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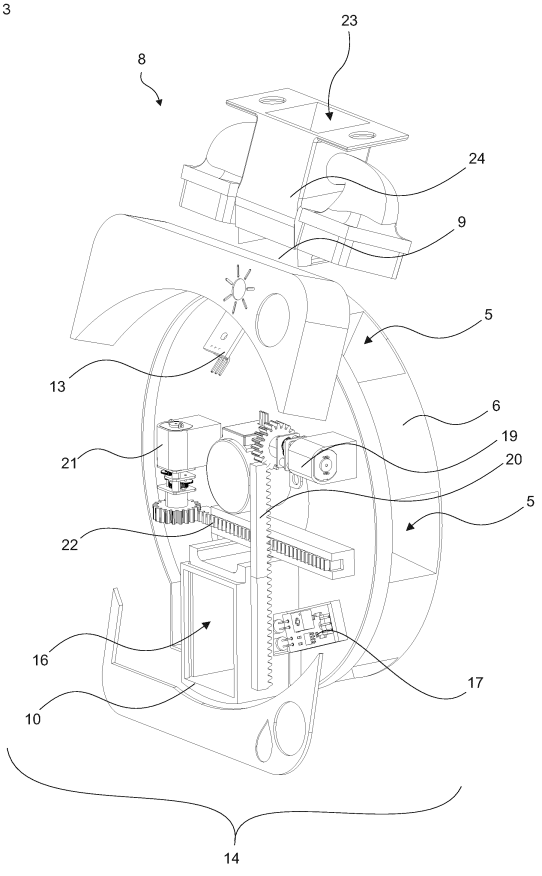
(54) A DISHWASHER COMPRISING A DETERGENT DOSING UNIT

(57) The present invention relates to a dishwasher (1) comprising a body (2); a washing tub (3) which is disposed in the body (2) and wherein the washing process is performed; a door (4) which isolates the washing tub (3) from the outside environment; and a detergent dosing unit (8) which can be detachably attached onto the inner surface of the door (4) or the washing tub (3) and which has a storage unit (6) with a circular form and a plurality of housings (5) at certain intervals wherein the tablet detergent is stored, and a motor (7) which enables the storage unit (6) to be rotated on an axis passing through the center thereof.

Figure 3



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Description

[0001] The present invention relates to a washer comprising a tablet detergent dosing unit.

[0002] A state of the art dishwasher comprises a washing tub wherein the dishes to be washed are placed, a door which opens/closes the washing tub, and a detergent dispenser wherein the detergent is placed. In the state of the art dishwasher, the detergent dispenser is usually arranged on the inner surface of the door. The user generally fills the detergent dispenser with gel detergent, powder detergent, or tablet detergent. The detergent dispensers used to dispense a tablet detergent into the washing tub are known in the state of the art. A state of the art detergent dispenser usually comprises a main body which has a compartment wherein a tablet detergent is manually placed and a pivotable lid which opens/closes the compartment. The lid is generally hinged onto the main body. The state of the art detergent dispenser generally has a lock mechanism which locks/unlocks the lid. The lock mechanism generally has a spring which moves the lid from the closed position towards the open position such that the lid opens when the lock mechanism is unlocked. In the state of the art dishwashers, the control unit operates the lock mechanism so as to unlock the lid at a predetermined stage of the washing process. Thus, the tablet detergent falls into the washing tub with the effect of gravity . However, the user has to add a new tablet detergent in each cycle. This causes problems such as storing tablet detergents outside or the user forgetting to add detergent.

[0003] In the state of the United States Patent Document No. US2022175212, a tablet detergent dosing unit is disclosed.

[0004] The aim of the present invention is the realization of a dishwasher wherein the tablet 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 tub which is disposed in the body and wherein the washing process is performed; a door which is disposed on the body and which closes the washing tub; and a detergent dosing unit which is disposed on the inner surface of the door and which has a storage unit with a plurality of housings thereon, and a motor. The tablet detergent is placed in the storage unit provided on the dosing unit. The storage unit is moved by means of the motor such that the tablet detergent reaches the washing tub.

[0006] The dishwasher of the present invention comprises a lid which is disposed on the detergent dosing unit. The lid has a filling opening and a discharge opening thereon. The filling opening opens onto the housings. The discharge opening opens into the washing tub. Thus, it becomes easier to fill the tablet detergent into the detergent dosing unit to be delivered into the washing tub.

[0007] In an embodiment of the present invention, the dishwasher comprises the detergent dosing unit which has a filling mode wherein the storage unit rotates continuously at a certain angle and an operation mode wherein the tablet detergent is delivered into the washing tub, and a control unit which enables the filling mode and the operation mode to be controlled. When the detergent dosing unit is in the filling mode, the user adds the tablet detergent through the filling opening and the housings on the storage unit are filled step by step. In the operation mode, the tablet detergent is enabled to be delivered into the washing tub during the washing process.

[0008] In an embodiment of the present invention, the dishwasher comprises a first sensor which detects the presence of the tablet detergent in the filling opening and the control unit which enables the detergent dosing unit to switch to the filling mode when the first sensor is triggered. When the user adds the tablet detergent through the filling opening, the detergent dosing unit automatically switches to the filling mode and the storage unit starts to rotate at certain intervals.

[0009] In an embodiment of the present invention, the dishwasher comprises a movement mechanism which is disposed between the lid and the storage unit and which enables the tablet detergent to be delivered from the storage unit to the washing tub. By means of the movement mechanism, the tablets in the storage unit are delivered into the washing tub in order and used in the washing process.

[0010] In an embodiment of the present invention, the dishwasher comprises the movement mechanism which has a first door to which the tablet detergent in the housing is delivered, a chamber which receives the tablet after the first door, a second sensor which is disposed on the chamber, and a second door which opens when the second sensor is triggered. The chamber is positioned between the first door and the second door. The second sensor disposed on the chamber is triggered by means of the tablet detergent such that the second door is opened and the tablet detergent is delivered into the washing tub. Since the tablet detergent passes through two different doors while being delivered from the storage unit to the washing tub, uncontrolled dosing is prevented and the tablet detergent is not damaged by water or heat.

[0011] In an embodiment of the present invention, the dishwasher comprises the control unit which enables the storage unit to be rotated again when the tablet detergent is not detected on the chamber in the operation mode. The storage unit is rotated again in case there are empty housings on the storage unit. Thus, the washing process is prevented from taking place without tablet detergent.

[0012] In an embodiment of the present invention, the dishwasher comprises the control unit which enables the detergent dosing unit to switch from the operation mode to the filling mode when the presence of a tablet is not detected in the chamber when the storage unit is rotated as many times as the number of housings. Thus, it is determined that the storage unit is empty. By switching to the filling mode, it is ensured that the washing process is

not performed without tablet detergent.

[0013] In an embodiment of the present invention, the dishwasher comprises a first movement motor and a first rack mechanism which are connected to the first door, and a second movement motor and a second rack mechanism which are connected to the second door. When the storage unit completes its rotation, the first movement motor is energized and the first door is opened by means of the first rack mechanism. When the tablet passing through the first door reaches the chamber, the second sensor is triggered, which in turn triggers the second movement motor. By means of the energy provided by the second movement motor, the second rack mechanism transmits the movement to the second door so as to open the second door. Thus, the tablet detergent is delivered from the storage unit into the washing tub.

[0014] In an embodiment of the present invention, the dishwasher comprises an opening which is provided on the door and a channel which extends from the opening to the filling opening. This enables the user to deliver the tablet detergent directly to the detergent dosing unit over the door.

[0015] By means of the present invention, a dishwasher is realized, comprising a detergent dosing unit which automatically delivers the tablet detergent into the washing tub.

[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 dosing unit on the door.

Figure 3 - is the perspective view of the detergent dosing unit and the movement mechanism.

Figure 4 - is the perspective view of the storage unit.

Figure 5 - is the front view of the detergent dosing unit and the movement mechanism.

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

1- Dishwasher

2- Body

3- Washing tub

4- Door

5- Housing

6- Storage unit

7- Motor

8- Detergent dosing unit

9- Filling opening

10- Discharge opening

11-Lid

12- Control unit

13-First sensor

14-Movement mechanism

15- First door

16- Chamber

17- Second sensor

18- Second door

19- First movement motor

20-First rack mechanism

21- Second movement motor

22- Second rack mechanism

23- Opening

24- Channel

[0018] The dishwasher (1) comprises a body (2); a washing tub (3) which is disposed in the body (2) and wherein the washing process is performed; a door (4) which isolates the washing tub (3) from the outside environment; and a detergent dosing unit (8) which can be detachably attached onto the inner surface of the door (4) or the washing tub (3) and which has a storage unit (6) with a circular form and a plurality of housings (5) at certain intervals wherein the tablet detergent is stored, and a motor (7) which enables the storage unit (6) to be rotated on an axis passing through the center thereof. The storage unit (6) disposed on the detergent dosing unit (8) comprises a plurality of housings (5) arranged in a circular order. The tablet detergent is placed on the housings (5). By rotating and moving the storage unit (6) from the center thereof by means of the motor (7), the tablet detergent is enabled to be delivered into the washing tub (3).

[0019] The dishwasher (1) of the present invention comprises a lid (11) which is disposed on the detergent dosing unit (8) and which has a filling opening (9) for filling the storage unit (6) and a discharge opening (10) for

transferring the tablet detergent into the washing tub (3). The filling opening (9) opens into each housing (5). The discharge opening (10 opens into the washing tub (3). The tablet detergent added through the filling opening (9) by the user reaches the housing (5) and is transferred to the washing tub (3) through the discharge opening (10) by means of the detergent dosing unit (8). By means of the lid (11), the user can fill the detergent dosing unit (8) without detaching the same from the door (4) or the washing tub (3).

[0020] In an embodiment of the present invention, the dishwasher (1) comprises the detergent dosing unit (8) having a filling mode wherein the storage unit (6) is continuously rotated at an angle predetermined by the manufacturer to align with the filling opening (9) of the housings (5) and an operation mode wherein the tablet detergent is delivered into the washing tub (3); and a control unit (12) which enables the filling mode and the operation mode to be controlled. In the filling mode, the storage unit (6) is continuously rotated at a predetermined angle. This rotation angle is determined by alignment of the housings (5) with the filling opening (9). Thus, the user adds the tablet detergent through the filling opening (9) and after one housing (5) rotates, the empty housing (5) again aligns with the filling opening (9). The filling process is completed when all housings (5) are full. In the operation mode, the tablets in the housings (5) are delivered into the washing tub (3). In the operation mode, the storage unit (6) rotates and the tablet detergent is delivered to the discharge opening (10) from the housing (5). Thus, the tablet detergent is delivered into the washing tub (3).

[0021] In an embodiment of the present invention, the dishwasher (1) comprises a first sensor (13) which is disposed on the filling opening (9) and which detects the presence of the tablet detergent on the filling opening (9) and the control unit (12) which enables the detergent dosing unit (8) to switch to the filling mode when the first sensor (13) is triggered. By means of the first sensor (13) disposed on the filling opening (9), the presence of the tablet detergent is detected and the detergent dosing unit (8) is switched to the filling mode. An IR sensor is preferably used as the first sensor (13).

[0022] In an embodiment of the present invention, the dishwasher (1) comprises a movement mechanism (14) which is disposed between the lid (11) and the storage unit (6) and which enables the tablet detergent to be delivered to the washing tub (3). By means of the movement mechanism (14) disposed between the lid (11) and the storage unit (6), the tablet detergent is delivered safely from the housing (5) to the washing tub (3) without being deformed.

[0023] In an embodiment of the present invention, the dishwasher (1) comprises the movement mechanism (14) having a first door (15) which opens when the storage unit (6) rotates by an angle predetermined by the manufacturer, a chamber (16) to which the tablet is delivered through the first door (15), a second sensor (17) which is disposed on the chamber (16) and which detects the presence of the tablet detergent and a second door (18) which opens when the second sensor (17) is triggered. When the detergent dosing unit (8) is in the operation mode, the first door (15) opens when the storage unit (6) rotates by a certain angle and stops. The tablet detergent is delivered to the first door (15) from the housing (5). The tablet detergent passing through the first door (15) reaches the chamber (16). By means of the second sensor (17) disposed on the chamber (16), the presence of the tablet detergent is detected and the second door (18) is opened. The second sensor (17) is preferably an IR sensor. The chamber (16) is positioned between the first door (15) and the second door (18). Thus, the tablet detergent is prevented from being deformed by getting into contact with water or heat before being transferred to the washing tub (3). When the second door (18) is opened, the tablet detergent is delivered into the washing tub (3).

[0024] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (12) which enables the storage unit (6) to be rotated again when the presence of the tablet detergent is not detected by means of the second sensor (17) while in the operation mode. In the operation mode, when the presence of the tablet detergent is not detected on the chamber (16) after the storage unit (6) rotates and the first door (15) is opened, the storage unit (6) is rotated again. Thus, the washing process is prevented from taking place without dosing the tablet detergent.

[0025] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (12) which enables the shift from the operation mode to the filling mode when the presence of the tablet detergent is not detected by means of the second sensor (17) after the storage unit (6) is rotated as much as the number of housings (5). When it is detected that no tablet detergent is delivered to the chamber (16) when the storage unit (6) is rotated as much as the number of housings (5), the control unit (12) switches the detergent dosing unit (8) to the filling mode. thus, the user is warned that there is no tablet detergent left, and the washing process is prevented from being performed without detergent.

[0026] In an embodiment of the present invention, the dishwasher (1) comprises the movement mechanism (14) having a first movement motor (19) which provides the energy required for the movement of the first door (15), a first rack mechanism (20) which is connected to the first movement motor (19) and which enables the first door (15) to be moved, a second movement motor (21) which provides the energy required for the movement of the second door (18) and a second rack mechanism (22) which is connected to the second movement motor (21) and which enables the second door (18) to be moved. The first movement motor (19) and the first rack mechanism (20) are connected to the first door (15). In the operation mode, when the storage unit (6) completes its rotation with a certain angle, the first movement motor

(19) is energized such that the first rack mechanism (20) is moved. Thus, the door (15) is opened. When the presence of the tablet detergent on the chamber (16) is detected, the second movement motor (21) is energized such that the second rack mechanism (22) is moved. Thus, the second door (18) is opened and the tablet detergent is delivered into the washing tub (3).

[0027] In an embodiment of the present invention, the dishwasher (1) comprises an opening (23) which is provided on the door (4) and a channel (24) which extends from the opening (23) to the filling opening (9) and which enables the tablet detergent to be delivered to the filling opening (9). By means of the opening (23) provided on the door (4) and the channel (24) connected to the opening (23), the user can perform the filling process without removing the detergent storage unit (6). The channel (24) is positioned between the opening (23) and the filling opening (9). Thus, the tablet detergent added through the opening (23) is delivered to the housing (5).

[0028] By means of the present invention, a dishwasher (1) is realized, comprising a detergent dosing unit (8) which has a storage chamber (16) and which automatically doses the tablet detergent. By means of the filling opening (9) and the discharge opening (10) provided on the lid (11) of the detergent dosing unit (8) and the filling mode and the operation mode controlled by the control unit (12), the filling process is performed without detaching the detergent dosing unit (8) from the dishwasher (1). Thus, ease of use is provided.

Claims

1. A dishwasher (1) **comprising** a body (2); a washing tub (3) which is disposed in the body (2) and wherein the washing process is performed; a door (4) which isolates the washing tub (3) from the outside environment; and a detergent dosing unit (8) which can be detachably attached onto the inner surface of the door (4) or the washing tub (3) and which has a storage unit (6) with a circular form and a plurality of housings (5) at certain intervals wherein the tablet detergent is stored, and a motor (7) which enables the storage unit (6) to be rotated on an axis passing through the center thereof, **characterized by** a lid (11) which is disposed on the detergent dosing unit (8) and which has a filling opening (9) for filling the storage unit (6) and a discharge opening (10) for transferring the tablet detergent into the washing tub (3).

2. A dishwasher (1) as in Claim 1, **characterized by** the detergent dosing unit (8) having a filling mode wherein the storage unit (6) is continuously rotated at an angle predetermined by the manufacturer to align with the filling opening (9) of the housings (5) and an operation mode wherein the tablet detergent is delivered into the washing tub (3); and a control unit (12) which enables the filling mode and the operation mode to be controlled.

3. A dishwasher (1) as in Claim 2, **characterized by** a first sensor (13) which is disposed on the filling opening (9) and which detects the presence of the tablet detergent on the filling opening (9) and the control unit (12) which enables the detergent dosing unit (8) to switch to the filling mode when the first sensor (13) is triggered.

4. A dishwasher (1) as in any one of the above claims, **characterized by** a movement mechanism (14) which is disposed between the lid (11) and the storage unit (6) and which enables the tablet detergent to be delivered to the washing tub (3).

5. A dishwasher (1) as in Claim 4, **characterized by** the movement mechanism (14) having a first door (15) which opens when the storage unit (6) rotates by an angle predetermined by the manufacturer, a chamber (16) to which the tablet is delivered through the first door (15), a second sensor (17) which is disposed on the chamber (16) and which detects the presence of the tablet detergent and a second door (18) which opens when the second sensor (17) is triggered.

6. A dishwasher (1) as in Claim 5, **characterized by** the control unit (12) which enables the storage unit (6) to be rotated again when the presence of the tablet detergent is not detected by means of the second sensor (17) while in the operation mode.

7. A dishwasher (1) as in Claim 5 or Claim 6, **characterized by** the control unit (12) which enables the shift from the operation mode to the filling mode when the presence of the tablet detergent is not detected by means of the second sensor (17) after the storage unit (6) is rotated as much as the number of housings (5).

8. A dishwasher (1) as in any one of Claims 5 to 7, **characterized by** the movement mechanism (14) having a first movement motor (19) which provides the energy required for the movement of the first door (15), a first rack mechanism (20) which is connected to the first movement motor (19) and which enables the first door (15) to be moved, a second movement motor (21) which provides the energy required for the movement of the second door (18) and a second rack mechanism (22) which is connected to the second movement motor (21) and which enables the second door (18) to be moved.

9. A dishwasher (1) as in any one of the above claims, **characterized by** an opening (23) which is provided on the door (4) and a channel (24) which extends

from the opening (23) to the filling opening (9) and which enables the tablet detergent to be delivered to the filling opening (9).

Figure 1

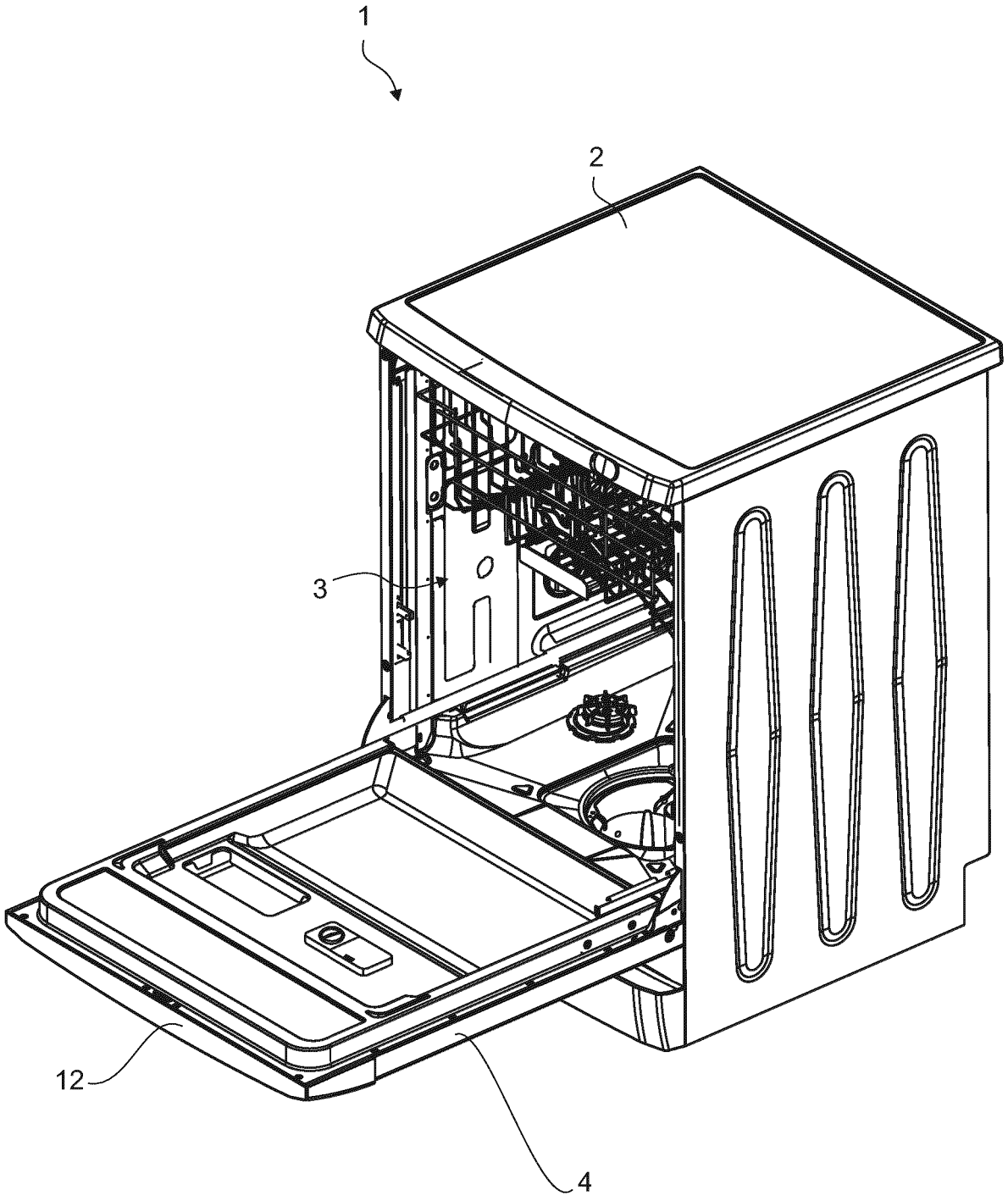


Figure 2

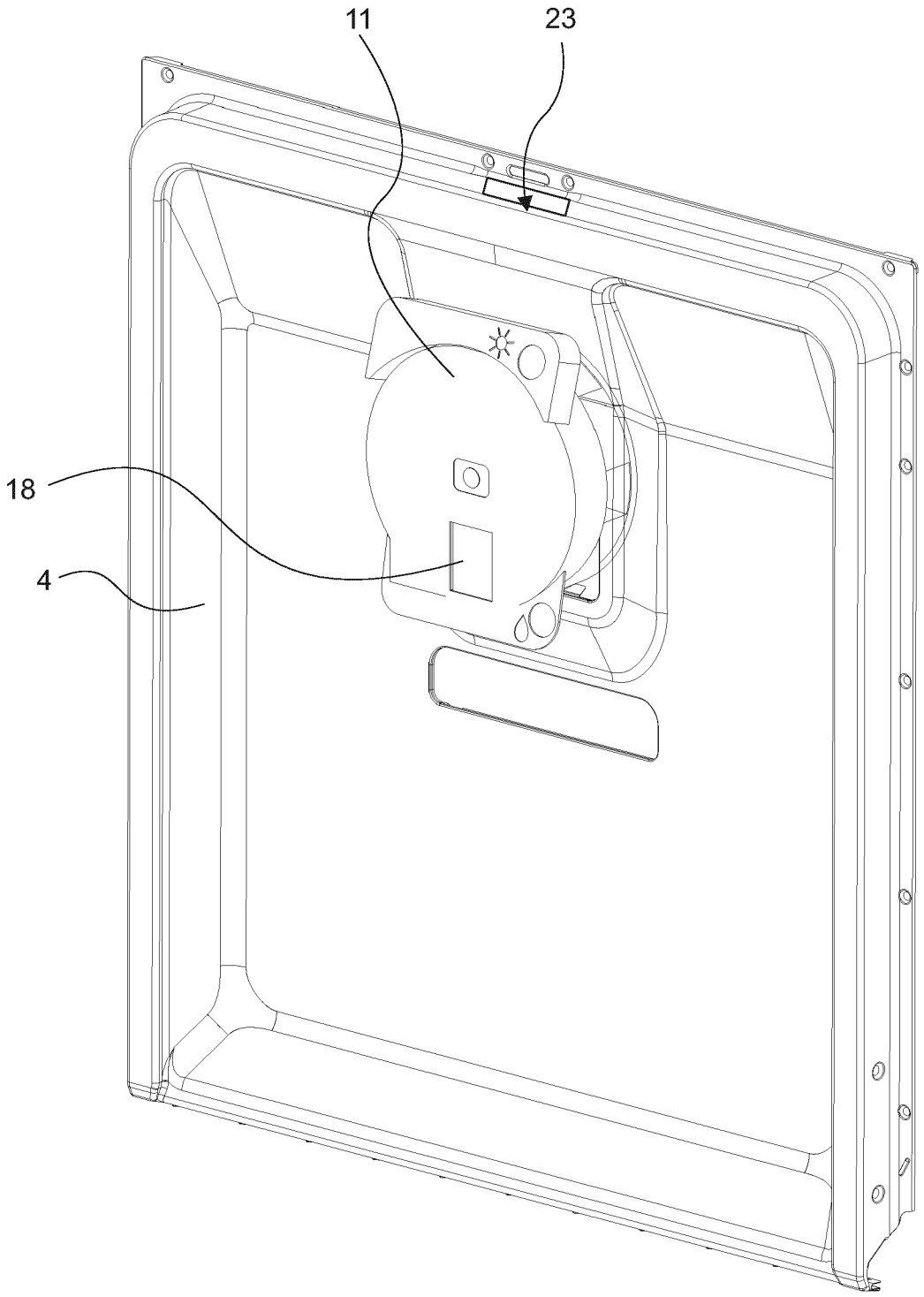


Figure 3

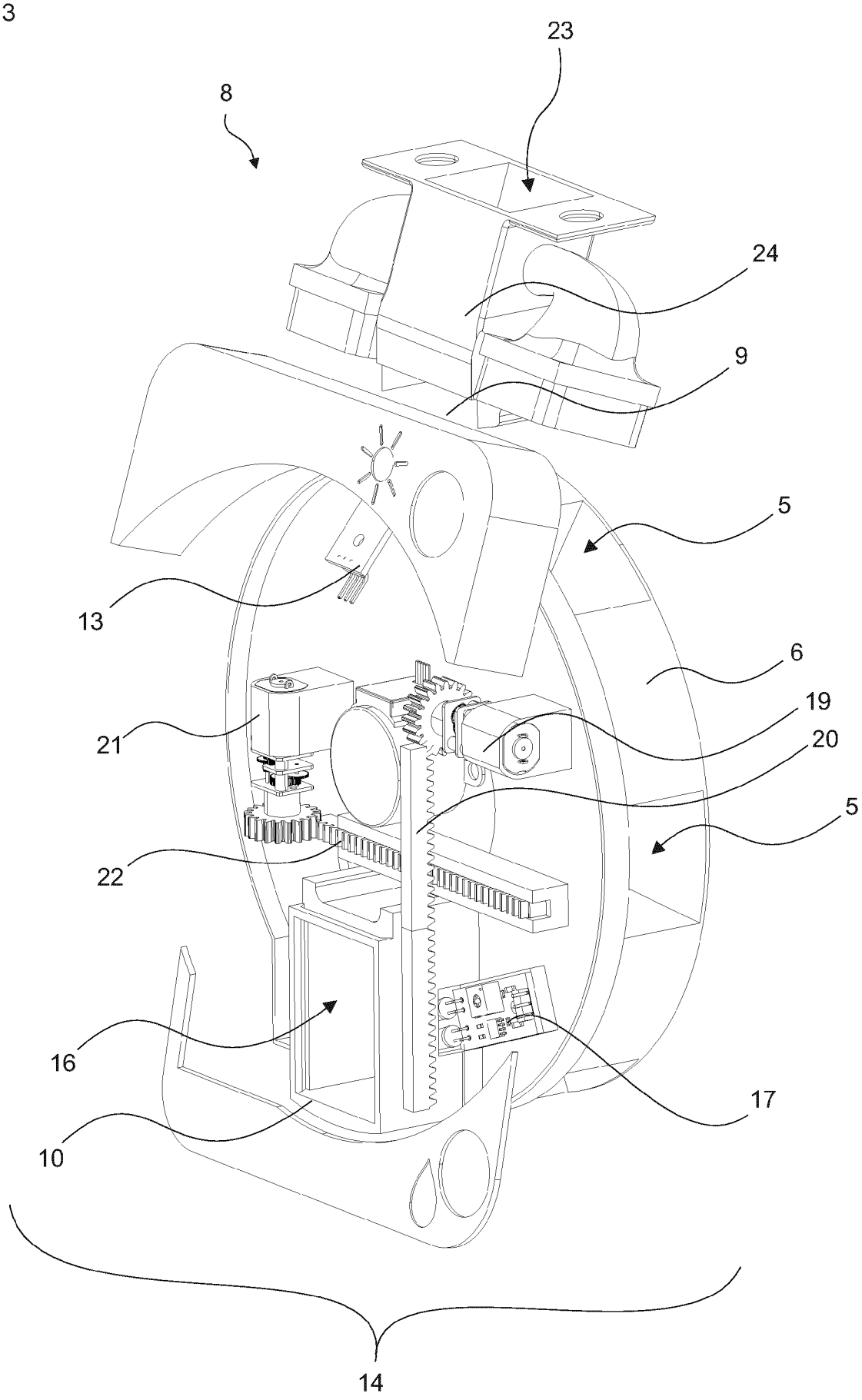


Figure 4

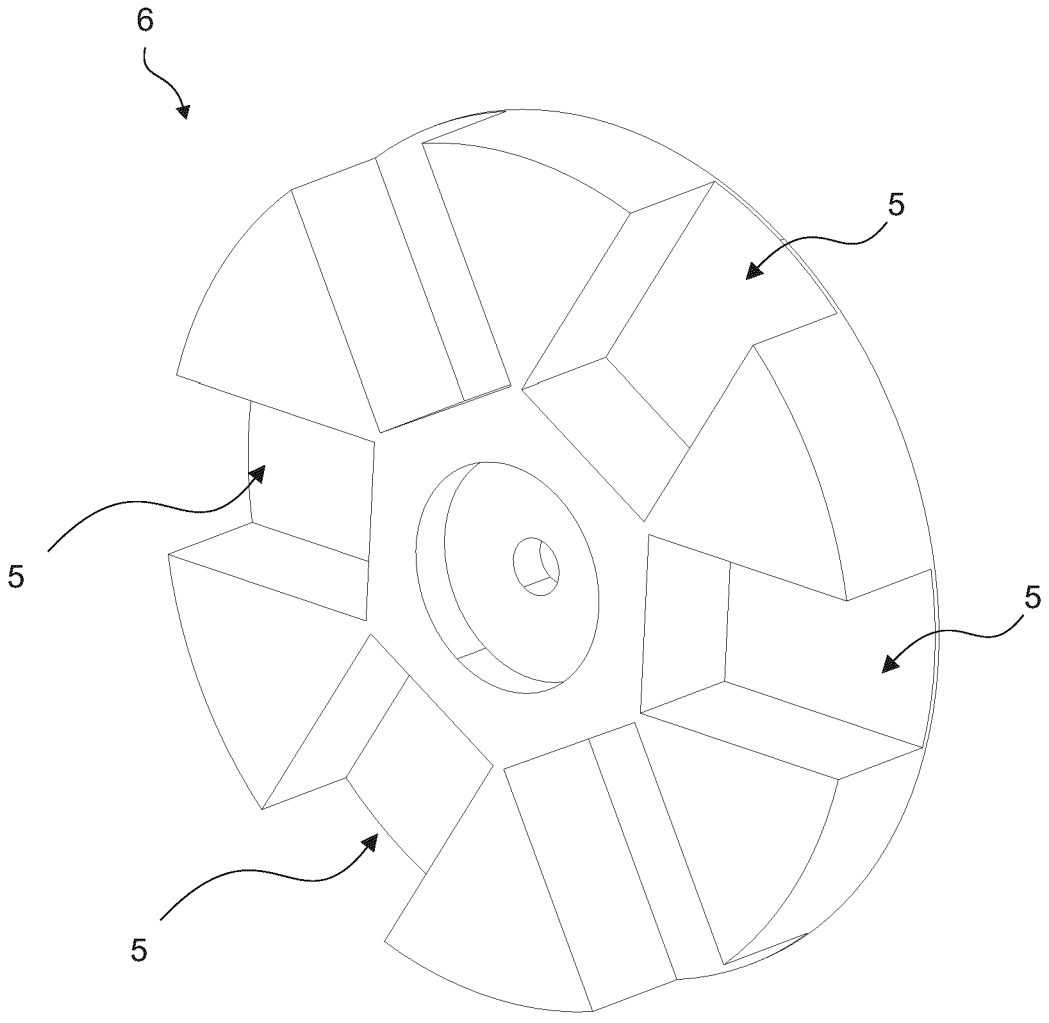
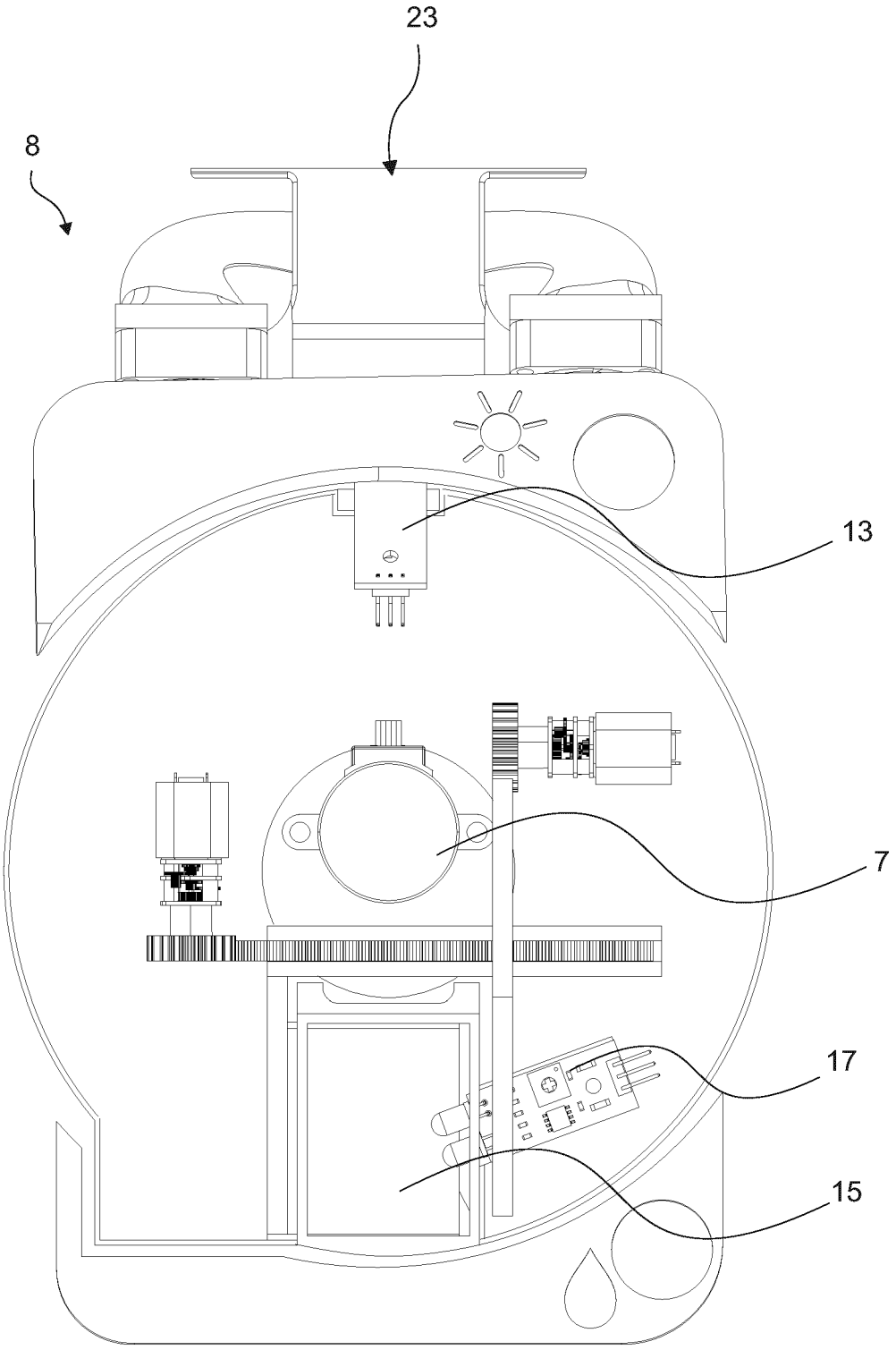


Figure 5



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EUROPEAN SEARCH REPORT

Application Number
EP 24 20 8674

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* figures 1-4 *	2-9	
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A	* figures 1-2 *	2-9	
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A	* figures 1,2 *	2-9	
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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
Munich	18 March 2025	Lodato, Alessandra

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