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(54) **HOUSEHOLD CLEANING TOOL WITH IMPROVED LEAKAGE RESISTANCE**

HAUSHALTSREINIGUNGSUTENSIL MIT VERBESSERTEM SCHUTZ GEGEN AUSLAUFEN  
OUTIL DE NETTOYAGE MENAGER A RESISTANCE AUX FUITES AMELIOREE

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(73) Proprietors:  
• **UNILEVER PLC**  
**London EC4P 4BQ (GB)**  
Designated Contracting States:  
**CY GB IE**  
• **UNILEVER N.V.**  
**3013 AL Rotterdam (NL)**  
Designated Contracting States:  
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(72) Inventor: **NEWBOULD, Peter James,**  
**Lever Faberge Italia SpA**  
**I-26841 Casalpuusterlengo (Lodi) (IT)**

(74) Representative: **Rosen Jacobson, Frans Lucas M.**  
**et al**  
**Unilever Patent Group**  
**Olivier van Noortlaan 120**  
**3133 AT Vlaardingen (NL)**

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**WO-A-01/65969**                      **DE-A- 10 001 182**

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## Description

### Field of the Invention

**[0001]** This invention relates to a household cleaning tool which incorporates a reservoir for containing household cleaning fluid and which has improved resistance to accidental leakage or dripping of the contained household cleaning fluid when the tool is not in use.

### Background of the Invention

**[0002]** When cleaning bathroom fixtures such as toilets or urinals, the use of a bottle of cleaning liquid in combination with a cleaning tool such as a brush, results in considerable wastage due to factors such as lack of controlled dosage and use of excess cleaning liquid. The two-step process of application of cleaning liquid to the surface to be treated, followed by cleaning with the brush, is also time-consuming and laborious.

**[0003]** Cleaning tools which incorporate reservoirs of cleaning liquid, have been proposed as a convenient way to avoid these problems.

**[0004]** However, the corrosive or irritant nature of some cleaning products means that is especially important to avoid accidental leakage of cleaning liquid from the dispensing end of the cleaning tool when it is not in use. Otherwise there is a risk that the cleaning liquid may come into contact with skin, clothing or other surfaces which are not intended to be treated.

**[0005]** A problem with many of the prior devices with cleaning liquid reservoirs is that they do not sufficiently prevent such accidental leakage.

**[0006]** As an example, US 4,875,791 illustrates a liquid dispensing brush. However, since this design contains no flow control mechanism, it requires that the brush head be kept higher than the reservoir while not in use, or else the liquid flows unobstructed to the brush head. This makes the design impractical for most bathroom cleaning uses since most people store their toilet bowl and other bathroom brushes standing or hanging with the brush head below the handle.

**[0007]** Consequently such devices have not found particular favour with the consumer and the "traditional" system of separate liquid and brush is still in widespread usage.

**[0008]** WO01/65969 discloses a brush with an integrated cleaning liquid reservoir, in which a piston pump is used to forward cleaning liquid from the reservoir to a discharge opening in the brush head. In preferred embodiments according to this publication, the pump forms the mechanical connection between the brush handle and the brush head, and the dispensing of cleaning liquid is effected by movement between the brush handle and the brush head in the axial direction of the brush handle. In use, the cleaning liquid travels from within the chamber of the pump towards a single discharge opening via a passage which extends axially through the core of the

brush head. As a solution to the problem of leakage, it is proposed to reduce the length of the passage as far as possible, by locating the pump in the area between the handle and the head of the brush. Also, it is preferred to integrate a spring assisted ball check valve into the pump, or downstream of the pump, which serves to block the passage when the brush is not in use.

**[0009]** A problem with the above arrangement is that the constraints on the location of the pump may make sizing and manufacture of the pump and its components difficult (for example, if the area between the handle and the head of the brush is small or narrow due to the design of the brush). Also the incorporation of spring assisted ball check valves represents an extra expense.

### Summary of the Invention

**[0010]** The invention provides a replaceable cleaning head for use with a cleaning tool and a household cleaning tool which comprises an elongate housing incorporating a reservoir for household cleaning fluid, the housing having at one end said cleaning head, the cleaning head forming a hollow chamber which is in fluid communication with the reservoir and which is provided with at least one outlet for the dispensation of the household cleaning fluid, characterised in that the hollow chamber formed by the cleaning head contains a space-filler insert plug.

**[0011]** The space-filler insert plug serves to minimise the volume of fluid accommodating space inside the hollow chamber of the cleaning head and therefore reduces dripping and leakage by controlling the volume and distribution of household cleaning fluid in the cleaning head when the tool is not in use.

**[0012]** The cleaning head of the invention is also much easier to manufacture by injection moulding than a cleaning head which is in the form of a solid core with a single liquid passage, as is described in WO01/65969. Such a solid core with single passage would be very difficult to injection mould because of the thickness of the plastic involved, which would be slow to cool and prone to shrinkage during cooling. The injection moulding process requires quick cooling of the molten plastic, because otherwise it becomes necessary to shut down the injection moulding machinery periodically to permit cooling, which is inefficient and may make the process economically infeasible on a large scale. By contrast, the cleaning head of the invention can be made with relatively thin plastic walls.

**[0013]** A further advantage of the cleaning head of the invention is that it can be provided with a number of outlets for the dispensation of the household cleaning fluid, instead of a single outlet. This enables a more uniform and complete distribution of household cleaning fluid onto the exterior surfaces of the cleaning head when the tool is in use, and therefore more efficient cleaning, especially of areas such as toilet bowls where thorough cleaning of the entire surface is important. In a cleaning

head which is in the form of a solid core with a single outlet, as is described in WO01/65969, it would be very difficult to provide further outlets because such outlets would have to be drilled with precision through the entire wall thickness of the solid core.

#### Preferred Embodiments and Detailed Description of the Invention

**[0014]** The space-filler insert plug controls dripping and leakage by minimising the volume of space inside the hollow chamber of the cleaning head which is available to accommodate fluid, and therefore controlling the volume and distribution of household cleaning fluid in the cleaning head when the tool is not in use.

**[0015]** Accordingly, the space-filler insert plug is of suitable dimensions so that it forms a sufficiently close fit with the interior surface of the hollow chamber of the cleaning head in order to minimise the volume of fluid accommodating space as far as possible without actually preventing the flow of household cleaning fluid when the cleaning tool is actuated into a dispensing position. Actuation of the cleaning tool is typically via a piston pump, squeeze chamber or the like which serves to apply an overpressure to the household cleaning fluid, thereby forwarding it from the hollow chamber of the cleaning head to the outlet for its dispensation to the exterior surfaces of the cleaning head.

**[0016]** In a preferred embodiment, the space-filler insert plug is provided with projections on its surface, which projections make a flush fit with the interior surface of the hollow chamber of the cleaning head. This arrangement therefore leaves areas between the individual projections which can accommodate the flow of a thin layer of household cleaning fluid. The projections are suitably in the form of studs, ribs, nodules or the like.

**[0017]** In a most preferred embodiment, the hollow chamber of the cleaning head and the space-filler insert plug are both of a generally cylindrical shape, and the plug fits concentrically inside the chamber. The plug is provided with longitudinal rows of studs, which studs make a flush fit with the interior surface of the chamber of the cleaning head. Since the studs only project to a small extent radially outward in relation to the surface of the space-filler insert plug, the fluid accommodating space can be minimised without preventing household cleaning fluid flow.

**[0018]** The space-filler insert plug may be solid or hollow and may suitably be made of plastic, foam or any other material which is easily formed and resistant to attack from the chemicals in household cleaning fluids. Preferred are rigid plastics materials.

**[0019]** The cleaning head of the household cleaning tool according to the invention is typically provided on its exterior surface with a suitable scrubbing means.

**[0020]** Preferably the scrubbing means constitutes an array of bristles or synthetic bristles located on the exterior surface of the cleaning head.

**[0021]** The bristles may be fastened to the cleaning head according to techniques known in the art such as fusing-on or staple-setting.

**[0022]** Most preferably the bristles are arranged in tufts, and fluid continuous channels lead from the interior of the cleaning head to the base of each of the tufts of bristles on the cleaning head. These channels therefore form outlets for the dispensation of the household cleaning fluid. This arrangement provides an additional hygiene benefit since it ensures that the cleaning fluid comes into contact with the base of each of the tufts of bristles, enabling uniform coating of the entire bristle array.

**[0023]** The uniform coating of the bristle array ensures as a consequence that the household cleaning fluid is applied more efficiently and thoroughly to the surface to be treated. Also, it enables the tool to stay hygienically clean and fresh between uses, due to the residual hygiene effect of the coating.

**[0024]** It is preferred to use transparent or translucent bristle tufts to enable visualisation of the uniform coating of cleaning fluid on the bristle array.

**[0025]** The orientation of the bristle tufts is also important for improved resistance to leakage and dripping. It is preferred to locate bristle tufts on the sidewalls of the cleaning head as well as the tip of the cleaning head, because the former are less subject to leakage when not in use due to gravity-influenced drainage. A distribution of bristle tufts over all surfaces of the cleaning head of bristle tufts is also more efficient for cleaning hard-to-reach areas.

**[0026]** It is also preferred to set the bristle tufts into the wall of the cleaning head so that they serve to plug the fluid channel which extends from the interior of the cleaning head through the wall of the cleaning head to the bristle. This improves resistance to leakage and dripping by reducing the space inside the cleaning head which is available to be accommodated by fluid.

**[0027]** Thixotropic household cleaning fluids are preferred for use in conjunction with the tool according to the invention, since these may be pumped without running or dripping after pumping, which provides further anti-leak protection.

**[0028]** In a preferred household cleaning tool according to the invention, a piston pump forms the mechanical connection between the reservoir for household cleaning fluid and the cleaning head, and the dispensing of household cleaning fluid is effected by movement between the reservoir and the cleaning head in the axial direction of the reservoir. Most preferably the reservoir for household cleaning fluid is in the form of a cartridge which is reversibly interengageable with the housing so that the cartridge can simply be removed when empty of household cleaning fluid and replaced with a full one which is sold as a refill.

**[0029]** The cleaning head may also be a separate component which is releasably secured to the housing, e.g. by means of a screw or snap-fit connection, so that it is

replaceable by a new cleaning head in the event that the scrubbing means on its surface wears out.

**[0030]** A specific example of a household cleaning tool according to the invention is shown in the accompanying figures, in which:

Figure 1 is a longitudinal cross-section showing a household cleaning tool according to the invention, showing the space-filling insert plug, and

Figure 2 shows a developed view of the cleaning head of the tool of Figure 1.

**[0031]** In the figures, like numerals represent like parts.

**[0032]** Referring to Figure 1, a household cleaning tool (1) is seated in a storage pot (2), and has an elongate housing (3) which is in the form of a rigid sleeve furnished with an inclined handle (4) and a cleaning head (5). A springloaded piston pump (6) is located in the base of the main body of the housing (3).

**[0033]** The cleaning head (5) consists of a generally cylindrical hollow chamber (7), which is contained by a wall member (8) having an interior surface (8a) and an exterior surface (8b). A plurality of fluid continuous channels, four of which are shown representatively as (9), lead from the interior surface (8a) to the exterior surface (8b) of the cleaning head (5), which exterior surface (8b) is provided with an array of bristles arranged in tufts. The bristle tufts are distributed uniformly around the sides and tip of the cleaning head, and are set into the wall member (8) of cleaning head (5) so that they plug the fluid channels (9). Four of these bristle tufts are shown representatively as (10).

**[0034]** As is further illustrated in Figure 2, a space-filling insert plug (11) fits concentrically inside the chamber (7). The plug (11) is provided with four equally spaced longitudinal rows of studs (12) which form a flush fit against the interior surface (8a) of the chamber (7) of the cleaning head (5). Since the studs (12) only project to a small extent radially outward in relation to the surface of the space-filler insert plug (11) the fluid accommodating space can be minimised without preventing household cleaning fluid flow.

**[0035]** A rigid elongate axisymmetric cartridge (13) containing household cleaning fluid is located in the sleeve of the housing (3) and is connected with the housing (3) by means of a bayonet-type coupling between recesses (14) which are provided on the neck of the cartridge (13) with corresponding projections (15) which are provided on an annular connection socket (16) which is located at the base of the sleeve of the housing (3) above the pump (6). A hollow needle (17) is provided between the pump (6) and the cartridge (13), so that when the cartridge (13) is screwed into place, the needle (17) penetrates a flexible silicone sealing septum (18), which seals the neck of the cartridge (13). This allows cleaning fluid to enter the pump (6) through the hollow needle (17).

**[0036]** In order to operate the tool (1) the cartridge (13)

is pushed down axially in the direction of the cleaning head (5) which causes the pump (6) to be actuated, thereby transferring household cleaning fluid from the cartridge (13) through the channels (9) to the array of bristle tufts (10). The spring-loading of the pump (6) returns the cartridge (13) to its starting position after the pump stroke.

## Claims

1. A household cleaning tool (1) which comprises an elongate housing (3) incorporating a reservoir (13) for household cleaning fluid, the housing (3) having at one end a cleaning head (5), the cleaning head (5) forming a hollow chamber (7) which is in fluid communication with the reservoir (13) and which is provided with at least one outlet (9) for the dispensation of the household cleaning fluid, **characterised in that** the hollow chamber (7) formed by the cleaning head (5) contains a space-filler insert plug (11).
2. A cleaning tool (1) according to claim 1, in which the space-filler insert plug (11) is provided with projections (12) on its surface, which projections (12) make a flush fit with the interior surface (8a) of the hollow chamber (7) of the cleaning head (5).
3. A cleaning tool (1) according to claim 1 or claim 2, in which the hollow chamber (7) of the cleaning head (5) and the space-filler insert plug (11) are both of a generally cylindrical shape, the plug (11) fits concentrically inside the chamber (7), and the plug (11) is provided with longitudinal rows of studs (12), which studs (12) make a flush fit with the interior surface (8a) of the chamber (7) of the cleaning head (5).
4. A cleaning tool (1) according to any one of claims 1 to 3, in which the cleaning head (5) is provided on its exterior surface (8b) with an array of bristles or synthetic bristles (10).
5. A replaceable cleaning head (5) for use with a cleaning tool (1) according to any one of claims 1 to 4, said cleaning head (5) forming a hollow chamber (7) for fluid communication with the reservoir (13) of the cleaning tool (1) and being provided with at least one outlet (9) for the dispensation of a household cleaning fluid, **characterised in that** the hollow chamber (7) formed by the cleaning head (5) contains a space-filler insert plug (11).

## Patentansprüche

1. Haushaltsreinigungswerkzeug (1), das ein langgestrecktes Gehäuse (3) umfasst, welches einen Behälter (13) für Haushaltsreinigungswasser einschließt,

- wobei das Gehäuse (3) an einem Ende einen Reinigungskopf (5) aufweist, wobei der Reinigungskopf (5) eine hohle Kammer (7) bildet, die mit dem Behälter (13) in Fluidverbindung steht und die mit mindestens einem Auslass (9) zur Abgabe des Haushaltsreinigungsfluids versehen ist, **dadurch gekennzeichnet, dass** die vom Reinigungskopf (5) gebildete hohle Kammer (7) einen raumfüllenden Einsatzstopfen (11) enthält.
2. Reinigungsutensil (1) nach Anspruch 1, bei dem der raumfüllende Einsatzstopfen (11) auf seiner Oberfläche mit Vorsprüngen (12) versehen ist, welche Vorsprünge (12) einen bündigen Sitz mit der inneren Oberfläche (8a) der hohlen Kammer (7) des Reinigungskopfs (5) herstellen.
  3. Reinigungsutensil (1) nach Anspruch 1 oder Anspruch 2, bei dem die hohle Kammer (7) des Reinigungskopfs (5) und der raumfüllende Einsatzstopfen (11) beide von einer allgemein zylindrischen Gestalt sind, der Stopfen (11) konzentrisch ins Innere der Kammer (7) passt und der Stopfen (11) mit längs verlaufenden Reihen von Stollen (12) versehen ist, welche Stollen (12) einen bündigen Sitz mit der inneren Oberfläche (8a) der Kammer (7) des Reinigungskopfs (5) herstellen.
  4. Reinigungsutensil (1) nach einem der Ansprüche 1 bis 3, bei dem der Reinigungskopf (5) auf seiner äußeren Oberfläche (8b) mit einer Anordnung von Borsten oder Synthetikborsten (10) versehen ist.
  5. Austauschbarer Reinigungskopf (5) zur Verwendung mit einem Reinigungsutensil (1) nach einem der Ansprüche 1 bis 4, wobei der Reinigungskopf (5) eine hohle Kammer (7) zur Fluidverbindung mit dem Behälter (13) des Reinigungsutensils (1) bildet und mit mindestens einem Auslass (9) zur Abgabe eines Haushaltsreinigungsfluids versehen ist, **dadurch gekennzeichnet, dass** die vom Reinigungskopf (5) gebildete hohle Kammer (7) einen raumfüllenden Einsatzstopfen (11) enthält.
2. Outil de nettoyage (1) selon la revendication 1, dans lequel l'obturateur d'insertion de remplissage de l'espace (11) est muni de saillies (12) sur sa surface, lesquelles saillies (12) forment un ajustement encasté avec la surface intérieure (8a) de la chambre creuse (7) de la tête de nettoyage (5).
  3. Outil de nettoyage (1) selon la revendication 1 ou 2, dans lequel la chambre creuse (7) de la tête de nettoyage (5) et l'obturateur d'insertion de remplissage d'espace (11) sont tous deux de forme généralement cylindrique, l'obturateur (11) s'adaptant de manière concentrique à l'intérieur de la chambre (7), et l'obturateur (11) étant muni de rangées longitudinales de crampons (12), lesquels crampons (12) forment un ajustement encasté avec la surface intérieure (8a) de la chambre (7) de la tête de nettoyage (5).
  4. Outil de nettoyage (1) selon l'une quelconque des revendications 1 à 3, dans lequel la tête de nettoyage (5) est munie sur sa surface extérieure (8b) d'une rangée de poils ou de poils synthétiques (10).
  5. Tête de nettoyage remplaçable (5), à utiliser avec un outil de nettoyage (1) selon l'une quelconque des revendications 1 à 4, ladite tête de nettoyage (5) formant une chambre creuse (7) pour une communication fluïdique avec le réservoir (13) de l'outil de nettoyage (1) et étant munie d'au moins une sortie (9) pour la distribution d'un liquide de nettoyage ménager, **caractérisée en ce que** la chambre creuse (7) formée par la tête de nettoyage (5) contient un obturateur d'insertion de remplissage d'espace (11).

## Revendications

1. Outil de nettoyage ménager (1) qui comprend un logement allongé (3) incorporant un réservoir (13) pour liquide de nettoyage ménager, le logement (3) comportant à une extrémité une tête de nettoyage (5), la tête de nettoyage (5) formant une chambre creuse (7) qui est en communication fluïdique avec le réservoir (13) et qui est munie d'au moins une sortie (9) pour la distribution du liquide de nettoyage ménager, **caractérisé en ce que** la chambre creuse (7) formée par la tête de nettoyage (5) contient un obturateur d'insertion de remplissage d'espace (11).

Fig.1.

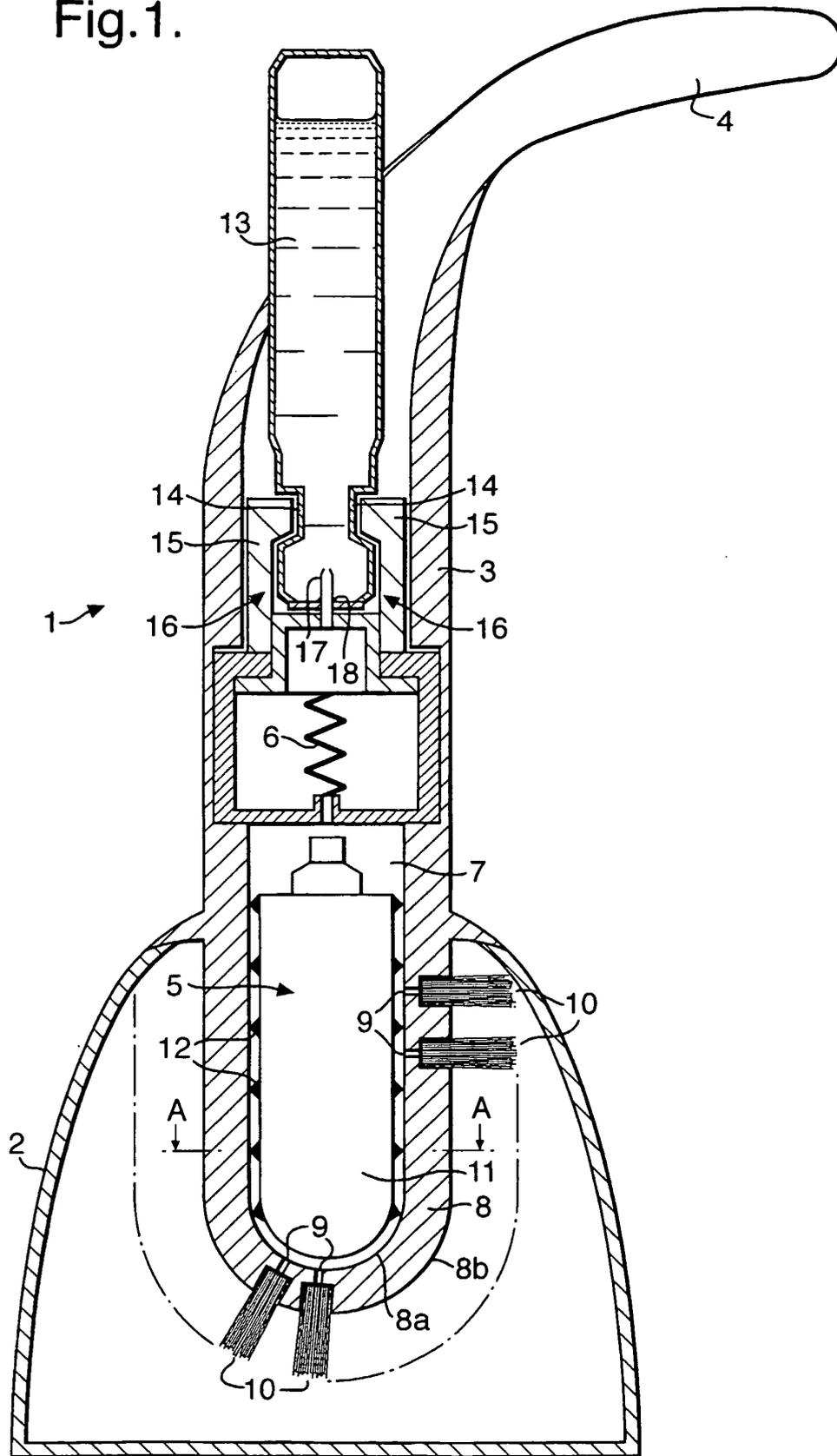


Fig.2.

