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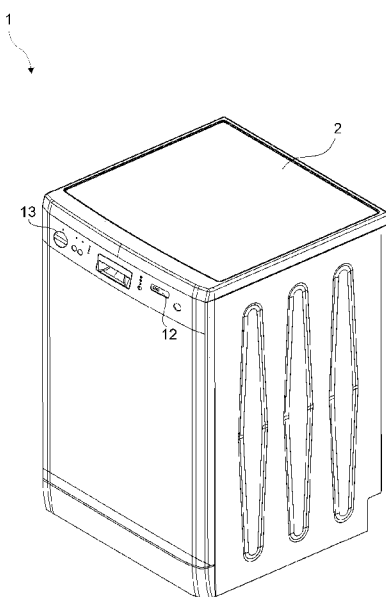
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(54) Title: A DISHWASHER

Figure 1



(57) Abstract: 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 by using washing water; a circulation pump (4) which enables the washing water to be pressurized and delivered to the washing tub (3); at least one rack (5) which is disposed in the washing tub (3) and whereon the items to be washed are placed; at least one spray arm (6) which enables the washing water to be delivered onto the items placed onto the rack (5) by means of a plurality of nozzles (11) and which has an upper piece (9) and a lower piece (10) forming the upper and lower parts thereof and a receptacle (7) provided between the upper piece (9) and the lower piece (10) and wherein the washing water is delivered by means of the circulation pump (4); a motor (8) which is provided at the lower side of the spray arm (6) and which operates the spray arm (6); a control panel (12) which is disposed on the body (2) and which allows the selection of the parameters related to the washing process; and a control unit (13) for controlling the washing process.

Description**A DISHWASHER**

- [0001] The present invention relates to a dishwasher with improved washing efficiency.
- [0002] In dishwashers, the washing process is realized by spraying the water received from the main supply line onto the items placed on the rack by means of the spray arms. By means of the nozzles provided on the spray arm, the washing water is enabled to be delivered onto the items with a certain pressure. The flow rate and pressure of the water delivered on the items affect the removal of dirt on the items. If items with different concentrations of dirt are placed on the rack, water must be delivered to the items at different flow rates and pressures in order to achieve an effective washing process. Various spray arms are designed to achieve high washing performance. The different spray arms also affect the amount of water consumed during the washing process. For example, the amount of water needed when the items with a low amount of dirt are placed on the rack differs from the amount of water needed when the items with a high amount of dirt are placed on the rack. Thus, it is difficult to ensure that the amount of water needed for different washing programs is delivered by means of spray arms of standard type with standard number of nozzles, and when this is not achieved, washing performance is adversely affected.
- [0003] In the state of the art European Patent Application No. EP2974644, a dishwasher is disclosed, comprising a spray arm with different compartments.
- [0004] The aim of the present invention is the realization of a dishwasher wherein the amount of water suitable for the selected washing program is delivered to the items placed onto the rack, thus performing an efficient washing process.
- [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 by using washing water; a circulation pump

which enables the washing water to be pressurized and delivered to the washing tub; and at least one rack which is disposed in the washing tub and whereon the items to be washed are placed. At least one spray arm is provided for delivering the washing water onto the rack through a plurality of nozzles provided thereon. The spray arm is composed of an upper piece and a lower piece. The washing water is filled into a receptacle by a circulation pump disposed between the upper piece and the lower piece, and the water is delivered through the nozzles on the spray arm to the items on the rack. A motor for operating the spray arm is provided at the lower side of the spray arm. The parameters related to the washing process are selected by means of a control panel provided on the body, and the washing process is controlled by a control unit.

[0006] The dishwasher of the present invention comprises the spray arm having a channel which is provided on the lower piece, and the upper piece which can move on the channel and which is fixed on the lower piece by a plurality of protrusions provided on the part facing the lower piece being placed in a plurality of housings provided on the base of the lower piece. The upper piece moves over the channel. The upper piece is connected to the lower piece by fitting the protrusion on the base of the upper piece into the housing on the base of the lower piece, and the water is delivered through the nozzles provided at the regions where the upper piece and the lower piece are connected to each other. The capacity to connect the upper piece and the lower piece to each other at different points affects the number of nozzles connected and hence the amount of water delivered through the nozzles.

[0007] In an embodiment of the present invention, the dishwasher comprises a cover which is detachably mounted onto the upper piece and whereon nozzles of different types and in different numbers are arranged so as to be suitable for different washing programs. The cover comprising the nozzles of different types and in different numbers is disposed onto the cover. For example, the nozzles of the type and in the number required for performing an efficient washing process when delicate items are placed onto the rack differ from the nozzles of the type and in the number of

required for the washing process when items with heavy dirt are placed onto the rack. Thus, an effective washing process is achieved by enabling the user to change only the cover to be placed onto the top cover without the need to replace the upper and/or lower pieces.

[0008] In another embodiment of the present invention, the control unit detects the cover placed onto the upper piece by means of a sensing member provided in the washing tub and compares the data received from the sensing member with the selected washing program. The sensing member is positioned in the washing tub so as to see the cover. After the cover is detected by the sensing member, the information on the cover is transmitted to the control unit. In the control unit, the information on the cover required to be placed onto the upper piece for different washing programs is prerecorded by the producer. The control unit compares the cover detected by the sensing member with the information on the cover suitable for the selected washing program. Thus, the user is enabled to be place the cover suitable for the selected washing program onto the upper piece.

[0009] In another embodiment of the present invention, the dishwasher comprises the control unit which detects the motor power consumed during the washing process and which compares the detected power with the motor power predetermined for the selected washing program. The spray arms comprising the upper piece whereon different covers having nozzles of different types and in different numbers are provided consume different amounts of motor power during the washing process. In the control unit, the information on the motor power to be consumed by different covers having nozzles of different types and in different numbers is prerecorded by the producer. The control unit compares the motor power consumed by the cover placed onto the upper piece with the motor power expected to be consumed when the cover suitable for the washing program is placed onto the upper piece. Thus, the user is enabled to be place the cover suitable for the selected washing program onto the upper piece.

[0010] In another embodiment of the present invention, the dishwasher comprises a sealing member which is provided on the channel and which provides

the leakproofing between the upper piece and the lower piece. Thus, leakproofing between the upper piece and the lower piece is ensured when the upper piece is placed onto the lower piece.

[0011] By means of the present invention, a dishwasher is realized, wherein an efficient washing process is performed by means of the spray arm having nozzles of the type and in the number suitable for the selected washing program.

[0012] The dishwasher realized in order to attain the aim of the present invention is illustrated in the attached figures, where:

[0013] Figure 1 - is the perspective view of the dishwasher.

[0014] Figure 2 - is the perspective view of the dishwasher comprising the sensing member and the spray arm in an embodiment of the present invention;

[0015] Figure 3 - is the schematic view of the dishwasher in an embodiment of the present invention.

[0016] Figure 4 - is the perspective view of the lower piece comprising the channel and the housing in an embodiment of the present invention.

[0017] Figure 5 - is the schematic view of the upper piece, the lower piece and the sealing member in an embodiment of the present invention.

[0018] Figure 6 - is the perspective view of the lower piece and the upper piece in an embodiment of the present invention.

[0019] Figure 7 - is the perspective view of the cover, the lower piece and the upper piece in an embodiment of the present invention.

[0020] Figure 8 - is the perspective view of the cover, the lower piece and the upper piece in an embodiment of the present invention.

[0021] The elements illustrated in the figures are numbered as follows:

1. Dishwasher
2. Body
3. Washing tub
4. Circulation pump
5. Rack
6. Spray arm
7. Receptacle

- 8. Motor
- 9. Upper piece
- 10. Lower piece
- 11. Nozzle
- 12. Control panel
- 13. Control unit
- 14. Channel
- 15. Protrusion
- 16. Housing
- 17. Cover
- 18. Sensing member
- 19. Sealing member

[0022] 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 by using washing water; a circulation pump (4) which enables the washing water to be pressurized and delivered to the washing tub (3); and at least one rack (5) which is disposed in the washing tub (3) and whereon the items to be washed are placed. The washing water is delivered to the items placed onto the rack (5) by means of a spray arm (6). A plurality of nozzles (11) for delivering the washing water are provided on the spray arm (6). The spray arm (6) is composed of an upper piece (9) and a lower piece (10). By means of the circulation pump (4) provided between the upper piece (9) and the lower piece (10), the washing water is delivered to a receptacle (7). A motor (8) for operating the spray arm (6) is provided at the lower side of the spray arm (6). A control panel (12) which allows the selection of the parameters related to the washing process and a control unit (13) for controlling the washing process are provided on the body (2).

[0023] The dishwasher (1) of the present invention comprises the spray arm (6) having a channel (14) which is provided on the lower piece (10), and the upper piece (9) which can move on the channel (14) and which is fixed on the lower piece (10) by a plurality of protrusions (15) provided on the part facing the lower piece (10) being placed in a plurality of housings (16) provided on the base of the lower piece (10). The upper piece (9) can

move over the channel (14) provided on the lower piece (10). The upper piece (9) preferably makes a sliding movement over the channel (14). After the movement of the upper piece (9), a plurality of protrusions (15) provided on the base of the upper piece (9) are fitted into a plurality of housings (16) provided at the base of the lower piece (10) to perform the connection. The washing water is delivered from the nozzles (11) located where the protrusion (15) is fitted into the housing (16) to the items placed on the rack (5). Thus, an amount of washing water suitable to the washing program selected by the user is delivered.

[0024] In an embodiment of the present invention, the dishwasher (1) comprises a cover (17) which is detachably mounted onto the upper piece (9) and whereon nozzles (11) of different types and in different numbers are arranged so as to be suitable for different washing programs. In order to achieve an effective washing process during different types of washing programs, there is a need for using a spray arm (6) comprising nozzles (11) of different types and in different numbers. Thus, it is ensured that an effective washing process is performed by the user replacing only the cover (17) placed on the upper piece (9) without completely replacing the lower piece (10) and/or the upper piece (9) of the spray arm (6).

[0025] In another embodiment of the present invention, the control unit (13) detects the cover (17) placed onto the upper piece (9) by means of a sensing member (18) provided in the washing tub (3) and compares the data received from the sensing member (18) with the selected washing program. By means of the sensing member (18) placed in the washing tub (3) to see the cover (17), the information on the detected cover (17) is transmitted to the control unit (13). In the control unit (13), the information on the cover (17) required to be placed onto the upper piece (9) for performing different washing programs in an efficient manner is prerecorded by the producer. The information received from the sensing member (18) and the information on the cover (17) suitable for the selected washing program are compared by the control unit (13). If it is detected that the user has not placed the cover (17) suitable for the washing program on the upper piece (9), a warning is transmitted to the

user by means of the control panel (12). Thus, an effective washing process is performed by enabling the cover (17) suitable for the selected washing program to be placed on the upper piece (9).

[0026] In another embodiment of the present invention, the dishwasher (1) comprises the control unit (13) which detects the motor (8) power consumed during the washing process and which compares the detected power with the motor (8) power predetermined for the selected washing program. The spray arms (6) comprising the cover (17) comprising nozzles (11) of different types and in different numbers consume different amounts of motor (8) power during the washing process. In the control unit (13), the information on the motor (8) power to be consumed by the spray arms (6) whereon different covers (17) are placed is prerecorded by the producer. The information on the motor (8) power to be consumed by the spray arm (6) whereon the cover (17), which is placed on the upper piece (9), is placed is compared with the motor (8) power to be consumed when the cover (17) suitable for the selected washing program is placed by the control unit (13). In case the motor (8) power information differs, the user is warned by means of the control panel (12). Thus, an effective washing process is performed by enabling the cover (17) suitable for the selected washing program to be placed on the upper piece (9).

[0027] In another embodiment of the present invention, the dishwasher (1) comprises a sealing member (19) which is provided on the channel (14) and which provides the leak proofing between the upper piece (9) and the lower piece (10). Thus, leak proofing between the lower piece (10) and the upper piece (9) placed thereon is ensured.

[0028] By means of the present invention, a dishwasher (1) is realized, comprising the spray arm (6) enabling the washing water in an amount suitable for the selected washing program to be delivered onto the items placed onto the rack (5) by means of the nozzles (11). Thus, an efficient washing process is performed in the dishwasher (1).

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 by using washing water; a circulation pump (4) which enables the washing water to be pressurized and delivered to the washing tub (3); at least one rack (5) which is disposed in the washing tub (3) and whereon the items to be washed are placed; at least one spray arm (6) which enables the washing water to be delivered onto the items placed onto the rack (5) by means of a plurality of nozzles (11) and which has an upper piece (9) and a lower piece (10) forming the upper and lower parts thereof and a receptacle (7) provided between the upper piece (9) and the lower piece (10) and wherein the washing water is delivered by means of the circulation pump (4); a motor (8) which is provided at the lower side of the spray arm (6) and which operates the spray arm (6); a control panel (12) which is disposed on the body (2) and which allows the selection of the parameters related to the washing process; and a control unit (13) for controlling the washing process, **characterized by** the spray arm (6) having a channel (14) which is provided on the lower piece (10), and the upper piece (9) which can move on the channel (14) and which is fixed on the lower piece (10) by a plurality of protrusions (15) provided on the part facing the lower piece (10) being placed in a plurality of housings (16) provided on the base of the lower piece (10).
2. A dishwasher (1) as in Claim 1, **characterized by** a cover (17) which is detachably mounted onto the upper piece (9) and whereon nozzles (11) of different types and in different numbers are arranged so as to be suitable for different washing programs.
3. A dishwasher (1) as in Claim 2, **characterized by** a sensing member (18) which is provided in the washing tub (3) and which detects the cover (17) placed onto the upper piece (9) and by the control unit (13) which compares the data received from the sensing member (18) with the selected washing program.
4. A dishwasher (1) as in any one of the above claims, **characterized by** the control unit (13) which detects the motor (8) power consumed during the washing process and which compares the detected power with the motor (8) power predetermined for the selected washing program.

5. A dishwasher (1) as in any one of the above claims, **characterized by** a sealing member (19) which is provided on the channel (14) and which provides the leak proofing between the upper piece (9) and the lower piece (10).

Figure 1

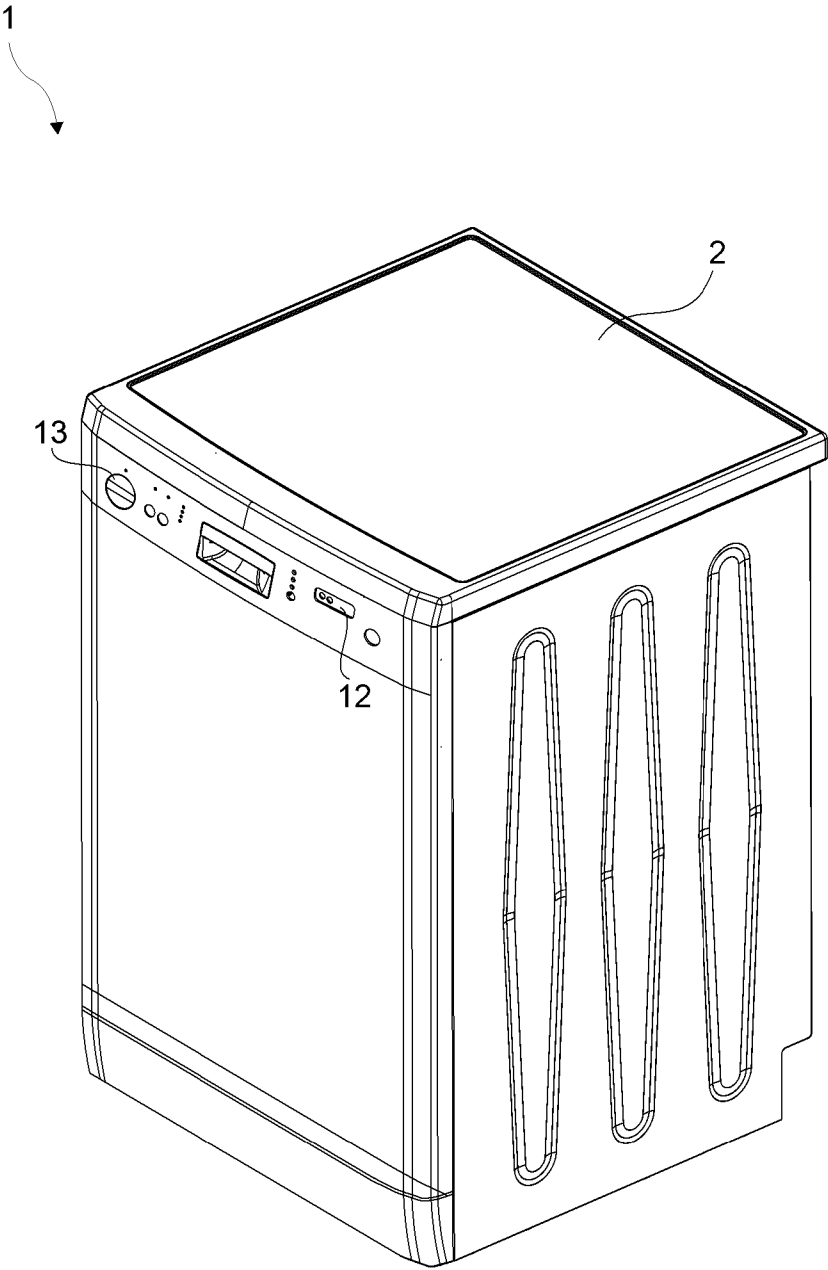


Figure 2

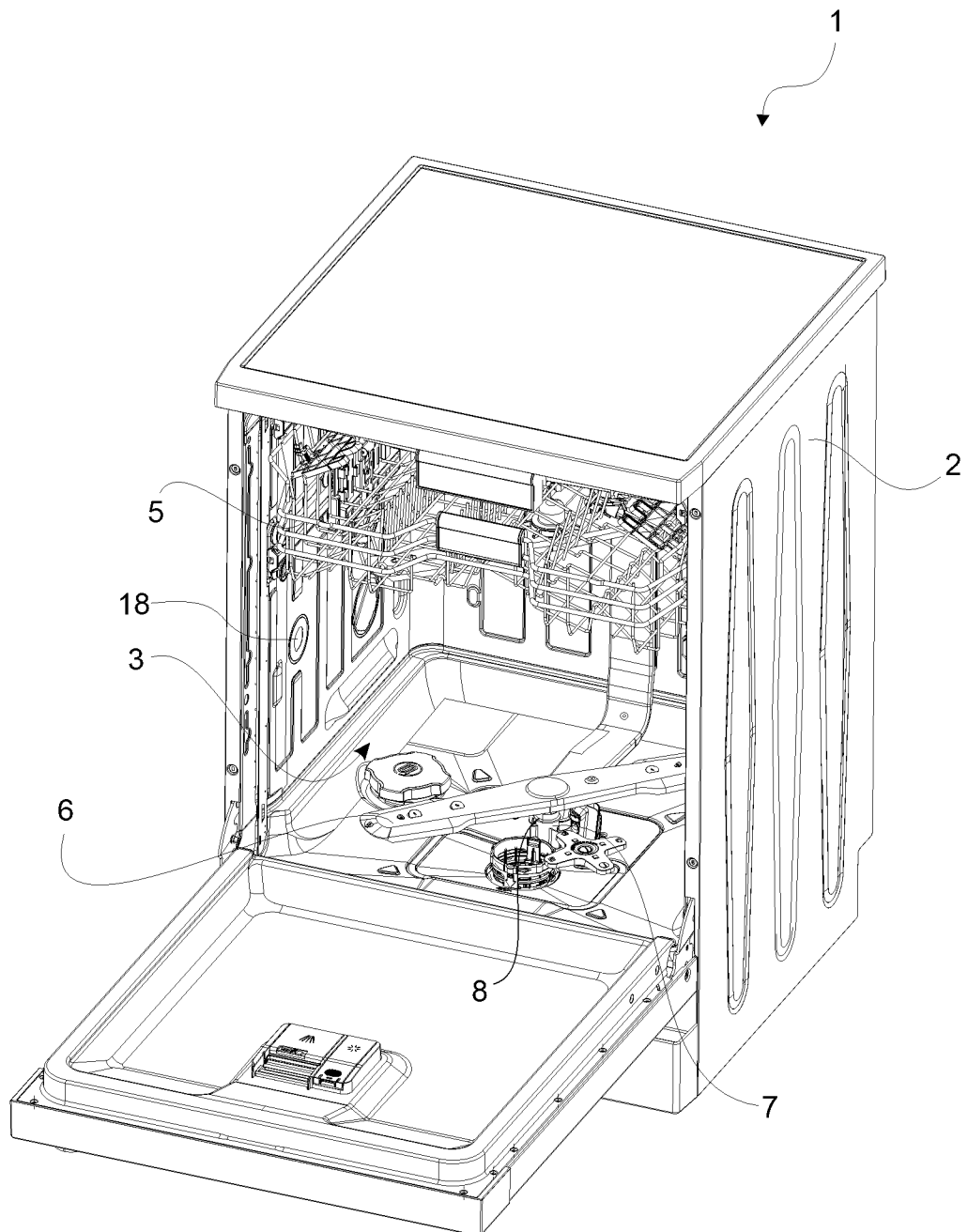


Figure 3

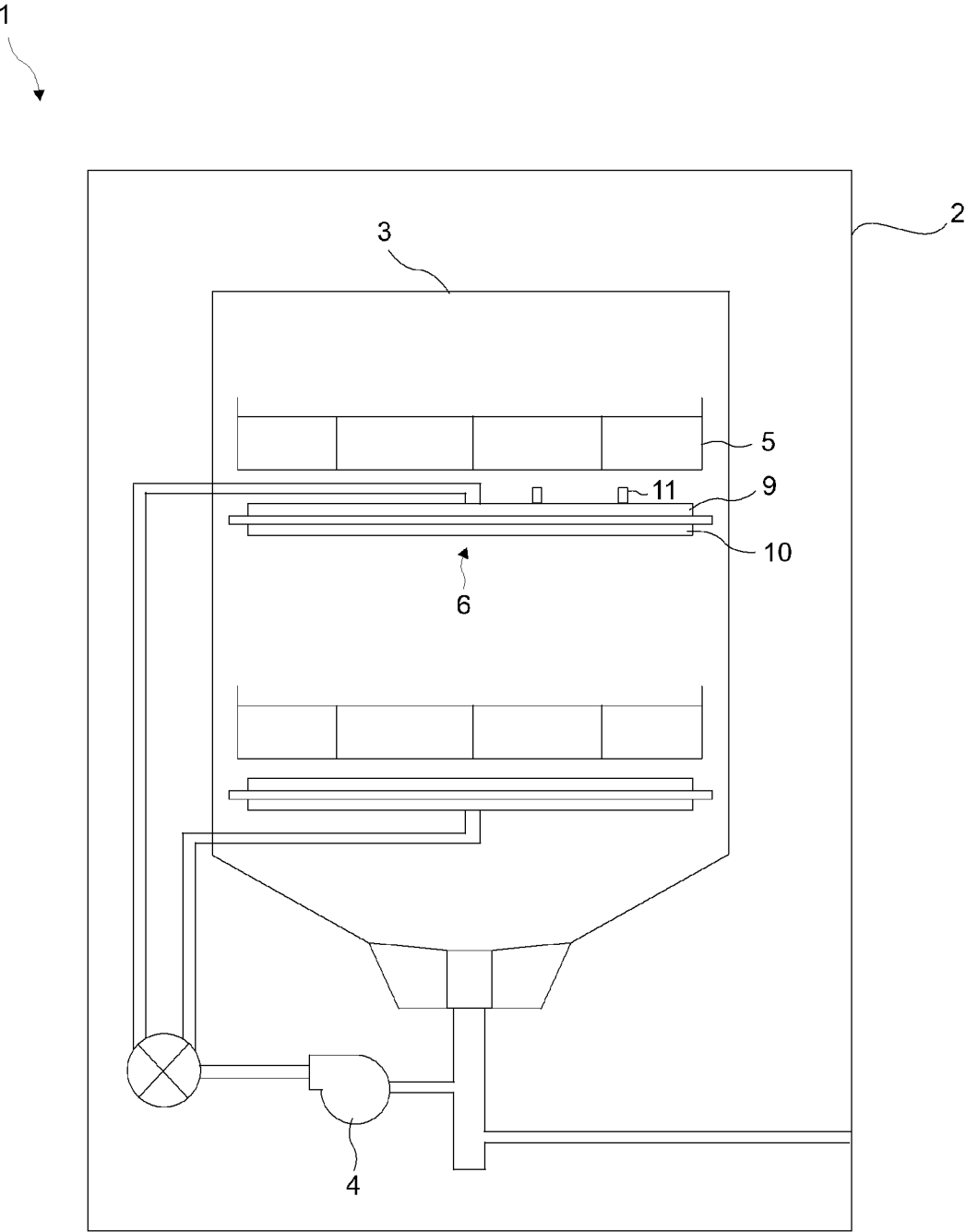


Figure 4

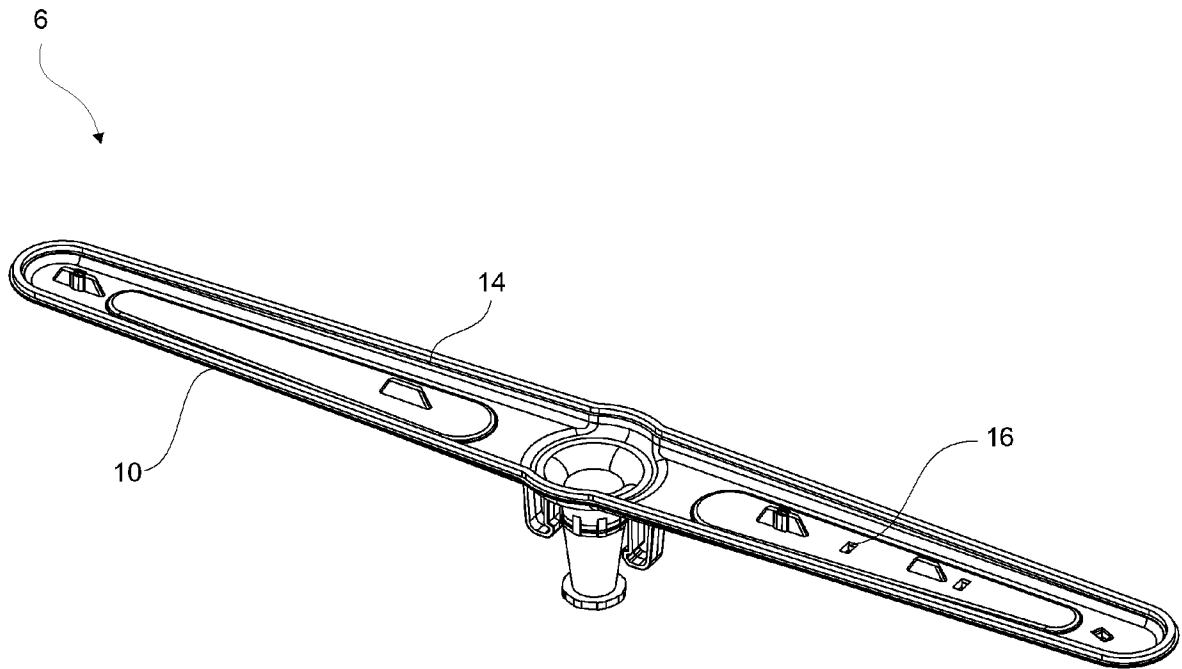


Figure 5

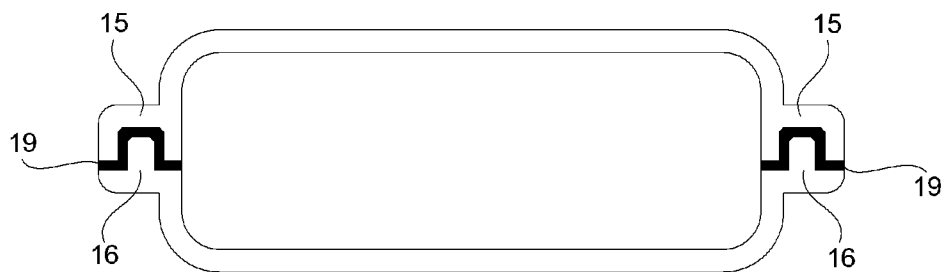


Figure 6

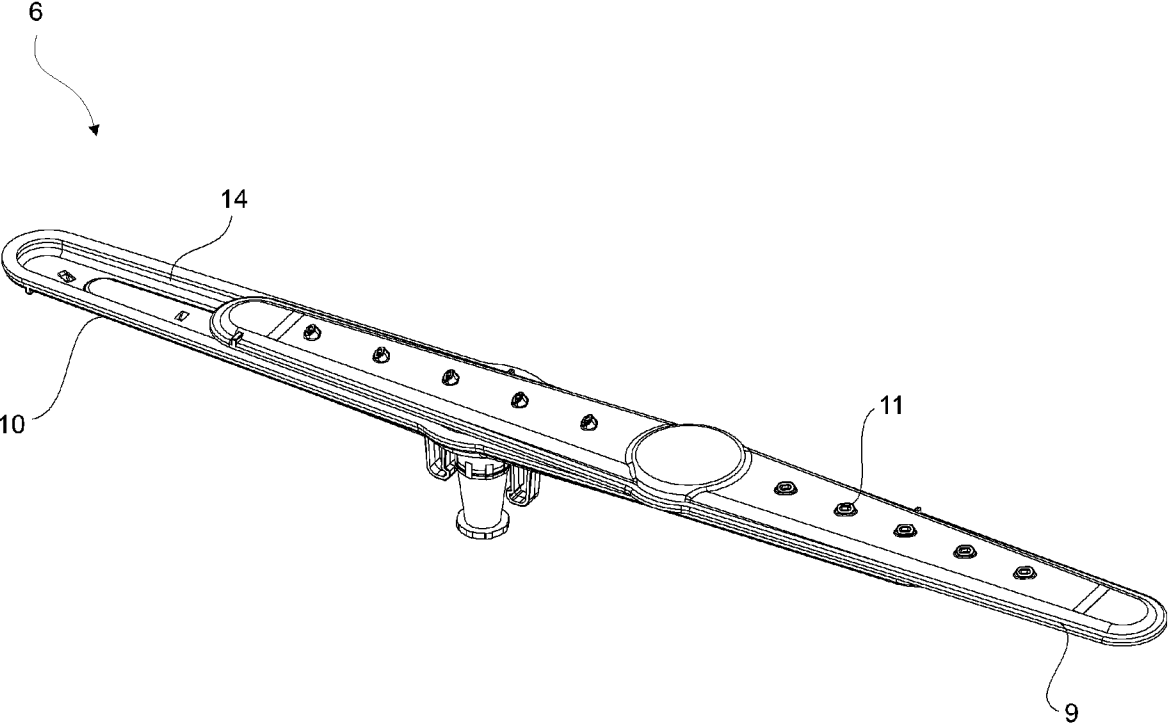


Figure 7

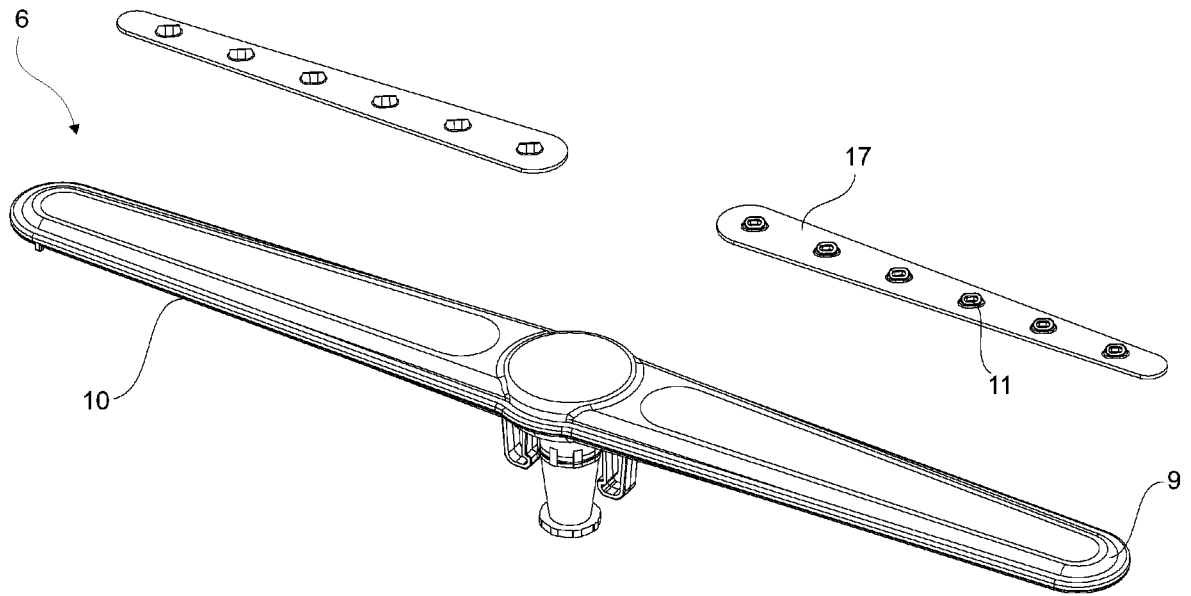
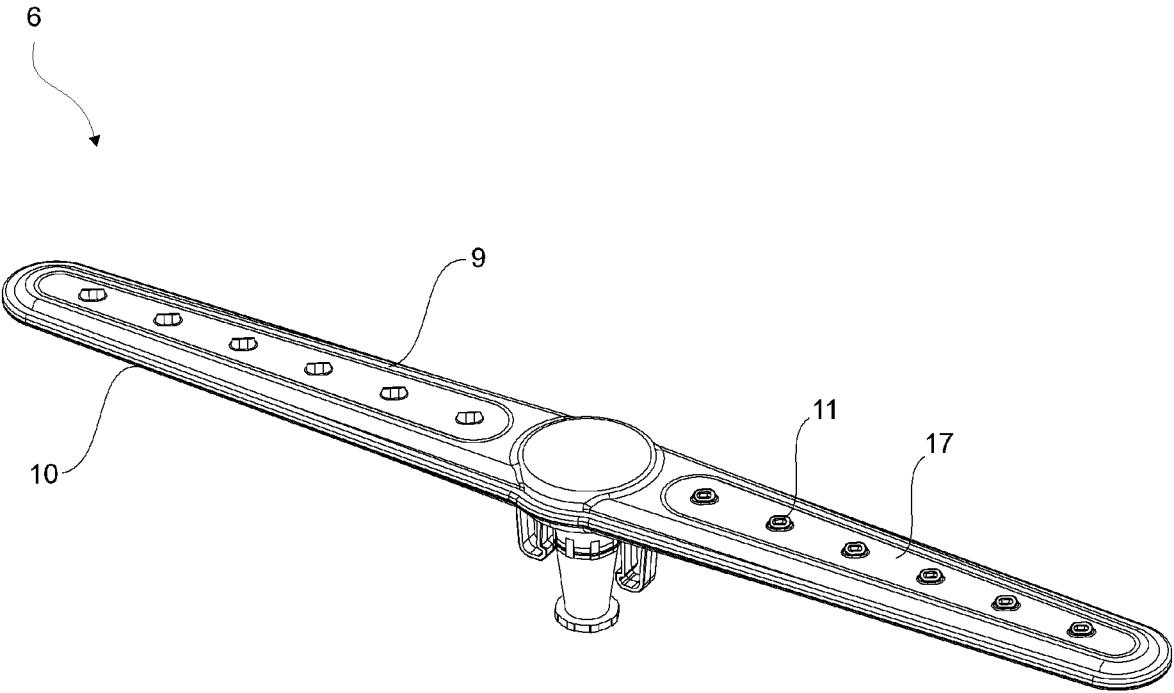


Figure 8



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/087096

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/42 A47L15/22
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2017/354311 A1 (YOO SEUNG WAN [KR] ET AL) 14 December 2017 (2017-12-14) paragraph [0044] - paragraph [0097]; figures 1,2,6	1-5
Y	----- CN 204 511 989 U (NINGBO FOTILE KITCHEN WARE CO) 29 July 2015 (2015-07-29) figure 2	1-5
A	----- US 2013/255734 A1 (HERMANN HEINZ [DE] ET AL) 3 October 2013 (2013-10-03) figures 1-5	1
A	----- JP 2000 157478 A (HOSHIZAKI ELECTRIC CO LTD) 13 June 2000 (2000-06-13) figure 1	1,2
	----- -/-	



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See patent family annex.

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Date of the actual completion of the international search

21 February 2020

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02/03/2020

Name and mailing address of the ISA/

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Kising, Axel

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/087096

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2019/087096

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