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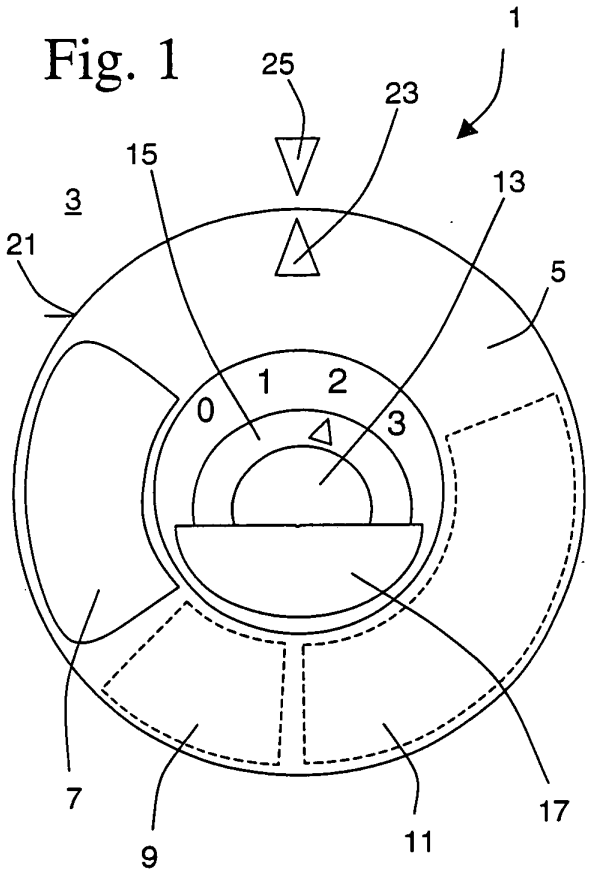
(54) Dispenser unit for a dishwashing machine

(57) The invention relates to a dispenser unit (1) for a dishwashing machine having a dispenser body, at least one detergent compartment (9, 11) arranged in the dispenser body and a dispenser lid (5) for opening and closing the at least one compartment. According to the invention, the dispenser lid (5) is pivotably or rotatably mounted on the dispenser body and adapted to open and close the at least one detergent compartment (9, 11) by a rotary movement and the rotation axis of the lid is perpendicular to the dispenser body.

Fig. 1



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Description

[0001] The present invention relates to a dispenser unit for a dishwashing machine having a lid for opening/closing at least one detergent compartment formed within a body of the dispenser unit.

[0002] In a conventional dishwashing machine the front portion of a dispenser unit is arranged at the inside of a dishwasher door. A detergent compartment for the main wash, a detergent compartment for the prewash and a rinsing aid doser are arranged in the dispenser. The prewash and main wash detergent compartments are covered by a pivotably mounted lid, wherein the pivoting axis of the lid is in an upper region of the dispenser unit. After filling the detergent compartments, the lid is closed via a lock and then the dishwasher door is closed. When the lid is released during the main wash, the lid swings out into the interior of the dishwasher and abuts against the inner wall of the door above the dispenser unit. Free space is required within the cleaning compartment of the dishwasher such that the lid can perform the swing. Further, the lid causes a knocking sound, when hitting against the doors inner wall.

[0003] It is an object of the invention to provide a dispenser unit for a dishwashing machine, which is compact and minimizes the volume necessary for opening/closing a detergent compartment. It is also an object to provide a dishwashing machine having such a dispenser unit.

[0004] The invention is defined in claims 1 and 19, respectively.

[0005] Particular embodiments of the invention are set out in the dependent claims.

[0006] According to claim 1, the dispenser unit is provided with a pivotably or rotatably mounted lid, which opens and closes at least one detergent compartment by swinging or turning the lid. The axis of rotation of the lid is perpendicular to the dispenser body such that, when the dispenser unit is mounted at an inner wall of the dishwashing machine, the lid turns parallel to the surface of the inner wall of the dishwashing machine. The lid does not swing out into the dishwashing compartment, when opening/closing the at least one detergent compartment.

[0007] In a preferred embodiment there are provided at least two detergent compartments, and in a first angular orientation of the rotatable lid a first compartment is at least partially opened or uncovered, while at least a second compartment is still closed by the lid. In this first angular orientation the detergent is washed out of the first compartment, for example from a prewash compartment during the prewash, while the detergent for the main wash is kept dry in the second detergent compartment. Of course, more than two detergent compartments may be provided under the lid, such that each compartment is successively uncovered or exposed to the cleaning liquid sprayed by the spray arms of the dishwashing machine. In an embodiment a rinsing liquid dispenser or opening may be arranged under the lid such that the rinsing liquid doser or liquid dosing opening is uncovered or exposed in a third or second angular position of the lid.

[0008] Preferably, the lid has a closed surface with the exception of an opening successively exposing the detergent compartments and/or rinsing aid doser during a rotation of the lid. Preferably, the size of the opening and/or the angular distance between the detergent compartments is selected such that at least two neighboring compartments are at least partially uncovered. In this case, the opening of the lid can be rotated by the user into a position, where two compartments (e.g. prewash and main wash detergent) can be filled in one position.

[0009] When the lid is ring-shaped, the inner area of the ring can be used for additional components of the dispenser unit, for example a refill opening and a setting level for a rinse aid doser or dispenser. Of course, the lid can have the shape of a partial ring (for example three quarters of a ring) or a partial circle (for example a semicircle) such that no additional opening is necessary in the lid.

[0010] In a preferred embodiment the (e.g. ringshaped or circle-shaped) lid has an peripheral wall such that a user can grip the lid at the periphery and turn it to a refill position or to a starting position. One or more openings may be provided at the peripheral wall such that detergent and/or rinsing aid liquid can flow or fall out of the dispenser unit at a lower section of the dispenser unit. Alternatively or additionally, -cleaning liquid may enter the dispenser unit through peripheral openings in the peripheral wall to wash out detergent and/or rinsing aid liquid.

[0011] A synchronization of the lid's angular position and the respective phase of the dishwashing program is achieved by providing a driving device for turning or pivoting the lid. A motor (e.g. an electro-motor) may be provided, which is controlled by a control unit of the dishwashing machine. Alternatively, a turbine drive or an impeller drive may be provided, which are driven by the cleaning liquid circulated within.the dishwashing machine. For example, a connection between the circulation pump of the dishwasher and the turbine drive or impeller drive are provided to supply the cleaning liquid directly to the turbine drive or impeller drive. Or the cleaning liquid sprayed by a spray arm is guided to the turbine or the impeller drive in order to rotate them. Preferably, the turbine drive or impeller drive are arranged within the dispenser unit, especially integrated at the ringshaped lid (wings or shovels). Alternatively, a wind-up drive is provided, which is wound up by a user, when turning the lid from an end position to a starting position prior to starting the dishwasher. A stop/start element interrupts or releases the rotation of the lid by the driving device, for example the turbine drive, impeller drive or wind-up drive.

[0012] In an embodiment the sealing and/or draining channels are provided at the inner side of the lid or the outer side of the dispenser body facing the lid, such that no cleaning liquid flows to the detergent compartments during these phases in which the respective detergent or rinsing aid liquid is not to be released into the interior

of the dishwashing machine.

[0013] In a preferred embodiment the dispenser body has a round insertion portion to be inserted in a round opening of an inner wall of a dishwashing machine. Forming a round opening at an inner wall is a simple manufacturing process as compared to forming more complex openings like rectangular openings or the like.

[0014] If a bayonet connector element is provided at the insertion portion, the mounting and sealing process is simplified in that the insertion portion is inserted through an opening from the rear side of an inner wall of the dishwashing machine, a bayonet counter-connector element is guided over the insertion portion and the dispenser unit is fixed by a fractional rotation of the bayonet counter-connector element. At the same time sealing is achieved by a sealing at the bottom face of the bayonet counter-connector element.

[0015] Reference is made in detail to a preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings which show:

Fig. 1 a front view of a dispenser unit with a lid in a starting position;

Fig. 2 the unit of Fig. 1 in a prewash position,

Fig. 3 the unit of Fig. 1 with the lid in a main wash position, and

Fig. 4 the unit of Fig. 1 with the lid in a rinsing position.

[0016] Fig. 1 shows a front view of a dispenser unit 1 arranged at an inner wall of a dishwashing machine door (not shown). A circular front section of about 10 mm height protrudes from the surrounding surface of the inner wall 3. Except for an inner section for a rinse aid doser 13 and an opening 7, a ring lid 5 covers the front section of the dispenser unit 1. A side wall 21 or edge of the ring lid 5 encloses the edge of the dispenser unit's front section protruding from the inner wall's surface. A user can grip the ring lid 5 at its side wall 21 and turn it clockwise or counter-clockwise.

[0017] Fig. 1 shows the ring lid 5 being in a starting position in which a position indicator 23 of the ring lid 5 faces a start indicator 25 being formed at the inner wall 3. In this starting position the ring lid 5 covers a prewash compartment 9 and a main wash compartment 11 both being formed under the lid 5 within the dispenser unit 1. The inner circular opening of the ring lid 5 exposes the rinse aid doser 13 having a setting or dose level 15 for setting the amount of rinse aid liquid to be used during the rinse phase. A hinged doser lid 17 is provided, which can be swung aside to expose a refill opening of the rinse aid doser 13. In the starting position of Fig. 1 the opening 7 exposes a plane surface of the front section of the dispenser unit 1, i.e. the upper surface of the protruding dispenser unit 1 closes the opening 7 from behind.

[0018] Fig. 2 shows the dispenser unit 1 of Fig. 1, while the ring lid 5 has been turned into a prewash position marked 'P'. The lid 5 has turned in counter-clockwise direction from the starting position 25 to the prewash position P and the opening 7 is now positioned over the prewash compartment 9. In this position, the prewash detergent is washed out of the compartment 9 by the cleaning liquid sprayed from a rotating spray arm into the compartment 9. In position P the rotation of the ring lid 5 is stopped during the prewash program sequence and rotation of the lid 5 is restarted as soon as the program continues with the main wash sequence. When the lid 5 turns further counter-clockwise, the compartment 9 is completely exposed such that all detergent remainders are washed out of prewash compartment 9.

[0019] During the main wash phase the lid rotates until the opening 7 exposes the main wash compartment 11 in a main wash position M indicated in Fig. 3, and the main wash detergent is washed out by cleaning liquid sprayed from the spray arm into the main wash compartment 11.

[0020] Fig. 4 shows the lid 5 being turned to a rinsing position marked 'R'. In this position the rinsing aid liquid is exhausted into the washing compartment of the dishwasher. In position R an opening 29 at the side wall 21 of the lid 5 faces a channel opening of channel 31 (dotted lines). The liquid sprayed from the spray arms is collected by the slightly tapered opening 29 in the side wall 21 and flows through the channel 31 to an outlet of the rinse aid doser 13. The rinse aid diluted by the cleaning liquid flows out of the dispenser unit 1 via a drain channel 31 (dotted lines) and through an opening 33 in the side wall 21 of the lid 5. Collecting and exhausting the liquids is indicated in Fig. 4 by the arrows.

[0021] The rotation of ring lid 5 is driven by a synchronous motor (not shown) being operated or stopped under the control of a control unit of the washing machine. If necessary, the rotation of the lid 5 is stopped in the positions as shown in Figs. 1 to 4 during the corresponding sequence of the washing program. Then rotation is resumed, when the next sequence of the washing program is to be started. After the washing program, the lid stops in the position R as shown in Fig. 4. For refilling the prewash and main wash compartments 9, 11 the user can freely rotate the lid in clock or counter-clock direction and position the lid in an intermediate position between positions P and M shown in Figs. 2 and 3. In this intermediate position both compartments are at least partially exposed by opening 7, and the detergent amount for each compartment can be filled into the respective compartment. After refilling is finished, the user rotates the lid into the starting position 25 as shown in Fig. 1.

[0022] In an embodiment not shown the compartments 9, 11 are arranged on the left half side of the dispenser unit 1, and the opening 7 is correspondingly arranged to the right of arrow 23. In such configuration the lid plate closes the deepest points of the compartments at the latest time during counter-clockwise rotation of the lid, such that all liquid drains out at the lowest point of the

compartments and no liquid or contamination can accumulate at the lowest point of the compartments.

[0023] In another embodiment the lid has a semi-ring form or a semi-circle form or the opening 7 extends about 180°. In starting position 25 the lid covers all compartments and liquid doser openings, while in an end position (like R) all compartments and liquid doser openings are exposed or uncovered. In such a configuration the compartments remain uncovered until the user fills the compartments with the respective detergent and turns the lid back to the starting position 25.

Reference Numerals List

[0024]

1	dispenser unit
3	inner wall
5	ring lid
7	opening
9	prewash compartment
11	main wash compartment
13	rinse aid doser
15	dose level
17	doser lid
21	side wall
23	position indicator
25	start indicator
27	feeding channel
29	collection opening
31	drain channel
33	exhaust opening

Claims

1. Dispenser unit (1) for a dishwashing machine having a dispenser body, at least one detergent compartment (9, 11) arranged in the dispenser body and a dispenser lid (5) for opening and closing the at least one compartment, wherein the dispenser lid (5) is pivotably or rotatably mounted on the dispenser body and adapted to open and close the at least one detergent compartment (9, 11) by a rotary movement and wherein the rotation axis of the lid is perpendicular to the dispenser body.

2. Dispenser unit according to claim 1, wherein at least two detergent compartments (9, 11) are arranged in the dispenser body and a first compartment (9) is uncovered by the lid in a first angular orientation (P) of the lid (5) and a second compartment (11) is uncovered by the lid in a second angular orientation (M) of the lid.

3. Dispenser unit according to claims 1 or 2, wherein an opening (7) is arranged in'the lid (5), the opening uncovering the first compartment (9) in the first angular orientation (P) and/or uncovering the second compartment (11) in the second angular orientation (M).

4. Dispenser unit according to claims 2 or 3, wherein in an intermediate angular orientation of the lid (5) the opening at least partially uncovers the first and the second compartments (9, 11).

5. Dispenser unit according to any of the previous claims, wherein the lid (5) is ring-shaped or circular-shaped.

6. Dispenser unit according to any of the previous claims, wherein the lid (5) has a peripheral wall (21).

7. Dispenser unit according to claim 6, wherein at least one opening (29, 33) is arranged in the peripheral wall (21) .

8. Dispenser unit according to claim 7, wherein at least one opening (29) in the peripheral wall (21) is funnel-shaped.

9. Dispenser unit according to any of the previous claims, wherein in a predetermined angular position (R) of the lid (5) a first peripheral opening (29) opens to a first channel (27) opening in a peripheral region of the dispenser body.

10. Dispenser unit according to claim 9, wherein in the predetermined angular position (R) of the lid (5) a second peripheral opening (33) opens to a drain channel (31) opening in a peripheral region of the dispenser body.

11. Dispenser unit according to claim 10, wherein the first channel (27) and/or the drain channel (31) are connected to a rinse dispensing device (13).

12. Dispenser unit according to any of the previous claims, wherein a rinse dispensing device (13) is arranged in a center opening of the lid (5).

13. Dispenser unit according to any of the previous claims, comprising a driving device for turning or pivoting the lid (5).

14. Dispenser unit according to claim 13, wherein the driving device is a motor, a wind-up drive, a turbine drive or an impeller drive.

15. Dispenser unit according to claim 13 or 14, comprising a stop/start element for stopping/starting the driving device.

16. Dispenser unit according to any of the previous claims, wherein at least one sealing and/or at least

one draining channel is arranged at the inside of the lid (5) and/or at the outside of the dispenser body.

17. Dispenser unit according to any of the previous claims, wherein the dispenser body has a round insertion portion for mounting the dispenser unit (1) in a round opening of an inner wall (3) of a dishwashing machine.

18. Dispenser unit according to claim 17, wherein the round insertion portion comprises a bayonet connector element.

19. Dishwashing machine having a dispenser unit (1) according to any of the previous claims.

Fig. 1

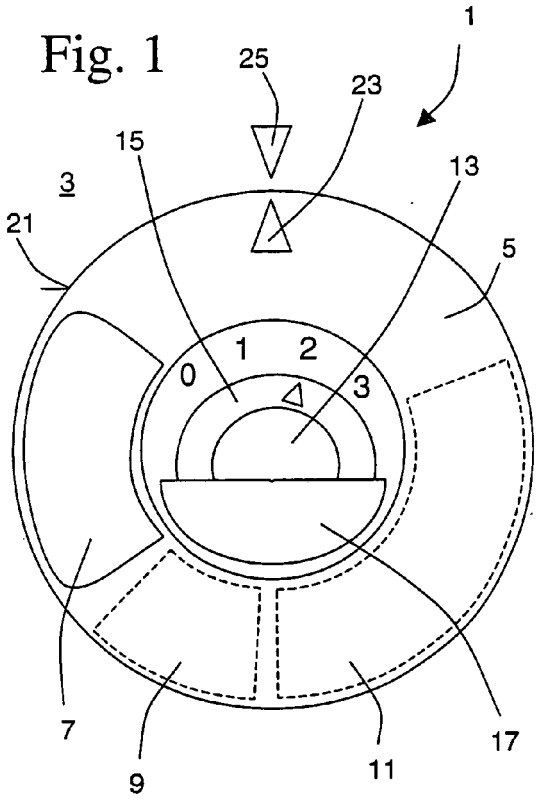


Fig. 2

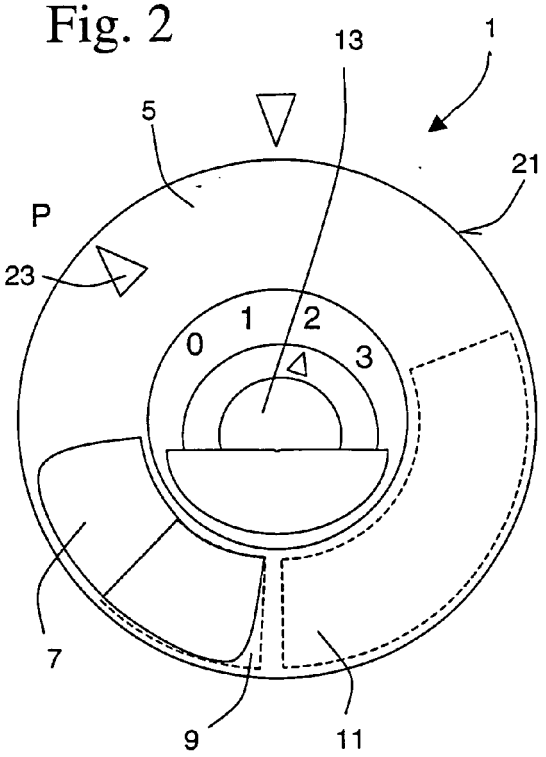


Fig. 3

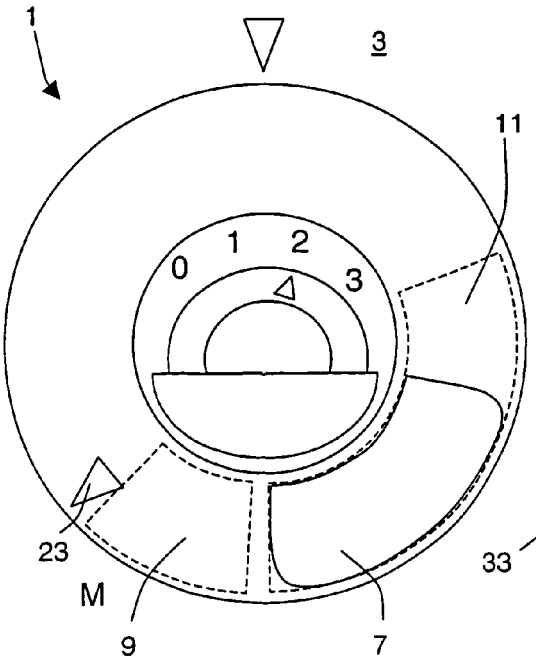
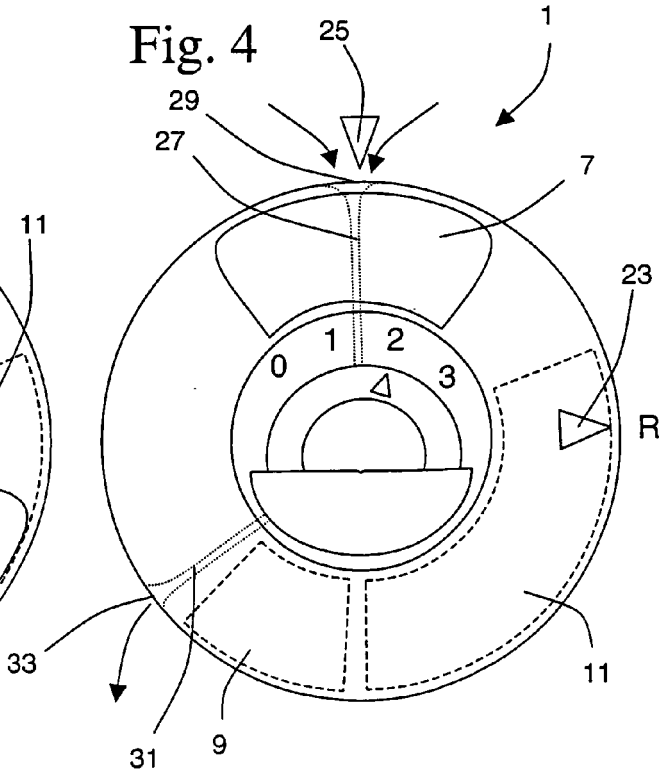


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 05 02 3109

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 April 2006	Norman, P

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
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