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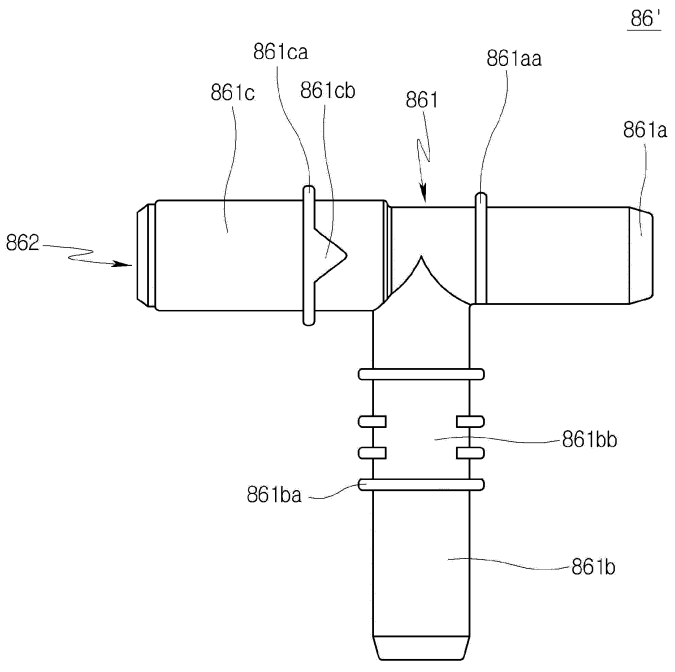
(54) LAUNDRY TREATING APPARATUS

(57) The present disclosure relates to a laundry dryer. The laundry treating apparatus includes a water supply connector (86,86') for connecting an internal water supply pipe (83), a direct water pipe (84), and a water supply inlet pipe (85) with each other. The water supply connector (86,86') may include a connector main body (861) and a connector backflow-preventing valve (862) that is coupled into the connector main body (861) to prevent water from flowing back toward an water supply assembly, thereby preventing the water from flowing back to a water source and improving assembleability by mounting a check valve by only assembling a connector with a pipe.

【FIG 7】



EP 3 896 215 A1

Description

BACKGROUND

Field

[0001] The present disclosure relates to a laundry dryer, and more particularly, to a laundry treating apparatus that sprays high-temperature steam into a drum using a steam generating assembly.

Discussion of the Related Art

[0002] In recent years, laundry treating apparatuses that perform a drying process capable of removing moisture from laundry have appeared. A conventional laundry treating apparatus may not only drastically shorten a drying time of the laundry by supplying hot air to a drum that accommodates the laundry therein to dry the laundry, but also sterilize and disinfect the laundry.

[0003] In one example, the laundry treating apparatuses that perform the drying process also include a conventional laundry treating apparatus that supplies steam to the laundry to remove wrinkles from the laundry, improve a drying efficiency, perform the sterilization, and the like.

[0004] Korean Patent No. 10-1435823 discloses a laundry treating apparatus that supplies the steam to the laundry and then dries the laundry.

[0005] A water supply connector that connects an external water source, a water supply container, and a steam generator is disclosed in the conventional laundry treating apparatus.

[0006] However, when a negative pressure is simply generated in the external water source including waterworks and the like or a reverse osmosis pressure by direct water is generated, there is a limit that water in the water supply container or water in the steam generator may flow backward and contaminate water.

SUMMARY

[0007] The present disclosure is to ameliorate the problems of the conventional laundry treating apparatus as described above, and a purpose thereof is to provide a laundry treating apparatus that prevents backflow of water so as not to contaminate an external water source.

[0008] In order to achieve the purpose as described above, a laundry treating apparatus according to the present disclosure may include a drum rotatably installed inside a cabinet forming an appearance of the laundry treating apparatus to accommodate an object to be dried therein, a duct assembly constructed to re-supply air discharged from the drum to the drum, a circulating fan for providing a flow force to the air flowing along the duct assembly, a heat exchanger assembly disposed on the duct assembly to exchange heat with the air circulating along the duct assembly, a steam generating assembly including a steam generator for generating steam, wherein the steam generating assembly supplies the steam into the drum, and a water supply assembly including an internal water supply assembly and an external water supply assembly, wherein the water supply assembly supplies water for generating the steam to the steam generating assembly.

[0009] The water supply assembly may include an internal water supply pipe connected to the internal water supply assembly to supply water in the internal water supply assembly to the steam generator, a direct water pipe connected to the external water supply assembly to supply water in the external water supply assembly to the steam generator, a water supply inlet pipe connected to the steam generator, wherein the water in the internal water supply assembly or the water in the external water supply assembly flows into the water supply inlet pipe, a water supply connector for connecting the internal water supply pipe, the direct water pipe, and the water supply inlet pipe with each other, and a check valve assembly including at least one check valve installed on the direct water pipe or the internal water supply pipe to prevent water in the steam generator from flowing back.

[0010] The check valve assembly may include a connecting holder for connecting two pipes with each other, and a check valve inserted into and coupled to the connecting holder.

[0011] The connecting holder may include a holder main body formed in a cylindrical shape such that both ends in an axial direction thereof are respectively inserted into pipes, and a guide protrusion protruding from an outer circumferential face of the holder main body to guide assembly direction and position.

[0012] The check valve assembly may include a first direct water check valve installed on the direct water pipe to prevent the water from flowing back toward the external water supply assembly, and a second direct water check valve disposed between the first direct water check valve and the water supply connector.

[0013] In order to achieve the purpose as described above, a laundry treating apparatus according to another embodiment of the present disclosure may include a drum rotatably installed inside a cabinet forming an appearance of the laundry treating apparatus to accommodate an object to be dried therein, a duct assembly constructed to re-supply air discharged from the drum to the drum, a circulating fan for providing a flow force to the air flowing along the duct assembly, a heat exchanger assembly disposed on the duct assembly to exchange heat with the air circulating along the duct assembly, a steam generating assembly including a steam generator for generating steam, wherein the steam generating assembly supplies the steam into the drum, and a water supply assembly including an internal water supply assembly and an external water supply assembly, wherein the water supply assembly supplies water to the steam generating assembly. The water supply assembly may include an internal water supply pipe connected to the

internal water supply assembly to supply water in the internal water supply assembly to the steam generator, a direct water pipe connected to the external water supply assembly to supply water in the external water supply assembly to the steam generator, a water supply inlet pipe connected to the steam generator, wherein the water in the internal water supply assembly or the water in the external water supply assembly flows into the water supply inlet pipe, and a water supply connector for connecting the internal water supply pipe, the direct water pipe, and the water supply inlet pipe with each other. The water supply connector may include a connector main body having a flow channel defined therein for communicating the internal water supply pipe, the direct water pipe, and the water supply inlet pipe with each other, and a connector backflow-preventing valve coupled into the connector main body to prevent backflow of water toward the external water supply assembly.

[0014] The connector main body may include an outlet coupled to the water supply inlet pipe, wherein the outlet discharges the water introduced from the internal water supply assembly or the external water supply assembly to the water supply inlet pipe, an internal water supply inlet connected to the outlet and coupled to the internal water supply pipe, wherein the water in the internal water supply assembly is introduced into the internal water supply, and a direct water inlet connected to the outlet and coupled to the direct water pipe, wherein the water in the direct water pipe is introduced into the direct water inlet.

[0015] The connector backflow-preventing valve may be inserted into and coupled to the direct water inlet.

[0016] The direct water inlet may be formed to have an inner diameter larger than an inner diameter of the outlet.

[0017] The direct water inlet may be formed to have an outer diameter larger than an outer diameter of the outlet.

[0018] The direct water inlet may include a guide protrusion protruding from an outer circumferential face of the direct water inlet to guide an insertion position of the connector backflow-preventing valve.

[0019] The direct water inlet may further include a direction indicating protrusion connected to a face in an axial direction of the guide protrusion and protruding in a triangular column shape to indicate an assembly direction.

[0020] The connector backflow-preventing valve may include a valve body formed in a cylindrical shape to be inserted into and coupled to the direct water inlet, and a valve outlet extending at one end in the axial direction of the valve body such that a diameter thereof is reduced, wherein the valve outlet is disposed inside the connector main body to discharge the water introduced from the direct water pipe, wherein the valve outlet blocks flow of the water introduced from the internal water supply pipe or the water supply inlet pipe.

[0021] The connector backflow-preventing valve may further include a coupling support hook extending radially outward from the other end in the axial direction of the valve body and supported on the connector main body.

[0022] The connector backflow-preventing valve may further include a coupling protrusion protruding along a circumferential direction on an outer circumferential face of the valve body and in contact with an inner circumferential face of the connector main body.

[0023] The water supply assembly may further include a direct water check valve installed on the direct water pipe to prevent the water from flowing back toward the external water supply assembly.

[0024] The water supply assembly may further include an internal water supply check valve installed in the internal water supply pipe to prevent water from flowing back toward the internal water supply assembly.

[0025] A size of an inner diameter of the valve body may correspond to a size of an inner diameter of the outlet.

[0026] As described above, according to the laundry treating apparatus according to the present disclosure, there is an effect of preventing the water from flowing backward toward the water source by having the check valve inside the connector.

[0027] In addition, because the check valve may be mounted only by inserting and coupling the check valve into the connector and assembling the connector with the pipe, there is an effect of improving the assemblability.

[0028] In addition, there is an effect of mounting the check valve by only replacing the connector on the existing pipe.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

FIG. 1 is a view for illustrating an appearance of a laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 2 is a cross-sectional view illustrating an internal structure of a laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 3 is a view for illustrating pipe structures of a water supply assembly and a steam generating assembly in a laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 4 is a view for illustrating a check valve in a laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 5 is a cross-sectional view of FIG. 4.

FIG. 6 is a view for illustrating pipe structures of a water supply assembly and a steam generating assembly in a laundry treating apparatus according to another embodiment of the present disclosure.

FIG. 7 is a view illustrating a water supply connector in a laundry treating apparatus according to another embodiment of the present disclosure.

FIG. 8 is a cross-sectional view of FIG. 7.

FIG. 9 is a perspective view illustrating a structure of a connector backflow-preventing valve in a laundry treating apparatus according to another embodiment of the present disclosure.

DESCRIPTION OF SPECIFIC EMBODIMENTS

[0030] Hereinafter, a preferred embodiment of the present disclosure will be described in detail with reference to the accompanying drawings.

[0031] Various modifications and various embodiments may be made to the present disclosure. Thus, specific embodiments will be illustrated in the drawings and described in detail in the detailed description. This is not intended to limit the present disclosure to a specific embodiment, and should be construed as including all changes, equivalents, or substitutes included in the spirit and scope of the present disclosure.

[0032] In describing the present disclosure, terms such as "first", "second", and the like may be used to describe various components, but the components may not be limited by the terms. These terms are only for the purpose of distinguishing one component from another component. For example, without departing from the scope of the present disclosure rights, a first component may be referred to as a second component, and similarly, a second component may be referred to as a first component.

[0033] The term 'and/or' includes a combination of a plurality of listed items or any of the plurality of listed items.

[0034] It will be understood that when a component is referred to as being "connected with" another component, the component can be directly connected with the other component or intervening components may also be present. In contrast, when a component is referred to as being "directly connected with" another component, there are no intervening components present.

[0035] The terminology used in the present disclosure is used only to describe specific embodiments, not intended to limit the present disclosure. A singular representation may include a plural representation unless it represents a definitely different meaning from the context.

[0036] It should be understood that the terms 'comprises', 'comprising', 'includes', and 'including' when used herein, specify the presence of the features, numbers, steps, operations, components, parts, or combinations thereof described herein, but do not preclude the presence or addition of one or more other features, numbers, steps, operations, components, or combinations thereof.

[0037] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0038] In addition, the following embodiment is provided for a more complete description to those with average knowledge in the art, and the shapes and sizes of elements in the drawings may be exaggerated for clearer description.

[0039] FIG. 1 is a view for illustrating an appearance of a laundry treating apparatus according to an embodiment of the present disclosure, and FIG. 2 is a cross-sectional view illustrating an internal structure of a laundry treating apparatus according to an embodiment of the present disclosure.

[0040] As shown in FIGS. 1 and 2, a cabinet 10 that forms an appearance of a laundry treating apparatus 1 includes a front panel 11 constituting a front face, a rear panel 12 constituting a rear face, a pair of side panels 14 respectively constituting side faces, and a top panel 13 constituting a top face of the laundry treating apparatus 1.

[0041] The front panel 11 may include a laundry inlet 111 defined therein to communicate with a drum 20 to be described later, and a door 112 pivotably coupled to the cabinet 10 to open and close the laundry inlet 111.

[0042] A control panel 117 is disposed on the front panel 11.

[0043] An input unit 118 that receives a control command from a user, a display 119 that outputs information such as a control command or the like selectable by the user, and a main controller (not shown) that controls a command for performing a process of the laundry treating apparatus 1 may be installed on the control panel 117.

[0044] In one example, the input unit 118 may include a power supply request unit that requests power supply to the laundry dryer, a course input unit that enables the user to select a desired course among a number of courses, an execution request unit that requests start of the course selected by the user, and the like.

[0045] The display 119 may include at least one of a display panel capable of outputting characters and/or figures, and a speaker capable of outputting audio signals and sounds. The user may easily identify a status of a currently performed process, a remaining time, and the like through the information output through the display 119.

[0046] The drum 20 that is rotatably disposed and provides a space therein in which laundry (an object to be dried) is accommodated, a duct assembly 30 that defines a flow channel for re-supplying air discharged from the drum 20 to the drum 20, and a heat exchanger assembly 40 that dehumidifies and heats the air introduced into the duct assembly 30 and then re-supplies the dehumidified air to the drum 20 may be arranged inside the cabinet 10.

[0047] The drum 20 includes a cylindrical drum body 21 with an open front face. A first support 22 that rotatably supports a front face of the drum body 21 and a second support 23 that rotatably supports a rear face of the drum body 21 may be arranged inside the cabinet 10.

[0048] The first support 22 may include a first fixed

body 22a fixed inside the cabinet 10, a drum laundry inlet 22b that is disposed to penetrate the first fixed body 22a to communicate the laundry inlet 111 with an interior of the drum body 21, and a first support body 22c disposed on the first fixed body 22a and inserted into the front face of the drum body 21.

[0049] The first support 22 may further include a connecting body 22d that connects the laundry inlet 111 with the drum laundry inlet 22b. As shown, the connecting body 22d may be formed in a pipe shape extending from the drum laundry inlet 22b toward the laundry inlet 111. In addition, an air outlet 22e that communicates with the duct assembly 30 may be formed in the connecting body 22d.

[0050] As shown in FIG. 2, the air outlet 22e, which is a passage that allows the air inside the drum body 21 to flow to the duct assembly 30, may be defined as a through-hole penetrating the connecting body 22d.

[0051] The second support 23 includes a second fixed body 23a fixed inside the cabinet 10 and a second support body 23b disposed on the second fixed body 23a and inserted into the rear face of the drum body 21.

[0052] The second support 23 further includes an air inlet 23c defined to penetrate the second fixed body 23a and communicating the interior of the drum body 21 with an interior of the cabinet 10.

[0053] In this case, the duct assembly 30 is constructed to connect the air outlet 22e with the air inlet 23c.

[0054] The cylindrical drum body 21 may be rotated through a driver 50 of various shapes.

[0055] For example, FIG. 2 illustrates an embodiment in which the driver 50 includes a drum motor 51 fixed inside the cabinet 10, a pulley 52 rotated by the drum motor 51, and a belt 53 that connects a circumferential face of the pulley 52 with a circumferential face of the drum body 21.

[0056] In this case, the first support 22 may further include a first roller R1 that rotatably supports the circumferential face of the drum body 21, and the second support 23 may further include a second roller R2 that rotatably supports the circumferential face of the drum body 21.

[0057] However, the present disclosure is not limited thereto. A direct drive type driver in which the drum motor 51 is directly connected to the drum to rotate the drum without using the pulley and the belt may also be applied to the present disclosure, which is obviously within the scope of the present disclosure. For convenience, the following description will be made based on the illustrated embodiment of the driver 50.

[0058] The duct assembly 30 includes an exhaust duct 31 connected to the air outlet 22e, a supply duct 32 connected to the air inlet 23c, and a connecting duct 33 that connects the exhaust duct 31 with the supply duct 32 and includes the heat exchanger assembly 40 installed therein.

[0059] The exhaust duct 31 may communicate with the front face of the drum 20, and the supply duct 32 may communicate with a rear face of the drum 20.

[0060] The heat exchanger assembly 40 may be implemented as various apparatuses capable of sequentially performing dehumidification and heating of the air introduced into the duct assembly 30. For example, the heat exchanger assembly 40 may be implemented as a heat pump system.

[0061] As a heat pump system scheme, the heat exchanger assembly 40 may include a circulating fan 43 that flows the air along the duct assembly 30, a first heat exchanger (a heat absorber) 41 that performs a dehumidification function by lowering humidity of the air introduced into the duct assembly 30, and a second heat exchanger (a heater) 42 disposed inside the duct assembly 30 to heat the air that has passed through the first heat exchanger 41.

[0062] The circulating fan 43 is constructed to include an impeller 43a disposed in the duct assembly 30 and an impeller motor 43b that rotates the impeller 43a, and provides a flow force to the air flowing along the duct assembly 30.

[0063] The impeller 43a may be installed at any position in the exhaust duct 31, the connecting duct 33, and the supply duct 32. FIG. 2 illustrates an embodiment in which the impeller 43a is disposed in the connecting duct 33. The present disclosure is not limited thereto, but for convenience, the description will be made with the embodiment in which the impeller 43a is disposed in the connecting duct 33.

[0064] The heat exchanger assembly 40 may perform heat exchange with the air circulating along the duct assembly 30.

[0065] The heat absorber 41 and the heater 42 are sequentially arranged inside the connecting duct 33 along a direction from the exhaust duct 31 to the supply duct 32, and are connected to each other through a refrigerant pipe 44 that defines therein a circulation flow path of a refrigerant.

[0066] The heat absorber 41 is means for cooling the air and evaporating the refrigerant by transferring heat of the air introduced into the exhaust duct 31 to the refrigerant.

[0067] The heater 42 is means for heating the air and condensing the refrigerant by transferring heat of the refrigerant that has passed through the compressor 45 to the air.

[0068] The compressor 45 compresses the refrigerant that is heat-exchanged with the air circulating along the duct assembly 30 by receiving a rotational force by the compressor motor 45a.

[0069] In this case, when passing through the heat absorber 41, moisture contained in the air flows along a surface of the heat absorber 41 and be collected on a bottom face of the connecting duct 33.

[0070] As described above, a configuration already known in the art may be applied to the configuration of the heat exchanger assembly 40 of the heat pump system scheme including the heat absorber 41 and the heater

42, and a detailed description of such configuration will be omitted.

[0071] In one example, in order to collect condensate water that has been condensed from the air passing through the heat absorber 41 and collected on a bottom face of the connecting duct 33, the laundry treating apparatus 1 according to the present disclosure further includes a water collector 60.

[0072] The condensate water condensed in the heat absorber 41 may be firstly collected in the water collector 60 and then secondarily collected in a water storage 70. The water collector 60 may be located inside the connecting duct 33 as shown or may be separately disposed in a space spaced apart from the connecting duct 33.

[0073] The condensate water firstly collected through the water collector 60 is supplied to the water storage 70 through a condensate water supply pipe 61. In this connection, a condensate water pump 62 is disposed in the condensate water supply pipe 61 for smooth discharge of the condensate water.

[0074] The water storage 70 includes a water storage tank 72 constructed to be extended from one side of the front panel 11 to the outside. The water storage tank 72 is constructed to collect the condensate water delivered from the water collector 60 to be described later.

[0075] The user may remove the condensate water by extending the water storage tank 72 from the cabinet 10 and then mount the water storage tank 72 into the cabinet 10 again. Thus, the laundry treating apparatus according to the present disclosure may be placed in any place even in a place where a drainage hole or the like is not installed.

[0076] More specifically, the water storage 70 may be constructed to include the water storage tank 72 that is detachably disposed in the cabinet 10 to provide a space for storing the water therein and an inlet 72a defined to penetrate the water storage tank 72 to inflow the water discharged from the condensate water supply pipe 61 into the water storage tank 72.

[0077] The water storage tank 72 may be formed as a drawer-type tank extended from the cabinet 10. In this case, a water storage mounting hole into which the water storage tank 72 is retracted is defined in the front panel 11 of the cabinet.

[0078] A panel 71 is fixed on a front face of the water storage tank 72. The panel 71 may be constructed to form a portion of the front panel 11 by detachably coupled to the water storage mounting hole.

[0079] The panel 71 may further include a groove 71a into which a user's hand is inserted to grip the panel 71. In this case, the panel 71 also functions as a handle for extending or retracting the water storage tank 72 from or into the cabinet.

[0080] The inlet 72a is defined to receive the condensate water discharged from a condensate water nozzle 63 fixed to the cabinet 10. The condensate water nozzle 63 may be fixed to the top panel 13 of the cabinet 10 such that the condensate water nozzle 63 is positioned above the inlet 72a when the water storage tank 72 is retracted into the cabinet 10.

[0081] The user may dispose of the water inside the water storage tank 72 by extending the water storage tank 72 from the cabinet 10 and then turning the water storage tank 72 over or tilting the water storage tank 72 in a direction in which the inlet 72a is located. The water storage tank 72 may further include a communication hole 72b defined to penetrate a top face thereof such that the water inside the water storage tank 72 is easily discharged through the inlet 72a.

[0082] In addition, the laundry treating apparatus 1 according to the present disclosure includes a first filter F1 and a second filter F2 as means for removing foreign substances such as lint, dust, and the like generated in a drying process of laundry such as clothing and the like.

[0083] The first filter F1 is disposed in the exhaust duct 31 to firstly filter foreign substances contained in the air discharged from the drum 20.

[0084] The second filter F2 is disposed downstream of the first filter F1 in a flow direction of the air such that the foreign substances contained in the air that has passed through the first filter F1 may be secondarily filtered. More specifically, as shown, the second filter F2 is preferably disposed upstream of the first heat exchanger 41 in the connecting duct 33. This is to prevent the foreign substances contained in the air from accumulating in the first heat exchanger 41 acting as the heat absorber and contaminating the first heat exchanger 41 or causing performance degradation of the first heat exchanger 41.

[0085] Any means known in the art is applicable to detailed configurations of the first filter F1 and the second filter F2, so that a description of the detailed configuration will be omitted.

[0086] In one example, the laundry treating apparatus 1 according to the present disclosure further includes a supply assembly 80 that includes a first supply assembly 81 and second supply assembly 82 and a steam generating assembly 90 that generates steam by receiving water from the water supply assembly 80. The first supply assembly 81 and the second supply assembly 82 may be provided to supply water to the steam generating assembly 90 from different water sources.

[0087] The steam generating assembly 90 may be constructed to generate the steam by receiving fresh water instead of the condensate water. The steam generating assembly 90 may include a steam generator 91, a steam pipe 92, a steam nozzle 93, and an accumulator 94 (see FIG. 3).

[0088] The steam generator 91 may receive the water from the supply assembly 80 and heat the supplied water to generate the steam. A pipe structure through which the water flows into the steam generator 91 and the steam is discharged will be described later.

[0089] In one example, in the present embodiment, the steam generator 91 has been described to use a scheme (hereinafter, referred to as an 'induction heating scheme' for convenience) of generating the steam by heating a

certain amount of water accommodated therein with a heater (not shown in the drawing), but is not limited thereto.

[0090] The steam generated from the steam generator 91 may flow into the steam nozzle 93 and the steam nozzle 93 may inject the steam into the drum 20.

[0091] The steam pipe 92 connects the steam generator 91 with the steam nozzle 93, and a flow channel along which the steam may flow is defined in the steam pipe 92. Accordingly, the steam generated from the steam generator 91 may flow along the steam pipe 92 and be discharged into the drum 20 through the steam nozzle 93.

[0092] The accumulator 94 may be installed on the steam pipe 92 and serve to separate the condensate water from the steam when the steam generated from the steam generator 91 is condensed in the steam pipe 92 to become the condensate water. In this connection, the condensed condensate water may flow back into the steam generator 91 or flow into the water collector 60.

[0093] For example, the first supply assembly 81 may correspond to an internal water supply assembly 81, and the second supply assembly 82 may correspond to the external water supply assembly 82.

[0094] The steam generating assembly 90 may be controlled to supply the steam into the drum body 21 by receiving the water through the external water supply assembly 82 as well as the internal water supply assembly 81 as needed.

[0095] The external water supply assembly 82 may include a direct water valve 82a adjacent to the rear panel 13 or fixed to the rear panel 13, and a direct water pipe 84 that supplies the water delivered from the direct water valve 82a to the steam generating assembly 90.

[0096] The direct water valve 82a may be constructed to be coupled with an external water source. For example, the direct water valve 82a may be coupled to a water supply pipe (not shown) extending to the rear face of the cabinet. Accordingly, the steam generating assembly 90 may be constructed to receive the water directly through the direct water valve 82a.

[0097] Therefore, even when the internal water supply assembly 81 is omitted or no water is stored in the internal water supply assembly 81, the steam generating assembly 90 may receive the water for generating the steam through the direct water valve 82a as needed.

[0098] The direct water valve 82a may be directly controlled by a controller 100.

[0099] The controller 100 may be installed on the control panel 117, but as shown in FIG. 1, the controller 100 may be constructed as a separate control panel to prevent overload of the control panel 117 and not increase a manufacturing cost.

[0100] In this connection, the controller 100 may be disposed adjacent to the steam generating assembly 90. The controller 100 may be disposed on the side panel 14 on which the steam generating assembly 90 is installed to reduce a length of a control line or the like connected to the steam generating assembly 90.

[0101] In one example, the steam generating assembly 90 is preferably installed adjacent to the direct water valve 82a. Accordingly, residual water may be prevented from remaining unnecessarily in the direct water pipe 84, and the water may be immediately supplied when necessary.

[0102] In one example, the internal water supply assembly 81 includes a storage tank 810 that stores the water therein, a supply pump 820 that receives the water from the storage tank 810 and delivers the water to the steam generating assembly 90, a tank housing 830 that provides a space for accommodating the storage tank 810 and the supply pump 820 therein, and an internal water supply pipe 83 that connects the supply pump 820 with the steam generating assembly 90 and has a flow channel defined therein through which the water may flow.

[0103] Therefore, the internal water supply assembly 81 is constructed to supply the stored water to the steam generating assembly. That is, the water stored in the storage tank 810 may be supplied to the steam generating assembly 90 along the internal water supply pipe 83 by an operation of the supply pump 820.

[0104] In one example, FIG. 3 is a view for illustrating pipe structures of a water supply assembly and a steam generating assembly in a laundry treating apparatus according to an embodiment of the present disclosure, FIG. 4 is a view for illustrating a check valve in a laundry treating apparatus according to an embodiment of the present disclosure, and FIG. 5 is a cross-sectional view of FIG. 4.

[0105] Referring to FIGS. 2 to 5, pipe structures of the water supply assembly and the steam generating assembly of the laundry treating apparatus according to an embodiment of the present disclosure will be described as follows.

[0106] The supply assembly 80 of the present disclosure may include the internal water supply assembly 81 that supplies the water from the storage tank 810 to the steam generating assembly 90, the external water supply assembly 82 that supplies the water from the external water source to the steam generating assembly 90, a water supply connector 86 that is able to receive the water from at least one of the internal water supply assembly 81 and the external water supply assembly 82, and a water supply inlet pipe 85 that connects the water supply connector 86 with the steam generating assembly 90.

[0107] In addition, the supply assembly 80 may further include a check valve assembly 87 that prevents backflow of the water or the steam in at least one of the internal water supply assembly 81, the external water supply assembly 82, and the steam generating assembly 90.

[0108] Specifically, the internal water supply assembly 81 may include the internal water supply pipe 83 that supplies the water in the storage tank 810 to the steam generator 91.

[0109] The external water supply assembly 82 may include the direct water pipe 84 that is in communication

with the external water source to receive the water and supply the water to the steam generator 91.

[0110] The internal water supply pipe 83 and the direct water pipe 84 may be connected to the water supply connector 86. As a result, the water in the internal water supply assembly 81 or the water in the external water supply assembly 82 may flow into the water supply connector 86. In addition, the water supply connector 86 and the steam generator 91 are connected to each other by the water supply inlet pipe 85, so that the water in the internal water supply assembly 81 or the water in the external water supply assembly 82 may be supplied to the steam generator 91.

[0111] The internal water supply pipe 83 may mean a pipe in which a flow channel along which the water may flow is defined.

[0112] One end of the internal water supply pipe 83 may be in communication with the storage tank 810 or the supply pump 820, and the other end thereof may be connected to the water supply connector 86.

[0113] For example, the internal water supply pipe 83 includes a first internal water supply pipe 83a and a second internal water supply pipe 83b.

[0114] The check valve assembly 87 may further include an internal water supply check valve 87c that prevents backflow of water flowing along the first internal water supply pipe 83a and the second internal water supply pipe 83b. One end of the first internal water supply pipe 83a may be in communication with the storage tank 810 or the supply pump 820 and the other end thereof may be connected to the internal water supply check valve 87c.

[0115] In addition, one end of the second internal water supply pipe 83b may be connected to the internal water supply check valve 87c, and the other end thereof may be connected to the water supply connector 86.

[0116] The direct water pipe 84 may mean a pipe in which a flow channel along which the water may flow is defined. One end of the direct water pipe 84 may be connected to the external water supply assembly 82, and the other end thereof may be connected to the water supply connector 86.

[0117] The check valve assembly 87 may include direct water check valves 87a and 87b that prevent the backflow of the water flowing along the direct water pipe 84.

[0118] A plurality of direct water check valves may be arranged.

[0119] For example, the direct water pipe 84 may include a first direct water pipe 84a, a second direct water pipe 84b, and a third direct water pipe 84c. One end of the first direct water pipe 84a may be connected to the direct water valve 82a, and the other end thereof may be connected to a first direct water check valve 87a.

[0120] In addition, both ends of the second direct water pipe 84b may be connected to the first direct water check valve 87a and a second direct water check valve 87b, respectively. In addition, one end of the third direct water pipe 84c may be connected to the second direct water check valve 87b, and the other end thereof may be connected to the water supply connector 86. Accordingly, two check valves of the check valve assembly 87 may be respectively disposed between the first direct water pipe 84a and the second direct water pipe 84b and between the second direct water pipe 84b and the third direct water pipe 84c.

[0121] The supply assembly 80 may include the water supply inlet pipe 85 connected to the steam generator 91 and supplying the water from the internal water supply assembly 81 or the water supplied from the external water supply assembly 82 to the steam generator 91.

[0122] The water supply inlet pipe 85 may mean a pipe in which a flow channel along which the water may flow is defined. One end of the water supply inlet pipe 85 may be connected to the water supply connector 86, and the other end thereof may be connected to the steam generator 91.

[0123] The water supply connector 86 may connect the internal water supply pipe 83, the direct water pipe 84, and the water supply inlet pipe 85 with each other. Specifically, the water supply connector 86 may be in a form of a pipe open in three directions. For example, the water supply connector 86 may be a T-shaped connector.

[0124] The check valve assembly 87 may mean a structure that plays a role of preventing backflow of fluid. Specifically, the check valve assembly 87 may be a component that is disposed on the flow channel, and does not block flow of the fluid when the fluid flows in a direction intended at a time of design (hereinafter, able to be referred to as a 'forward direction'), but blocks the flow of the fluid when the fluid flows backward in a direction opposite to the intended direction (hereinafter, able to be referred to as a 'reverse direction').

[0125] Both the internal check valve and the direct water check valve may have the same structure.

[0126] A laundry treating apparatus of a type of spraying high-temperature steam into the drum is constructed to supply the water into the steam generator using the internal water supply assembly or the external water supply assembly.

[0127] In one example, in a case of the external water supply assembly that is connected to waterworks or the like to supply clean water, there is a possibility that a negative pressure may occur depending on a condition. Even in a case of the internal water supply assembly in which the water is supplied by an operation of the supply pump 820, there is a possibility that the negative pressure may occur depending on an operating condition of the pump.

[0128] In addition, in this case, a reverse osmosis pressure for the direct water or a reverse osmosis pressure for the stored water may occur.

[0129] In one example, when the water stored in the internal water supply assembly 81 or the steam generator 91 stagnates for a long time, contamination such as bacterial growth in the water may occur. When the contam-

inated water flows back by the reverse osmosis or a pressure difference, the contaminated water may contaminate the waterworks or the storage tank 810 in which the clean water is stored.

[0130] Therefore, it is necessary to prevent the contaminated water from flowing back from the internal water supply assembly 81 or the steam generator 91 to flow into the external water supply assembly 82.

[0131] To solve such problem, in the laundry treating apparatus 1 according to an embodiment of the present disclosure, the check valve assembly 87 may be installed on the direct water pipe 84 or the internal water supply pipe 83 to prevent the water in the steam generator 91 or the internal water supply assembly 81 from flowing back.

[0132] Hereinafter, a description will be made focusing on the check valve assembly 87.

[0133] As described above, the check valve assembly 87 may include the first direct water check valve 87a installed on the direct water pipe 84 to prevent the water from flowing back toward the external water supply assembly 82, and the second direct water check valve 87b placed between the first direct water check valve 87a and the water supply connector 86.

[0134] In addition, the check valve assembly 87 may be installed on the internal water supply pipe 83 to prevent the water from flowing back toward the internal water supply assembly 82.

[0135] Specifically, the first direct water check valve 87a may be disposed between the first direct water pipe 84a and the second direct water pipe 84b, and the second direct water check valve 87b may be disposed between the second direct water pipe 84b and the third direct water pipe 84c.

[0136] In addition, the internal water supply check valve 87c may be disposed between the first internal water supply pipe 83a and the second internal water supply pipe 83b.

[0137] With such configuration, the water flowed back may be prevented from flowing into the internal water supply assembly 81 and the external water supply assembly 82.

[0138] In particular, in a case of the direct water pipe 84, which needs to block the backflow in order to prevent water pollution, the two check valves of the check valve assembly 87 are arranged to prevent the backflow even when damage occurs in one of the two check valves of the check valve assembly 87.

[0139] This has an effect of stably protecting the external water supply assembly 82 from the backflow compared to a case of installing the check valve assembly 87 on the water supply inlet pipe 85.

[0140] For example, it may be assumed that each of the internal water supply pipe 83, the direct water pipe 84, and the water supply inlet pipe 85 has one check valve of the check valve assembly 87. In this case, the water flowing back from the steam generator 91 is blocked by the two check valve of the check valve assembly 87 while flowing to the external water supply assembly 82.

[0141] However, backflow of the water flowing back from the internal water supply assembly 81 through the internal water supply pipe 83 and the water supply connector 86 to the external water supply assembly 82 is blocked by only one check valve of the check valve assembly 87 disposed on the direct water pipe 84. That is, when the water flows back from the internal water supply assembly 81 to the external water supply assembly 82, because the check valve assembly 87 disposed on the internal water supply pipe 83 is installed in the forward direction, the check valve assembly 87 is not able to block the backflow, and only the check valve assembly 87 disposed on the direct water pipe 84 is able to prevent the backflow.

[0142] To solve this, in the present disclosure, two check valve of the check valve assembly 87 are installed on the direct water pipe 84, so that there is an effect of double-blocking the backflow that may occur in the internal water supply assembly 81 or the steam generator 91. FIGS. 4 and 5 show an embodiment of the check valve assembly 87.

[0143] The check valve assembly 87 of the present disclosure may include a connecting holder 871 and a backflow-preventing valve 872.

[0144] Specifically, the check valve assembly 87 may include the connecting holder 871 that connects two pipes with each other and the backflow-preventing valve 872 inserted into and coupled to the connecting holder 871 to block the backflow of the fluid.

[0145] The connecting holder 871 may include a holder main body 871a and a guide protrusion 871b. Specifically, the connecting holder 871 may include a holder main body 871a and a guide protrusion 871b that protrudes along a circumferential direction from an outer circumferential face of the holder main body 871a.

[0146] For example, the holder main body 871a may be formed in a cylindrical shape to allow the fluid to flow therein, and both ends thereof may be formed to be inserted into the internal water supply assembly 81 and the external water supply assembly 82, respectively. For example, the holder main body 871a may be formed to be inserted into at least one of the internal water supply pipe 83, the direct water pipe 84, and the water supply inlet pipe 85.

[0147] In one example, an outlet 871d is formed at an end in a direction in which the fluid is discharged (in the forward direction) of the holder main body 871a.

[0148] An inner diameter of the holder main body 871a may become smaller in a direction from a vicinity of the outlet 871d to the outlet 871d.

[0149] In other words, the outlet 871d may be formed as the inner diameter of the holder main body 871a gradually decreases.

[0150] The guide protrusion 871b is formed to protrude from the outer circumferential face of the holder main body 871a to guide assembly direction and position.

[0151] For example, the guide protrusion 871b may be formed to protrude in a ring shape along the outer circumferential face of the holder main body 871a.

[0152] In addition, the connecting holder 871 may further include a direction indicating protrusion 871c connected to a face in an axial direction of the guide protrusion 871b and formed to protrude from the outer circumferential face of the holder main body 871a in a form of a triangular column to indicate the assembly direction.

[0153] The direction indicating protrusion 871c may extend from one face of the guide protrusion 871b in a longitudinal direction of the holder main body 871a. For example, the direction indicating protrusion 871c may extend from the guide protrusion 871b toward the outlet 871d.

[0154] Therefore, when assembling the connecting holder 871 to a pipe, an operator may recognize a direction of a triangle (or an arrow) indicated on the direction indicating protrusion 871c, and may assemble the connecting holder 871 to the pipe after inserting the backflow-preventing valve 872 into the connecting holder 871 in consideration of the flow of the fluid intended at a time of designing. That is, incorrect assembly may be prevented through the guide protrusion 871b and the direction indicating protrusion 871c of the present disclosure.

[0155] The backflow-preventing valve 872 may include a valve body 872a, a valve outlet 872b, a coupling support hook 872c, and a coupling protrusion 872d.

[0156] Specifically, the backflow-preventing valve 872 includes the valve body 872a inserted into the connecting holder 871. The valve outlet 872b that discharges the fluid introduced in the forward direction is formed at one end of the valve body 872a. The coupling support hook 872c hooked and supported on an end of the connecting holder 871 is formed at the other end of the valve body 872a. In addition, the coupling protrusion 872d supported in contact with an inner circumferential face of the connecting holder 871 protrudes from an outer circumferential face of the valve body 872a.

[0157] For example, the valve body 872a may be formed in a cylindrical shape to be inserted into and coupled to the holder main body 871a.

[0158] In one example, an inner diameter of the valve body 872a may correspond to a size of an inner diameter of the outlet 871d of the connecting holder 871. For example, a size of the inner diameter of the valve body 872a may be equal to the size of the inner diameter of the outlet 871d of the connecting holder 871.

[0159] With such structure, in the present disclosure, an amount of fluid flowing into the valve body 872a and an amount of fluid discharged through the outlet 871d may be uniformly maintained, and an occurrence of pulsation or the like resulted from the inflow of the fluid may be prevented.

[0160] The valve outlet 872b may be formed to extend while narrowing in a diameter at one end in the axial direction of the valve body 872a. In this connection, valve outlet 872b may have various forms in which an area of a flow channel along which the fluid is discharged decreases.

[0161] For example, the valve outlet 872b may be formed to extend while gradually narrowing one end in the axial direction of the cylindrical valve body 872a in a conical shape.

[0162] In addition, as another example, the valve outlet 872b may be formed to be opened in a rectangular shape as one end of the valve body 872a narrows in an axisymmetric manner. That is, one end in the axial direction of the valve body 872a may be extended while forming inclined faces to be closer to each other, and the extended inclined faces may be gathered to define the rectangular hole.

[0163] With such configuration, the valve outlet 872b of the present disclosure may be formed inside the holder main body 871a to discharge the water introduced in the forward direction, and may interfere or block flow of the water flowing backward in the reverse direction.

[0164] The coupling support hook 872c may be formed to extend radially outward from the other end of the valve body 872a and may be supported in contact with the holder main body 871. For example, the coupling support hook 872c may be formed to protrude radially outward from the other end of the valve body 872a, and may protrude in a shape of a hook along the circumferential direction.

[0165] With such configuration, the coupling support hook 872c of the present disclosure may be hooked and supported on an end in the direction in which the fluid is introduced (an end opposite to the outlet 871d) of the holder main body 871a. Accordingly, the backflow-preventing valve 872 may be supported even when an inflow pressure of the fluid is large.

[0166] The coupling protrusion 872d may protrude from the outer circumferential face of the valve body 872a along the circumferential direction, and may be in contact with the inner circumferential face of the holder main body 871a.

[0167] For example, the coupling protrusion 872d may include two protrusions protruding from the outer circumferential face of the valve body 872a along the circumferential direction in a rib shape.

[0168] With such configuration, the coupling protrusion 872d of the present disclosure may be supported in contact with the inner circumferential face of the holder main body 871a, and deviation of the backflow-preventing valve 872 from the connecting holder 871 by the pressure of the fluid may be prevented.

[0169] In one example, the backflow-preventing valve 872 of the present embodiment has the same structure as a connector backflow-preventing valve 862 to be described later, so that a structure of the connector backflow-preventing valve 862 disclosed in FIG. 9 may be understood using the structure of the backflow-preventing valve 872.

[0170] In one example, FIG. 6 is a view for illustrating pipe structures of a water supply assembly and a steam

generating assembly in a laundry treating apparatus according to another embodiment of the present disclosure, FIG. 7 is a view illustrating a water supply connector in a laundry treating apparatus according to another embodiment of the present disclosure, FIG. 8 is a cross-sectional view of FIG. 7, and FIG. 9 is a perspective view illustrating a structure of a connector backflow-preventing valve.

[0171] In order to avoid redundant expression, in the present embodiment, the same contents as those of an embodiment of the present disclosure described above will be omitted, and different components will be mainly described in detail.

[0172] First, in the pipe structures of the water supply assembly and the steam generating assembly according to an embodiment of the present disclosure, the two check valve of the check valve assembly 87 are installed on the direct water pipe 84 to prevent the water in the internal water supply assembly 81 or the steam generator 91 from flowing back to the external water supply assembly 82.

[0173] In one example, as shown in FIG. 3, in order to prevent the condensate water from stagnating in the drum when the steam is generated, the accumulator 94 may be installed. In this case, the accumulator 94 is coupled to a top face frame 24 disposed above the drum 20 and is disposed such that a portion of the accumulator 94 supports the direct water pipe 84 by holding an outer circumferential face of the direct water pipe 84.

[0174] In this connection, in order to place the two check valves of the check valve assembly 87 on the direct water pipe 84, the direct water pipe 84 should be divided into a first direct water pipe 84a, a second direct water pipe 84b, and a third direct water pipe 84c, the first direct water check valve 87a should be assembled between the first direct water pipe 84a and the second direct water pipe 84b, and the second direct water check valve 87b should be assembled between the second direct water pipe 84b and the third direct water pipe 84c.

[0175] In the case of assembling and connecting a number of parts in such a narrow space, there is a possibility of water leakage because of incomplete assembly of the direct water pipe 84 and the check valve assembly 87, and the condensate water may flow into the drum 20 because of incomplete mounting of the accumulator 94.

[0176] In order to solve such problem, another embodiment of the present disclosure proposes a structure that prevents the water from flowing back to the external water supply assembly 82 while improving assemblability and space efficiency.

[0177] A water supply connector 86' according to another embodiment of the present disclosure will be described with reference to FIGS. 2 and 6 to 8 as follows.

[0178] In the present embodiment, the water supply connector 86' may be constructed to connect the internal water supply pipe 83, the direct water pipe 84, and the water supply inlet pipe 85 with each other, and prevent the water from flowing back toward the external water supply assembly 81.

[0179] The water supply connector 86' includes a connector main body 861 and a connector backflow-preventing valve 862.

[0180] The connector main body 861 has a structure in which a flow channel for communicating the internal water supply pipe 83, the direct water pipe 84, and the water supply inlet pipe 85 with each other is defined therein.

[0181] Specifically, the connector main body 861 may be in a form of a pipe open in three directions including an outlet 861a, an internal water supply inlet 861b, and a direct water inlet 861c defined therein.

[0182] For example, the connector main body 861 may be a T-shaped connector in which the outlet 861a and the direct water inlet 861c are connected to each other in a straight line on the same axis, and the internal water supply inlet 861b is connected perpendicularly to the outlet 861a.

[0183] More specifically, the outlet 861a may be coupled to the water supply inlet pipe 85, and may discharge the water introduced from the internal water supply assembly 81 or the external water supply assembly 82 to the water supply inlet pipe 85.

[0184] For example, the outlet 861a may be formed in a cylindrical shape to define therein a flow channel along which the water for generating the steam is introduced, and a discharge protrusion 861aa that guides coupling with the water supply inlet pipe 85 may be formed to protrude along the circumferential direction on an outer circumferential face of the outlet 861a.

[0185] The internal water supply inlet 861b may communicate with the outlet 861a, and may be coupled to the internal water supply pipe 83 to define therein a flow channel along which the water discharged from the internal water supply assembly 81 is introduced.

[0186] For example, the internal water supply inlet 861b may be formed in a cylindrical shape to define therein a flow channel along which the water discharged from the internal water supply assembly 81 is introduced, and a water supply protrusion 861ba that guides coupling with the internal water supply pipe 83 may be formed to protrude along the circumferential direction on an outer circumferential face of the internal water supply inlet 861b. In addition, a steam pipe seating face 861bb that guides a position where the steam pipe 92 is disposed may be formed on the outer circumferential face of the internal water supply inlet 861b.

[0187] In addition, a size of an inner diameter $\Phi 2$ of the internal water supply inlet 861b may be the same as a size of an inner diameter $\Phi 1$ of the outlet 861a. With such configuration, the water introduced into the internal water supply inlet 861b may be stably discharged to the water supply inlet pipe 85 without changes in a water pressure and a flow rate.

[0188] The direct water inlet 861c may be connected to the outlet 861a, and may be coupled to the direct water pipe 84 to define therein a flow channel along which the

water from the direct water pipe 82b is introduced.

[0189] For example, the direct water inlet 861c may be formed in a cylindrical shape to define therein a flow channel along which the water discharged from the external water supply assembly 82 is introduced, and a direct water protrusion 861ca that guides coupling with the direct water pipe 84 may be formed to protrude along the circumferential direction on an outer circumferential face of the direct water inlet 861c.

[0190] In addition, the direct water inlet 861c may further include a direction indicating protrusion 861cb extending from the guide protrusion 861ca to indicate the assembly direction.

[0191] The direction indicating protrusion 861cb may be formed to protrude from the guide protrusion 861ca in the form of the triangular pillar or the arrow.

[0192] With such configuration, when assembling the water supply connector 86', the operator may recognize a direction of a triangle (or an arrow) indicated on the direction indicating protrusion 861cb, and may assemble the water supply connector 86' to the pipe after inserting the connector backflow-preventing valve 862 to be described later into the connector main body 861 in consideration of the flow of the fluid intended at a time of designing. Therefore, in the present disclosure, there is an effect of preventing incorrect assembly by the direction indicating protrusion 861cb.

[0193] In one example, an inner diameter $\Phi 3$ of the direct water inlet 861c may be larger than the inner diameter $\Phi 1$ of the outlet 861a ($\Phi 3 > \Phi 1$). In addition, an outer diameter of the direct water inlet 861c may be larger than an outer diameter of the outlet 861a. Therefore, according to the present disclosure, the connector backflow-preventing valve 862 may be easily inserted into the direct water inlet 861c.

[0194] The connector backflow-preventing valve 862 may be coupled into the connector main body 861 to prevent the backflow of the water towards the external water supply assembly. Specifically, the connector backflow-preventing valve 862 may be inserted into and coupled to the direct water inlet 861c.

[0195] The connector backflow-preventing valve 862 may include a valve body 862a, a valve outlet 862b, a coupling support hook 862c, and a coupling protrusion 862d.

[0196] Specifically, the connector backflow-preventing valve 862 includes the valve body 862a inserted into the connector main body 861. The valve outlet 862b that discharges the fluid introduced in the forward direction is formed at one end of the valve body 862a. The coupling support hook 862c hooked and supported on an end of the connector main body 861 is formed at the other end of the valve body 862a. In addition, the coupling protrusion 862d supported in contact with an inner circumferential face of the connector main body 861 protrudes from an outer circumferential face of the valve body 862a.

[0197] For example, the valve body 862a may be formed in a cylindrical shape to be inserted into and coupled to the direct water inlet 861c.

[0198] In one example, an inner diameter $\Phi 4$ of the valve body 862a may correspond to the size of the inner diameter $\Phi 1$ of the outlet 861a. For example, a size of the inner diameter $\Phi 4$ of the valve body 862a may be equal to the size of the inner diameter Φ 1 of the outlet 861a.

[0199] With such structure, in the present disclosure, an amount of fluid flowing into the valve body 862a and an amount of fluid discharged through the outlet 861a may be uniformly maintained, and an occurrence of pulsation or the like resulted from the inflow of the fluid may be prevented.

[0200] The valve outlet 862b may be formed to extend while narrowing in a diameter at one end in the axial direction of the valve body 862a. In this connection, valve outlet 862b may have various forms in which an area of a flow channel decreases.

[0201] For example, the valve outlet 862b may be formed to extend while gradually narrowing one end in the axial direction of the cylindrical valve body 862a in a conical shape.

[0202] In addition, as another example, the valve outlet 862b may be formed to be opened in a rectangular shape as one end of the valve body 862a narrows in an axisymmetric manner. That is, one end in the axial direction of the valve body 862a may be extended while forming inclined faces to be closer to each other, and the extended inclined faces may be gathered to define the rectangular hole.

[0203] With such configuration, the valve outlet 862b of the present disclosure may be formed inside the direct water inlet 861c to discharge the water introduced in the forward direction, and may block flow of the water flowing backward in the reverse direction.

[0204] The coupling support hook 862c may be formed to extend radially outward from the other end of the valve body 862a and may be supported in contact with the connector main body 861. For example, the coupling support hook 862c may be formed to protrude radially outward from the other end of the valve body 862a, and may protrude in a shape of a hook along the circumferential direction.

[0205] With such configuration, the coupling support hook 862c of the present disclosure may be hooked and supported on an end in the direction in which the fluid is introduced (an end opposite to the outlet 861a) of the direct water inlet 861c. Accordingly, the connector backflow-preventing valve 862 may be supported even when an inflow pressure of the fluid is large.

[0206] The coupling protrusion 862d may protrude from the outer circumferential face of the valve body 862a along the circumferential direction, and may be in contact with the inner circumferential face of the direct water inlet 861c.

[0207] For example, the coupling protrusion 862d may include two protrusions protruding from the outer circumferential face of the valve body 862a along the circum-

ferential direction in a rib shape.

[0208] With such configuration, the coupling protrusion 862d of the present disclosure may be supported in contact with the inner circumferential face of the direct water inlet 861c, and deviation of the connector backflow-preventing valve 862 from the connector main body 861 by the pressure of the fluid may be prevented.

[0209] Therefore, according to the water supply connector 86' of the present embodiment, a sufficient backflow prevention effect may be maintained by simply disposing only one check valve of the check valve assembly 87 on the direct water pipe 84. For example, in the present embodiment, the direct water pipe 84 may be composed of the first direct water pipe 84a and the second direct water pipe 84b, and only one direct water check valve 87a may be placed between the first direct water pipe 84a and the second direct water pipe 84b.

[0210] With such configuration, the number of parts that need to be assembled and connected in the narrow space above the drum 20 may be reduced, and the water leakage or the flow of the condensate water into the drum resulted from the incomplete assembly may be prevented.

[0211] In addition, the assemblability and the space efficiency may be improved to improve production and repair efficiencies.

[0212] In addition, the check valve may be installed by only replacing a connector on an existing pipe.

Claims

1. A laundry treating apparatus comprising:

a cabinet (10);
a drum (20) rotatably installed inside the cabinet (10) to accommodate a laundry;
a duct assembly (30) configured to re-supply air discharged from the drum (20) to the drum (20);
a circulating fan (43) for providing a flow force to the air flowing along the duct assembly (30);
a heat exchanger assembly (40) disposed in the duct assembly (30) to exchange heat with the air;
a steam generating assembly (90) including a steam generator (91) for generating steam, wherein the steam generating assembly (90) supplies the steam into the drum (20); and
a supply assembly (80) for supplying water for generating the steam to the steam generating assembly (90),
wherein the supply assembly (80) includes:

an first supply assembly (81) including a storage tank for storing water therein and an internal water supply pipe (83) for supplying the water stored in the storage tank to the steam generator (91); and
an second supply assembly (82) including a direct water pipe (84) for receiving water from an external water source and supplying the water to the steam generator (91);
a water supply inlet pipe (85) for supplying the water in the first supply assembly (81) or the water in the second supply assembly (82) to the steam generator (91); and
a water supply connector (86, 86') for connecting the internal water supply pipe (83) and the direct water pipe (84) to the water supply inlet pipe (85),
a check valve assembly (87) including at least one check valve installed on the direct water pipe (84) or the internal water supply pipe (83) to prevent water in the steam generator (91) from flowing back.

2. The laundry treating apparatus of claim 1, wherein the check valve assembly (87) includes:

a connecting holder (871) for connecting at least two of the internal water supply pipe (83), the direct water pipe (84), and the water supply inlet pipe (85) with each other; and
a backflow-preventing valve (872) inserted into and coupled to the connecting holder (871).

3. The laundry treating apparatus of claim 2, the connecting holder (871) includes:

a holder main body (871a) formed in a cylindrical shape such that both ends in an axial direction thereof are respectively inserted into at least one of the internal water supply pipe (83), the direct water pipe (84), and the water supply inlet pipe (85), and
a guide protrusion (871b) protruding from an outer circumferential face of the holder main body (871a) to guide assembly direction and position.

4. The laundry treating apparatus of claim 1, 2, or 3, wherein the check valve assembly (87) includes:

a first direct water check valve (87a) installed on the direct water pipe (84) to prevent the water from flowing back toward the second water supply assembly (82); and
a second direct water check valve (87b) disposed between the first direct water check valve (87a) and the water supply connector (86).

5. The laundry treating apparatus of any one of claims 1 to 4, wherein the water supply connector (86') includes:

a connector main body (861) having a flow channel defined therein for communicating the inter-

nal water supply pipe (83), the direct water pipe (84), and the water supply inlet pipe (85) with each other; and
a connector backflow-preventing valve (862) coupled into the connector main body (861) to prevent backflow of water flowing along the flow channel defined in the connector main body (861).

6. The laundry treating apparatus of claim 5, wherein the connector main body (861) includes:

an outlet (861a) coupled to the water supply inlet pipe (85) to discharge the water to the water supply inlet pipe (85);
an internal water supply inlet (861b) connected to the outlet (861a) and coupled to the internal water supply pipe (83), wherein the water in the first supply assembly (81) is introduced into the internal water supply pipe (83); and
a direct water inlet (861c) connected to the outlet (861a) and coupled to the direct water pipe (84), wherein the water in the direct water pipe (84) is introduced into the direct water inlet (861c),
wherein the connector backflow-preventing valve (862) is inserted into and coupled to the direct water inlet (861c).

7. The laundry treating apparatus of claim 6, wherein the direct water inlet (861c) is formed to have an inner diameter larger than an inner diameter of the outlet (861a).

8. The laundry treating apparatus of claim 6, or 7, wherein the direct water inlet (861c) is formed to have an outer diameter larger than an outer diameter of the outlet (861a).

9. The laundry treating apparatus of claim 6, 7, or 8, wherein the direct water inlet (861c) includes a guide protrusion (871b) protruding from an outer circumferential face of the direct water inlet (861c) to guide an insertion position of the connector backflow-preventing valve (862).

10. The laundry treating apparatus of claim 9, wherein the direct water inlet (861c) further includes a direction indicating protrusion (871c) protruding from the guide protrusion (871b) in a triangular column shape.

11. The laundry treating apparatus of any one of claims 6 to 10, wherein the connector backflow-preventing valve (862) includes:

a valve body (862a) inserted into and coupled to the direct water inlet (861c); and
a valve outlet (862b) extending at one end of the valve body (862a) such that a diameter thereof is reduced, wherein the valve outlet (862b) is disposed inside the connector main body (861) to discharge the water introduced from the direct water pipe (84), wherein the valve outlet (862b) blocks flow of the water introduced from the internal water supply pipe (83) or the water supply inlet pipe (85).

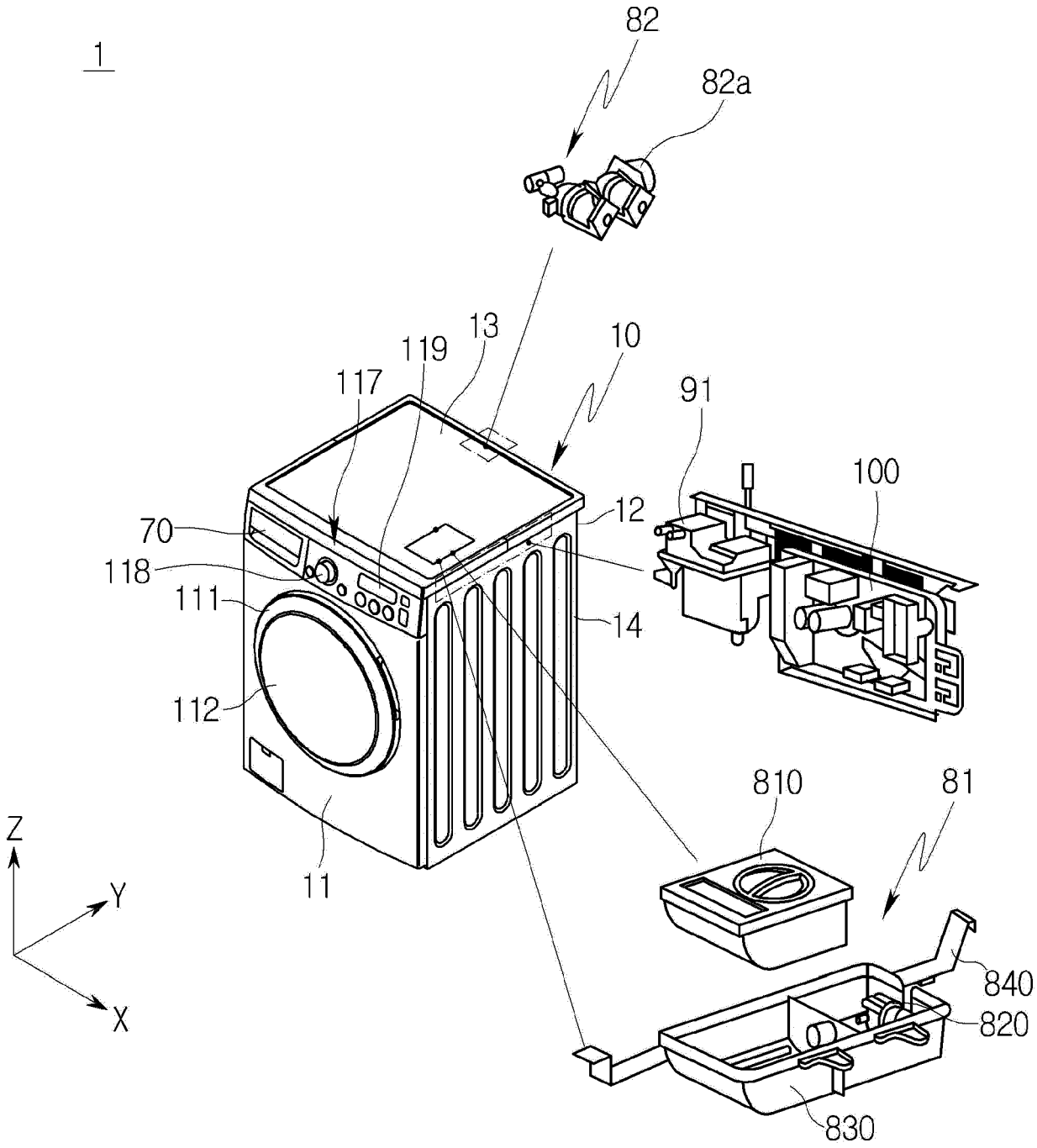
12. The laundry treating apparatus of claim 11, wherein the connector backflow-preventing valve (862) further includes a coupling support hook (862c) extending radially outward from the other end of the valve body (862a) and supported on the connector main body (861).

13. The laundry treating apparatus of claim 11, or 12, wherein the connector backflow-preventing valve (862) further includes a coupling protrusion (862d) protruding along a circumferential direction on an outer circumferential face of the valve body (862a) and in contact with an inner circumferential face of the connector main body (861).

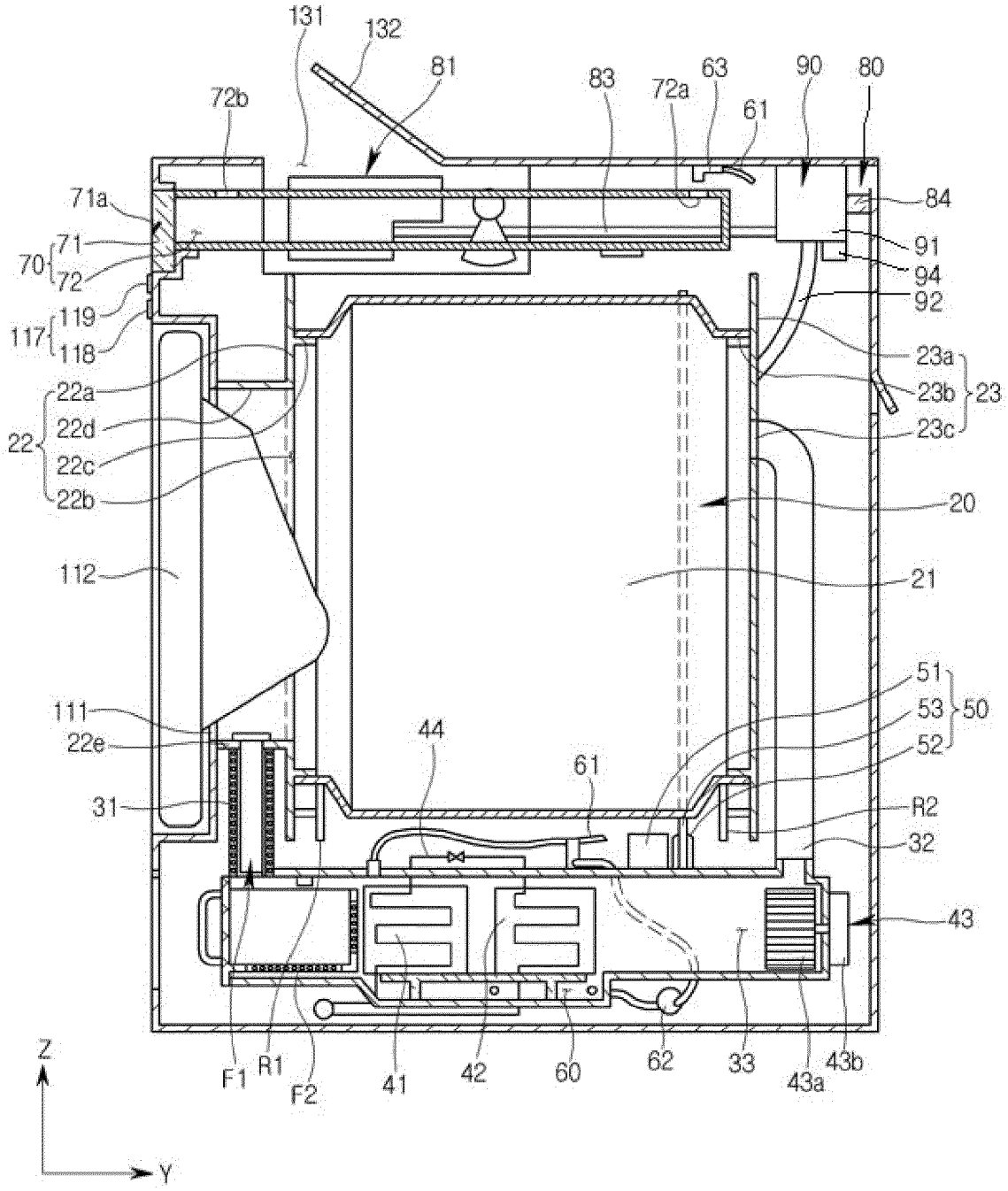
14. The laundry treating apparatus of any one of claims 5 to 13, wherein the supply assembly (80) further includes a direct water check valve (87a) installed on the direct water pipe (84) to prevent the water from flowing back toward the second water supply assembly (82).

15. The laundry treating apparatus of any one of claims 5 to 14, wherein the supply assembly (80) further includes an internal water supply check valve (87c) installed in the internal water supply pipe (83) to prevent water from flowing back toward the first water supply assembly (81).

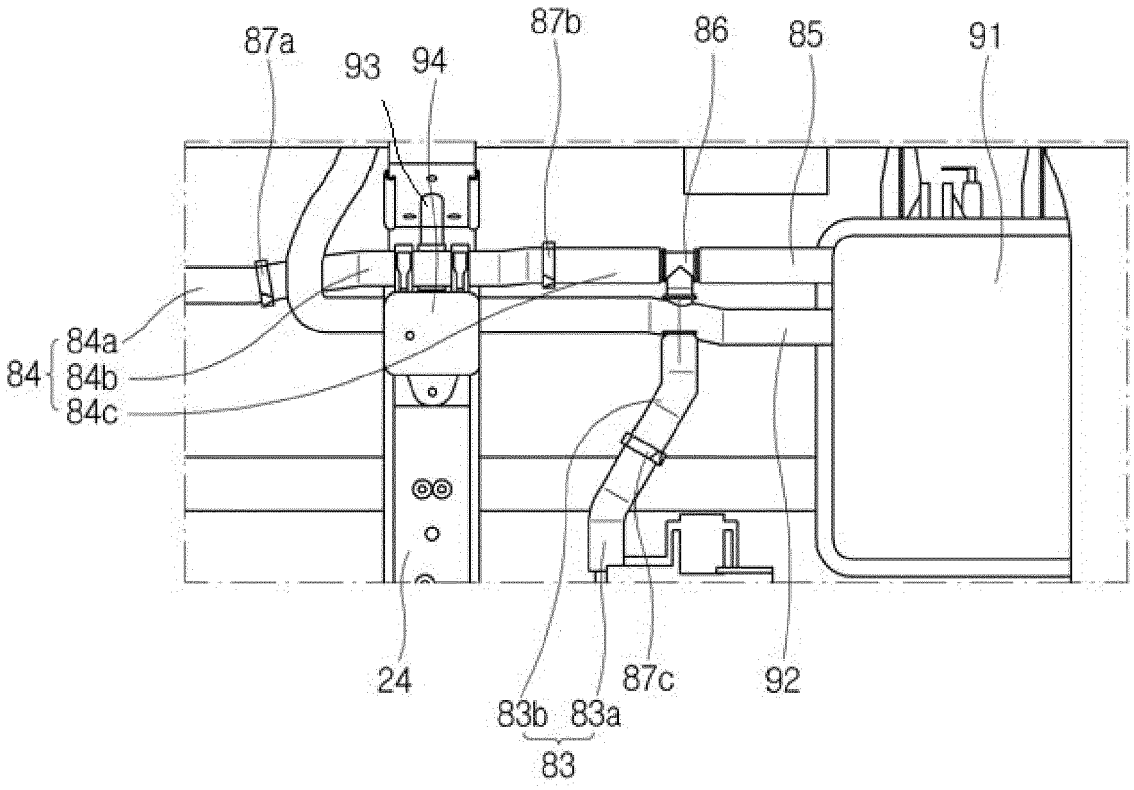
【FIG 1】


1
82
82a
13
119
117
10
91
100
12
70
118
111
14
112
11
810
81
840
820
830
Z
Y
X

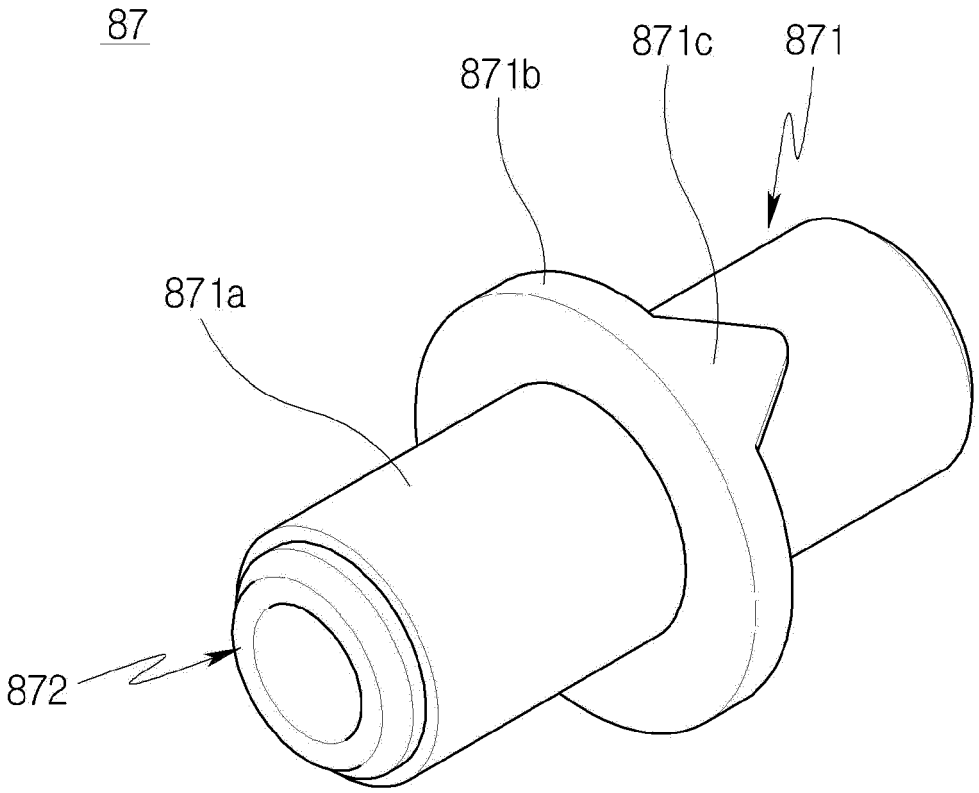
【FIG 2】


131
132
81
83
72a
63
90
80
72b
61
71a
84
71
70
72
91
94
92
119
117
118
23a
23b
23
23c
22a
22d
22c
22b
22
20
112
21
51
53
50
52
111
22e
44
61
31
R2
32
43
Z
F1
R1
F2
41
42
60
62
33
43a
43b
Y

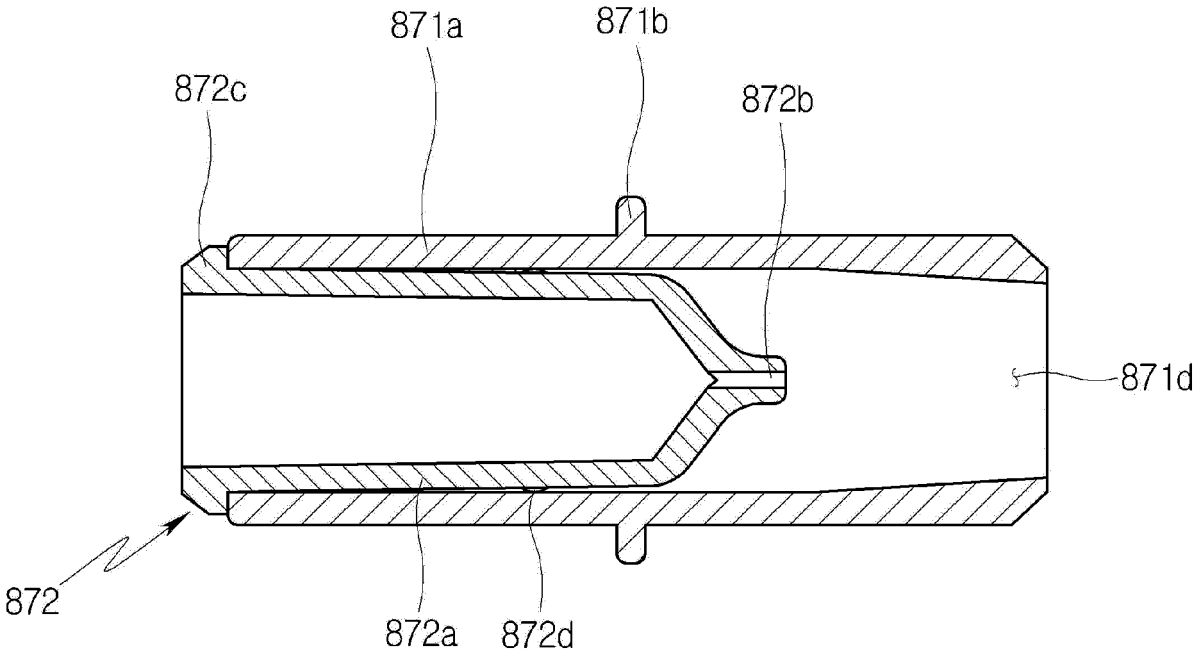
【FIG 3】



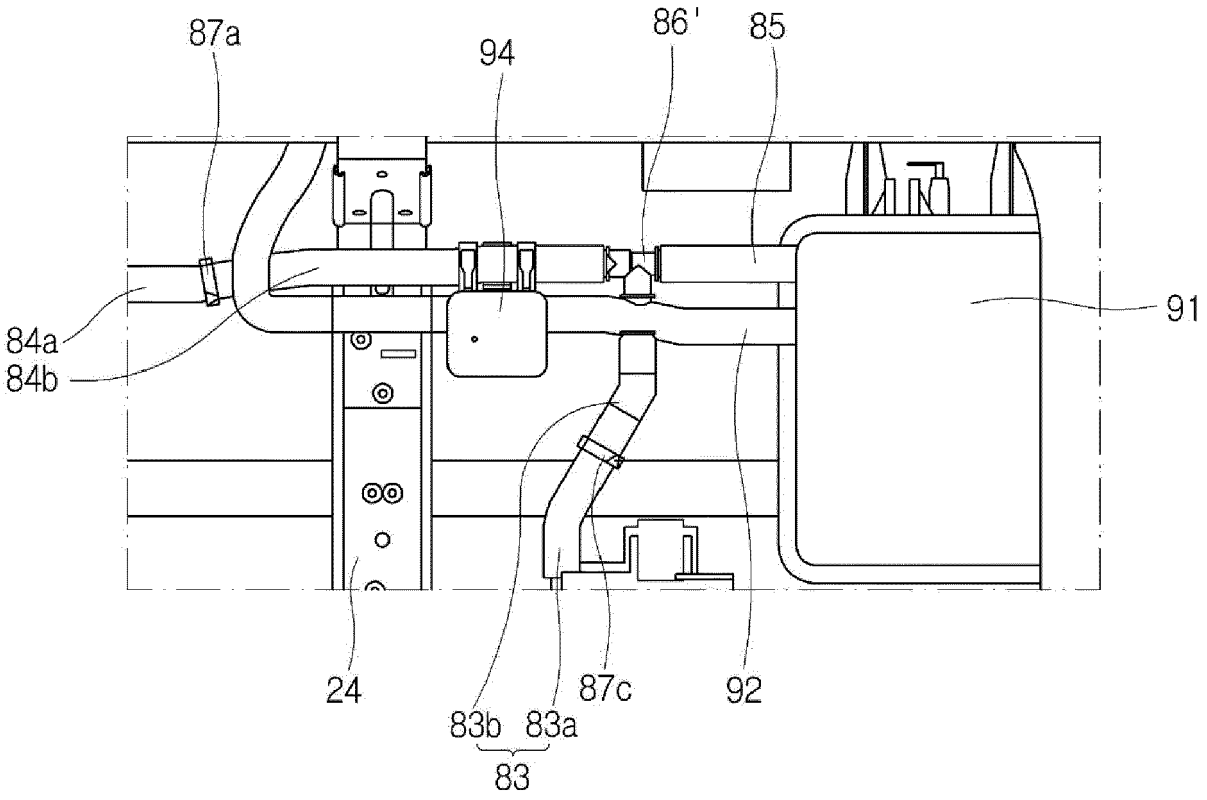
【FIG 4】


87
871b
871c
871
871a
872

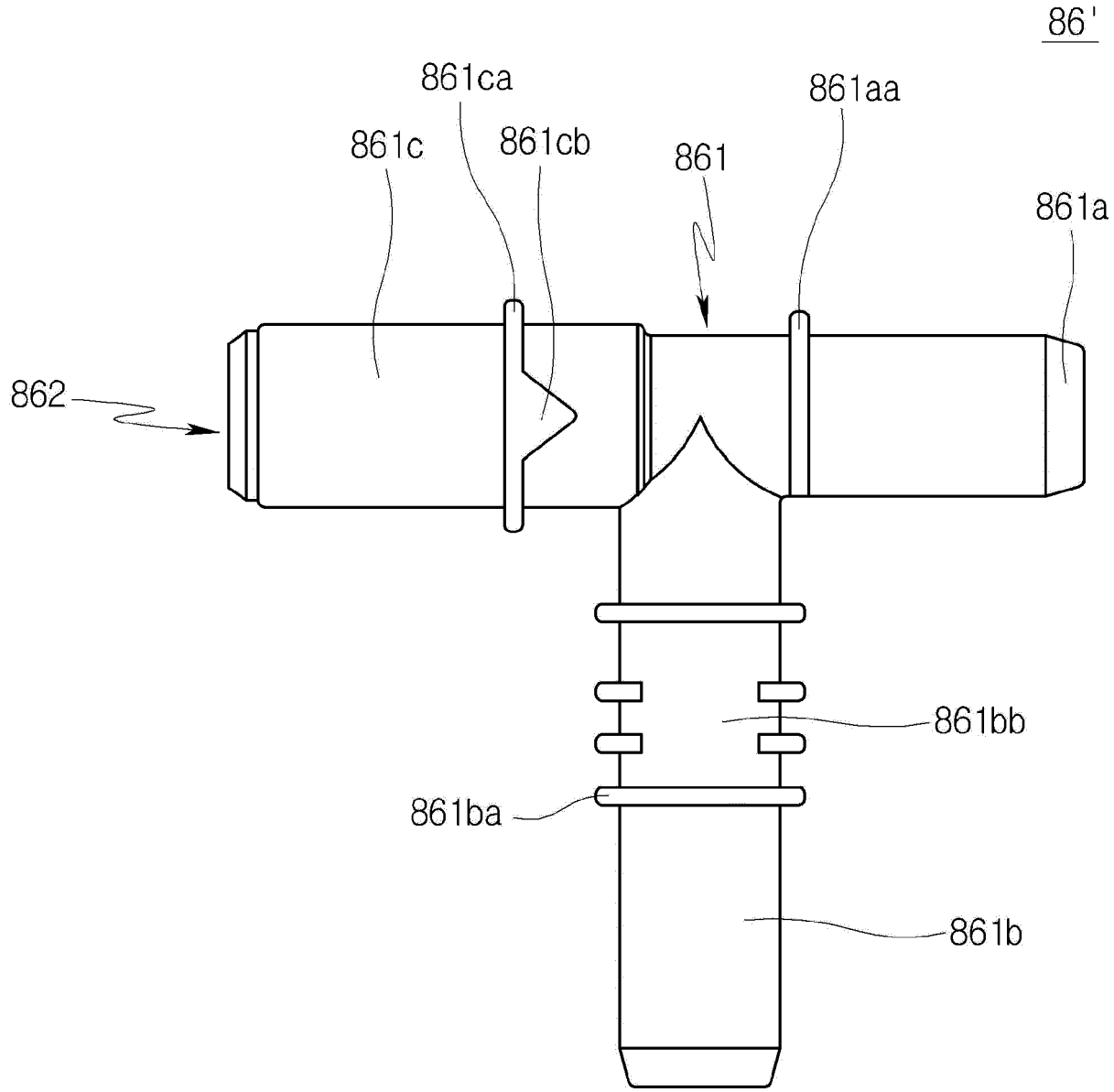
【FIG 5】


871a
871b
872c
872b
871d
872
872a
872d

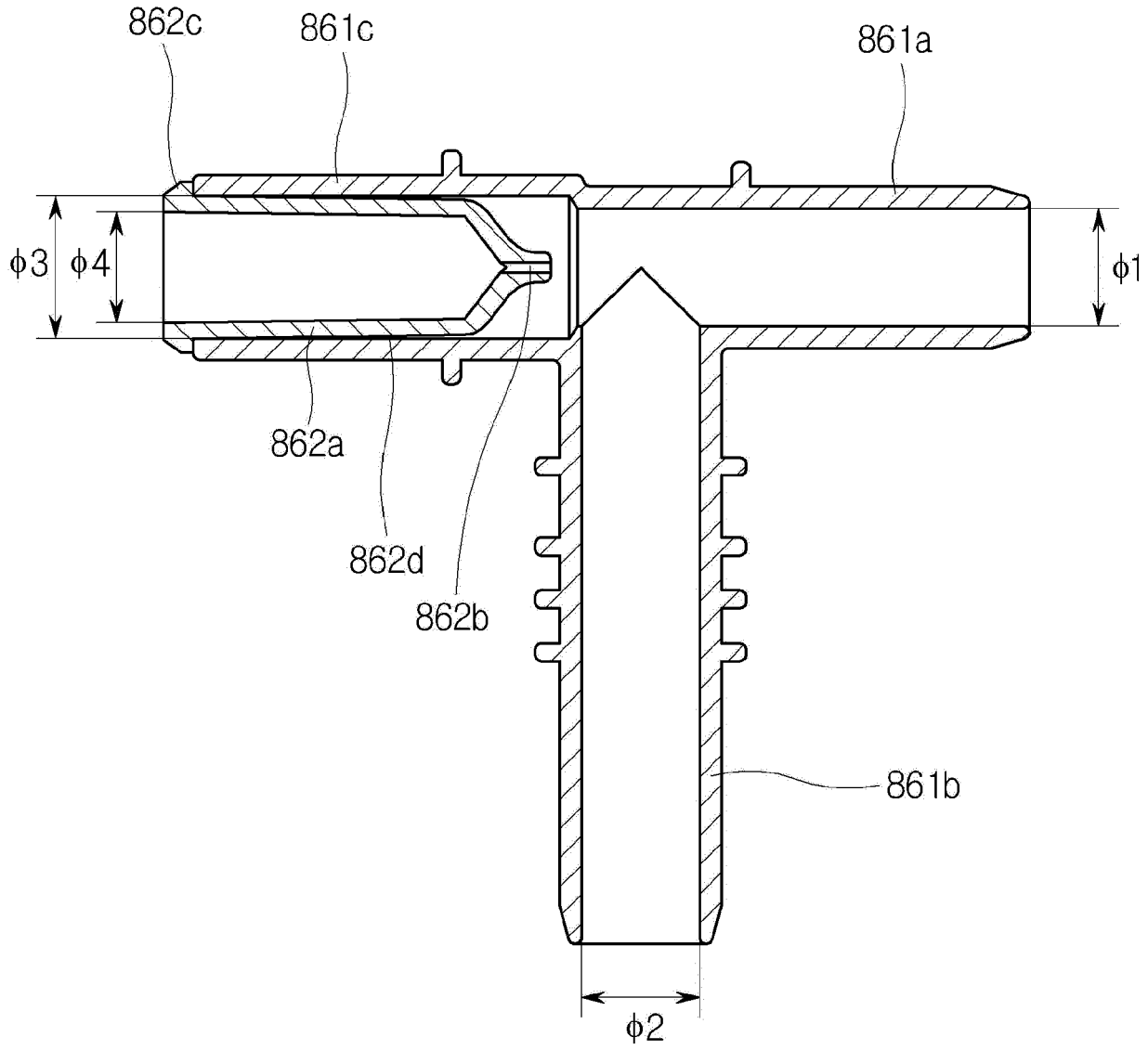
【FIG 6】



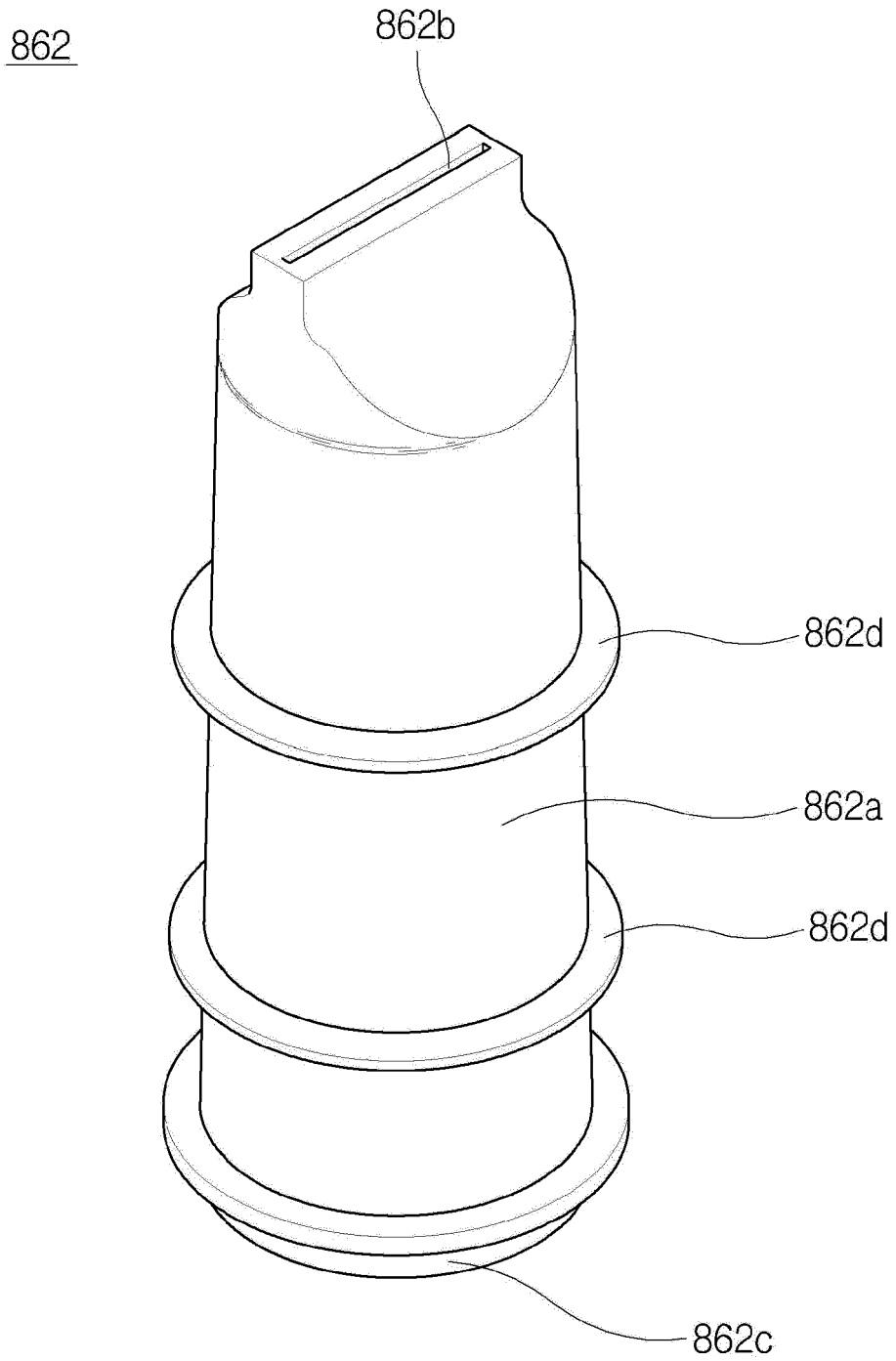
【FIG 7】



【FIG 8】



【FIG 9】



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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 8888

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 September 2021	Kirner, Katharina

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