en ce que** ledit premier volume est égal à au moins 25 fois le volume de la composition de nettoyage liquide pulvérisée.
6. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce que** le poids total du surfactant présent dans ladite composition de nettoyage est compris entre 0,5 et 5% en poids.
7. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce qu'il** comprend un agent de blanchiment.
8. Système de nettoyage selon la revendication 7, **caractérisé en ce que** ledit agent de blanchiment comprend un hypochlorite de sodium.
9. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce qu'il** comprend du peroxyde d'hydrogène.

10. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce qu'il** comprend de l'hydroxyde de sodium.

5 11. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce qu'il** comprend un solvant organique.

12. Système de nettoyage selon l'une des revendications précédentes, **caractérisé en ce qu'il** comprend un acide.

10 13. Système de nettoyage selon la revendication 12, **caractérisé en ce que** ladite chambre (25) comprend une première (30) et une seconde ouverture (31).

14. Système de nettoyage selon la revendication 13, **caractérisé en ce que** ladite au moins une ouverture (30) occupe de 10% à 75% de l'extension axiale de ladite paroi annulaire (26).

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FIG. 1

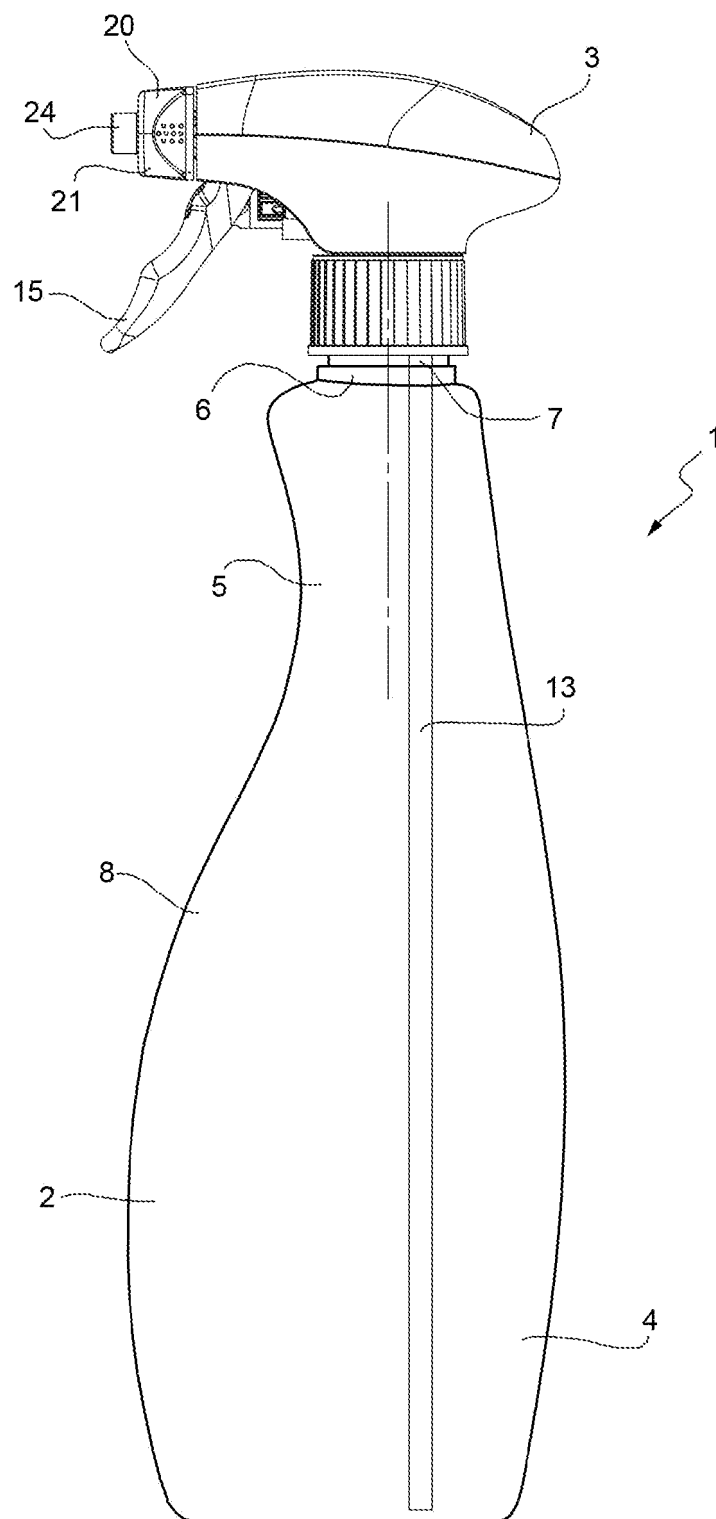


FIG. 2

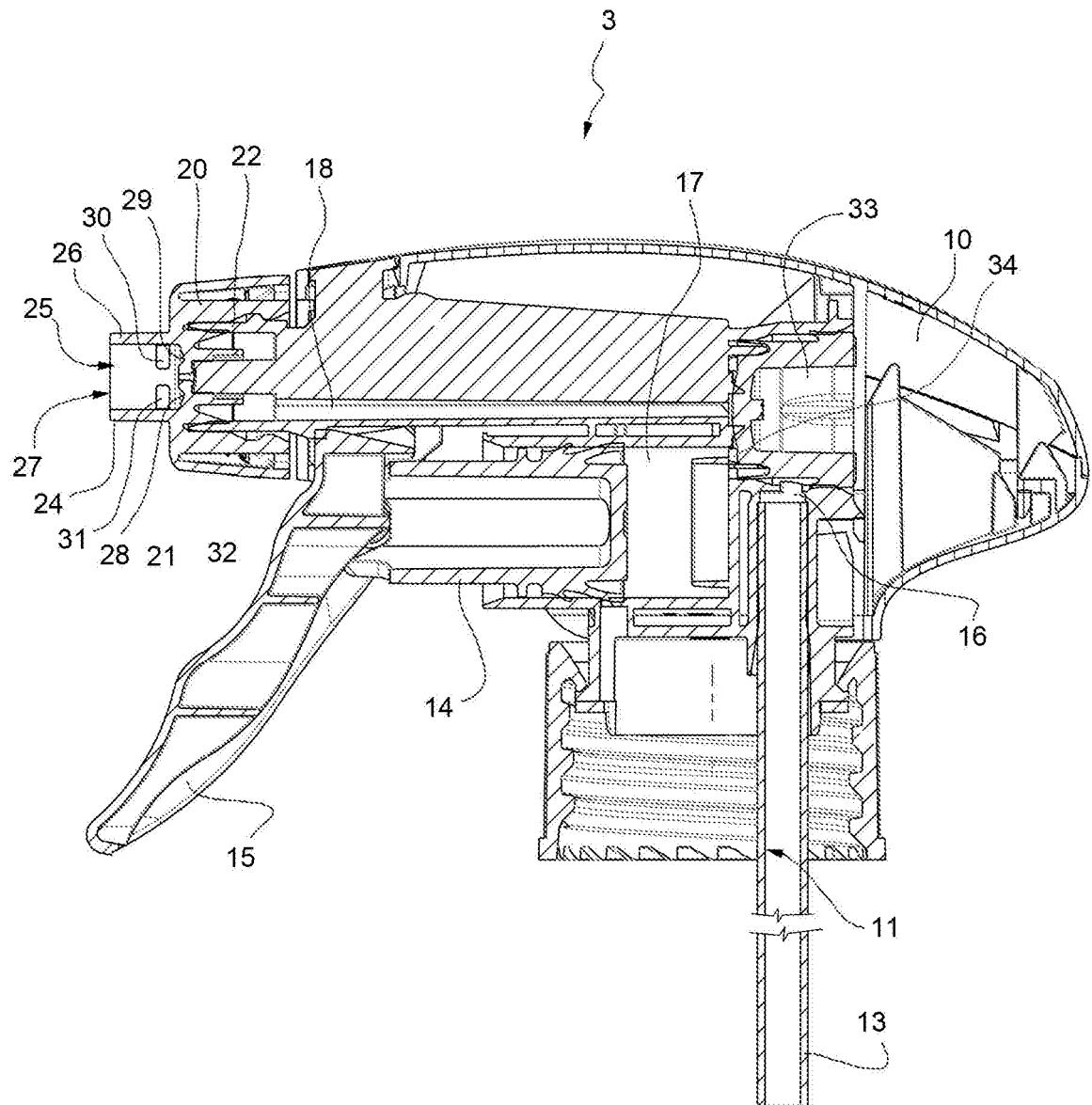
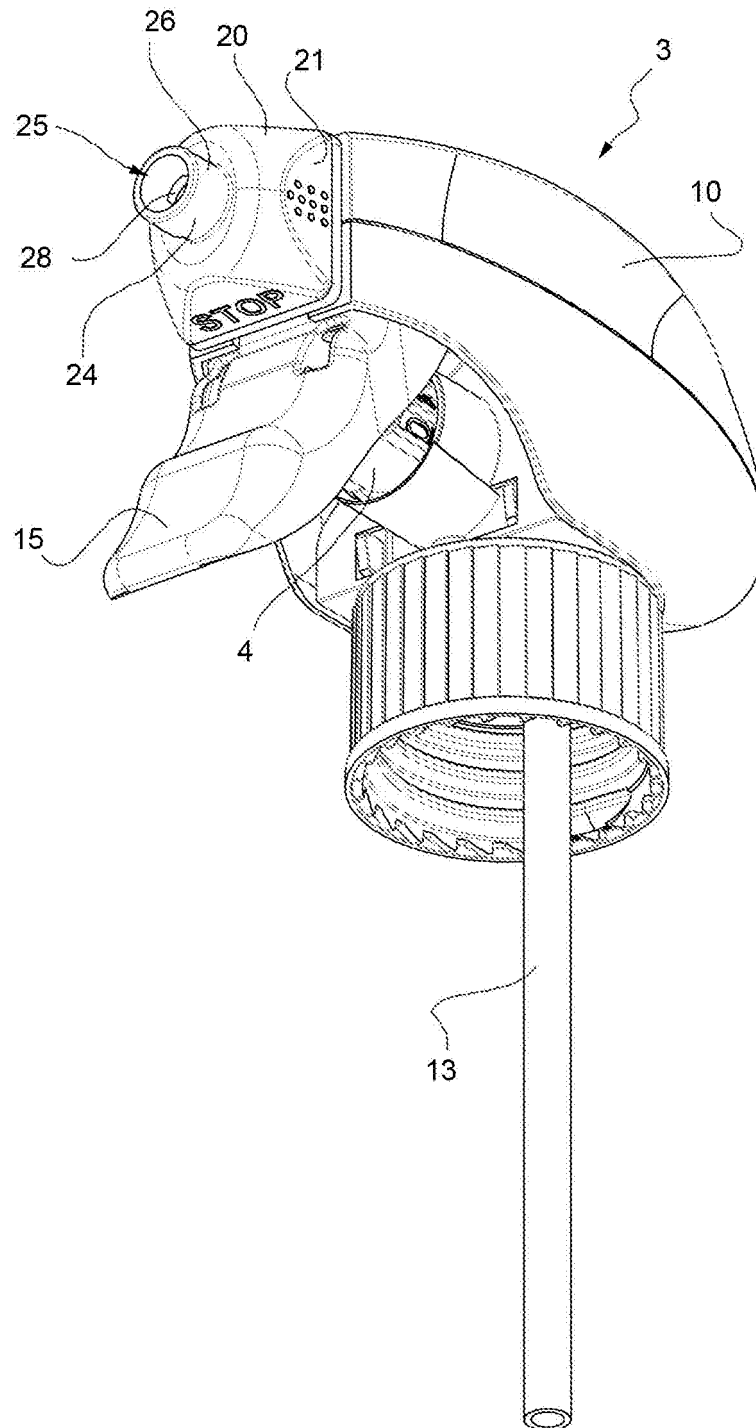


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

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