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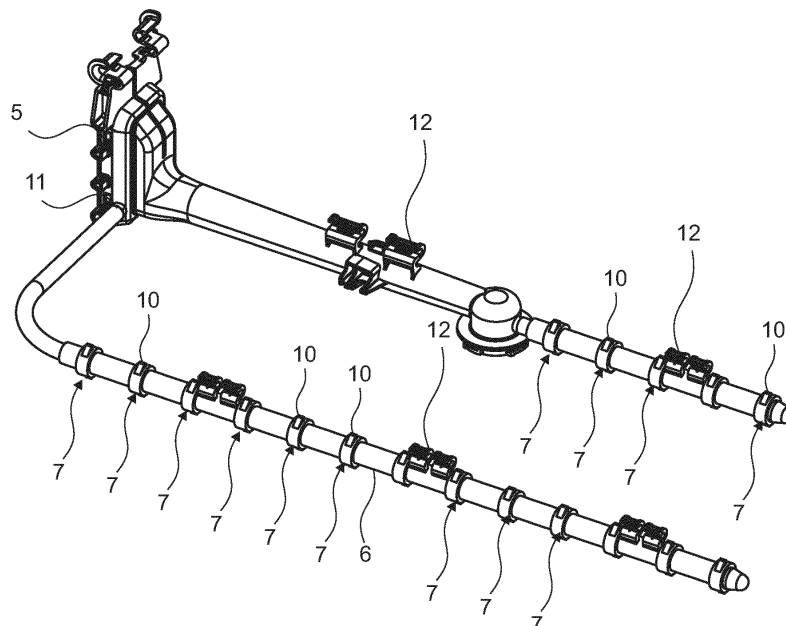
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(54) A DISHWASHER WITH IMPROVED WASHING EFFECTIVENESS

(57) The present invention relates to a dishwasher (1) comprising a washing tub (2) which has two side walls and a rear wall; a door (3) which provides access to the washing tub (2) from outside; at least one rack (4) which is positioned in the washing tub (2) and which has a loading position wherein the items are loaded thereon while at least partially outside the washing tub (2) and a washing position wherein the rack (4) is completely in the washing tub (2); a cylindrical pipe (6) which is closed at one end, which is attached to the rack (4), which has an inlet (11) connected to the water line (5) when the rack

(4) is in the washing position and through which the water flows; at least one passage (9) which is provided on the wall of the pipe (6); and at least one spraying member (7) which is in the form of a hollow ring, which is borne on the pipe (6) by surrounding the passage (9) all around, which moves radially around the axis where the spraying member (7) is borne on the pipe (6) and which has at least one outlet (10) on the outer wall thereof, extending in a direction perpendicular to the axis where the spraying member (7) is borne.

Figure 7**EP 4 364 633 A1**

Description

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

[0002] Dishwashers generally comprise upper and lower racks which are placed into the washing tub and where kitchen items, pots and pans and dishes are placed, loaded or taken out of the dishwasher.

[0003] Under each rack a spray arm, connected to the water line, is disposed, which rotates and sprays water onto the items placed on the rack.

[0004] The state of the art dishwasher comprises, in addition to the existing spray arm, additional, auxiliary spray arm which enable extra water to be sprayed in the area where the items with relatively heavy dirt are placed. Thus, the items with heavy dirt are cleaned more effectively. However, in some cases, the auxiliary spray arms cannot spray water adequately to the desired area. Moreover, when the auxiliary spray arms are used, the design of water transfer and spraying becomes complicated and the production and installation costs increase.

[0005] In the state of the art European Patent Application Document No. EP 1549196, a dishwasher is disclosed, having a nozzle which extends from the side of the spray arm and which sprays water to a region of the rack.

[0006] In the state of the art United States Patent Application No. US2007006903, a dishwasher is disclosed, comprising a bar-shaped pipe having nozzles thereon, which is disposed under the rack in addition to the spray arm, which controls the flow of water by means of various valves and which enables the water to be sprayed intensely to a region.

[0007] In the state of the art European Patent Application No. US2003192578, a dishwasher is disclosed, comprising channels having nozzles thereon at certain intervals, which extend from back to front parallel to the side wall of the dishwasher in addition to the spray arms.

[0008] The aim of the present invention is the realization of a dishwasher with improved washing performance.

[0009] 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 washing tub which has two side walls and a rear wall; a door which provides access to the washing tub from outside; at least one rack which is positioned in the washing tub and which has a loading position wherein the items are loaded thereon while at least partially outside the washing tub and a washing position wherein the rack is completely in the washing tub; a cylindrical pipe which is closed at one end, which is attached to the rack, which has an inlet connected to the water line when the rack is in the washing position and through which the water flows; at least one passage which is provided on the wall of the pipe; and at least one spraying member which is in the form of a hollow ring, which is borne on the pipe by surrounding the passage all around, which moves radially around the

axis where the spraying member is borne on the pipe and which has at least one outlet on the outer wall thereof, extending in a direction perpendicular to the axis where the spraying member is borne. Thus, the items placed in the rack in the area where the spraying member is located are effectively washed. In this embodiment of the present invention, the spraying members rotate around the axis where the same are borne on the pipe with the pressure of the water. The rotation speed of the spraying member varies according to the water pressure.

[0010] In an embodiment of the present invention, the horizontal axis of the pipe and the rotation axis of the ring overlap.

[0011] In the preferred embodiment of the present invention, the number of passages in the pipe wall is two and these passages are located on the same diameter. In this embodiment of the present invention, the spraying member comprises two outlets which are arranged on the same diameter, but open to opposite directions and which are perpendicular to the horizontal axis of the pipe. In another embodiment, there is 180° between the two outlets on the spraying member.

[0012] In an embodiment of the present invention, the spraying member comprises at least one spray nozzle which is provided above the outlet and which enables the water flowing in the pipe and passing through the passage to be sprayed. The spray nozzle forms a protrusion extending outwards on the outer wall of the spraying member, and the outlet is positioned in a direction perpendicular to the horizontal axis of the pipe. Thus, upon entering the spraying member through the passage, the water flowing in the pipe enters the spray nozzle and is sprayed into the washing tub through the outlet.

[0013] In the preferred embodiment of the present invention, there are two spray nozzles, and the spray nozzles are disposed on the same line passing through the center of the spraying member, there is 180° therebetween, and the outlets face opposite directions. Thus, the water entering the spraying member is directed to the outlets from the spray nozzles and at the same time, enables the spraying member to rotate around its own axis like a wheel such that water is effectively sprayed into the washing tub.

[0014] In an embodiment of the present invention, the dishwasher comprises the pipe which extends along the bottom of the rack and at least two spraying members which are arranged at certain intervals on the pipe. In the preferred embodiment of the present invention, there are thirteen spraying members.

[0015] In another embodiment of the present invention, the dishwasher comprises at least one hanging means which is bent in the form of a C, which is provided on the pipe and which enables the pipe to be attached to the rack.

[0016] In the embodiment of the present invention, the hanging means is attached to the wires forming the rack and remains stable and fixed at the base of the rack.

[0017] In the preferred embodiment of the present in-

vention, the hanging means is disposed between two spraying members. In this embodiment of the present invention, the dishwasher comprises two pairs of hanging means between the spraying members on a pipe.

[0018] In an embodiment of the present invention, the pipe is L-shaped. In this embodiment, the spraying members are positioned on the pipe along the long side of the pipe. In the preferred embodiment of the present invention, the straight form and the L form of the pipe are used together.

[0019] In the embodiment of the present invention, in order to load the items to be washed into the rack, the door is opened and the rack is partially or completely pulled out of the washing tub. The rack changed to the loading position is pushed in the opposite direction after loading the items to be washed therein and thus the rack is placed into the washing tub. When the rack is completely fitted into the washing tub, the pipe is physically connected to the water line. During the washing process, water, preferably pressurized, is delivered to the pipe under the rack through the water line. The pressurized water transmitted from the water line to the pipe enters the spraying members through the passages while moving through the pipe and the water is enabled to be sprayed through the outlets in the spray nozzles into the washing tub and hence towards the rack to which the pipe is attached. Moreover, with the pressure of the water, the spraying members rotate around the axis where the same are borne on the pipe. Thus, the area in the rack where the items with heavy dirt are placed is cleaned more effectively. By means of the pressurized water transmitted from the water line, the spraying member moves radially around the axis where the same is borne on the pipe and sweeps the area in the rack where the pipe is attached with water. Thus, by spraying a sufficient amount of water on the items, the items are washed more effectively.

[0020] By means of the present invention, the washing performance of the dishwasher is increased and by enabling regional washing, higher washing performance is achieved with lower energy consumption values.

[0021] An oven 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 a dishwasher when the door is open.

Figure 2 - is the front view of the dishwasher when the door is open.

Figure 3 - is the top perspective view of the rack.

Figure 4 - is the front view of the rack.

Figure 5 - is the sideways view of the rack.

Figure 6 - is the detailed perspective view of the rack.

Figure 7 - is the perspective view of the pipe.

Figure 8 - is the front view of the pipe.

Figure 9 - is the perspective view of the pipe from a different angle.

Figure 10 - is the sideways view of the spraying member.

Figure 11 - is the sideways cross-sectional view of the spraying member.

[0022] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Washing tub
3. Door
4. Rack
5. Water line
6. Pipe
7. Spraying member
8. Spray nozzle
9. Passage
10. Outlet
11. Inlet
12. Hanging means

[0023] The dishwasher (1) comprises a washing tub (2) which has two side walls and a rear wall; a door (3) which provides access to the washing tub (2) from outside; at least one rack (4) which is positioned in the washing tub (2) and which has a loading position wherein the items are loaded thereon while at least partially outside the washing tub (2) and a washing position wherein the rack (4) is completely in the washing tub (2); a cylindrical pipe (6) which is closed at one end, which is attached to the rack (4), which has an inlet (11) connected to the water line (5) when the rack (4) is in the washing position and through which the water flows; at least one passage (9) which is provided on the wall of the pipe (6); and at least one spraying member (7) which is in the form of a hollow ring, which is borne on the pipe (6) by surrounding the passage (9) all around, which moves radially around the axis where the spraying member (7) is borne on the pipe (6) and which has at least one outlet (10) on the

outer wall thereof, extending in a direction perpendicular to the axis where the spraying member (7) is borne. Thus, the items placed in the rack (4) in the area where the spraying member (7) is located are effectively washed. In this embodiment of the present invention, the spraying members (7) rotate around the axis where the same are borne on the pipe (6) with the pressure of the water. The rotation speed of the spraying member (7) varies according to the water pressure (Figure 1 and Figure 2).

[0024] In an embodiment of the present invention, the horizontal axis of the pipe (6) and the rotation axis of the spraying member (7) overlap.

[0025] In the preferred embodiment of the present invention, the number of passages (9) in the pipe (6) wall is two and these passages (9) are located on the same diameter. In this embodiment of the present invention, the dishwasher (1) comprises two outlets (10) on the spraying member (7) which are arranged on the same diameter, but open to opposite directions and which are perpendicular to the horizontal axis of the pipe (6). In another embodiment, there is 180° between the two outlets (10) on the spraying member (7) (Figure 10 and Figure 11).

[0026] In an embodiment of the present invention, the dishwasher (1) comprises at least one spray nozzle (8) on the spraying member (7), whereon the outlet (10) is positioned and which enables the water flowing in the pipe (6) and passing through the passage (9) to be sprayed. The spray nozzle (8) forms a protrusion extending outwards on the outer wall of the spraying member (7), and the outlet (10) is positioned in a direction perpendicular to the horizontal axis of the pipe (6). Thus, upon entering the spraying member (7) through the passage (9), the water flowing in the pipe (6) enters the spray nozzle (8) and is sprayed into the washing tub (2) through the outlet (10).

[0027] In the preferred embodiment of the present invention, there are two spray nozzles (8), and the spray nozzles (8) are disposed on the same line passing through the center of the spraying member (7), there is 180° therebetween, and the outlets (10) face opposite directions. Thus, the water entering the spraying member (7) is directed to the outlets (10) from the spray nozzles (8) and at the same time, enables the spraying member (7) to rotate around its own axis like a wheel such that water is effectively sprayed into the washing tub (2).

[0028] In an embodiment of the present invention, the dishwasher (1) comprises the pipe (6) which extends along the bottom of the rack (4) and at least two spraying members (7) which are arranged at certain intervals on the pipe (6). In the preferred embodiment of the present invention, there are thirteen spraying members (7) (Figure 3, Figure 4, Figure 5 and Figure 6).

[0029] In another embodiment of the present invention, the dishwasher (1) comprises at least one hanging means (12) which is bent in the form of a C, which is provided on the pipe (6) and which enables the pipe (6) to be attached to the rack (4). In the embodiment of the

present invention, the hanging means (12) is attached to the wires forming the rack (4) and remains stable and fixed at the base of the rack (4).

[0030] In the preferred embodiment of the present invention, the hanging means (12) is disposed between two spraying members (7). In this embodiment of the present invention, the dishwasher (1) comprises two pairs of hanging means (12) between the spraying members (7) on a pipe (6).

[0031] In an embodiment of the present invention, the pipe (6) is L-shaped. In this embodiment, the spraying members (7) are positioned on the pipe (6) along the long side of the pipe (6). In the preferred embodiment of the present invention, the straight form and the L form of the pipe (6) are used together (Figure 7, Figure 8 and Figure 9).

[0032] In the embodiment of the present invention, in order to load the items to be washed into the rack (4), the door (3) is opened and the rack (4) is partially or completely pulled out of the washing tub (2). The rack (4) changed to the loading position is pushed in the opposite direction after loading the items to be washed therein and thus the rack (4) is placed into the washing tub (2). When the rack (4) is completely fitted into the washing tub (2), the pipe (6) is physically connected to the water line (5). During the washing process, water, preferably pressurized, is delivered to the pipe (6) under the rack (4) through the water line (5). The pressurized water transmitted from the water line (5) to the pipe (6) enters the spraying members (7) through the passages (9) while moving through the pipe (6) and the water is enabled to be sprayed through the outlets (10) in the spray nozzles (8) into the washing tub (2) and hence towards the rack (4) to which the pipe (6) is attached. Moreover, with the pressure of the water, the spraying members (7) rotate around the axis where the same are borne on the pipe (6). Thus, the area in the rack (4) where the items with heavy dirt are placed is cleaned more effectively. By means of the pressurized water transmitted from the water line (5), the spraying member (7) moves radially around the axis where the same is borne on the pipe (6) and sweeps the area in the rack (4) where the pipe (6) is attached with water. Thus, by spraying a sufficient amount of water on the items, the items are washed more effectively.

[0033] By means of the present invention, the washing performance of the dishwasher (1) is increased and by enabling regional washing, higher washing performance is achieved with lower energy consumption values.

Claims

1. A dishwasher (1) **characterized by** a washing tub (2) which has two side walls and a rear wall; a door (3) which provides access to the washing tub (2) from outside; at least one rack (4) which is positioned in the washing tub (2) and which has a loading position

- wherein the items are loaded thereon while at least partially outside the washing tub (2) and a washing position wherein the rack (4) is completely in the washing tub (2); a cylindrical pipe (6) which is closed at one end, which is attached to the rack (4), which has an inlet (11) connected to the water line (5) when the rack (4) is in the washing position and through which the water flows; at least one passage (9) which is provided on the wall of the pipe (6); and at least one spraying member (7) which is in the form of a hollow ring, which is borne on the pipe (6) by surrounding the passage (9) all around, which moves radially around the axis where the spraying member (7) is borne on the pipe (6) and which has at least one outlet (10) on the outer wall thereof, extending in a direction perpendicular to the axis where the spraying member (7) is borne.
2. A dishwasher (1) as in Claim 1, **characterized by** the spraying member (7) of which the rotation axis overlaps with the horizontal axis of the pipe (6).
 3. A dishwasher (1) as in Claim 1, **characterized by** the two passages (9) which are located on the same diameter on the wall of the pipe (6).
 4. A dishwasher (1) as in Claim 1, **characterized by** two outlets (10) on the spraying member (7) which are arranged on the same diameter, but open to opposite directions and which are perpendicular to the horizontal axis of the pipe (6).
 5. A dishwasher (1) as in Claim 4, **characterized by** the two outlets (10) which are arranged with 180° therebetween.
 6. A dishwasher (1) as in Claim 1, **characterized by** at least one spray nozzle (8) on the spraying member (7), whereon the outlet (10) is positioned and which enables the water flowing in the pipe (6) and passing through the passage (9) to be sprayed.
 7. A dishwasher (1) as in Claim 6, **characterized by** the spray nozzle (8) which forms a protrusion extending outwards on the outer wall of the spraying member (7).
 8. A dishwasher (1) as in Claim 1, **characterized by** the outlet (10) which is positioned in a direction perpendicular to the horizontal axis of the pipe (6).
 9. A dishwasher (1) as in Claim 6, **characterized by** the two spray nozzles (8) which are disposed on the same line passing through the center of the spraying member (7), arranged with 180° therebetween.
 10. A dishwasher (1) as in Claim 9, **characterized by** the two outlets (10) which face opposite directions.
 11. A dishwasher (1) as in any one of the above claims, **characterized by** the pipe (6) which extends along the bottom of the rack (4) and at least two spraying members (7) which are arranged at certain intervals on the pipe (6).
 12. A dishwasher (1) as in any one of the above claims, **characterized by** at least one hanging means (12) which is bent in the form of a C, which is provided on the pipe (6) and which enables the pipe (6) to be attached to the rack (4).

Figure 1

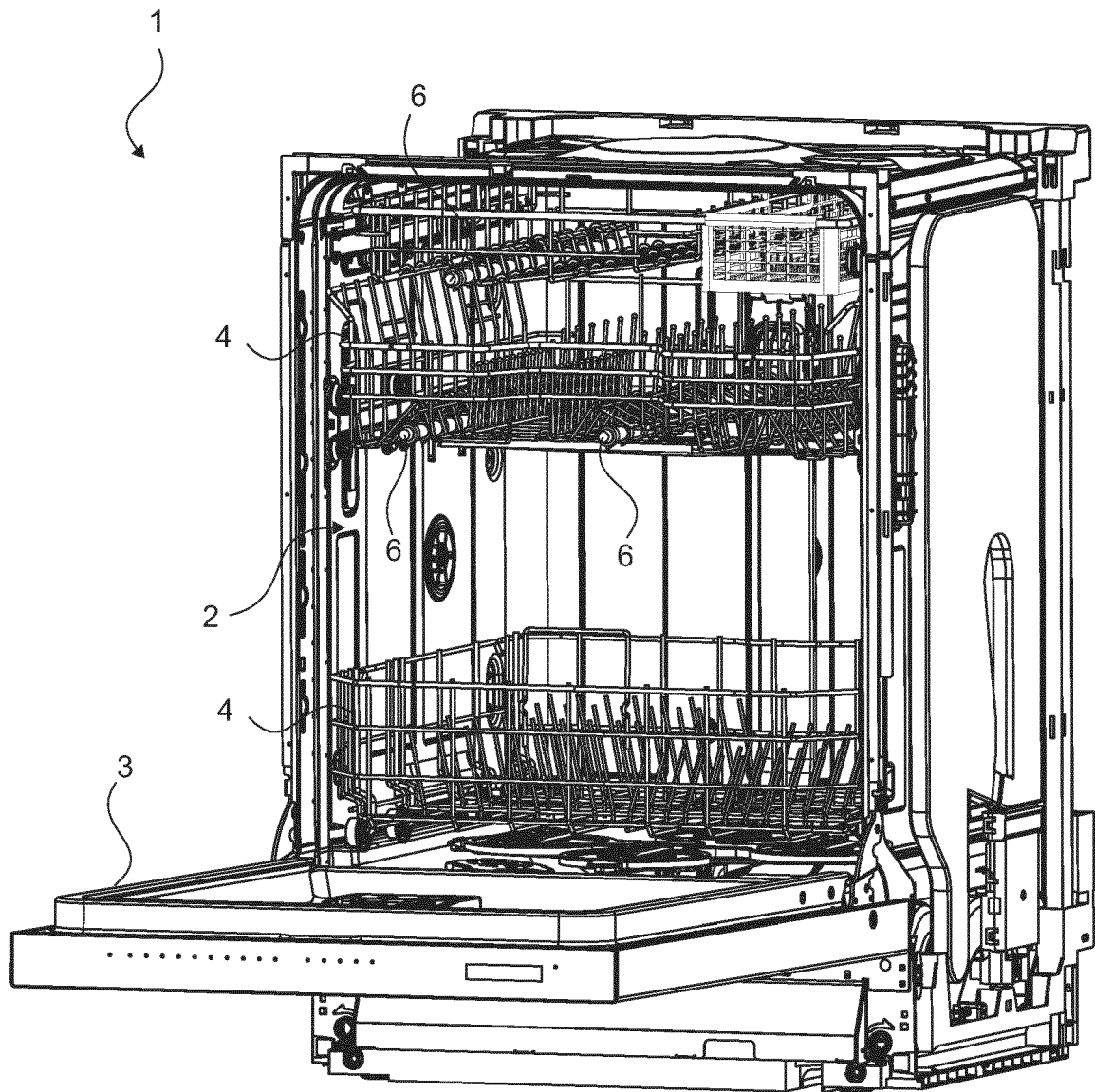


Figure 2

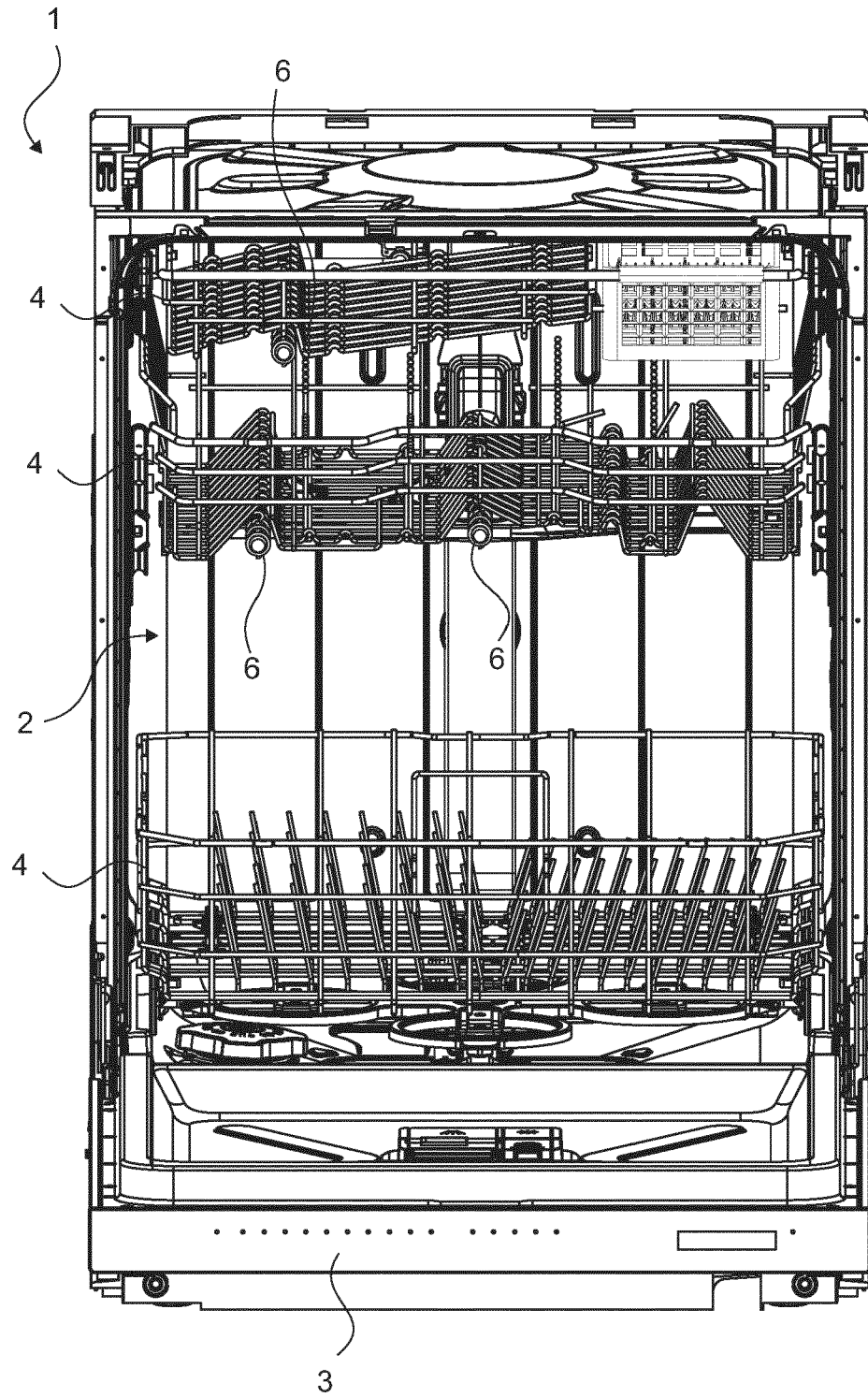


Figure 3

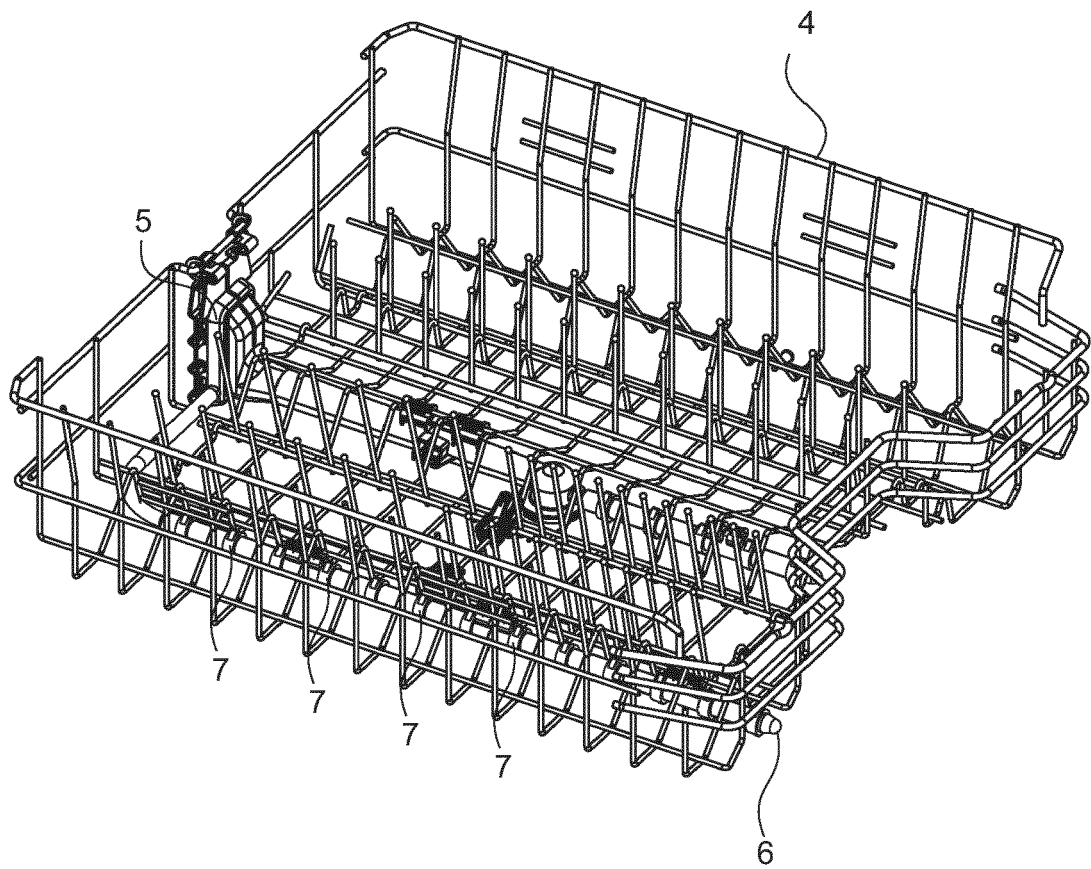


Figure 4

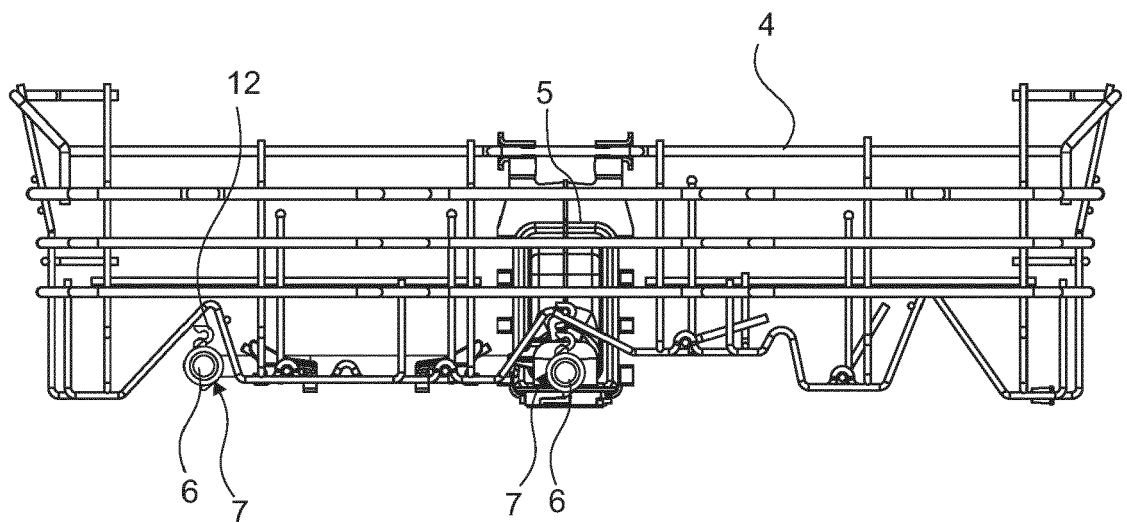


Figure 5

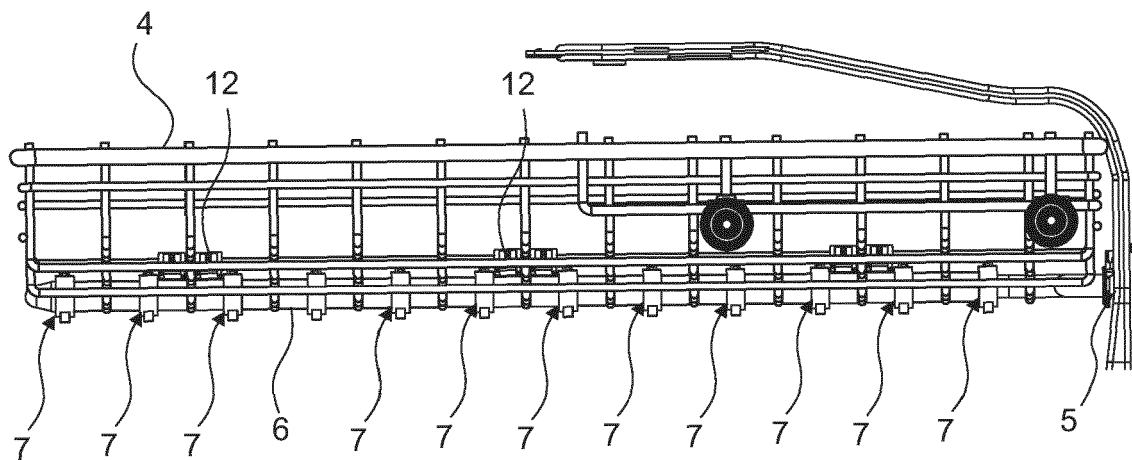


Figure 6

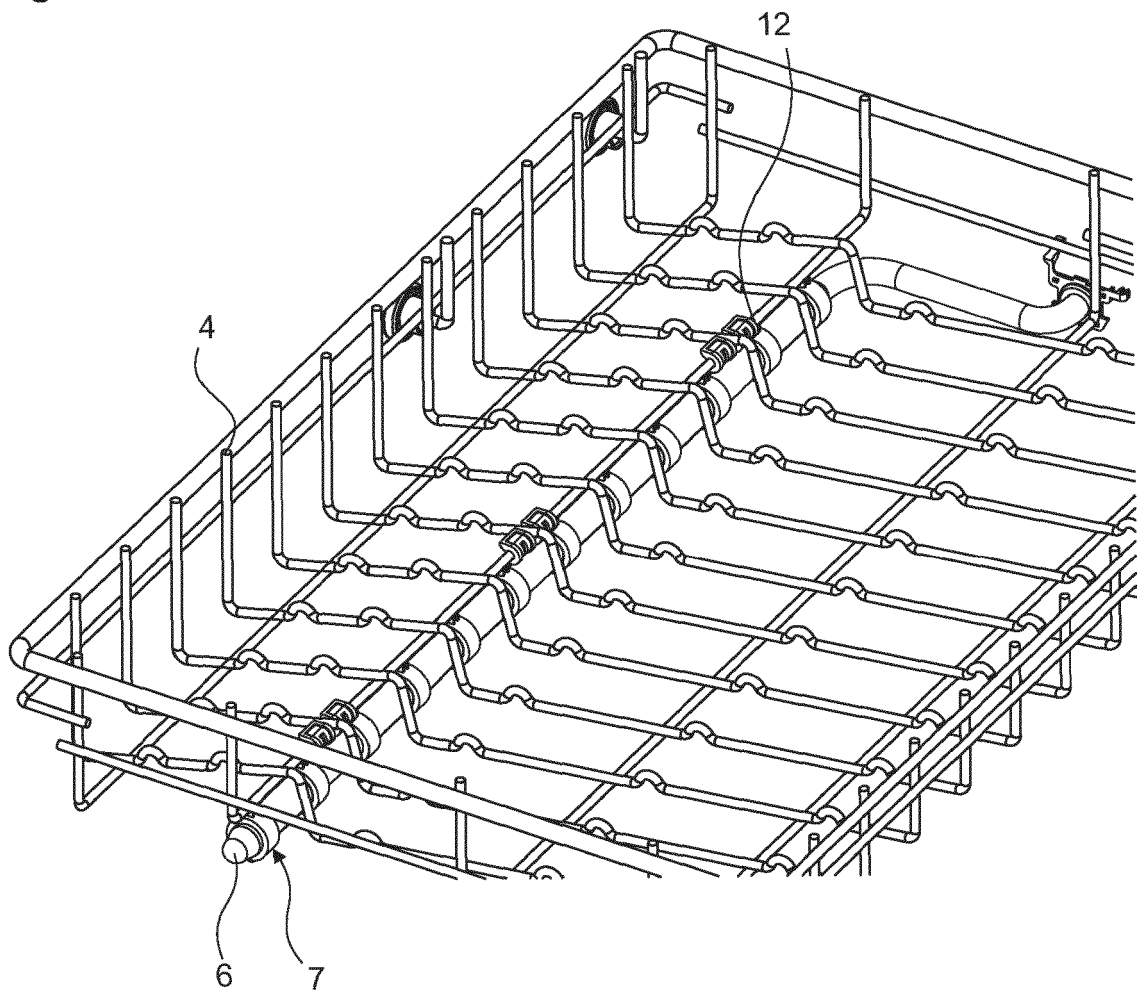


Figure 7

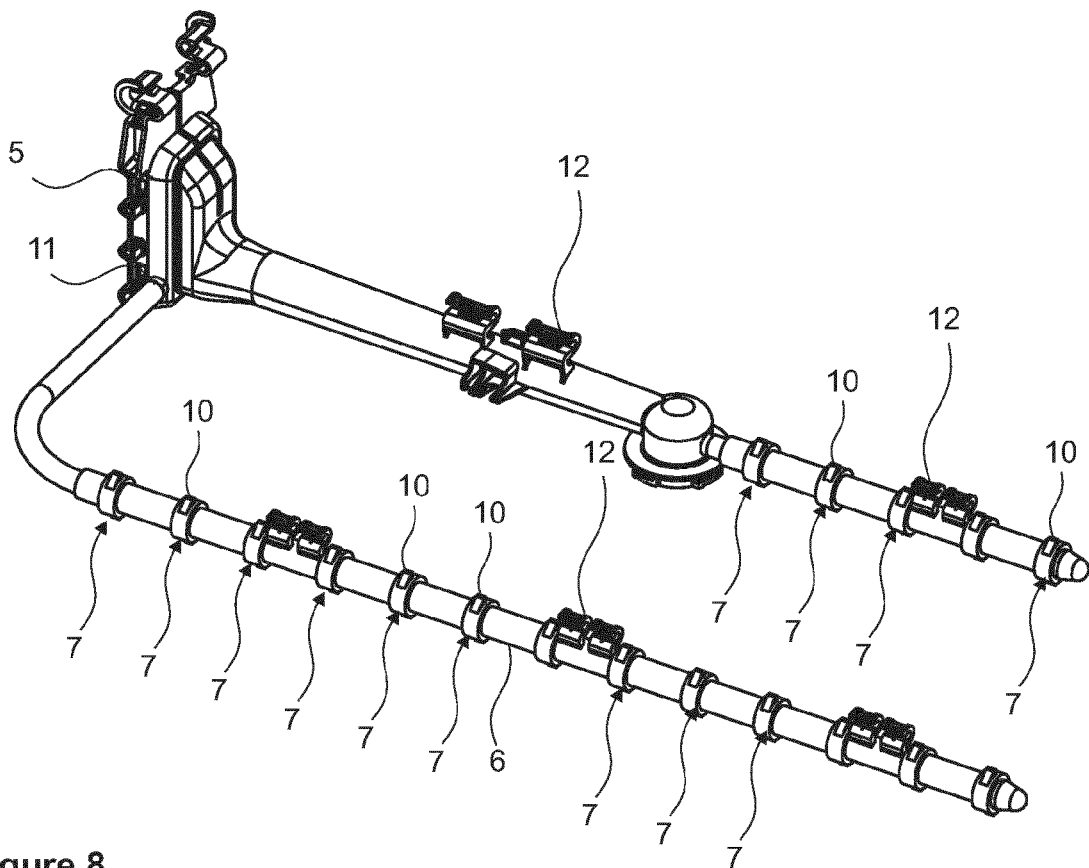


Figure 8

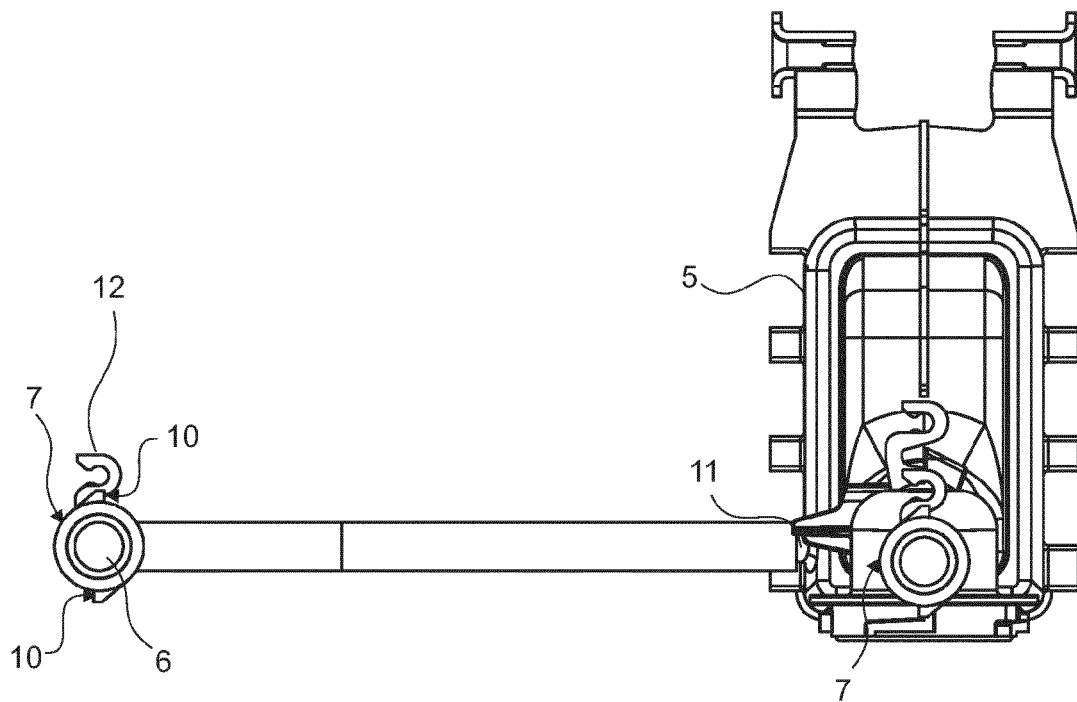


Figure 9

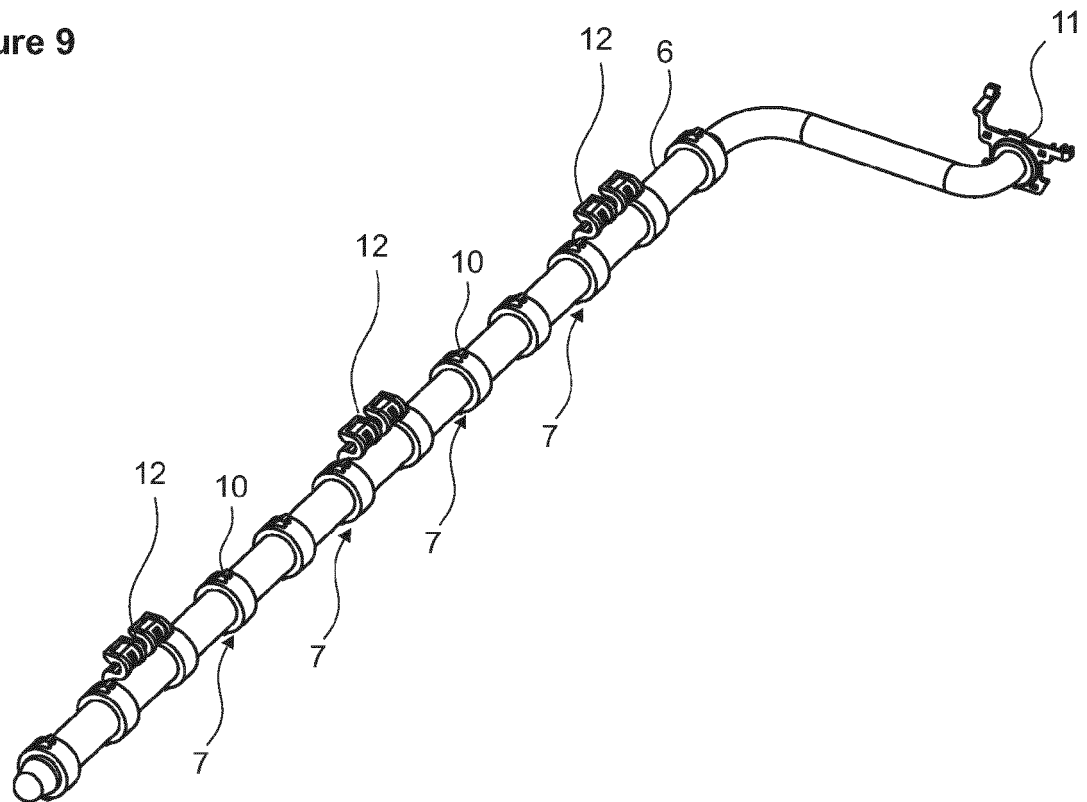


Figure 10

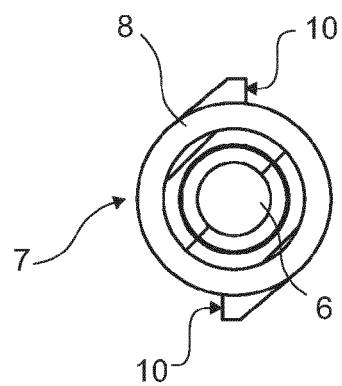
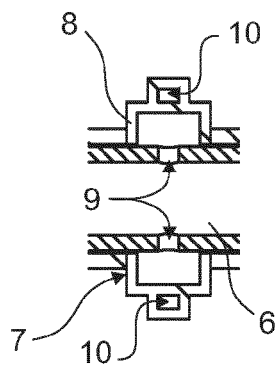


Figure 11





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Place of search		Date of completion of the search	Examiner
Munich		5 March 2024	Prosig, Christina
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