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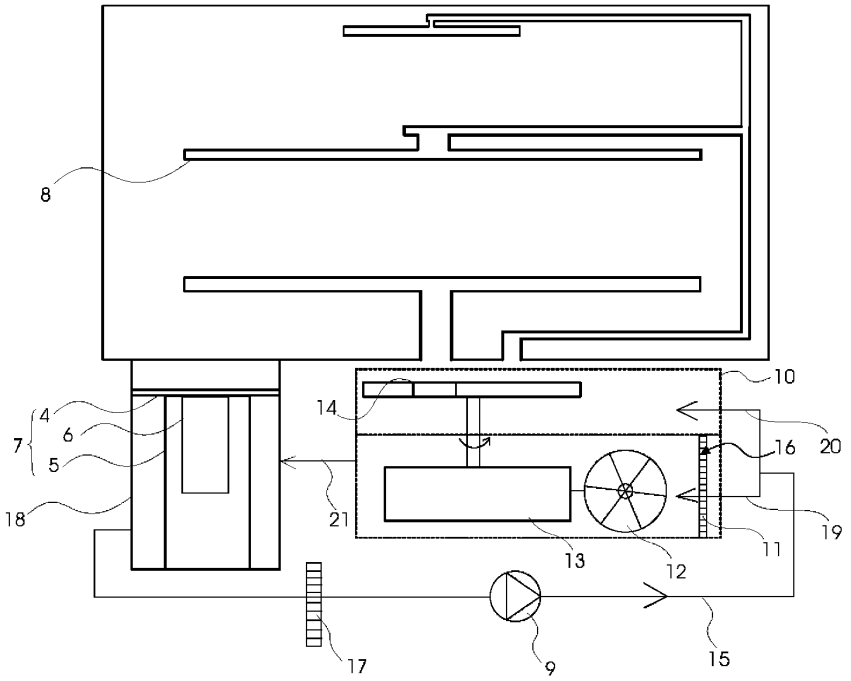
(54) A DISHWASHER COMPRISING A STRAINER

(57) The present invention relates to a dishwasher (1) comprising a body (2); a washing tub (3) which is provided in the body (2) and wherein the washing process is performed; a sump (18) which is provided on the base of the washing tub (3) and wherein water is collected; a filter group (7) provided in the sump (18) and having a main strainer (4) which strains the dirt particles breaking off from the kitchen items placed into the washing tub (3) and a microfilter (5) and a coarse filter (6) which are positioned under the main strainer (4); a plurality of spraying members (8) which provide the delivery of water to the kitchen items in the washing tub (3); a circulation pump (9) which enables the water to be guided to the spraying members (8); and a mechanical water guiding valve (10) which enables the water to be guided to the desired spraying members (8) in order.

Figure 2



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Description

[0001] The present invention relates to a dishwasher comprising a strainer.

[0002] In dishwashers, dirty kitchen items are placed onto the racks. The water is delivered onto the dirty kitchen items placed onto the racks by means of the spraying members. The water is delivered to the spraying members by means of the circulation pump. However, a mechanical water guiding valve is used to guide the water to different spraying members at different times. The dirt particles removed from the kitchen items with the pressure of the sprayed water sometimes scatter in the washing tub without being dissolved and leave the tub with the guidance of the water. The dirt particles leaving the tub are retained by means of the strainer, microfilter and the coarse filter structures provided on the base of the tub. Thus, the dirt particles are prevented from entering the water line and clogging the water line. The dirt particles retained by the strainer, the microfilter and the coarse filter structures accumulate there in the course of time, preventing a clean washing of the dishes. Therefore, the strainer, the microfilter and the coarse filter structures are removed from the washing tub and cleaned by the user at certain intervals. The same components are replaced after the washing process and the washing programs are run. However, when the strainer, the microfilter and the coarse filter structures are not properly mounted or are damaged, the filtering process cannot be efficiently realized. This causes the spraying members, the circulation pump and the mechanical valves to get clogged.

[0003] In the state of the art European Patent Application No. EP3222193, a dishwasher is disclosed, wherein a mechanism water guiding valve is used.

[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 provided in the body; a sump wherein the water in the washing tub is collected; a filter group which filters the dirt particles in the water in the sump; a plurality of spraying members which are disposed in the washing tub and which provide the delivery of the water to the kitchen items; a circulation pump which provides the delivery of the water to the spraying members; and a mechanical water guiding valve which enables the water to be guided to the desired spraying member. By means of the circulation pump, the water filtered by the filter group is delivered to the spraying members via the mechanical water guiding valve. The filter group comprises a main strainer at the base of the washing tub, and a microfilter and a coarse filter which are provided under the main strainer. Thus, the dirt particles in the washing tub are filtered.

[0006] The dishwasher of the present invention comprises a straining member which is provided between the circulation pump and the mechanical water guiding valve. By means of the straining member, the dirt particles, which cannot be retained by the filter group, are prevented from clogging the mechanical water guiding valve and the spraying members.

[0007] In an embodiment of the present invention, the dishwasher comprises an additional straining member which is provided between the filter group and the circulation pump. By means of the additional straining member, the dirt particles passing through the filter group are retained before entering the circulation pump.

[0008] In an embodiment of the present invention, the dishwasher comprises the mechanical water guiding valve comprising a wheel group, a gear group and a shutter group; and the straining member which is positioned in front of the wheel group. By means of the wheel group, the movement of the water is converted to circular movement and is transmitted to the gear group. By means of the movement of the gears in the gear group, the shutter moves and the water is guided towards different spraying members. The straining member is positioned in front of the wheel group. Thus, the water is strained before being delivered to the mechanical water guiding valve.

[0009] In an embodiment of the present invention, the dishwasher comprises a delivery live having a first delivery line which delivers the water leaving the circulation pump to the mechanical water guiding valve and a second delivery line which delivers the same to the spraying member. The water delivered to the first delivery line operates the mechanical water guiding valve so as to enable the operation of the shutter group. The water delivered to the second delivery line is delivered to the spraying member in connection with the shutter group in operation.

[0010] In an embodiment of the present invention, the dishwasher comprises a plurality of openings which are provided on the straining member; and the first delivery line which has the same cross-sectional area as the total of the areas of the openings. The water flowing through the first delivery line moves through the straining area without any decrease in the cross-sectional area.

[0011] In an embodiment of the present invention, the dishwasher comprises a connection line which enables the water coming from the first delivery line to return to the sump after passing through the mechanical water guiding valve. Thus, the water operating the mechanical water guiding valve is delivered to the sump to be reused.

[0012] In an embodiment of the present invention, the dishwasher comprises the straining member which has a permeability level at least equal to that of the microfilter. Thus, the particles which cannot be retained by the filter group are retained by the straining member and prevented from being delivered to the mechanical water guiding valve.

[0013] By means of the present invention, a dishwasher is realized, wherein the washing efficiency is improved by retaining the solid particles forming in the washing water.

[0014] A dishwasher realized in order to attain the aim of the present invention is illustrated in the attached fig-

ures, where:

Figure 1 - is the perspective view of the dishwasher.

Figure 2 - is the schematic view of the washing tub, the filter group and the mechanical water guiding valve.

Figure 3 - is the perspective view of the mechanical water guiding valve.

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

1. Dishwasher
2. Body
3. Washing tub
4. Main strainer
5. Microfilter
6. Coarse filter
7. Filter group
8. Spraying member
9. Circulation pump
10. Mechanical water guiding valve
11. Straining member
12. Wheel group
13. Gear group
14. Shutter group
15. Delivery line
16. Opening
17. Additional straining member
18. Sump
19. First delivery line
20. Second delivery line
21. Connection line

[0016] The dishwasher (1) comprises a body (2); a washing tub (3) which is provided in the body (2) and wherein the washing process is performed; a sump (18) which is provided on the base of the washing tub (3) and wherein water is collected; a filter group (7) provided in the sump (18) and having a main strainer (4) which strains the dirt particles breaking off from the kitchen items placed into the washing tub (3) and a microfilter (5) and a coarse filter (6) which are positioned under the main strainer (4); a plurality of spraying members (8) which provide the delivery of water to the kitchen items in the washing tub (3); a circulation pump (9) which enables the water to be guided to the spraying members (8); and a mechanical water guiding valve (10) which enables the water to be guided to the desired spraying members (8) in order. The dirt particles removed from the kitchen items are retained by the filter group (7). The water in the washing tub (3) is collected in the sump (18). The water cleansed of dirt particles by passing through the filter group (7) is delivered back to the spraying members (8) by means of the circulation pump (9). The mechanical water guiding valve (10) is used to guide the water to the desired spraying member (8).

[0017] The dishwasher (1) of the present invention comprises a straining member (11) which is provided between the circulation pump (9) and the mechanical water guiding valve (10) and which retains the particles passing through the filter group (7). By means of the straining member (11), the dirt particles which cannot be retained by the filter group (7) are enabled to be retained. Thus, the circulation pump (9), the mechanical water guiding valve (10) and the spraying members (8) are prevented from getting clogged. Consequently, the washing efficiency is improved.

[0018] In an embodiment of the present invention, the dishwasher (1) comprises an additional straining member (17) which is provided between the filter group (7) and the circulation pump (9). The additional straining member (17) retains the dirt particles passing through the filter group (7) before entering the circulation pump (9). Thus, possible malfunctions in the circulation pump (9) are prevented.

[0019] In an embodiment of the present invention, the dishwasher (1) comprises the mechanical water guiding valve (10) having at least one wheel group (12), at least one gear group (13) connected to the wheel group (12) and at least one shutter group (14) delivering the water to the correct spraying member (8); and the straining member (11) which strains the water before reaching the wheel group (12). The straining member (11) is positioned in front of the wheel group (12). Thus, the dirt particles are prevented from blocking the movement of the wheel group (12). The dirt particles are removed from the mechanical water guiding valve (10).

[0020] In an embodiment of the present invention, the dishwasher (1) comprises a delivery line (15) having a first delivery line (19) which delivers the water leaving the circulation pump (9) to the mechanical water guiding valve (10) and a second delivery line (20) which delivers the same to the spraying members (8). The water leaving the circulation pump (9) flows through the delivery line (15). The water leaving the first delivery line (19) passing through the mechanical water guiding valve (10) so as to operate the shutter group (14). The water delivered to the second delivery line (20) flows towards the spraying member (8) which is open depending on the position of the shutter group (14), thus performing the washing process. The amount of water delivered to the second delivery lien (20) is more than the amount of water delivered to the first delivery line (19).

[0021] In an embodiment of the present invention, the dishwasher (1) comprises a plurality of openings (16) which are provided on the straining member (11); and the first delivery line (19) which has almost the same cross-sectional area as the total of the areas of the openings (16). The total of the areas of the openings (16) provided on the straining member (11) is equal to the cross-sectional area of the first delivery line (19) or larger than the cross-sectional area of the first delivery line (19). The amount of water flowing through the first delivery line (19) does not change while passing through the straining member (11). Thus, the operation of the mechanical wa-

ter guiding valve (10) is ensured without any change in water pressure.

[0022] In an embodiment of the present invention, the dishwasher (1) comprises a connection line (21) which enables the water to be delivered to the sump (18) after operating the mechanical water guiding valve (10) via the first delivery line (19). The water flowing through the first delivery line (19) which operates the mechanical water guiding valve (10) is delivered to the sump (18) to be reused via the connection line (21).

[0023] In an embodiment of the present invention, the dishwasher (1) comprises the straining member (11) which has a permeability level for solid particles at most equal to the permeability level of the microfilter (5). The permeability level of the straining member (11) is at least equal to the permeability of the microfilter (5). The microfilter (5) allows the passage of particles with a size of 0.3 x 0.3 at the most. Thus, small dirt particles are prevented from being delivered to the mechanical water guiding valve (10).

[0024] By means of the present invention, a dishwasher (1) is realized, comprising a straining member (11) which is disposed between the filter group (7), the circulation pump (9) and/or the mechanical water guiding valve (10). Thus, the dirt particles, which cannot be retained by the microfilter (5) and the coarse filter (6), are prevented from being delivered to the mechanical water guiding valve (10) and the spraying members (8).

Claims

1. A dishwasher (1) **comprising** a body (2); a washing tub (3) which is provided in the body (2) and wherein the washing process is performed; a sump (18) which is provided on the base of the washing tub (3) and wherein water is collected; a filter group (7) provided in the sump (18) and having a main strainer (4) which strains the dirt particles breaking off from the kitchen items placed into the washing tub (3) and a microfilter (5) and a coarse filter (6) which are positioned under the main strainer (4); a plurality of spraying members (8) which provide the delivery of water to the kitchen items in the washing tub (3); a circulation pump (9) which enables the water to be guided to the spraying members (8); and a mechanical water guiding valve (10) which enables the water to be guided to the desired spraying members (8) in order, **characterized by** a straining member (11) which is provided between the circulation pump (9) and the mechanical water guiding valve (10) and which retains the particles passing through the filter group (7).

2. A dishwasher (1) as in Claim 1, **characterized by** an additional straining member (17) which is provided between the filter group (7) and the circulation pump (9).

3. A dishwasher (1) as in Claim 1 and Claim 2, **characterized by** the mechanical water guiding valve (10) having at least one wheel group (12), at least one gear group (13) connected to the wheel group (12) and at least one shutter group (14) delivering the water to the correct spraying member (8); and the straining member (11) which strains the water before reaching the wheel group (12).

4. A dishwasher (1) as in any one of the above claims, **characterized by** a delivery line (15) having a first delivery line (19) which delivers the water leaving the circulation pump (9) to the mechanical water guiding valve (10) and a second delivery line (20) which delivers the same to the spraying members (8).

5. A dishwasher (1) as in Claim 4, **characterized by** a plurality of openings (16) which are provided on the straining member (11); and the first delivery line (19) which has almost the same cross-sectional area as the total of the areas of the openings (16).

6. A dishwasher (1) as in any one of the above claims, **characterized by** a connection line (21) which enables the water to be delivered to the sump (18) after operating the shutter (14) via the first delivery line (19).

7. A dishwasher (1) as in any one of the above claims, **characterized by** the straining member (11) and the additional straining member (17) which have a permeability level for solid particles at most equal to the permeability level of the microfilter (5).

Figure 1

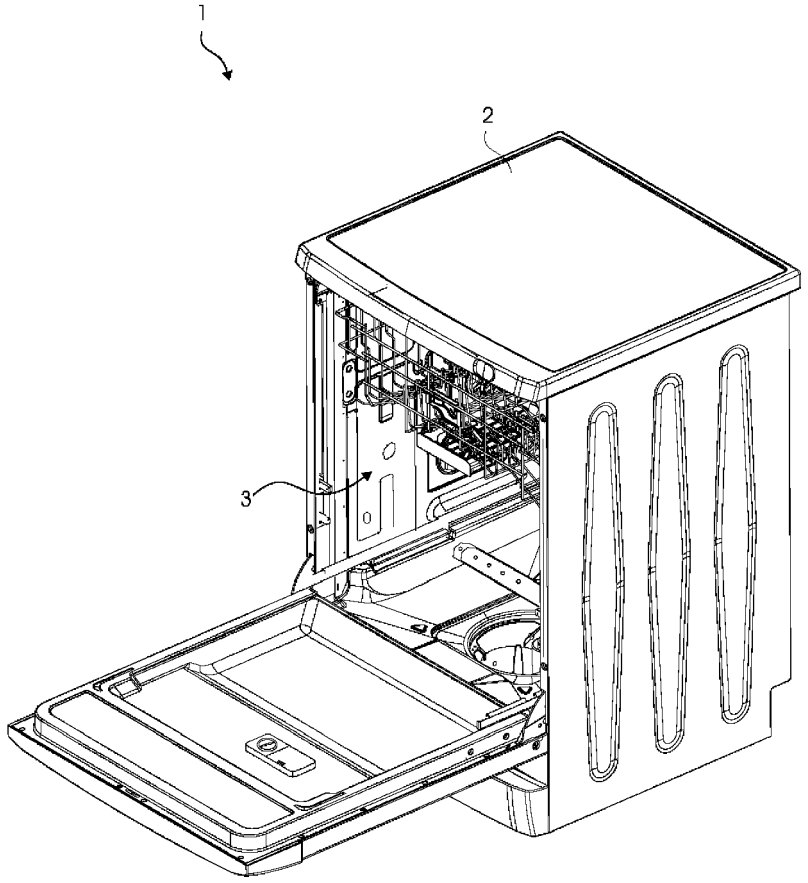


Figure 2

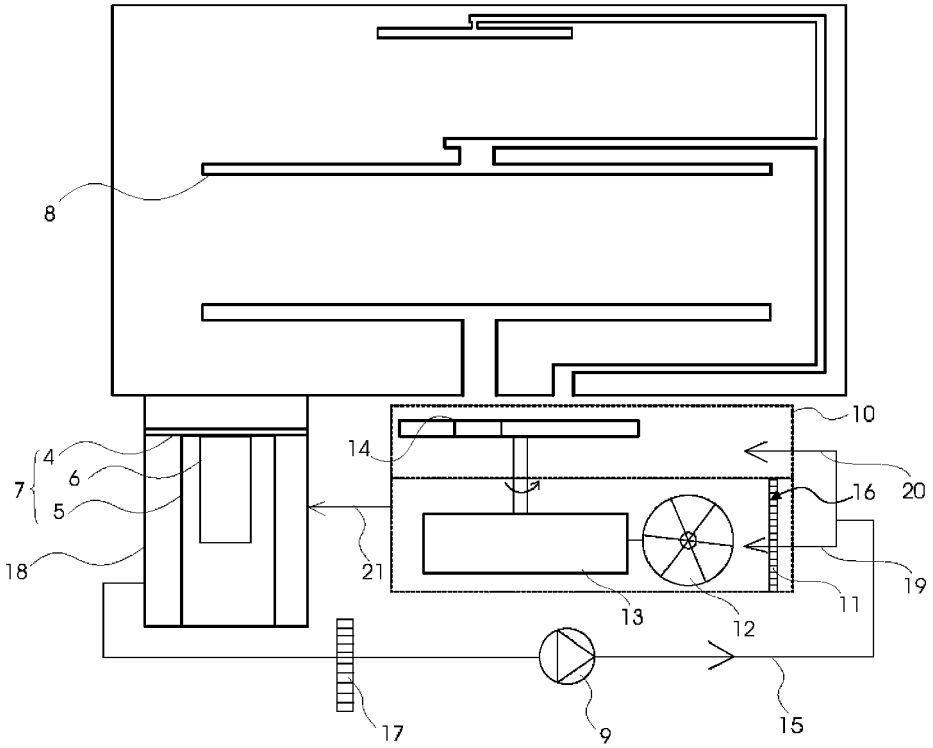
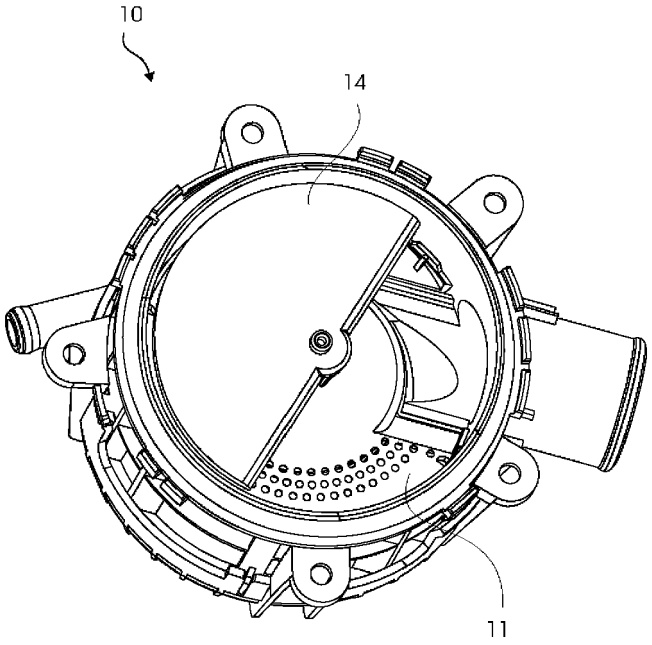


Figure 3



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EUROPEAN SEARCH REPORT

Application Number
EP 21 19 9965

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2011/056527 A1 (CLASSEN EGBERT [DE] ET AL) 10 March 2011 (2011-03-10) * paragraphs [0040], [0041], [0054], [0056] * * figures *	1-7	INV. A47L15/42
Y	DE 10 2011 002989 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 26 July 2012 (2012-07-26) * paragraph [0024] - paragraph [0026] * * figures *	1-7	
A	IT PN20 120 063 A1 (EMAINOX S P A) 17 April 2014 (2014-04-17) * paragraph [0026] - paragraph [0029]; figure 1 *	1-7	
A	US 2014/373876 A1 (WHIRLPOOL CO [US]) 25 December 2014 (2014-12-25) * paragraphs [0021], [0023], [0032]; figure 1 *	1-7	TECHNICAL FIELDS SEARCHED (IPC)
A	US 2020/022557 A1 (WHIRLPOOL CO [US]) 23 January 2020 (2020-01-23) * paragraph [0025] - paragraph [0027]; figure 3 *	1-7	A47L

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 February 2022	Popara, Velimir

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22-02-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011056527 A1	10-03-2011	AT 511381 T	15-06-2011
		CN 101902948 A	01-12-2010
		DE 102007060196 A1	18-06-2009
		EP 2222218 A1	01-09-2010
		ES 2365036 T3	20-09-2011
		PL 2222218 T3	31-10-2011
		US 2011056527 A1	10-03-2011
		WO 2009077286 A1	25-06-2009
DE 102011002989 A1	26-07-2012	DE 102011002989 A1	26-07-2012
		EP 2478818 A2	25-07-2012
		PL 2478818 T3	31-10-2019
		TR 201906640 T4	21-05-2019
		US 2012186609 A1	26-07-2012
IT PN20120063 A1	17-04-2014	---	---
US 2014373876 A1	25-12-2014	NONE	
US 2020022557 A1	23-01-2020	CN 110731742 A	31-01-2020
		US 2020022557 A1	23-01-2020

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Patent documents cited in the description

- EP 3222193 A **[0003]**