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

(11) EP 1 477 098 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.11.2004 Bulletin 2004/47

(51) Int Cl.[7]: **A47K 11/10**

(21) Application number: **03291143.0**

(22) Date of filing: **15.05.2003**

(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 PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

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(54) **Cleaning assembly**

(57) A cleaning assembly comprises a cleaning article and a housing for stowing the cleaning article, wherein the cleaning article has a handle (2) and a cleaning head (4), the cleaning head being releasably located at the distal end of the handle, wherein the housing contains an upright stack of replacement cleaning heads. The cleaning heads are of compact, preferably lozenge form, and are degraded by water. After use a cleaning head is released into the waste water and a replacement cleaning head is engaged from the stack.

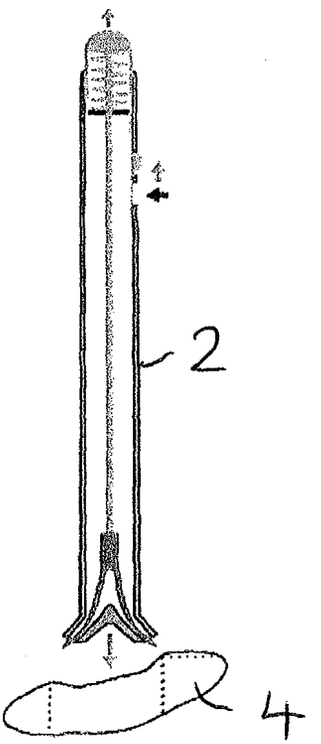

Fig.1c

EP 1 477 098 A1

Description

[0001] The present invention relates to cleaning apparatus, and to a method of cleaning using such apparatus. It relates particularly, though not exclusively, to an apparatus and method for cleaning a toilet bowl.

[0002] Known toilet brushes have a handle to one of which is fixedly attached a brush head. The toilet brush is normally stowed upright, brush lowermost, in a cylindrical housing, from which it is withdrawn, for use. There is no provision for replacing the brush head. Such articles are perceived as being unpleasant to use, and unhygienic.

[0003] Toilet brushes have been proposed, with brush heads that are replaceable, at least in part. For example in GB-A-2371474 there is described a toilet brush with a removable cleaning sleeve which fits over a bristle head.

[0004] In WO 01/43618 there is described a cleaning device having a disposable cleaning head, which dissolves in liquid so that it can be flushed away after use. The cleaning head is shown as having a series of parallel tubes. A refill package is shown, having an array of cleaning heads, arranged side-by-side. However, the bulk of the refill package, with its array of cleaning heads, themselves individually bulky, is a significant practical disadvantage, and an impediment to the commercial utilisation of the device.

[0005] It would be desirable to provide cleaning apparatus suitable for cleaning a toilet bowl, and which is of a more compact, practical nature.

[0006] In accordance with a first aspect of the present invention there is provided a cleaning assembly comprising a cleaning article and a housing for stowing the cleaning article, wherein the cleaning article has a handle and a cleaning head, the cleaning head being releasably located at the distal end of the handle, wherein the housing contains a stack of replacement cleaning heads.

[0007] The term "stack" denotes that the housing contains a collection of cleaning heads having a vertical dimension; as distinct from the side-by-side arrangement of WO 01/43618.

[0008] In one embodiment a stack may comprise a collection of cleaning heads in a linear array, preferably in a substantially vertical column, one above the other.

[0009] In another embodiment a stack may comprise a collection of cleaning heads extending in three dimensions. The cleaning heads could be arranged in a repeating three-dimensional array but preferably form a random heap.

[0010] Preferably the handle is stowed in the housing without a cleaning head attached thereto.

[0011] Preferably the handle is stowed in the housing in a compartment which does not contain cleaning heads.

[0012] Preferably the housing provides a first zone for stowing the cleaning article (or, more preferably, just the handle thereof) and a second zone for storing a stack of replacement cleaning heads. Preferably those zones are separated by an impermeable upright barrier.

[0013] A housing may be designed for storing a plurality of stacks of replacement cleaning heads.

[0014] Preferably the cleaning head at the distal end of the handle may be released by a mechanical action of the user applied remotely from the cleaning head. Preferably there is a release mechanism which includes an actuator located at or towards the proximal end of the handle.

[0015] In one embodiment the actuator is coupled to a rod having one or more prongs at its distal end. The user advances the rod and drives the prong(s) into a replacement cleaning head, to couple it to the handle. Preferably there are two prongs which enter the cleaning head on non-parallel paths. For example they may be flexible, and may splay, as they enter the cleaning head. The reverse movement retracts the rod and withdraws the prong(s) from the cleaning head when it is to be replaced. Preferably it can then fall from the handle, into the toilet bowl, and be flushed away.

[0016] In another embodiment the user causes a rod to rotate and the rod has a screw or auger-type head to engage the cleaning head. Reverse movement withdraws the auger-type head from the cleaning head, allowing the latter to fall away.

[0017] In another embodiment the user causes a pinching action at the distal end of the handle, and by means of this pinching action the replacement cleaning head may be engaged. When the action is reversed the pinching action ceases and the cleaning head can drop away from the handle, into the toilet bowl, and be flushed away. The cleaning head may have a projection which is the part to be pinched, to assist this operation.

[0018] Preferably the cleaning heads are of a shape such that they can be stacked together compactly. Preferably when there is a projection from one surface there may be a complementary recess in the opposite surface.

[0019] Preferably when a cleaning head is released it may drop from the handle without the user having to touch it.

[0020] Preferably, a replacement cleaning head can be engaged without the user having to touch it.

[0021] The user may cause a used cleaning head to be released from the handle and a replacement cleaning head to be coupled to the handle by a mechanical action. In certain embodiments this may be a purely mechanical action.

[0022] A purely mechanical action may involve the user applying a force throughout the action. Alternatively it may be of a type such that one mechanical action may store energy (for example in a spring) which can assist the following mechanical action. For example the action of releasing the head may store energy in a mechanism which can "drive" or assist the subsequent action, of engaging the replacement head; or vice-versa.

[0023] In alternative embodiments the release or coupling of a cleaning head may occur by an electro-mechanical action, preferably with the user initiating the release or engagement action and some or all of the rest of the release or engagement action being electrically driven (for example by a motor or solenoid). Preferably the power source is one or more electrical batteries.

[0024] Preferably the cleaning assembly is designed to minimise the risk of contact of the handle with the cleaning heads, other than the replacement cleaning head selected. One way in which this can be done is by providing the cleaning heads in a substantially vertical column, with the top cleaning head always being the replacement cleaning head. Lower cleaning heads are screened by the cleaning heads above them. Another way is by causing the cleaning heads to move, one by one, to a location at which they can be engaged by the handle, and at which the other cleaning heads are not contactable by the handle. This may be achieved by the gravity feed of cleaning heads to the said location. Suitably the housing has an outlet at its base, of size to pass one cleaning head at a time, and a tray carried externally of the outlet, of size to accommodate one cleaning head at a time. Preferably such a housing has within it an inclined wall or a chute, to assist the cleaning heads to pass through the outlet.

[0025] Most preferably the cleaning heads comprise a body of a material, for example a pad, preferably somewhat compressible but substantially able to hold its shape when used in a scrubbing or rubbing action. It may suitably be of plastics and/or foam and/or fibrous material.

[0026] Suitable materials for the cleaning heads include synthetic thermoplastics material, for example polyvinyl alcohol, and biopolymer materials, for example cellulosic materials or starch-derived materials, and a mixture of a synthetic thermoplastics material and a biopolymer material, able to be compounded to yield a satisfactory material.

[0027] The cleaning heads may comprise a plastics wall having an outer cleaning surface, for example nonwoven fabric or loose fibres adhered to the plastics wall.

[0028] The cleaning heads may comprise a plastics wall having an outer cleaning surface, for example nonwoven fabric or loose fibres adhered to the plastics wall.

[0029] When a cleaning head is of a plastics material it maybe a homogeneous part, for example formed by moulding, or it may be in the form of pieces cohered together.

[0030] In some embodiments the cleaning heads may be provided on their outer surface with an abrasive material, for example bonded hard particles.

[0031] In some embodiments the cleaning heads may have a textured outer surface. This may be the result of a moulding process or of the material used. For example an outer fabric of honeycomb pattern may be used; or a filament of material, for example of a thermoplastics or a natural material, may be wrapped repeatedly around the cleaning head to form the textured outer surface.

[0032] Preferably the cleaning heads do not comprise bristles.

[0033] Preferably the cleaning heads are of a material which is degradable in water. Preferably the cleaning heads are of a material which dissolves or disintegrates in still water at ambient temperature (preferably 20°C), in not more than 24 hours, more preferably not more than 2 hours, and most preferably not more than 30 minutes.

[0034] The cleaning head may be such as to both disintegrate and dissolve in water. For example the cleaning head may be designed to disintegrate before complete dissolution is achieved. For example it may be a compact of hydrosoluble pieces and after a period of contact with water it may fall apart into those pieces, which subsequently completely dissolve.

[0035] The cleaning head may comprise a material or component which causes it to be non-buoyant in water.

[0036] The cleaning head may comprise a superabsorbent material, for example a superabsorbent polyacrylate.

[0037] The cleaning head may comprise a superabsorbent material, for example a superabsorbent polyacrylate.

[0038] Preferably the maximum length of the cleaning heads (ie parallel to the handle) does not exceed their maximum width. More preferably the maximum length is not more than one-half of the maximum width. Preferably the cleaning heads are of generally rounded form or, most preferably, of oblate or lozenge form.

[0039] The cleaning heads may comprise a supporting core which has better mechanical properties than the surrounding part which comprises a cleaning surface. For example the supporting core may, relative to the surrounding part, be stiff, or harder, or tougher.

[0040] The cleaning article may include a cleaning agent. This may be a cleaning agent of liquid form. Thus, the cleaning heads could be supplied impregnated with a liquid cleaning agent. Alternatively the cleaning article could contain a reservoir of cleaning liquid. The liquid could be dispensed onto the cleaning head. Alternatively, or additionally, it could be dispensed directly onto the surface being cleaned. The dispensing of the liquid could be under the control of the user, for example by operation of a lever. Alternatively the dispensing could be caused by the engagement of the cleaning article with the substrate to be cleaned. The resulting compressive force applied to the handle could cause an aliquot of cleaning liquid to be dispensed.

[0041] In other embodiments the cleaning agent could be a solid, in particular a particulate cleaning agent carried by the cleaning head. A particulate material may be selected which dissolves when applied to a surface during cleaning, when water is present. It may effervesce as it does so. Furthermore a solid cleaning agent could include an abrasive.

[0042] The cleaning agent could include an anti-bacterial agent. The anti-bacterial agent could be compounded into the material of the cleaning head or it could be applied thereto, as a liquid, gel or solid.

[0043] In accordance with a second aspect of the present invention there is provided a housing *per se,* containing a stack of cleaning heads for use with a cleaning article which is not itself part of or stowed in the housing.

[0044] In accordance with a third aspect of the present invention there is provided a cleaning article comprising a handle and a cleaning head of generally rounded or oblate or lozenge form at the distal end of the handle, wherein the handle is adapted to release a used cleaning head and accept a replacement cleaning head at its distal end, by the agency of a user but without the user having to touch the used cleaning head or the replacement cleaning head.

[0045] In accordance with a fourth aspect of the present invention there is provided a cleaning head *per se,* adapted for temporary securement to a handle, degradable in water, and having a maximum length which does not exceed its maximum width.

[0046] In accordance with a fifth aspect of the present invention there is provided a method of cleaning a hard surface, for example the inside surface of a toilet bowl, using a cleaning assembly of the first aspect or a cleaning article of the third aspect or a cleaning head of the fourth aspect.

[0047] Definitions of preferred features of the first aspect of the present invention apply *mutatis mutandis* to the further aspects of the present invention.

[0048] The invention will now be further described, by way of example, with reference to the accompanying drawings in which:

Figs. 1A, 1B and 1C show a first embodiment of cleaning article, in different configurations;

Figs. 2A, 2B and 2C show a second embodiment of cleaning article, in different configurations;

Figs. 3A and 3B are schematic views of a cleaning assembly comprising a cleaning article and stacks of replacement cleaning heads;

Figs. 4A-4H show different possible shapes of cleaning head; and

Figs. 5A and 5B respectively show, in perspective and vertical cross-sectional views, a housing of a further embodiment, the housing containing cleaning heads.

[0049] With reference firstly to Fig. 1B, in this embodiment a toilet cleaning article (intended to replace a conventional toilet brush) is shown. It comprises a tubular handle 2, and, at the distal end of the handle, a cleaning head 4. The handle is provided with a mechanism for securement of the cleaning head 4. A rod 6 is located within the handle and terminates at the distal end in splayable prongs 8. The splaying of the prongs is assisted by an angle piece 10 at the distal end. The prongs pass between this angle piece and a flared end region 12 of the handle. As a result, the prongs are forced into the cleaning head 4. As can be seen, the cleaning head 4 is of generally lozenge-form.

[0050] At the proximal end of the handle the rod 6 terminates in a domed part 14. There is a cross wall 16 within the handle, and between the domed part 14 and the cross wall 16, there is a helical spring 18.

[0051] Carried by the domed part 14 is a resilient depending arm 20 having a button 22 which co-operates with two openings 24, 26 in the wall of the handle, adjacent to the proximal end.

[0052] The position shown in Fig. 1B is the normal operative position. The prongs 8 are firmly located within the cleaning head 4. The rod 6 is in an advanced position. The spring 18 is compressed. The button 22 is retained within the lower opening 26.

[0053] When it is wished to change the cleaning head the button 22 is depressed. The spring 18 relaxes. On relaxation of the spring the rod 6 is raised. The button is now retained within the upper opening 24. The prongs 8 have now been withdrawn from the cleaning head, which detaches, and falls into the toilet bowl (Fig. 1C). A replacement cleaning head must be engaged. The handle is placed with its distal end on a replacement cleaning pad and the domed portion 14 is depressed, until the button 22 once more engages the lower opening 26. At this point the prongs have been driven into the replacement cleaning head. Thus, the arrangement shown in Fig. 1B is again achieved.

[0054] The cleaning head of Figs. 1A to 1C is of a polymeric material which is 50:50 (w:w) compound of polyvinyl alcohol and cellulose, which disintegrates and dissolves in water in the circumstances to be described.

[0055] Figs. 2A-2C show an alternative arrangement differing from that of Figs. 1A-1C primarily in that the cleaning head is not pierced by prongs, but pinched by jaws. To assist this operation the cleaning head, again generally of lozenge-form, has a central nipple-like projection 28 on one side. It also has a lower recess 29, able to snugly receive the projection of the adjacent cleaning head, such that cleaning heads may form a stable and compact vertical column. There is again a rod 30 within the handle. However, the rod terminates at its distal end in a pair of jaws 32. A helical spring 34 is trapped between the proximal end face 36 of the handle and an uppermost abutment 38 carried by the rod 30. In normal use (Fig. 2B) a cleaning head is securely gripped. The rod is in its most advanced position and the helical spring 34 is not compressed. To remove a cleaning head the rod is retracted by means of a slider 40, coupled to the rod 30 but located outside the handle. The spring 34 is compressed. The arrangement at the

distal end is such that the jaws 32 open, and the cleaning head falls into the toilet bowl (Fig. 2C). The handle is then located on a replacement cleaning head (Fig. 2A) and the rod caused to advance, with the assistance of the spring 34 as it relaxes. When this happens the jaws 32 close, so gripping the protuberance 38. The jaws 32 are held in that position until the slider 40 is released, to retract the rod.

[0056] The cleaning head of Figs. 2A to 2C is of a biopolymeric material. In this embodiment it is of a cellulosic material compounded 50:50 (w:w) with polyvinyl alcohol, and designed to disintegrate in water under the conditions of use.

[0057] Fig. 3A shows a cleaning assembly which includes a cleaning article according to Figs. 1A-1C, and replacement cleaning pads. The cleaning assembly comprises a housing 42 of trigonal form, in which three main compartments are divided, by means of upright radial walls, set at 120 ° to each other. The cleaning article (whose handle is shown as 44 protruding upwardly from the housing) has its distal end stowed in a further compartment (not shown) carried by one of the external walls of the housing, such that liquid cannot pass from this compartment to the other compartments. This further compartment is of narrow flute-form and can accommodate the handle without a cleaning head thereon. The three main compartments contain replacement cleaning heads face-to-face in three vertical columns. The wall of the housing 42 may be of a heavy-duty plastics sheet material. Depending on the design the top 46 (which is shown partially cut away) may be removed permanently, or removed or displaced (eg by hinging) intermittently, at times when a cleaning head is needed.

[0058] Fig. 3B shows a refill pack of cleaning heads. The refill pack is a housing like that of Fig. 3A, but is supplied without a handle, because the original handle 44 is retained. The refill pack is of similar shape to the housing 42. Again, three main compartments are formed, again by means of three radial walls as described above.

[0059] The outer wall 48 of the refill unit 42 is of a flexible but strong plastics sheet material and its upper region may be torn away to allow access to the cleaning heads. To assist this process there is a band of perforations 50 extending around the wall, separating the upper region from the remainder of the wall and assisting the removal of the former. The top of the narrow compartment for the handle can be seen as 49.

[0060] Figs. 4A-4H show alternative cleaning heads. The cleaning head shown in Fig. 4A is of lozenge-form without a discrete protuberance, and is intended to be used by an embodiment of the type with reference to Figs. 1A-1C, having securement prongs, or with a handle having a rotatable auger-type head. The cleaning head shown in Fig. 4B is also of lozenge-form but has a protuberance to enable it to be gripped in the manner described with reference to Figs. 2A-2C. The cleaning heads shown in Figs. 4C-4H are all generally spherical, having rigid walls covered with fibrous and mildly abrasive materials. They have different frontal conformations to improve their scrubbing properties. Thus, in Fig. 4C the cleaning head has a series of serpentine raised conformations. In Fig. 4D the cleaning head has a series of hoops. In Fig. 4E the cleaning head has a scalloped conformation. In Fig. 4F the surface has a series of hoops which converge upon a nib (which may be pressed into tight corners during cleaning). Fig. 4G shows a cleaning head which is also scalloped, but not in such a pronounced manner as in the cleaning head of Fig. 4E. Fig. 4H shows a cleaning head with an array of parallel projections, providing a knobbly cleaning surface.

[0061] Figs. 5A and 5B show a housing in the form of an upright cylindrical container 50. The container has an upper lid 51 and a lower opening 52 associated with a tray 54, the opening and the tray 54 being of size to admit only one ball-like cleaning head 56. The tray has raised walls 57 which prevent the cleaning head from falling from the tray. Within the container there is a wall 58 inclined at 45° to the horizontal, whose lower edge is coincident with the lower edge of the opening, and the inside edge of the tray. On the outside of the container parallel to the cylinder axis there is a narrow chamber 60, to receive a handle of the type described above. In use the lid 50 is removed and the container filled with cleaning heads 52. Under the influence of gravity and aided by the inclined wall 58 they are urged to the opening 52. A single cleaning head is available on the tray 54, to be picked up by the handle (for example impaled by prongs or by an auger-type head). Once it has been picked up the next cleaning head passes through the opening onto the tray, ready for use. Once the cleaning article has been used the cleaning head is released and falls into the toilet bowl. The handle may be stowed in the chamber 60. When the next cleaning operation is needed it is removed and used to pick up the next cleaning head; and so on.

Claims

1. A cleaning assembly comprising a cleaning article and a housing for stowing the cleaning article, wherein the cleaning article has a handle and a cleaning head, the cleaning head being releasably located at the distal end of the handle, wherein the housing contains a stack of replacement cleaning heads.

2. A cleaning assembly as claimed in claim 1, wherein the housing provides a first zone for stowing the cleaning article and a second zone for storing a stack of replacement cleaning heads.

3. A cleaning assembly as claimed in claim 2, wherein the first and second zones are separated by an im-

permeable upright barrier.

4. A cleaning assembly as claimed in any preceding claim, wherein the cleaning head may be released from the handle by an action of the user applied remotely from the cleaning head.

5. A cleaning assembly as claimed claim 4, wherein there is a release mechanism which includes an actuator located at or towards the proximal end of the handle.

6. A cleaning assembly as claimed in claim 5, wherein the actuator is coupled to a rod having prongs at its distal end, wherein the actuator may be moved lengthwise in order to advance or retract the prongs, to engage or release a cleaning head.

7. A cleaning assembly as claimed in claim 5, wherein the actuator is coupled to a rod which has at its distal end pinching jaws, wherein the actuator may be moved in order to close or open the jaws, to engage or release a cleaning head.

8. A cleaning assembly as claimed in claim 5, wherein the actuator is coupled to a rotatable rod having an auger-type head, to engage a cleaning head.

9. A cleaning assembly as claimed in any preceding claim, wherein the mechanism is such that a cleaning head may be released, and a replacement cleaning head engaged, without the user having to touch either of them.

10. A cleaning assembly as claimed in any preceding claim, wherein the cleaning heads comprise a body of a material substantially able to hold its shape when used in a scrubbing or rubbing action.

11. A cleaning assembly as claimed in any preceding claim, wherein the cleaning heads are degradable in water.

12. A cleaning assembly as claimed in any preceding claim, wherein the maximum length of the cleaning heads does not exceed their maximum width.

13. A cleaning assembly as claimed in any preceding claim, wherein the cleaning heads are of generally rounded, oblate or lozenge form.

14. A cleaning assembly as claimed in any preceding claim, wherein the cleaning article comprises a chemical cleaning agent and/or a physical cleaning aid.

15. A cleaning assembly as claimed in claim 14, wherein the cleaning heads are compounded with or impregnated by a chemical cleaning agent.

16. A cleaning assembly as claimed in claim 14, wherein the cleaning heads have on their surface a chemical cleaning agent or a physical cleaning aid.

17. A cleaning assembly as claimed in any preceding claim, wherein the housing has a compartment for the handle, wherein the compartment does not contain any cleaning heads.

18. A cleaning assembly as claimed in any preceding claim, wherein the stack is a substantially vertical column.

19. A cleaning assembly as claimed in any of claims 1 to 17, wherein the stack is a three-dimensional array or heap.

20. A cleaning assembly as claimed in any preceding claim, wherein at any one time only one cleaning head is available to the handle requiring a replacement cleaning head.

21. A housing containing a stack of cleaning heads adapted for temporary attachment to a handle, the handle not itself being part of a stowed in the housing.

22. A cleaning article comprising a handle and a cleaning head of generally rounded or oblate or lozenge form at the distal end of the handle, wherein the handle is adapted to release a used cleaning head and accept a replacement cleaning head at its distal end, by the agency of a user but without the user having to touch the used cleaning head or the replacement cleaning head.

23. A cleaning head *per se* , adapted for temporary securement to a handle, degradable by water and of generally rounded or oblate or lozenge form.

24. A method of cleaning a hard surface, for example the inside surface of a toilet bowl, using a cleaning assembly as claimed in any of claims 1 to 20 or a cleaning article as claimed in claim 23 or a cleaning head as claimed in claim 23.

25. A cleaning apparatus or method substantially as hereinbefore described with reference to the accompanying drawings.

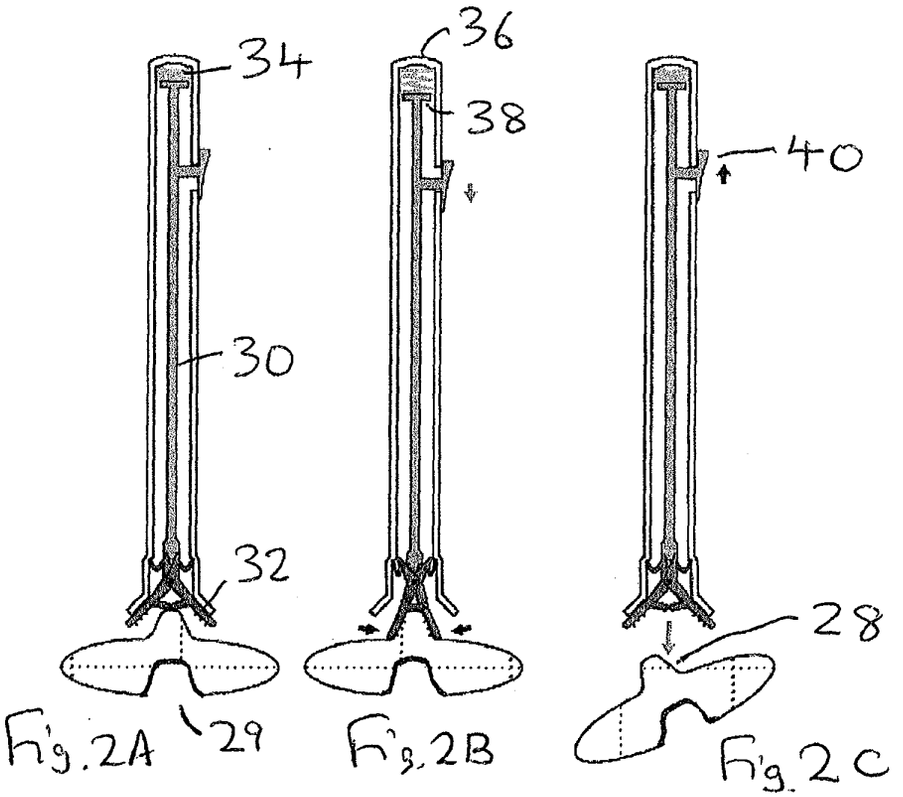

Fig. 2A Fig. 2B Fig. 2C

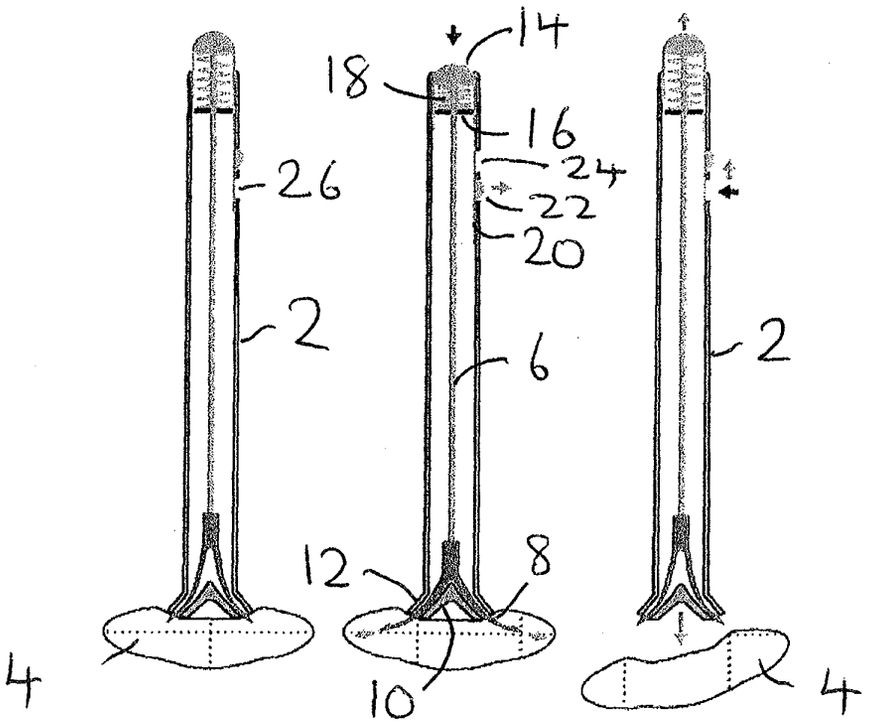

Fig. 1A Fig. 1B Fig. 1C

Fig. 3A

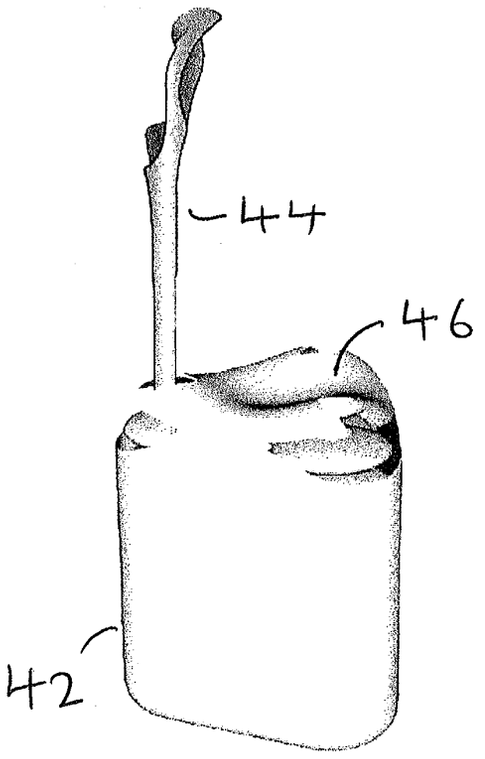

Fig. 3B

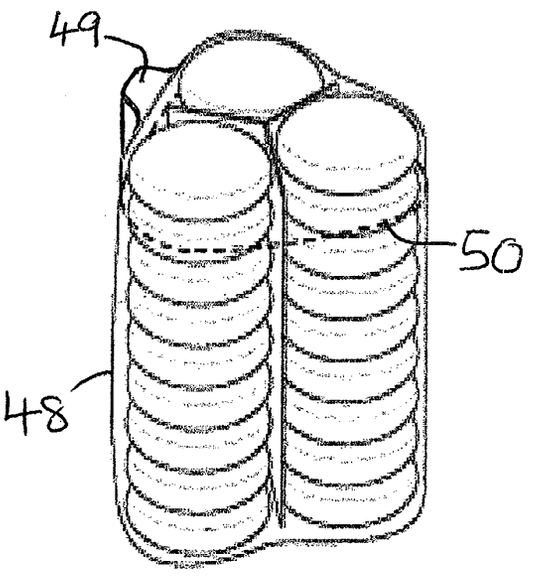

Fig. 4B

Fig. 4A

Fig 4C

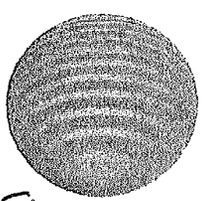

Fig 4D

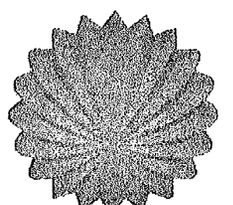

Fig. 4E

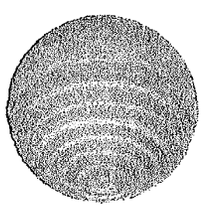

Fig. 4F

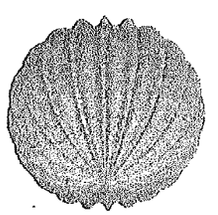

Fig. 4G

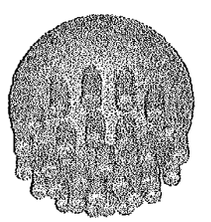

Fig. 4H

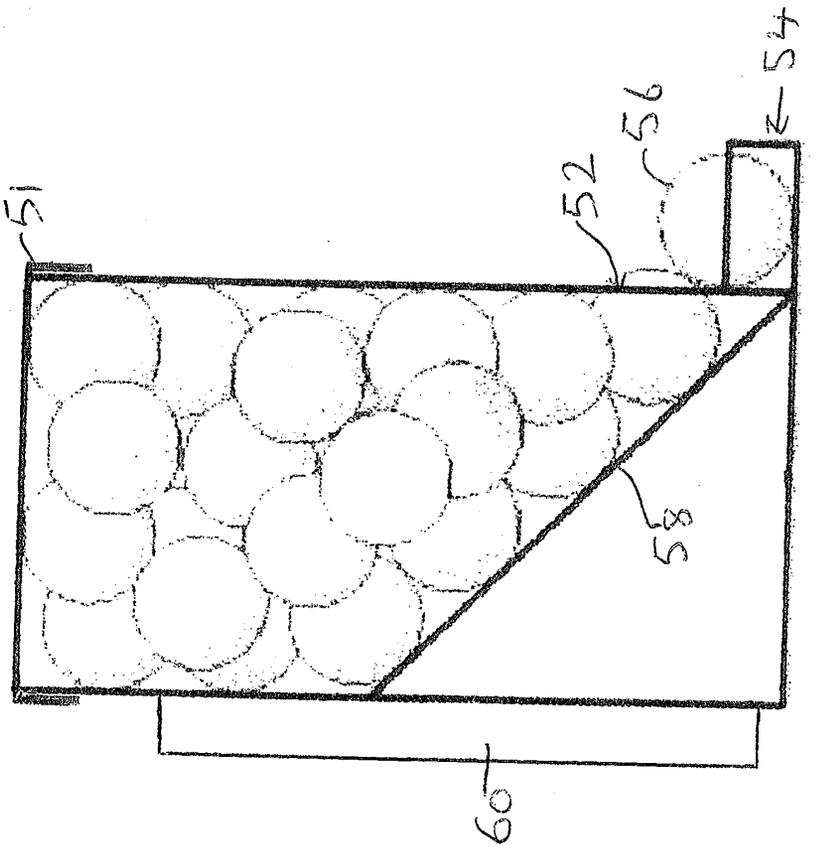

Fig. 5B

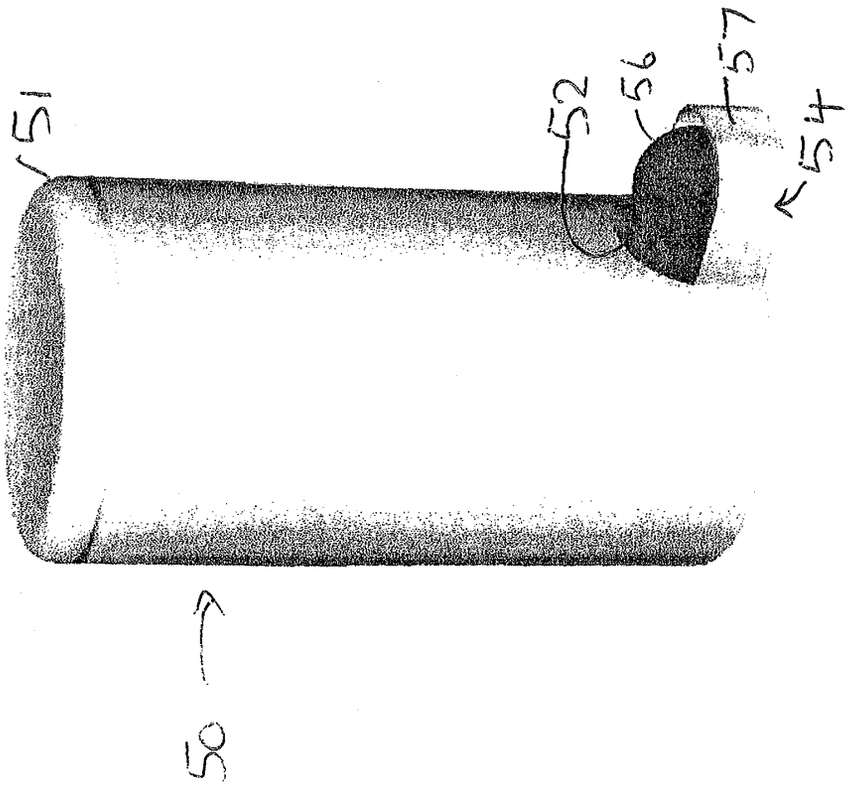

Fig. 5A

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 29 1143

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 094 771 A (EGOLF HEINZ ET AL) 1 August 2000 (2000-08-01)	1-5,7, 9-11,17, 18,20, 21,24,25	A47K11/10
Y	* column 5, line 26 - line 31; figures *	6,12,13, 22,23	

Y	DE 100 59 764 A (KUHN JOACHIM) 6 June 2002 (2002-06-06)	6	
A	* the whole document *	1,21-25	

Y	US 2 648 085 A (RODGERS DOROTHY F) 11 August 1953 (1953-08-11) * the whole document *	12,13, 22,23	

X	WO 00 71012 A (UNILEVER PLC ;LEVER HINDUSTAN LTD (IN); UNILEVER NV (NL)) 30 November 2000 (2000-11-30)	1-5, 9-11,14, 15,17, 18,20, 21,24,25	
	* the whole document *		TECHNICAL FIELDS SEARCHED (Int.Cl.7)

X	US 4 987 634 A (WEIHRAUCH GEORG) 29 January 1991 (1991-01-29)	1-7,9, 11,18, 20,21, 24,25	A47K
A	* the whole document *	22,23	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 September 2003	Fordham, A

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-09-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6094771 A	01-08-2000	AT 189369 T	15-02-2000
		AU 714034 B2	16-12-1999
		AU 2760897 A	05-01-1998
		WO 9745050 A1	04-12-1997
		CN 1219854 A ,B	16-06-1999
		DE 59701090 D1	09-03-2000
		EP 0900044 A1	10-03-1999
		ES 2145600 T3	01-07-2000
		JP 2001516231 T	25-09-2001
		KR 2000015947 A	15-03-2000
		NO 985283 A	13-11-1998
DE 10059764 A	06-06-2002	DE 10059764 A1	06-06-2002
US 2648085 A	11-08-1953	NONE	
WO 0071012 A	30-11-2000	AU 4922300 A	12-12-2000
		WO 0071012 A1	30-11-2000
US 4987634 A	29-01-1991	DE 3719904 A1	29-12-1988
		AT 105165 T	15-05-1994
		DE 3889382 D1	09-06-1994
		EP 0295505 A2	21-12-1988
		ES 2051798 T3	01-07-1994
		JP 1017620 A	20-01-1989

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82