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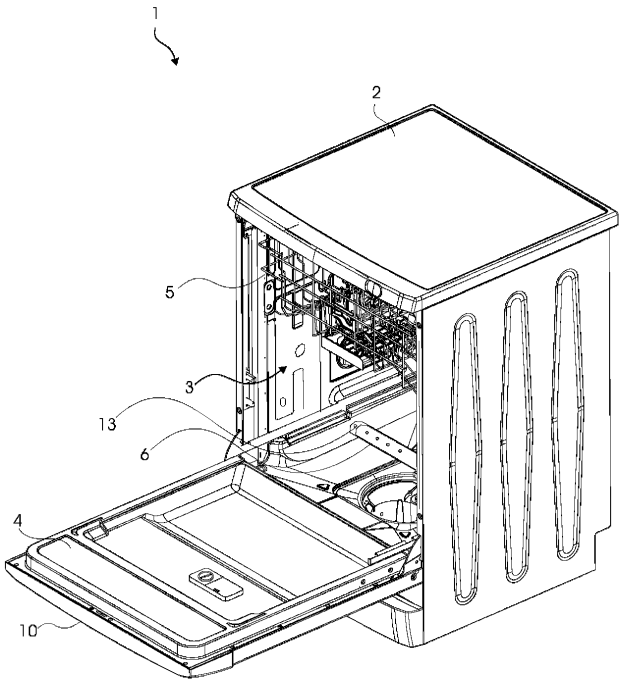
(54) A WASHING MACHINE WITH IMPROVED SAFETY

(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 is provided on the body (2) and which isolates the washing tub (3) from the outer environment; at least one rack (5) which is disposed in the washing tub (3) and whereon the kitchen items are placed; at least one spraying member (6) which sprays water onto the rack (5) so as to clean the kitchen items; a delivery line (7) which provides the delivery of water to the spraying member (6); a circulation motor (8) which controls the delivery of water to the delivery line (7); a sensor (9) which is provided on the door (4) and which detects the contact of the user; and a control unit (10) which stops the circulation motor (8) after it is detected by the sensor (9) that the door (4) is to be opened.

Figure 1



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Description

[0001] The present invention relates to a dishwasher with improved safety.

[0002] In dishwashers used today, a washing cycle is completed by successively performing the cold washing, main washing, rinsing and drying steps. In the dishwashers, the washing program is performed by spraying water onto the kitchen items. The water taken from the main supply line into the dishwasher is delivered to the spray arms. The water is sprayed onto the dishes by means of the openings arranged on the spray arms. The spray arms make rotational movement by means of the pressure of the water delivered thereon. Thus, the water is homogeneously enabled to be delivered onto the dishes. In particular, since the temperature of the water reaches high levels during the main washing process, the dirt on the dishes can be easily cleaned. During the operation of the dishwasher, the door can be opened due to user intervention. When the door is opened, the electrical energy is completely cut off, and the water delivery to the spray arms is stopped. Thus, the user has the opportunity to add or remove kitchen items into/out of the washing tub after the start of the washing program. However, when the door is opened during the washing program, the electrical energy may not be cut off simultaneously. In this case, the risk of hot water splattering on the user is encountered.

[0003] In the state of the art Korean Patent Application No. KR20050005873, a dishwasher is disclosed, wherein the user is visually or audibly warned when the door is opened during the washing process.

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

[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; a door which is provided on the body; at least one rack which is disposed in the washing tub; at least one spraying member which sprays water onto the rack; a delivery line which provides the delivery of water to the spraying member; and a circulation motor which controls the delivery of water to the delivery line. The door enables the washing tub to be isolated from the outer environment. The rack whereon the kitchen items are placed is disposed in the washing tub. The spraying members rotate due to the pressure of the water delivered so as to homogeneously spray water onto the kitchen items. The water drawn from the main supply line is pumped to the delivery line by means of the circulation motor, and delivered to the spraying member by means of the delivery line.

[0006] The dishwasher of the present invention comprises a sensor which detects the user contact with the door, and a control unit which stops the circulation motor depending on the data received from the sensor. As the user contacts the sensor, it is detected that the door is to be opened during the operation. Depending on the data received from the sensor, the circulation motor is enabled to be stopped, and the delivery of water to the spraying members is interrupted. Thus, the hot water is prevented from splattered on the user when the door is opened.

[0007] In an embodiment of the present invention, the dishwasher comprises a motor card which controls the circulation motor. The control unit is in contact communication with the motor card. Thus, the circulation motor is controlled.

[0008] In an embodiment of the present invention, the dishwasher comprises the sensor which detects that the door is to be opened when the user contacts the sensor for a predetermined time during the washing program. Thus, the circulation motor is prevented from being stopped in case the user only stands in front of the dishwasher.

[0009] In an embodiment of the present invention, the dishwasher comprises the sensor having a proximity sensor. By means of the proximity sensor, a counting process starts from the moment the user gets closer to the sensor.

[0010] In an embodiment of the present invention, the dishwasher comprises a position sensor which is provided on the spraying member and the control unit which is in communication with the position sensor. By means of the position sensor, the position of the spraying member is determined. The control unit can detect if the spraying member has stopped or moves by means of the position sensor.

[0011] In an embodiment of the present invention, the dishwasher comprises a recess which is arranged on the door and the sensor which is disposed in the recess. The user pulls the door from the recess and opens the same. The recess is shaped so as to allow the user to place his/her fingers thereon, and the sensor is arranged on the part whereon the user places his/her fingers. Thus, when the user wants to open the door, the movement is detected.

[0012] In an embodiment of the present invention, the dishwasher comprises a handle which is provided on the door. The handle enables the user to open the door. The sensor is arranged on the handle, on the surface of the handle facing the door. Thus, when the user grips the handle to open the door, the movement is detected by the sensor.

[0013] By means of the present invention, a dishwasher is realized, comprising a control unit which detects the opening of the door during the program and which prevents hot water from splattering onto the user.

[0014] 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.
Figure 2 - is the schematic view of the circulation motor, the delivery line and the spraying member.
Figure 3 - is the schematic view of the handle, the sensor and the proximity sensor.

Figure 4 - is the front view of the door and the recess.
Figure 5 - is the front view of the door and the handle.

[0015] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing tub
4. Door
5. Rack
6. Spraying member
7. Delivery line
8. Circulation motor
9. Sensor
10. Control unit
11. Motor card
12. Proximity sensor
13. Position sensor
14. Recess
15. Handle

[0016] 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 is provided on the body (2) and which isolates the washing tub (3) from the outer environment; at least one rack (5) which is disposed in the washing tub (3) and whereon the kitchen items are placed; at least one spraying member (6) which sprays water onto the rack (5) so as to clean the kitchen items; a delivery line (7) which provides the delivery of water to the spraying member (6); and a circulation motor (8) which controls the delivery of water to the delivery line (7). The kitchen items are placed onto the rack (5). By means of the water delivered by the spraying member (6), the kitchen items are cleaned. The water received from the main supply line is delivered to the spraying members (6) by means of the delivery line (7). By means of the circulation motor (8) connected to the delivery line (7), the water delivered from the delivery line (7) to the spraying members (6) is controlled.

[0017] The dishwasher (1) of the present invention comprises a sensor (9) which is provided on the door (4) and which detects the contact of the user, and a control unit (10) which stops the circulation motor (8) after it is detected by the sensor (9) that the door (4) is to be opened. When the user touches the sensor (9), it is detected by the sensor (9) that the door (4) is to be opened. Accordingly, the circulation motor (8) is stopped, and thus the water delivery to the delivery line (7) and the spraying members (6) is interrupted. By preventing water delivery to the spraying member (6), the risk of splattering water onto the user is eliminated.

[0018] In an embodiment of the present invention, the dishwasher (1) comprises a motor card (11) which controls the circulation motor (8) and the control unit (10) which is in communication with the motor card (11). The control unit (10) warns the motor card (11) depending on the data received from the sensor (9). Thus, the circulation motor (8) is enabled to be stopped.

[0019] In an embodiment of the present invention, the dishwasher (1) comprises the sensor (9) which detects that the door (4) is to be opened as the user contacts the sensor (9) for a time predetermined by the producer during the program. It is detected that the door (4) is to be opened when the user contacts the sensor (9) for a predetermined time.

[0020] In an embodiment of the present invention, the dishwasher (1) comprises the sensor (9) having a proximity sensor (12). By means of the proximity sensor (12) provided on the sensor (9), the user is detected from the moment as he/she gets closer to the sensor (9), and a counting process is performed depending on the time the user contacts the sensor (9). Thus, the circulation motor (8) is prevented from being stopped in unnecessary cases.

[0021] In an embodiment of the present invention, the dishwasher (1) comprises a position sensor (13) which is provided on the spraying member (6), and the control unit (10) which informs the user when the spraying member (6) is stopped thanks to the data received from the position sensor (13). By means of the position sensor (13) provided on the spraying member (6), the position of the spraying member (6) is detected. When the movement of the spraying member (6) completely stops, the user is informed by the control unit (10). Thus, the risk of the user opening the door (4) before the spraying member (6) fully stops is eliminated.

[0022] In an embodiment of the present invention, the dishwasher (1) comprises a recess (14) which is arranged on the door (4) and the sensor (9) which is disposed in the recess (14). The user can open/close the door (4) by means of the recess (14). By means of the sensor (9) provided on the recess (14), it is detected that the user wants to open the door (4) during the program.

[0023] In an embodiment of the present invention, the dishwasher (1) comprises a handle (15) which is arranged on the door (4) and the sensor (9) which is disposed on the surface of the handle (15) facing the door (4). By means of the handle (15), the user can open/close the door (4). By means of the sensor (9) provided on the handle (15), it is detected that the user wants to open the door (4) during the program.

[0024] By means of the present invention, a dishwasher (1) is realized, wherein the user safety is improved when the user opens the door (4). The sensor (9) detects if the user wants to open the door (4), and the water delivered to the spraying member (6) is interrupted by means of the circulation motor (8). Thus, when the door (4) is opened during the program, the risk of water splattering onto the user is eliminated.

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 is provided on the body (2) and which isolates the washing tub (3) from the outer environment; at least one rack (5) which is disposed in the washing tub (3) and whereon the kitchen items are placed; at least one spraying member (6) which sprays water onto the rack (5) so as to clean the kitchen items; a delivery line (7) which provides the delivery of water to the spraying member (6); and a circulation motor (8) which controls the delivery of water to the delivery line (7), **characterized by**
a sensor (9) which is provided on the door (4) and which detects the contact of the user, and
a control unit (10) which stops the circulation motor (8) after it is detected by the sensor (9) that the door (4) is to be opened.

2. A dishwasher (1) as in Claim 1, which is **characterized by** a motor card (11) which controls the circulation motor (8) and the control unit (10) which is in communication with the motor card (11).

3. A dishwasher (1) as in Claim 1 or Claim 2, **characterized by** the sensor (9) which detects that the door (4) is to be opened as the user contacts the sensor (9) for a time predetermined by the producer during the program.

4. A dishwasher (1) as in any one of the above claims, **characterized by** the sensor (9) comprising a proximity sensor (12).

5. A dishwasher (1) as in any one of the above claims, **characterized by** a position sensor (13) which is provided on the spraying member (6), and the control unit (10) which informs the user when the spraying member (6) is stopped thanks to the data received from the position sensor (13).

6. A dishwasher (1) as in any one of the above claims, **characterized by** a recess (14) which is arranged on the door (4) and the sensor (9) which is disposed in the recess (14).

7. A dishwasher (1) as in any one of the Claims 1 to 5, **characterized by** a handle (15) which is arranged on the door (4) and the sensor (9) which is disposed on the surface of the handle (15) facing the door (4).

Figure 1

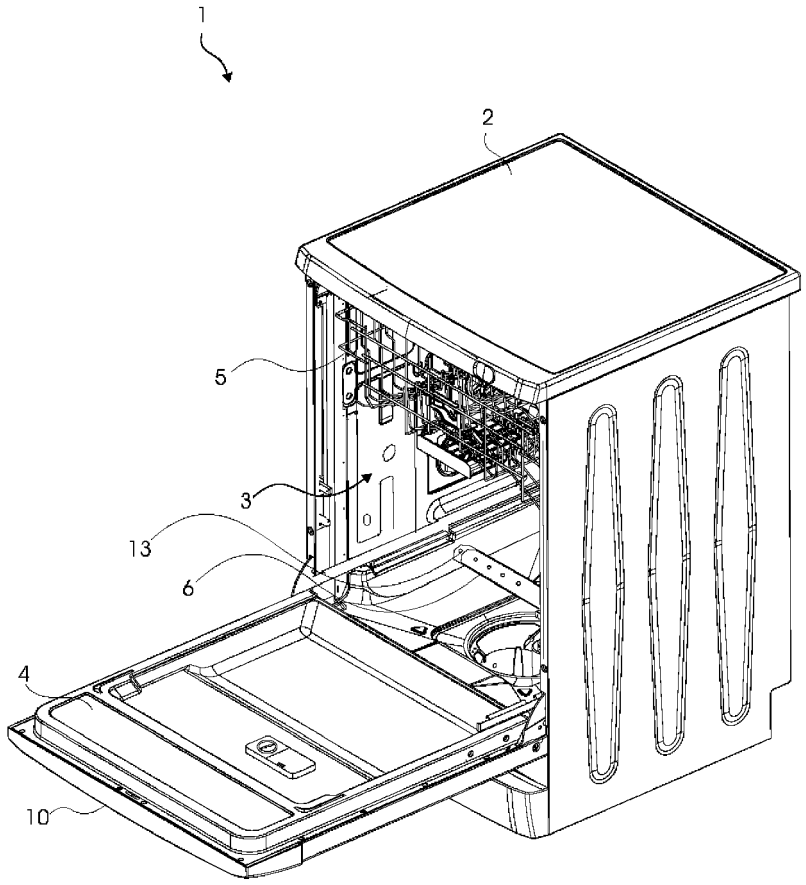


Figure 2

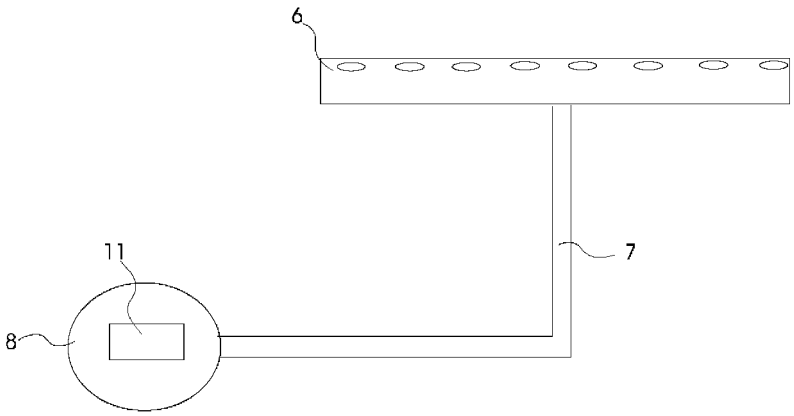


Figure 3

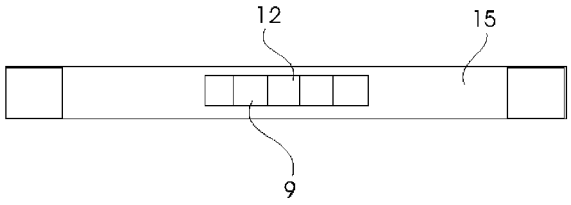


Figure 4

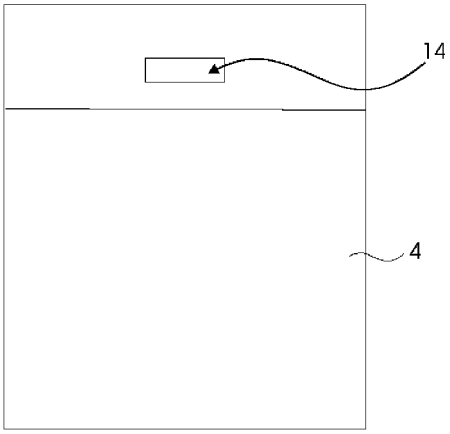
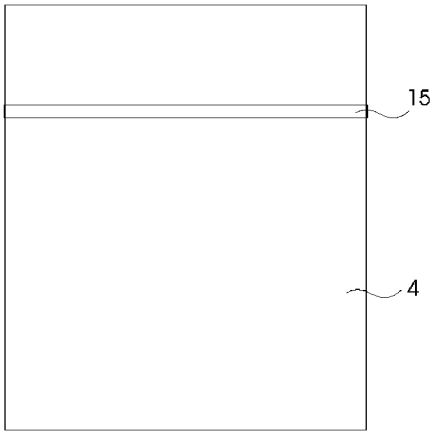


Figure 5



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EUROPEAN SEARCH REPORT

Application Number
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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	23 April 2021	Weidner, Maximilian

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