



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
24.04.2013 Bulletin 2013/17

(51) Int Cl.:
A47L 15/42 (2006.01)

(21) Application number: **11797743.9**

(86) International application number:
PCT/JP2011/001601

(22) Date of filing: **18.03.2011**

(87) International publication number:
WO 2011/161853 (29.12.2011 Gazette 2011/52)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **21.06.2010 JP 2010140096**

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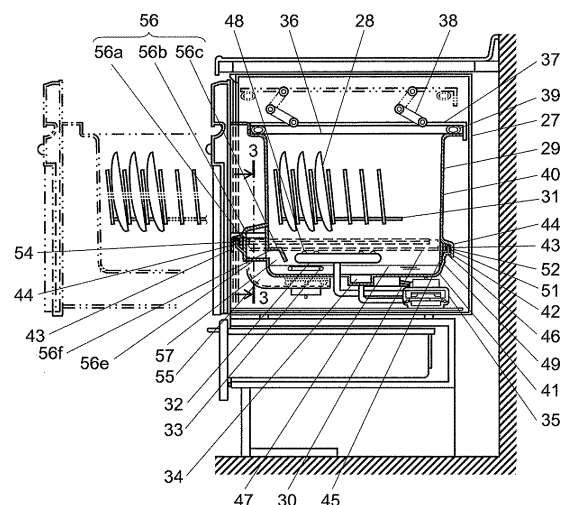
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(54) **DISHWASHER**

(57) There is provided a dishwasher in which washing tub (29) arranged so as to be freely pulled out forward is configured by bottom portion configuring member (41) and washing tub member (40), and air blow path (56) configured by engaging lower divided path (56a), which is integrally formed on bottom portion configuring member (41), and upper divided path (56b), which is integrally formed on washing tub member (40) is arranged. According to such a configuration, the washing water does not come into contact with a joining portion even if the washing water enters air blow path (56), and thus the washing water that enters air blow path (56) can be prevented from leaking out to outside of the washing tub (29) even if used over a long period of time.

FIG. 1



Description

TECHNICAL FIELD

[0001] The present invention relates to a built-in type dishwasher for washing dishes and the like by spraying washing water.

BACKGROUND ART

[0002] Fig. 7 is a longitudinal cross-sectional view of a conventional dishwasher. In Fig. 7, the conventional dishwasher is accommodated in a built-in kitchen, and arranged inside housing 1. Washing tub 2 in which a bottom portion and side surface portions are integrally formed includes opening 3 on an upper side, and interiorly includes dish basket 5 for accommodating dishes 4. Washing nozzle 6 is rotatably arranged below dish basket 5, and the washing water accumulated in washing tub 2 is pressurized and circulated by washing pump 7, and sprayed by washing nozzle 6 to wash dishes 4. Rail 8 is fixed on a lower side of washing tub 2 and supported so as to be movable in parallel in a front and back direction. When putting in and taking out dishes 4, washing tub 2 stored in housing 1 is pulled out forward, and dishes 4 are accommodated through opening 3.

[0003] In such a built-in type dishwasher in which washing tub 2 is pulled out forward from housing 1 to put in or take out dishes 4 through opening 3 on the upper side, air blow path 60 for feeding outside air into washing tub 2 from air blow port 62 during a drying step needs to be arranged on an outer side of an outer wall of washing tub 2, and furthermore, in a limited space. Air blow path 60 requires, of course, air tightness, and furthermore water tightness since it is communicated to air blowing device 61 such as an air blowing fan, and the washing water in washing tub 2 also needs to be prevented from entering from air blow port 62.

[0004] For this purpose, as shown in Fig. 7, intake cover member 59 configured as a separate body from washing tub 2 is arranged on the outer side of the outer wall of washing tub 2, so that a side wall of washing tub 2 and intake cover member 59 configure air blow path 60 of tubular path form in a compact manner. Then, the outside air is blown into washing tub 2 from air blow port 62 provided in washing tub 2 through air blow path 60 by air blowing device 61 thus drying dishes 4. With such a configuration, intake cover member 59 is securely attached to washing tub 2 by way of a seal member (not shown) including an elastic body, thus preventing water leakage and wind leakage (refer to PTL 1, for example).

[0005] In order to prevent the washing water falling from an upper side of air blow port 62 during washing and after washing from entering air blow path 60, there is proposed a dishwasher in which air blow cover 63, which is a separate body from washing tub 2, is attached to the upper side of air blow port 62 (refer to PTL 2, for example).

[0006] In the conventional configuration, washing tub 2 has the bottom portion and the side surface portions integrally formed, and thus intake cover member 59 is arranged on the outer side of washing tub 2 to configure air blow path 60 of tubular path form. The a large part of the washing water falling from the upper side does not enter air blow path 60 by air blow cover 63 but is collected to the bottom portion of washing tub 2. However, a small amount of washing water enters air blow path 60 from a gap between washing tub 2 and air blow cover 63, and the like, and hence joining portion 64 of washing tub 2 and intake cover member 59 requires water sealability. Thus, washing tub 2 and intake cover member 59 are securely attached by way of the seal member or welded to realize water sealability.

[0007] Here, consideration is made in integrally forming washing tub 2 and air blow cover 63. However, it is very difficult to configure a die since the bottom portion and the side surface portions of washing tub 2 are integrally formed.

[0008] Furthermore, even if air blow cover 63 and washing tub 2 are water-tightly joined using the seal member, and the like, the washing water sometimes enters from the lower side of air blow cover 63 due to vibrations at the time of an pull-out operation of washing tub 2, and the like. It is thus still required to water-tightly join intake cover member 59 and washing tub 2.

[0009] Considering a long-term usage, the water tightness of joining portion 64 of washing tub 2 and intake cover member 59 may be impaired thus causing water leakage due to a welding defect, and degradation in the material caused by a heat cycle, detergent, oil, and the like. This is also the same when water sealing intake cover member 59 using the seal member including the elastic body.

Citation List

Patent Literatures

[0010]

PTL 1: Unexamined Japanese Patent Publication No. 2002-325714

PTL 2: Unexamined Japanese Patent Publication No. 2003-180602

SUMMARY OF THE INVENTION

[0011] The present invention provides a dishwasher including a dishwasher main body having an opening on a front side; and a washing tub arranged so as to be freely pulled out through the opening, where the occurrence of water leakage is prevented even when used over a long period of time.

[0012] A dishwasher of the present invention includes a dishwasher main body having an opening on a front side; a washing tub arranged so as to be freely pulled

out through the opening; and an air blowing device for supplying outside air into the washing tub from an air blow port through an air blow path. The washing tub is configured by engaging a bottom portion configuring member that configures a bottom portion, and a washing tub member that configures at least a side surface of the washing tub. The air blow path is positioned on an outer side of an outer wall of the washing tub and is configured by engaging a lower divided path formed integrally on the bottom portion configuring member, and an upper divided path integrally formed on the washing tub member.

[0013] According to such a configuration, the washing water that entered the air blow path from the air blow port does not come into contact with the joining portion such as a welding portion, and thus the occurrence of water leakage can be eliminated even if used over a long period of time. The present invention can realize a dishwasher in which water leakage does not occur even if used over a long period of time in the built-in type dishwasher.

BRIEF DESCRIPTION OF DRAWINGS

[0014]

Fig. 1 is a longitudinal cross-sectional view of a dishwasher according to a first exemplary embodiment of the present invention.

Fig. 2 is a perspective view seen from a front side of a washing tub of the dishwasher according to the first exemplary embodiment of the present invention.

Fig. 3 is a cross-sectional view taken along line 3-3 in Fig. 1.

Fig. 4 is a cross-sectional perspective view of the main parts seen from the front side of the washing tub of the dishwasher according to the first exemplary embodiment of the present invention.

Fig. 5 is a cross-sectional view of the main parts taken along line 5-5 in Fig. 4.

Fig. 6 is a cross-sectional view of the main parts taken along line 6-6 in Fig. 4.

Fig. 7 is a longitudinal cross-sectional view of a conventional dishwasher.

DESCRIPTION OF EMBODIMENT

[0015] An exemplary embodiment of the present invention will be hereinafter described with reference to the drawings. It should be recognized that the present invention is not limited by the exemplary embodiment.

EXEMPLARY EMBODIMENT

[0016] Fig. 1 is a longitudinal cross-sectional view of a dishwasher according to a first exemplary embodiment of the present invention. Fig. 2 is a perspective view seen from a front side of a washing tub of the dishwasher according to the first exemplary embodiment of the present

invention. Fig. 3 is a cross-sectional view taken along line 3-3 in Fig. 1. Fig. 4 is a cross-sectional perspective view of the main parts seen from the front side of the washing tub of the dishwasher according to the first exemplary embodiment of the present invention. Fig. 5 is a cross-sectional view of the main parts taken along line 5-5 in Fig. 4. Fig. 6 is a cross-sectional view of the main parts taken along line 6-6 in Fig. 4.

[0017] In Fig. 1, housing 27 accommodated in a built-in kitchen interiorly includes washing tub 29 for accommodating and washing dishes 28. Washing tub 29 is arranged so as to be freely pulled out in a front and back direction along a set of rails 30 bridged in a substantially horizontal direction on an inner side of both side surfaces of housing 27 at the lower part. Dish basket 31 for accommodating dishes 28 is arranged inside washing tub 29, and washing nozzle 32 is rotatably arranged below dish basket 31 and at a bottom portion of washing tub 29. Heating device 33 such as a heater for heating the stored washing water is arranged inside washing tub 29, and drain outlet 34 is provided at the bottom portion of washing tub 29.

[0018] Washing pump 35 for pressurizing the washing water accumulated at drain outlet 34 and feeding the same to washing nozzle 32 is arranged on an outer side of the bottom portion of washing tub 29. The washing water accumulated at drain outlet 34 is pressurized and circulated by washing pump 35, and sprayed into washing tub 29 from spray hole 48 of washing nozzle 32 to wash dishes 28.

[0019] Air blowing device 55 including an air blowing fan, or the like is arranged at the bottom portion of washing tub 29, and dishes 28 are dried by blowing outside air from air blow port 57 into washing tub 29 through air blow path 56 configured at a lower part of an outer wall on the front side of washing tub 29. At an upper part of air blow port 57, umbrella shaped portion 56c, which has an end bent downward, is configured to project out backward substantially horizontally in washing tub 29, and the washing water falling directly from the upper side of washing tub 29 or along the inner wall is prevented from entering air blow path 56. At the same time, umbrella shaped portion 56c rectifies the outside air fed from air blowing device 55 toward heating device 33 positioned on the lower side than air blow port 57 since it has the end bent downward, and thus can efficiently heat the outside air.

[0020] The washing water accumulated in washing tub 29 is supplied through water supply hose and water supply valve (both not shown) from water piping. When detecting that the washing water is supplied up to predetermined washing water level 47 by a water level detection device (not shown) communicated to washing tub 29, the control device closes the water supply valve to stop the supply of the washing water to washing tub 29.

[0021] Lid body 37 for closing opening 36 of washing tub 29 is movably arranged on the upper side of housing 27, and is supported so as to be movable in an up and

down direction by a pair of left and right parallel link mechanisms 38 including a pair of front and back links. In addition, first seal member 39 including an elastic body such as rubber for sealing opening 36 of washing tub 29 is fixed, which first seal member 39 is configured to displace toward the upper side so as not to interfere with the front and back movement of washing tub 29 when washing tub 29 is pulled out.

[0022] A configuration of washing tub 29 and air blow path 56 will now be described with reference to Fig. 2 to Fig. 6.

[0023] Washing tub 29 includes opening 36 on the upper side, and is configured by washing tub member 40 that configures the side surface and is made of resin, and bottom portion configuring member 41 that configures the bottom portion and is made of resin.

[0024] Bottom portion configuring member 41 is formed in a bottomed tray shape, and second seal member 42 including an elastic body such as a rubber is arranged at an upper end of the outer periphery thereof. Groove 43 that is opened to the upper side in order to hold second seal member 42 is annularly formed in bottom portion configuring member 41. Lower divided path 56a configuring a lower part of air blow path 56 is integrally formed with bottom portion configuring member 41 on the front side of bottom portion configuring member 41 and on the inner side of annular groove 43.

[0025] On bottom portion configuring member 41, a large part of the electrical components and mechanism components necessary for the operation control of the dishwasher such as a movable rail portion of rail 30, washing nozzle 32, heating device 33, washing pump 35, a pump motor, air blowing device 55, a water level detection device, and a temperature sensor is mounted and formed as a unit. Air blowing device 55 arranged by being securely attached to the bottom portion on the front side of bottom portion configuring member 41 includes opening 55a that is opened toward the upper side at an end on a side opposite to the side of taking in the outside air. Annular groove 43 is formed on the outer side of lower divided path 56a and on the inner side of opening 55a of air blowing device 55.

[0026] As shown in Fig. 5, seal rib 44 for holding down second seal member 42 from the upper side and cooperatively operating with groove 43 of bottom portion configuring member 41 to exhibit water tightness is arranged on the lower end of the outer periphery at the front, back, left, and right of washing tub member 40, and shielding rib 45 is arranged in a suspended manner on the interior side. Shielding rib 45 on both side surface portions of washing tub 29 is arranged without creating a difference in level with side surface inner wall 40a of washing tub member 40.

[0027] Upper divided path 56b configuring the upper part of air blow path 56 is integrally formed with washing tub member 40 on the front side of washing tub member 40 and on the inner side of seal rib 44. Umbrella shaped portion 56c is integrally formed with washing tub member

40 while communicating with upper divided path 56b at a lower end of washing tub member 40.

[0028] A vicinity of an upper end of upper divided path 56b has an opening on the front surface. This opening on the front surface is necessary in terms of die configuration in forming the shape of upper divided path 56b, and is closed by attaching lid body 58 so that the lower side of lid body 58 is opened by opening 58a. Note that, lid body 58 can also be integrally formed with washing tub member 40 by complicating the structure of the die.

[0029] The upper end of the outer periphery of bottom portion configuring member 41 and the lower end of the outer periphery of washing tub member 40 are joined in the up and down direction. Seal unit 54 configured by groove 43, seal rib 44 and second seal member 42 is arranged at the joining portion to water-tightly seal the joining portion. A space between shielding rib 45 and groove 43 is provided with collecting space 46 of such an extent that the washing water is not taken up by capillary action so as to communicate over the entire periphery of washing tub 29 thus preventing the washing water from reaching seal unit 54. A distal end of shielding rib 45 is configured such that a gap with bottom portion configuring member 41, that is, a dimension of inlet 46a of collecting space 46 is smaller than a width dimension of main space 46b of collecting space 46 on the upper side.

[0030] The distal end of shielding rib 45 is configured to be positioned on the upper side of defined washing water level 47 and on the lower side of spray hole 48 formed in plurals in washing nozzle 32. Furthermore, the distal end of shielding rib 45 is configured at a position where splashing water flow of the washing water from the bottom surface of bottom portion configuring member 41 cannot be reached. The distal end of shielding rib 45 is configured so as not to be positioned on the outer side than side wall 49 of bottom portion configuring member 41 over the entire periphery of washing tub 29.

[0031] Generally, in the dishwasher, a special detergent is dissolved in water to wash dishes 28, where the wetness of the surface of washing tub 29 significantly increases by the component such as a surface acting agent contained in the detergent. When the wetness increases, the capillary action generates very strongly, and thus the width of collecting space 46 (main space 46b) is formed wide compared to when the normal water is the target. Collecting space 46 is configured with the shape of being communicated over the entire periphery, that is, the cross-sectional shape shown in Fig. 5 being substantially the same over the entire periphery of washing tub 29 excluding dish basket supporting unit 53.

[0032] When forming washing tub 29 by joining bottom portion configuring member 41 and washing tub member 40, lower divided path 56a and upper divided path 56b configure air blow path 56 on the outer side of the outer wall on the front side of washing tub 29. At the same time, opening 55a of air blowing device 55 and opening 58a of lid body 58 are joined so that air blow path 56 and air blowing device 55 are coupled and connected. Moreover,

lower divided path 56a has a projecting shape in accordance with the shape of upper divided path 56b, and the cross-section of air blow path 56 is made to substantially the same area so that the pressure loss at the time of air blow is reduced.

[0033] When forming air blow path 56 by lower divided path 56a and upper divided path 56b, an outer peripheral part of lower divided path 56a and an outer peripheral part of a portion excluding the portion corresponding to opening 58a of upper divided path 56b form seal unit 54, and are joined by engaging projection 51 and engagement hole 52a. As shown in Fig. 3, seal unit 54 has the same configuration as seal unit 54 formed at the joining portion of the upper end of the outer periphery of bottom portion configuring member 41 and the lower end of the outer periphery of washing tub member 40 described above. A height position of seal unit 54 at this portion is substantially the same height position as seal unit 54 between the upper end of the outer periphery of bottom portion configuring member 41 and the lower end of the outer periphery of washing tub member 40.

[0034] Air blow port 57 for blowing the outside air into washing tub 29 through air blow path 56 is also formed with the formation of air blow path 56 by joining lower divided path 56a and upper divided path 56b. As shown in Fig. 1 and Fig. 3, air blow port 57 is formed by lowermost surface 56e at a right end of lower divided path 56a formed in a downward-sloping manner in front view, and upper surface 56f and left and right side surfaces 56g, 56h of umbrella shaped portion 56c formed at a right end of upper divided path 56b similarly formed in a downward-sloping manner in front view. Here, seal unit 54 at the upper end of bottom portion configuring member 41 is positioned on the upper side of air blow port 57, so that the washing water does not come into contact with seal unit 54, which is the joining portion, even if the washing water enters from air blow port 57.

[0035] Seal unit 54 of bottom portion configuring member 41 and washing tub member 40 is arranged on the inner side of opening 55a of air blowing device 55. Even when configuring upper end 56d of air blow path 56 at a position higher than air blow port 57 and bubbles are generated in great amount by misuse of general kitchen detergent, bubbles can be prevented from leaking toward air blowing device 55.

[0036] As shown in Fig. 4, dish basket supporting units 53 for mounting and supporting dish basket 31 are arranged in few areas on the left and the right near the left and right side walls of the bottom of washing tub 29. Dish basket supporting unit 53 is configured by being divided to supporting unit lower part 53a arranged on bottom portion configuring member 41, and supporting unit upper part 53b arranged on washing tub member 40. As will be described later, by joining washing tub member 40 and bottom portion configuring member 41, dish basket supporting unit 53 is formed with supporting unit upper part 53b facing the upper side of supporting unit lower part 53a, as shown in Fig. 6. The height position of lower

surface 53c of supporting unit upper part 53b, which is a divided surface, is substantially the same height as the lower end of shielding rib 45 of washing tub member 40.

[0037] Rail receiving unit 50 for supporting the weight of washing tub 29 is configured almost immediately below groove 43 on the outer side of side wall 49 on both side surfaces of bottom portion configuring member 41. On the outer end of rail receiving unit 50, rib 50a is extended downward so as to cover the movable rail portion of rail 30 from the upper side and the outer side to enhance the mechanical strength of rail receiving unit 50. Furthermore, the washing water falling from lid body 37 onto the outer wall of washing tub member 40 is prevented from entering into rail 30.

[0038] Engagement unit 52 is extended downward in a rib form on the outer side of seal rib 44 arranged at the lower end of the outer periphery at the front, back, left, and right of washing tub member 40. Projection 51 is arranged at plural areas on the outer periphery of groove 43 of bottom portion configuring member 41, and engagement hole 52a is formed at a position corresponding to projection 51 in engagement unit 52 of washing tub member 40. When washing tub member 40 is inserted and attached from the upper side of bottom portion configuring member 41, engagement unit 52 elastically deforms thus engaging projection 51 with engagement hole 52a, and joining washing tub member 40 and bottom portion configuring member 41. The lower end of engagement unit 52 on both left and right side surface portions makes contact with the upper surface of rail receiving unit 50 in this joined state.

[0039] With the joining portion of washing tub member 40 and bottom portion configuring member 41 configured as above, they can be joined with a simple configuration, and the washing water falling from lid body 37 onto the outer wall of washing tub member 40 can be prevented from entering the portion of second seal member 42.

[0040] As shown in Fig. 5, the cross-sectional shape of a fixed rail portion of rail 30 has a shape in which bump portion 30b is arranged on the outer side of movable mechanism unit 30a, and groove 30c, which is one step lower, is further arranged on the outer side. The outer side of the lower end of rib 50a arranged at the outer end of rail receiving unit 50 of bottom portion configuring member 41 is positioned immediately above or on the outer side of bump portion 30b.

[0041] With such a configuration, the washing water falling from lid body 37 onto the outer side of the lower end of rib 50a along the outer wall of washing tub member 40 is guided to groove 30c and prevented from entering movable mechanism unit 30a of rail 30. Furthermore, although not shown, a through-hole is formed on any backward part of movable mechanism unit 30a and groove 30c, so that the fallen and guided washing water falls onto the inner bottom portion of housing 27 and is detected by a leakage water detection sensor arranged in the vicinity thereof.

[0042] The operations and the effects of the dishwash-

er configured as above will be described below. Washing tub 29 has washing tub member 40 inserted and attached from the upper side of bottom portion configuring member 41 set with second seal member 42 so that engagement portion 52 temporarily deforms by its own elasticity. As a result, engagement hole 52a engages projection 51 arranged on bottom portion configuring member 41 thus enabling regulation in the up and down direction, whereby washing tub member 40 and bottom portion configuring member 41 are coupled and integrally formed. In this case, seal rib 44 of washing tub member 40 pushes second seal member 42 from the upper side and deforms it to a defined fastening position, thus water sealing the joining portion. Shielding rib 45 arranged on washing tub member 40 and groove 43 of bottom portion configuring member 41 configure collecting space 46 by integrating washing tub 29. Note that, second seal member 42 is formed as an elastic body, but can be water sealed with a silicon adhesive or the like.

[0043] Lower divided path 56a and upper divided path 56b are also coupled and integrated by coupling and integrating washing tub member 40 and bottom portion configuring member 41. Then, the formation of air blow path 56, the formation of seal unit 54 at the periphery of air blow path 56, the formation of air blow port 57, and the coupling and connection of air blow path 56 and air blowing device 55 are carried out.

[0044] Shielding rib 45 arranged on the interior side of groove 43 is arranged so that the dimension of inlet 46a of collecting space 46 is smaller than the width dimension of main space 46b of collecting space 46 on the upper side, and thus the entering of water into collecting space 46 can be reduced. Furthermore, since the lower end of shielding rib 45 is positioned on the upper side of defined washing water level 47, foreign substances, oil and the like washed off from dishes 28 do not deposit in collecting space 46 and do not inhibit the collection of the washing water. The occurrence of abnormal odor and the like can be suppressed.

[0045] Moreover, the lower end of shielding rib 45 is positioned on the lower side than spray hole 48 of washing nozzle 32, so that the washing water sprayed from spray hole 48 is reliably shielded by shielding rib 45. Therefore, only the washing water of small force falling from the upper side of washing tub 29 makes contact with inlet 46a of collecting space 46, and the water flow with pressure does not reach groove 43.

[0046] The washing water sprayed from spray hole 48 either hits dishes 28 and falls off as is, or flows off along the side surface of washing tub member 40, and flows toward the lower end of shielding rib 45. In this case, the distal end of shielding rib 45 is configured so as not to be positioned on the outer side than side wall 49 of bottom portion configuring member 41 over the entire periphery of washing tub 29, so that the washing water flowing off from the upper side along shielding rib 45 is collected at the bottom surface of bottom portion configuring member 41 without entering collecting space 46.

[0047] Furthermore, shielding rib 45 on both side surfaces of washing tub 29 is provided without creating a difference in level with inner wall 40a of washing tub member 40, and thus an unnecessary difference in level does not exist, the washing water collecting speed does not drop, and the designability also enhances.

[0048] Moreover, since seal unit 54 for water sealing the joining portion and collecting space 46 are formed at the same time as the joining of bottom portion configuring member 41 and washing tub member 40, the joining work and the formation of seal unit 54 and collecting space 46 are facilitated thus enhancing the assembly workability.

[0049] Even with such a configuration, if the gap of collecting space 46 (main space 46b) is formed narrow, the washing water brought into contact with inlet 46a of collecting space 46 is taken up by capillary action thus reaching groove 43. According to the present invention, collecting space 46 between shielding rib 45 and groove 43 is provided with a gap of such an extent that the washing water is not taken up by capillary action, and thus the washing water will not be taken up to groove 43 even if the washing water makes contact with inlet 46a of collecting space 46.

[0050] Therefore, according to the present invention, the washing water sprayed from washing nozzle 32 does not reach groove 43, and water leakage does not occur at the joining portion even if the configuration in which second seal member 42 is not arranged is adopted. If the washing water is heated, water vapor generates and condenses near groove 43, and thus a small amount of water may leak out to the outside of washing tub 29. To this end, in the present invention, second seal member 42 is arranged on the upper side on the outer side of collecting space 46. Since the water leakage does not occur even if second seal member 42 is not arranged, the water leakage does not occur even if the sealability lowers by degradation of second seal member 42 through long-term use or repeated application of vibration and force caused by the pull-out operation on groove 43.

[0051] Collection space 46 has a configuration of being communicated over the entire periphery of washing tub 29, and thus the washing water reaches a higher level than that defined washing water level 47 when washing tub 29 is pulled out strongly. Since a space to which the washing water escapes is provided in a lateral direction by communicated collecting space 46, the washing water reaching groove 43 can be greatly reduced even if the washing water enters collecting space 46. Water leakage also does not occur, of course, even if the washing water reaches groove 43 since it is water sealed by second seal member 42.

[0052] Therefore, in the present exemplary embodiment, seal unit 54 for water sealing the joining portion configured by the upper end of bottom portion configuring member 41 and the lower end of washing tub member 40 is configured, and second seal member 42 for water sealing seal unit 54 is arranged. Furthermore, shielding rib 45 is provided on the interior side of seal unit 54 in

washing tub member 40, and collecting space 46 for preventing the washing water from rising by the capillary action and reaching seal unit 54 is provided between seal unit 54 and shielding rib 45. Therefore, the washing water does not reach up to seal unit 54 in normal use, and the water leakage does not occur even if the sealability of second seal member 42 lowers at the time of pull-out operation and long-term use.

[0053] In the washing tub of the conventional dishwasher, if dish basket supporting unit 53 is integrally formed from bottom portion configuring member 41 and configured to rise upward, a gap that is opened toward the upper side is formed between dish basket supporting unit 53 and shielding rib 45 as can be easily analogized when applied to Fig. 6. The sprayed washing water thus easily enters collecting space 46 through inlet 46a from such a gap.

[0054] In the present exemplary embodiment, however, dish basket supporting unit 53 is configured by being divided to supporting unit lower part 53a arranged on bottom portion configuring member 41 and supporting unit upper part 53b arranged on washing tub member 40 facing the upper side of supporting unit lower part 53a. The height position of the divided surface is made to substantially the same height as the lower end of shielding rib 45 of washing tub member 40, so that the gap between supporting unit lower part 53a arranged on bottom portion configuring member 41 and supporting unit upper part 53b arranged on washing tub member 40 is formed in a substantially horizontal direction. Therefore, the sprayed washing water is less likely to enter the gap, the washing water that entered is expected to fall and return toward washing tub 29, and the washing water can be prevented from flowing into collecting space 46 from dish basket supporting unit 53.

[0055] Lower divided path 56a integrally formed on bottom portion configuring member 41 and upper divided path 56b integrally formed on washing tub member 40 are also coupled and integrated by coupling and integrating washing tub member 40 and bottom portion configuring member 41. Air blow path 56 is thereby formed, so that the washing water that entered air blow path 56 is collected in washing tub 29 without making contact with welding portion or joining portion. Therefore, the washing water entering air blow path 56 can be prevented from leaking to the outside of washing tub 29 in long-term use.

[0056] Air blow port 57 is formed by engaging lower divided path 56a and upper divided path 56b, and thus the joining portion of air blow port 57 and air blow path 56 can be eliminated, and the leaking of the washing water therefrom to the outside of washing tub 29 can be prevented.

[0057] Air blow port 57 of air blow path 56 configured by joining washing tub member 40 and bottom portion configuring member 41 is configured to blow air toward heating device 33 (see Fig. 1), so that the outside air can be heated to dry dishes 28. Therefore, the drying performance can be enhanced. In this case, the outside air

fed from air blowing device 55 is fed to the heating device 33 in a rectified state by umbrella shaped portion 56c. Therefore, the outside air can be efficiently heated. A structure such as a rib is provided on lower divided path 56a, the upper divided path 56b, and the umbrella shaped portion 56c in accordance with the flow of the outside air flowing through air blow path 56 to adjust the flow to heating device 33, so that the outside air can be more efficiently heated. Since umbrella shaped portion 56b is integrally formed with washing tub member 40, a gap is not formed, and the washing water falling from the upper side of washing tub 29 does not enter air blow path 56.

[0058] Since the upper end of bottom portion configuring member 41 is formed on the upper side of air blow port 57, the washing water that entered from air blow port 57 does not directly make contact with the joining portion, and water leakage can be resolved even in long-term use.

[0059] Seal unit 54 of bottom portion configuring member 41 and washing tub member 40 is positioned on the outer side of air blow path 56. Thus, when bubbles are produced in washing tub 29 from food or detergent, the waster leakage can be prevented even if the bubbles enter from air blow port 57. The washing water does not enter air blowing device 55 since seal unit 54 of bottom portion configuring member 41 and washing tub member 40 is arranged on the inner side of opening 55a of air blowing device 55.

[0060] Furthermore, since upper end 56d of air blow path 56 is formed at a higher position than air blow port 57, the bubbles are prevented from leaking toward air blowing device 55 even if a great amount of bubbles are produced when the general kitchen detergent is misused.

[0061] In the present exemplary embodiment, rail receiving unit 50 for supporting the weight of washing tub 29 is formed on both side surfaces of bottom portion configuring member 41, which is a lower side member of washing tub 29 having a top-bottom joining configuration. According to such a configuration, sealability of second seal member 42 can be maintained over a long period without the weight of washing tub 29 and other components applying in a direction of separating seal unit 54.

[0062] Furthermore, in the present exemplary embodiment, bottom portion configuring member 41 is formed as a unit by mounting a large part of the electrical components and mechanism components, so that the washing tub of different capacity can be obtained by having the portion on the upper side of seal unit 54 of washing tub member 40 larger or smaller even if a single bottom portion configuring member 41 is used. Therefore, the production of the dishwasher having different washing tub capacity can be easily responded, and the manufacturing efficiency can be enhanced.

[0063] In the present exemplary embodiment, only washing nozzle 32 that is rotatable is arranged at the inner bottom portion of washing tub 29. However, a different washing nozzle may be further arranged on the inner side portion of washing tub 29, for example, and the effects of the present invention are still obtained,

which is not to be excluded from the present invention.

INDUSTRIAL APPLICABILITY

[0064] Therefore, the dishwasher according to the present invention is a built-in type dishwasher, and is useful as a dishwasher, or the like for washing dishes by spraying the washing water since the water leakage from the air blow path can be prevented even if the washing water enters the air blow path even in a long-term use.

REFERENCE MARKS IN THE DRAWINGS

[0065]

27	housing (dishwasher main body)
29	washing tub
30	rail
32	washing nozzle
40	washing tub member
41	bottom portion configuring member
50	rail receiving unit
51	projection
52	engagement unit
52a	engagement hole
54	seal unit
55	air blowing device
55a	opening
56	air blow path
56a	lower divided path
56b	upper divided path
56c	umbrella shaped portion
57	air blow port
58	lid body
58a	opening

Claims

1. A dishwasher comprising:

a dishwasher main body having an opening on a front side;
 a washing tub arranged so as to be freely pulled out through the opening; and
 an air blowing device for supplying outside air into the washing tub from an air blow port through an air blow path; wherein
 the washing tub is configured by engaging, a bottom portion configuring member that configures a bottom portion, and
 a washing tub member that configures at least a side surface of the washing tub; and
 the air blow path is positioned on an outer side of an outer wall of the washing tub and is configured by engaging,

a lower divided path formed integrally on the bottom portion configuring member, and
 an upper divided path integrally formed on the washing tub member.

2. The dishwasher according to claim 1, wherein the air blow port is formed by engaging the lower divided path and the upper divided path.

3. The dishwasher according to claim 1 or 2, further comprising:

a seal unit for water sealing a joining portion configured by an upper end of the bottom portion configuring member and a lower end of the washing tub member; wherein
 the seal unit is configured on an outer side of the air blow path.

4. The dishwasher according to claim 1 or 2, further comprising:

an umbrella shaped portion on an upper side of the air blow port; wherein
 the umbrella shaped portion is integrally formed with the washing tub member.

5. The dishwasher according to claim 1 or 2, wherein a projection toward an outer side is arranged on an upper part of an outer surface of the bottom portion configuring member and the lower divided path; an engagement hole is formed in the washing tub member and the upper divided path in accordance with a position of the projection; and
 when the engagement hole and the projection are engaged,
 the bottom portion configuring member is joined to the washing tub member, and
 the lower divided path is joined to the upper divided path thus forming a seal unit for water sealing the joining portion of the members.

FIG. 1

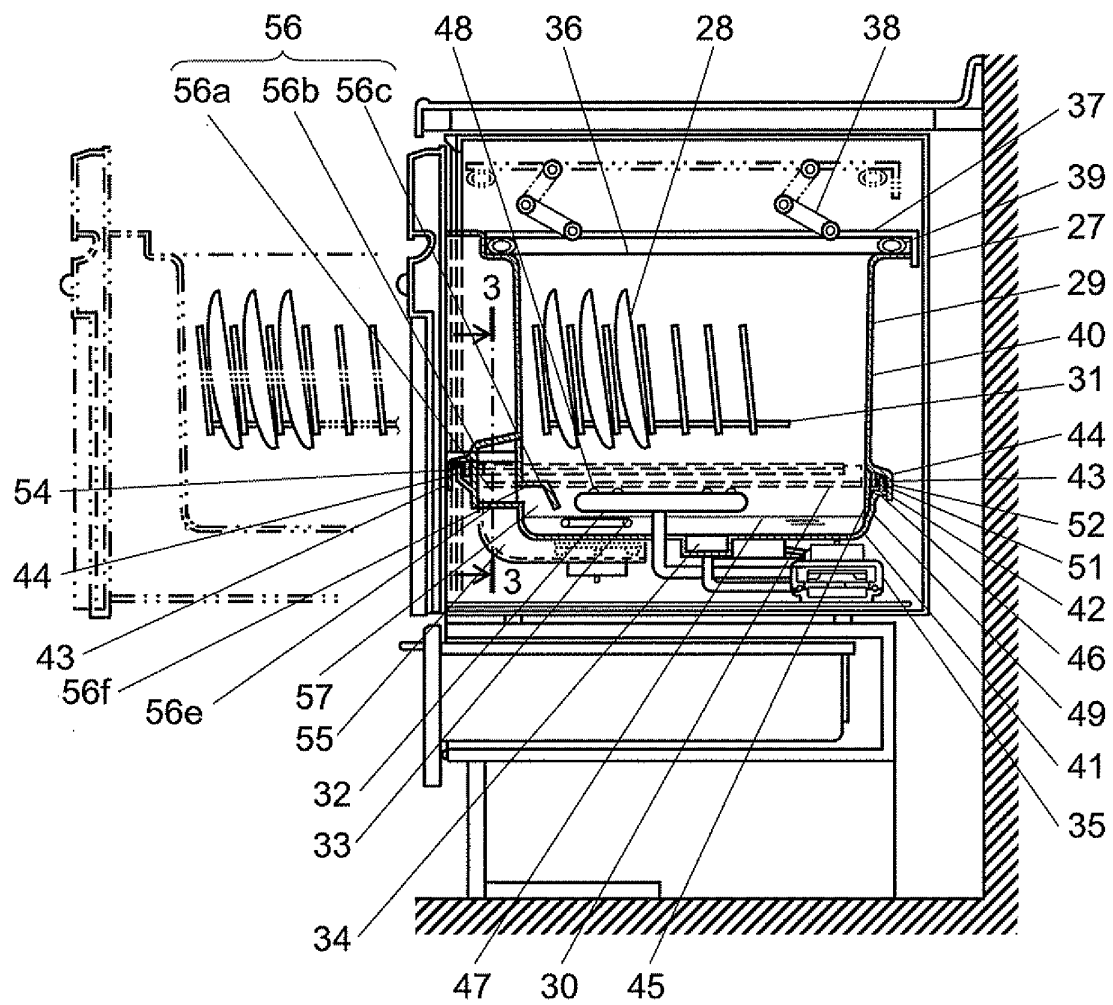


FIG. 2

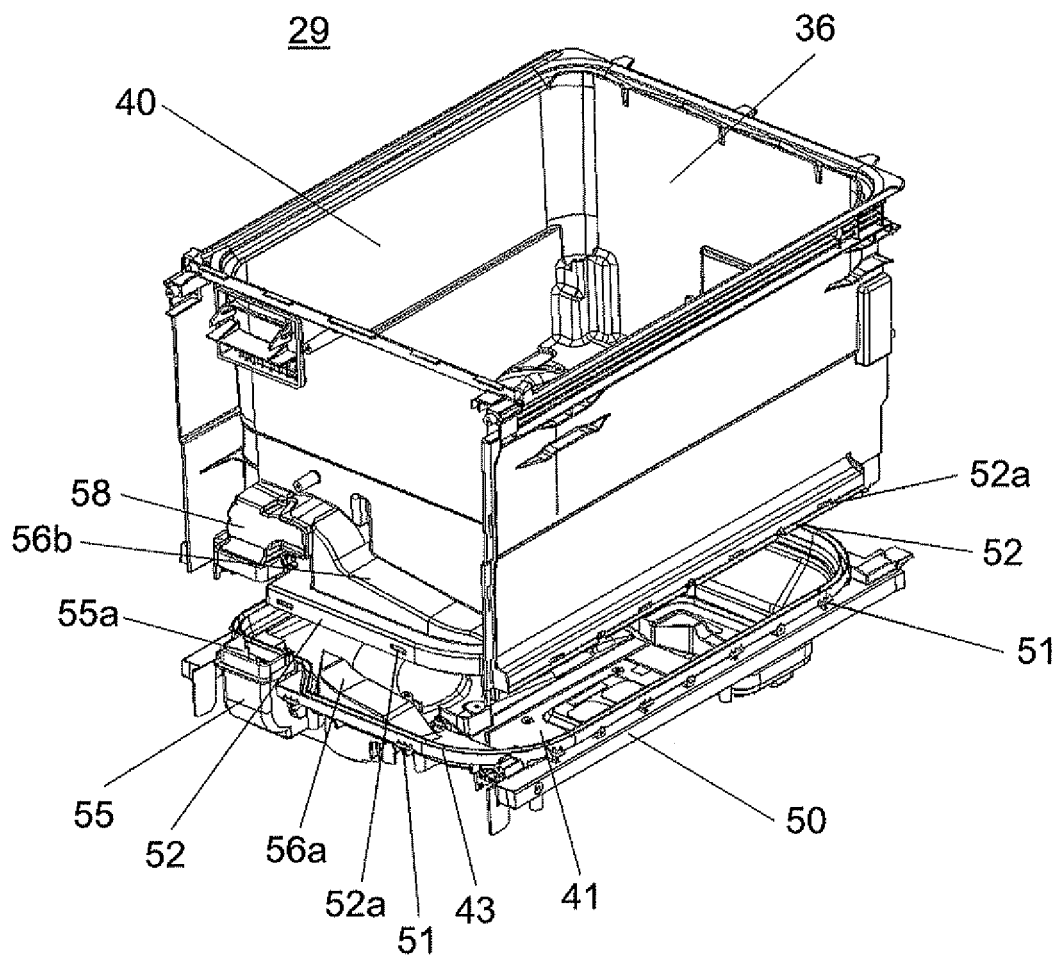


FIG. 3

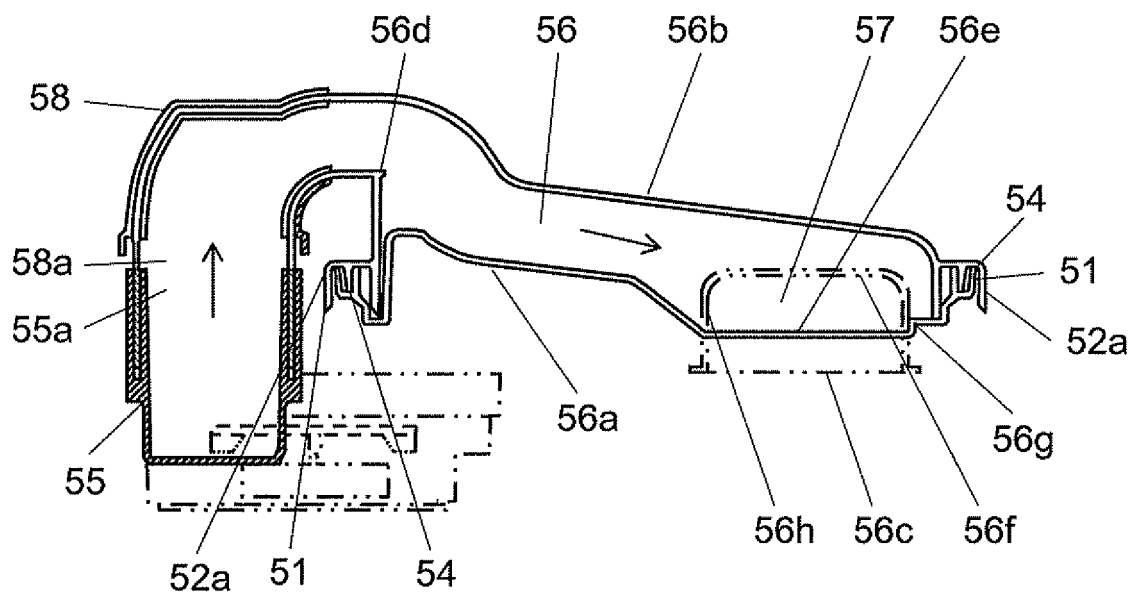


FIG. 4

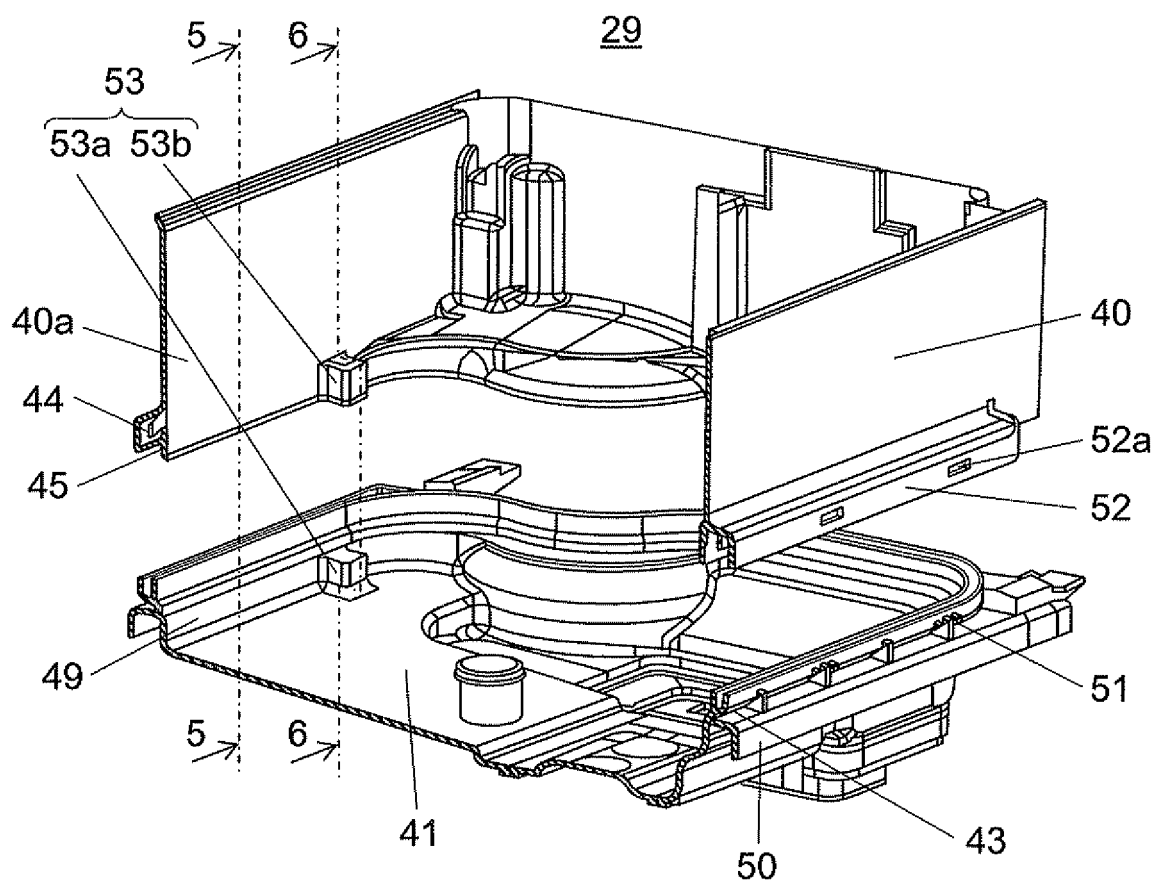


FIG. 5

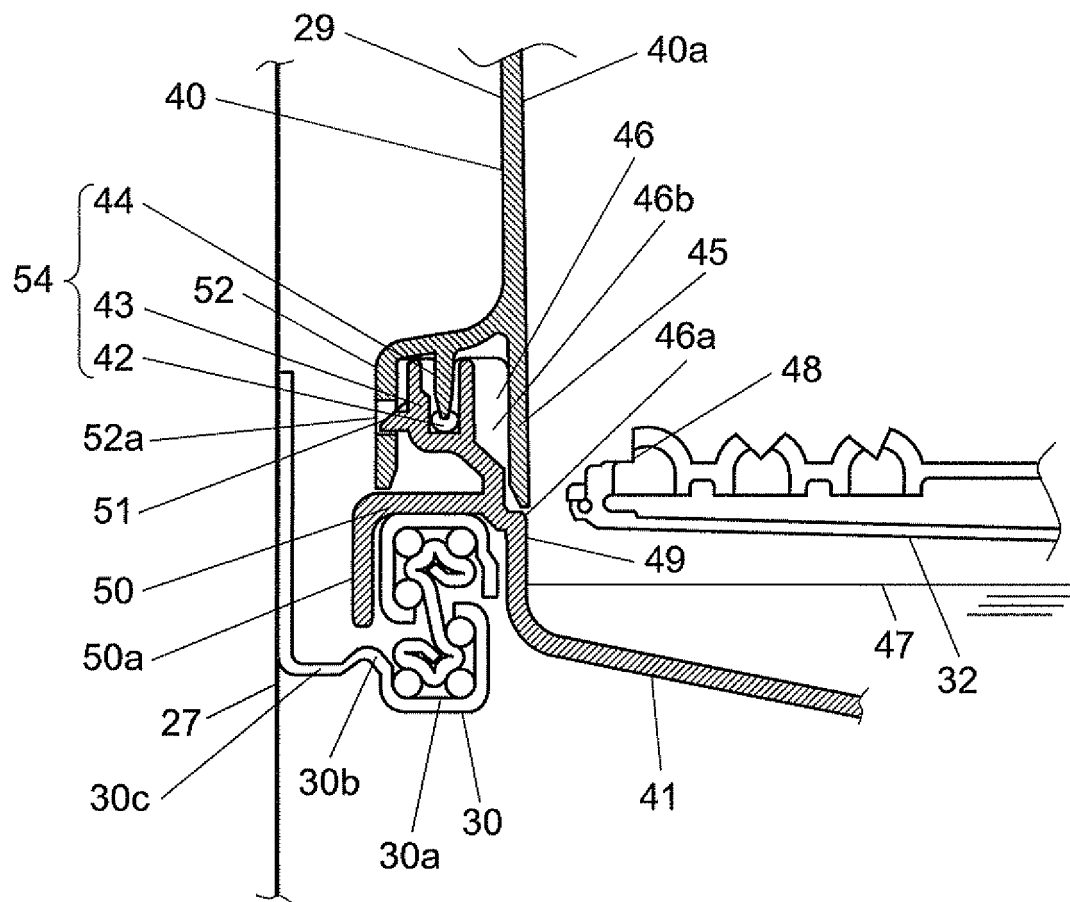


FIG. 6

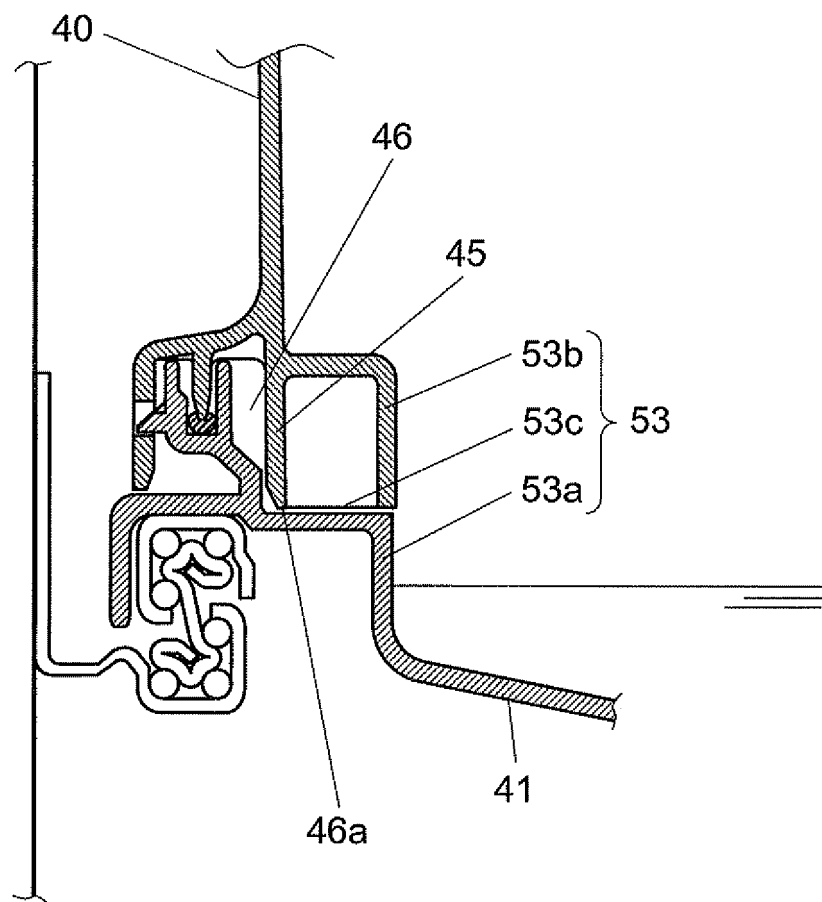
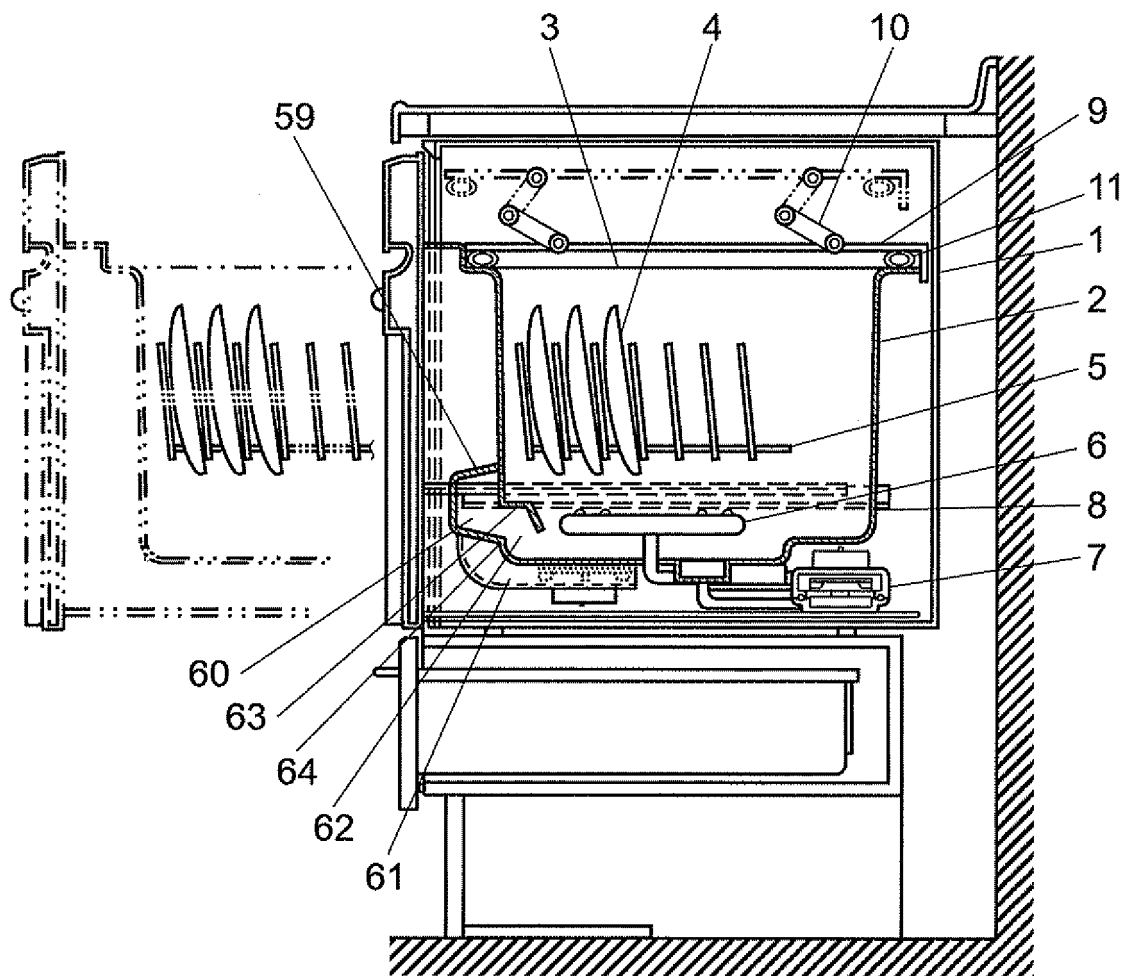


FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/001601

A. CLASSIFICATION OF SUBJECT MATTER

A47L15/42 (2006.01) i

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)

A47L15/42

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011

Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2002-143070 A (Toto Ltd.), 21 May 2002 (21.05.2002), entire text; all drawings (Family: none)	1-5
Y	JP 2003-180602 A (Hitachi, Ltd.), 02 July 2003 (02.07.2003), entire text; all drawings (Family: none)	1-5
Y	WO 2008/080933 A1 (ARCELIK ANONIM SIRKETI), 10 July 2008 (10.07.2008), entire text; all drawings & EP 2124700 A	3, 5

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search

25 May, 2011 (25.05.11)

Date of mailing of the international search report

07 June, 2011 (07.06.11)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/001601

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005-334360 A (Mitsubishi Electric Corp.), 08 December 2005 (08.12.2005), entire text; all drawings (Family: none)	1-5
A	JP 61-181434 A (Matsushita Electric Industrial Co., Ltd.), 14 August 1986 (14.08.1986), entire text; all drawings (Family: none)	1-5

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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