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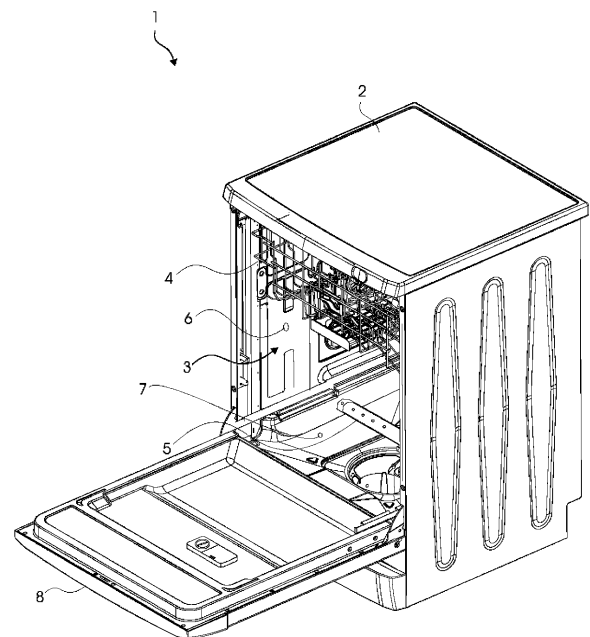
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(54) **A DISHWASHER COMPRISING A MALFUNCTION CONTROL SYSTEM**

(57) The present invention relates to a dishwasher (1) comprising a body (2); a washing tub (3) which is arranged in the body (2) and wherein the washing process is realized; at least one rack (4) which is disposed in the washing tub (3) and whereon the kitchen items are placed to be washed; at least one spraying member (5) which enables the water to be sprayed onto the rack (4) to perform the washing process; an illumination member (6) which is provided in the washing tub (3); and an optical sensor (7), wherein a control unit (8) controls the change in the light intensity in the washing tub (3) during the movement of the spraying member (5).

Figure 1



Description

[0001] The present invention relates to a dishwasher comprising a malfunction control system.

[0002] Today, using a dishwasher for washing dirty kitchen items is common and efficient. Dishwashers enable the cleaning process to be performed at high temperatures and with less water in a shorter time. Dirty kitchen items are placed onto the racks in the dishwasher. By means of the spray arms positioned close to the racks, the water is transferred onto the kitchen items. By means of the holes provided on the spray arm and the rotation of the spray arms, the water is pressurized and the cleaning effect is increased. Thus, the cleaning process is performed with less water, saving time and energy. The placement of the kitchen items on the rack is important. While placing the kitchen items onto the rack, it must be ensured that the water is directly sprayed onto the kitchen items. The parts not in contact with water may remain dirty. Therefore, the kitchen items are placed onto the racks as wide as possible. When the contact surface with water is increased, problems such as failing to efficiently use the rack area may occur. Therefore, the kitchen items are mostly placed one onto the other on the rack. In this case, the spray arms may hit the kitchen items while rotating, and as a result, may stop or rotate slowly. The inefficient operation of the spray arm causes the kitchen items in the dishwasher to remain dirty at the end of the washing process. This decreases the user satisfaction.

[0003] In the state of the art European Patent Application No. EP2614763, a dishwasher is disclosed, wherein the movement of the spray arm is detected by means of a vibration sensor.

[0004] The aim of the present invention is the realization of a dishwasher with improved washing efficiency.

[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; at least one rack which is disposed in the washing tub; at least one spraying member which sprays water onto the rack; an illumination member which is provided in the washing tub; and an optical sensor. The kitchen items are placed onto the rack by the user. The water delivered onto the rack is pressurized by means of the rotation of the spraying member around its own axis. Thus, the kitchen items are enabled to be cleaned in a shorter period of time. By means of the illumination member provided in the washing tub, the inner volume of the washing tub is illuminated. By means of the optical sensor, the light intensity changing during the rotation of the spraying member can be detected.

[0006] The dishwasher of the present invention comprises a control unit which detects and controls the change in the light intensity in the washing tub. The change in the light intensity by time in the washing tub can be monitored by means of the control unit.

[0007] In an embodiment of the present invention, the

dishwasher comprises the control unit which controls the movement of the spraying member depending on the change in the light intensity in the washing tub. The control unit evaluates the change in the light intensity by taking into the account the movement of the spraying member. If the light intensity changes during the regular rotation of the spraying member, the movement of the spraying member is controlled.

[0008] In an embodiment of the present invention, the dishwasher comprises the control unit which determines the rotational speed of the spraying member depending on the rate of change in the light intensity. The rotational speed of the spraying member is determined depending on the rate of change in the light intensity. Thus, the spraying member is enabled to rotate at the normal rotational speed depending on the washing program.

[0009] In an embodiment of the present invention, the dishwasher comprises the control unit which increases the rpm of the spraying member when the rotational speed thereof decreases. In order to provide a rotational speed suitable for the washing program selected by the user, the rpm of the spraying member is increased. Thus, it is ensured that non-mechanical malfunctions are solved, providing an efficient washing process.

[0010] In an embodiment of the present invention, the dishwasher comprises the control unit which provides the intake of additional water when the rotational speed of the spraying member decreases. By means of the intake of additional water, the rotational speed of the spraying member is increased, providing an efficient washing process.

[0011] In an embodiment of the present invention, the dishwasher comprises the control unit which warns the user if the rotational speed of the spraying member cannot be controlled. The user is warned if the rotational speed of the spraying member cannot be brought to the reference values despite the measures taken. Thus, the kitchen items are prevented from remaining dirty at the end of the washing process.

[0012] By means of the present invention, a dishwasher is realized, comprising the control unit which detects the light intensity in the washing tub by means of the optical sensor and the change in the light intensity depending on the rotational speed of the spraying member.

[0013] A 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.

[0014] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing tub
4. Rack
5. Spraying member

- 6. Illumination member
- 7. Optic sensor
- 8. Control unit

[0015] The dishwasher (1) comprises a body (2); a washing tub (3) which is arranged in the body (2) and wherein the washing process is realized; at least one rack (4) which is disposed in the washing tub (3) and whereon the kitchen items are placed to be washed; at least one spraying member (5) which enables the water to be sprayed onto the rack (4) to perform the washing process; an illumination member (6) which is provided in the washing tub (3); and an optical sensor (7). The user places the kitchen items onto the rack (4). The water is enabled to be delivered onto the dishes in a pressurized manner by means of the rotation of the spraying member (5) around its own axis. Thus, the cleaning process is facilitated. By means of the illumination member (6) provided in the washing tub (3), the inner volume of the washing tub (3) is illuminated. The optical sensor (7) detects the light. The change in the light intensity in the washing tub (3) during the rotation of the spraying member (5) is detected by the optical sensor (7).

[0016] The dishwasher (1) of the present invention comprises a control unit (8) which controls the change in the light intensity in the washing tub (3) during the movement of the spraying member (5). The control unit (8) can control the change in the washing tub (3) thanks to the light intensity information received from the optical sensor (7). Thus, the change in the light intensity is controlled and evaluated by taking into account other factors.

[0017] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (8) which controls the movement of the spraying member (5) depending on the change in the light intensity in the washing tub (3). In case of an unexpected change in the light intensity, the control unit (8) controls the rotational speed and the rpm of the spraying member (5). In case the light intensity changes during the rotation of the spraying member (5), the control unit (8) determines that there is an error concerning the spraying member (8), and controls the situation. Thus, the kitchen items are prevented from remaining dirty.

[0018] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (8) which detects the rotational speed of the spraying member depending on the change in the light intensity. The control unit (8) can determine the rotational speed of the spraying member (5) depending on the change in the light intensity. Thus, the spraying member (5) is enabled rotate at a speed suitable for the washing program.

[0019] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (8) which increases the rpm of the spraying member when the rotational speed thereof is detected to decrease. When the rpm of the spraying member (5) is detected to be low, the control unit (8) increases the rpm of the spraying member (5). Thus, the washing efficiency is increased.

[0020] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (8) which provides the intake of additional water when the rotational speed thereof is detected to decrease. When the spraying member (5) is detected to rotate at a speed lower than the values suitable for the washing program, the control unit (8) provides the intake of additional water. Thus, since the amount of water delivered to the spraying member (5) is increased, the rotational speed thereof also increases.

[0021] In an embodiment of the present invention, the dishwasher (1) comprises the control unit (8) which warns the user if the rotational speed of the spraying member (5) is not within the range of values predetermined by the user. The user is informed if the measures taken by the control unit (8) fail to keep the rotational speed of the spraying member (5) within the normal range of values. Thus, the problem can be eliminated by the user.

[0022] By means of the present invention, a dishwasher (1) is realized, comprising a control unit (8) which detects the possible malfunctions in the spraying member (5) by means of the optical sensor (7). The movement of the spraying member (5) can be controlled by means of the change in the light intensity detected by the optical sensor (7). Thus, the washing problems which may occur due to malfunctions such as slowing down or stopping during the washing process can be prevented.

Claims

1. A dishwasher (1) comprising a body (2); a washing tub (3) which is arranged in the body (2) and wherein the washing process is realized; at least one rack (4) which is disposed in the washing tub (3) and whereon the kitchen items are placed to be washed; at least one spraying member (5) which enables the water to be sprayed onto the rack (4) to perform the washing process; an illumination member (6) which is provided in the washing tub (3); and an optical sensor (7), **characterized by** a control unit (8) which controls the change in the light intensity in the washing tub (3) during the movement of the spraying member (5).
2. A dishwasher (1) as in Claim 1, **characterized by** the control unit (8) which controls the movement of the spraying member (5) depending on the change in the light intensity in the washing tub (3).
3. A dishwasher (1) as in Claim 1 or Claim 2, **characterized by** the control unit (8) which detects the rotational speed of the spraying member depending on the change in the light intensity.
4. A dishwasher (1) as in Claim 3, **characterized by** the control unit (8) which increases the rpm of the spraying member when the rotational speed thereof

is detected to decrease.

5. A dishwasher (1) as in Claim 3 or Claim 4, **characterized by** the control unit (8) which provides the intake of additional water when the rotational speed thereof is detected to decrease. 5
6. A dishwasher (1) as in any one of the above claims, **characterized by** the control unit (8) which warns the user if the rotational speed of the spraying member (5) is not within the range of values predetermined by the user. 10

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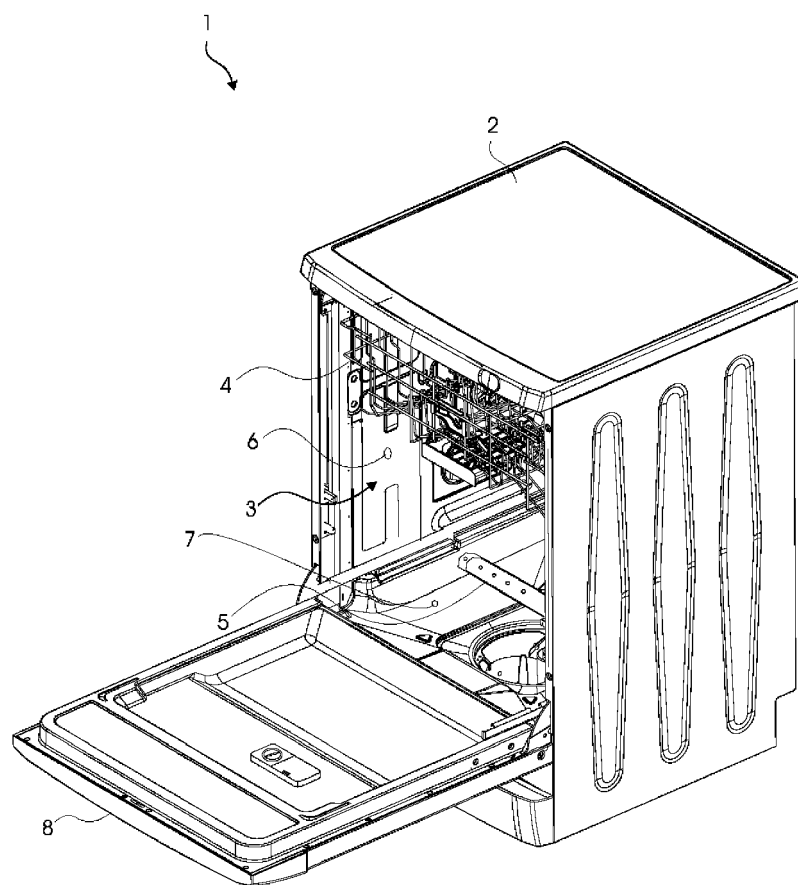
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Figure 1





EUROPEAN SEARCH REPORT

Application Number
EP 21 18 2231

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Place of search Munich		Date of completion of the search 24 November 2021	Examiner Weidner, Maximilian
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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