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Description

Title of Invention: DETERGENT SUPPLY DEVICE AND LAUNDRY TREATMENT APPARATUS HAVING THE SAME

Technical Field

- [1] The present disclosure relates to a detergent supply device and a laundry treatment apparatus having the detergent supply device.

Background Art

- [2] A laundry treatment apparatus for separating dirt from a laundry object (such as clothing) using water includes a tub arranged to store water, a drum rotatably disposed inside the tub to store clothing, a water supply part arranged to supply water to the tub, and a drain part arranged to drain water stored in the tub.
- [3] In order to facilitate the separation of dirt, a conventional laundry treatment apparatus is equipped with a detergent supply device configured to supply detergent to the tub. A conventional detergent supply device includes a drawer removably disposed in a cabinet of the laundry treatment apparatus, and a detergent flow path provided in the drawer to guide detergent to the tub.
- [4] In the conventional detergent supply device described above, the water supply part is arranged to supply water to the detergent flow path, such that upon operation of the water supply part, detergent introduced into the detergent flow path is supplied to the tub along with water (Korean Patent Application Publication No. 10-2020-0007549). However, the above-described detergent supply device is likely to contain residual detergent or be subject to leakage.

Disclosure of Invention

Technical Problem

- [5] An object of the present disclosure is to provide a detergent supply device capable of minimizing the issue of residual detergent, and a laundry treatment apparatus having the detergent supply device.
- [6] Another object of the present disclosure is to provide a detergent supply device capable of minimizing leakage and a laundry treatment apparatus having the detergent supply device.

Solution to Problem

- [7] In one aspect of the present disclosure, provided herein is a detergent supply device including a drawer including a storage portion providing a space to store detergent, an inlet provided in a top surface of the storage portion to supply the detergent or water to the storage portion, and a discharge flow path formed through one surface of the storage portion to discharge the detergent or water inside the storage portion to an

outside of the storage portion, a housing including a chamber allowing the drawer to be withdrawably accommodated therein, a water supply port provided to supply water to the chamber, and a chamber discharge portion provided to discharge substances inside the chamber to the outside, and a flow path defining part including a flow path body fixed to the housing and positioned at a point higher than the top surface of the storage portion, a supply flow path provided in the flow path body to guide water supplied from the water supply port in a width direction of the chamber, and a branch flow path configured to guide the water inside the supply flow path to the inlet.

- [8] The branch flow path may include a connecting flow path defined by a first defining wall and a second defining wall, the first defining wall and the second defining wall extending from the supply flow path toward a center of the inlet, and a diffusion flow path formed in a shape surrounding the first defining wall and the second defining wall.
- [9] At least one of the first defining wall or the second defining wall may be configured to supply water inside the connecting flow path to the diffusion flow path in an overflow manner.
- [10] At least one of an upper end of the first defining wall or an upper end of the second defining wall may be inclined down toward the center of the inlet.
- [11] At least one of a spacing between an upper end of the first defining wall and the housing or a spacing between an upper end of the second defining wall and the housing may increase toward the center of the inlet.
- [12] The connecting flow path may be inclined down toward the center of the inlet.
- [13] The detergent supply device may further include a guide configured to guide the water inside the supply flow path into the connecting flow path.
- [14] The diffusion flow path may include a first surface formed in a shape surrounding the first defining wall and the second defining wall and positioned above the inlet, a first diffusion flow path discharge hole formed through the first surface in a penetrating manner, a second surface arranged along an edge of the first surface and positioned above the inlet, the second surface being inclined down toward the edge of the first surface, and a second diffusion flow path discharge hole formed through the second surface in a penetrating manner.
- [15] The first surface may be a horizontal surface.
- [16] The first surface may be provided with a slope inclined down toward an edge of the connecting flow path.
- [17] The detergent supply device may further include a plurality of flushing holes arranged along the width direction of the chamber to discharge the water inside the supply flow path into a space between a rear surface of the chamber and a rear surface of the drawer.

- [18] The storage portion may include a first storage portion configured to store a first detergent, and a second storage portion configured to store a second detergent, wherein the inlet may include a first inlet provided in a top surface of the first storage portion, and a second inlet provided in a top surface of the second storage portion. The discharge flow path may include a first discharge flow path provided in a rear surface or a bottom surface of the first storage portion, and a second discharge flow path configured to discharge liquid inside the second storage portion when a water level inside the second storage portion is above a reference water level. The branch flow path may include a first branch flow path arranged to guide the water inside the supply flow path to the first inlet, and a second branch flow path arranged to guide the water inside the supply flow path to the second inlet.
- [19] The detergent supply device may further include a first guide protruding from an inlet of the first branch flow path toward an edge of the supply flow path to guide the water being along the supply flow path into the first branch flow path, and a second guide protruding from an inlet of the second branch flow path toward the edge of the supply flow path to guide the water moving along the supply flow path into the second branch flow path.
- [20] In another aspect of the present disclosure, provided herein is a laundry treatment apparatus including a tub providing a space to store water, a drum rotatably disposed in the tub to store laundry, a drawer including a storage portion providing a space to store detergent, an inlet provided in a top surface of the storage portion to supply the detergent or water to the storage portion, and an discharge flow path formed through one surface of the storage portion to discharge the detergent or water inside the storage portion to an outside of the storage portion, a housing including a chamber allowing the drawer to be withdrawably accommodated therein, a water supply port provided to supply water to the chamber, and a chamber discharge portion provided to discharge substances inside the chamber to the tub, a flow path defining part including a flow path body fixed to the housing and positioned at a point higher than the top surface of the storage portion, a supply flow path provided in the flow path body to guide water supplied from the water supply port in a width direction of the chamber, and a branch flow path configured to guide the water inside the supply flow path to the inlet.
- [21] The branch flow path may include a connecting flow path defined by a first defining wall and a second defining wall, the first defining wall and the second defining wall extending from the supply flow path toward a center of the inlet, and a diffusion flow path formed in a shape surrounding the first defining wall and the second defining wall.

- [22] At least one of the first defining wall or the second defining wall may be configured to supply water inside the connecting flow path to the diffusion flow path in an overflow manner.
- [23] At least one of an upper end of the first defining wall or an upper end of the second defining wall may be inclined down toward the center of the inlet.
- [24] The diffusion flow path may include a first surface formed in a shape surrounding the first defining wall and the second defining wall and positioned above the inlet, a first diffusion flow path discharge hole formed through the first surface in a penetrating manner, a second surface arranged along an edge of the first surface and positioned above the inlet, the second surface being inclined down toward the edge of the first surface, and a second diffusion flow path discharge hole formed through the second surface in a penetrating manner.

Advantageous Effects of Invention

- [25] The present disclosure provides a detergent supply device capable of minimizing the issue of residual detergent, and a laundry treatment apparatus having the detergent supply device.
- [26] The present disclosure also provides a detergent supply device capable of minimizing leakage and a laundry treatment apparatus having the detergent supply device.

Brief Description of Drawings

- [27] FIGS. 1 and 2 illustrate an example of a laundry treatment apparatus.
- [28] FIG. 3 illustrates an example of a detergent supply device.
- [29] FIG. 4 illustrates the detergent supply device and an example of a water supply part.
- [30] FIGS. 5, 6, 7, and 8 illustrate an example of a flow path forming part provided in the detergent supply device.
- [31] FIGS. 9 and 10 illustrate an example of a coupling structure of a housing and a flow path forming part.

Best Mode for Carrying out the Invention

- [32] Hereinafter, a preferred embodiment of the present disclosure will be described with reference to the accompanying drawings. Unless otherwise defined, all terms used herein shall have the same meaning as the ordinary meaning of such terms as understood by one of ordinary skill in the art to which the present disclosure pertains. If any term used herein conflicts with the ordinary meaning of such term, the definition used herein shall govern.
- [33] As shown in FIGS. 1 and 2, a laundry treatment apparatus 100 may include a cabinet 1, a tub 2 disposed inside the cabinet to store water, and a drum 3 rotatably disposed inside the tub to store laundry objects (such as clothing).

- [34] As shown in FIG. 1, the cabinet 1 may include a cabinet body 11 providing a space in which the tub 2 is accommodated, and a cabinet cover 12 fixed to the cabinet body 11 and defining a top surface of the laundry treatment apparatus.
- [35] The cabinet cover 12 may be provided with a control panel 129. The control panel 129 may include an input unit 129a configured to receive a control instruction from a user, and a display (not shown) configured to display information (a control instruction selectable by the user or information related to the control instruction selected by the user).
- [36] As shown in FIG. 2, the cabinet cover 12 is provided with an inlet 125 through which laundry is supplied into the drum 3. The inlet 125 is openable and closable by a door 126 rotatably fixed to the cabinet cover 12.
- [37] The tub 2 may be formed in various shapes as long as it is capable of storing water. FIG. 2 shows an example of the tub 2 which is formed in a hollow cylindrical shape.
- [38] The tub 2 may include a tub body 21 having a cylindrical shape. The tub body 21 is fixed to the cabinet 1 by a tub support 23. The tub support 23 may include one end fixed to the cabinet cover 12 or the cabinet body 11, and an opposite end provided with a bar fixed to a circumferential surface of the tub body 21.
- [39] The tub cover 22 is fixed to the top surface of the tub body 21. The tub cover 22 may be provided with a tub inlet 24 for communicating the inside of the tub body 21 with the outside. The tub inlet 24 may be positioned under the inlet 125.
- [40] The tub 2 is supplied with water through a water supply part 25, and water stored in the tub is discharged from the cabinet 1 through a drainage part 26.
- [41] The drainage part 26 may include a drain pipe 261 arranged to guide water inside the tub body 21 to the outside of the cabinet, and a drain valve 262 arranged to control the opening and closing of the drain pipe 261.
- [42] The drum 3 may include a drum body 31 having a hollow cylindrical shape, positioned inside the tub body 21 as a means providing a space in which laundry are stored.
- [43] The top surface of the drum body 31 may be provided with a drum inlet 32 arranged to be positioned under the tub inlet 24. Thus, a user may put laundry into the drum body 31 through the inlet 125, the tub inlet 24 and the drum inlet 32. A circumferential surface and a bottom surface of the drum body 31 may be provided with drum through-holes 311 allowing the tub body 21 to communicate with the inner space of the drum body 31 therethrough.
- [44] The bottom surface of the drum body 31 may further be provided with an agitator 33 rotatably disposed inside the drum body to form a water current and/or agitate the laundry.

- [45] The drum body 31 and the agitator 33 may be rotated by a drum drive part. The drum drive part may include a stator 34 fixed to the bottom surface of the tub body 21 to form a rotating magnetic field, a rotor 35 rotated by the rotating magnetic field, a drum shaft 37 extending through the tub body 21 and fixed to the drum body 31, and an agitation shaft 36 extending through the drum shaft 37 to connect the rotor 35 and the agitator 33.
- [46] To control the coupling between the drum shaft 37 and the rotor 35, the drum drive part may include a coupler 38 and an actuator 39. The actuator 39 is a means to control the position of the coupler 38, and the actuator 39 may cause the coupler 38 to reciprocate between a first point and a second point. In this case, the first point may be set as a point at which the coupler 38 connects the drum shaft 37 to the rotor 35, and the second point may be set as a point at which the coupler 38 disconnects the drum shaft 37 from the rotor 35.
- [47] The laundry treatment apparatus 100 may have a detergent supply device (detergent supplier) D arranged to supply detergent to the tub body 21. The detergent supply device D may be arranged to move detergent to the tub body 21 using water supplied from the water supply part 25 (the water supply part may supply water to the tub body through a flow path provided inside the detergent supply device).
- [48] As shown in FIG. 3, the detergent supply device D may include a housing 4 arranged to guide water supplied from the water supply part 25 to the tub body 21, a drawer 7 providing a space for storing detergent and withdrawable from the housing 4, and a flow path defining part 5 configured to guide water introduced into the housing 4 to the drawer 7.
- [49] As shown in FIG. 4, the detergent supply device D may be secured to the cabinet cover 12. The cabinet cover 12 may be provided with a first area 121 and a second area (rear space) 122, which are divided by a cover partition 123.
- [50] The cabinet cover 12 may include an inlet defining wall 125a enclosing the cabinet inlet 125. In this case, the cover partition 123 may form part of the inlet defining wall 125a.
- [51] The first area 121 is a front space of the cabinet cover 12, wherein the inlet 125 may be provided in the first area 121. The second area 122 is a rear space of the cabinet cover 12, wherein the detergent supply device D and the water supply part 25 may be provided in the second area 122.
- [52] The cover partition 123 may be provided with a mounting hole 124 for the insertion of the housing 4. The mounting hole 124 may be formed in the cover partition 123 as a through-hole such that the inlet 125 is connected to the second area 122.
- [53] The laundry treatment apparatus 100 may include a support body 127 fixed to the cabinet cover 12 to support the housing 4 of the detergent supply device. The support

body 127 may be positioned in the second area 122. In this case, the water supply part 25 may include a water supply pipe 251 and a valve 252 arranged to control the opening and closing of the water supply pipe in response to a control signal from a controller (not shown).

[54] The valve 252 may include a first valve 252a, a second valve 252b, and a third valve 252c, which are fixed to the support body 127, and the water supply pipe 251 may include a first water supply pipe 251a connected to the first valve 252a, a second water supply pipe 251b connected to the second valve 252b, and a third water supply pipe 251c connected to the third valve 252c.

[55] The first water supply pipe 251a and the second water supply pipe 251b may be arranged to supply water (cold water) of the same temperature to the detergent supply device D, and the third water supply pipe 251c may be arranged to supply water (hot water) of a different temperature than the water supply pipes 251a and 251b to the detergent supply device D.

[56] The support body 127 may be provided with a support body through-hole 128. The support body through-hole 128 may be connected to the mounting hole 124 to guide the housing 4 to the top surface of the support body 127. Thus, the housing 4 may be seated on the support body 127 by being inserted into the mounting hole 124 and into the support body through-hole 128 (and may be positioned in a second area).

[57] The housing 4 may include a chamber 41 providing a space in which the drawer 7 is accommodated.

[58] As shown in FIG. 3, the chamber 41 may be defined by a lower surface 412 seated on or supported by the support body 127, first and second side surfaces 413 and 414 arranged at both side edges of the bottom surface, a top surface 411 positioned above the bottom surface by the two side surfaces 413 and 414, and a rear surface 415.

[59] As shown in FIG. 4, the front face of the chamber 41 may be provided as an open face providing a space for the drawer 7 to enter and exit, and the lower surface 412 may be provided with a chamber discharge portion 416 for discharging fluid inside the chamber 41 to an outside of the chamber (such as a tub inlet). To facilitate the discharge of fluid inside the chamber 41 to the outside (to minimize the possibility of any fluid residue), the lower surface 412 may be provided with a slope inclined down toward the chamber discharge portion 416.

[60] The rear surface 415 may be provided with a first water supply port 417, a second water supply port 418, and a third water supply port 419.

[61] The first water supply port 417 may be supplied with water from the first water supply pipe 251a, the second water supply port 418 may be supplied with water from the second water supply pipe 251b, and the third water supply port 419 may be supplied with water from the third water supply pipe 251c.

- [62] The drawer 7 may include a body (drawer body) 71 that provides a space where detergent is stored, the body being inserted into the chamber 41, and a panel (drawer panel) 73 fixed to a front surface of the body 71 and capable of closing the mounting hole 124.
- [63] The body 71 may include a first storage portion 711 in which a first detergent is stored, a second storage portion 712 in which a second detergent is stored, and a third storage portion 713 in which a third detergent is stored. The first detergent may be set as a powder detergent (such as powder laundry detergent) to facilitate the separation of dirt from the laundry, the second detergent may be set as a liquid detergent (such as fabric softener) to add fragrance to the laundry or to protect the fabrics, and the third detergent may be set as a liquid detergent (such as liquid laundry detergent) to facilitate the separation of dirt from the laundry.
- [64] The top surface of the body 71 may be provided with a first inlet 711a connecting to the first storage portion 711, a second inlet 712a connecting to the second storage portion 712, and a third inlet 713a connecting to the third storage portion 713.
- [65] The first storage portion 711 may be supplied with the first detergent and water through the first inlet 711a, the second storage portion 712 may be supplied with the second detergent and water through the second inlet 712a, and the third storage portion 713 may be supplied with the third detergent and water through the third inlet 713a.
- [66] The detergent in the first storage portion 711 may be discharged to the chamber 41 through a first discharge flow path 711b. The detergent in the second storage portion 712 may be discharged to the chamber 41 through the second discharge flow path. The detergent in the third storage portion 713 may be discharged to the chamber 41 through the third discharge flow path.
- [67] The first discharge flow path 711b may include a through-hole formed through the bottom surface or rear surface of the first storage portion 711. The second discharge flow path may be provided as a flow path to discharge liquid inside the second storage portion 712 to the chamber 41 when the water level inside the second storage portion 712 is higher than or equal to a reference water level. The third discharge flow path may be provided as a flow path to discharge liquid inside the third storage portion 713 to the chamber 41 when the water level inside the third storage portion 713 is higher than or a reference water level.
- [68] The flow path defining part 5 is a means fixed inside the chamber 41 to guide water to the inlets 711a, 712a, and 713c of the storage portions.
- [69] As shown in FIG. 5, the flow path defining part 5 may include a flow path body 54 fixed inside the chamber 41 and positioned on top of the body 71, supply flow paths 541 and 542 provided in the flow path body 54 to provide a path for the water to move along, and branch flow paths 51 and 52. The flow path body 54 may be fixed to the

top surface 411 of the chamber, and the flow paths may be positioned between the top surface 411 and the flow path body 54.

[70] The supply flow paths may include a first supply flow path 541 and a second supply flow path 542 supplied with water from the water supply ports 417, 418, and 419.

[71] The first supply flow path 541 may be configured as a flow path to guide water to be supplied to the first storage portion 711 and the third storage portion 713, and the second supply flow path 542 may be configured as a flow path to guide water to be supplied to the second storage portion 712. In this case, the first water supply port 417 and the third water supply port 419 may be configured to deliver water to the first supply flow path 541, and the second water supply port 418 may be configured to deliver water to the second supply flow path 542.

[72] The first supply flow path 541 may be configured to guide water supplied from the water supply ports 417 and 419 in a width direction of the chamber 41 (X-axis direction, orthogonal to the direction in which the drawer is drawn out), and the second supply flow path 542 may be arranged along a depth direction of the chamber 41 (Z-axis direction, orthogonal to the direction in which the drawer is drawn out) to guide water supplied from the second water supply port 418 to the second inlet 712a. Water in the second supply flow path 542 may be supplied to the second inlet 712a via a second supply flow path discharge hole 544.

[73] The first supply flow path 541 may include a groove formed by recessing the rear edge of the flow path body 54 toward the lower surface (bottom surface) 412 of the chamber. The second supply flow path 542 may include a groove formed by recessing the flow path body 54 toward the lower surface 412 of the chamber. The first supply flow path 541 and the second supply flow path 542 are independent flow paths separated from each other by a flow path partition 546.

[74] The top surface 411 of the chamber may define the top surface of the first supply flow path 541, and the rear surface 415 of the chamber may define the rear surface of the first supply flow path 541. The groove formed in the flow path body 54 may define the front surface and bottom surface of the first supply flow path 541, and the first side surface 413 of the chamber and the flow path partition 546 may define both side surfaces of the first supply flow path 541.

[75] As shown in FIG. 6, the branch flow paths may include a first branch flow path 51 guiding the flow from the first supply flow path 541 to the first inlet 711a, and a second branch flow path 52 guiding water in the first supply flow path 541 to the third inlet 713a.

[76] The second branch flow path 52 may include a groove formed by recessing the flow path body 54 toward the lower surface 412 of the chamber. Water introduced into the second branch flow path 52 may be supplied to the third inlet 713a through a second

branch flow path discharge hole 521. The second branch flow path discharge hole 521 may include a plurality of holes formed through the flow path body 54.

- [77] The first branch flow path 51 may include a connecting flow path 511 extending from the first supply flow path 541 toward the first inlet 711a, and a diffusion flow path 515 extending from the connecting flow path 511 and shaped to surround the edge of the first inlet 711a.
- [78] The connecting flow path 511 may be defined by a first defining wall 512, which extends from the first supply flow path 541 toward the center of the first inlet 711a, and a second defining wall 513, which extends from the first supply flow path 541 toward the center of the first inlet 711a and positioned at a point spaced apart from the first defining wall. The connecting flow path 511 may be provided with a connecting flow path discharge hole 514 for discharging water into the first inlet 711a.
- [79] To minimize the amount of water remaining inside the connecting flow path 511, the bottom surface of the connecting flow path 511 may be provided with a slope inclined down toward the center of the first inlet 711a.
- [80] As shown in FIG. 7, the diffusion flow path 515 may be configured to guide water from the outlet of the connecting flow path 511 to the space between the first defining wall 512 and the edge of the first inlet 711a, and to the space between the second defining wall 513 and the edge of the first inlet 711a.
- [81] The diffusion flow path 515 may include a first surface 516 having a shape surrounding the first defining wall 512 and the second defining wall 513 and positioned over the first inlet 711a, and a second surface 518 arranged along an edge of the first surface 516 and positioned over the first inlet 711a. The first surface 516 may be provided with a first diffusion flow path discharge hole 517, and the second side 518 may be provided with a second diffusion flow path discharge hole 519.
- [82] To minimize the amount of water remaining inside the diffusion flow path 515, the second surface 518 may be provided with a slope inclined down toward an edge of the first surface 516. The first surface 516 may be provided as a horizontal surface or as a slope inclined down toward the connecting flow path 511.
- [83] The first branch flow path 51 of the above-described structure may deliver water not only to the center of the first storage portion 711 through the connecting flow path 511, but also from the edge of the first storage portion 711 to the center of the first storage portion 711 through the diffusion flow path 515, thereby minimizing the issue of residual detergent inside the first storage portion 711.
- [84] In the case where the pressure of the water supplied to the first water supply port 417 or the third water supply port 419 is high, the water discharged from the connecting flow path 511 may not be supplied to the entire area of the diffusion flow path 515

and may be directed to the area located on the right side of FIG. 7. This increases the likelihood of detergent remaining in the first storage portion 711.

- [85] To minimize the above-mentioned issue, at least one of the first defining wall 512 and the second defining wall 513 may be configured to supply water inside the connecting flow path 511 to the diffusing flow path 515 in an overflow manner.
- [86] That is, at least one of the spacing between the upper end of the first defining wall 512 and the chamber top surface 411, and the spacing between the upper end of the second defining wall 513 and the chamber top surface 411 may increase toward the center of the first inlet 711a.
- [87] This means that at least one of the upper end of the first forming wall 512 and the upper end of the second forming wall 513 may be inclined down toward the first inlet 711a. FIG. 6 illustrates an example in which the upper ends of the two defining walls 512 and 513 are inclined.
- [88] When the upper ends of the defining walls 512 and 513 are inclined, a space is formed between the upper ends of the defining walls 512 and 513 and the top surface 411 of the chamber. Accordingly, the water moving from the inlet to the outlet of the connecting flow path 511 may move over the defining walls to the diffusion flow path 515. Thus, water concentration in a portion of the space of the diffusion flow path 515 may be minimized.
- [89] Although not shown in the figures, the first branch flow path 51 may be provided with a communication hole for discharging water inside the connecting flow path 511 into the diffuse flow path 515. The communication hole may include a plurality of holes formed through the first defining wall 512 and a plurality of holes formed through the second defining wall 513.
- [90] To facilitate the flow of water inside the first supply flow path 541 into the branch flow paths 51 and 52, the flow path defining part 5 may further include guides 544 and 545.
- [91] The guides may include a first guide 544 protruding from an inlet of the first branch flow path 51 toward an edge of the first supply flow path 541, and a second guide 545 protruding from an inlet of the second branch flow path 52 toward the edge of the first supply flow path 541.
- [92] The detergent supply device D of the above-described structure may minimize the residual detergent in the drawer 7, but it is difficult to minimize the residual detergent in the chamber 41.
- [93] In order to minimize the residual detergent in the chamber 41, the flow path defining part 5 may be further provided with flushing holes 543. As shown in FIG. 7, the flushing holes 543 may include a plurality of grooves or holes provided along the rear edge of the flow path body 54 (in the width direction of the chamber) as a means to

drain water into the space between the rear surface 415 of the chamber and the rear surface of the drawer 7.

- [94] In the case of the detergent supply device D of the above-described structure, water in the first supply flow path 541 or water in the second supply flow path 542 may not be supplied to the inlets 711a, 712a, and 713a of the respective storage portions is likely to leak into the chamber 41. This is because the flow path body 54 is fixed to the top surface 411 of the chamber 41.
- [95] In order to prevent water inside the supply flow paths 541 and 542 from leaking into the chamber 41 through the space formed between the two side surfaces of the flow path body 54 and the two side surfaces 413 and 414 of the chamber, the detergent supply device D may further include a sealing portion 61, 62, 63. The sealing portion may include bonding surfaces that bond the top surface of the flow path body 54 to the top surface 411 of the chamber.
- [96] The sealing portion may include a first bonding portion 61 to prevent leakage of the first supply flow path 541, and a second bonding portion 62 to prevent leakage of the second supply flow path 542.
- [97] The first bonding portion 61 may be provided with a fusion surface extending from the rear surface 415 of the chamber toward the chamber discharge portion 416 along an edge of the first supply flow path 541 and an edge of the first branch flow path 51. The second bonding portion 62 may include a fusion surface extending from the rear surface 415 of the chamber toward the chamber discharge portion 416 along an edge of the second supply flow path 542.
- [98] When the first branch flow path 51 includes the connecting flow path 511 and the diffusion flow path 515, the first bonding portion 61 may extend from the rear surface of the chamber toward the chamber discharge portion along an edge of the first supply flow path 541 and an edge of the diffusion flow path 515, as shown in FIG. 8.
- [99] To prevent water in the first supply flow path 541 from moving to the second supply flow path 542, or water in the second supply flow path 542 from moving to the first supply flow path 541, the sealing portion may further include a third bonding portion 63 extending from the rear surface 415 of the chamber toward the chamber discharge portion 416 to separate the first supply flow path 541 from the second supply flow path 542.
- [100] The first bonding portion 61, the second bonding portion 62, and the third bonding portion 63 may be provided with a fusion surface that fuses the contact points between the flow path body 54 and the housing 4 by heat or ultrasound.
- [101] FIGS. 9 and 10 illustrate an example of a detergent supply device D having the above-described sealing portion. Hereinafter, the operation of the detergent supply device D will be described with reference to the figures.

- [102] As shown in FIG. 9, water supplied into the first water supply port 417 or the third water supply port 419 moves along the first supply flow path 541 in the width direction of the chamber 41, and water supplied from the second water supply port 418 moves to the second storage portion 712 along the second supply flow path 541.
- [103] Since both side surfaces of the flow path body 54 are bonded to the top surface 411 of the chamber by the first bonding portion 61 and the second bonding portion 62, water in the first supply flow path 541 and water in the second supply flow path 542 cannot leak into the chamber 41 through both side surfaces of the flow path body 54.
- [104] Further, since the first supply flow path 541 and the second supply flow path 542 are separated from each other by the flow path partition 546, and the upper end of the flow path partition 546 and the top surface 411 of the chamber are bonded by the third bonding portion 63, water may be prevented from being supplied to an unintended supply flow path.
- [105] Some of the water moving along the first supply flow path 541 is discharged to the rear surface 415 of the chamber through the wash hole 543. Since the water discharged into the chamber 41 through the flushing holes 543 moves along the bottom surface 415 of the chamber, the possibility of detergent remaining on the bottom surface 415 of the chamber may be minimized when the detergent is discharged from the drawer 7.
- [106] As shown in FIG. 10, water in the first supply flow path 541 is supplied to the first storage portion 711 and the third storage portion 713 through the first branch flow path 51 and the second branch flow path 52, respectively.
- [107] The water supplied to the first storage portion 711 will be discharged to the chamber 41 together with detergent through the first discharge flow path 711b, and the water supplied to the third storage portion 713 will be discharged to the chamber 41 713b together with the detergent through the third discharge flow path. The third discharge flow path 713b may include a siphon flow path configured to discharge the detergent and water from the third storage portion 713 into the chamber 41 when the water level in the third storage portion 713 becomes higher than the inlet of the third discharge flow path 713b.
- [108] Water inside the second supply flow path 542 may be supplied to the second storage portion 712 through the second supply flow path discharge hole 544, and water supplied to the second storage portion 712 may be discharged together with detergent into the chamber 41 through the second discharge flow path 712b. The second discharge flow path 712b may include a siphon flow path configured to discharge the detergent and water from the second storage portion 712 into the chamber 41 when the water level inside the second storage portion 712 becomes higher than the inlet of the second discharge flow path 712b.

[109] The above-described detergent supply device and laundry treatment apparatus are merely preferred embodiments, and therefore the scope of the present disclosure is not limited to the above-described embodiments.

Claims

[Claim 1]

A detergent supply device comprising:
a drawer comprising:
a storage portion providing a space to store detergent;
an inlet provided in a top surface of the storage portion to supply the detergent or water to the storage portion; and
an discharge flow path formed through one surface of the storage portion to discharge the detergent or water inside the storage portion to an outside of the storage portion;
a housing comprising:
a chamber allowing the drawer to be withdrawably accommodated therein;
a water supply port provided to supply water to the chamber; and
a chamber discharge portion provided to discharge substances inside the chamber to the outside; and
a flow path defining part comprising:
a flow path body fixed to the housing and positioned at a point higher than the top surface of the storage portion;
a supply flow path provided in the flow path body to guide water supplied from the water supply port in a width direction of the chamber; and
a branch flow path configured to guide the water inside the supply flow path to the inlet,
wherein the branch flow path comprises:
a connecting flow path defined by a first defining wall and a second defining wall, the first defining wall and the second defining wall extending from the supply flow path toward a center of the inlet; and
a diffusion flow path formed in a shape surrounding the first defining wall and the second defining wall.

[Claim 2]

The detergent supply device of claim 1, wherein at least one of the first defining wall or the second defining wall is configured to supply water inside the connecting flow path to the diffusion flow path in an overflow manner.

[Claim 3]

The detergent supply device of claim 2, wherein at least one of an upper end of the first defining wall or an upper end of the second defining wall is inclined down toward the center of the inlet.

- [Claim 4] The detergent supply device of claim 2, wherein the connecting flow path is inclined down toward the center of the inlet.
- [Claim 5] The detergent supply device of claim 1, further comprising:
a guide configured to guide the water inside the supply flow path into the connecting flow path.
- [Claim 6] The detergent supply device of claim 1, wherein the diffusion flow path comprises:
a first surface formed in a shape surrounding the first defining wall and the second defining wall and positioned above the inlet;
a first diffusion flow path discharge hole formed through the first surface in a penetrating manner;
a second surface arranged along an edge of the first surface and positioned above the inlet, the second surface being inclined down toward the edge of the first surface; and
a second diffusion flow path discharge hole formed through the second surface in a penetrating manner.
- [Claim 7] The detergent supply device of claim 6, wherein the first surface is a horizontal surface.
- [Claim 8] The detergent supply device of claim 6, wherein the first surface is provided with a slope inclined down toward an edge of the connecting flow path.
- [Claim 9] The detergent supply device of claim 1, further comprising:
a plurality of flushing holes arranged along the width direction of the chamber to discharge the water inside the supply flow path into a space between a rear surface of the chamber and a rear surface of the drawer.
- [Claim 10] The detergent supply device of claim 1, wherein the storage portion comprises:
a first storage portion configured to store a first detergent; and
a second storage portion configured to store a second detergent, wherein the inlet comprises:
a first inlet provided in a top surface of the first storage portion;
and
a second inlet provided in a top surface of the second storage portion,
wherein the discharge flow path comprises:
a first discharge flow path provided in a rear surface or a bottom surface of the first storage portion; and

a second discharge flow path configured to discharge liquid inside the second storage portion when a water level inside the second storage portion is above a reference water level, and

wherein the branch flow path comprises:

a first branch flow path arranged to guide the water inside the supply flow path to the first inlet; and

a second branch flow path arranged to guide the water inside the supply flow path to the second inlet.

[Claim 11]

The detergent supply device of claim 10, further comprising:

a first guide protruding from an inlet of the first branch flow path toward an edge of the supply flow path to guide the water being along the supply flow path into the first branch flow path; and

a second guide protruding from an inlet of the second branch flow path toward the edge of the supply flow path to guide the water moving along the supply flow path into the second branch flow path.

[Claim 12]

A laundry treatment apparatus comprising:

a tub providing a space to store water;

a drum rotatably disposed in the tub to store laundry;

a drawer comprising:

a storage portion providing a space to store detergent;

an inlet provided in a top surface of the storage portion to supply the detergent or water to the storage portion; and

an discharge flow path formed through one surface of the storage portion to discharge the detergent or water inside the storage portion to an outside of the storage portion;

a housing comprising:

a chamber allowing the drawer to be withdrawably accommodated therein;

a water supply port provided to supply water to the chamber; and

a chamber discharge portion provided to discharge substances inside the chamber to the tub;

a flow path defining part comprising:

a flow path body fixed to the housing and positioned at a point higher than the top surface of the storage portion;

a supply flow path provided in the flow path body to guide water supplied from the water supply port in a width direction of the chamber; and

a branch flow path configured to guide the water inside the supply flow path to the inlet;

wherein the branch flow path comprises:

a connecting flow path defined by a first defining wall and a second defining wall, the first defining wall and the second defining wall extending from the supply flow path toward a center of the inlet; and

a diffusion flow path formed in a shape surrounding the first defining wall and the second defining wall.

[Claim 13]

The laundry treatment apparatus of claim 12, wherein at least one of the first defining wall or the second defining wall is configured to supply water inside the connecting flow path to the diffusion flow path in an overflow manner.

[Claim 14]

The laundry treatment apparatus of claim 13, wherein at least one of an upper end of the first defining wall or an upper end of the second defining wall is inclined down toward the center of the inlet.

[Claim 15]

The laundry treatment apparatus of claim 12, wherein the diffusion flow path comprises:

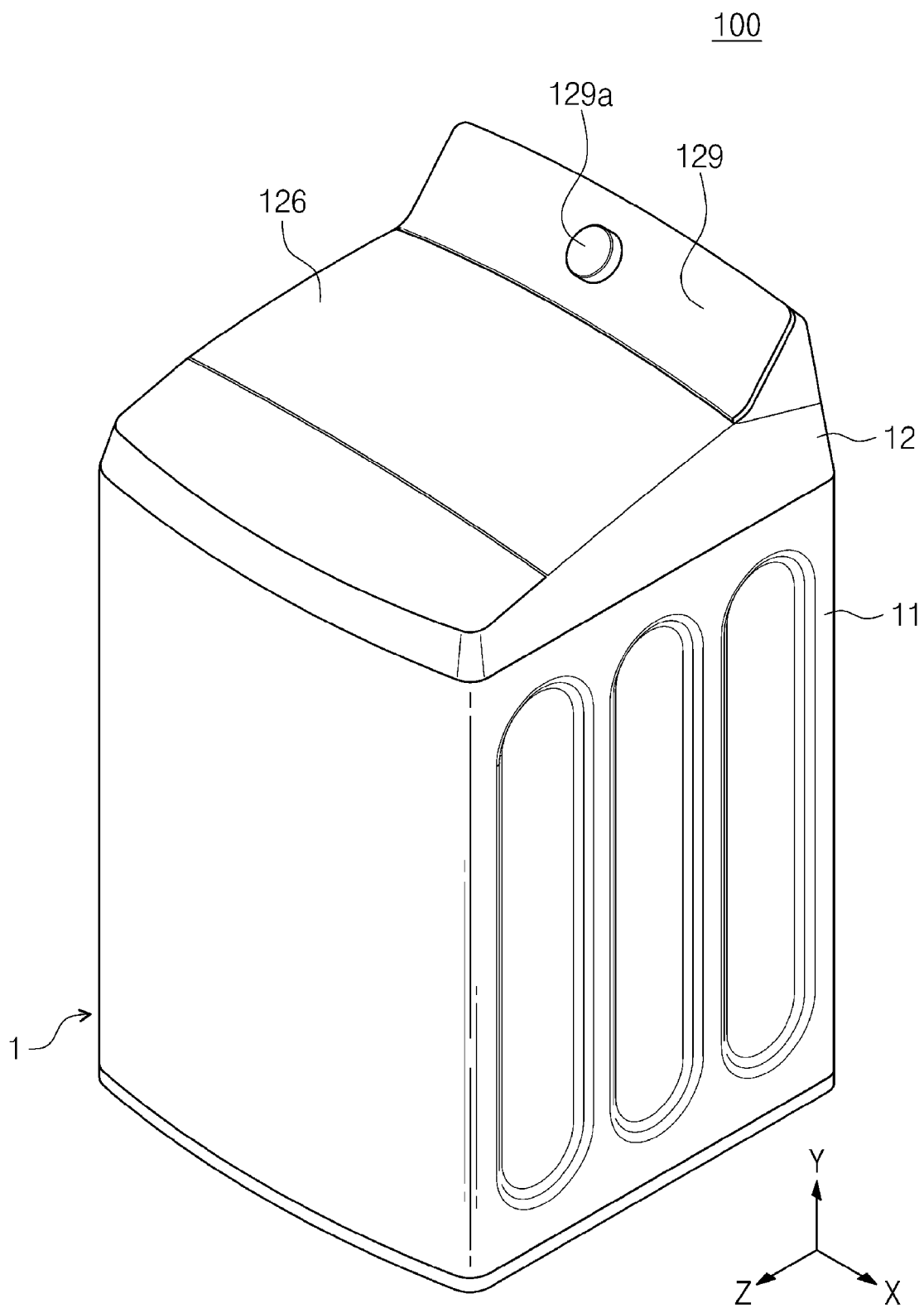
a first surface formed in a shape surrounding the first defining wall and the second defining wall and positioned above the inlet;

a first diffusion flow path discharge hole formed through the first surface in a penetrating manner;

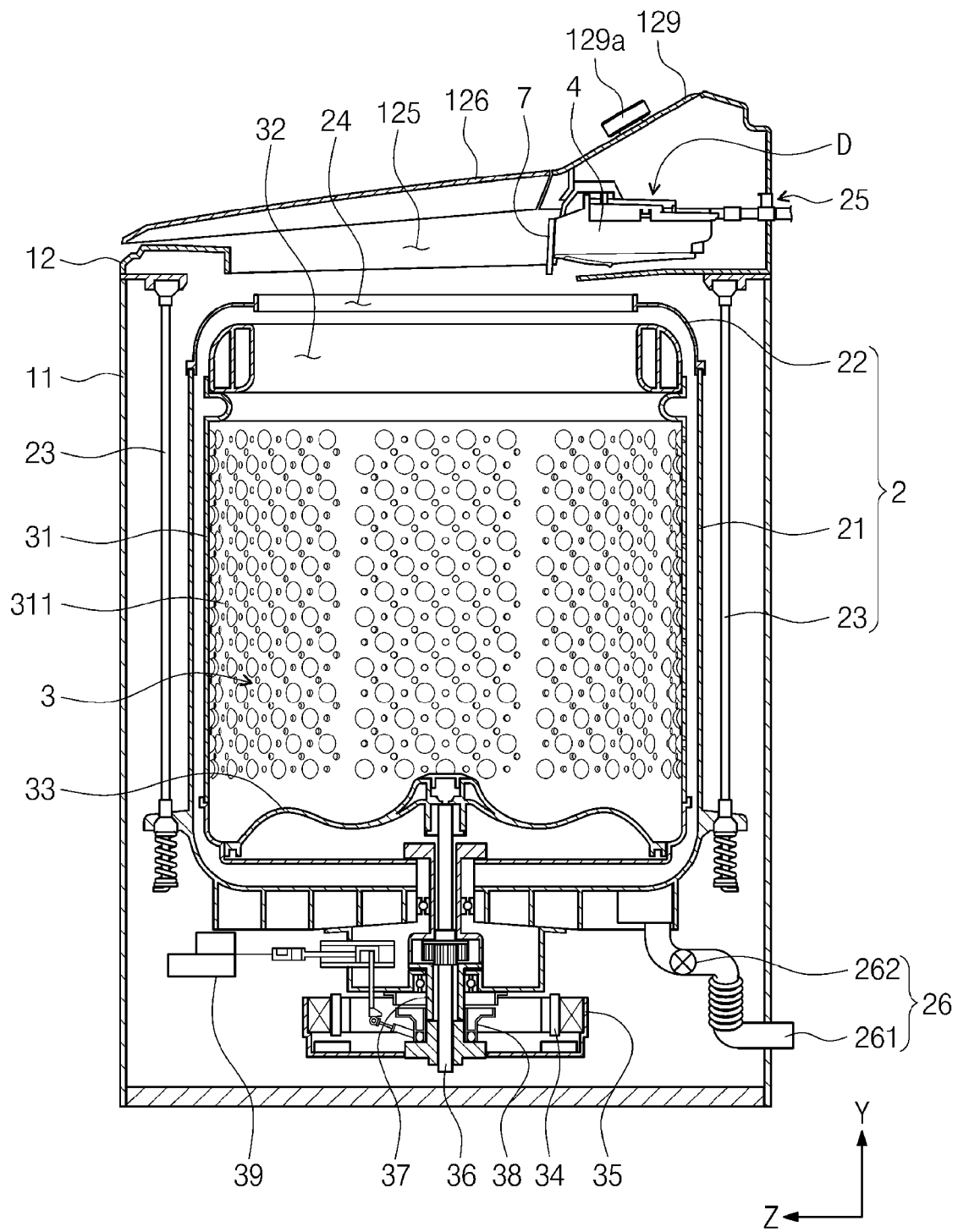
a second surface arranged along an edge of the first surface and positioned above the inlet, the second surface being inclined down toward the edge of the first surface; and

a second diffusion flow path discharge hole formed through the second surface in a penetrating manner.

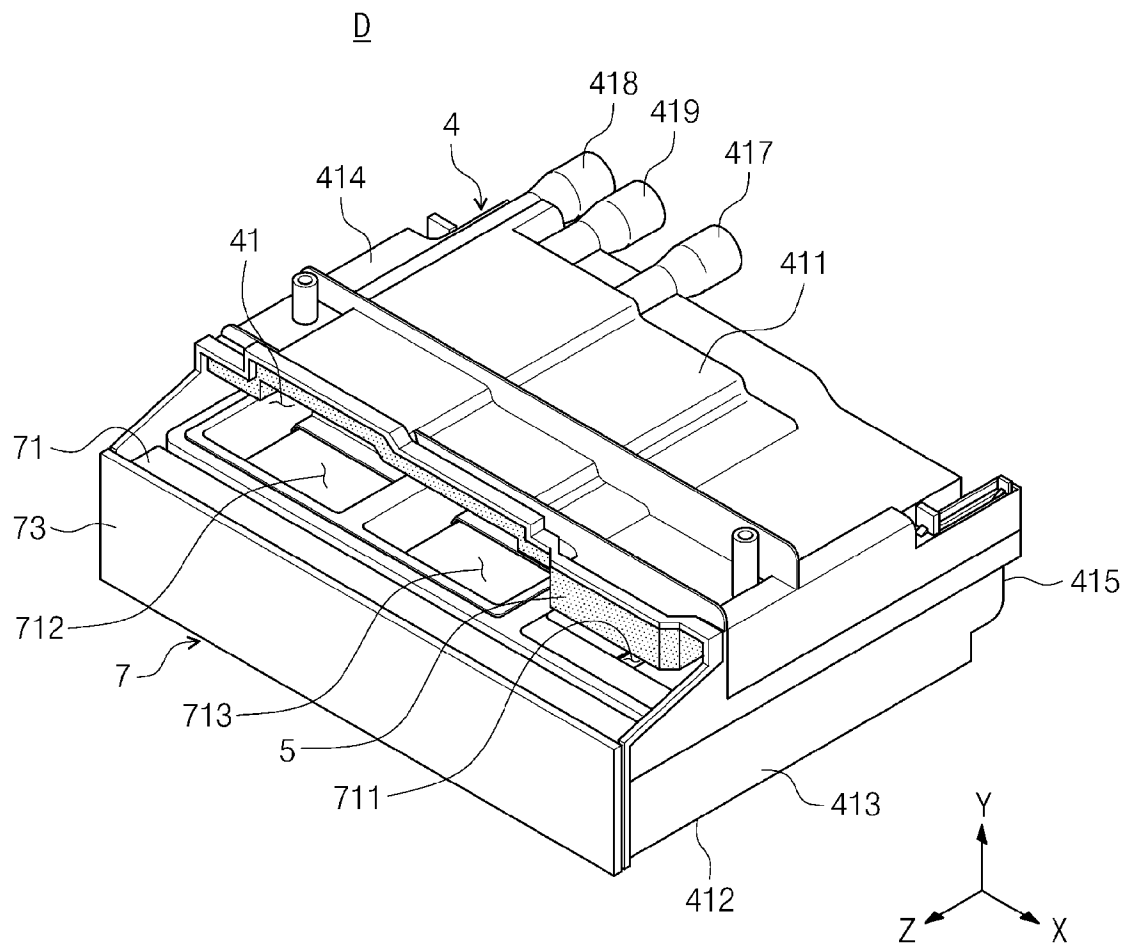
[Fig. 1]



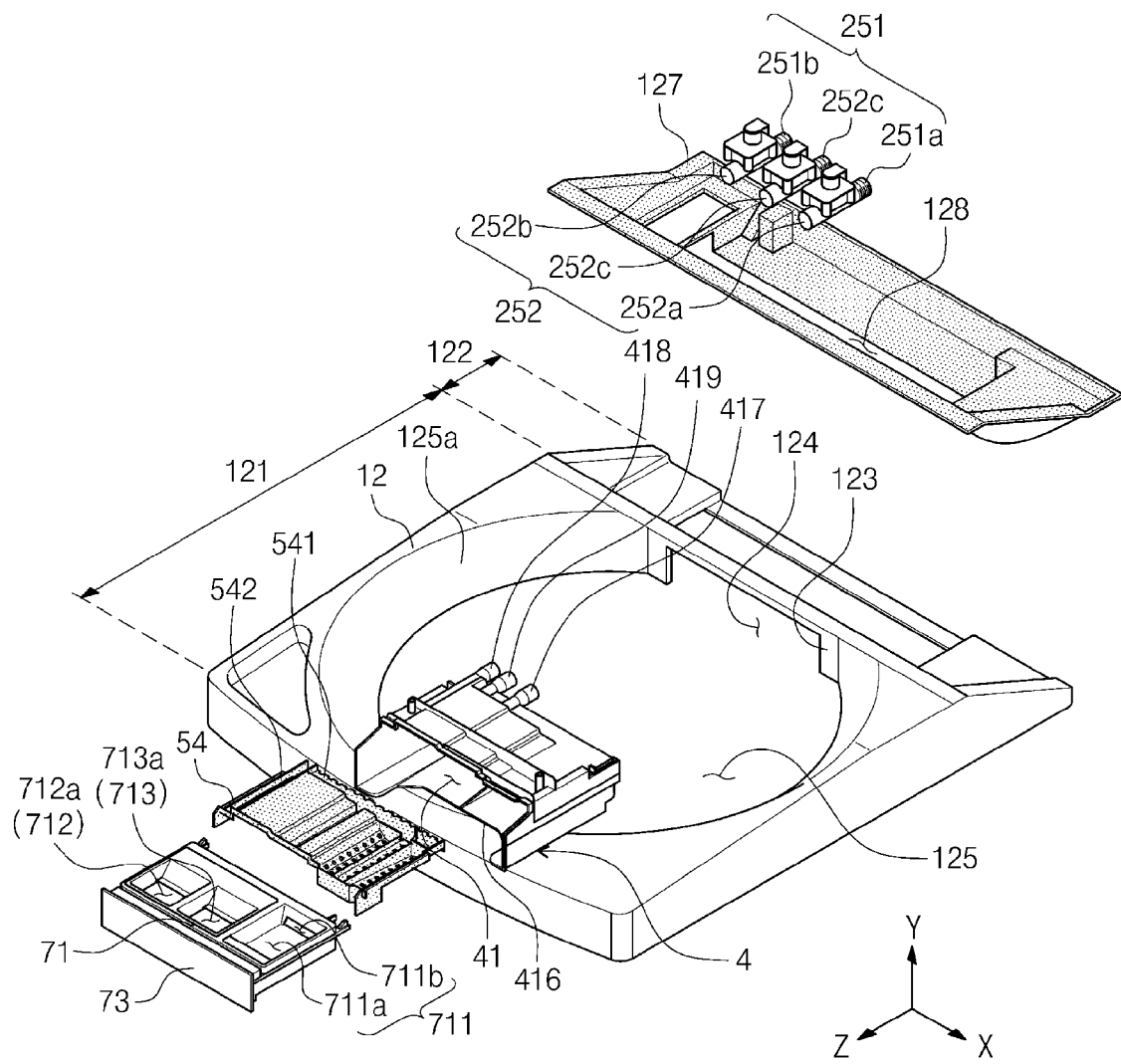
[Fig. 2]



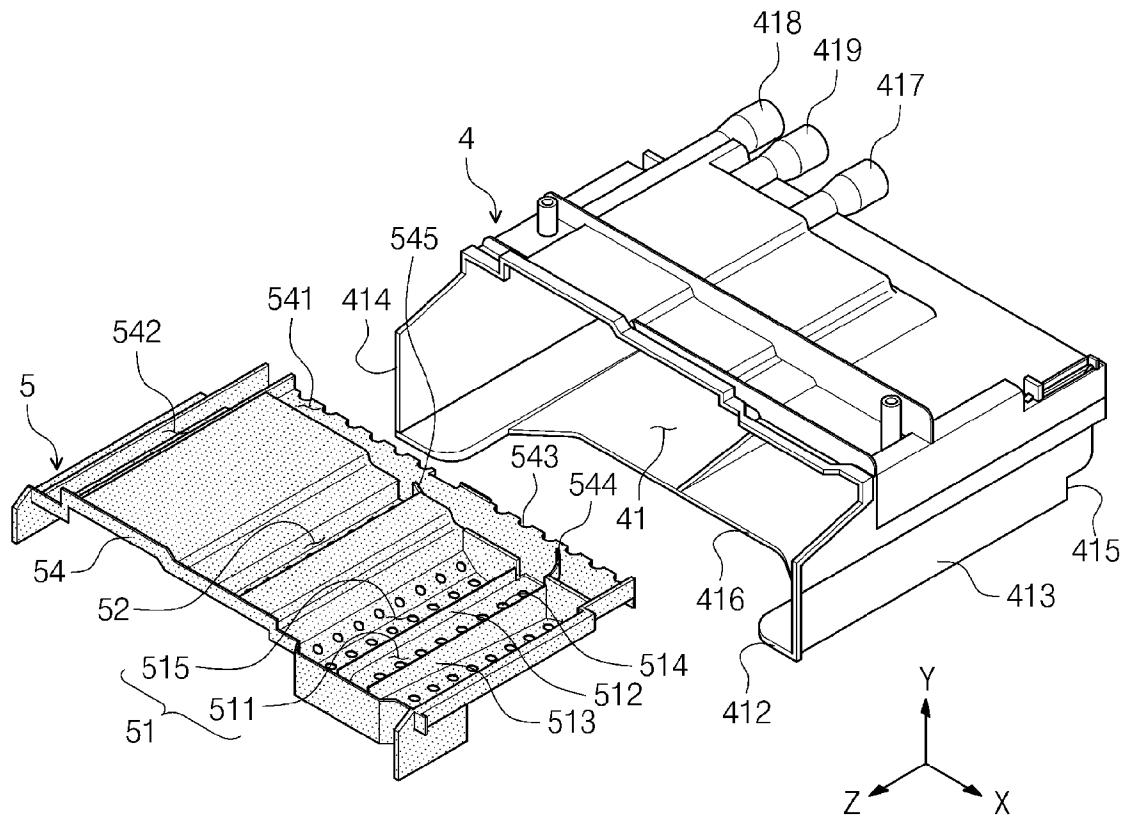
[Fig. 3]



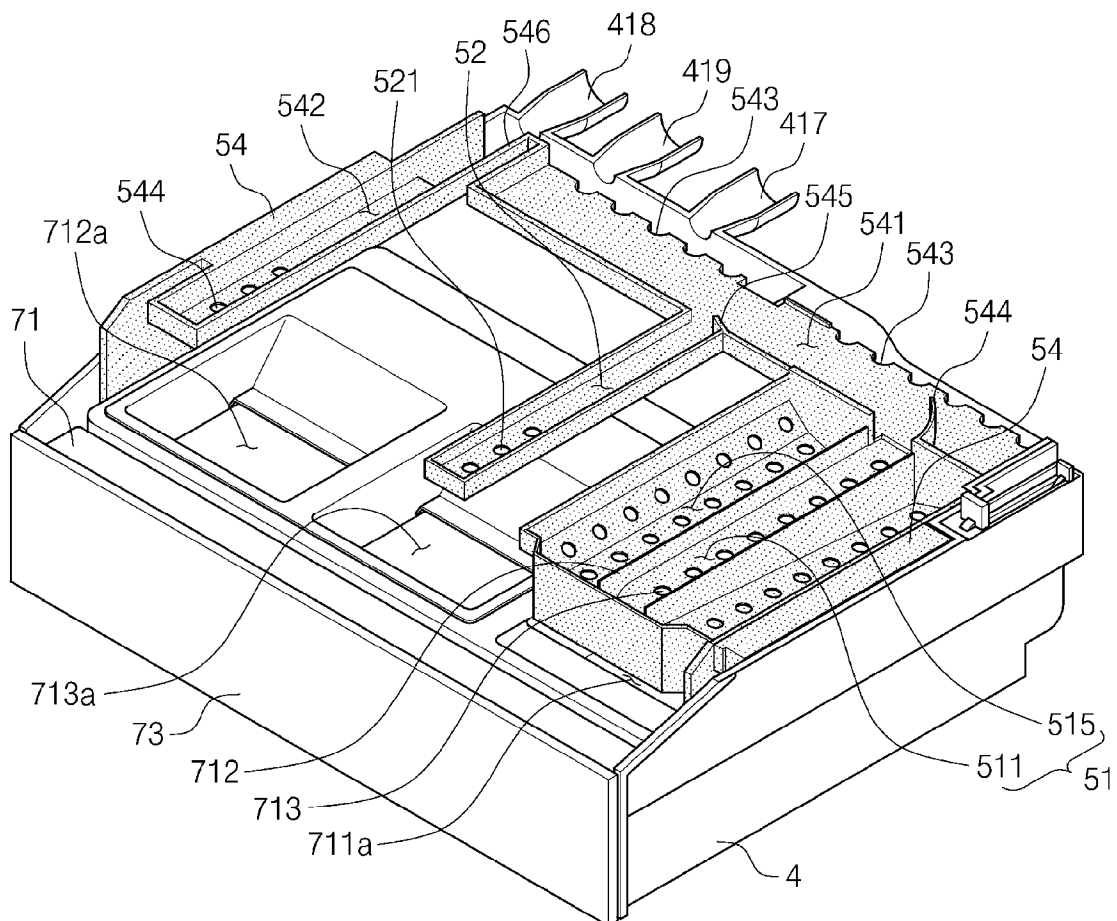
[Fig. 4]



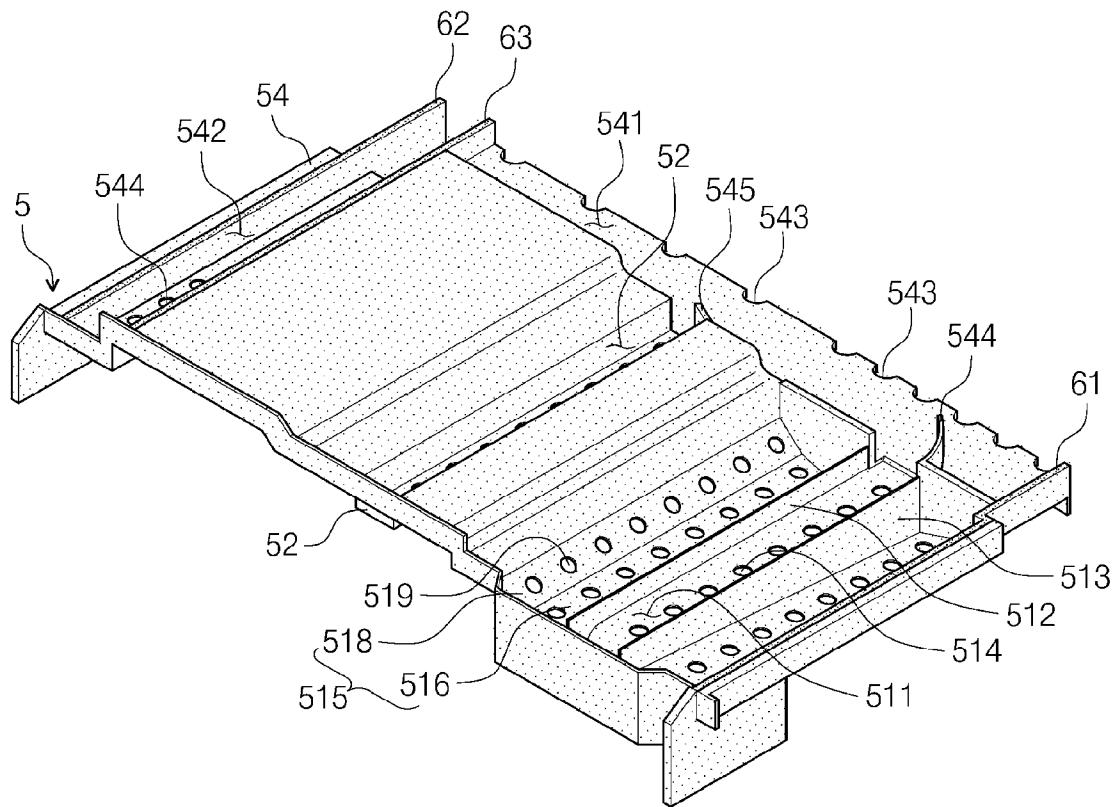
[Fig. 5]



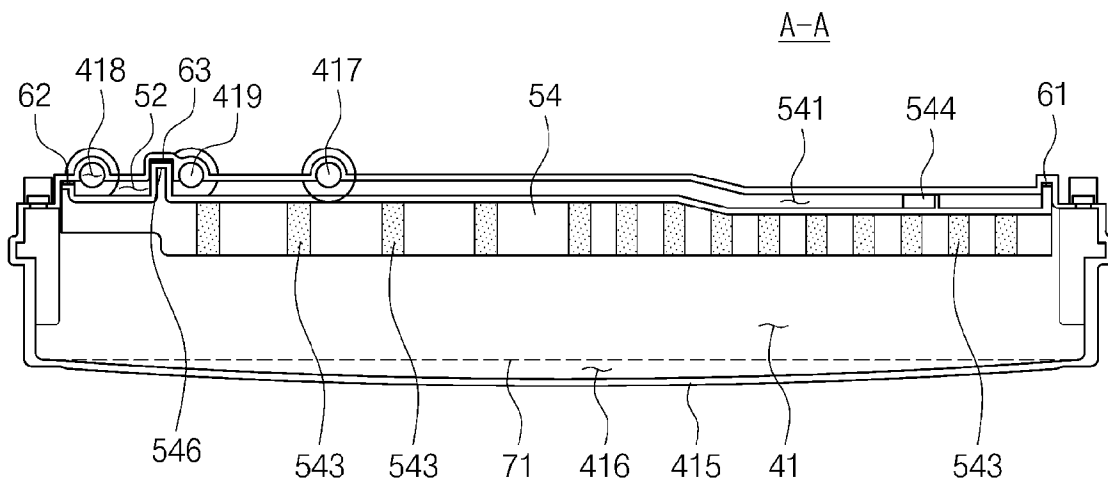
[Fig. 6]



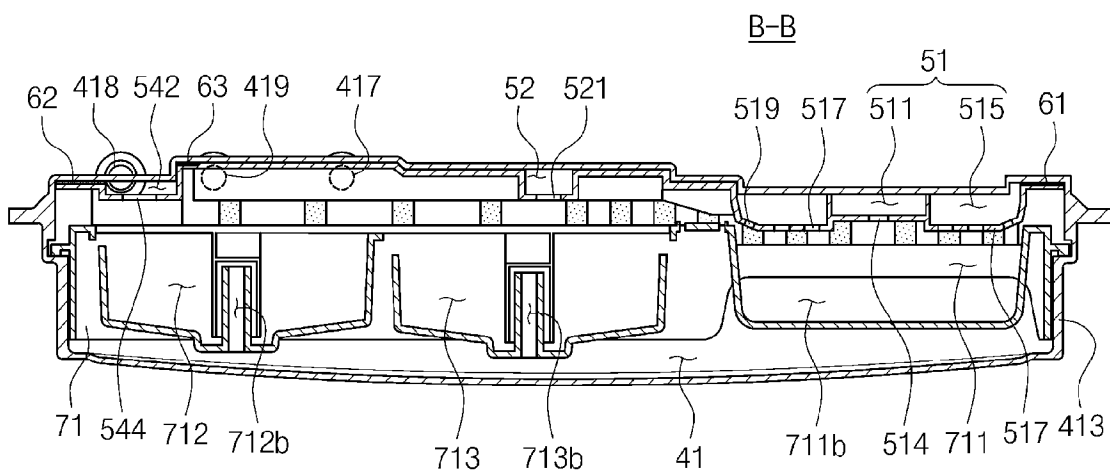
[Fig. 8]



[Fig. 9]



[Fig. 10]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/006761

A. CLASSIFICATION OF SUBJECT MATTER D06F 39/02(2006.01)i; D06F 37/12(2006.01)i; D06F 39/08(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) D06F 39/02(2006.01); D06F 33/37(2020.01); D06F 39/08(2006.01) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models Japanese utility models and applications for utility models Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: laundry, detergent, flow path, drawer, and overflow		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	US 2018-0355543 A1 (ELECTROLUX APPLIANCES AKTIEBOLAG) 13 December 2018 (2018-12-13) paragraphs [0074]-[0198] and figures 1-7, 12-12A, 14	1-15
Y	US 2004-0172770 A1 (HEO, SEONG EUN et al.) 09 September 2004 (2004-09-09) paragraphs [0031]-[0048] and figures 2-4	4,6-9,15
A	KR 10-2013-0125199 A (LG ELECTRONICS INC.) 18 November 2013 (2013-11-18) paragraphs [0019]-[0065] and figures 1-8	1-15
A	US 2021-0254253 A1 (HAIER US APPLIANCE SOLUTIONS, INC.) 19 August 2021 (2021-08-19) paragraphs [0034]-[0111] and figures 1-21	1-15
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: “A” document defining the general state of the art which is not considered to be of particular relevance “D” document cited by the applicant in the international application “E” earlier application or patent but published on or after the international filing date “L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) “O” document referring to an oral disclosure, use, exhibition or other means “P” document published prior to the international filing date but later than the priority date claimed “T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone “Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art “&” document member of the same patent family		
Date of the actual completion of the international search 13 September 2024		Date of mailing of the international search report 19 September 2024
Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon 35208, Republic of Korea Facsimile No. +82-42-481-8578		Authorized officer LEE, Eon Su Telephone No. +82-42-481-8539

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Information on patent family members

International application No.

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