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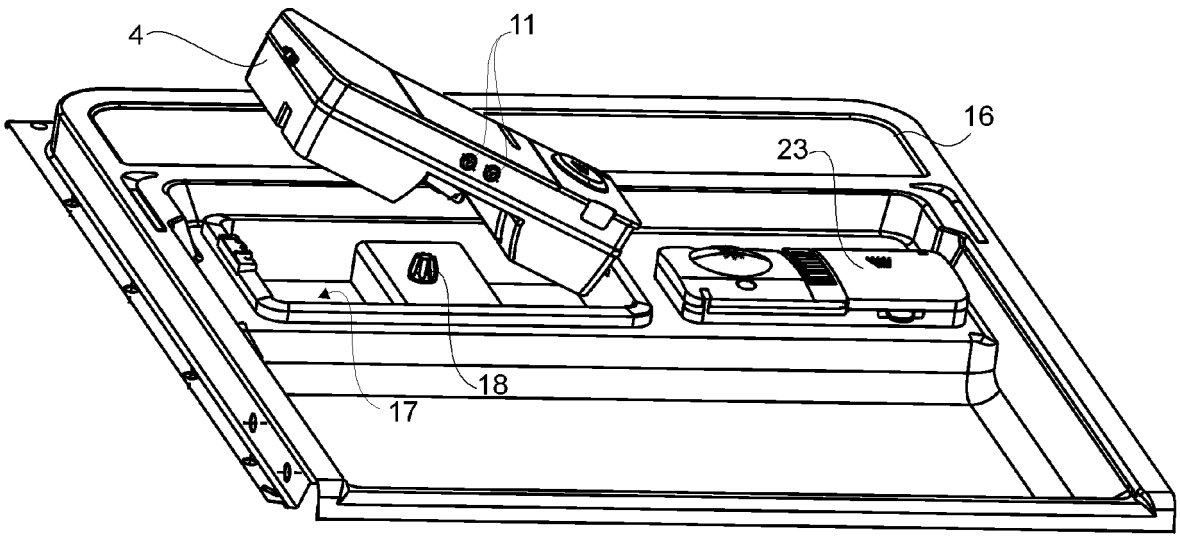
(54) **A DISHWASHER**

(57) The present invention relates to a dishwasher (1) comprising a body (2); a washing cabin (3) that is disposed on the body (2) and wherein the washing process is performed; a detergent dispenser (4) that is detachably mounted on the body (2) and wherein liquid/gel detergent (D) can be filled; and a control unit (5) n the memory of which the amount of liquid/gel detergent to be transferred to the washing cabin (3) according to the washing type predetermined by the producer is saved.

Figure 2



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Description

[0001] The present invention relates to a dishwasher comprising a liquid/gel detergent dosing unit that can dose the required amount of detergent into the washing cabin.

[0002] In dishwashers, it is important that the use of detergent should be at the optimum level for cleaning the dishes in terms of both the life span of the dishes and of also our health and pollution of the environment because of the chemicals contained therein. At the start of each washing cycle, the detergent is filled into the detergent dispenser disposed on the machine by the user. In washing cycles wherein intensively dirty dishes are washed, generally the use of greater amounts of detergent is preferred. Using the detergent in the right amount is among the factors that directly affect the washing performance. Therefore, lately the use of powder or gel/liquid detergents, the amount of which depends on user preference is becoming widespread. However, the amount of detergent being determined by the user cannot always provide the optimum washing performance. The user can use less or more detergent that is not suitable with the selected program. Therefore, problems of detergent residues due to adding high amounts of detergent for the short programs selected for dishes with low dirt, and problems of insufficient washing due to using less detergent in a program selected for dishes with high dirt can occur.

[0003] In the state of the art European Patent No. EP2073684, a household appliance is disclosed, that comprises a detergent dosing unit.

[0004] The aim of the present invention is the realization of a dishwasher wherein the liquid/gel dosing operation can be performed automatically.

[0005] The dishwasher realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, comprises a body; a washing cabin disposed on the body wherein the washing process is performed; and a dosing mechanism that automatically transfers detergent to the washing cabin. The detergent receptacle disposed in the detergent dispenser is filled by the user. The required amount of detergent during the washing process is provided from the detergent receptacle and transferred to the washing cabin.

[0006] The dishwasher of the present invention comprises a detergent receptacle wherein the detergent is filled by the user; and a scaling receptacle wherein the detergent to be transferred from the detergent receptacle to the washing cabin in the present cycle is collected. The dosing mechanism is in the open position when the detergent flow from the detergent receptacle to the scaling receptacle is enabled and in the closed position when the flow is disabled. The control unit enables the transition of the dosing mechanism between the open and closed positions by controlling the operation of the dosing mechanism. Thus, the amount of detergent required according to the dirtiness ratio of the dishes and the amount of dishes is provided from the detergent dispenser without requiring the user to add detergent in each washing cycle.

[0007] In an embodiment of the present invention, the dosing mechanism comprises at least one first opening disposed between the detergent receptacle and the scaling reservoir; and at least one second opening that opens from the scaling receptacle to the washing cabin. A crankshaft that is energized by the motor is disposed in the direction of the openings and a piston rod that moves as connected to the crankshaft is provided. The dosing mechanism is enabled to change to the open or closed position by means of a piston that moves vertically as connected to the piston rod, a support disposed on the piston, and gaskets disposed on the lower and upper surfaces of the support. When the dosing mechanism is in the open position, the amount of detergent to be transferred to the washing cabin is transmitted from the detergent receptacle to the scaling receptacle.

[0008] In an embodiment of the present invention, more than one first gasket is disposed on the upper surface of the support and more than one second gasket on the lower surface thereof. When the piston moves towards the scaling receptacle, the second openings are closed by the second gaskets. By means of the first opening, detergent flow from the detergent receptacle to the scaling receptacle is realized and the dosing mechanism changes to the open position. When the piston moves towards the detergent receptacle, the first openings are closed by the first gaskets, thus providing detergent flow from the second openings towards the washing cabin.

[0009] In an embodiment of the present invention, a door and a stationary detergent distribution unit that enables the use of powder or solid detergent are disposed on the body. The detergent dispenser can be disposed on the door or on the washing cabin with the detergent distribution unit.

[0010] In an embodiment of the present invention, the control unit enables the dosing mechanism to change to the open and closed positions more than once in order to provide the necessary amount of detergent in the intensive washing programs.

[0011] In an embodiment of the present invention, the dishwasher comprises the dosing mechanism that stays in the closed position during the cycle after the detergent taking process is completed. Thus, the detergent residues remaining on the scaling receptacle are enabled to be cleaned by means of the wash water. When the dishwasher passes to the drying step, the scaling receptacle is enabled to be dried.

[0012] In an embodiment of the present invention, a housing wherein the detergent dispenser is disposed is arranged on the door or the washing cabin.

[0013] In an embodiment of the present invention, the dishwasher comprises a bevel gear that enables the detergent dispenser to be fixed.

[0014] In an embodiment of the present invention, the dishwasher comprises a cover that isolates the scaling receptacle, the detergent receptacle and the dosing mechanism from the outer environment. The cover is

fixed on the detergent dispenser by means of a lock.

[0015] In an embodiment of the present invention, the dishwasher comprises a filling opening that is arranged on the cover and that opens to the detergent receptacle; and a filling cover that isolates the filling opening from the outer environment. Thus, the user can fill detergent without taking out the detergent dispenser from the dishwasher.

[0016] The dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

Figure 1 - is the perspective view of the dishwasher.
Figure 2 - is the perspective view of the detergent dispenser on the door.
Figure 3 - is the schematic view of the detergent receptacle and the scaling receptacle when the dosing mechanism is in the closed position.
Figure 4 - is the schematic view of the detergent receptacle and the scaling receptacle when the dosing mechanism is in the open position.
Figure 5 - is the perspective view of the detergent dispenser.
Figure 6 - is the perspective view of the detergent dispenser, the motor, and the control unit.

[0017] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing cabin
4. Detergent dispenser
5. Control unit
6. Motor
7. Dosing mechanism
8. Detergent receptacle
9. Scaling receptacle
10. First opening
11. Second opening
12. Crankshaft
13. Piston rod
14. Piston
15. 115 - Gasket
16. Door
17. Housing
18. Bevel gear
19. Cover
20. Lock
21. Filling opening
22. Filling cover
23. Stationary detergent distribution unit
24. Support

[0018] The dishwasher (1) comprises a body (2); a washing cabin (3) that is disposed on the body (2) and wherein the washing process is performed; a detergent dispenser (4) that is detachably mounted to the body (2) and wherein liquid/gel detergent (D) can be filled; and a control unit (5) in the memory of which the amount of liquid/gel detergent to be transferred to the washing cabin (3) according to the washing type predetermined by the producer is saved. By means of the dosing mechanism (7), the need for the detergent to be filled by the user in the dishwasher (1) at the beginning of each washing cycle is eliminated. The amount of detergent needed during the washing cycle is provided by automatically dosing the detergent filled in the detergent dispenser (4).

[0019] The dishwasher (1) of the present invention comprises a detergent receptacle (8) that is disposed in the detergent dispenser (4) and wherein the detergent is filled; a scaling receptacle (9) that is disposed next to the detergent receptacle (8) and wherein the detergent the amount of which is determined by the control unit (5) according to the selected program is transferred from the detergent receptacle (8); the dosing mechanism (7) that is disposed between the detergent receptacle (8) and the scaling receptacle (9) and that has an open position (A) wherein the flow of the detergent from the detergent receptacle (8) towards the scaling receptacle (9) is enabled, and a closed position (K) wherein the flow of the detergent is disabled; and the control unit (5) that controls the transition of the dosing mechanism (7) between the open (A) and closed (K) positions. During the washing process, the detergent to be transferred to the washing cabin (3) is first transmitted from the detergent receptacle (8) to the scaling receptacle (9). When the dosing mechanism (7) is in the open position (A), detergent transmission from the detergent dispenser (4) to the washing cabin (3) is not realized. The amount of detergent to be transferred is determined by the control unit (5) according to the density of the dishes. Thus, by automatically determining the amount of detergent according to the amount of dishes and the dirtiness ratio, the detergent can be delivered to the washing cabin (3) by means of the dosing mechanism (7). Thus, the dishes are enabled to be washed with the appropriate amount of detergent without requiring the user to add detergent before each washing. Thus, the user satisfaction is improved and the detergent consumption is realized at an optimum level.

[0020] In an embodiment of the present invention, the dishwasher (1) comprises at least one first opening (10) that is disposed between the detergent receptacle (8) and the scaling receptacle (9) and that enables the transmission of the detergent from the detergent receptacle (8) to the scaling receptacle (9); at least one second opening (11) that is disposed between the scaling receptacle (9) and the washing cabin (3) and that enables the transmission of the detergent from the scaling receptacle (9) to the washing cabin (3); a crankshaft (12) disposed on the detergent receptacle (8) in the direction of the first opening (11) and the second opening (12); a motor (6) the operation of which is controlled by the control unit (5) and that moves the crankshaft (12); a piston rod (13) one end of which is connected to the crankshaft (12), the other end extending in the direction of the scaling receptacle

(9); a piston (14) that is disposed on the scaling receptacle (9) and that moves in the vertical direction as being connected to the piston rod (13); a support (24) that is connected to the piston (14) and that moves with the piston (14); and more than one gasket (15, 115) that is disposed on the upper and lower surfaces of the support (24) and that enables the dosing mechanism (7) to change to the open (A) and closed (K) positions depending on the movement of the piston (14). The motor (6) starts to operate according to the information received from the control unit (5). With the operation of the motor (6), the crankshaft (12) rotates and enables the piston rod (13) connected to the crankshaft (12) to move in the vertical direction. Thus, the piston (14) that is connected to the piston rod (13) and the support (24) that is connected to the piston (14) are enabled to move in the vertical direction. The gaskets (15,115) are enabled to open and close the first openings (10) or the second openings (11) depending on the movement direction of the support.

[0021] In an embodiment of the present invention, the dosing mechanism (7) comprises at least one first gasket (15) that is disposed on the upper surface of the support (24) and that enables the dosing mechanism (7) to change to the closed position (K) by enabling the first openings (10) to close when the piston (14) moves towards the detergent receptacle (8); and at least one second gasket (115) that enables the dosing mechanism (7) to change to the open position (A) by enabling the second openings (11) to close when the piston (14) moves towards the scaling receptacle (9). By means of the piston (14) moving in the vertical direction, the support (24) also moves in the vertical direction. By means of the support (24) moving downwards, the second gaskets (115) disposed in the lower part thereof close the second openings (11) and the dosing mechanism (7) is enabled to change to the open position (A). When the support (24) moves upwards, the gaskets (15) disposed in the upper part thereof close the first openings (10). Thus, the detergent is transferred from the scaling receptacle (9) towards the washing cabin (3) by enabling the dosing mechanism (7) to change to the closed position (K).

[0022] In an embodiment of the present invention, the dishwasher (1) comprises a door (16) disposed on the body (2); a stationary detergent distribution unit (23) that enables the use of powder or solid detergent and wherein detergent is filled in such an amount that the entire detergent can be used in a single washing cycle; and a detergent dispenser (4) disposed on the door (16) or the washing cabin (3). The use of the detergent dispenser (4) with the present detergent distribution unit (23) provides the user with the ease of selecting the type of detergent and the ease of use.

[0023] In an embodiment of the present invention, the control unit (5) enables the dosing mechanism (7) to change to the open position (A) more than once and enables the detergent to be transmitted from the scaling receptacle (9) to the washing cabin (3) more than once in the washing programs wherein the need for detergent is high. There may be a need for more detergent in the intensive washing programs. In cases where more amount of detergent is needed than the amount of detergent that the scaling receptacle (9) can take, the dosing mechanism (7) can transmit detergent to the washing cabin (3) more than once.

[0024] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (5) that enables the dosing mechanism (7) to remain in the closed position (K) after the process of taking detergent is completed, and that enables the scaling receptacle (9) to be cleaned by means of the wash water entering through the second opening (11). The dosing mechanism (7) remains in the closed position (K) during the washing cycle in order to clean the detergent residues. Thus, the detergent residues are enabled to be cleaned with the water entering through the second opening (11). In the drying step of the dishwasher (1), the scaling receptacle (9) is also enabled to be dried.

[0025] In an embodiment of the present invention, the dishwasher (1) comprises a housing (17) that is disposed on the door (16) or the washing cabin (3) and wherein the detergent dispenser (4) is disposed. Thus, the detergent dispenser (4) can easily be detached from or attached on the dishwasher (1) by the user.

[0026] In an embodiment of the present invention, the dishwasher (1) comprises a bevel gear (18) that is disposed on the housing (17) and that enables the detergent dispenser (4) to be fixed. By means of the bevel gear (18), the detergent dispenser (4) can easily be centered and fixed in the housing (17).

[0027] In an embodiment of the present invention, the dishwasher (1) comprises a cover (19) that is disposed on the detergent dispenser (4) and that isolates the detergent receptacle (8), the scaling receptacle (9) and the dosing mechanism (7) from the outer environment; and a lock (20) that enables the cover (20) to be fixed on the detergent dispenser (4). The cover (19) can be easily detached from the detergent dispenser (4) and cleaned by the user.

[0028] In an embodiment of the present invention, the dishwasher (1) comprises a filling opening (21) that is disposed on the cover (19) and that enables the user to fill detergent to the detergent receptacle (8) and a filling cover (22) that isolates the filling opening (21) from the outer environment. The user can easily fill detergent to the detergent receptacle (8) by opening the filling cover (22) without detaching the detergent dispenser (4) from the dishwasher (1).

[0029] By means of the present invention, a dishwasher (1) is realized, comprising the liquid/gel detergent dosing mechanism (7) as well as the present stationary detergent distribution unit (23). Thus, the amount of detergent is adjusted by the control unit (5) without requiring the user to fill detergent before each washing cycle. The right dose of detergent is determined according to the amount of the dishes and used in the washing process.

Claims

1. A dishwasher (1) comprising a body (2); a washing cabin (3) that is disposed on the body (2) and wherein the washing process is performed; a detergent dispenser (4) that is detachably mounted to the body (2) and wherein liquid/gel detergent (D) can be filled; and a control unit (5) in the memory of which the amount of liquid/gel detergent to be transferred to the washing cabin (3) according to the washing type predetermined by the producer is saved, **characterized by** a detergent receptacle (8) that is disposed in the detergent dispenser (4) and wherein the detergent is filled; a scaling receptacle (9) that is disposed next to the detergent receptacle (8) and wherein the detergent the amount of which is determined by the control unit (5) according to the selected program is transferred from the detergent receptacle (8) and collected; a dosing mechanism (7) that is disposed between the detergent receptacle (8) and the scaling receptacle (9) and that has an open position (A) wherein the flow of the detergent from the detergent receptacle (8) towards the scaling receptacle (9) is enabled, and a closed position (K) wherein the flow of the detergent is disabled; and the control unit (5) that controls the transition of the dosing mechanism (7) between the open (A) and closed (K) positions.

2. A dishwasher as in Claim 1, **characterized by** at least one first opening (10) that is disposed between the detergent receptacle (8) and the scaling receptacle (9) and that enables the transmission of the detergent from the detergent receptacle (8) to the scaling receptacle (9); at least one second opening (11) that is disposed between the scaling receptacle (9) and the washing cabin (3) and that enables the transmission of the detergent from the scaling receptacle (9) to the washing cabin (3); a crankshaft (12) disposed on the detergent receptacle (8) in the direction of the first opening (11) and the second opening (12); a motor (6) the operation of which is controlled by the control unit (5) and that moves the crankshaft (12); a piston rod (13) one end of which is connected to the crankshaft (12), the other end extending in the direction of the scaling receptacle (9); a piston (14) that is disposed on the scaling receptacle (9) and that moves in the vertical direction as being connected to the piston rod (13); a support (24) that is connected to the piston (14) and that moves with the piston (14); and more than one gasket (15, 115) that is disposed on the upper and lower surfaces of the support (24) and that enables the dosing mechanism (7) to change to the open (A) and closed (K) positions depending on the movement of the piston (14).

3. A dishwasher (1) **characterized by** the dosing mechanism (7) comprising at least one first gasket (15) that is disposed on the upper surface of the support (24) and that enables the dosing mechanism (7) to change to the closed position (K) by enabling the first openings (10) to close when the piston (14) moves towards the detergent receptacle (8); and at least one second gasket (115) that enables the dosing mechanism (7) to change to the open position (A) by enabling the second openings (11) to close when the piston (14) moves towards the scaling receptacle (9).

4. A dishwasher (1) as in any one of the above claims, **characterized by** a door (16) disposed on the body (2); a stationary detergent distribution unit (23) that enables the use of powder or solid detergent and wherein detergent is filled in such an amount that the entire detergent can be used in a single washing cycle; and a detergent dispenser (4) disposed on the door (16) or the washing cabin (3).

5. A dishwasher (1) as in any one of the above claims, **characterized by** the control unit (5) that enables the dosing mechanism (7) to change to the open position (A) more than once and enables the detergent to be transmitted from the scaling receptacle (9) to the washing cabin (3) more than once in the washing programs wherein the need for detergent is high.

6. A dishwasher (1) as in any one of the above claims, **characterized by** the control unit (5) that enables the dosing mechanism (7) to remain in the closed position (K) after the process of taking detergent is completed, and that enables the scaling receptacle (9) to be cleaned by means of the wash water entering through the second opening (11).

7. A dishwasher (1) as in any one of the above claims, **characterized by** a housing (17) that is disposed on the door (16) or the washing cabin (3) and wherein the detergent dispenser (4) is disposed.

8. A dishwasher (1) as in any one of the above claims, **characterized by** a bevel gear (18) that is disposed on the housing (17) and that enables the detergent dispenser (4) to be fixed.

9. A dishwasher (1) as in any one of the above claims, **characterized by** a cover (19) that is disposed on the detergent dispenser (4) and that isolates the detergent receptacle (8), the scaling receptacle (9) and the dosing mechanism (7) from the outer environment and a lock (20) that enables the cover (20) to be fixed on the detergent dispenser (4).

10. A dishwasher (1) as in any one of the above claims, **characterized by** a filling opening (21) that is dis-

posed on the cover (19) and that enables the user to fill detergent to the detergent receptacle (8) and a filling cover (22) that isolates the filling opening (21) from the outer environment.

Figure 1

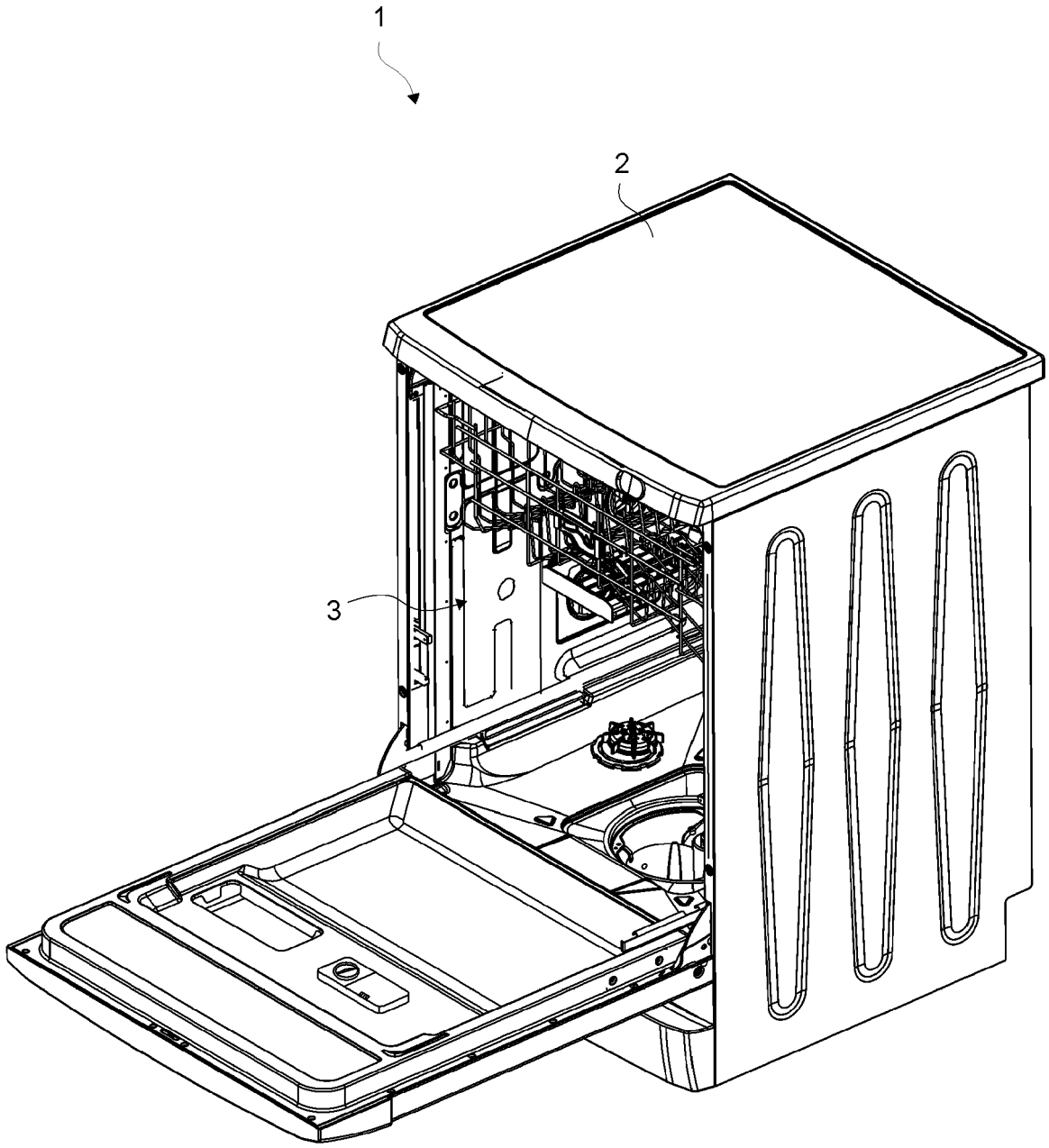


Figure 2

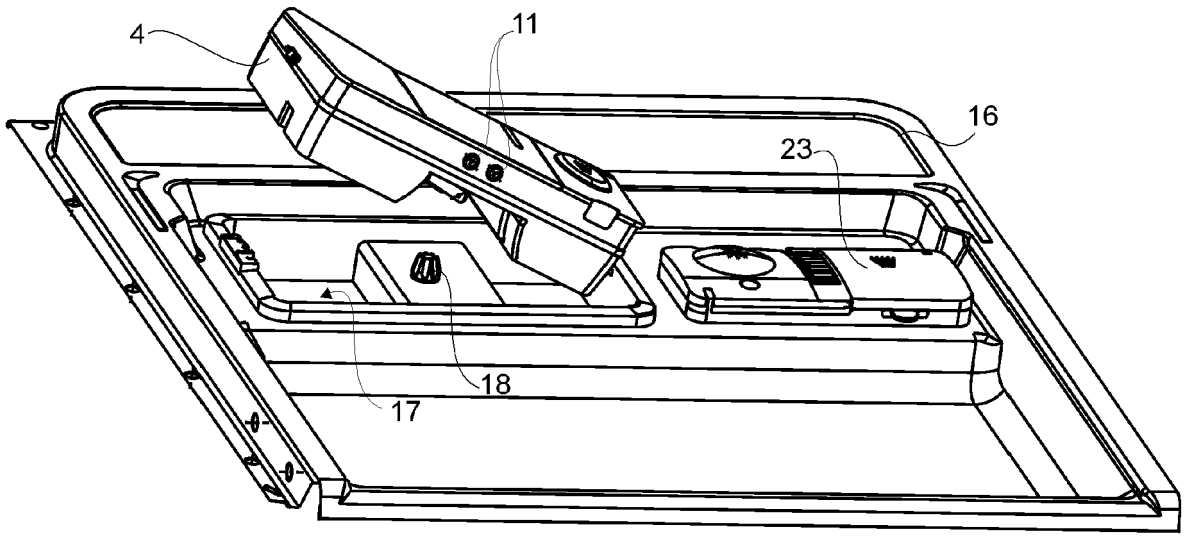


Figure 3

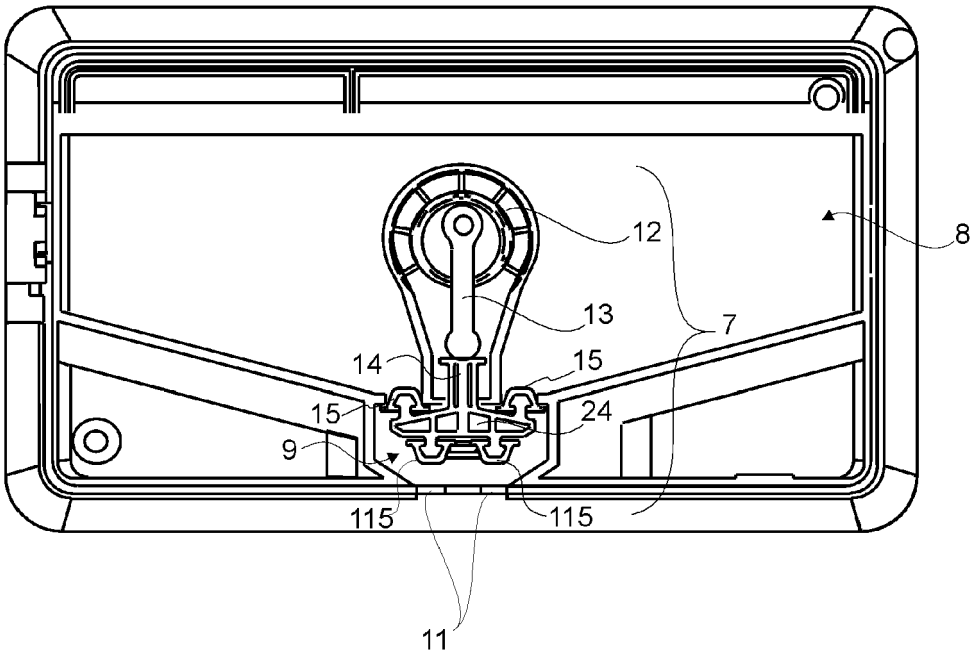


Figure 4

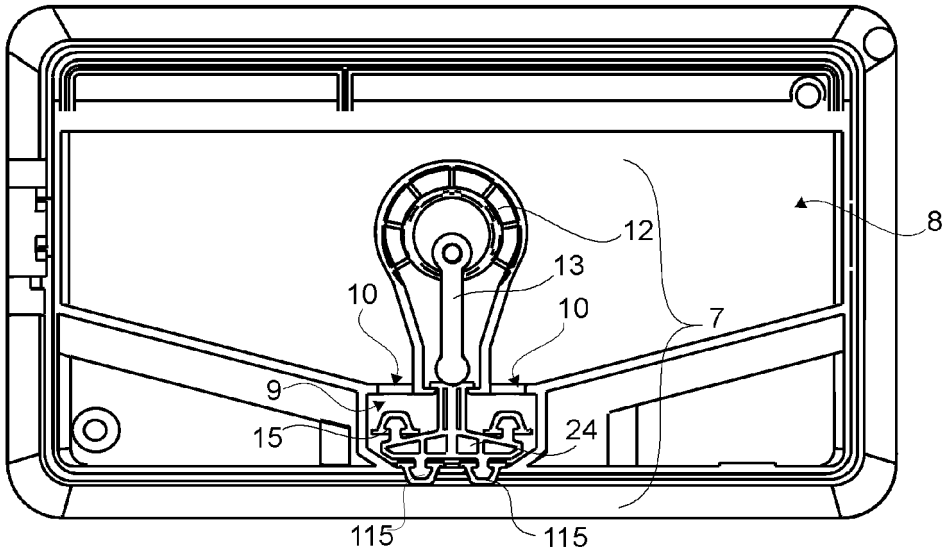


Figure 5

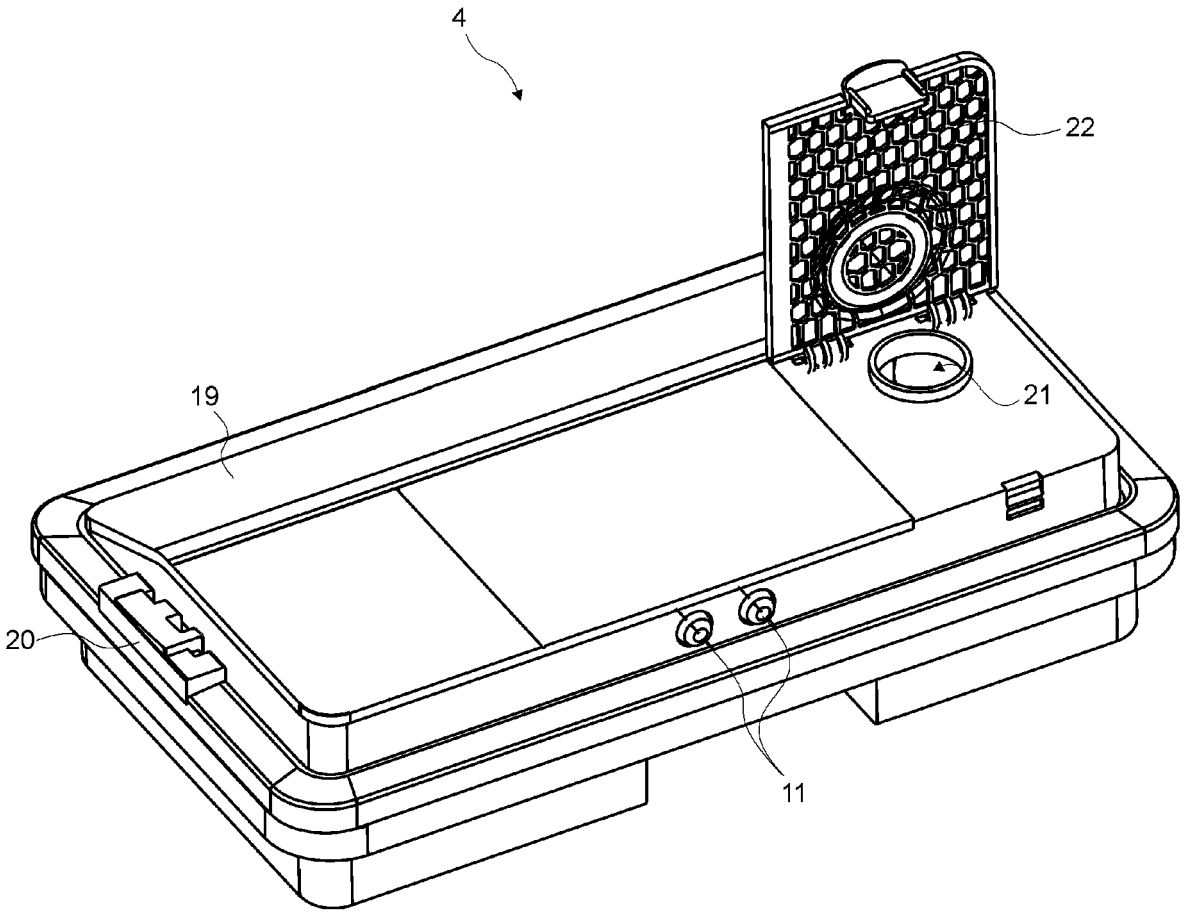
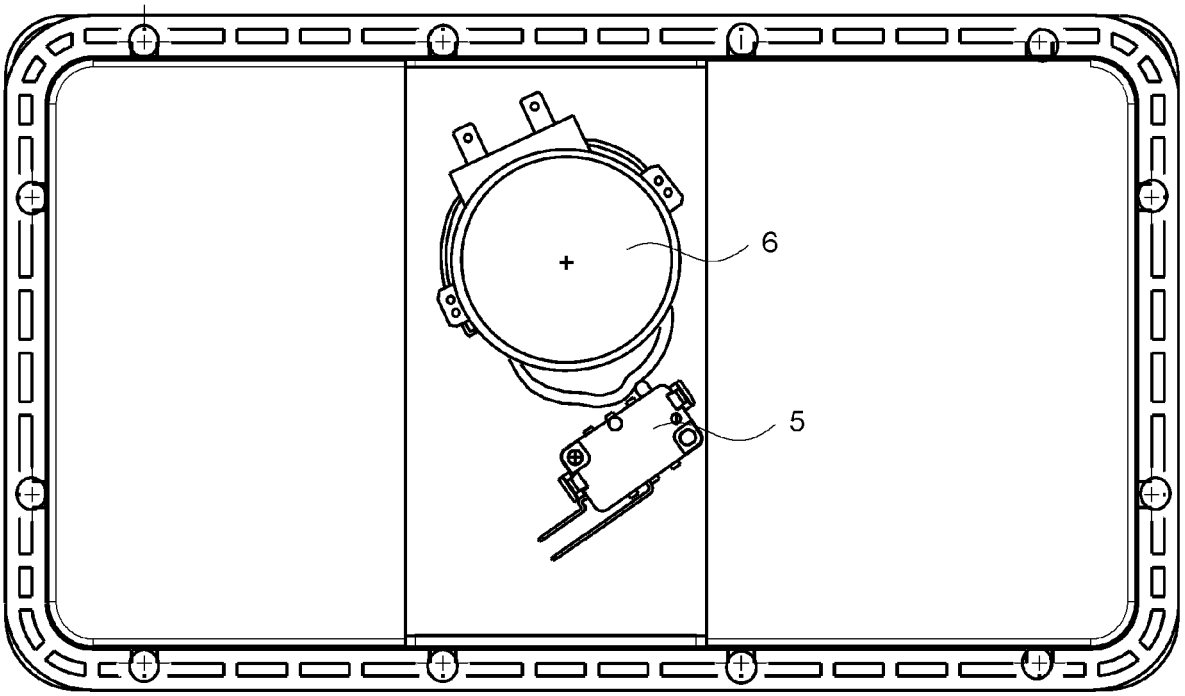


Figure 6



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EUROPEAN SEARCH REPORT

Application Number
EP 16 18 3171

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 October 2016	Jezierski, Krzysztof

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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