



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.12.2009 Bulletin 2009/51

(51) Int Cl.:
D06F 39/02 (2006.01)

(21) Application number: **08158288.4**

(22) Date of filing: **13.06.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(71) Applicant: **Electrolux Home Products Corporation N.V.**
1930 Zaventem (BE)

(72) Inventor: **Fairy, Jean**
08000 Charleville-Mézières (FR)

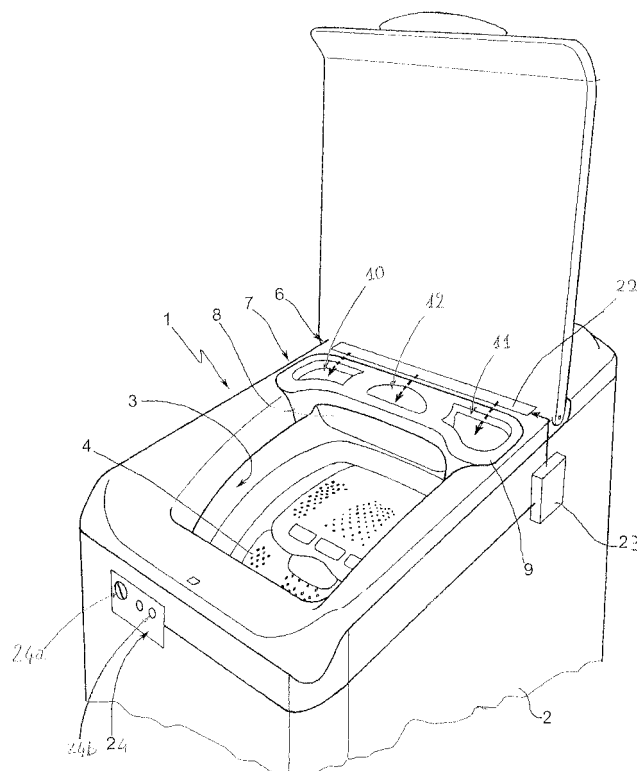
(74) Representative: **Baumgartl, Gerhard Willi et al**
AEG Hausgeräte GmbH
Group Intellectual Property
90327 Nürnberg (DE)

(54) **Laundry washing and/or drying machine with a multifunction detergent dispenser, and relative operating method**

(57) A laundry washing and/or drying machine (1) having a casing (2); a laundry wash tub (3) mounted inside the casing (2); and detergent dispenser unit (6) for containing and selectively feeding a number of detergents into the tub (3), and having a detergent dispenser

(7) in turn having a container (8) divided into three separate compartments, wherein a first (10) and second (11) compartment each contain a powdered detergent for use in a laundry main wash stage and/or prewash stage, and a third compartment (12) is designed to contain liquid softener or liquid bleach.

FIG.1



Description

[0001] The present invention relates to a laundry washing and/or drying machine with a multifunction detergent dispenser, and to the relative operating method.

[0002] More specifically, the present invention relates to a front- or top-loading laundry washing and/or drying machine of the type comprising a casing; a wash tub connected in floating manner to the casing by a number of suspension devices; a perforated laundry drum for housing laundry for washing, and which is mounted inside the wash tub to rotate about an axis of rotation; and a drive unit connected by a connecting member to the laundry drum to rotate it, on command, about the axis of rotation.

[0003] More specifically, the present invention relates to a household machine featuring a detergent dispenser unit comprising a multifunction detergent dispenser for containing bleach or a given amount of softener; to which the following description refers purely by way of example.

[0004] As is known, home washing and/or drying machines comprise a detergent dispenser unit designed to contain a given amount of liquid or powdered detergents, which are flushed into the tub in a given sequence according to the wash cycle performed by the machine on the basis of the user-selected wash program.

[0005] The dispenser unit normally comprises a detergent dispenser defined by a drawer container divided into four inner compartments : a first compartment contains powdered detergent which is flushed into the tub at the prewash stage; a second compartment contains powdered detergent which is flushed into the tub at the main wash stage; a third compartment contains a liquid softener which is flushed into the tub at the soak stage; and a fourth compartment contains liquid bleach which is flushed into the tub at the bleach stage.

[0006] Washing machines with a four-compartment detergent container of the type described above have the major drawback of only allowing a limited increase in the capacity and easiness to fill of the second and third compartments containing large quantities of detergents, which are used more frequently and in larger amounts than bleach or powdered prewash detergent.

[0007] As is known, simplifying washing machine detergent dispenser units is one of several major design issues, which are the object of continual improvement aimed at simplifying use by the end user. Despite extensive research over the past few years into improving detergent dispenser units and relative detergent dispensers, however, considerable room for improvement still remains.

[0008] It is therefore an object of the present invention to provide a laundry washing and/or drying machine equipped with a detergent dispenser unit that is easy to produce and use.

[0009] According to the present invention, there is provided a laundry washing and/or drying machine as claimed in Claim 1 and preferably in any one of the fol-

lowing Claims depending directly or indirectly on Claim 1.

[0010] According to the present invention, there is also provided a method of operating a laundry washing and/or drying machine, as claimed in Claim 9 and preferably in any one of the following Claims depending directly or indirectly on Claim 9.

[0011] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view in perspective of a laundry washing and/or drying machine in accordance with the teachings of the present invention;

Figure 2 shows a view in perspective of a detergent dispenser of the Figure 1 laundry washing and/or drying machine;

Figure 3 shows a larger-scale cross section, along line I-I in Figure 2, of the laundry washing and/or drying machine detergent dispenser;

Figure 4 shows a larger-scale section, along line II-II in Figure 2, of the laundry washing and/or drying machine detergent dispenser;

Figure 5 shows a time sequence table of the operating stages in a main wash program performed by the Figure 1 laundry washing and/or drying machine;

Figure 6 shows a time sequence table of the operating stages in a wash program, comprising a bleach stage, performed by the Figure 1 laundry washing and/or drying machine.

[0012] Number 1 in Figure 1 indicates as a whole a front- or top-loading home laundry washing and/or drying machine comprising a preferably, though not necessarily, parallelepiped-shaped casing 2; a wash tub 3 mounted inside casing 2; a laundry drum 4 mounted inside wash tub 3 to rotate about an axis of rotation (not shown); and a drive unit (not shown) connected by a connecting member to laundry drum 4 to rotate it, on command, about the axis of rotation.

[0013] Washing machine 1 also comprises a detergent storage and dispenser unit 6 containing a number of chemical detergents, and which, on command, selectively feeds each detergent into tub 3 according to the wash sequence implemented by machine 1 on the basis of a user-selected wash program.

[0014] More specifically, storage and dispenser unit 6 comprises a detergent dispenser 7, in turn comprising a detergent container 8 designed, preferably though not necessarily, to fit firmly but easily removably to machine 1; and a lid 9 which, preferably though not necessarily, fits firmly but easily removably to container 8.

[0015] Container 8 is open on top and is divided internally into a number of different compartments for respective detergents. More specifically, in the embodiment shown in Figure 1-4, container 8 is divided internally into three different compartments for respective detergents, wherein a first compartment 10 is for containing a specific wash detergent; a second compartment 11 is for contain-

ing a specific powdered prewash detergent; and a third compartment 12 is for containing liquid softener or liquid bleach.

[0016] In the embodiment shown in Figure 1-4, container 8 comprises an elongated, substantially bean-shaped tray, in turn comprising a detergent feed conduit 13 located at the bottom of container 8, i.e. directly beneath compartments 10, 11, 12, and which feeds the mixture of water and at least one detergent by gravity into tub 3 along a drain channel (not shown) in machine 1.

[0017] In the Figure 4 example, first and second compartments 10, 11 have respective outlets 10a, 11a formed in the respective bottom walls, and which connect first and second compartments 10, 11 to feed conduit 13 to permit outflow of the water and powdered detergent mixture from container 8 into tub 3.

[0018] More specifically, in the Figure 4 example, the third softener compartment 12 is located in the central portion of container 8, and first and second compartments 10, 11 are formed on opposite sides of third compartment 12.

[0019] In the Figure 1-4 example, lid 9 is defined by a peripheral frame 15, which is also substantially bean-shaped to fit firmly but easily removably to the top peripheral edge 16 of container 8, and has three through openings 18, 19, 20 facing respective compartments 10, 11, 12 of container 8.

[0020] More specifically, a first and second opening 18, 19 are formed in end portions of frame 15, and face first and second compartment 10, 11 respectively; and a third opening 20 is formed centrally between first and second opening 18 and 19, and is located over third compartment 12.

[0021] With reference to Figures 3 and 4, detergent dispenser 7 also comprises a siphon 21 located inside third compartment 12, and for discharging the liquid softener or liquid bleach from third compartment 12 into feed conduit 13 underneath.

[0022] More specifically, in the Figure 3 example, siphon 21 comprises two straight sleeves, which fit one inside the other when lid 9 is fixed to container 8. More specifically, a first sleeve 21a is located inside third compartment 12, has a preferably, though not necessarily, circular cross section, and extends upwards from the bottom wall of third compartment 12, in a direction parallel to the mid-plane of container 8, so that its bottom end communicates with feed conduit 13, and its top end communicates with third compartment 12.

[0023] Similarly, a second sleeve 21b of siphon 21 has a circular cross section, is preferably, though not necessarily, larger in outside diameter than first sleeve 21a, and is connected to lid 9 inside third opening 20. In the Figure 3 example, second sleeve 21b extends downwards from the plane of frame 15, with its axis parallel to the mid-plane of lid 9, and is connected to frame 15 by a lateral supporting appendix 15a.

[0024] With reference to Figure 1, machine 1 also comprises a known feed device 22 for selectively feeding

water into each of compartments 10, 11, 12 of detergent dispenser 7; an electronic control unit 23 containing a number of wash programs, and which controls the drive unit and/or feed device 22 according to the stages in the current wash program; and a user interface device 24 comprising, for example, a selection knob 24a and/or one or more user control buttons 24b by which to select a given wash program.

[0025] More specifically, the wash programs memorized in electronic control unit 23 and performable by machine 1 comprise a number of softener wash programs A_i (where i is 1 to n), each of which involves the use of liquid softener, and may or may not comprise a prewash stage; and at least one bleach program B comprising a bleach stage, i.e. use of liquid bleach.

[0026] It should be pointed out that the wash programs, and in particular the bleach program B, may be user-selected, for example, by setting selection knob 24a to a given angular position and/or by pressing button 24b of interface device 24.

[0027] The method of operating machine 1 will now be described, assuming a softener wash program A1 in the Figure 5 Table comprises at least the following stages: a prewash stage FO, which may or may not be selected by the user; a tub 3 water-fill stage F1; a main-wash stage F2; a first rinse stage F3; at least a number of intermediate water-fill stages F4, F6, and a number of intermediate rinse stages F5, F7; at least one final laundry soak and rinse stage F8; and at least one final cleaning stage F9 to clean container 8.

[0028] It is also assumed the bleach program B in the Figure 6 Table is a bleach wash program comprising at least the following stages: at least one main wash stage Z1; at least a first rinse stage Z2; a wash stage Z3; a number of bleach stages Z4, Z5; at least one final rinse stage Z6 to remove the liquid bleach thoroughly from the wash; and preferably, though not necessarily, a final cleaning stage Z7 to clean container 8.

[0029] To wash with softener, the user fills first and second compartments 10, 11 with powdered wash detergent and powdered prewash detergent, and third compartment 12 with liquid softener, and selects one of the wash programs, e.g. $A_i=A_1$, comprising a final softener-soaking stage.

[0030] In this case (Figure 5), when activated, electronic control unit 23 sequentially performs the following operations. If the prewash function has been selected, electronic control unit 23 performs stage FO, in which water is fed into second compartment 11 to flush a water and powdered prewash detergent mixture into tub 3. When stage FO is completed, electronic control unit 23 cuts off water supply to second compartment 11, and performs stage F1, in which water is fed into first compartment 10 to flush a water and powdered wash detergent mixture into tub 3. At the end of stage F1, electronic control unit 23 cuts off water supply to first compartment 10, and performs repeated intermediate tub 3 water-fill stages F4, F6 alternating with intermediate rinse stages

F5, F7. At these stages, electronic control unit 23 feeds water into first compartment 10 to repeatedly flush a water and powdered wash detergent mixture into tub 3. At the end of stage F7, electronic control unit 23 cuts off water supply to first compartment 10, and performs stage F8, in which water is fed into third compartment 12, containing liquid softener, to flush a water and softener mixture into tub 3. More specifically, at stage F8, the wash is soaked and undergoes a final rinse, and electronic control unit 23 feeds enough water into third compartment 12 to flush all the softener out of third compartment 12 and siphon 21.

[0031] At the end of stage F8, electronic control unit 23 preferably, though not necessarily, performs stage F9, in which water is fed into first compartment 10 and second compartment 11 to eliminate any traces of powdered prewash and wash detergent from container 8.

[0032] To bleach the wash, the user fills first compartment 10 and second compartment 11 with powdered prewash and wash detergent respectively, and third compartment 12 with liquid bleach, and sets knob 24a and/or presses button 24b to select bleach program B.

[0033] In this case, when activated, electronic control unit 23 sequentially performs the following operations (Figure 6). At stage Z1, water is fed into first compartment 10 to flush a water and main wash detergent mixture into tub 3. At the end of stage Z1, electronic control unit 23 cuts off water supply to first compartment 10, and performs stage Z2, in which it feeds water into second compartment 11 to flush a water and powdered prewash detergent mixture into tub 3, and activates rinsing.

[0034] At the end of stage Z2, electronic control unit 23 cuts off water supply to second compartment 11, and starts stage Z3, in which water is fed into first compartment 10 to flush a water and detergent mixture into tub 3. At the end of stage Z3, electronic control unit 23 cuts off water supply to first compartment 10, and sequentially performs stages Z4 and Z5, in which water is fed into first compartment 10 and third compartment 12 respectively, to flush a mixture of water, powdered wash detergent, and liquid bleach into tub 3.

[0035] It should be pointed out that, at stage Z5, enough water is fed into third compartment 12 to flush all the bleach from third compartment 12 and siphon 21.

[0036] At stage Z6, electronic control unit 23 feeds water into third compartment 12, so that, third compartment 12 being flushed clean, only water is fed into tub 3 to rinse and eliminate any trace of liquid bleach from the wash.

[0037] At stage Z7, electronic control unit 23 cuts off water supply to third compartment 12, feeds water into first compartment 10 and second compartment 11 to flush out any detergent, and at the same time performs final rinsing of the wash.

[0038] The advantages of the machine as described above are obvious : in addition to providing a detergent dispenser with larger-capacity compartments than known dispensers, it also provides for an extremely prac-

tical, easy-to-use bleaching stage.

[0039] Clearly, changes may be made to the machine and operating method as described and illustrated herein without, however, departing from the scope of the present invention as defined in the accompanying Claims.

Claims

1. A laundry washing and/or drying machine comprising a casing (2), a laundry wash tub (3) mounted inside said casing (2), and detergent dispensing means (6) for containing and selectively feeding a number of detergents into said tub (3) and comprising a detergent dispenser (7) in turn comprising a container (8); said machine being **characterized in that** said container (8) of said detergent dispenser (7) comprises at least a compartment (12) which is designed to contain liquid softener or liquid bleach.
2. A machine as claimed in Claim 1, wherein said container (8) is divided into a number of separate compartments (10, 11, 12), wherein a first (10) and second (11) compartment each contain a detergent for use in a laundry main wash stage and/or prewash stage; and a third compartment (12) of said container (8) being designed to contain liquid softener or liquid bleach.
3. A machine as claimed in Claim 2, and comprising feed means (22) for selectively feeding water into each said compartment (10, 11, 12) of said detergent dispenser (7); and electronic control means (23) which, when said third compartment (12) contains said liquid softener, implement a wash program (Ai) by which said feed means (22) feed water into said third compartment (12) to flush said liquid softener into said tub (3), or, when said third compartment (12) contains liquid bleach, implement a bleach program (B) comprising at least one stage in which water is fed into said third compartment (12) to flush the liquid bleach into said tub (3).
4. A machine as claimed in Claim 3, wherein, when said third compartment (12) contains liquid bleach, said electronic control means (23) control said feed means (22) on the basis of at least one bleach program (B) comprising at least one rinse stage of the laundry in said tub (3); said electronic control means (23) controlling said feed means (22) to feed water into said third compartment (12) before and/or during said at least one rinse stage of the laundry.
5. A machine as claimed in Claim 4, wherein said third compartment (12) comprises at least one siphon (21) for feeding said liquid softener or said liquid bleach from said third compartment (12) into said tub (3); said electronic control means (23) commanding at

least one rinse stage following complete removal of liquid bleach from said siphon (21).

6. A machine according to any one of Claims 3 to 5, wherein, when said third compartment (12) contains liquid softener, said electronic control means (23) implement at least one wash program (Ai) having no bleach stages; said wash program comprising at least one rinse stage of the laundry in said tub (3), during which said electronic control means (23) control said feed means (22) to feed water into said third compartment (12) to flush said liquid softener into said tub (3). 5
7. A machine according to any one of Claims 3 to 5, wherein, when said third compartment (12) contains liquid softener, said electronic control means (23) implement at least one rinse stage and, at the same time, control said feed means (22) to feed enough water into said third compartment (12) to remove said softener from said third compartment (12) and said siphon (21). 10 15 20
8. A machine according to any one of Claims 3 to 7, and comprising interface means (24) enabling user selection of said wash program (Ai) or said bleach program (B). 25
9. A method of operating a laundry washing and/or drying machine comprising a casing (2), a laundry wash tub (3) mounted inside said casing (2), and dispensing means (6) for containing and selectively feeding a number of detergents into said tub (3), and comprising a detergent dispenser (7) in turn comprising container (8); said method being **characterized by** comprising the step of providing said container (8) with a compartment (12) for containing liquid softener or liquid bleach. 30 35
10. A method as claimed in Claim 9, wherein said container (8) is divided into a number of separate compartments (10,11,12), wherein a first (10) and second (11) compartment each contain a detergent for use in a laundry main wash stage and/or prewash stage; said method comprising the step of providing said container (8) with a third compartment (12) for containing liquid softener or liquid bleach. 40 45
11. A method as claimed in Claim 10, wherein said machine comprises feed means (22) for selectively feeding water into each said compartment (10, 11, 12) of said detergent dispenser (7); said method comprising the steps of: 50
 - implementing, when said third compartment (12) contains said liquid softener, a wash program (Ai) by which said feed means (22) feed water into said third compartment (12) to flush 55

said liquid softener into said tub (3); or,
- implementing, when said third compartment (12) contains liquid bleach, at least one bleach program comprising at least one stage in which water is fed into said third compartment (12) to flush the liquid bleach into said tub (3).

12. A method as claimed in Claim 10 or 11, and comprising the step of:
 - controlling said feed means (22), when said third compartment (12) contains liquid bleach, to feed water into said third compartment (12) before at least one laundry rinse stage. 10
13. A method as claimed in Claim 12, wherein said third compartment (12) comprises at least one siphon for feeding said liquid softener or said liquid bleach from said third compartment (12) into said tub (3); said method comprising the step of commanding a rinse stage following complete removal of liquid bleach from said siphon (21). 15 20 25 30 35 40 45 50 55

FIG.1

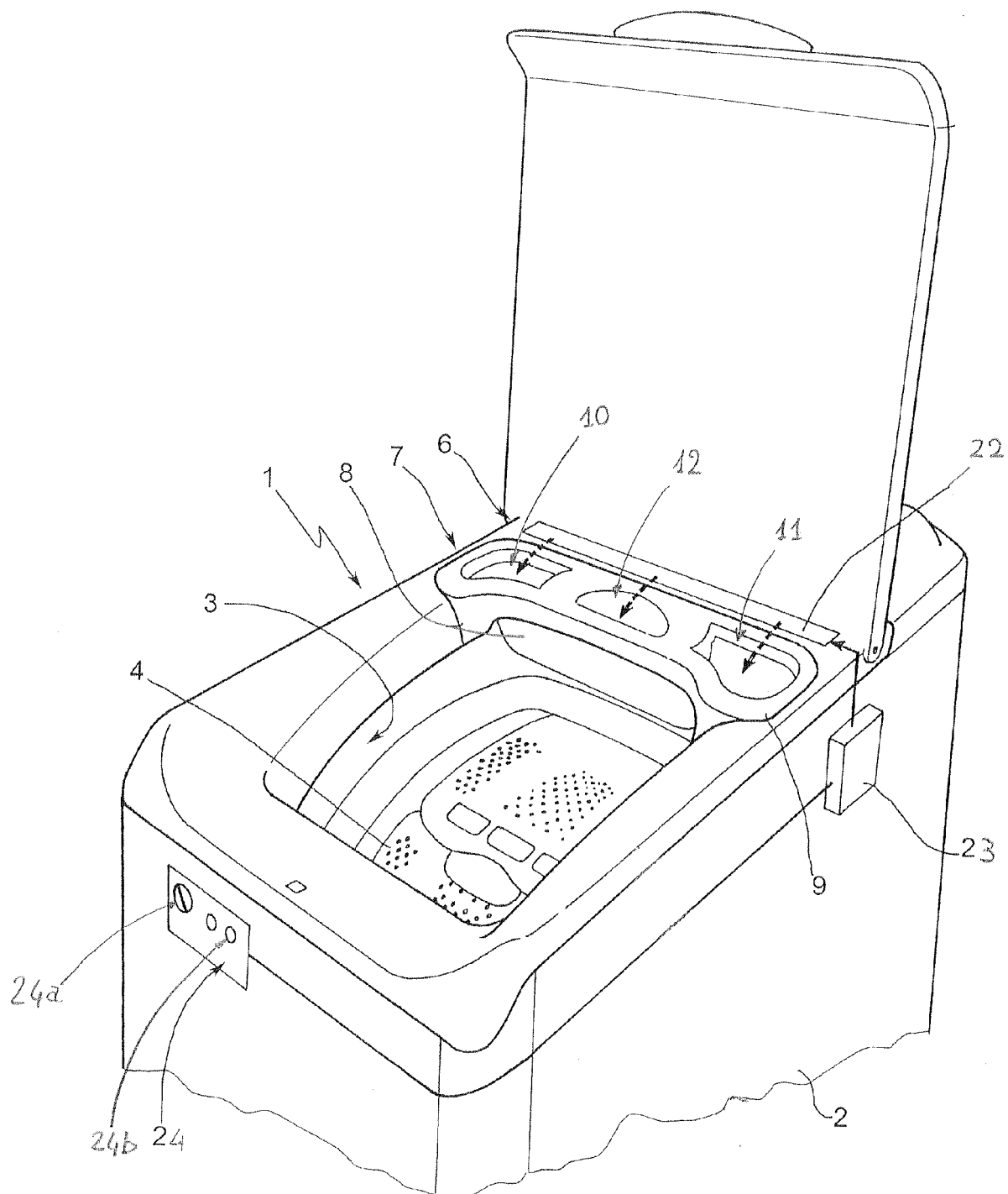


FIG.2

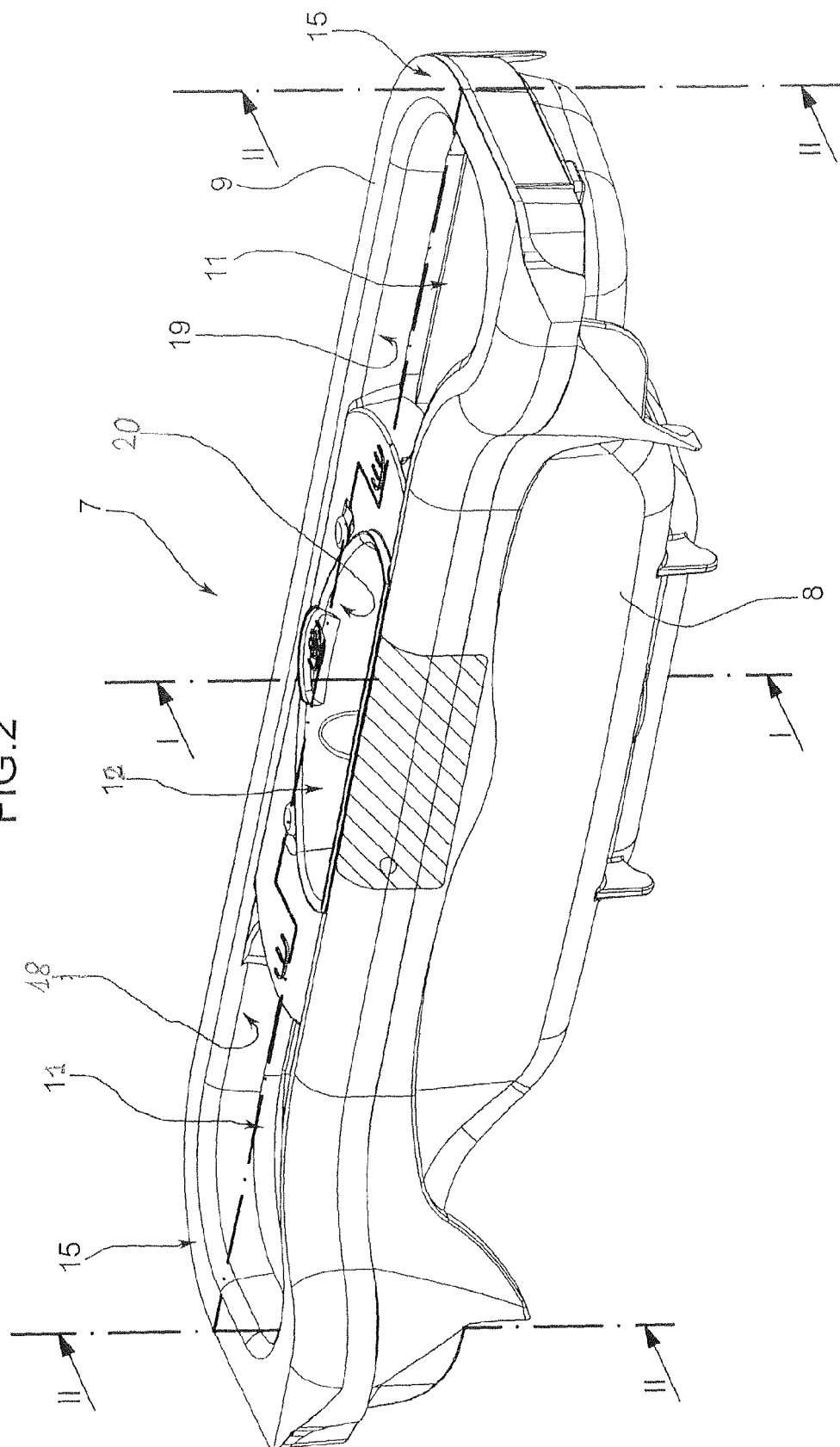


FIG. 3

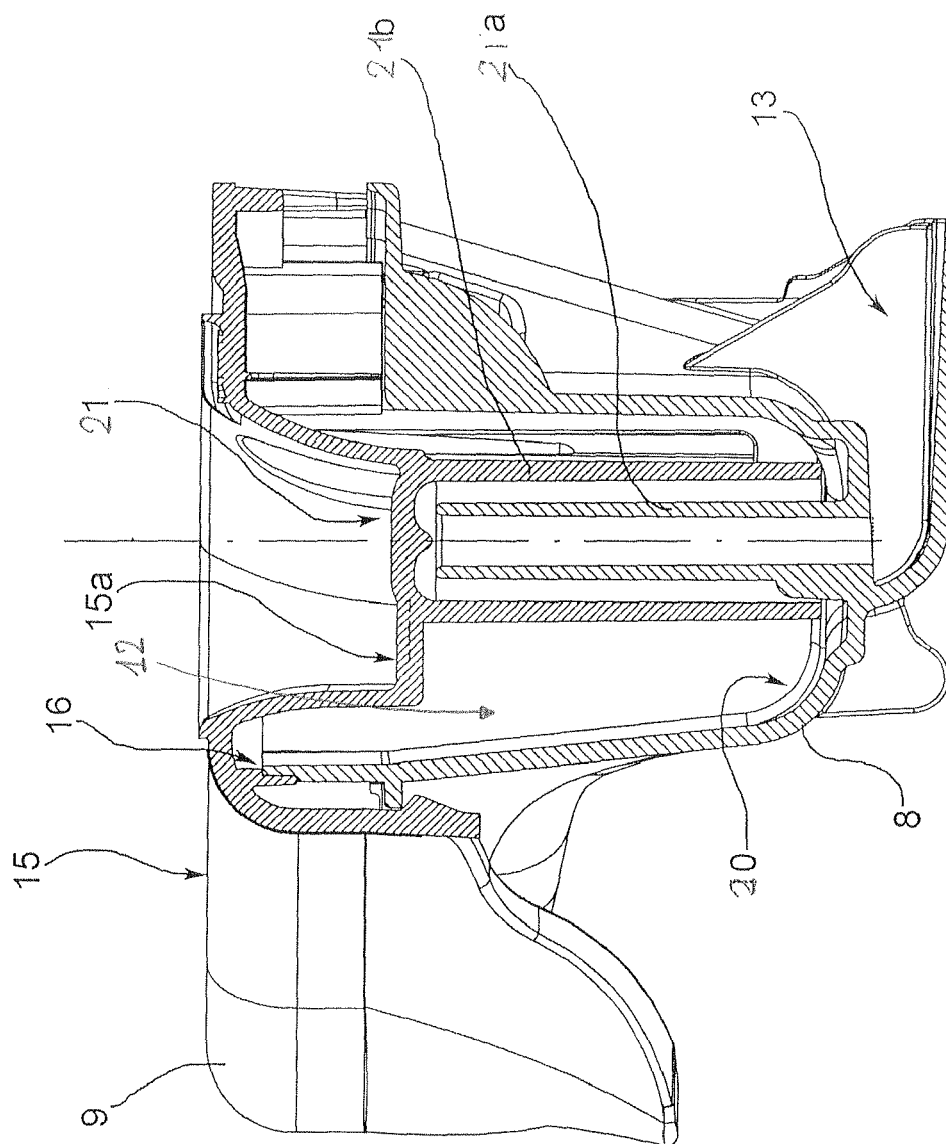
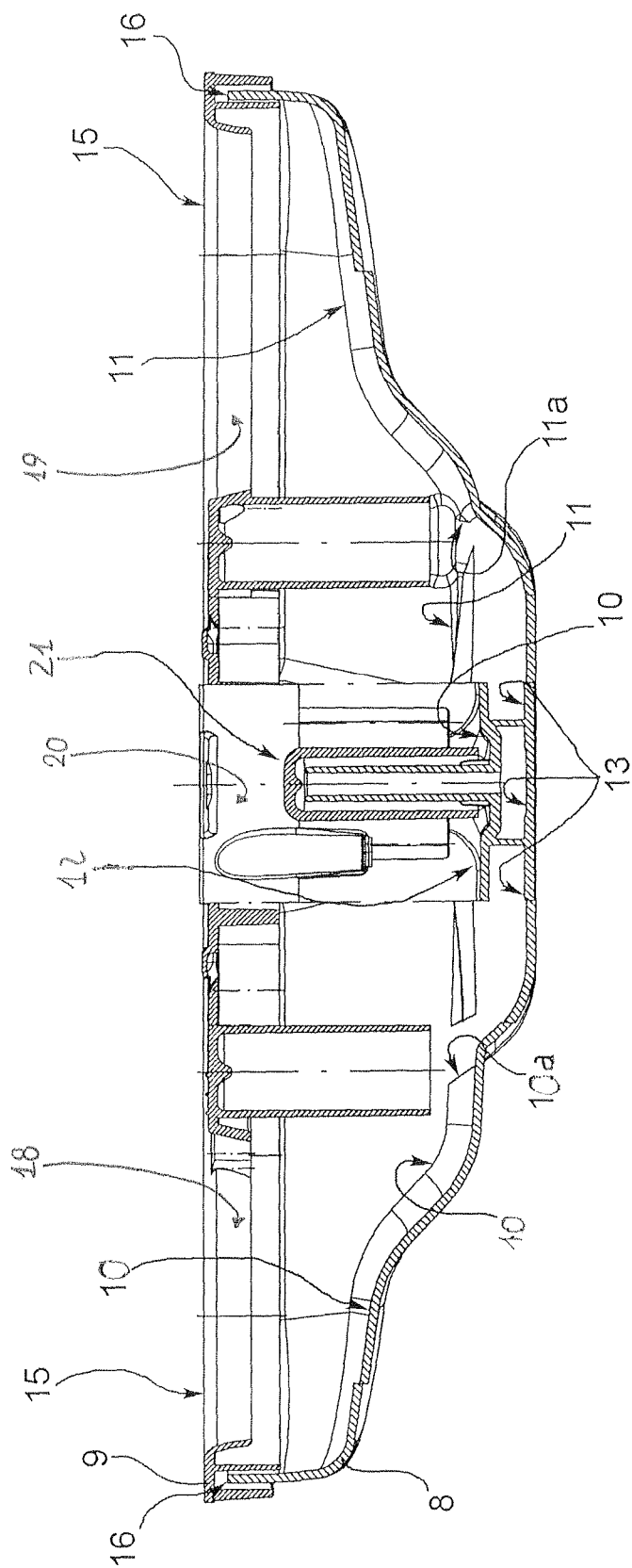


FIG. 4



Operation	Prewash	Water fill	Main wash	Rinse	Filling water	Rinse	Water fill	Rinse	Soak	End Clean
Compartment	11	10	10	10	10	10	10	10	12	11; 10
Stage	F0	F1	F2	F3	F4	F5	F6	F7	F8	F9

FIG. 5

Operation			Main wash	Rinse	Wash	Bleach Rinse	Bleach Rinse	Rinse	End Clean
Compartment			10	11	10	10	12	12	10; 11
Stage			Z1	Z2	Z3	Z4	Z5	Z6	Z7

FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 08 15 8288

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 401 499 B1 (CLARK BRIAN D [US] ET AL) 11 June 2002 (2002-06-11)	1,9	INV. D06F39/02
Y	* column 2, line 44 - line 53; figure 2 *	2-8, 10-12	
Y	----- DE 10 2005 061801 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 28 June 2007 (2007-06-28) * paragraph [0007]; figure 1 *	2-8, 10-12	
A	----- US 2003/145633 A1 (MERKLE SCOTT A [US] ET AL) 7 August 2003 (2003-08-07) * abstract; figure 5 *	1-13	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			D06F A47L
Place of search		Date of completion of the search	Examiner
Munich		13 November 2008	Westermayer, Wilhelm
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1
EPO FORM 1503.03.82 (P04C01)

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

EP 08 15 8288

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.

13-11-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6401499 B1	11-06-2002	CA 2344970 A1	31-01-2002
DE 102005061801 A1	28-06-2007	EP 1965688 A1	10-09-2008
		WO 2007074028 A1	05-07-2007
US 2003145633 A1	07-08-2003	CA 2417070 A1	06-08-2003