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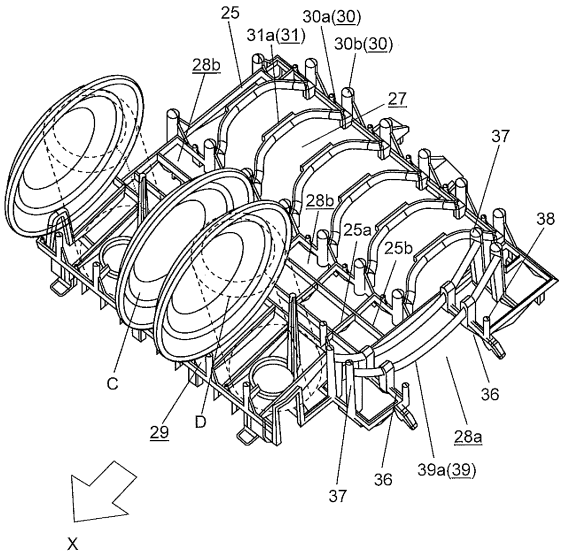
(54) Dishwasher

(57) A dishwasher includes a housing case, a washing tub disposed in the housing case, and a dish basket disposed in the washing tub for receiving dishes. The dish basket has setting sections (29) that are divided according to kinds of the dishes. The setting sections (29) include support portions (32) for supporting the dishes from underside, and ring-shaped ribs (35) serving as guide-shaped portions that imitate a sectional shape or an outline of the dishes. A support plane (W1) including the support portions (32) on one plane, and a guide-shaped plane (W2) including the guide-shaped portions on another plane are disposed at different positions. This configuration facilitates recognition of kinds and orientations of dishes to be placed, and accommodates dishes of different kinds in one area, hence providing the dishwasher of excellent usability.

FIG. 6



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a dishwasher for washing dishes, and in particular, to a dish basket in which dishes are placed.

2. Background Art

[0002] Conventional dishwashers hitherto available are configured to wash dishes by spraying washing water to the dishes from a washing nozzle while heating the washing water.

[0003] Referring to FIG. 13, description is provided hereinafter about a structure of a conventional dishwasher. FIG. 13 is a sectioned side view of a conventional dishwasher.

[0004] As shown in FIG. 13, the conventional dishwasher is constructed of at least housing case 1, washing tub 2, feed valve 3, washing pump 5, washing nozzle 7, heater 8, dish basket 10, drain pump 11, and the like. Door 1a is provided for opening and closing a front side of a main body of the dishwasher for placement and removal of dishes 9.

[0005] Washing tub 2 is disposed in the dishwasher, in which cold or hot water is supplied by feed valve 3. Drain port 4 is formed in a bottom portion of washing tub 2.

[0006] Washing pump 5 is mounted in communication with drain port 4, and driven by a motor. Washing pump 5 thus circulates the washing water inside washing tub 2 by spraying it from washing nozzle 7, and washes dishes 9 and the like.

[0007] Drain port 4 is provided with food waste filter 6 for collecting food waste washed off from dishes 9.

[0008] In the following descriptions, liquids used in the steps of washing and rinsing the objects to be washed such as dishes 9 placed in washing tub 2 are collectively called as "washing water".

[0009] Next, circulating operation of the washing water in the dishwasher is described briefly.

[0010] First, the washing water is supplied when feed valve 3 is opened, and retained in washing tub 2. The retained washing water is sucked into washing pump 5 after passing through food waste filter 6. The sucked washing water is pumped into washing nozzle 7 disposed in washing tub 2 by washing pump 5. The supplied washing water is sprayed toward dishes 9 from washing nozzle 7. The washing water sprayed from washing nozzle 7 circulates through a path in which it returns again to drain port 4 after dishes 9 are washed.

[0011] At the same time, food waste and like particles washed off from dishes 9 flow into food waste filter 6 with the washing water, and the food waste of such sizes that cannot pass through food waste filter 6 are collected in food waste filter 6.

[0012] The washing water in the dishwasher circulates and washes dishes 9, as described above.

[0013] In addition, heater 8 is disposed between washing nozzle 7 and the bottom portion of washing tub 2, as shown in FIG. 13, and heats the washing water. To be specific, heater 8 is energized at about the same time with the start of washing pump 5 and heats the washing water in the washing step, after the washing water is supplied to a predetermined water level in washing tub 2. As a result, the washing water is heated up to about 60°C while being circulated inside washing tub 2.

[0014] Dish basket 10 is configured to keep dishes 9 arranged in an orderly manner, and disposed above washing nozzle 7. With this structure, the dishwasher can spray the washing water effectively against dishes 9 placed in dish basket 10, and wash them efficiently.

[0015] Drain pump 11 is configured to drain the washing water to the outside of the dishwasher through drain hose 12 after dishes 9 are washed.

[0016] Additionally, blower fan 13 for taking fresh air into washing tub 2, and control unit 15 for controlling and executing a series of washing operation are disposed in a bottom space of the main body of the dishwasher. Thermistor 14 is disposed outside of drain port 4 for sensing a temperature of the washing water.

[0017] The dishwasher constructed as above operates in a manner which is described briefly hereinafter. Note that the operation of the dishwasher is controlled by control unit 15.

[0018] First, control unit 15 of the dishwasher carries out a washing step for washing off soils of food adhering to dishes 9. In the beginning of the washing step, washing water containing detergent is sprayed from washing nozzle 7 while the detergent, dispensed beforehand into washing tub 2, is being dissolved. The soils adhering to dishes 9 are thus washed off.

[0019] After completion of the washing step, control unit 15 drains the washing water containing soils, and replaces with clean washing water. Then, control unit 15 carries out a rinsing step to rinse the detergent out of dishes 9.

[0020] Next, control unit 15 carries out a hot-rinsing step in which the washing water is heated to 70°C to 80°C, for instance, with heater 8, and rinses with the clean heated water of high temperatures. As a result, dishes 9 can be cleaned more hygienically.

[0021] Subsequent to completion of the hot-rinsing step, control unit 15 carries out a drying step. In the drying step, fresh air is taken into washing tub 2 with blower fan 13. The fresh air taken in this step is supplied toward and around dishes 9 after it is heated with heater 8. This step dries drops of water that stay on dishes 9, and hence dishes 9 are dried.

[0022] The operation of the dishwasher is performed as described above.

[0023] In conjunction with the conventional dishwasher described above, dish baskets configured to accommodate dishes of various shapes have been proposed such

as the one disclosed in Japanese Unexamined Patent Publication, No. 1991-215233 (hereinafter referred to as PTL 1). Specifically, a typical dish basket includes a main basket made of a wire, and a dish-setting basket made of a resin which is configured removable and used in combination with the main basket.

[0024] Description is provided hereinafter of a structure of the dish basket of the conventional dishwasher disclosed in PTL 1, by referring to FIG. 14 and FIG. 15.

[0025] FIG. 14 is a perspective view of the dish basket of the conventional dishwasher, and FIG. 15 is a plan view of a main part of a dish-setting basket made of a resin for the conventional dishwasher.

[0026] As shown in FIG. 14 and FIG. 15, conventional dish basket 10 is formed from frame structure 10a of a latticed shape made of a wire, for instance. Frame structure 10a has plate-setting section 16 disposed in one area where plates and the like dishes are placed vertically on their sides (e.g., in a radial direction of the plates). Plate-setting section 16 is provided with support pins 16a that are formed of upwardly protruding wires to support the plates from the front and back sides (i.e., in a holding direction).

[0027] Note that dish basket 10 has such a structure that lattice-shaped spaces formed with the wires are widened to a largest extent possible in order to efficiently splash the washing water sprayed from washing nozzle 7 against dishes 9.

[0028] Furthermore, dish basket 10 has dish-setting basket 17 made of a resin for accommodating bowls and plates, and it is disposed removably. Dish-setting basket 17 is provided with a large number of support pins 18 having a plurality of protruding shapes and the like in a left-to-right direction (i.e., the lengthwise direction of dish basket 10) as well as a front-to-back direction (i.e., the crosswise direction of dish basket 10). Dish-setting basket 17 thus configured is capable of accommodating bowls and plates of various sizes and shapes.

[0029] To be specific, a user places bowls and the like dishes in various supporting positions by using the plurality of support pins 18 when placing the bowls and the like dishes in dish-setting basket 17, as shown in FIG. 15. Accordingly, dishes 9 of various sizes and shapes can be placed stably in dish-setting basket 17.

[0030] In addition, dish-setting basket 17 formed of the resin can provide the user with soft feel to the touch when placing the dishes. Moreover, it also has an advantage of not inflicting any pain even if the user hits her fingers against support pins 18.

[0031] When dish-setting basket 17 is made of a resin, however, it is necessary that the lattice-shaped frame structure is formed thicker to ensure the strength as compared with the dish basket made of wires. This gives rise to a problem that the frame structure of dish-setting basket 17 is prone to getting wet with drops of water, which leads to a decrease in the drying efficiency.

[0032] In order to resolve the above problem, the frame structure of dish-setting basket 17 is formed generally into an arc shape in cross section. Accordingly, dish-setting basket 17 can prevent the water from collecting on an upper surface of the frame structure, and help drops of the water to easily drip downward.

[0033] In the above-described structure of the conventional dish basket, there are a large number of support pins standing close to one another in plate-setting section 16 and dish-setting basket 17 for dishes and plates, when the user looks over dish basket 10 to place dishes 9. It therefore causes the user to become confused about where to put dishes 9 of various shapes, and it increases a possibility that dishes 9 are not placed in appropriate orientations and postures. As a result, there occurs a case where dishes 9 are not splashed adequately with the washing water, thereby having a problem that the efficiency of washing decreases.

[0034] Hence proposed is another dish basket that addresses the problem discussed above, and is provided with a configuration that shows various kinds of dishes that are to be placed and their orientations of placement by imitating sectional shapes of the dishes to be placed. This configuration helps the user to intuitively recognize the way to place various dishes.

[0035] A structure of the above dish basket will be description hereinafter with reference to FIG. 16 and FIG. 17.

[0036] FIG. 16 is a perspective view of the dish basket of a conventional dishwasher, and FIG. 17 is a sectional view taken along a line 17 - 17 of FIG. 16.

[0037] In the case of another conventional dish basket 10 of the dishwasher, small bowls and the like dishes are placed in setting section 19 in which ribs 19a imitating a vertically sectioned shape of a typical small bowl are formed, as shown in FIG. 16. Flat plates and the like dishes are placed in setting section 20 in which arc-shaped ribs 20a imitating an outline of a typical plate are formed. Large bowls and the like dishes are placed in setting section 21 in which ribs 21a imitating a vertically sectioned shape of a typical large bowl are formed. Moreover, glassware and the like cups are placed in setting section 22 formed of latticed shape grid 22a1 having ribs 22a that imitate a horizontally sectioned shape of a typical glass are formed. The individual dishes such as small bowls, flat plates, large bowls and glasses are hence supported from the underside as they are placed in their respective setting sections 19, 20, 21 and 22.

[0038] In this case, ribs 22a that imitate the horizontally sectioned shape of the glass include a plurality of support portions on which upper lips of openings of glasses rest, such that the support portions are formed with an inclination on the same plane as an inclined surface of grid 22a1, as shown in FIG. 17.

[0039] In the structure of the above dish basket, however, ribs 22a are formed on the same plane as the inclined surface of grid 22a1. Therefore, when a flat plate or the like dish other than glass is placed in setting section 22 designed for placement of tall glasses and cups, for instance, a brim of the plate comes into contact with ribs

22a so that a space between portions serving as supporting points of the plate is narrow. In other words, it is not possible to place flat plates and the like dishes stably in setting section 22 for glassware. As a result, plates and the like dishes placed in setting section 22 during washing cannot be cleaned effectively.

[0040] That is, the conventional dish basket has had a problem that the ribs, which are formed to imitate sectional shapes of dishes to be placed for the purpose of showing kinds of the placeable dishes and their orientations of placement, do work contrary to the intention such that they limit the kinds of dishes that can be placed.

SUMMARY OF THE INVENTION

[0041] The present invention provides a dishwasher that is equipped with a dish basket capable of holding different kinds of dishes in a same space, and has excellent usability.

[0042] That is, the dishwasher of the present invention includes a housing case, a washing tub disposed in the housing case, and a dish basket disposed in the washing tub for receiving dishes. The dish basket has setting sections that are divided according to kinds of the dishes, and at least one of the setting sections includes a support portion for supporting the dishes from underside, and a guide-shaped portion that imitates a sectional shape or an outline of the dishes. In addition, a support plane that includes the support portion on a horizontal plane, and a guide-shaped plane that includes the guide-shaped portion on another horizontal plane are disposed at different positions.

[0043] This configuration helps a user to intuitively recognize a kind of dishes that can be placed in the dish basket and an orientation of placement. It also becomes possible that dishes of different kinds can be placed stably in one area. As a result, the invention can enhance ease of placing dishes in the dish basket, and achieve the dishwasher that is excellent in usability and demonstrates fundamental washing performance.

BRIEF DESCRIPTION OF DRAWINGS

[0044]

FIG. 1 is a sectioned side view of a dishwasher according to a first exemplary embodiment of the present invention.

FIG. 2 is a perspective view of a dish basket of the dishwasher according to the same exemplary embodiment.

FIG. 3 is a plan view of the dish basket of the dishwasher according to the same exemplary embodiment.

FIG. 4 is a plan view of a dish-setting basket of the dishwasher according to the same exemplary embodiment.

FIG. 5 is a perspective view of the dish-setting basket of the dishwasher according to the same exemplary embodiment.

FIG. 6 is another perspective view of the dish-setting basket of the dishwasher according to the same exemplary embodiment.

FIG. 7 is a perspective view of a main part of the dish-setting basket of the dishwasher according to the same exemplary embodiment.

FIG. 8 is a sectional view taken along a line 8 - 8 of FIG. 4.

FIG. 9 is another sectional view taken along a line 9 - 9 of FIG. 4.

FIG. 10A is a perspective view of the dish basket of the dishwasher according to the same exemplary embodiment.

FIG. 10B is a perspective view of a main part of the dish-setting basket.

FIG. 11A is a plan view of a dish-setting basket of a dishwasher according to a second exemplary embodiment of the present invention.

FIG. 11B is a sectioned perspective view taken along a line 11B - 11B of FIG. 11A.

FIG. 12A is a perspective view of a dish-setting basket of a dishwasher according to a third exemplary embodiment of the present invention.

FIG. 12B is a sectioned perspective view taken along a line 12B - 12B of FIG. 12A.

FIG. 13 is a sectioned side view of a conventional dishwasher.

FIG. 14 is a perspective view of a dish basket of the conventional dishwasher.

FIG. 15 is a plan view of a main part of a dish-setting basket of the conventional dishwasher.

FIG. 16 is a perspective view of another dish basket of the conventional dishwasher.

FIG. 17 is a sectional view taken along a line 17 - 17 of FIG. 16.

DETAILED DESCRIPTION OF THE INVENTION

[0045] Description is provided hereinafter of exemplary embodiments of the present invention with reference to the accompanying drawings. It should be understood that these exemplary embodiments are not intended to restrict the scope of the present invention.

FIRST EXEMPLARY EMBODIMENT

[0046] Description is provided hereinafter about a structure of a dishwasher according to the first exemplary embodiment of the invention by referring to FIG. 1 to FIG. 7. Since the structure of the dishwasher of this exemplary embodiment is basically identical to that of the conventional dishwasher described by using FIG. 13, same reference marks are used and their descriptions will be omitted. The following description will therefore focus on details about a dish basket of the dishwasher that is the feature of this exemplary embodiment.

[0047] FIG. 1 is a sectioned side view of the dishwasher according to the first exemplary embodiment of this invention. The dishwasher of this exemplary embodiment specifically represents a counter-top type dishwasher installed on a kitchen counter, for example. FIG. 2 is a perspective view of the dish basket of the dishwasher according to this exemplary embodiment, and FIG. 3 is a plan view of the dish basket. FIG. 4 is a plan view of a dish-setting basket of the dishwasher according to this exemplary embodiment, and FIG. 5 and FIG. 6 are perspective views of the dish-setting basket. FIG. 7 is a perspective view of a main part of the dish-setting basket of the dishwasher according to this embodiment.

[0048] FIG. 4 through FIG. 7 illustrate certain kinds of dishes 9, and more specifically, they show dishes 9 of such kinds as large bowls A, medium-sized plates B, small plates C, glasses D, and small bowls E. In this case, glasses D also include teacups, not shown in the figures, as one kind of dishes 9. Although not shown in any of the figures, large plates F, slim utensils and cutlery G such as chopsticks, spoons and forks, small items J such as sake cups, and kitchen knives K are also included in dishes 9. It is also noted that the differences of the plates distinguished by their sizes are not strictly defined, but they are merely relative differences in the sizes within the limits that can be accommodated in washing tub 2, as a matter of course.

[0049] Dish basket 23 of this exemplary embodiment includes at least frame structure 24, dish-setting basket 25, and small-item basket 26, as shown in FIG. 2 and FIG. 3. Frame structure 24 is made of a wire, for instance. Dish-setting basket 25 is configured to be removable from frame structure 24, and has a plurality of setting sections formed into a single piece from a resin such as polypropylenes (PP). Small-item basket 26 accommodates cutlery G, for instance, in upright positions.

[0050] Here, direction X of an arrow shown in each of the figures of dish basket 23 corresponds to a direction of front side of the dishwasher on which door 1a is disposed. In other words, dish basket 23 can be pulled out from washing tub 2 in the direction X of the arrow.

[0051] As shown in FIG. 4 to FIG. 7, dish-setting basket 25 of dish basket 23 is formed of a frame structure that has a combination of longitudinal grids 25a in the longitudinal direction (i.e., the direction X) and lateral grids 25b in the lateral direction (i.e., an orthogonal direction to the direction X), that are molded of a resin such as PP into a single piece.

[0052] Dish-setting basket 25 is provided with a plurality of setting sections divided according to kinds of the dishes. In specific, dish-setting basket 25 has setting section 27 for large bowls A, setting section 28a for medium-sized plates B, setting section 28b for cutlery G, and setting section 29 for accommodating any of small plates C and glasses D, as an example. Additionally, small bowls E shown in FIG. 7 are accommodated usually in setting section 27 since they are similar in shapes to large bowls A.

[0053] Furthermore, frame structure 24 includes setting section 24a for large plates F in an area not occupied by dish-setting basket 25 and small-item basket 26, as shown in FIG. 2 and FIG. 3. A basic structure of setting section 24a for large plates F is similar to the conventional dish basket described with reference to FIG. 13.

[0054] Generally, the dishes such as large bowls A, medium-sized plates B, small plates C, small bowls E, large plates F and the like are placed standing sideways in their respective setting sections such that their diametral planes are in the vertical direction. Glasses D are turned over with their lips down on setting section 29.

[0055] Description is provided individually of various states of dishes 9 placed in the setting sections of the dish-setting basket in the dish basket according to this exemplary embodiment, as follows.

[0056] Described first, by referring to FIG. 4 and FIG. 7, pertains to a state of large bowls A or small bowls E placed in setting section 27 of dish-setting basket 25.

[0057] Setting section 27 is made up from support members 30 constructed of two confronting lateral grids 25b, and ribs 31. Ribs 31 are formed from a plurality of arc-shaped rows, for instance, that connect between two support members 30. Support members 30 also include support portions 30a and support pins 30b that are contiguous to ribs 31, as shown in FIG. 7. Support portions 30a support two positions at an outer periphery, or the brim of each of small bowls E that are placed standing sideways, from the underside. Support pins 30b are so formed as to protrude upward from support portions 30a. With this structure, each of small bowls E, for example, is supported by two positions of support points P1 and two positions of support points P2 shown in FIG. 7, for a total of four points on two rows of support members 30 constructed of lateral grids 25b. In specific, support pins 30b of the first row at the brim side of small bowl E support the two lower positions of the outer periphery, i.e., the brim of small bowl E, in combination with support portions 30a at respective support points P1 from the front side. In addition, support pins 30b of the second row support outer periphery of small bowl E from the backside at support points P2. As a result, small bowl E can be placed stably in setting section 27.

[0058] Center portion 31a of are-shaped rib 31 has a protrusion that imitates a shape of a dish base. Because of this structure, rib 31 forms a guide-shaped portion that imitates a sectional shape (i.e., a sectional shape that is vertically sectioned in the position of use) of large bowl A or small bowl E to be placed, when viewed from the above, as shown in FIG. 4. As a result, the user can intuitively recognize that dishes 9 placeable in setting section 29 are large bowls A or small bowls E having similar shapes and their orientations of placement, according to a shape of the guide-shaped portion formed of rib 31.

[0059] Description is provided next of a state of small plates C and glasses D placed in setting section 29 of dish-setting basket 25, by referring to FIG. 4 to FIG. 6,

FIG. 8 and FIG. 9. In this exemplary embodiment, setting section 29 is configured to provide a single area that can be shared by two kinds of dishes having differences in shapes and methods of placement.

[0060] FIG. 8 is a sectional view taken along a line 8 - 8 of FIG. 4, and FIG. 9 is a sectional view taken along a line 9 - 9 of FIG. 4.

[0061] Described first is a state of small plates C placed in setting section 29 of dish-setting basket 25.

[0062] Setting section 29 is made up from support portions 32 (i.e., second support portions) constructed of two confronting lateral grids 25b, which are different from support members 30 in setting section 27 where small bowls E are placed, and ribs 33 (i.e., second guide-shaped portions) formed from a plurality of longitudinal grids 25a. To be specific, setting section 29 is made up from support portions 32, support pins 32a, and support pins 32b. Support portions 32 are constructed of lateral grids 25b, as described above, and support two positions at an outer periphery of each of small plates C that are placed standing sideways, from the underside. Support pins 32a are formed at predetermined intervals on support portions 32, and support outer surfaces of small plates C from the backside. Support pins 32b are shorter in length of the height direction than support pins 32a, disposed between support pins 32a, and support opening brims of small plates C from the front side. Ribs 33 formed of longitudinal grids 25a connect support portions 32 into a ladder-like shape.

[0063] In addition, each of ribs 33 in setting section 29 is so formed that lower center portion 33b bulges out downward into an arc shape as shown in FIG. 5. Accordingly, each rib 33 forms a second guide-shaped portion that imitates an outer shape of small plate C to be placed, when rib 33 is viewed from one side orthogonal to the direction X.

[0064] Described next is a state of glasses D placed in setting section 29 of dish-setting basket 25.

[0065] Setting section 29 includes ribs 33 (i.e., first support portions), which are also used commonly as ribs 33 (i.e., the second guide-shaped portions) for placement of small plates C, support pins 34 formed to protrude upward, and ring-shaped ribs 35 (i.e., first guide-shaped portions). Ribs 33 in setting section 29 serve as the first support portions when glasses D are placed, whereas they also serve as the second guide-shaped portions when small plates C are placed. In other words, ribs 33 are configured to serve both as the first support portions and the second guide-shaped portions in setting section 29.

[0066] Support pins 34 and ring-shaped ribs 35 (i.e., the first guide-shaped portions) are disposed in parallel to and in a same line with longitudinal grids 25a between support portions 32 (i.e., the second support portions).

[0067] Furthermore, ribs 33 that serve as the first support portions or the second guide-shaped portions are inclined to one side between support portions 32, as shown in FIG. 9. Therefore, glasses D can be supported stably by support pins 34 from the insides with a slight inclination, when glasses D are placed in inverted positions from above support pins 34. Support pins 34 are preferably disposed near ring-shaped ribs 35 at one side that is the higher position of inclined ribs 33.

[0068] That is, ribs 33 provided with the inclination serve as the first support portions of the openings of glasses D, as well as the second guide-shaped portions of small plates C, as illustrated above.

[0069] As shown in FIG. 4, adjoining combinations of support pins 34 that support the inner sides of glasses D and ring-shaped ribs 35 that form guide-shaped portions are disposed alternately with middle rib 33a interposed between two ribs 33. According to this structure, positions of placing glasses D can be identified explicitly by ring-shaped ribs 35. In other words, ring-shaped ribs 35 form the guide-shaped portions that imitate an outline of the opening or a cross-sectional shape of the cylindrical body of glasses D to be placed, when dish-setting basket 25 is viewed from the upper side, as shown in FIG. 4.

[0070] In setting section 29, when a plane including the plurality of support portions 32 that support small plates C from the underside is designated as support plane W1, and another plane including upper faces of the plurality of ring-shaped ribs 35 serving as the guide-shaped portions is designated as guide-shaped plane W2, then both these planes are formed into approximately horizontal (including strictly horizontal), as shown in FIG. 8. Guide-shaped plane W2 constitutes a different plane from support plane W1, and is located below support plane W1 by a predetermined distance "h". This structure can be configured so that lower edge C1 of the brim of small plate C does not come into contact with any of ring-shaped ribs 35, when the predetermined distance "h" is set with consideration given to diameters of small plates C.

[0071] With this structure, the user can intuitively recognize the kind of dishes that can be placed in setting section 29 of dish-setting basket 25 is glasses D. In addition, this structure can avoid the outer brims of small plates C from coming into contact with ring-shaped ribs 35 that serve as the guide-shaped portions of glasses D, even when the user places small plates C that are dishes 9 of completely different in shapes and methods of placement from those of glasses D into setting section 29. It is thus possible for small plates C to be placed stably into setting section 29 of dish-setting basket 25. As a result, it enhances the ease of placing dishes 9 in dish basket 10.

[0072] Referring to FIG. 4 through FIG. 6, description is provided next of a state of medium-sized plates B placed in setting section 28a of dish-setting basket 25.

[0073] As shown in FIG. 4 through FIG. 6, setting section 28a of dish-setting basket 25 includes support members 36, support pins 37, support pins 38 and ribs 39. Support members 36 are disposed at four locations, for instance, and two support members 36 at inner sides support outer brims of medium-sized plates B from the

underside. Support pins 37 are formed on support members 36 at outer sides, and support medium-sized plates B from the backside. Support pins 38 are formed on support members 36 at the inner sides, and support medium-sized plates B from the front side. Each of ribs 39 that connects support pins 37 is formed into an arc shape with center portion 39a curved downward, and it connects between support pins 37. With this structure, each of the are-shaped ribs 39 forms a guide-shaped portion that imitates an outer shape of medium-sized plate B to be placed.

[0074] Description is provided next of setting section 28b of dish-setting basket 25 by referring to FIG. 4 through FIG. 9.

[0075] As shown from FIG. 4 through FIG. 9, setting section 28b of dish-setting basket 25 is formed into a lattice shape from longitudinal grids 25a and lateral grids 25b, and it is provided between setting section 27 and setting section 29. Each of longitudinal grids 25a has such a shape that center portion 25a1 is curved downward when viewed from one side orthogonal to the direction X, as shown in FIG. 8 and FIG. 9. In addition, setting section 28b is formed between setting section 27 for large bowls A and setting section 29 for glasses D, at a position slightly lower than both setting sections 27 and 29. Therefore, when dishes such as round plates are placed in setting sections 27 and 29, there is a free space that becomes available in an area above setting section 28b. Dish-setting basket 25 of this exemplary embodiment makes effective use of this free space by providing setting section 28b. This structure allows setting section 28b to accommodate cutlery G laid down in their horizontal positions, instead of an ordinary manner of placing cutlery G in upright positions in small-item basket 26. As a result, more pieces of cutlery G can be accommodated in dish-setting basket 25. In addition, small items J such as sake cups and demitasse cups can also be accommodated stably in setting section 28b without using setting section 29 for glasses D. Thus obtained, as a result, is dish-setting basket 25 that can accommodate much more pieces of dishes with various shapes.

[0076] Description is provided next of a state of placing kitchen knives K in setting section 29 of dish-setting basket 25 by referring to FIG. 10A and FIG. 10B.

[0077] FIG. 10A is a perspective view of the dish basket of the dishwasher in this exemplary embodiment, and FIG. 10B is a perspective view of a main part of the dish-setting basket. FIG. 10A illustrates a state wherein kitchen knife K is placed.

[0078] As described above, setting section 29 of dish-setting basket 25 includes ribs 33 constructed from lateral grids 25b for supporting glasses D, and longitudinal grids 25a that are arranged one after another in a row to form middle ribs 33a, as shown in FIG. 10A and FIG. 10B. Longitudinal grids 25a are provided with thin grooves 25c formed in a lateral direction (i.e., the same direction as lateral grids 25b) at predetermined positions for setting blades of kitchen knives K. In addition, setting section 29 includes knife support portion 25d formed in a position adjacent to where the points of kitchen knives K stay located. A knife setting section is thus constructed within setting section 29, as described above. With this structure, kitchen knives K can be placed stably in grooves 25c without causing the blades of kitchen knives K to slide. In addition, knife support portion 25d and small-item basket 26 can help support kitchen knives K stably by preventing them from toppling over.

[0079] In other words, setting section 29 of dish-setting basket 25 in this exemplary embodiment further includes a setting section for kitchen knives, and that the knife setting section is disposed in a conspicuous position at the front side of dish basket 23 in the direction X, that is a direction of sliding out dish basket 23. With this structure, kitchen knives K can be held and accommodated safely inside dish-setting basket 25 of dish basket 23.

[0080] The dish basket of the dishwasher in this exemplary embodiment is constructed as illustrated above.

[0081] The dishwasher according to this exemplary embodiment operates and functions in a manner which is described below.

[0082] When the user intends to place dishes 9 in dish basket 23, he or she first determines positions where dishes 9 are to be placed. According to this embodiment, dish-setting basket 25 is provided with ribs 31, 33, 35 and 39 that respectively imitate shapes of large bowls A, small plates C, glasses D and medium-sized plates B as the guide-shaped portions in their setting positions. The user can thus intuitively recognize the positions and orientations of dishes 9 to be placed by the help of the guide-shaped portions. By virtue of this structure, the user can save time for preparation by efficiently placing dishes 9 in dish basket 23.

[0083] Furthermore, the dish-setting basket 25 is so configured that small plates C and glasses D of different shapes can be placed in setting section 29 of the same single area, for instance. In this case, setting section 29 is provided with guide-shaped portions that imitate the individual types of dishes. In addition, setting section 29 has the guide-shaped plane W2 for glasses D located at a position lower than the support plane W1 for supporting brims (outer periphery) of small plates C only by the predetermined distance "h" (i.e., a distance sufficient to keep the brims of small plates C free from contacting). This structure can avoid contact between ring-shaped ribs 35 that form the guide-shaped portions of glasses D and small plates C, thereby preventing ribs 35 from interfering with placement of small plates C. As a result, any of small plates C and glasses D can be placed stably in setting section 29 regardless of the types of dishes being placed.

[0084] Moreover, the dishwasher of this exemplary embodiment sets a spraying direction of the washing water such that the washing water is sprayed accurately to dishes 9 when placed properly in their setting positions. Therefore, there exists a possibility that the washing water is not splashed vigorously against dishes 9 if placed in improper positions or improper orientations, and this

causes a decrease in the washing efficiency. According to this exemplary embodiment, however, the user can intuitively recognize the positions and orientations of dishes 9 to be placed by means of the guide-shaped portions, and place dishes 9 accordingly in the individual setting sections without an error in the orientations of placement. Dishes 9 thus placed correctly in the proper positions and orientations can be washed by the washing water more appropriately. As a result, the dishwasher can demonstrate the fundamental washing performance, and wash the dishes effectively.

[0085] Furthermore, dish-setting basket 25 is formed of a resin into a single-piece structure. In addition, the individual support portions and the like elements are connected with ribs that form the guide-shaped portions. As a result, the structure contributes to improvement of the robustness of dish-setting basket 25.

[0086] Note that the shapes of the ribs that form the individual guide-shaped portions are not necessarily limited to the above structures described in this exemplary embodiment. The shapes of the individual ribs may be modified according to the design of the dish basket and types of the dishes to be placed, for example.

[0087] Although the description has been provided in this exemplary embodiment by presenting an example in which dish-setting basket 25 is formed of a resin, and the individual ribs are constructed from the resin, this is not restrictive. Dish-setting basket 25 and the individual ribs may be constructed from wires or metal materials, which can also provide equivalent advantageous effectiveness.

[0088] In this exemplary embodiment, although the description has been provided of an example in which the shape of the guide-shaped portions of glasses D is formed into a ring shape that imitates a cross-sectional shape of glasses D, this is not restrictive. Instead, the guide-shaped portions may be formed into a trapezoidal shape, for instance, to imitate a longitudinal-sectional shape of glass D.

[0089] In this exemplary embodiment, although the description has been provided of an example in which the structure includes support points P1 and P2 at two locations for supporting dishes 9 from the underside and the backsides, this is again not restrictive. There may be just one point, or three or more support points on the backsides, for instance, so long as they can support the dishes stably.

[0090] In this exemplary embodiment, although the description has been provided of an example which gives two types of dishes, small plates C and glasses D, as the different kinds of dishes that can be placed in the same single area, this is not restrictive. There should not be any specific limitation in the structure of the setting section to accommodate dishes of different shapes even when they are, for instance, two or more kinds of dishes.

[0091] Moreover, each of the guide-shaped portions formed of the individual ribs and relative positions of the support portions for supporting the dishes described in this exemplary embodiment are also not restricted only to the above-described protruding directions and configurations. Their directions and configurations, for example, can be of any forms so long as the structures are capable of ensuring sufficient spaces for setting the dishes of different kinds.

SECOND EXEMPLARY EMBODIMENT

[0092] Description is provided hereinafter about a structure of a dishwasher according to the second exemplary embodiment of the present invention by referring to FIG. 11A and FIG. 11B.

[0093] FIG. 11A is a plan view of a dish-setting basket of the dishwasher according to the second exemplary embodiment of this invention, and FIG. 11B is a sectioned perspective view taken along a line 11B - 11B of FIG. 11A.

[0094] As shown in FIG. 11A and FIG. 11B, the dishwasher of this exemplary embodiment is different from the first exemplary embodiment in an aspect that ribs 310, i.e., guide-shaped portions that imitate a shape of dish bases of large bowls A, for instance, in setting section 27 of dish-setting basket 25 are formed with an inclination, as compared with horizontally formed ribs 31.

[0095] In other words, ribs 310 are inclined either upward or downward with respect to a vertical direction from portions connected to support pins 30b provided on support portions 30a toward center portions 310a of ribs 310, on which dish-base shapes of large bowls A, for instance, are formed.

[0096] In this structure, ribs 310 are so formed as to appear thinner, in a plan view, as compared with ribs 31 of the first exemplary embodiment. Therefore, an amount of the washing water blocked by ribs 310 is reduced. As a result, this structure helps spray more amount of the washing water to the dishes such as large bowls A, and further increase the washing efficiency.

[0097] In addition, it becomes easier to place dishes 9 such as large bawls A and small bowls E when compared with the structure having the ribs formed in a horizontal plane. This structure can therefore ensure setting efficiency of the dishes equivalent to the case having the ribs formed in the horizontal plane, even if the spaces between the dishes are reduced.

[0098] Furthermore, the structure having ribs 310 formed entirely with the inclination can help the drops of water adhering to ribs 310 to run down easily. It thus improves the capability of drip-drying the drops of water adhering to ribs 310 of the dish basket, and, as a result, it can improve the drying efficiency of the dishwasher.

THIRD EXEMPLARY EMBODIMENT

[0099] Description is provided hereinafter about a dishwasher according to the third exemplary embodiment of the present invention by referring to FIG. 12A and FIG. 12B.

[0100] In this exemplary embodiment, description is

given specifically about a structure of longitudinal grids and lateral grids that make up a whole dish-setting basket, including support portions, ribs, and the like elements that support dishes. Here, the lateral grids and the longitudinal grids configure support members and the suppor portions of individual setting sections.

[0101] FIG. 12A is a perspective view of a main part of the dish-setting basket of the dishwasher according to the third exemplary embodiment of the present invention, and FIG. 12B is a sectioned perspective view taken along a line 12B - 12B of FIG. 12A. Note that FIG. 12A illustrates an appearance of dish-setting basket 25 in the vicinity of setting section 27 and setting section 28b as viewed from diagonally below. FIG. 12B illustrates a sectional shape in a vertical direction of lateral grids 25b of setting section 28a.

[0102] That is, the dishwasher of this exemplary embodiment differs from any of the above exemplary embodiments in an aspect that water-dripping portions 40 of a slender triangular shape, for instance, are provided on underside faces 25b2 of longitudinal grids 25a and lateral grids 25b along longitudinal directions of longitudinal grids 25a and lateral grids 25b, as shown in FIG. 12A. Additional aspect that is different from the above exemplary embodiments is that upper side faces 25b1 of lateral grids 25b are formed into an arc shape, and underside faces 25b2 are formed into a triangular shape, as shown by the sectional shape in the vertical direction of lateral grids 25b in FIG. 12B. In other words, underside faces 25b2 of longitudinal grids 25a and lateral grids 25b are formed to extend toward their longitudinal directions and downward into the triangular shape, for instance.

[0103] Specifically, water-dripping portions 40 are formed individually between support pins 30b along underside faces 25b2 in the longitudinal direction of lateral grids 25b, and they are formed continuously in a wavy shape or waveform, for instance, over the entire longitudinal direction. Triangularly shaped water-dripping portions 40 may also be formed into a wavy shape or waveform, for instance, entirely or partially on the underside faces of longitudinal grids 25a and the individual rib portions.

[0104] Because of this structure, the washing water that pours over dish basket 23 runs down smoothly from arc-shaped faces 25b1 of lateral grids 25b along underside faces 25b2 formed into the triangular shape, for example. When the washing water runs down in the form of drops of water, in particular, the drops of water first flow in the vertical direction along triangularly shaped underside faces 25b2 from arc-shaped faces 25b1. The drops of water that have reached underside faces 25b2 further flow through the lower edges and proximities of triangularly shaped water-dripping portions 40 toward the vertices, or the lowest points of the triangles. At this time, the drops of water merge and their sizes grow gradually in the areas where water-dripping portions 40 are formed, as they flow through the lower edges of the triangles in cross section of water-dripping portions 40. As a result, the drops of water pouring down over lateral grids 25b and longitudinal grids 25a become more easily to drip down from the vertices and their proximities of the triangles in the longitudinal direction of water-dripping portions 40.

[0105] In other words, the above structure can further facilitate the drops of water to drip down by letting them merge through the triangles in the longitudinal direction of water-dripping portions 40, even though the drops of water tend to stay adhering to the edges of underside faces 25b2 of lateral grids 25b due to the surface tension, if water-dripping portions 40 are not provided. This structure hence reduces an amount of the drops of water that stays in and all around dish-setting basket 25. As a result, it promotes evaporation of the moisture from dishes 9, and further improves the drying efficiency of the dishwasher.

[0106] Though the above description has not covered the details about water-dripping portions 40 provided on longitudinal grids 25a, the structure and function of water-dripping portions 40 on longitudinal grids 25a are also similar to those of water-dripping portions 40 of lateral grids 25b.

[0107] Although what has been described above is an example in which water-dripping portions 40 and the like are formed on the dish basket made of a resin, the same can also apply to a dish basket made of wires. For example, a wire used to make a frame structure may be formed into a waveform that configures a zigzag pattern in the vertical direction. Such a structure can provide similar advantages as the water-dripping portions formed of the resin.

[0108] Moreover, although the description provided above is an example in which the water-dripping portions are formed into straight-sided triangles in the longitudinal direction and in the cross-sectional shape, these are not restrictive. The water-dripping portions may be formed into an arc shape, for instance, or any other shapes as long as they can make the drops of water gather around lower ends of the water-dripping portions.

[0109] As described above, the dishwasher of the present invention includes a housing case, a washing tub disposed in the housing case, and a dish basket disposed in the washing tub for receiving dishes. The dish basket has setting sections that are divided according to kinds of the dishes, and at least one of the setting sections includes a support portion for supporting the dishes from the underside, and a guide-shaped portion that imitates a sectional shape or an outline of any of the dishes. In addition, a support plane that includes the support portion on one plane, and a guide-shaped plane that includes the guide-shaped portion on another plane are disposed at different positions.

[0110] This configuration helps the user to intuitively recognize a kind of dishes that can be placed in the dish basket and an orientation of placement. It also becomes possible that dishes of different kinds can be placed stably in one area. As a result, the invention can enhance

ease of placing dishes in the dish basket, and achieve the dishwasher that is excellent in the usability and demonstrates the fundamental washing performance.

[0111] In the dishwasher of this invention, the dish basket may have the guide-shaped plane disposed below the support plane.

[0112] With this configuration, the kind of dishes that can be placed in the dish basket and the orientation of placement become intuitively recognizable. It also becomes possible to stably place different kinds of dishes in the same area. As a result, there achieves an improvement in the setting efficiency of the dishes into the dish basket.

[0113] In the dishwasher of this invention, the guide-shaped portion may be formed into an outline or a sectional shape of glasses or cups, so that any dishes of similar shapes to the glasses or cups can be turned over on the support portion.

[0114] Accordingly, it becomes possible to intuitively recognize that the kinds of dishes that can be placed in the dish basket are glasses or cups. It also becomes possible to stably place dishes without causing them to come into contact with the guide-shaped portion, even if the dishes being placed have different shapes from the glasses. As a result, it achieves an improvement in the setting efficiency of the dishes into the dish basket.

[0115] Moreover, in the dishwasher of this invention, the support portion is defined as a first support portion, and the dish basket may further includes a second support portion where dishes having different shapes from the glasses are placed, and is configured such that an area where the first support portion is formed, and another area where the second support portion is formed overlap with each other to share a same space.

[0116] With this structure, it becomes possible to intuitively recognize that the kinds of dishes that can be placed in the dish basket are glasses or cups. It also becomes possible, when placing flat plates of quite different shapes, to stably place the plates without causing their brims to come into contact with the first guide-shaped portion. As a result, it achieves an improvement in the setting efficiency of the dishes into the dish basket.

[0117] In addition, the dishwasher of this invention may be so configured that the guide-shaped portion is defined as a first guide-shaped portion, and further include a second guide-shaped portion that imitates a sectional shape or an outline of the dishes to be placed on the second support portion.

[0118] It becomes possible with this structure to intuitively recognize that two kinds of different dishes can be placed in one area. As a result, the setting efficiency for placing the dishes in the dish basket can be further improved.

[0119] The dish basket of the dishwasher of this invention has a longitudinal grid and a lateral grid to make up the support portion, and it may be provided with a water-dripping portion on the underside of at least one of the longitudinal grid and the lateral grid.

[0120] This structure facilitates drops of water to drip down from the underside of the longitudinal grid or the lateral grid, and reduces an amount of the drops of water that stays in and all around the dish basket. As a result, it promotes evaporation of the moisture adhering to the dishes, and improves the drying efficiency of the dishwasher.

[0121] Moreover, the dish basket of the dishwasher of this invention may have grooves formed in a lateral direction at predetermined positions of the longitudinal grids that are arranged laterally in a row, and a knife setting section is provided where a blade of a kitchen knife is placed in the grooves.

[0122] With this structure, the kitchen knife can be placed stably in the grooves, and kept safely without causing the blade of the kitchen knife to slip.

[0123] In the dish basket of the dishwasher of this invention, at least one of the setting sections is configured to accommodate small bowls, and the setting section is provided with an arc-shaped rib to make up a guide-shaped portion that imitates a sectional shape of the small bowls, and that the are-shaped rib may be inclined in the vertical direction.

[0124] The rib is thus formed to appear thinner in a plan view, as compared with a rib provided horizontally. An amount of the washing water blocked by the rib therefore becomes reduced. As a result, this structure helps spray more amount of the washing water to the bowl-shaped dishes, and further improve the washing efficiency.

Claims

1. A dishwasher comprising:

   a housing case;
   a washing tub disposed in the housing case; and
   a dish basket disposed in the washing tub for receiving dishes,
   wherein the dish basket includes a plurality of setting sections that are divided according to kinds of the dishes,
   at least one of the setting sections includes a support portion for supporting the dishes from underside, and a guide-shaped portion that imitates a sectional shape or an outline of the dishes, and
   a support plane that includes the support portion on one plane, and a guide-shaped plane that includes the guide-shaped portion on another plane are disposed at different positions.

2. The dishwasher according to claim 1, wherein the dish basket is configured such that the guide-shaped plane is disposed below the support plane.

3. The dishwasher according to claim 1, wherein the

guide-shaped portion is formed into an outline or a sectional shape of glassware, and configured such that the glassware or the dishes of a similar shape to the glassware are turned over on the support portion.

4. The dishwasher according to claim 3, wherein
the support portion is defined as a first support portion,
the dish basket further includes a second support portion where dishes of a different shape from the glassware are placed, and
the dish basket is configured such that an area where the first support portion is formed, and another area where the second support portion is formed overlap with each other to share a same space.

5. The dishwasher according to claim 4, wherein
the guide-shaped portion is defined as a first guide-shaped portion, and
the dish basket further includes a second guide-shaped portion that imitates a sectional shape or an outline of the dishes to be placed on the second support portion.

6. The dishwasher according to claim 1, wherein
the dish basket includes a longitudinal grid and a lateral grid that make up the support portion, and
a water-dripping portion is provided on an underside of at least one of the longitudinal grid and the lateral grid.

7. The dishwasher according to claim 6, wherein
the dish basket includes a groove formed in a lateral direction at a predetermined position of the longitudinal grids that are arranged laterally in a row, and
a knife setting section formed of the groove in which a blade of a kitchen knife is placed.

8. The dishwasher according to claim 1, wherein
at least one of the setting sections is configured to accommodate small bowls,
the one of the setting sections includes a rib of an arc shape to make up the guide-shaped portion that imitates a sectional shape of the small bowls, and
support pins connected to both ends of the rib, and
the rib of the arc shape is inclined in a vertical direction.

FIG. 1

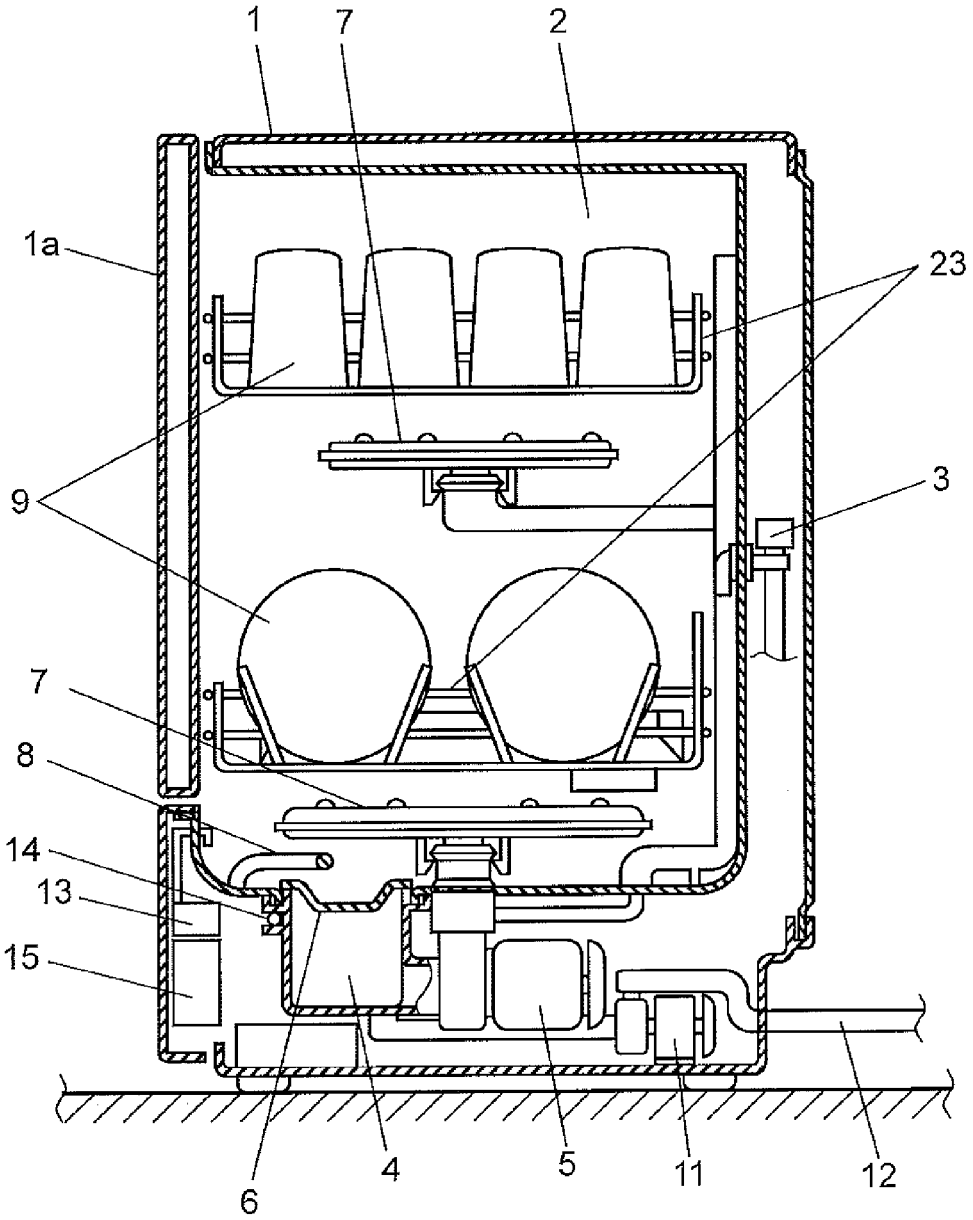


FIG. 2

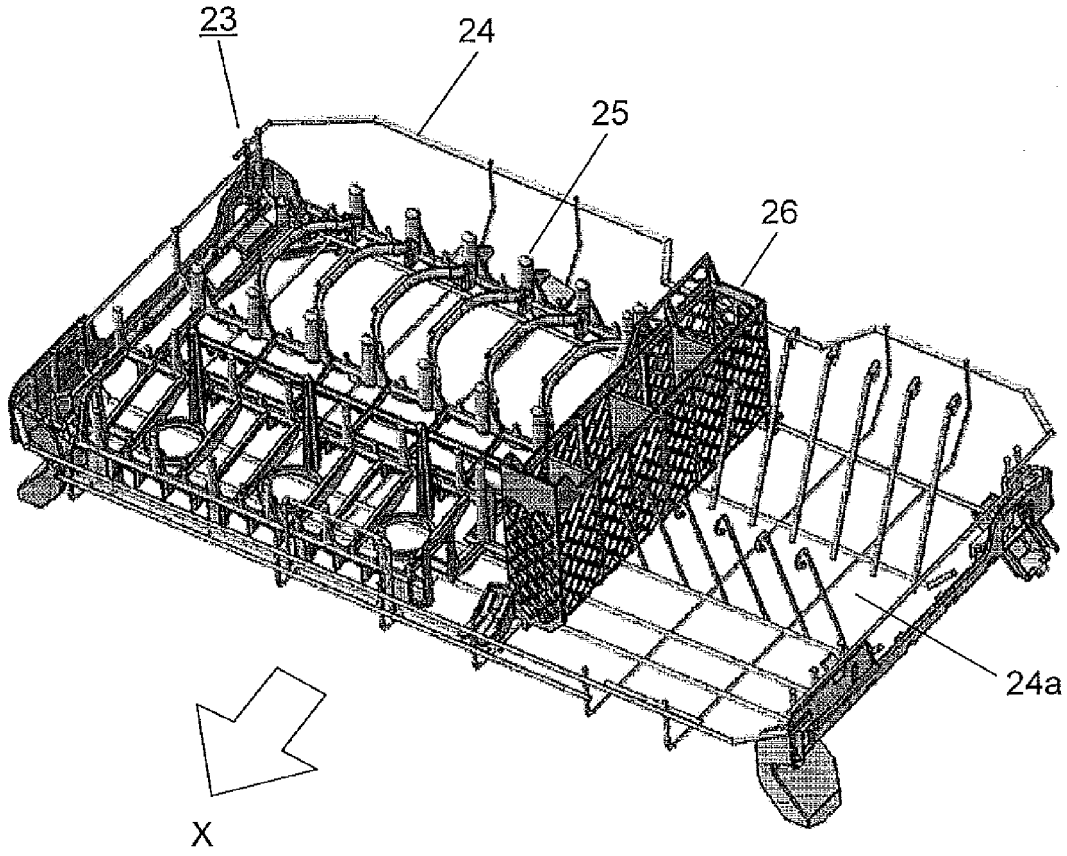


FIG. 3

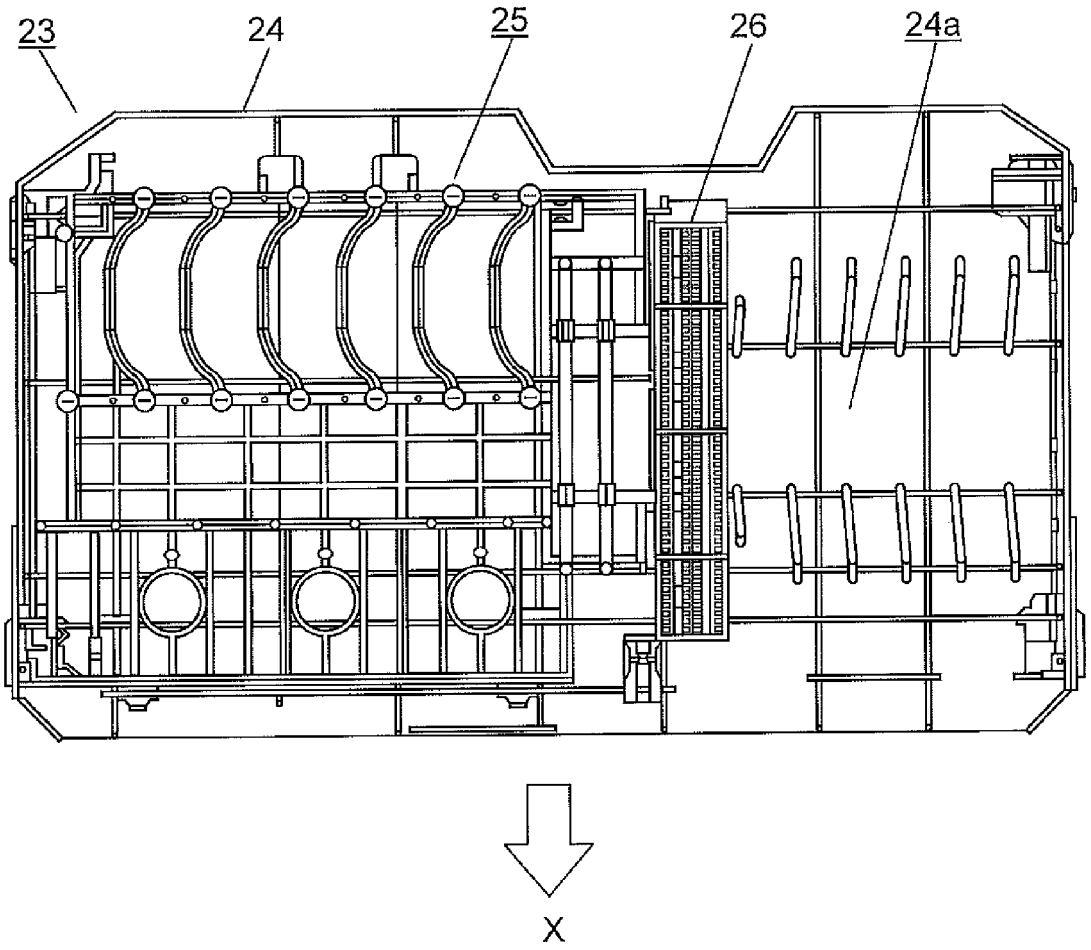


FIG. 4

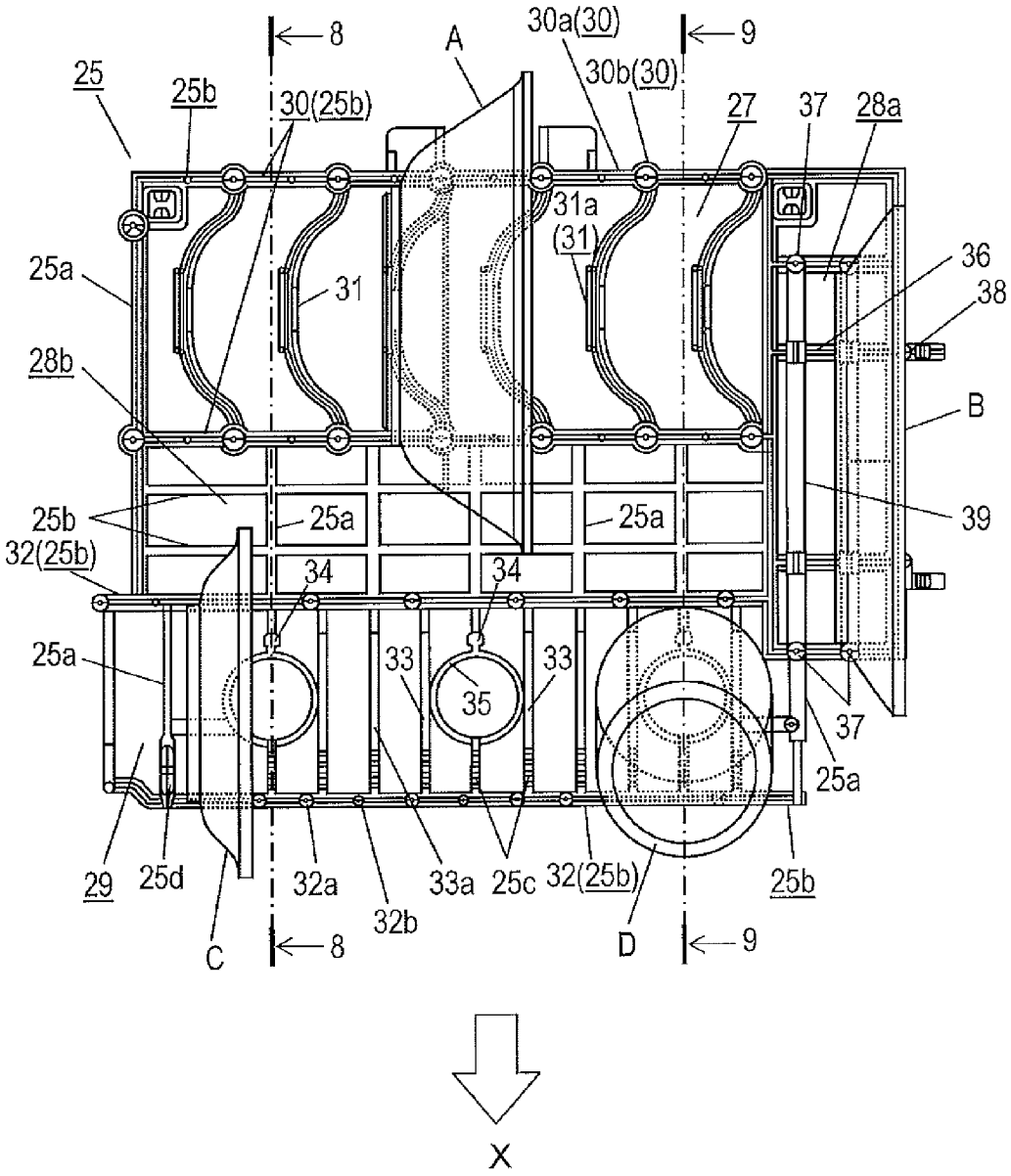

8
A
30a(30)
9
25
25b
30(25b)
30b(30)
27
37
28a
31a
(31)
36
38
25a
31
28b
B
39
25b
25a
25a
32(25b)
34
34
25a
33
33
35
37
25a
29
25d
32a
33a
25c
32(25b)
25b
C
8
32b
D
9
X

FIG. 5

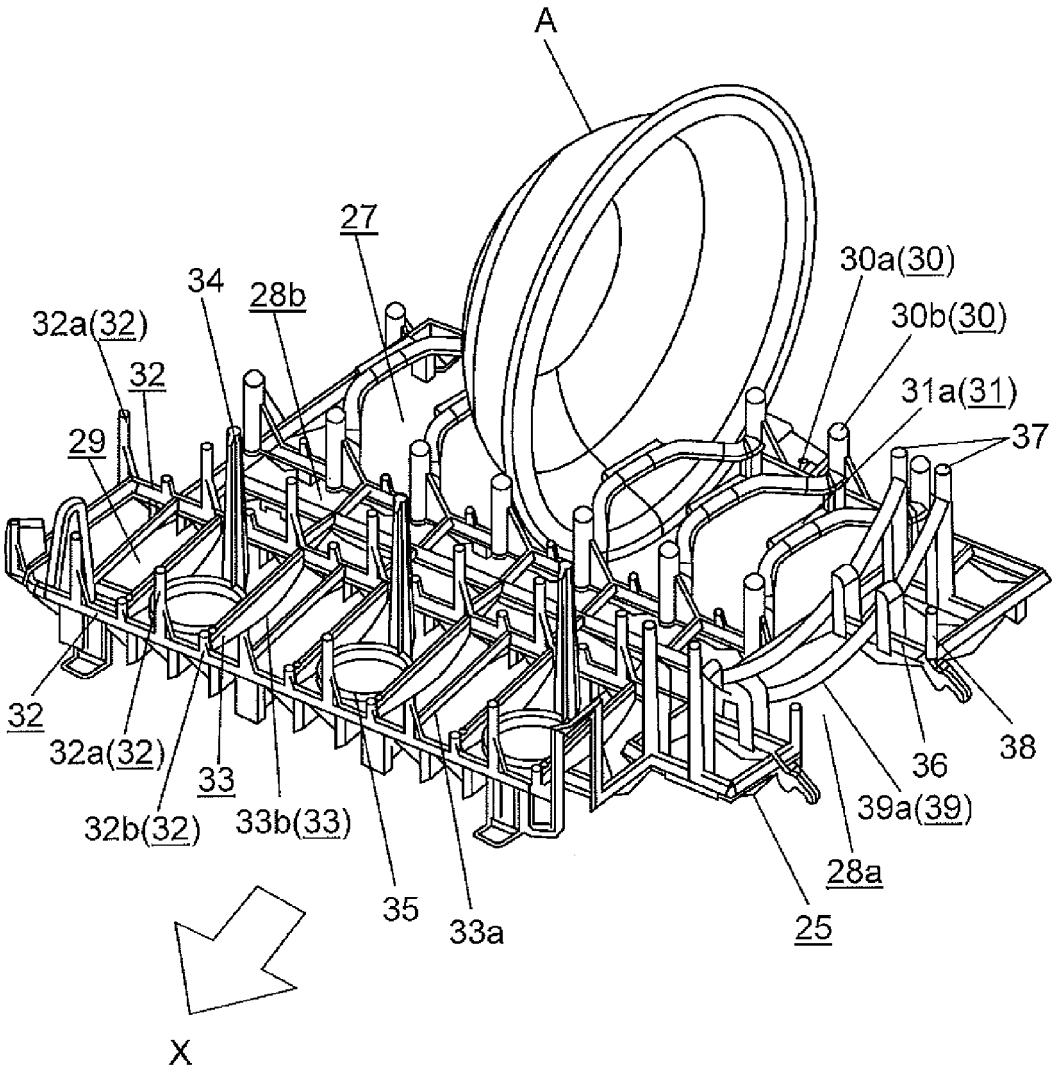

A
27
34
28b
32a(32)
32
29
30a(30)
30b(30)
31a(31)
37
32
32a(32)
33
32b(32)
33b(33)
35
33a
28a
25
36
39a(39)
38
X

FIG. 6

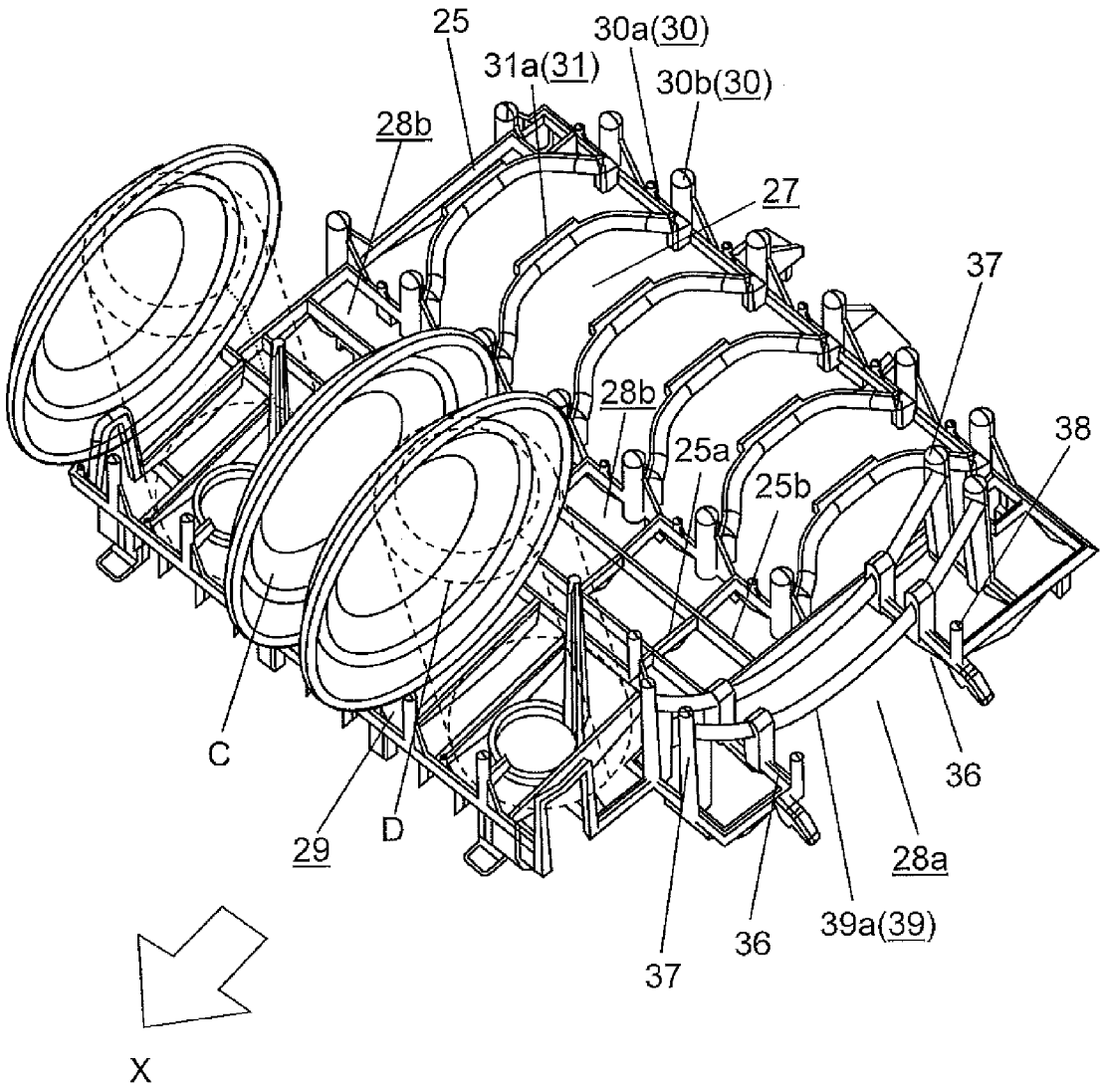

25
30a(30)
31a(31)
30b(30)
28b
27
37
28b
38
25a
25b
C
29
D
36
28a
39a(39)
36
37
X

FIG. 7

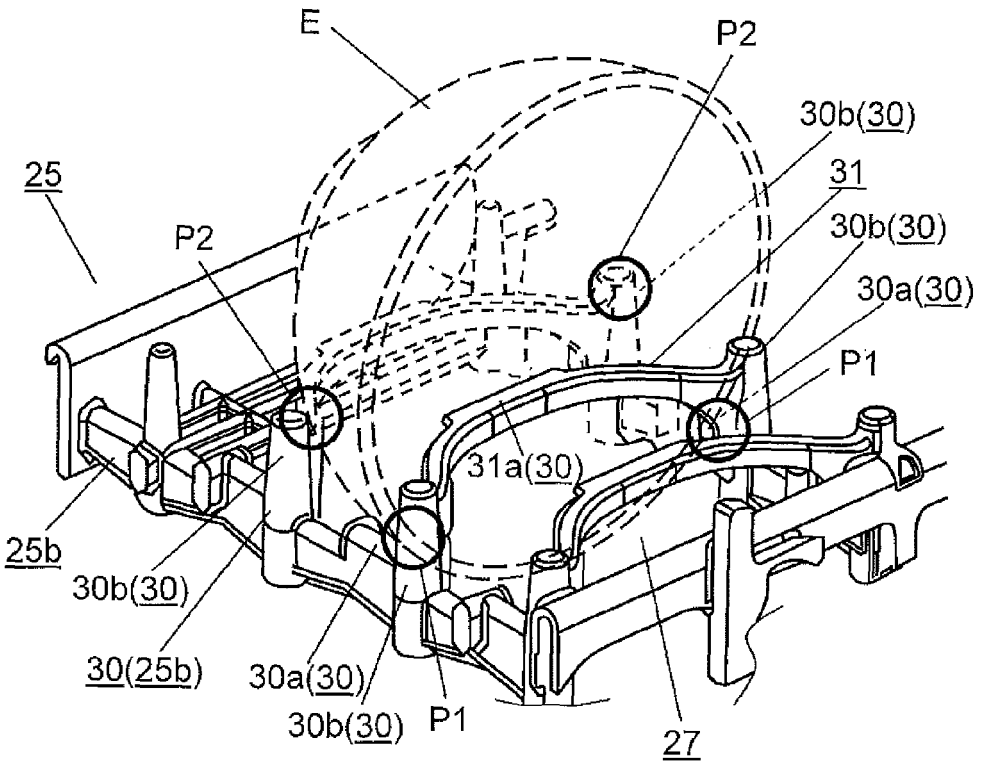

E
P2
30b(30)
25
31
P2
30b(30)
30a(30)
P1
31a(30)
25b
30b(30)
30(25b)
30a(30)
30b(30)
P1
27

FIG. 8

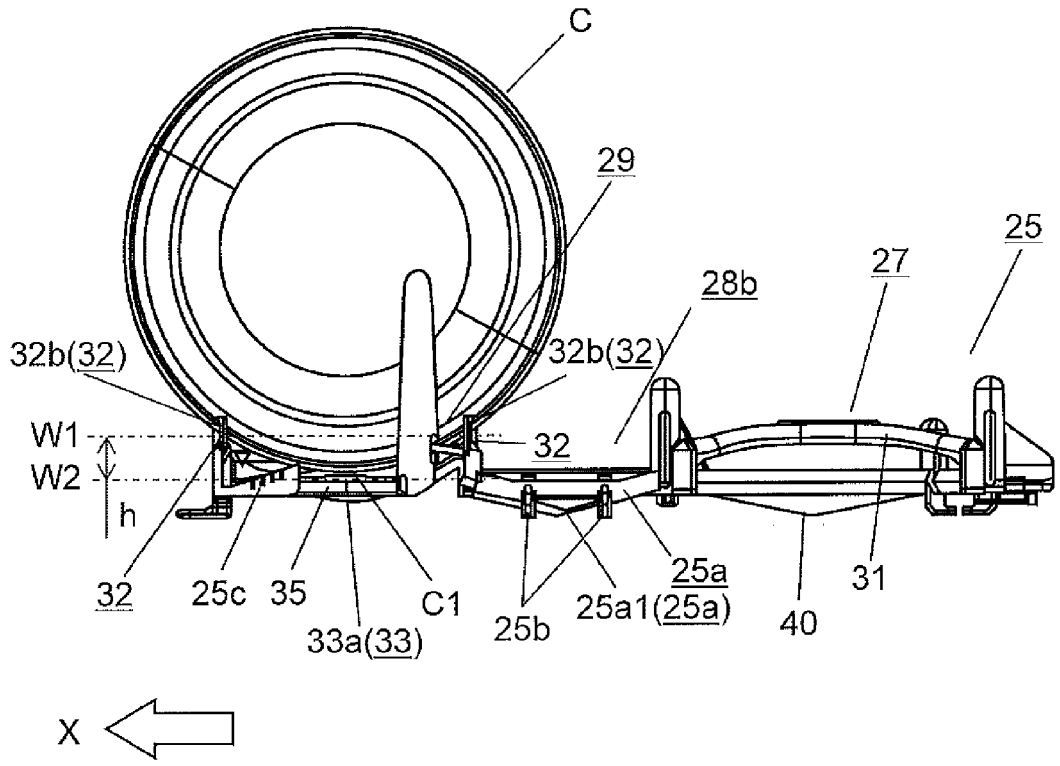

C
29
25
27
28b
32b(32)
32b(32)
W1
W2
h
32
32
25c
35
33a(33)
C1
25b
25a1(25a)
25a
31
40
X

FIG. 9

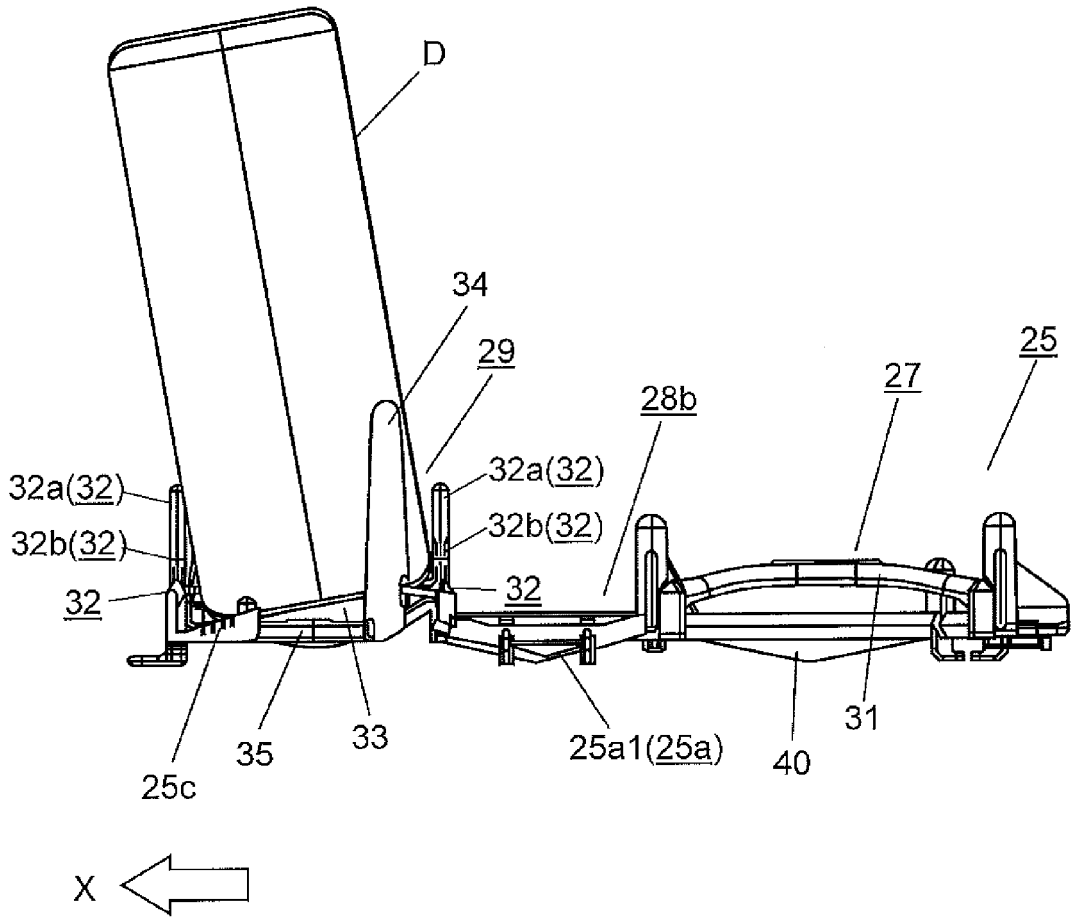

D
34
29
25
27
28b
32a(32)
32b(32)
32a(32)
32b(32)
32
32
25c
35
33
25a1(25a)
40
31
X

FIG. 10A

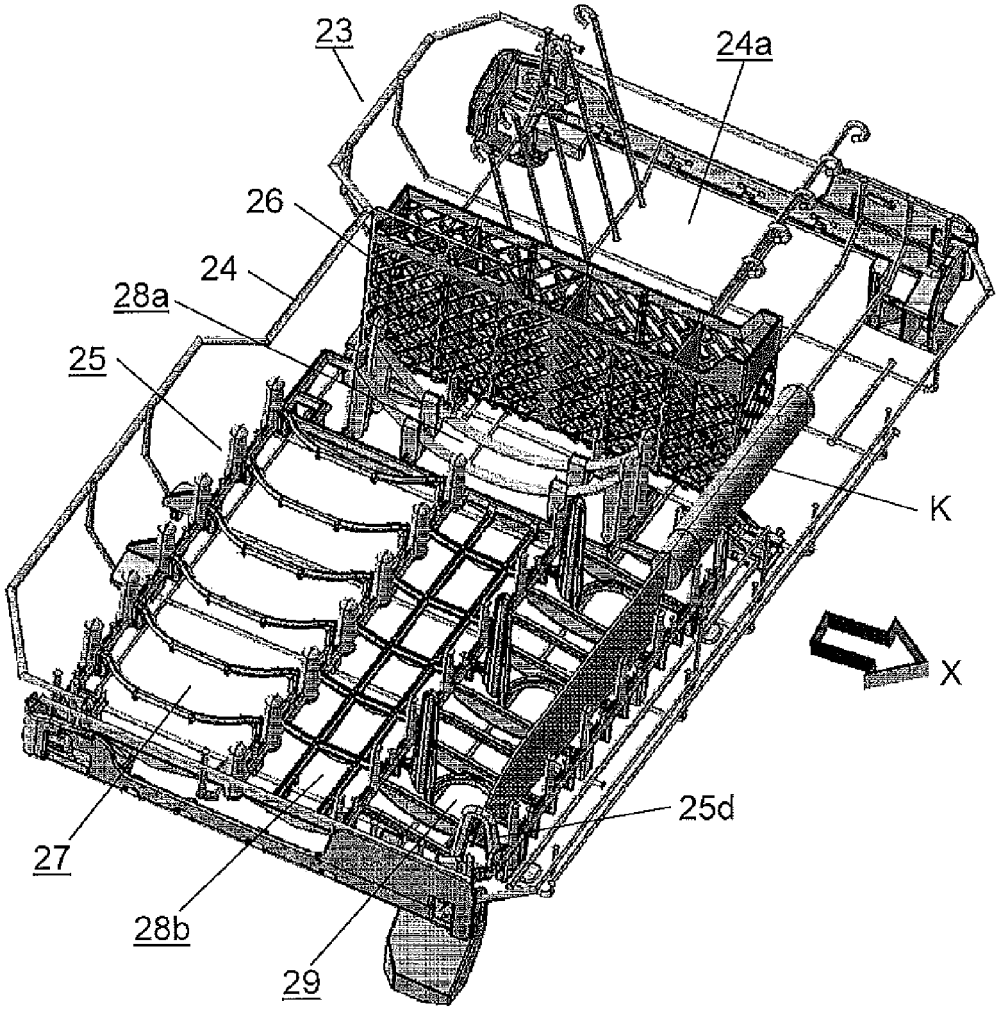


FIG. 10B

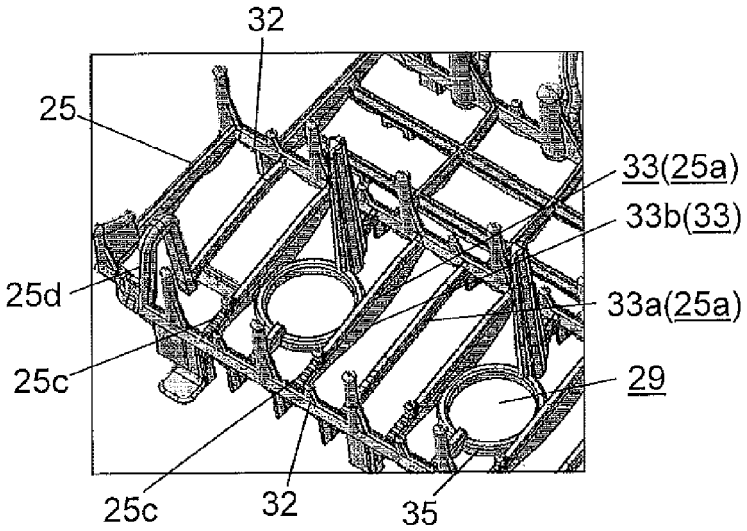


FIG. 11A

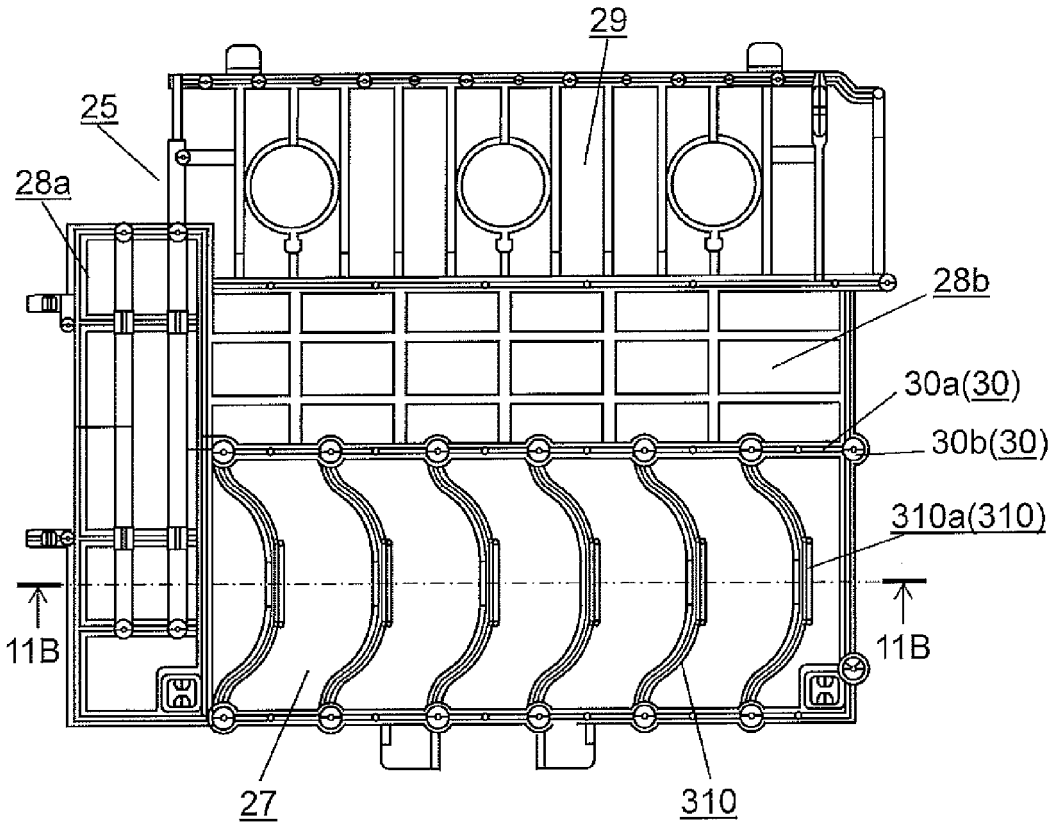


FIG. 11B

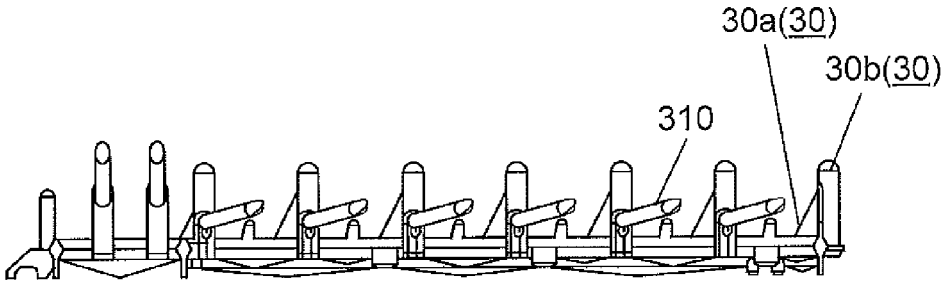


FIG. 12A

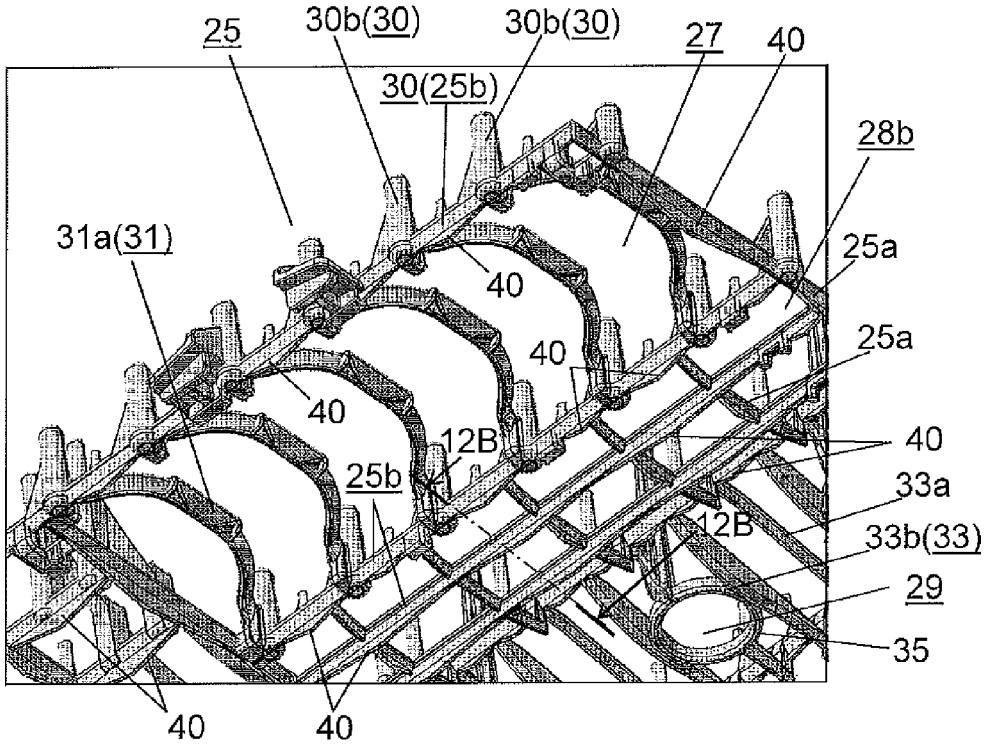


FIG. 12B

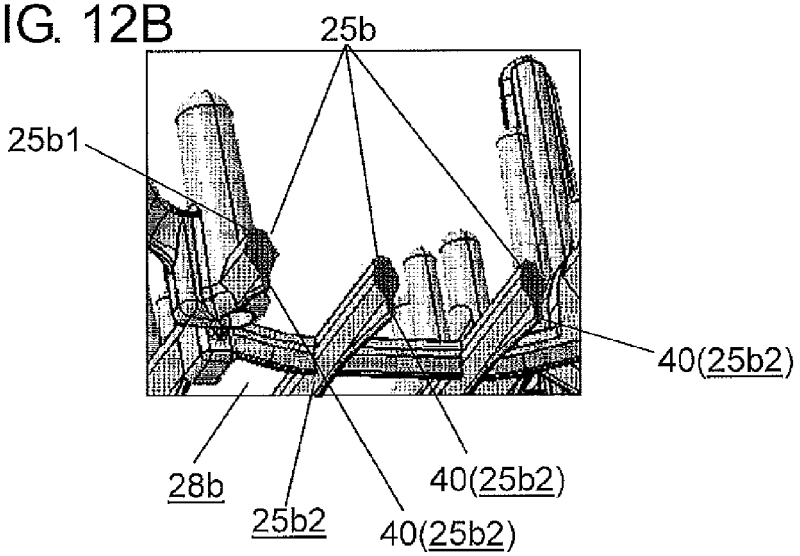


FIG. 13

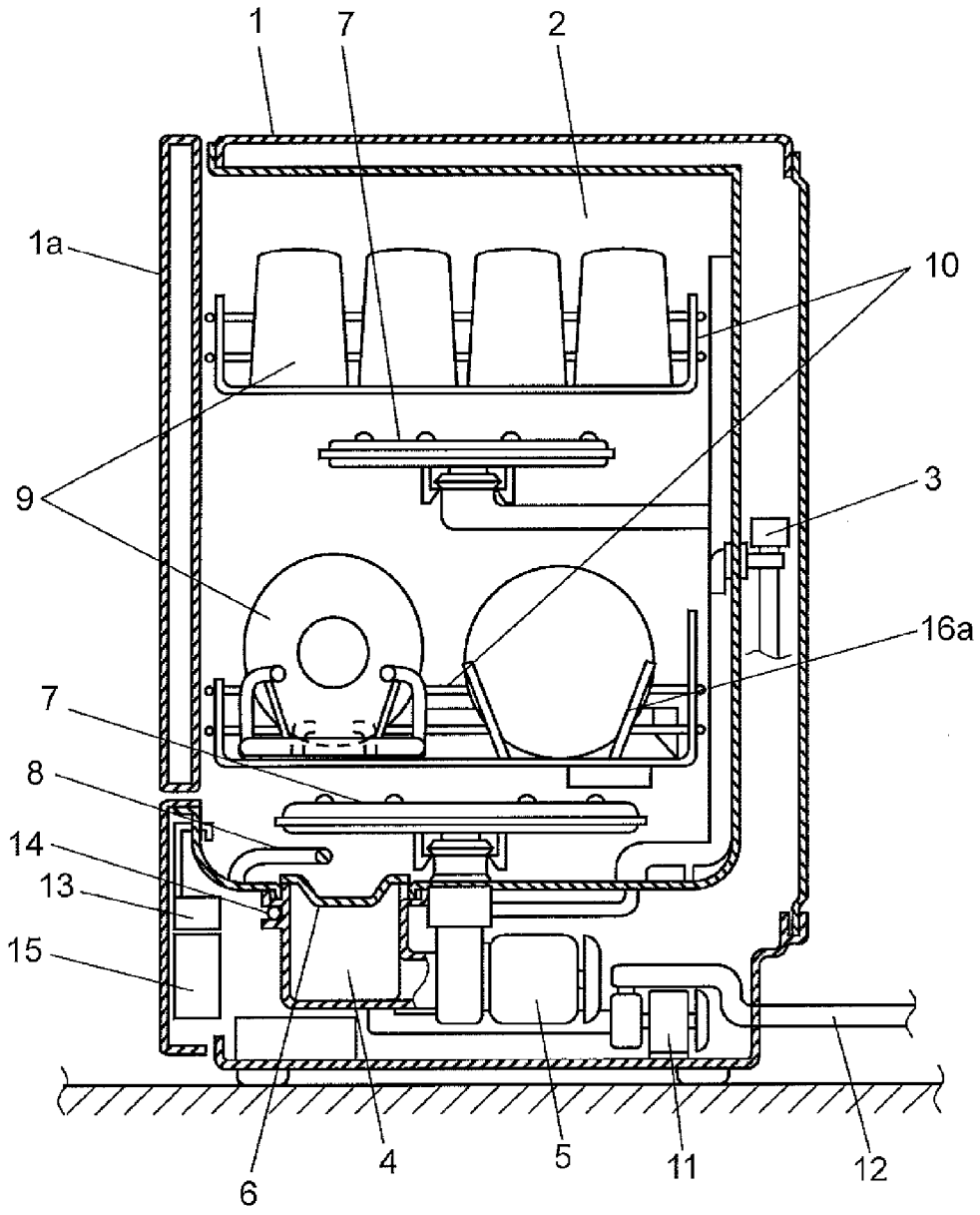


FIG. 14

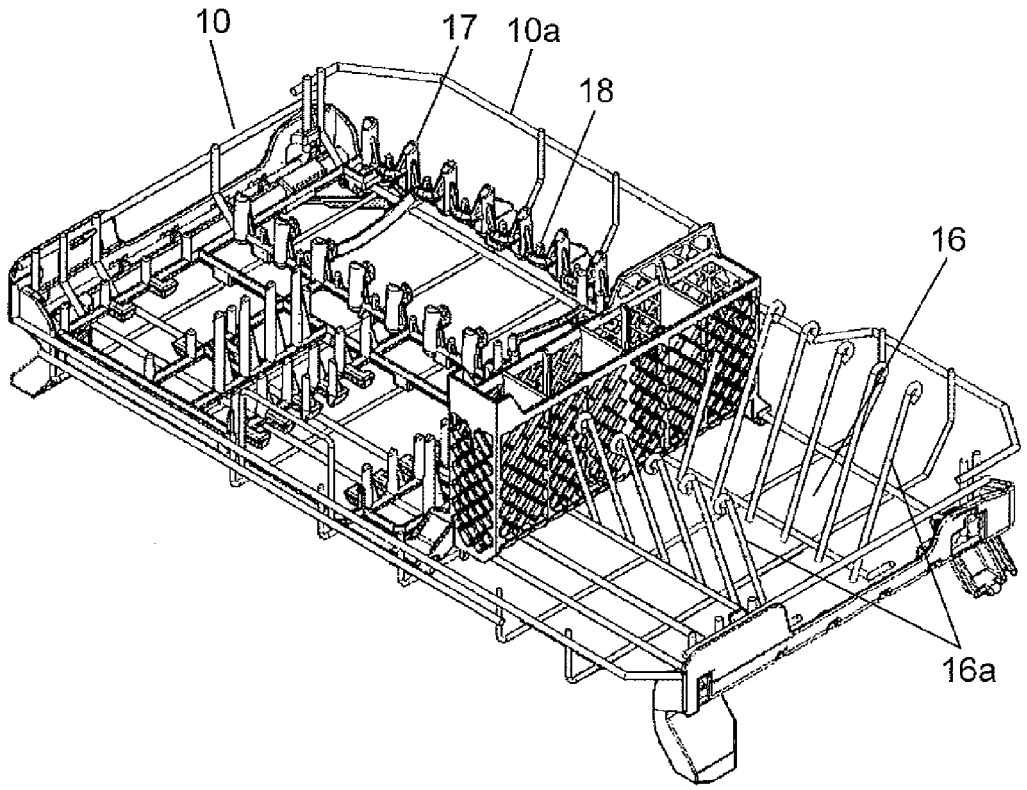


FIG. 15

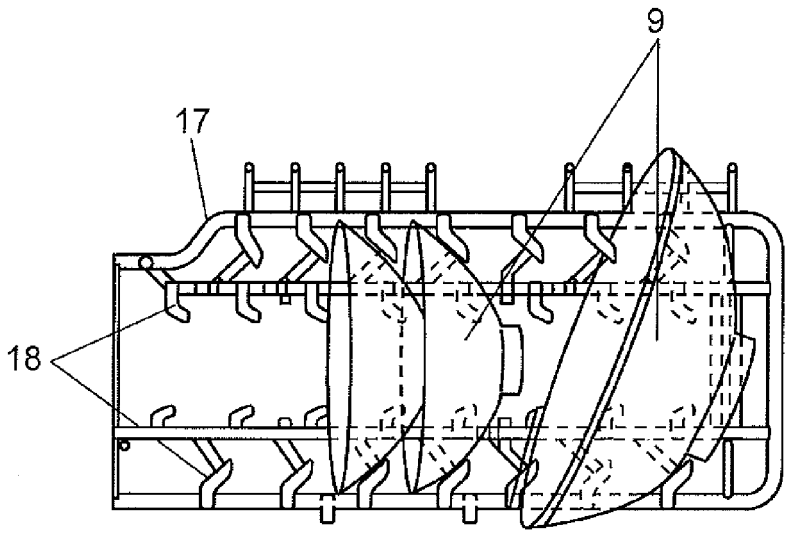


FIG. 16

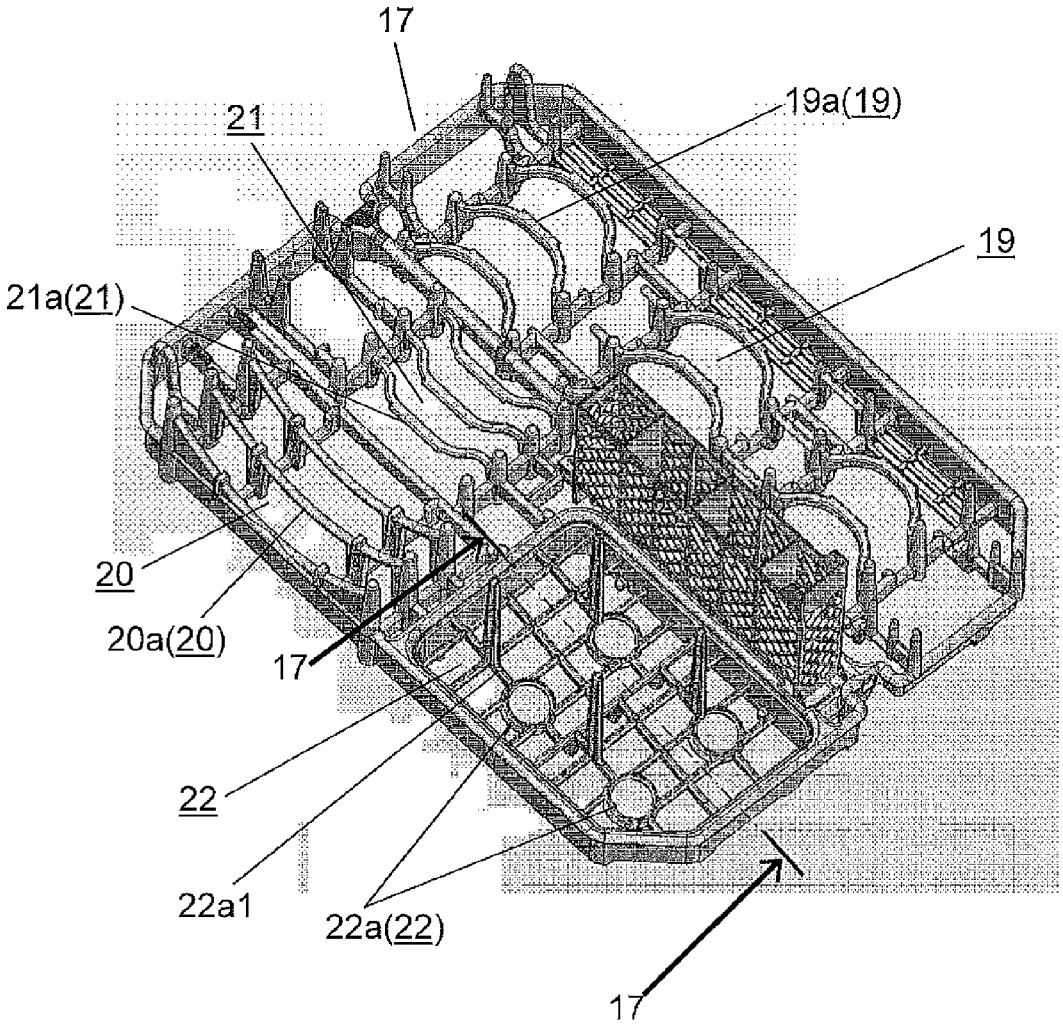
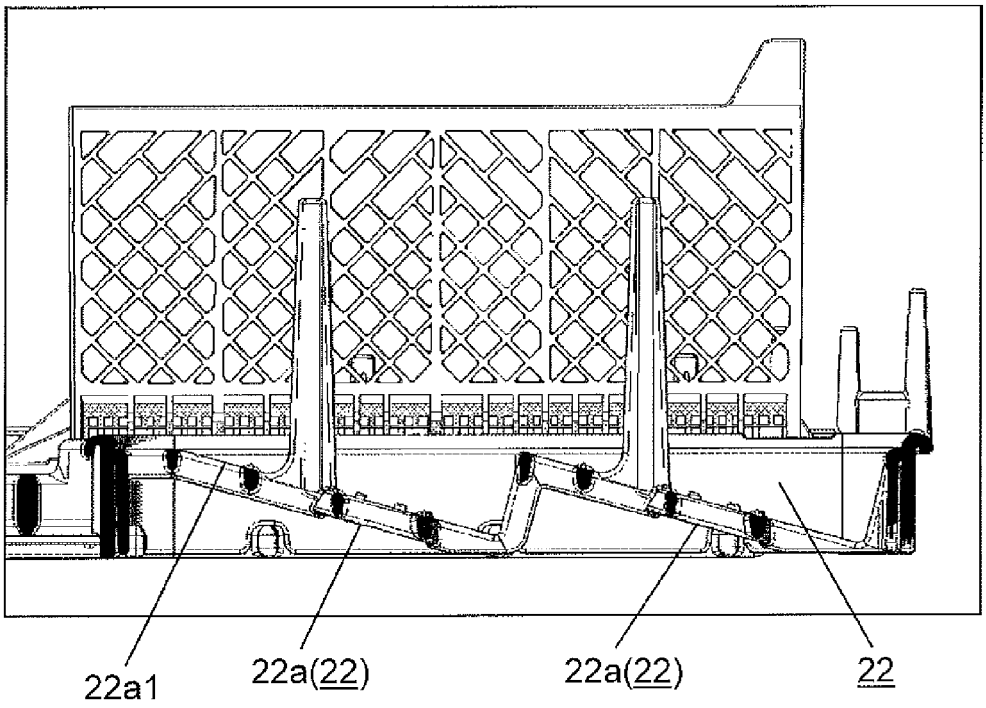


FIG. 17



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EUROPEAN SEARCH REPORT

Application Number
EP 15 15 6665

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2004 057018 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 1 June 2006 (2006-06-01) * paragraph [0025] - paragraph [0035]; figures 1-3 *	1-7	INV. A47L15/50
X	FR 2 915 362 A1 (BRANDT IND SAS [FR]) 31 October 2008 (2008-10-31) * page 5, line 11 - page 25, line 3; figures *	1-5,8	
X	DE 10 2011 080842 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 14 February 2013 (2013-02-14) * paragraph [0032] - paragraph [0048]; figures *	1,2,6,7	
X	JP H07 67826 A (SANYO ELECTRIC CO) 14 March 1995 (1995-03-14) * figure 4 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 June 2015	Beckman, Anja

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