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(54) **METHOD FOR CONTROLLING A FABRIC TREATMENT APPARATUS**

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Description

Technical Field

[0001] This relates to a method for controlling a fabric treatment apparatus and, more particularly, to a method for controlling a fabric treatment apparatus that includes a storing mode.

Background Art

[0002] A fabric treatment apparatus is an appliance that has a refreshing function for removing odors and/or wrinkles from fabric articles stored therein. By removing odor particles and wrinkles using the refreshing function, the fabric articles in the fabric treatment apparatus may appear to be freshly cleaned and/or ironed. Document US 5,815,961 discloses such an appliance which comprises a cabinet that defines an interior region for receiving fabric articles, a door hinge-connected to the cabinet for closing the interior region, steam generation means for humidifying the fabric articles disposed in the cabinet and hot air generating means for delivering warm air in the cabinet.

[0003] A storing mode that allows treated fabric articles to be stored in the apparatus for some period of time upon completion of the treatment process would enhance the utility of the fabric treatment apparatus.

Disclosure of Invention

Technical Problem

[0004] A method for controlling a fabric treatment apparatus that includes a case for defining a treating space storing fabric articles, a steam supply device for supplying steam into the treating space, and a dry air supply device for supplying dry air into the treating space is provided. The method includes a steam mode, a dry mode, and a storing mode. In the storing mode, steam is supplied into the treating space by operating the steam supply device. In dry mode, dry air is supplied into the treating space by operating the dry air supply device. In the storing mode, humidity is controlled in the treating space by operating at least one of the steam supply device and the dry air supply device.

Technical Solution

[0005] The fabric treatment apparatus may also include an operating unit for controlling operation of the treatment apparatus by a user. The storing mode may end by operating the operating unit.

[0006] The case may include a door for opening and closing the treating space. The storing mode may temporarily stop when the door opens, and resume when the door closes.

[0007] The fabric treatment apparatus may also in-

clude a humidity sensor disposed inside the treating space for sensing inside humidity of the treating space. In the storing mode, the sensing value of the humidity sensor may be sustained to be in-between a first predetermined value and a second predetermined value that is smaller than the first predetermined value. In the storing mode, the dry air supply device may be operated unit the sensing value of the humidity sensor reaches the second predetermined value if the sensing value is larger than the second predetermined value. In the storing mode, the steam supply device may be operated until the sensing value of the humidity sensor reaches the first predetermined value if the sensing value of the humidity sensor is smaller than the second predetermined value. The first and second predetermined values may be set or modified by operating the operating unit.

[0008] The fabric treatment apparatus may also include a timer for measuring a time of operating the dry air supply device and the steam supply device. The storing mode may include a stopping step for stopping the dry air supply device and the steam supply device for a predetermined time and an operating step for operating at least one of the dry air supply device and the steam supply device for a second predetermined time. In the storing mode, the timer measures a time of operating the fabric treatment apparatus and transfers the measured time value to the controlling unit. The controlling unit alternatively and repeatedly performs the stopping step and the operating step. The first and second predetermined times may be set or modified by operating the operating unit.

[0009] In accordance with another embodiments broadly described herein, a method for controlling a fabric treatment apparatus that includes a case for defining a treating space storing fabric articles, a steam supply device for supplying steam into the treating space, a dry air supply device for supplying a dry air into the treating space, and an operating unit for controlling operation of the treatment apparatus by a user, the method includes a storing mode for controlling humidity in the treating space by operating at least one of the steam supply device and the dry air supply device, wherein the storing mode progresses or ends by operating the operating unit.

[0010] In accordance with another embodiment as broadly described herein, a treatment apparatus includes a case and a steam supply device. The case defines a treating space for storing fabric articles, and the steam supply device is connected to the case for supplying steam to a plurality of locations in the treating space.

[0011] The steam supply device may include a plurality of nozzles disposed at the case, a plurality of steam channels connected to the nozzles, and a steam generator for supplying steam to the steam channels. The steam supply device may also include a distributor disposed between the steam channels and the steam generator for distributing steam generated from the steam generator to the steam channels.

[0012] The nozzles may be disposed at at least one of

sides of the case forming the treating space. The nozzles may be disposed corresponding to fabric articles in the treating space to supply steam toward the fabric articles, or disposed corresponding to spaces between the fabric articles to supply steam toward the spaces between fabric articles hanging in the treating space. In the case, a rack unit may be disposed. The rack unit may include a plurality of hangers horizontally disposed at a predetermined interval. The nozzles may be disposed at a height lower than a middle height of fabric articles hanged on the rack unit. A plurality of rack units and nozzles may be disposed to be corresponding to each other.

[0013] The nozzles may form a plurality of nozzle sets. The nozzles of at least one of the nozzle sets are disposed at the same height and at a predetermined interval. At least one of the nozzle sets may be disposed at at least one sides of the case that defines the treating space. Nozzles of at least one of the nozzle sets may be disposed corresponding to the fabric articles to supply steam toward fabric articles hanged in the treating space. The nozzle sets may include the nozzles disposed corresponding to spaces between fabric articles to supply steam toward the spaces between the fabric articles hanged in the treating space.

[0014] A rack unit may be disposed in the case. The rack unit may include a plurality of hangers horizontally disposed at a predetermined interval. At least one of the nozzle sets may be disposed at a height lower than middle height of fabric articles hanged on the rack unit. At least one of the nozzle sets and the rack units may be disposed in the case to be corresponding to each other.

[0015] At least one of the nozzle sets may include a first nozzle set disposed at a rear side of the case to be located at the rear of fabric articles hanged on the rack unit. Nozzles of the first nozzle set may be disposed corresponding to spaces among the fabric articles.

[0016] At least one of nozzle sets may further include second nozzle sets disposed at a left side and a right side of the case to face each other in order to be located at a left side and a right side of fabric articles hanged on the rack unit. At least one of the nozzle sets may include a third nozzle set disposed at a bottom side of the case to face to a bottom side of the rack unit.

[0017] In accordance with another embodiments as broadly described herein, the nozzles may form at least one of nozzle sets. Nozzles in at least one of the nozzle sets may be disposed in the case in a top to down direction at a predetermined interval. A distance between the nozzles becomes increased in a bottom to top direction of the treating space.

Advantageous Effects

[0018] A fabric treatment apparatus as embodied and broadly described herein supplies steam to a plurality of locations in the treating space. As a result, steam is uniformly supplied to numerous locations in the treating space, and the performance of the refreshing operation

does not vary significantly based on location within the treating space.

[0019] The clothing treatment apparatus as embodied and broadly described herein may also reduce a time of supplying steam to all fabric articles in the treating space, thereby reducing a time to perform a refreshing operation and improving performance of the apparatus.

Brief Description of the Drawings

[0020]

FIG. 1 is a perspective view of an exemplary fabric treatment apparatus in accordance with an embodiment as broadly described herein;

FIG. 2 is a cross-sectional view of the fabric treatment apparatus shown in FIG. 1;

FIG. 3 is a perspective view of a refreshing unit of the fabric treatment apparatus shown in FIG. 1;

FIG. 4 is an exploded perspective view of the refreshing unit shown in FIG. 3;

FIG. 5 is a schematic block diagram of a fabric treatment apparatus in accordance with embodiments as broadly described herein;

FIG. 6 is a flowchart of a method for controlling a fabric treatment apparatus in accordance with embodiments as broadly described herein;

FIG. 7 is a schematic block diagram of a fabric treatment apparatus in accordance with another embodiment as broadly described herein;

FIG. 8 is a flowchart of a method for controlling a fabric treatment apparatus in accordance with another embodiment as broadly described herein;

FIG. 9 is a flowchart of a method for controlling a fabric treatment apparatus in accordance with another embodiment as broadly described herein.

FIG. 10 is a perspective view of an exemplary fabric treatment apparatus in accordance with another embodiment as broadly described herein;

FIG. 11 is a cross-sectional view of the fabric treatment apparatus shown in FIG. 10;

FIG. 12 is a front view of the fabric treatment apparatus shown in FIG. 10;

FIG. 13 is a perspective view of a refreshing unit of the fabric treatment apparatus shown in FIG. 10;

FIG. 14 is an exploded perspective view of the refreshing unit shown in FIG. 13;

FIG. 15 is a schematic block diagram of the refreshing apparatus shown in FIG. 13;

FIG. 16 is a front view of an exemplary fabric treatment apparatus in accordance with another embodiment as broadly described herein;

FIG. 17 is a front view of an exemplary fabric treatment apparatus in accordance within an other embodiment as broadly described herein; and

FIG. 18 is a front view of an exemplary fabric treatment apparatus in accordance with another embodiment as broadly described herein.

Best Mode for Carrying Out the Invention

[0021] Hereinafter, a method for controlling a fabric treatment apparatus in accordance with embodiments as broadly described herein will be described with reference to the accompanying drawings. Simply for ease of discussion, reference will be made to a condensing type refreshing apparatus. However, the principles set forth herein may be applied to other types of refreshing apparatuses, such as, for example, a discharge type. Likewise, simply for ease of discussion, fabric articles may be referred to as "clothes". However, a refreshing apparatus as embodied and broadly described herein is not limited to treating clothing, and may be used to treat a variety of different fabric articles, such as, for example, bedding, draperies, linens, towels and the like.

[0022] Referring to FIG. 1, a fabric treatment apparatus 100 may include a main body 80 including an outer case 110 and an inner case 120 disposed inside the outer case 110. The inner case 120 may define a treating space 125. The outer case 110 may include an entrance 111 formed at the front of the outer case 110 for putting in and taking out fabric articles to be treated by the apparatus 100. A door 112 may be rotatably coupled to the outer case 110 to open or to close the entrance 111.

[0023] An opening and closing sensor 113 may be provided between the door 112 and the outer case 110 to sense whether the door 112 is open or closed. The opening and closing sensor 113 may include a first contact point 113a and a second contact point 113b. In the embodiment shown in FIG. 1, the first contact point 113a is positioned at a rear side of the door 112, and the second contact point 113b is positioned at a front side of the outer case 110 corresponding to the first contact point 113a. However, other positions may also be appropriate. For example, the positions of the first and second contact points may be reversed.

[0024] In the embodiment shown in FIG. 1, positive and negative currents may be supplied to the first and second contact points 113a and 113b, respectively. The opening and closing sensor 113 may sense an open or closed state of the door 112 based on whether or not current flows from the first contact point 113a to the second contact point 113b. The opening and closing sensor 113 may include various other structures. For example, an attachable/detachable contact switch may be disposed at one of the door 112 or the outer case 110, or a position sensor for sensing a coordinate of the door 112 may be provided with the door 112.

[0025] A locking unit 114 may be used to engage the door 112 and the outer case 110 to restrict operation of the door 112 once the door 112 is closed. In the embodiment shown in FIG. 1, the locking unit 114 includes a door latch 114a provided at the rear side of the door 112 and a door switch 114b provided at the front side of the outer case 110 corresponding to the door latch 114a. Other positions may also be appropriate. For example, the positions of the door latch 114a and the door switch

114b may be reversed. The door latch 114a is inserted into the door switch 114b when the door 112 closes. The door switch 114b engages the door latch 114a to hold the door 112 closed relative to outer case 110. The locking unit 114 may have various other structures.

[0026] A control panel 116 having an operating unit 115 may be provided on at least one of the door 112 or the outer case 110 to allow a user to directly operate and control the functions of the fabric treatment apparatus 100.

[0027] The inner case 120 may be smaller than the outer case 110 so that the inner case 120 may be positioned inside the outer case 110. The inner case 120 may include side units 121 that form opposite vertical sides of the treating space 125, a top side unit 122 that forms a top side of the treating space 125, a bottom side unit 123 that forms a bottom side of the treating space 125, and a rear side unit 124 that forms a rear vertical side of the treating space 125.

[0028] A hanger 126 may extend within treating space 125 between the opposite vertical side units 121. An outlet 127 may be provided for discharging air or humidity from the clothing treating space 125 into a condensing chamber 129 formed between the rear side unit 124 and the outer case 110. An inlet 128 may be provided at the lower part of the rear side unit 124 to provide for air flow between the treating space 125 and the condensing chamber 129.

[0029] The condensing chamber 129 is a space where air, and in particular, air containing moisture, introduced through the outlet 127 may be condensed as a temperature of the air drops. In the embodiment shown in FIG. 2, the upper part of the condensing chamber 129 is in communication with the outlet 127, the lower part of the condensing chamber 129 is in communication with the inlet 128, and the condensing chamber 129 is formed at a rear portion of the main body 80. However, other locations, such as, for example, the sides of the main body 80, may also be appropriate based on, for example, the placement of a refreshing unit 200, various discharge ports, and the path of the fluid/vapor flowing through the apparatus.

[0030] Dry air or wet air may be discharged through the outlet 127. When wet air enters the condensing chamber 129, the wet air exchanges heat with low temperature outside air using the outer case 110 as a heat-exchanging medium. Therefore, the outer case 110 may be formed of a material having high thermal conductivity, such as, for example, steel or aluminum, in order to improve heat exchange performance. A humidity sensor 130 may be provided to sense a humidity level in the treating space 125.

[0031] Referring to FIG. 1, FIG. 3, and FIG. 4, the treatment apparatus 100 may include a refreshing apparatus 200 that treats and refreshes fabric articles in the treating space 125. The refreshing apparatus 200 may include a steam supply device 140 for generating steam and supplying the steam to the treating space 125 to remove

wrinkles and/or pollution particles from fabric articles stored in treating space 125. The steam supply device 140 may include a fluid supply tank 141 for storing fluid, a steam housing 142 for receiving fluid from the supply tank 141, a steam heater 143 provided in the steam housing 142 for generating steam by heating the stored fluid, and a steam nozzle 144 for injecting the steam into the treating space 125. A supply channel (not shown) may be formed between the supply tank 141 and the steam housing 142 for guiding fluid from the supply tank 141 into the steam housing 142.

[0032] In certain embodiments, the supply tank 141 may store water. In alternative embodiments, the supply tank 141 may store other mixtures of fluids which may further facilitate the removal of wrinkles, odors and the like from fabric articles during a refreshing process. In alternative embodiments, fluid may be supplied to the steam supply device 140 through a pressurized line (not shown). The steam heater 143 may include, for example, a sheath heater that penetrates a lower part of the steam housing 142 so as to heat the fluid stored in the steam housing 142 and generate steam.

[0033] The refreshing apparatus 200 may also include a dry air supply device 150 that draws in air from the condensing chamber 129 or external air, generates high temperature dry air, and supplies the high temperature dry air into the treating space 125. The dry air supply device 150 may include a dry housing 151 forming an air channel between the inlet 128 and the treating space 125, a ventilation fan 152 provided in the drying housing 151 for drawing air from the condensing chamber 129 through the air inlet 128 and discharging it into treating space 125, and a dry heater (not shown) for heating the air before it is discharged into the treating space 125. The dry housing 151 may have a duct shape with an inlet hole 153 at one side of the dry housing 151 in communication with the inlet 128 drawing in air. A discharging hole 154 may be formed at the other side of the dry housing 151, inside the treating space 125. High temperature dry air may be discharged into the treating space 125 through the discharging hole 154.

[0034] A case 160 may be provided in the treating space 125 to house the steam supply device 140 and the dry air supply device 150. The case 160 may be provided in a lower portion of the treating space 130, or other location as appropriate. A coupling unit 161 may be formed on the case 160 so that the supply tank 141 may be attachable/detachable thereto/therefrom. Since the supply tank 141 can be easily separated from the coupling unit 161, fluid can be easily added to the supply tank 141, and the supply tank 141 can be easily replaced. Alternatively, the supply tank 141 may be automatically filled from an external source through an additional fluid channel (not shown). A steam nozzle 144 of the steam supply device 140 may be provided at a side of the case 160, and a hole at another side of the case 160 may communicate with the discharging hole 154 of the dry air supply device 150. In alternative embodiments, the re-

freshing unit 200 may be housed in the case 160, and the case 160 may be coupled to an outside of the outer case 110 to increase a size of the treating space 125.

[0035] A draining unit 162 may be detachably coupled to the outer case 110 for collecting condensed fluid from the inner case 120 and the condensing chamber 129, as well as residual fluid from the steam supply device 142. The draining unit 162 may include a storing unit 163 detachably coupled to the outer case 110 for storing the condensed and residual fluid, and a drain channel (not shown) for guiding the condensed and residual fluid from the inner case 120, the condensing chamber 129, and the steam supply device 140 to the storing unit 163. In the embodiment shown in FIG. 3, the drain unit 162 is slidably coupled to a lower portion of the outer case 110. However, other positions may also be appropriate based on the placement of the related components.

[0036] The drain unit 162 shown in FIG. 3 is detachably coupled to the outer case 110 so that it slides opened and closed like a drawer. A hand-hold hole 164 may be provided at a front side of the storing unit 163 to allow a user to grasp the storing unit 163. As the fabric treatment apparatus 100 is operated, condensed fluid from the inner case 120 and the condensing chamber 129 is collected in the storing unit 163. When the fabric treatment apparatus 100 stops, fluid remaining in the steam housing 142 may also be collected in the storing unit 163. If the storing unit 163 becomes filled to a predetermined level or the storing unit 163 is left in place for longer than a predetermined time, the storing unit 163 may be detached from the outer case 110 and emptied. In alternative embodiments, collected fluid may be directed into a drainage system of a building in which the apparatus is installed.

[0037] For ease of discussion, this fluid/steam/air circulation process is described having the refreshing unit 200 at a bottom portion of the treating space 125, and the outlet 127 at a top portion of the inner case 120. However, other arrangements which would maintain adequate circulation and flow may also be appropriate. For example, positions of the refreshing unit 200 and the outlet 127 could be reversed, and a fan could be added to facilitate the desired circulation.

[0038] FIG. 5 is a schematic block diagram schematically of a fabric treatment apparatus as embodied and broadly described, and FIG. 6 is a flowchart of a method of controlling a fabric treatment apparatus as embodied and broadly described herein. The method for controlling the fabric treatment apparatus 100 includes a steam mode for supplying steam into the treating space 125 by operating the steam supply device 140, a dry mode for supplying dry air into the treating space 125 by operating the dry air supply device 150, and a storing mode for controlling a humidity level in the treating space 125 by operating at least one of the steam supply device 140 and the dry air supply device 150. Hereinafter, the steam mode, the dry mode, and the storing mode will be described in detail.

[0039] In the steam mode, the steam supply device 140 supplies steam to the treating space 125, thereby refreshing fabric articles positioned in treating space 125 at step S1. That is, fluid is supplied from the supply tank 141 to the steam housing 142 of the steam supply device 140. The fluid in the steam housing 142 is heated by the steam heater 143 and transformed into steam. The steam is supplied to the treating space 125, where it removes odors, particles, wrinkles and the like from fabric articles.

[0040] In the dry mode, the dry air supply device 150 supplies dry air into the treating space 125 when the steam mode ends, and the dry air dries the fabric articles positioned in treating space 125 at step S2. That is, the ventilation fan 152 of the dry air supply device 150 is operated, dry air enters through the inlet 128, the dry air is heated by the dry heater, and the resulting high temperature dry air is discharged into the treating space 125 through the discharging hole 154 of the dry housing 151. Any wet air remaining in the treating space 125 is discharged into the condensing chamber 129 through the outlet 127, and the wet air is condensed in the condensing chamber 129. The condensed dry air is resupplied into the dry housing 151 through the inlet 128. Therefore, humidity is removed from the fabric articles by the dry air as it circulates from the dry air supply device 150, through the treating space 125 and into the condensing chamber 129.

[0041] After the steam mode and the dry mode end, the operations for the storing mode are performed by the controller 170 at step S3.

[0042] In the storing mode, the humidity sensor 130 senses the humidity level in the treating space 125, and the sensed humidity level is transferred to the controller 170. The controller 170 controls the steam supply device 140 or the dry air supply device 150 to maintain the humidity level in the treating space 125 between a first predetermined value and a second predetermined value that is smaller than the first predetermined value at steps S4 to S12.

[0043] That is, if the sensed humidity level is greater than or equal to the first predetermined value at step S5, the controller 170 operates the dry air supply device 150 at step S6 until the sensed humidity level reaches the second predetermined value at steps S7 and S8. On the contrary, if the sensed humidity level is less than or equal to the second predetermined value at step S9, the controller 170 operates the steam supply device 140 at step S10 until the sensed humidity level reaches the first predetermined value at steps S11 and S12. The first and second predetermined values may be stored in the controller 170 in advance.

[0044] The opening and closing sensor 113 senses whether the door 112 is open or closed. If the door 112 is closed at step S 13, the controller 170 may repeatedly perform the above described steps. If the sensor 113 senses that the door 112 has been opened at step S 13, the controller 170 may terminate the storing mode by stopping the steam supply device 140 and the dry air

supply device 150 at step S14. In certain embodiments, the storing mode stops when the door 112 opens, and the storing mode may automatically restart when the door 112 closes. Also, the storing mode may completely end when the door 112 opens, and the storing mode may be reinstated by operating the operating unit 115 when the door 112 is once again closed.

[0045] FIG. 7 is a schematic diagram of a fabric treatment apparatus according to another embodiment as broadly described herein, and FIG. 8 is a flowchart of a method for controlling a fabric treatment apparatus as embodied and broadly described herein.

[0046] The fabric treatment apparatus 250 shown in FIG. 7 may include a timer 131 for measuring an operating time of the steam supply device 140 or the dry air supply device 150. In this embodiment, the controller 170 may control the storing mode based on operating times measured by the timer 131 in the method shown in FIG. 8.

[0047] When the steam mode at step S51 and the dry mode at step S52 end, the storing mode begins at step S53. Since the steam mode and the dry mode may be controlled as described above with respect to the method shown in FIG. 6, a detailed description of the steam mode and the dry mode is omitted.

[0048] In this embodiment, the storing mode may include a stopping step for stopping the dry air supply device 150 and the steam supply device 140 for a predetermined time, and an operating step for operating at least one of the dry air supply device 150 and the steam supply device 140 for a second predetermined time. In the storing mode, the timer 131 measures an operating time of the fabric treatment apparatus 250 and transfers the measured time value to the controller 170. The controller 170 alternatively and repeatedly performs the stopping step and the operating step at steps S54 and S60.

[0049] More specifically, if the time value measured by the timer 31 is greater than or equal to the first predetermined time at step S55, the controller 170 determines that the apparatus has operated long enough and stops the dry air supply device 150 and the steam supply device 140 at step S56. If the measured time is less than the first predetermined time and less than the second predetermined time at steps S55 and S57, the controller 170 determines that the operating time is still not within an acceptable range defined by the first and second predetermined times, and operates the dry air supply device 150 or the steam supply device 140 until the measured time value reaches the second predetermined time at steps S57 and S58. The controller 170 stops and/or operates dry air supply device 150 or the steam supply device 140 repeatedly and alternatively for the first predetermined time and the second predetermined time. The first and second predetermined times may be values stored in the controller 170 in advance.

[0050] The opening and closing sensor 113 senses whether the door 112 is open or closed at steps S61 and S62. When the door 112 is closed, the controller 170 repeatedly performs the above described steps. When

the door 112 opens, the controller 170 ends the storing mode.

[0051] That is, the storing mode stops when the door 112 opens, and the storing mode may be resumed when the door 112 closes again. In certain embodiments, the storing mode may completely end when the door 112 opens, and the storing mode may restart by operating the operating unit 115 once the door 112 is closed again. In alternative embodiments, the storing mode may be automatically resumed once the door 112 is closed.

[0052] FIG. 9 is a flowchart of a method for controlling a fabric treatment apparatus in accordance with another embodiment as broadly described herein. In the embodiment shown in FIG. 9, the storing mode starts, temporarily stops, and then resumes based on a command received by the operating unit 115. Also, setup values may be input into the operating unit 115. That is, initial setup values may be input, and existing values may be changed through the operating unit 115. The storing mode may be initiated based on a command received by the operating unit 115, regardless of whether or not the steam mode and the dry mode has been completed.

[0053] In the embodiment shown in FIG. 9, first and second predetermined values representing an acceptable humidity range are input at step S101, and the storing mode is initiated at step S102. The humidity sensor 130 senses the humidity level in the treating space 125 at step S103 and transfers the sensed humidity level to the controller 170. The controller 170 selectively controls the steam supply device 140 or the dry air supply device 150 to maintain the humidity level in the treating space 125 within the range defined by the first predetermined value and the second predetermined value, which is less than the first predetermined value, at steps S104 to S111.

[0054] More specifically, if the sensed humidity level is greater than or equal to the first predetermined value at S104, the controller 170 determines that the humidity level in the treating space 125 exceeds the acceptable range, and operates the dry air supply device 150 at step S 105 until the humidity level reaches the second predetermined value at steps S106 and S107. If the sensed humidity level is less than the first and second predetermined values at steps S104 and S108, the controller 170 determines that the humidity level in the treating space 125 is below the acceptable range, and operates the steam supply device 140 until the humidity level reaches the first predetermined value at steps S 110 and S111. In certain embodiments, the first and second predetermined values are values input into the operating unit 115 by a user.

[0055] When a storing mode termination command is received by the controller 170 from the operating unit 115 at step S 112, the controller 170 ends the storing mode by stopping the steam supply device 140 and the dry air supply device 150. The storing mode may be temporarily stopped, or may be resumed based on a command input at the operating unit 115.

[0056] A method for controlling a fabric treatment ap-

paratus as embodied and broadly described herein may include a storing mode for controlling a humidity level in the treating space 125. Therefore, fabric articles can be stored in proper conditions, and a condition of the fabric articles can be sustained in the treating space 125 for long time. Thus, even if the fabric articles are not removed from the fabric treatment apparatus for long time, the fabric articles can be safely stored and their refreshed condition maintained, thereby improving convenience and reliability of the apparatus.

[0057] Fabric treatment apparatuses in accordance with various other embodiments as broadly described herein are shown in FIGs. 10-18. As shown in FIG. 10, an embodiment of a fabric apparatus 300 may include an outer case 310 and an inner case 320 disposed inside the outer case 310 to define a treating space 325. The outer case 310 may include an entrance 311, and door 312 rotatably coupled to the outer case 310 to open or to close the entrance 311.

[0058] An opening and closing sensor may be provided at the door 312 and the outer case 310 to sense the state of the door 312, and a locking unit may be provided at the door 312 and the outer case 310 to restrict movement of the door 312 when the door 312 is closed. The locking unit may include a latch 313 and a switch 314. In the embodiment shown in FIG. 10, the latch 313 is provided on a rear side of the door 312 and the switch 314 is provided at the front side of the outer case 310 corresponding to the latch 313. However, these positions may be reversed. The latch 313 is inserted into the switch 314 when the door 312 closes. The switch 314 holds the latch 313 to prevent the door 312 from opening. The locking unit is not limited to this structure, and may have various other structures.

[0059] A control panel 316 may be provided on an outer surface of the apparatus 300 so that the control panel 316 is accessible to a user during operation of the apparatus 300. For example, as shown in FIG. 11, the control panel 316 may be provided on the door 312 to control operation of the fabric treatment apparatus 300. The control panel 316 may include an operating unit 315 that receives inputs related to the operation of the fabric treatment apparatus 300. In alternative embodiments, the control panel 316 instead be provided on the inner case 320.

[0060] The inner case 320 may include side units 321 for forming opposite lateral sides of the treating space 320, a top side unit 322 for forming a top side of the treating space 325, a bottom side unit 323 for forming a bottom side of the treating space 325, and a rear side unit 324 for forming a rear side of the treating space 325. A rack unit 326 may be provided the inner case 320 for hanging fabric articles in the treatment space 325. The rack unit 326 may include a hanger bar 326a horizontally positioned in the treating space 325 with opposite ends coupled to the side units 321 to receive a plurality of hangers 326b. The hangers 326b may be fixed to the hanger bar 326a at a predetermined interval or may be movably

disposed along the hanger bar 326a. The rack unit 326 may have various other structures so as to receive hangers formed in various other structures. Also, a plurality of rack units 326 may be disposed in the treating space 325 at a predetermined interval.

[0061] An outlet 327 may be provided at a rear portion of the top side unit 322 for discharging air from the treating space 325 into a condensing chamber 329 formed between the rear side unit 324 and the outer case 310. An inlet 328 may be provided at a lower portion of the rear side unit 324 to allow for flow the condensing chamber 329 and the treating space 325. Other locations for the outlet 327, the inlet 328, and the condensing chamber 329 may also be appropriate. When air, and particularly wet air, enters the condensing chamber 329 from the treating space 325, the wet air exchanges heat with low temperature outside air using the outer case 310 as a heat-exchanging medium, thus condensing the wet air as the temperature drops. The outer case 310 may be formed of material having high thermal conductivity, such as, for example, steel or aluminum, in order to improve the performance of exchanging heat with the wet air.

[0062] The fabric treatment apparatus 300 may include a refreshing unit 375 including a steam supply device 330 for supplying steam to a plurality of locations in the treating space 325 to remove wrinkles and pollution source from fabric articles C stored in the treating space 325 in order to refresh the fabric articles C. The steam supply device 330 may include a plurality of nozzles 331 provided in the inner case 320 for spraying steam to the treating space 325, a plurality of steam channels 332 connected to the nozzles 331, and a steam generator 333 for supplying steam to the steam channels 332.

[0063] The nozzles 331 may be positioned at various locations within the treating space 325. For example, the nozzles 331 may be positioned at a height lower than a mid-point of fabric articles C hanging on the hangers 326b, as shown in FIG. 12. That is, since steam has a tendency to rise, the nozzles 331 may be positioned lower than the middle of the fabric articles C. Although the hangers 326b shown in FIG. 12 are disposed at a constant height in the inner case 320, the lengths of the fabric articles C may be different.

[0064] The mid-point of the fabric articles C may be experimentally calculated as an optimal height through predicting the varying lengths of typical fabric articles C to be refreshed by the fabric treatment apparatus 300 and estimating the frequencies of treating the fabric articles C. Also, the mid-point of the fabric articles C may be set as a mid-point of the longest fabric article C among typical fabric articles C to be refreshed by the fabric treatment apparatus 300. Other methods for determining the position(s) of the nozzles 331 may also be appropriate.

[0065] The nozzles 331 may form at least one nozzle set provided in the inner case 320 at the same height and at a predetermined interval. However, the nozzles 331 may form a plurality of nozzle sets. The plurality of nozzle sets may include a first nozzle set 335 provided

in the rear side unit 324 and a second nozzle set 336 provided in each of the two side units 321. In certain embodiments, the first and second nozzle sets 335 and 336 may be positioned at the same height. Other arrangements may also be appropriate.

[0066] The first nozzle set 335 may include a plurality of nozzles 331 provided in the rear side unit 324 and arranged substantially horizontally, as shown in FIGs. 11-12. Other arrangements may also be appropriate. The nozzles 331 of the first nozzle set 335 may be arranged corresponding to spaces between fabric articles C so as to inject steam toward the spaces. When so arranged, the nozzles 331 of the first nozzle set 335 inject steam toward the front of the treating space 325, in a direction orthogonal to the horizontal, left to right direction of the hangers 326b, in order to inject the steam deeply into the spaces between the fabric articles C.

[0067] The second nozzle set 336 may include a plurality of nozzles provided in both side units 321 in a front to back, substantially horizontal direction. Other arrangements may also be appropriate. The nozzles 331 of the second nozzle set 336 may be arranged corresponding the fabric articles C in order to direct steam onto the front side and the rear side of the fabric articles C. The nozzles 331 of the second nozzle set 336 may direct steam substantially parallel to the orientation the hangers 326b.

[0068] In the embodiment shown in FIG. 16, the fabric treatment apparatus 300 may include a third nozzle set 337 provided in the bottom side unit 323 of the inner case 320. The nozzles 331 of the third nozzle set 337 may be arranged in a left to right direction at a predetermined interval to direct steam in an upward direction. Steam injected by the third nozzle set 337 may be orthogonal to, or cross the left to right direction of the hangers 326b so as to inject steam into a lower inner portion of the fabric articles C.

[0069] In the embodiment shown in FIG. 17, the fabric treatment apparatus 300 may include a plurality of rack units 326 and nozzles 331 provided in the inner case 320. The plurality of rack units 326 may be positioned at, for example, an upper part and a lower part of the inner case 320, with a predetermined interval therebetween. First and/or second and/or third nozzle sets 335, 336 and 337 may be provided in the inner case 320 corresponding to the rack units 326. A plurality of rack units 326 may be provided at a plurality of different locations in the inner case 320, with the first and/or second and/or third nozzle sets 335, 336 and 337 positioned at sides of the inner case 320 as appropriate.

[0070] Referring to FIG. 15, the steam channel 332 may extend between the steam generator 333 and the nozzles 331 in order to guide the steam generated by the steam generator 333 into the nozzles 331. In certain embodiments, a number of steam channels 332 is the same as a number of nozzles 331 so that each nozzle 331 has its own corresponding steam channel 332, and the steam channels 332 are provided with at least one of the outer case 310 or the inner case 320. In alternative

embodiments, each steam channel 332 may convey steam to a plurality of nozzles 331. The steam channels 332 may be formed of a hollow member such as, for example, a pipe, a hose or a duct.

[0071] The steam generator 333 may include a fluid supply tank 341 for storing fluid, a steam housing 342 for receiving the fluid from the supply tank 341, and a steam heater 343 provided in the steam housing 342 to heat the fluid and generate steam. A supply channel 344 may extend between the supply tank 341 and the steam housing 342 to guide fluid therebetween under the control of a supply valve 345. A fluid level sensor 346 may be used to sense a level of fluid supplied through the supply channel 344. The steam heater 343 may include a sheath heater penetrating a portion of the steam housing 342 in order to heat the fluid stored in the steam housing 342 and generate steam.

[0072] The steam supply device 330 may also include a distributor 334 connected to the steam channels 332 and the steam generator 333 for distributing steam generated by the steam generator 333. The distributor 334 may appropriately distribute steam generated by the steam generator 333 into the nozzles 331 of the first and second nozzle sets 335 and 336. In certain embodiments, the distributor 334 may distribute the same amount of steam to each of the nozzles 331 of the first and second nozzle sets 335 and 336. In alternative embodiments, the distributor 334 can control the amount of steam distributed to each of the nozzles 331 of the first and second nozzle sets 335 and 336 individually or as a set.

[0073] The distributor 334 shown in FIG. 15 is positioned substantially adjacent the steam housing 342. However, in alternative embodiments, the distributor 334 may be positioned at a predetermined interval from the steam generator 333 and connected thereto by an additional steam channel so that the distributor 334 may be positioned, for example, at the outside of the outer case 310.

[0074] Referring to FIG. 13 and FIG. 14, the refreshing unit 375 may also include a dry air supply device 350 for supplying dry air into the clothing treating space 325. The dry air supply device 350 draws in air from the condensing chamber 329 or external air, generates high temperature dry air, and supplies the high temperature dry air to the treating space 325. Hereinafter, the dry air supply device 350 will be described based on drawing in air from the condensing chamber 329.

[0075] The dry air supply device 350 may include a dry air housing 351 in communication with the inlet 328, a ventilation fan 352 provided in the housing 351 to draw in air from the condensing chamber 329 and to discharge the air into the treating space 325, and a dry air heater (not shown) for heating the air before it is discharged into the treating space 325 through a discharge hole 354.

[0076] The dry air housing 351 may have a duct shape, with the inlet 328 connected to one side of the dry air housing 351, thereby forming an intake hole 353 through

which air from the condensing chamber 329 may be drawn in. The discharging hole 354 may be provided the other side of the dry air housing 351 to discharge the high temperature dry air into the treating space 325.

[0077] The steam supply device 330 and the dry air supply device 350 may be housed in a case 360 positioned within the treating space 325 or outside of the outer case 310. The case 360 may include coupling unit 361 that attachably couples the supply tank 341 to the case 360. Since the supply tank 341 may be easily disassembled from the coupling unit 361, the supply tank 341 can be easily removed and replaced. In alternative embodiments, fluid may be automatically supplied into the supply tank 341 by an external source through an additional supply channel (not shown). The case 360 may also include a hole in communication with the discharging hole 354 of the dry air supply device 350.

[0078] The refreshing apparatus may also include a drain unit 370 for externally discharging condensed fluid accumulated in the inner case 320 and the condensing chamber 329 and residual fluid from the steam generator 333. The drain unit 370 may include a storing unit 371 removably coupled the outer case 310 and having a space for storing the condensate and residual fluid, and a drain channel for guiding the condensed and residual fluid from the inner case 320, the condensing chamber 329, and the steam generator 333 to the storing space of the storing unit 371.

[0079] In the embodiment shown in FIG. 13, the storing unit 371 is coupled to a lower portion of the outer case 310 and is in the form of a drawer that slides into and out of the outer case 310. A hand-hold groove 372 may be provided at an exposed surface of the storing unit 371. When the fabric treatment apparatus 300 is driven, condensed fluid from the inner case 320 and the condensing chamber 329 is stored in the storing unit 371. When the fabric treatment apparatus 300 stops, residual fluid in the steam generator 333 is stored in the storing unit 371. If the storing unit 371 is filled to a predetermined level, or if the storing unit 371 has not been emptied for longer than a predetermined time, the storing unit 371 is separated from the outer case 310 and fluid in the storing unit 371 emptied.

[0080] The drain channel may include a first drain channel 373 that extends between the bottom side unit 323 of the inner case 320 and the storing unit 371, a second drain channel 374 that extends between the bottom side of the condensing chamber 329 and the storing unit 371, and a third drain channel 375 that extends between the bottom side of the steam housing 342 and the storing unit 371. A drain valve 376 may be provided along the third drain channel 375 for restricting fluid in the steam housing 342 from being drained while the fabric treatment apparatus 300 is driven.

[0081] Hereinafter, the operation of a fabric treatment apparatus according to an embodiment as broadly described herein will be described.

[0082] The fabric treatment apparatus 300 refreshes

fabric articles stored in the treating space 325 through a steam supplying operation that supplies steam into the treating space 325 by operating the steam supply device 330 and a dry air supplying operation that supplies dry air into the treating space 325 by operating the dry air supply device 350 after ending the steam supplying operation.

[0083] During the steam supplying operation, fluid is supplied from the supply tank 341 into the steam housing 342 of the steam generator 333, the fluid in the steam housing 342 is heated by the steam heater 343 and steam is generated. The distributor 334 properly distributes the steam into the steam channels 332. Then, the steam flows along the steam channels 332 to the nozzles 331 of the first and/or second and/or third nozzle sets 335, 336 and 337. The nozzles 331 inject the steam into the treating space 325, and the injected steam refreshes the fabric articles in the treating space 325.

[0084] Since the first, second and third nozzle sets 335, 336 and 337 are disposed at different locations in the inner case 320, steam may be simultaneously supplied to a plurality of locations in the treating space 325. Also, steam may be supplied to the plurality of locations in multiple directions. Thus, a time of filling the treating space 325 with steam may be reduced, and the density of steam in the treating space 325 may be uniform. Therefore, the steam may uniformly treat the fabric articles C in treating space 325.

[0085] More specifically, since the nozzles 331 of the first nozzle set 335 are disposed corresponding to spaces between the fabric articles C in the treating space 325, the steam may deeply penetrate into the spaces, and the steam contacts greater areas of the fabric articles C. That is, steam injected from the first nozzle set 335 smoothly circulates to the front side and to the rear side of the fabric articles C as it passes through the spaces without being disturbed by the fabric articles C. Therefore, the performance of the refreshing operation may be improved, and the front and rear sides of the fabric articles C may be uniformly refreshed.

[0086] Since the nozzles 331 of the first and second nozzle sets 335 and 336 are positioned at a predetermined height, for example, a height that is lower than a mid-point of fabric articles C on the hangers 326b, the steam injected from the nozzles 331 is able to rise while also maintaining sufficient contact with the fabric articles C. Since the time and the contact area between the steam and the fabric articles C increases, the performance of refreshing operation may be improved and the amount of steam used may be reduced.

[0087] The steam injected by the nozzles 331 may remove pollution particles and foul odor from the fabric articles C. Also, the steam may remove wrinkles from the fabric articles C so that the fabric articles C appear freshly laundered/ironed.

[0088] In the dry air supplying operation, the dry air supply device 350 is operated and supplies dry air into the treating space 325 when the steam supplying oper-

ation ends. That is, the ventilation fan 352 is turned on, and air enters through the inlet 328. After the dry air heater heats the air, hot dry air is discharged into the treating space 325 through the discharging hole 354 of the dry air housing 351. The high temperature dry air absorbs any humidity from the refreshed fabric articles C and is then discharged into the condensing chamber 329 through the outlet 327. The discharged air is condensed in the condensing chamber 329 while exchanging heat with outside air. The air is then re-supplied into the dry air housing 351 through the inlet 328. Therefore, humidity may be removed by air circulating in the dry air supply device 350 and the condensing chamber 329.

[0089] FIG. 18 is a front view of a fabric treatment apparatus according to another embodiment as broadly described herein. The fabric treatment apparatus 400 shown in FIG. 18 may include a first nozzle set 435 including a plurality of nozzles 431 provided at both side units 321 and the rear side unit 324 of the inner case 320, arranged in a top to bottom, substantially vertical direction at a predetermined interval. That is, the nozzles 431 of the first nozzle set 435 may be arranged at the rear side unit 324 of the inner case 320 in a left to right direction at a predetermined interval to face spaces between the fabric articles C in the treating space 325. The plurality of nozzles 431 may also be arranged in a top to bottom direction at a predetermined interval along spaces between the fabric articles C.

[0090] Also, nozzles 431 of a second nozzle set 436 may be positioned in a front to back direction at a predetermined interval facing fabric articles C in the treating space 325. The plurality of nozzles 431 of the second nozzle set 436 may also be arranged in the top to bottom direction along the fabric articles C at a predetermined interval.

[0091] The nozzles 431 of the first and second nozzle sets 435 and 436 may be connected to a steam channel 332 to receive steam collectively, or may be connected to a plurality of steam channels 332 to receive steam individually. In certain embodiments, a distance between adjacent nozzles 431 may gradually decrease in a downward direction, or may gradually increase in an upward direction. Because steam has a tendency to rise in the treating space 325 after being injected by the first and second nozzle sets 435 and 436, such an arrangement allows more steam to be injected at a lower portion of the treating space 325 and gathered at an upper portion of the treating space 325.

[0092] In certain embodiments, the first and second nozzle sets 435 and 436 may be substantially horizontally arranged at the rear side unit 324 and both side units 321 at substantially the same height. Also, the first and second nozzle sets 435 and 436 may be positioned at a height lower than the mid-point of fabric articles C hanging on the hangers 326b. Other arrangements may also be appropriate.

[0093] The fabric treatment apparatus 400 as embodied and broadly described herein can uniformly supply

steam to the fabric articles C using a relatively small amount of steam through the first and second nozzle sets 435 and 436. The nozzles 431 can be arranged at the side units 321, the rear side unit 324, the bottom side unit 323, and the top side unit 322 of the inner case 320. Also, the nozzles 431 may be rearranged in various patterns according to the shape of the treating space 325, for example, in an oblique line, a curved line, a polygon, a circle, and other arrangements as appropriate. Furthermore, the nozzles 431 may also be provided at the inner side of the door 312.

[0094] Additional details regarding the structure and functionality of fabric treatment/refreshing apparatuses can be found in Korean Patent Application Nos. 37889/2006, 43405/2006, 131041/2006 and 131040/2006.

Industrial Applicability

[0095] A fabric treatment apparatus as embodied and broadly described herein supplies steam to a plurality of locations in the treating space. As a result, steam is uniformly supplied to numerous locations in the treating space, and the performance of the refreshing operation does not vary significantly based on location within the treating space.

[0096] The clothing treatment apparatus as embodied and broadly described herein may also reduce a time of supplying steam to all fabric articles in the treating space, thereby reducing a time to perform a refreshing operation and improving performance of the apparatus.

[0097] Any reference in this specification to "one embodiment", "an exemplary", "example embodiment", "certain embodiment", "alternative embodiment", and the like means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment as broadly described herein. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to affect such feature, structure, or characteristic in connection with other ones of the embodiments.

[0098] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, numerous variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A method for controlling a fabric treatment apparatus (100) including a case that defines a treatment space (125), a steam supply device (140) that supplies steam to the treatment space, and a dry air supply device (150) that supplies dry air into the space, the method comprising:

initiating a steam mode and supplying steam to the treatment space (125) by operating the steam supply device (140); and
initiating a dry mode and supplying dry air to the treatment space (125) by operating the dry air supply device (150);

characterized in that the method further comprises:

initiating a storing mode and selectively controlling the steam supply device (140) and the dry air supply device (150) so as to maintain a humidity level in the treatment space (125) within a predetermined range.

2. The method of claim 1, wherein initiating the storing mode comprises initiating the storing mode after the steam mode or the dry mode is terminated.

3. The method of claim 2, further comprising receiving, in an operating unit (115) that controls operation of the apparatus (100), a termination command, and terminating the storing mode based on the termination command.

4. The method of claim 2, further comprising temporarily stopping the storing mode when a door (112) coupled to the case opens, and resuming the storing mode when the door closes.

5. The method of claim 2, further comprising automatically terminating the storing mode when a door (112) coupled to the case opens, and resuming the storing mode based on an input received by an operating unit that controls operation of the apparatus.

6. The method of claim 2, wherein initiating the storing mode comprises sensing a humidity level in the treatment space (125) using a humidity sensor (130) and maintaining a humidity level in the treatment space between a first predetermined value and a second predetermined value that is less than the first predetermined value.

7. The method of claim 6, further comprising operating the dry air supply device (150) until the humidity level sensed by the humidity sensor (130) is greater than or equal to the second predetermined value if the sensed humidity level is less than the second pre-

determined value in the storing mode.p

8. The method of claim 6, further comprising operating the steam supply device (140) until the humidity level sensed by the humidity sensor (130) is less than or equal to the first predetermined value if the sensed humidity level is greater than the first predetermined value in the storing mode. 5
9. The method of claim 6, further comprising setting or modifying the first and second predetermined values using an operating unit (115) that controls operation of the apparatus (100). 10
10. The method of claim 2, wherein the storing mode comprises performing a storing cycle, wherein the storing cycle comprises stopping the dry air supply device (150) and the steam supply device (140) for a first predetermined elapsed time, and operating at least one of the dry air supply device or steam supply device for a second predetermined elapsed time. 15 20
11. The method of claim 10, further comprising repeating the storing cycle until a termination command is received. 25
12. A fabric treatment apparatus (100), comprising:
 - a main body (80) that defines a treatment space (125); 30
 - a door (112) coupled to the main body and configured to selectively open and close the treatment space;
 - a treatment unit (200) in communication with the main body (80), wherein the treatment unit comprises: 35
 - a steam supply (140) configured to supply steam to the treatment space; and
 - a dry air supply (150) configured to supply dry air to the treatment space; 40

characterized in that the apparatus (100) further comprises: 45

 - a controller (170) configured to selectively operate the steam supply (140) and the dry air supply (150) so as to maintain a humidity level in the treatment space (125) within a predetermined range. 50- 13. The apparatus of claim 12, further comprising:
 - a humidity sensor (130) configured to sense a humidity level in the treatment space (125) and to transmit a corresponding signal to the controller (170); and 55
 - an operating unit (115) configured to receive ex-

ternal operating commands and to transmit corresponding signals to the controller, wherein the controller (170) is configured to selectively operate the steam supply (140) and the dry air supply (150) based on the humidity level sensed by the humidity sensor (130) and the operating commands received by the operating unit (115) and the corresponding signals transmitted thereto.

14. The apparatus of claim 12, further comprising:

a timer (131) configured to monitor elapsed time of operation of the steam supply (140) and the dry air supply (150) and to transmit corresponding signals to the controller (170); and an operating unit (115) configured to receive external operating commands and to transmit corresponding signals to the controller (170), wherein the controller is configured to selectively operate the steam supply and the dry air supply based on the elapsed time of operation measured by the timer and the operating commands received by the operating unit and the corresponding signals transmitted thereto.

15. The apparatus of claim 12, further comprising:

a door sensor (113) configured to sense an opening and closing of the door (112) and to transmit a corresponding signal to the controller (170), wherein the controller is configured to selectively operate the steam supply (140) and the dry air supply (150) based on an opened or closed state of the door sensed by the door sensor.

Patentansprüche

1. Verfahren zur Steuerung einer Stoffverarbeitungsvorrichtung (100), die ein Gehäuse, das einen Verarbeitungsraum (125) definiert, eine Dampfzuführungsvorrichtung (140), die Dampf an den Verarbeitungsraum zuführt, und eine Trockenluftzuführungsvorrichtung (150), die trockene Luft an den Raum zuführt, umfasst, wobei das Verfahren aufweist:

Einleiten einer Dampfbetriebsart und Zuführen von Dampf an den Verarbeitungsraum (125) durch Betreiben der Dampfzuführungsvorrichtung (140); und
Einleiten einer Trocknungsbetriebsart und Zuführen von Trockenluft an den Verarbeitungsraum (125) durch Betreiben der Trockenluftzuführungsvorrichtung (150);
dadurch gekennzeichnet, dass das Verfahren ferner aufweist:

- Einleiten einer Lagerbetriebsart und selektives Steuern der Dampfzuführungsvorrichtung (140) und der Trockenluftzuführungsvorrichtung (150), um einen Feuchtigkeitspegel in dem Verarbeitungsraum (125) innerhalb eines vorgegebenen Bereichs zu halten.
2. Verfahren nach Anspruch 1, wobei das Einleiten der Lagerbetriebsart das Einleiten der Lagerbetriebsart aufweist, nachdem die Dampfbetriebsart oder die Trocknungsbetriebsart beendet ist. 10
 3. Verfahren nach Anspruch 2, das ferner das Empfangen eines Beendungsbefehls in einer Bedieneinheit (115), die den Betrieb der Vorrichtung (100) steuert, und das Beenden der Lagerbetriebsart basierend auf diesem Beendungsbefehl aufweist. 15
 4. Verfahren nach Anspruch 2, das ferner das vorübergehende Stoppen der Lagerbetriebsart, wenn eine mit dem Gehäuse verbundene Klappe (112) sich öffnet, und das Wiederaufnehmen der Lagerbetriebsart, wenn die Klappe sich schließt, aufweist. 20
 5. Verfahren nach Anspruch 2, das ferner das automatische Beenden der Lagerbetriebsart, wenn eine mit dem Gehäuse verbundene Klappe (112) sich öffnet, und das Wiederaufnehmen der Lagerbetriebsart basierend auf einer Eingabe, die von einer Bedieneinheit empfangen wird, die den Betrieb der Vorrichtung steuert, aufweist. 25
 6. Verfahren nach Anspruch 2, wobei das Einleiten der Lagerbetriebsart das Abtasten eines Feuchtigkeitspegels in dem Verarbeitungsraum (125) unter Verwendung eines Feuchtigkeitssensors (130) und das Aufrechterhalten eines Feuchtigkeitspegels in dem Verarbeitungsraum zwischen einem ersten vorgegebenen Wert und einem zweiten vorgegebenen Wert, der kleiner als der erste vorgegebene Wert ist, aufweist. 30
 7. Verfahren nach Anspruch 6, das ferner das Betreiben der Trockenluftzuführungsvorrichtung (150) aufweist, bis der von dem Feuchtigkeitssensor (130) abgetastete Feuchtigkeitspegel größer oder gleich dem zweiten vorgegebenen Wert ist, wenn der abgetastete Feuchtigkeitspegel niedriger als der zweite vorgegebene Wert in der Lagerbetriebsart ist. 35
 8. Verfahren nach Anspruch 6, das ferner das Betreiben der Dampfzuführungsvorrichtung (140) aufweist, bis der von dem Feuchtigkeitssensor (130) abgetastete Feuchtigkeitspegel kleiner oder gleich dem ersten vorgegebenen Wert ist, wenn der abgetastete Feuchtigkeitspegel größer als der erste vorgegebene Wert in der Lagerbetriebsart ist. 40
 9. Verfahren nach Anspruch 6, das ferner das Festlegen oder Modifizieren der ersten und zweiten vorgegebenen Werte unter Verwendung einer Bedieneinheit (115), die den Betrieb der Vorrichtung (100) steuert, aufweist. 45
 10. Verfahren nach Anspruch 2, wobei die Lagerbetriebsart das Durchführen eines Lagerzyklus aufweist, wobei der Lagerzyklus eine erste vorgegebene Ablaufzeit lang das Stoppen der Trockenluftzuführungsvorrichtung (150) und der Dampfzuführungsvorrichtung (140) und eine zweite vorgegebene Ablaufzeit lang das Betreiben der Trockenluftzuführungsvorrichtung und/oder der Dampfzuführungsvorrichtung aufweist. 50
 11. Verfahren nach Anspruch 10, das ferner das Wiederholen des Lagerzyklus aufweist, bis ein Beendigungsbefehl empfangen wird.
 12. Stoffverarbeitungsvorrichtung (100), die aufweist:
 - einen Hauptkörper (80), der einen Verarbeitungsraum (125) definiert:
 - eine Klappe (112), die mit dem Hauptkörper verbunden ist und aufgebaut ist, um den Verarbeitungsraum selektiv zu öffnen und zu schließen;
 - eine Verarbeitungseinheit (200) in Verbindung mit dem Hauptkörper (80), wobei die Behandlungseinheit aufweist:
 - eine Dampfzuführungsvorrichtung (140), die aufgebaut ist, um Dampf an den Verarbeitungsraum zuzuführen; und
 - eine Trockenluftzuführungsvorrichtung (150), die aufgebaut ist, um trockene Luft an den Raum zuzuführen;
- dadurch gekennzeichnet, dass** die Vorrichtung (100) ferner aufweist:
- eine Steuerung (170), die aufgebaut ist, um selektiv die Dampfzuführung (140) und die Trockenluftzuführung (150) zu betreiben, um einen Feuchtigkeitspegel in dem Verarbeitungsraum (125) innerhalb eines vorgegebenen Bereichs zu halten.
13. Vorrichtung nach Anspruch 12, die ferner aufweist:
 - einen Feuchtigkeitssensor (130), der aufgebaut ist, um einen Feuchtigkeitspegel in dem Verarbeitungsraum (125) abzutasten und das entsprechende Signal an die Steuerung (170) zu

senden; und
 eine Bedieneinheit (115), die aufgebaut ist, um externe Bedienbefehle zu empfangen und entsprechende Signale an die Steuerung zu senden, wobei die Steuerung (170) aufgebaut ist, um basierend auf dem von dem Feuchtigkeits-sensor (130) abgetasteten Feuchtigkeitspegel und den von der Bedieneinheit (115) empfangenen Bedienbefehlen und den entsprechenden an sie gesendeten Signalen selektiv die Dampfzuführung (140) und die Trockenluftzuführung (150) zu betreiben.

14. Vorrichtung nach Anspruch 12, die ferner aufweist:

einen Zeitschalter (131), der aufgebaut ist, um die Ablaufzeit des Betriebs der Dampfzuführung (140) und der Trockenluftzuführung (150) zu überwachen und entsprechende Signale an die Steuerung (170) zu senden; und
 eine Bedieneinheit (115), die aufgebaut ist, um externe Bedienbefehle zu empfangen und entsprechende Signale an die Steuerung (170) zu senden, wobei die Steuerung aufgebaut ist, um die Dampfzuführung und die Trockenluftzuführung basierend auf der von dem Zeitschalter gemessenen Betriebsablaufzeit und den von der Bedieneinheit empfangenen Befehlen und den entsprechenden an sie gesendeten Signalen selektiv zu betreiben.

15. Vorrichtung nach Anspruch 12, die ferner aufweist:

einen Klappensensor (113), der aufgebaut ist, um ein Öffnen und Schließen der Klappe (112) abzutasten und ein entsprechendes Signal an die Steuerung (170) zu senden, wobei die Steuerung aufgebaut ist, um die Dampfzuführung (140) und die Trockenluftzuführung (150) basierend auf einem geöffneten oder geschlossenen Zustand der Klappe, der von dem Klappensensor abgetastet wird, selektiv zu betreiben.

Revendications

1. Procédé pour commander un appareil de traitement de tissu (100) comprenant un boîtier qui définit un espace de traitement (125), un dispositif d'alimentation en vapeur (140) qui fournit de la vapeur à l'espace de traitement, et un dispositif d'alimentation en air sec (150) qui fournit de l'air sec dans l'espace, le procédé comprenant :

l'initiation d'un mode vapeur et la fourniture de vapeur à l'espace de traitement (125) en mettant le dispositif d'alimentation en vapeur (140) en

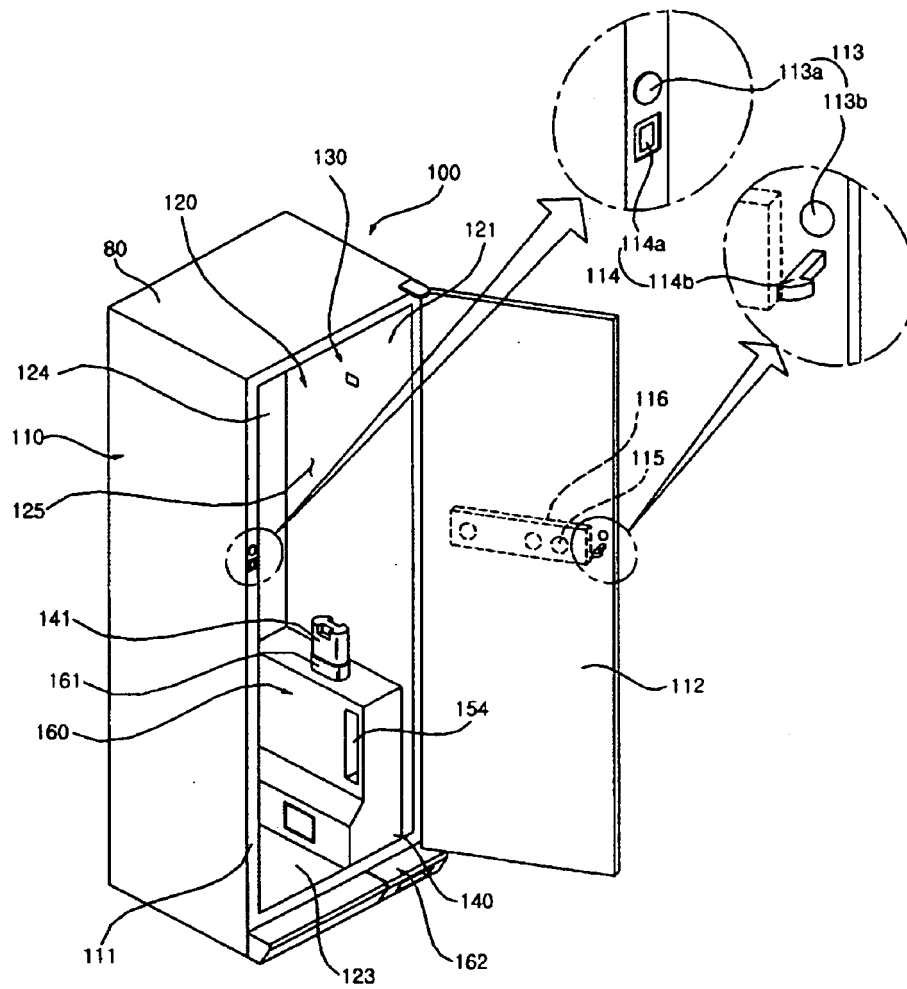
fonctionnement ; et
 l'initiation d'un mode sec et la fourniture d'air sec à l'espace de traitement (125) en mettant le dispositif d'alimentation en air sec (150) en fonctionnement ;
caractérisé en ce que le procédé comprend en outre :

l'initiation d'un mode de stockage et la commande sélective du dispositif d'alimentation en vapeur (140) et du dispositif d'alimentation en air sec (150) afin de maintenir un niveau d'humidité dans l'espace de traitement (125) au sein d'une plage prédéterminée.

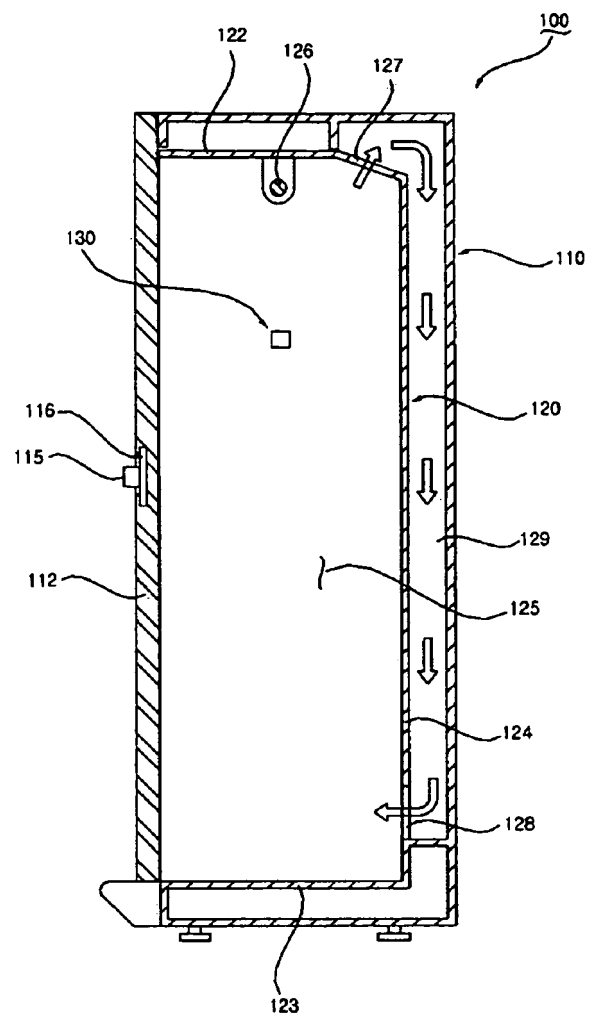
2. Procédé selon la revendication 1, dans lequel l'initiation du mode de stockage comprend l'initiation du mode de stockage après que le mode vapeur ou le mode sec est terminé.
3. Procédé selon la revendication 2, comprenant en outre la réception, dans une unité de fonctionnement (115) qui commande le fonctionnement de l'appareil (100), d'une commande de terminaison, et la terminaison du mode de stockage sur la base de la commande de terminaison.
4. Procédé selon la revendication 2, comprenant en outre l'arrêt temporaire du mode de stockage lorsqu'une porte (112) accouplée avec le boîtier s'ouvre, et le retour au mode de stockage lorsque la porte se ferme.
5. Procédé selon la revendication 2, comprenant en outre la terminaison automatique du mode de stockage lorsqu'une porte (112) accouplée avec le boîtier s'ouvre, et le retour au mode de stockage sur la base d'une entrée reçue par une unité de fonctionnement qui commande le fonctionnement de l'appareil.
6. Procédé selon la revendication 2, dans lequel l'initiation du mode de stockage comprend la détection d'un niveau d'humidité dans l'espace de traitement (125) en utilisant un capteur d'humidité (130) et le maintien d'un niveau d'humidité dans l'espace de traitement entre une première valeur prédéterminée et une deuxième valeur prédéterminée qui est inférieure à la première valeur prédéterminée.
7. Procédé selon la revendication 6, comprenant en outre le fonctionnement du dispositif d'alimentation en air sec (150) jusqu'à ce que le niveau d'humidité détecté par le capteur d'humidité (130) soit supérieur ou égal à la deuxième valeur prédéterminée si le niveau d'humidité détecté est inférieur à la deuxième valeur prédéterminée dans le mode de stockage.

8. Procédé selon la revendication 6, comprenant en outre le fonctionnement du dispositif d'alimentation en vapeur (140) jusqu'à ce que le niveau d'humidité détecté par le capteur d'humidité (130) soit inférieur ou égal à la première valeur prédéterminée si le niveau d'humidité détecté est supérieur à la première valeur prédéterminée dans le mode de stockage.
9. Procédé selon la revendication 6, comprenant en outre le réglage ou la modification des première et deuxième valeurs prédéterminées en utilisant une unité de fonctionnement (115) qui commande le fonctionnement de l'appareil (100).
10. Procédé selon la revendication 2, dans lequel le mode de stockage comprend la réalisation d'un cycle de stockage, dans lequel le cycle de stockage comprend l'arrêt du dispositif d'alimentation en air sec (150) et du dispositif d'alimentation en vapeur (140) pendant un premier temps écoulé prédéterminé, et le fonctionnement d'au moins un élément parmi le dispositif d'alimentation en air sec ou le dispositif d'alimentation en vapeur pendant un deuxième temps écoulé prédéterminé.
11. Procédé selon la revendication 10, comprenant en outre la répétition du cycle de stockage jusqu'à ce qu'une commande de terminaison soit reçue.
12. Appareil de traitement de tissu (100), comprenant :
- un corps principal (80) qui définit un espace de traitement (125) ;
 - une porte (112) accouplée avec le corps principal et configurée pour ouvrir et fermer sélectivement l'espace de traitement ;
 - une unité de traitement (200) en communication avec le corps principal (80), dans lequel l'unité de traitement comprend :
 - une alimentation en vapeur (140) configurée pour fournir de la vapeur à l'espace de traitement ; et
 - une alimentation en air sec (150) configurée pour fournir de l'air sec à l'espace de traitement ;
- caractérisé en ce que** l'appareil (100) comprend en outre :
- un dispositif de commande (170) configuré pour mettre sélectivement en fonctionnement l'alimentation en vapeur (140) et l'alimentation en air sec (150) afin de maintenir un niveau d'humidité dans l'espace de traitement (125) au sein d'une plage prédéterminée.
13. Appareil selon la revendication 12, comprenant en outre :
- un capteur d'humidité (130) configuré pour détecter un niveau d'humidité dans l'espace de traitement (125) et pour transmettre un signal correspondant au dispositif de commande (170) ; et
 - une unité de fonctionnement (115) configurée pour recevoir des commandes de fonctionnement externes et pour transmettre des signaux correspondants au dispositif de commande, dans lequel le dispositif de commande (170) est configuré pour mettre sélectivement l'alimentation en vapeur (140) et l'alimentation en air sec (150) en fonctionnement sur la base du niveau d'humidité détecté par le capteur d'humidité (130) et des commandes de fonctionnement reçues par l'unité de fonctionnement (115) et des signaux correspondants transmis à celui-ci.
14. Appareil selon la revendication 12, comprenant en outre :
- une minuterie (131) configurée pour surveiller le temps écoulé de fonctionnement de l'alimentation en vapeur (140) et de l'alimentation en air sec (150) et pour transmettre des signaux correspondants au dispositif de commande (170) ; et
 - une unité de fonctionnement (115) configurée pour recevoir des commandes de fonctionnement externes et pour transmettre des signaux correspondants au dispositif de commande (170), dans lequel le dispositif de commande est configuré pour mettre sélectivement l'alimentation en vapeur et l'alimentation en air sec en fonctionnement sur la base du temps écoulé de fonctionnement mesuré par la minuterie et des commandes de fonctionnement reçues par l'unité de fonctionnement et des signaux correspondants transmis à celui-ci.
15. Appareil selon la revendication 12, comprenant en outre :
- un capteur de porte (113) configuré pour détecter une ouverture et une fermeture de la porte (112) et pour transmettre un signal correspondant au dispositif de commande (170), dans lequel le dispositif de commande est configuré pour mettre sélectivement en fonctionnement l'alimentation en vapeur (140) et l'alimentation en air sec (150) sur la base d'un état ouvert ou fermé de la porte détecté par le capteur de porte.

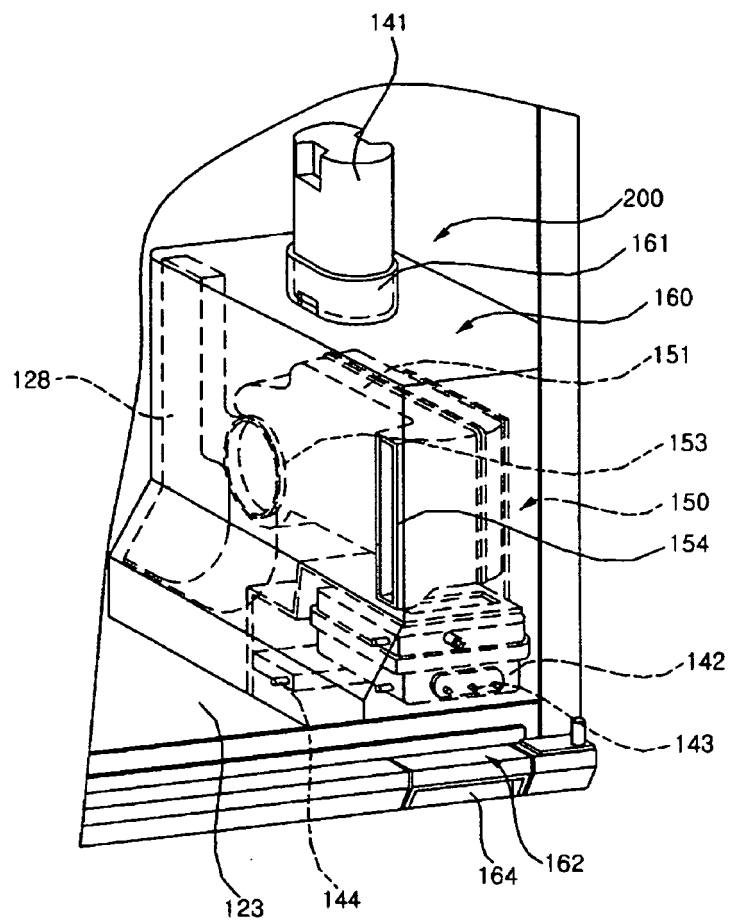
[Fig. 1]



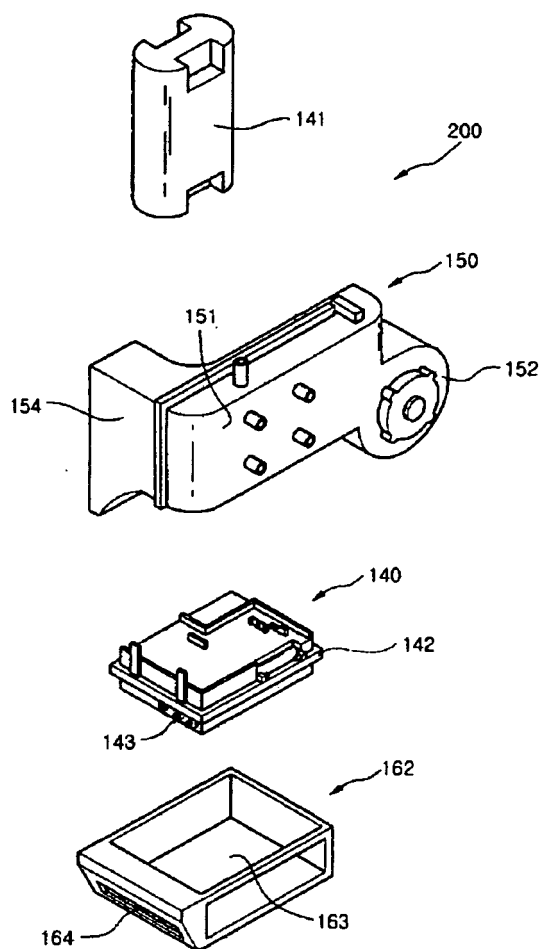
[Fig. 2]



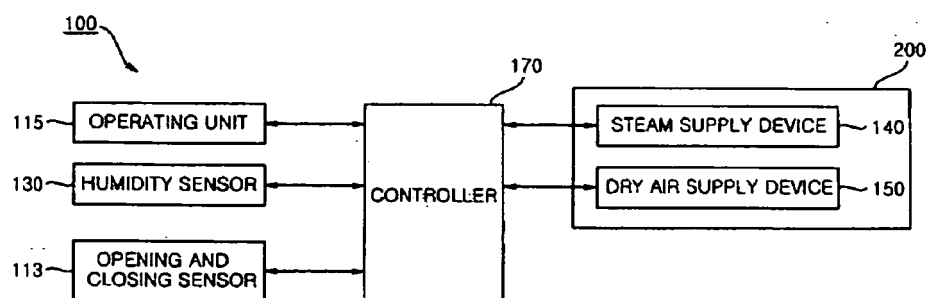
[Fig. 3]



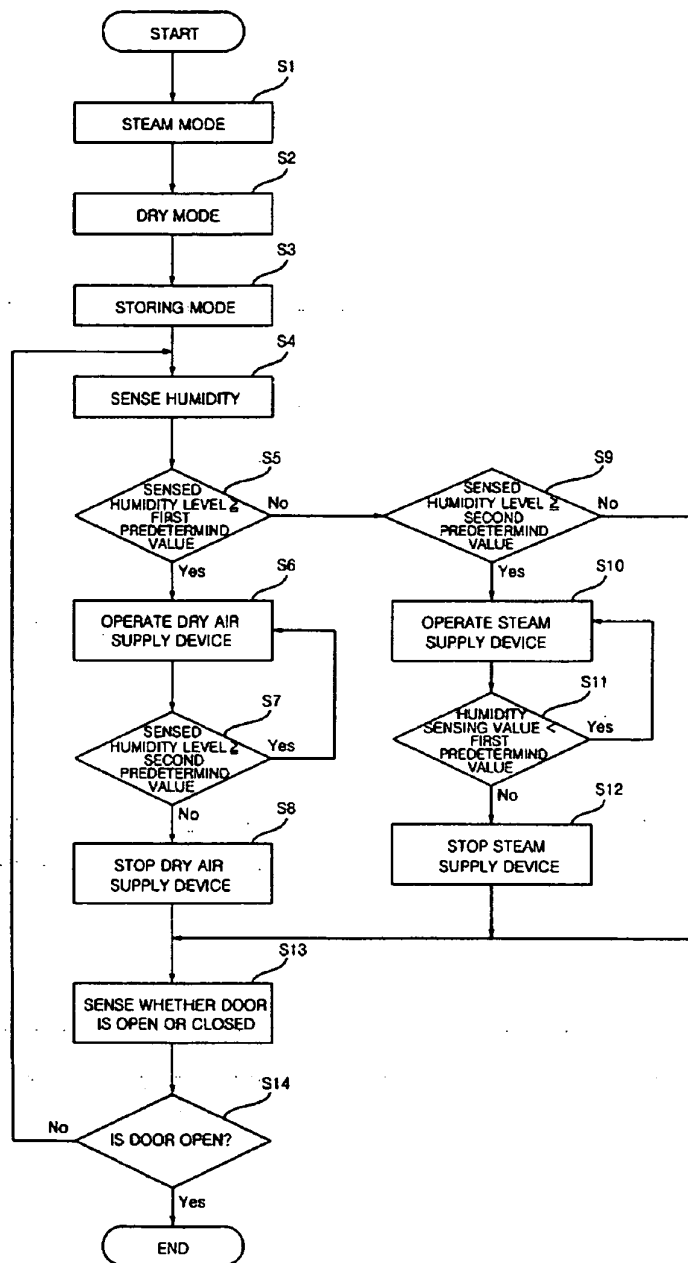
[Fig. 4]



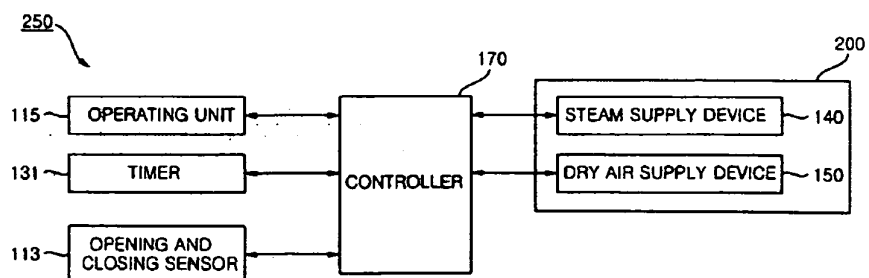
[Fig. 5]



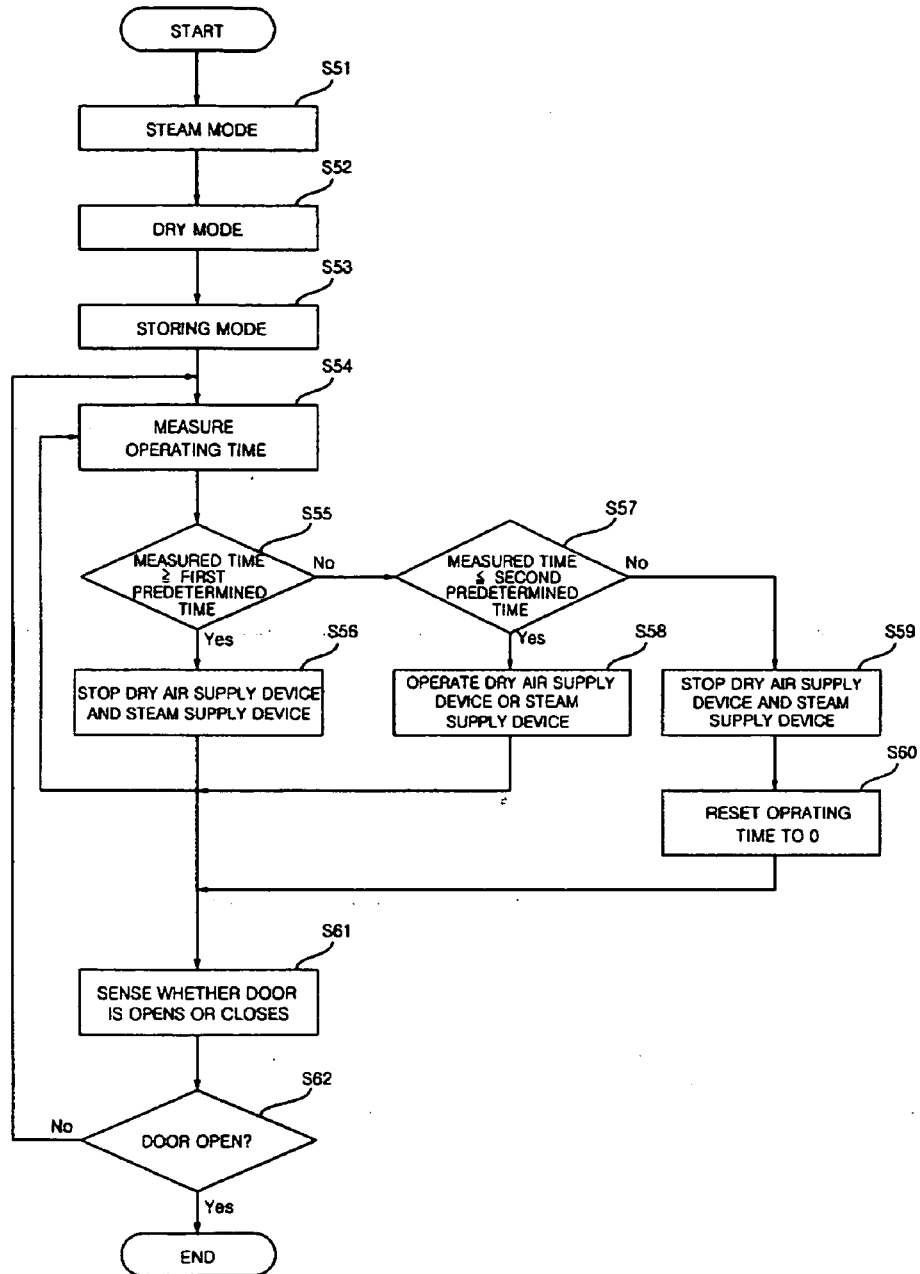
[Fig. 6]



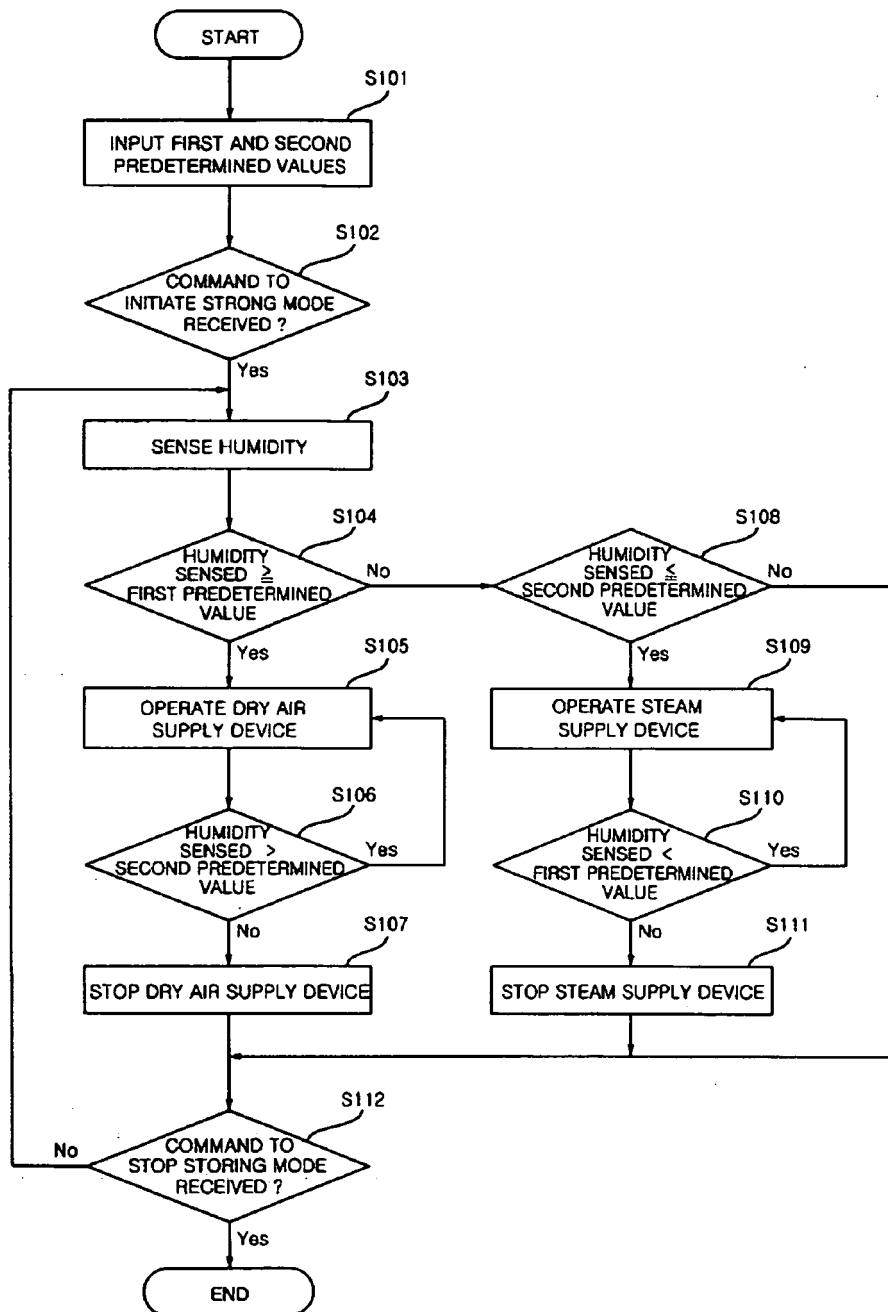
[Fig. 7]



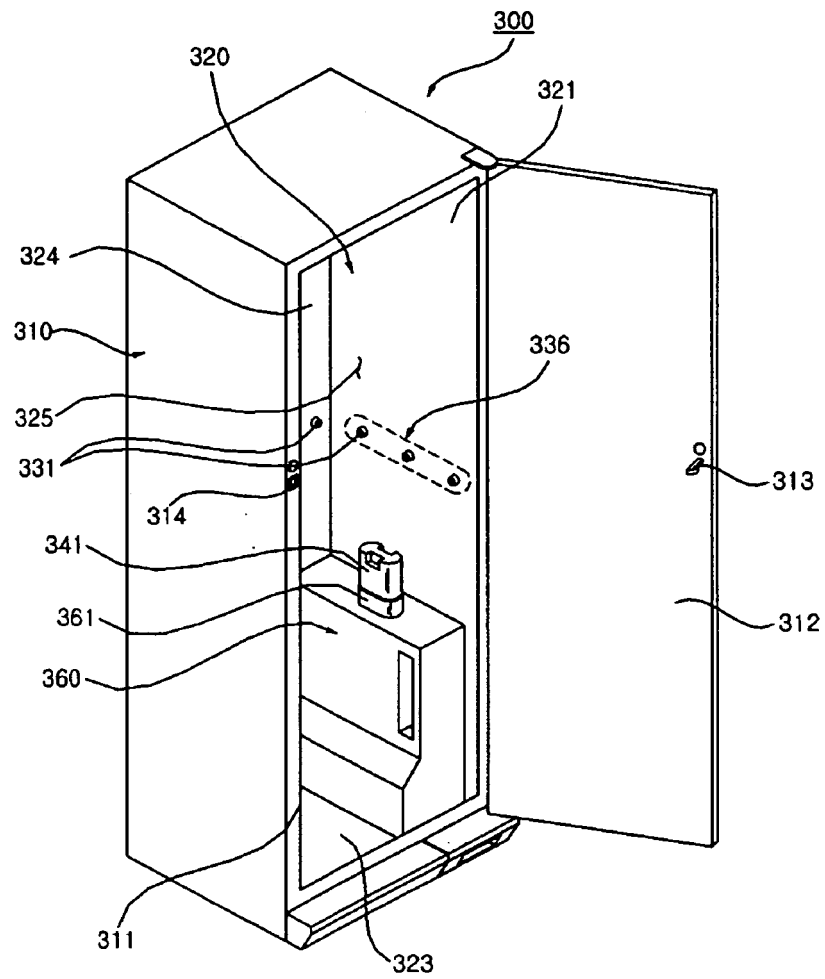
[Fig. 8]



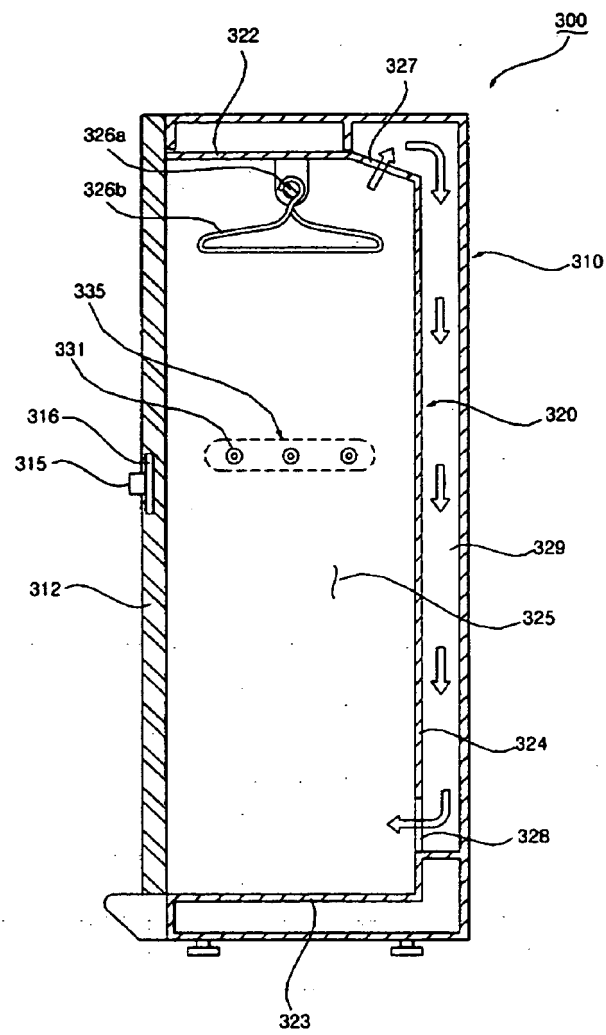
[Fig. 9]



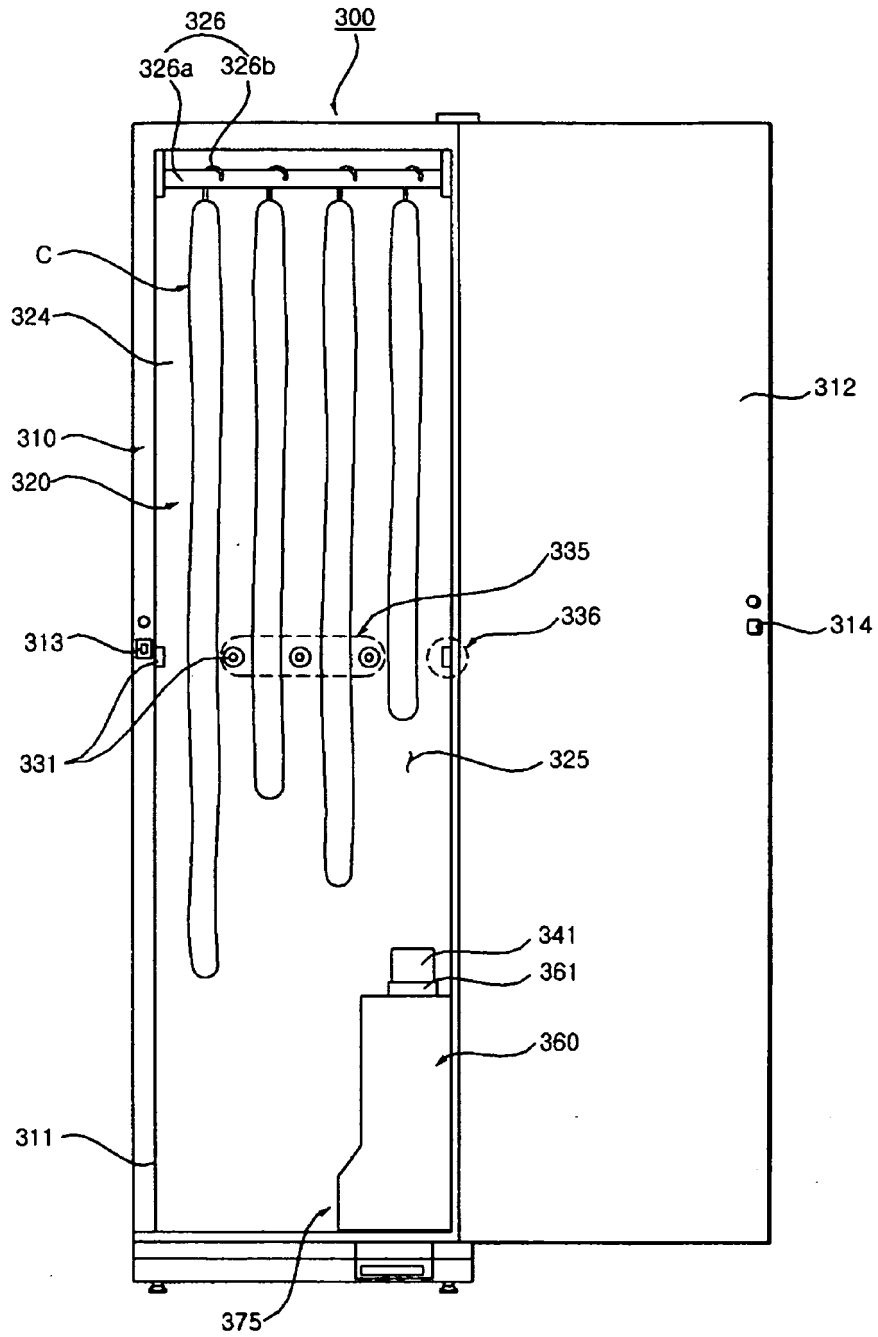
[Fig. 10]



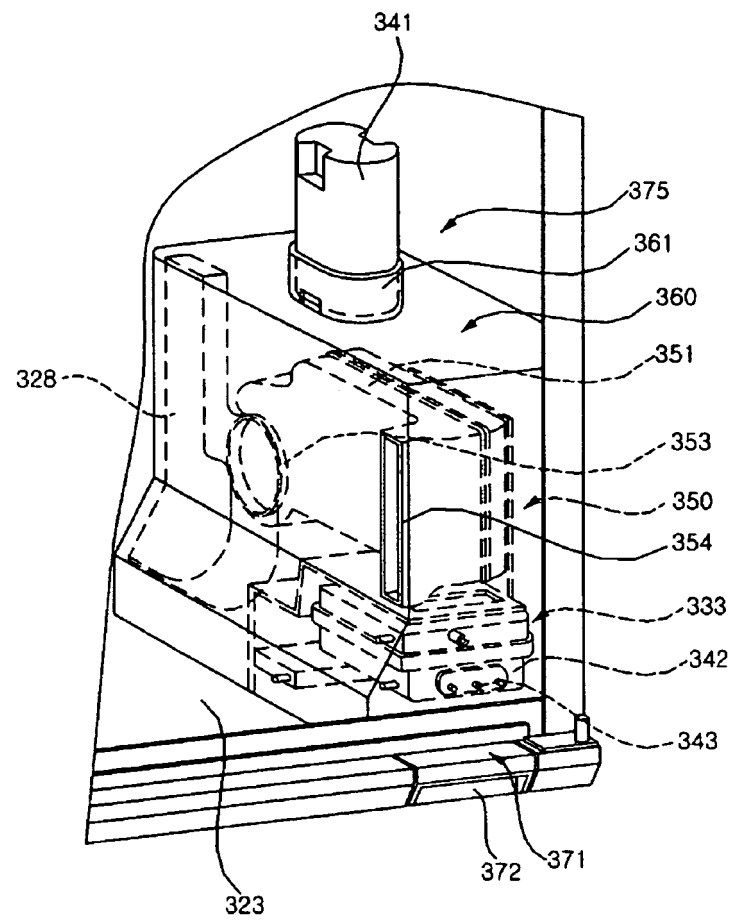
[Fig. 11]



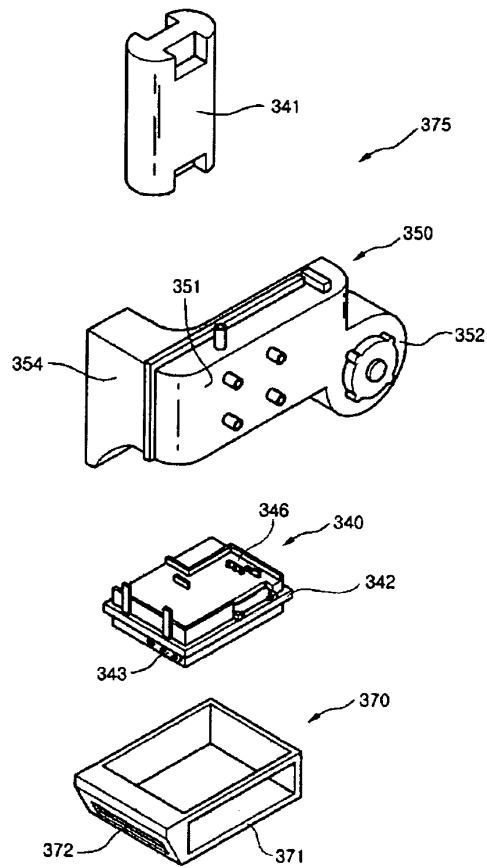
[Fig. 12]



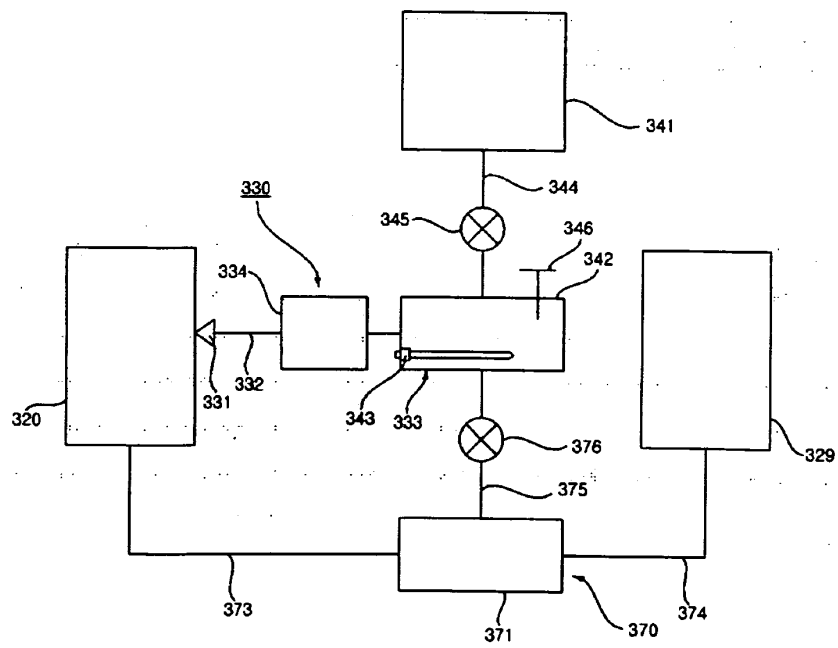
[Fig. 13]



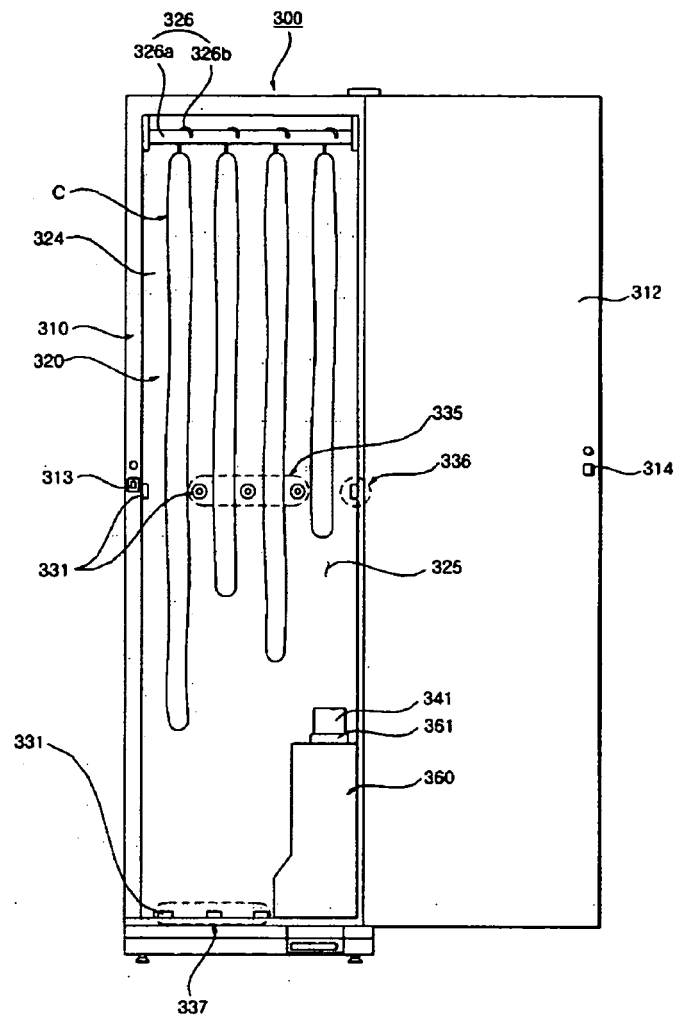
[Fig. 14]



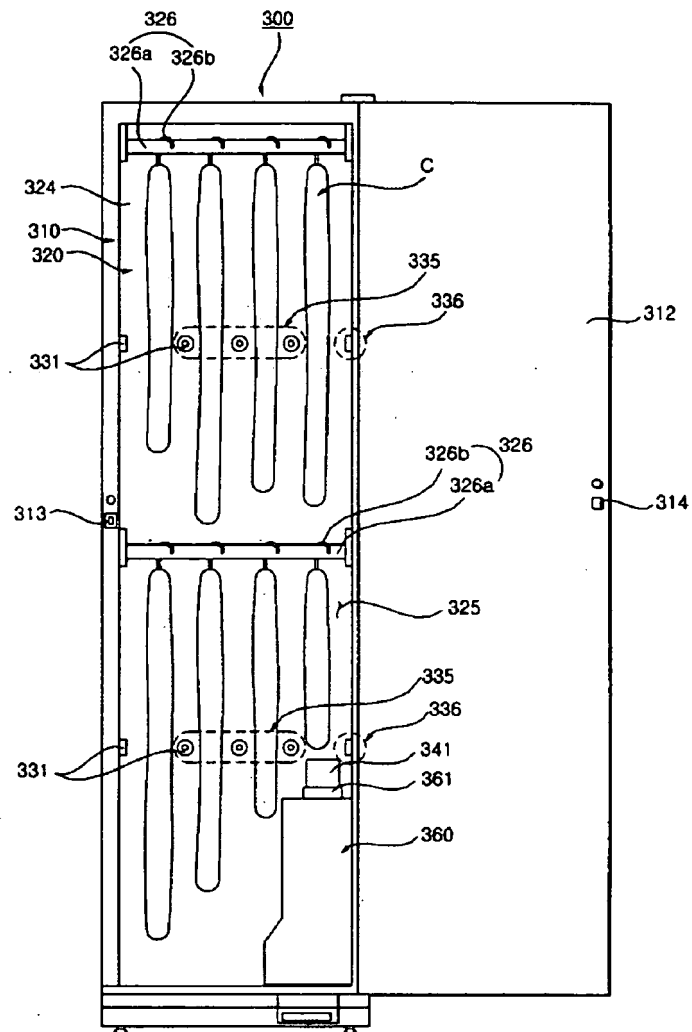
[Fig. 15]



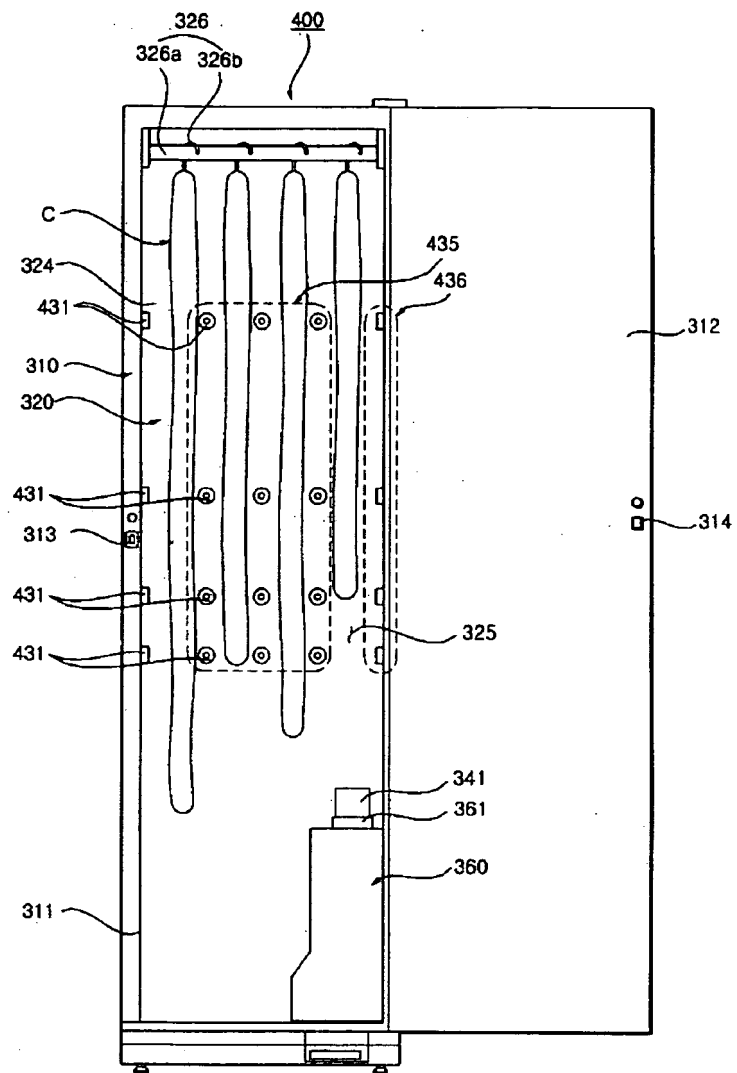
[Fig. 16]



[Fig. 17]



[Fig. 18]



REFERENCES CITED IN THE DESCRIPTION

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