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(54) CLOTHING TREATMENT APPARATUS

(57) The present disclosure relates to a clothing treatment apparatus characterized by comprising: a cabinet having an opening at the front; an inner case located inside the cabinet and providing a space for accommodating clothing; a door, coupled to the cabinet, for opening and closing the opening; a hanger part that is provided in an upper portion of the inner case and holds the clothing; a heater that communicates with the inner case and generates steam supplied to the inner case; a machine room provided with a compressor for pressurizing a refrigerant that exchanges heat with air supplied to the inner case; a light emitting unit that is provided in any one of the inner case, the door, or the machine room, and emits light into the inner case; a sensor unit that is provided in the inner case or on the door and detects light emitted from the light emitting unit; and a control unit provided to control at least one of the heater, the compressor, or the sensor unit. The control unit shuts down the operation of at least one of the heater or the compressor when the sensor unit is unable, prior to the operation of at least one of the heater or the compressor, to detect the light emitted from the light emitting unit.

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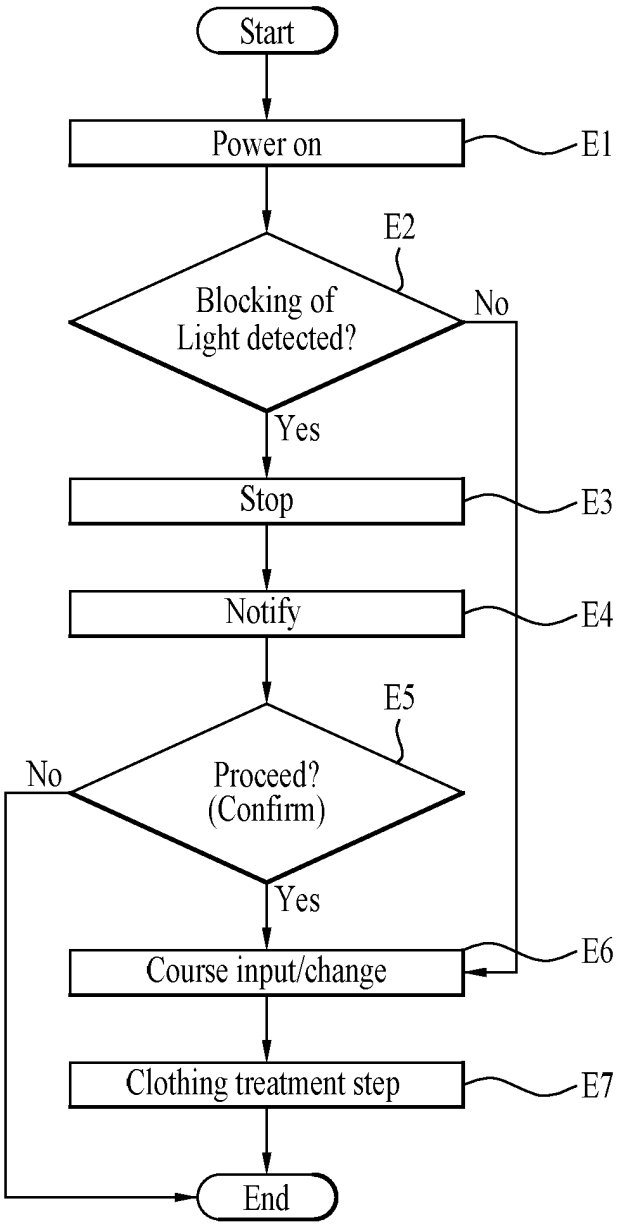
FIG. 35


Start
Power on
E1
E2
Blocking of Light detected?
No
Yes
Stop
E3
Notify
E4
E5
Proceed? (Confirm)
No
Yes
Course input/change
E6
Clothing treatment step
E7
End

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a clothing treatment apparatus and a control method thereof. More particularly, the present disclosure relates to a clothing treatment apparatus capable of determining whether clothes have fallen through an illuminance sensor.

BACKGROUND ART

[0002] In general, clothing treatment apparatuses conceptually include a washer that wets clothes in water to make it wet and then removes foreign substances through chemical action of detergent and physical action, such as drum rotation, and a dryer that dries the wet clothes using hot air and steam.

[0003] However, recently, a clothing care system that keeps dry clothes comfortable and clean without wetting thereof has appeared. This clothing care system may perform a refreshing cycle of removing odors from the clothes and drying or sterilizing the clothes by supplying steam or hot air to the clothes in a state in which the clothes are held.

[0004] This clothing care system may selectively add fragrance to the clothes, and has recently taken up an important role in clothing treatment apparatuses along with the washer and dryer.

[0005] FIG. 1 illustrates a conventional clothing treatment apparatus provided with a steam supply.

[0006] Referring to Korean Patent Laid-open Publication No. 10-2020-0057545, a conventional clothing treatment apparatus includes a cabinet 1 forming the appearance of the apparatus, and an inner case 2 provided in the cabinet 1 to accommodate clothes .

[0007] The clothing treatment apparatus may have a circulation duct 13 provided under the inner case 2 to circulate air of the inner case 2, a heat exchanger 15 provided in the circulation duct 13 to exchange heat with the air, and a compressor 14 configured to supply a high-temperature refrigerant to the heat exchanger 15. In addition, a hanger unit configured to hold clothes may be provided in the inner case 2. When the compressor 14 is operated, hot air may be supplied to the inner case 2 to raise the temperature of the clothes, and the clothes may be dried or sterilized.

[0008] In addition, referring to Korean Patent Laid-open Publication No. 10-2020-0065886, a clothing treatment apparatus that measures the material of clothes, the load of the clothes, etc. inside an inner case using an optical sensor is provided.

[0009] The conventional clothing treatment apparatus had advantages of efficiently performing clothing management and reducing a time required for the management by determining control parameters applied to a blower or a steam generator based on the estimated load of clothes.

[0010] However, in the conventional clothing treatment apparatus, when clothes fall off of the hanger unit in the inner case 2 during a clothing treatment process, a user may not recognize that the clothes have fallen off of a hanger during the clothing treatment process, and the clothes may be damaged if the fallen clothes block a steam or hot air injection hole.

[0011] Furthermore, since the user recognizes that the clothes have fallen and have not been properly treated after the clothing treatment process is over, there was a problem in that the user was not able to take active measures, resulting in low satisfaction with a clothing treatment apparatus product.

[0012] Accordingly, a clothing treatment apparatus that directly detects whether clothes have fallen by installing a load sensor on a hanger or the like has appeared. However, the load sensor may not properly detect whether clothes have fallen due to vibration occurring during the clothing treatment process and the light weight (1 kg or less) of the clothes.

[0013] Therefore, a need to provide a clothing treatment apparatus that may accurately determine whether clothes have fallen has arisen.

[0014] In addition, the clothing treatment apparatus may include a filter in the upper portion of a machine compartment to prevent dust from entering the inside of the circulation duct 13.

[0015] However, there was a problem in that the user would operate the clothing treatment apparatus while not installing the filter when using the clothing treatment apparatus, and if the filter was not installed, there is a high possibility that dust of large particles will enter the inside of the circulation duct 13, which may cause sanitation problems.

[0016] Accordingly, a clothing treatment apparatus that determines whether a filter is attached or detached using a reed switch installed on the filter has also appeared.

[0017] However, the reed switch is greatly affected by shock and vibration due to the mechanical characteristics thereof, causes separation of a contact part of the reed switch and reduces stability of the corresponding part, and is thus limited in accuracy.

[0018] In addition, there was a problem in that a mechanical reed switch wore out over time, and the lifespan thereof was thus limited.

[0019] Further, referring to Korean Patent Laid-open Publication No. 10-1995-0008839, a clothing treatment apparatus that detects clogging of a filter using light has appeared. However, since the conventional clothing treatment apparatus does not directly emit light to the filter, there was a problem in that it was not possible to determine whether the filter is not installed.

[0020] As a result, there was a problem in that the clothing treatment apparatus was not capable of accurately determining whether the filter was installed, and thus the clothing treatment apparatus was operated even when the filter was not installed.

[0021] In addition, the conventional clothing treatment apparatus had to have a device configured to detect falling of clothes and a device configured to detect attachment or detachment of the filter. Accordingly, the conventional clothing treatment apparatus required a plurality of parts and had inconvenience of having to determine and control the parts separately by a controller.

[0022] Further, the conventional clothing treatment apparatus may not determine whether clothes have fallen before or during clothing treatment, and had no choice but to continue a cycle without terminating the cycle even if the clothes have fallen.

[0023] Specifically, the conventional clothing treatment apparatus starts a clothing treatment step after a course input/change step in which a user selects a course, and even if the clothes have fallen, continues to perform the clothing treatment step without stopping the clothing treatment step until a set time elapses.

[0024] Accordingly, in the conventional clothing treatment apparatus, if the clothes have fallen and blocked a steam injection hole, there was a risk that the clothes would be damaged by hot and humid air injected during a steam cycle during the clothing treatment step.

[0025] In addition, there was a problem in that steam was not injected properly toward the inside of the inner case so that even the clothes hanging without falling would not be properly treated.

[0026] Therefore, a need to stop a cycle in progress and control whether to proceed with the cycle when detecting falling of clothes during clothing treatment was raised.

DISCLOSURE

TECHNICAL TASK

[0027] One technical task of the present disclosure is to provide a clothing treatment apparatus that may determine whether clothes have fallen from a change in the illuminance of light detected by a sensor unit when the clothes have fallen.

[0028] Another technical task of the present disclosure is to provide a clothing treatment apparatus that allows a user to proceed with clothing treatment even when it is impossible to determine whether clothes have fallen due to the long length of the clothes before the clothing treatment.

TECHNICAL SOLUTIONS

[0029] **In** order to solve the above technical tasks, the present disclosure provides a clothing treatment apparatus including a cabinet having an opening formed in a front portion thereof, an inner case provided in the cabinet to provide a space configured to accommodate clothes, a door coupled to the cabinet to open and close the opening, a hanger unit provided in an upper portion of the inner case to hold the clothes, a machine compartment provided to communicate with the inner case and including a heater configured to generate steam to be supplied to the inner case and a compressor configured to compress a refrigerant provided to exchange heat with air supplied to the inner case, a light emitting unit provided in one of the inner case, the door, and the machine compartment to emit light toward an inside of the inner case, a sensor unit provided in the inner case or the door to detect the light emitted from the light emitting unit, and a controller provided to control at least one of the heater, the compressor, or the sensor unit.

[0030] The controller may be provided to shut down operation of at least one of the heater or the compressor if the sensor unit is not able to detect the light emitted from the light emitting unit prior to the operation of the at least one of the heater or the compressor.

[0031] The clothing treatment apparatus may further include a display provided on the cabinet or the door to display clothing treatment information transmitted from the controller, and the clothing treatment information may include a stopped state of the operation of the at least one of the heater or the compressor.

[0032] The controller may display the stopped state of the operation of the at least one of the heater or the compressor on the display after shutting down the operation of the at least one of the heater or the compressor.

[0033] The controller may display the clothing treatment information on the display simultaneously with shutting down the operation of the at least one of the heater or the compressor.

[0034] The clothing treatment information may further include asking whether to reoperate one of the heater and the compressor in a fallen state of the clothes.

[0035] The clothing treatment apparatus may further include an input unit provided on the door or the cabinet to receive a driving command to reoperate the one of the heater and the compressor even in a state in which the sensor unit is not able to detect the light emitted from the light emitting unit.

[0036] The controller may reoperate the one of the heater and the compressor, when the driving command is input to the input unit.

[0037] The controller may shut down the operation of the one of the heater and the compressor, when the driving command is not input to the input unit.

[0038] The clothing treatment apparatus may further include a door detection unit provided in the cabinet or the door to detect opening of the door, and the controller may reoperate the one of the heater and the compressor if the door detection unit detects that the door is opened after the operation of the one of the heater or the compressor is shut down.

[0039] The clothing treatment apparatus may further include a filter unit provided in the machine compartment to filter out dust introduced from the inner case to the machine compartment, and the controller, if the one of the heater and the compressor is reoperated, may determine whether the filter is attached or detached by detecting an

increase in an amount of the light emitted from the light emitting unit by the sensor unit, and determine whether the clothes have fallen by detecting a decrease in the amount of the light emitted from the light emitting unit by the sensor unit.

[0040] The light emitting unit and the sensor unit may be disposed below the hanger unit.

[0041] The machine compartment may further include an inflow body configured to communicate with a bottom surface of the inner case to allow air to be introduced thereinto, a circulation duct provided with a heat exchanger configured to heat the air introduced from the inflow body to generate hot air, and a discharge duct configured to allow the circulation duct to communicate with the inside of the inner case and disposed farther rearward than the inflow body, the light emitting unit may be provided on the inflow body, and the sensor unit may be provided on a rear surface of the inner case.

[0042] The clothing treatment apparatus may further include a reflection unit disposed above the light emitting unit and provided to guide the light emitted from the light emitting unit to the sensor unit.

[0043] The machine compartment may further include a body filter mounted on the inflow body, and a filter cover disposed above the body filter, and the reflection unit may include side reflectors disposed on both sides of the filter cover.

ADVANTAGEOUS EFFECTS

[0044] The present disclosure has the effect of determining whether clothes have fallen from a change in the illuminance of light detected by a sensor unit when the clothes have fallen.

[0045] The present disclosure has the effect of allowing a user to proceed with clothing treatment even when it is impossible to determine whether clothes have fallen due to the long length of the clothes before the clothing treatment.

DESCRIPTION OF DRAWINGS

[0046]

FIG. 1 illustrates a conventional clothing treatment apparatus.

FIG. 2 illustrates the appearance of a clothing treatment apparatus of the present disclosure.

FIG. 3 illustrates the structure of an upper portion of an inner case.

FIG. 4 illustrates the structure of a machine compartment of the clothing treatment apparatus of the present disclosure.

FIG. 5 illustrates the structure of a base of the machine compartment of the clothing treatment apparatus of the present disclosure.

FIG. 6 illustrates the structure of a circulation duct of the clothing treatment apparatus of the present disclosure.

FIG. 7 illustrates the shape of the circulation duct of the clothing treatment apparatus of the present disclosure.

FIG. 8 is a cross-sectional view of the circulation duct.

FIG. 9 illustrates the structure of a controller installation unit provided on the base of the clothing treatment apparatus of the present disclosure.

FIG. 10 illustrates the structure of an air discharge unit (323) of the clothing treatment apparatus of the present disclosure.

FIG. 11 illustrates the structure of a base cover of the clothing treatment apparatus of the present disclosure.

FIG. 12 illustrates the structure of an external air duct.

FIG. 13 illustrates the flow of air flowing through the circulation duct.

FIG. 14 illustrates the installation structure of a steam supply.

FIG. 15 illustrates the detailed structure of the steam supply.

FIG. 16 illustrates the clothing treatment apparatus of the present disclosure in which a light emitting unit and a sensor unit are installed.

FIG. 17 illustrates division of spatial areas of the inner case of the clothing treatment apparatus of the present disclosure.

FIG. 18 illustrates one embodiment of positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 19 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 20 illustrates one embodiment of a reflection unit of the clothing treatment apparatus of the present disclosure.

FIG. 21 illustrates a filter unit of the clothing treatment apparatus of the present disclosure.

FIG. 22 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 23 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 24 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 25 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

FIG. 26 illustrates the structure of a first reflector.
FIG. 27 illustrates another embodiment of the reflection unit of the clothing treatment apparatus of the present disclosure.
FIG. 28 illustrates another embodiment of the reflection unit of the clothing treatment apparatus of the present disclosure.
FIG. 29 illustrates a clothes fall area of the clothing treatment apparatus of the present disclosure.
FIG. 30 illustrates the structure of a filter cover of the clothing treatment apparatus of the present disclosure.
FIG. 31 illustrates a control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.
FIG. 32 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.
FIG. 33 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.
FIG. 34 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.
FIG. 35 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.
FIG. 36 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.
FIG. 37 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.
FIG. 38 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.
FIG. 39 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

BEST MODE FOR DISCLOSURE

[0047] Hereinafter, embodiments of the disclosure will be described in detail with reference to the accompanying drawings. In the present disclosure, the same or similar components are indicated by the same or similar reference numbers even in different embodiments, and the description thereof is replaced with the first description. In the following description of the present disclosure, singular expressions encompass plural expressions unless the context clearly indicates otherwise. In addition, in describing the embodiments of the present disclosure, if it is determined that the detailed descriptions of related known technologies may obscure the gist of the embodiments of the present disclosure, the detailed descriptions will be omitted. Further, it should be understood that the accompanying drawings are provided only for ease of understanding the embodiments of the present disclosure, and the technical idea of the present disclosure is not limited by the accompanying drawings.

[0048] FIG. 2 illustrates the appearance of a clothing treatment apparatus 1 of the present disclosure.

[0049] Referring to FIG. 2(a), the clothing treatment apparatus of the present disclosure may include a cabinet 100 forming the appearance of the clothing treatment apparatus, and a door 40 rotatably coupled to the cabinet 100.

[0050] The door 40 may include a main body 410 forming the front surface of the cabinet 100, and an installation body 420 extending from one side of the main body 410 so that a display configured to display information of the clothing treatment apparatus may be installed thereon.

[0051] The installation body 420 may be provided to form a step 43 toward the rear of the cabinet 100 from the main body 410.

[0052] Further, at least a portion of the installation body 20 may be disposed to overlap the main body 410 in the forward and rearward directions at the rear of the main body 410. Thereby, the step 43 may function as a handle.

[0053] The installation body 420 may be formed of a different material or in a different color from the main body 410. In addition, the installation body 420 may be formed of a translucent material that transmits light emitted from the display.

[0054] Referring to FIG. 2(b), an inner case 200 having an accommodation space 220 to accommodate clothes may be provided within the cabinet 100. The inner case 200 may be provided with an opening 210 formed at the front portion thereof so that the clothes enter and exit the inner case 200 therethrough, and the opening 210 may be shielded by the door 40.

[0055] The inner case 200 may be formed of a plastic resin-based material, and may be formed of a reinforced plastic resin-based material that is not deformed even by air of a higher temperature than room temperature, heated air (hereinafter, hot air), steam, or moisture.

[0056] The inner case 200 may be provided such that the length thereof is longer than the width thereof. Accordingly, the clothes may be accommodated in the accommodation space 220 without being folded and wrinkled.

[0057] The clothing treatment apparatus 1 of the present disclosure may include a holding unit 500 that may hold the clothes in the accommodation space 220 of the inner case 200.

[0058] The holding unit 500 may include a hanger unit 510 provided on the upper surface of the inner case 200 to hold the clothes.

[0059] When the clothes are held on the hanger unit 510, the clothes may be disposed in a state of floating in the air within the accommodation space 220.

[0060] Further, the holding unit 500 may further include a pressing unit 520 coupled to the inner surface of the door 40 to fix the clothes.

[0061] The hanger unit 510 may be provided in a bar

shape arranged in the width direction of the inner case 200 to support hangers on which clothes are held. Further, as illustrated, the hanger unit 510 may be provided in a hanger shape to allow clothes to be directly held thereon.

[0062] The clothing treatment apparatus of the present disclosure may further include a vibration unit that vibrates the hanger unit 510 to remove foreign substances, such as fine dust, attached to the clothes.

[0063] The holding unit 500 may include the pressing unit 520 provided on the door 40 to press and fix the clothes. The pressing unit 520 may include a support 522 fixed to the inner surface of the door 40 to one surface of the clothes, and a presser 521 configured to press the clothes supported by the support 522.

[0064] The presser 521 may be provided to move toward the support 522 or away from the support 522. For example, the presser 521 may be rotatably provided on the inner surface of the support 522 or the door 40.

[0065] As such, the presser 521 and the support 522 may press both sides of the clothes to remove wrinkles from the clothes and create intended creases.

[0066] The clothing treatment apparatus of the present disclosure may have a machine compartment 300 equipped with various devices that may supply at least one of hot air or steam to the accommodation space 220 or purify or dehumidify external air of the cabinet 100.

[0067] The machine compartment 300 may be disposed to be separated or partitioned from the inner case 200, but may be provided to communicate with the inner case 200.

[0068] The machine compartment 300 may be disposed below the inner case 200. Accordingly, when hot air and steam with low specific gravity are supplied to the inner case 200, the hot air and steam may be naturally supplied to the clothes.

[0069] The machine compartment 300 may include a heat supply 340 that may supply hot air to the inside of the inner case 200. The heat supply 340 may be provided as a heat pump system, or may be provided as a heater that directly heats air with electric energy.

[0070] If the heat supply 340 is provided as a heat pump system, it may be provided to dehumidify and heat air discharged from the inner case 200 again and supply the air to the inner case 200. The detailed structure of the heat supply 340 will be described later.

[0071] The machine compartment 300 may include a steam supply 800 that may supply steam to the inside of the inner case 200. The steam supply 800 may be provided to directly supply steam to the inside of the inner case 200. The detailed structure of the steam supply 800 will be described later.

[0072] For this purpose, the inner case 200 may have a plurality of through holes 230 formed through one surface of the inner case 200 to communicate with the machine compartment 300.

[0073] Through the through holes 230, air inside the accommodation space 220 may be supplied to the machine compartment 300, and at least one of hot air or steam generated in the machine compartment 300 may be supplied to the accommodation space 200.

[0074] The through holes 230 may include an inflow hole 231 formed through the lower surface of the inner case 200 so that the air inside the inner case 200 is suctioned or discharged to the machine compartment 300 therethrough, and a discharge hole 232 formed through the lower surface of the inner case 200 so that the hot air generated in the machine compartment 300 is discharged therethrough.

[0075] The discharge hole 232 may be disposed in a portion of the lower surface of the inner case 200 close to the rear surface thereof. For example, the discharge hole 232 may be disposed to be inclined from the ground between the lower surface and the rear surface of the inner case 200 to face the hanger unit 510.

[0076] In addition, the inflow hole 231 may be disposed in a portion of the lower surface of the inner case 200 close to the front thereof. Accordingly, the inflow hole 231 may be disposed to be spaced apart from the discharge hole 232.

[0077] The through holes 230 may include a steam hole 233 through which steam generated in the steam supply 800 is supplied. The steam hole 233 may be disposed on one side of the discharge hole 232.

[0078] Further, a water supply tank 3 capable of supplying water to the steam supply 800 and a drain tank 4 that collects condensed water from the heat supply 340 may be provided in a front portion of the machine compartment 300.

[0079] The water supply tank 3 and the drain tank 4 may be detachably provided in the front portion of the machine compartment 300. Accordingly, the clothing treatment apparatus 1 of the present disclosure may be freely installed without being restricted by a water supply source or a drain source.

[0080] Meanwhile, a drawer 5 that is withdrawn from and inserted into the front portion of the machine chamber 300 and has a separate storage space may be further provided in the front portion of the machine chamber 300. A steam generator or an iron may be stored in the drawer 5.

[0081] FIG. 3 illustrates the structure of the upper portion of the inner case.

[0082] The hanger unit 510 of the clothing treatment apparatus of the present disclosure may include power transmission units 513 disposed in the upper portion of the inner case 200 and provided to shake the hangers 511.

[0083] A hook 512 on which the hanger 511 is placed or held may be provided at the lower portion of the power transmission unit 513.

[0084] Accordingly, when the power transmission units 513 move, the hooks 512 move, and the hangers 511 held on the hooks 512 shake, thereby exhibiting the effect of shaking off the clothes.

[0085] The power transmission units 513 may be pro-

vided in plural, and the hooks 512 coupled to the power transmission units 513 may be provided in plural. Accordingly, a large number of pieces of clothes corresponding to the number of the power transmission units 513 may be held in the inner case 200 to be refreshed.

[0086] FIG. 3 illustrates that the hanger unit 510 and the power transmission units 513 are arranged in the width direction of the inner case 200.

[0087] The hanger unit 510 and the power transmission units 513 may be arranged in a direction in which the clothes are arranged in the accommodation space. For example, if the clothes are arranged in the forward and rearward directions in the inner case 200, the hanger unit 510 and the power transmission units 513 may be arranged in the forward and rearward directions of the inner case 200.

[0088] Hereinafter, the hanger unit 510, the plurality of power transmission units 513, and the plurality of hooks 512 will be described as being arranged in the width direction of the inner case 200, but this is only an example, and the hanger unit 510, the plurality of power transmission units 513, and the plurality of hooks 512 may be arranged in a direction designed so that a plurality of pieces of clothes are held or arranged in the accommodation space.

[0089] The hanger unit 510 may further include a driver 514 that provides power to move the power transmission units 513.

[0090] The driver 514 may be provided to be exposed to the inside of the inner case 200 as long as the driver 514 is capable of transmitting power to the power transmission units 513. However, since the driver 514 is provided to be operated by receiving electric energy, exposure of the driver 514 to steam or hot air is preferably prevented.

[0091] Therefore, the driver 514 may be disposed between the upper surface of the inner case 200 and the cabinet 100 so that exposure of the driver 514 to the accommodation space 210 may be prevented.

[0092] The power transmission units 513 may penetrate the upper surface of the inner case 200 to receive power from the driver 514. The power transmission units 513 penetrate the upper surface of the inner case 200 and extend downward so that the lower ends of the power transmission units 513 may be exposed to the accommodation space 210.

[0093] The power transmission units 513 may be provided in a rod shape, a tube shape, a plate shape, or the like in which the length thereof is longer than the thickness thereof.

[0094] FIG. 4 illustrates the structure of the machine compartment of the clothing treatment apparatus of the present disclosure.

[0095] FIG. 4(a) is a front view of the machine compartment 300, and FIG. 4(b) is a rear view of the machine compartment 300.

[0096] Components configured to supply hot air to a clothing treatment space, circulate air inside the clothing treatment space, supply steam to the clothing treatment space, or purify air outside the cabinet may be disposed within the machine compartment 300.

[0097] The machine compartment 300 may include a base unit 310 configured such that various devices are supported thereby or installed thereon. The base unit 310 may provide an area where the various devices are installed.

[0098] A circulation duct 320 through which air introduced from the inner case 200 or the outside of the cabinet 100 moves may be installed on the base unit 310.

[0099] The circulation duct 320 may be provided in a case shape with an open upper surface, and some of the components of the heat supply 340 may be installed in the circulation duct 320.

[0100] If the heat supply 340 is provided as a heat pump system, it may include heat exchangers 341 and 343, which will be described later, and a compressor 342 that supplies a high-temperature and high-pressure refrigerant to the heat exchangers in the circulation duct 320.

[0101] The heat exchangers 341 and 343 may be accommodated in the circulation duct 320 to cool and dehumidify the air flowing through the circulation duct 320 or heat the air to generate hot air.

[0102] If the circulation duct 320 is provided to draw in air from the outside of the cabinet 100, an external air duct 370 configured to draw in external air may be installed in front of the circulation duct 320.

[0103] The circulation duct 320 may be provided to communicate with the external air duct 370 to selectively draw in external air.

[0104] The water supply tank and the drain tank may be detachably connected to the front of the circulation duct 320. The water supply tank 3 and the drain tank 4 may be disposed to be placed above the external air duct 370.

[0105] The circulation duct 320 may be provided to be coupled to the base unit 310, or may be provided integrally with the base unit 310. For example, the base unit 310 and the circulation duct 320 may be manufactured by injection molding.

[0106] The machine compartment 300 may include a base cover 360 provided to allow the circulation duct 320 to communicate with the inflow hole 231.

[0107] The base cover 360 may be provided to be coupled to the upper portion of the circulation duct 320 so as to guide air suctioned through the inflow hole 231 into the inside of the circulation duct 320.

[0108] The base cover 360 may shield the upper surface of the circulation duct 320 to prevent discharge of air inside the circulation duct 320 to the outside. The lower portion of the base cover 360 and the upper surface of the circulation duct 20 may form one surface of the flow path of the circulation duct 320.

[0109] The base cover 360 may include an inflow part 362 that connects the inflow hole 231 and the circulation duct 320. The inflow part 362 may be provided in a duct shape and serve as an intake duct that delivers air inside

the inner case 200 to the circulation duct 320.

[0110] The steam supply 800 connected to the water supply tank 3 to receive water, generate steam, and supply the generated steam to the inner case 200 may be installed in the machine compartment 300. The steam supply 800 may be disposed to be placed on the base cover 360.

[0111] The steam supply 800 may be disposed at the rear of the inflow part 362.

[0112] The machine compartment 300 may include a fan installation unit 350 provided to allow the circulation duct 320 to communicate with the inner case 200. The fan installation unit 350 may include a blower fan 353 that provides power to move air inside the circulation duct 320 in one direction, and a fan housing 351 that accommodates the blower fan 353 and is coupled to or extends toward the circulation duct 320.

[0113] The fan installation unit 350 may further include a discharge duct 352 provided to allow the circulation duct 320 to communicate with the discharge hole 232.

[0114] The discharge duct 352 may be provided to extend from lower portion of the fan housing 351 toward the discharge hole 232 to have a cross-sectional shape and a cross-sectional area corresponding to the discharge hole 232.

[0115] As a result, the air inside the inner case 200 may be introduced through the base cover 360, pass through the circulation duct 320, and then be supplied back to the inside of the inner case 200 through the fan installation unit 350.

[0116] FIG. 5 illustrates the structure of the base of the machine compartment of the clothing treatment apparatus of the present disclosure. The base unit 310 may be provided with a compressor installation unit 313 in which the compressor 342 configured to supply the refrigerant to the heat exchangers 341 and 343 is installed. The compressor installation unit 313 may be disposed outside the circulation duct 320.

[0117] In addition, a controller or a control panel C that controls the clothing treatment apparatus of the present disclosure may be installed on the base unit 310.

[0118] The base unit 310 may be provided with a controller installation unit 313 that forms a space into which the controller C is inserted below the circulation duct 320.

[0119] The controller C may be provided to control all electronically controlled components, such as the compressor 342, the steam supply 800, and the blower fan 353.

[0120] Since the controller C is inserted into the base unit 310 to be supported thereby, and vibration or shock applied to the controller C may be buffered. In addition, since the controller C is disposed close to all electronic components, occurrence of control errors, such as noise, may be minimized.

[0121] In addition, the steam supply is disposed above the circulation duct 320, and the controller C is disposed below the circulation duct 320. Therefore, the circulation duct 320 may be provided in a straight duct shape between the steam supply 800 and the controller C. Accordingly, the flow resistance of air passing through the circulation duct 320 may be minimized.

[0122] The circulation duct 320, the external air duct 370, the steal supply 800, the controller C, and the steam supply 340 may be provided in a module format on the base unit 310.

[0123] Thereby, the base unit 310 may be easily installed and maintained while being withdrawn from or inserted into the machine compartment 300 forwards or rearwards.

[0124] FIG. 5(a) is a perspective view of the base unit 310 viewed from the front, and FIGs. 5(b) and 5(c) are perspective views of the base unit 310 viewed from the rear.

[0125] The base unit 310 may be installed on a base plate forming the lower surface of the clothing treatment apparatus. The base unit 310 may itself form the lower surface of the clothing treatment apparatus.

[0126] The base unit 310 may include a base bottom 311 forming a support surface. The base bottom 311 may form the lower surface of the clothing treatment apparatus. Further, the base bottom 311 may be installed on the upper surface of the bottom surface of the cabinet 100 forming the lower surface of the clothing treatment apparatus.

[0127] The base unit 310 may be provided integrally with the circulation duct 320 forming at least a portion of a flow path in which air flows. The circulation duct 320 may be formed to extend upward from the base bottom 311.

[0128] The circulation duct 320 may include a duct body 321 that extends from the base bottom 311 to form the flow path, a heat exchanger installation unit 3212 that provides a space in which an evaporator 341 or a condenser 343 is installed in the duct body 321, and an air discharge unit 323 that is provided at the rear of the duct body 321 and through which air inside the duct body 321 is discharged.

[0129] The air discharge unit 323 may be provided in a pipe shape that extends rearward from the duct body 321. The diameter of the air discharge unit 323 may be smaller than the width of the duct body 321.

[0130] The air discharge unit 323 may be connected to the fan housing 350. The air discharged from the air discharge unit 323 may be guided into the inner case 200 through the fan housing 350.

[0131] The circulation duct 320 may include an external air intake part 322 formed to penetrate the front surface of the duct body 321.

[0132] The external air intake part 322 may be provided to communicate with the external air duct 370. The external air duct 370 may be placed in front of the external air intake part 322 to be supported.

[0133] The circulation duct 320 may be provided with a damper that opens and closes the external air intake part 322. Inflow of external air into the circulation duct 320 may be allowed or blocked by opening and closing the damper.

[0134] The base unit 310 may include a compressor installation unit 312 that provides a space in which the compressor 342 is installed. The compressor installation unit 312 may be formed on one side of the base bottom 311, and may be formed integrally with the base bottom 311.

[0135] The compressor installation unit 312 may have a protrusion that supports the compressor 342. The compressor installation unit 312 may be disposed on the rear portion of the base unit 310. The compressor installation unit 312 may be disposed such that at least a portion thereof overlaps the air discharge unit 323 in the width direction.

[0136] A buffer member that reduces vibration transmitted from the compressor 342 may be installed in the compressor installation unit 312. The buffer member may be fixed to the protrusion.

[0137] The base unit 310 may include the controller installation unit 313 in which the controller C is installed. The controller installation unit 313 may be formed between the base bottom 311 and the circulation duct 320. The controller installation unit 313 may be formed between the base bottom 311 and the bottom surface of the circulation duct 320. The controller installation unit 313 may be provided in a duct shape configured such that one of the front portion and the rear portion thereof is open below the circulation duct 320.

[0138] The structure of the controller installation unit 313 will be described later.

[0139] FIG. 6 illustrates the structure of the circulation duct of the clothing treatment apparatus.

[0140] The circulation duct 320 may extend upward from the base bottom to form the flow path in which air flows. The circulation duct 320 may include the heat exchanger installation unit 3212 that provides the space in which the evaporator 341 and the condenser 343 are installed. The heat exchanger installation unit 3212 may be provided within the duct body 321.

[0141] The duct body 321 may be provided with an open upper surface. The condenser 343 and the evaporator 341 may be inserted through the opening of the duct body 321 to be installed.

[0142] The opening of the duct body 321 may be shielded by the base cover 360, and the base cover 360 and the duct body 321 may form the flow path of the circulation duct 320.

[0143] The front surface of the duct body 321 may disposed to be spaced apart rearward from the front end of the base bottom 311.

[0144] Thereby, the base bottom 311 may secure a support surface 3111 on which one or more of the above-described water supply tank 3 or drain tank 4 and the external air duct 370 are installed and supported.

[0145] Meanwhile, the heat supply 340 may include the evaporator 341 provided as a heat exchanger installed in the circulation duct 320 to cool and dehumidify the air introduced into the circulation duct 320, the condenser 343 provided as a heat exchanger configured to heat the air having passed through the evaporator 341 to generate hot air, the compressor 342 configured to supply the refrigerant that exchanges heat with the air to the condenser 343 and disposed outside the circulation duct 320, and an expansion valve 344 configured to expand and cool the refrigerant having passed through the condenser 343.

[0146] Further, since the duct body 321 is formed integrally with the base unit 310, the heat exchanger installation unit 3212 may secure a great height, and the heights of the condenser 343 and the evaporator 341 may be increased.

[0147] As a result, the widths of the condenser 343 and the evaporator 341 in the forward and rearward directions may be reduced, and thus the number of refrigerant pipes passing through the condenser and the evaporator may be reduced. Accordingly, an effect of reducing the flow loss of air passing through the condenser and evaporator may be exhibited.

[0148] Further, the sum of the length of the evaporator 341 and the length of the condenser 343 may be smaller than the length of the heat exchanger installation unit 3212. Accordingly, the length of the heat exchanger installation unit 3212 in the forward and rearward directions may be equal to or smaller than half the length of the duct body 321.

[0149] Therefore, since the heat exchanger installation unit 3212 may be sufficiently separated from the external air intake part 322, a sufficient space into which external air and the air inside the inner case 200 are introduced may be secured in the circulation duct 320.

[0150] Further, the inside of the duct body 321 may include an installation partition 3211 that separates the heat exchanger installation unit 3212 from the outside of the heat exchanger installation unit 3212. The installation partition 3211 may be provided to protrude from the side surface of the duct body 321 to support the front portion of the evaporator 341.

[0151] In addition, the duct body 321 may be expanded in width based on the installation partition 3211, and extend rearward.

[0152] As a result, the width of the heat exchanger installation unit 3212 may be greater than half the width of the base unit 310. In addition, the width of the circulation duct 320 may be greater than half the width of the base unit 310.

[0153] The width of the condenser 343 and the width of the evaporator 341 may also be greater than half the entire width of the base unit 310.

[0154] When the widths of the condenser 343 and the evaporator 341 are secured, as described above, there may be an effect of sufficiently securing a heat exchange capacity.

[0155] In addition, the fan housing 350 may be disposed to overlap the condenser 343 or the evaporator 341 in the forward and rearward directions. Accordingly, air having passed through the condenser 343 and the evaporator 341 may be introduced into the fan housing

350 without bending the flow path. That is, the air introduced into the circulation duct 320 has an effect of minimizing flow loss because the flow path is not bent during the process of moving the air to the fan housing.

[0156] FIG. 7 illustrates the shape of the circulation duct of the clothing treatment apparatus of the present disclosure.

[0157] The base bottom 310 and the circulation duct 320 of the base unit 310 may be formed as a single body by injection molding.

[0158] A mold configured to form the inner surface of the duct body 321 may be withdrawn upward from the inside of the duct body 21 to be removed. Here, in order to facilitate withdrawal of the mold, the wall surface of the duct body 321 may be inclined at a predetermined angle with respect to the removal direction of the mold.

[0159] The width of a lower surface 321a of the duct body 321 may be longer than the width of an upper surface 321b of the duct body 321.

[0160] Specifically, a distance between the wall surfaces of the duct body 321 facing each other may increase as the duct body gets farther from the base bottom 311. A distance between the left and right surfaces of the circulation duct facing each other may increase in the withdrawal direction of the mold. Accordingly, the mold may be easily removed.

[0161] Meanwhile, the discharge unit 323 may include an air extension pipe 3231 that extend from the rear portion of the duct body 321 to have a reduced diameter or width, and an air discharge pipe 3232 that extends from the air extension pipe 3231 in a pipe shape having a uniform diameter to form a hollow 3233 formed therein. The air extension pipe 3231 may function as a nozzle and thus increase the rate of discharged air.

[0162] In addition, a mold for forming the air discharge unit 323 may be removed a shown in the figure above. The mold may be withdrawn forward from the inside of the air discharge unit 323 toward the inside of the circulation duct 320, and then be removed toward the open upper surface of the circulation duct 320. In this process, the air discharge unit 323 may be formed in a structure that facilitates withdrawal of the mold.

[0163] FIG. 8 is a cross-sectional view of the circulation duct.

[0164] The installation partition 3211 may protrude inward from the inner wall of the duct body 321, or be formed by indenting the outer wall of the circulation duct inward.

[0165] The heat exchanger installation unit 3212 may be formed between the heat exchanger installation partition 3211 and the air discharge unit 323.

[0166] The mold for forming the air discharge unit 323 may be withdrawn forward from the air discharge unit 323 and then withdrawn upward to be removed. It is necessary to prevent the mold for forming the air discharge unit 323 from interfering with the heat exchanger installation partition when the mold is withdrawn forward from the inside of the air discharge unit 323. For this purpose, the design values of the air discharge unit 323 may be adjusted.

[0167] Specifically, when forming the air discharge unit 323, a mold for forming the front portion of the air discharge unit 323 and a mold for forming the rear portion of the air discharge unit 323 based on a parting line 3233 of the air discharge unit 323 of this figure may be separately provided. Accordingly, the removal directions of the molds may be different from each other. The mold for forming the front portion of the air discharge unit 323 based on the parting line of the air discharge unit 323 may be withdrawn forward, and the mold for forming the rear portion of the air discharge unit 323 based on the parting line of the air discharge unit 323 may be withdrawn rearward.

[0168] That is, in order to prevent the mold withdrawn forward from interfering with the heat exchanger installation partition during the withdrawal process, a distance 1 321a may be smaller than a distance 2 321c in the figure. The distance 1 321a may mean a distance between the parting line of the air discharge unit 323 and the front end of the air discharge unit 323. In addition, the distance 1 321a may mean a distance between the parting line of the air discharge unit 323 and the rear opening of the circulation duct. The distance 2 321c may mean a distance between the front end of the air discharge unit 323 and the heat exchanger installation partition. In addition, the distance 2 323c may mean a distance between the rear opening of the circulation duct and the heat exchanger installation partition 3211.

[0169] FIG. 9 illustrates the structure of the controller installation unit provided on the base unit of the clothing treatment apparatus of the present disclosure.

[0170] FIG. 9(a) illustrates an embodiment in which the controller C is installed in the controller installation unit 313.

[0171] The controller C may be provided so that the clothing treatment apparatus of the present disclosure is capable of controlling all devices necessary to perform an arbitrary course for performing the refreshing cycle on clothes. The controller C may be provided as a PCB substrate, but is not limited thereto, and may be provided as various devices for control.

[0172] The controller C may be inserted into the controller installation unit 313 to be placed therein.

[0173] The controller installation unit 313 may be disposed below the circulation duct 320.

[0174] The bottom surface of the circulation duct 320 may form the upper surface of the controller installation unit 313. The controller installation unit 313 may be disposed below the air discharge unit 323.

[0175] The controller installation unit 313 may be formed integrally with the base bottom 311. The controller installation unit 313 may be formed as a sunken space under the circulation duct during a process of molding the circulation duct 320 in the base unit 310.

[0176] The controller C may be introduced into the controller installation unit 313 forward from the rear in

a sliding manner.

[0177] Brackets 3131 provided to surround the controller may be provided on the surface of the controller C. The brackets 3131 may be disposed on the upper and lower portions of the controller to prevent foreign substances from entering the controller.

[0178] In addition, the brackets 3131 may prevent damage to a circuit board in the controller C due to heat or vibration transmitted to the controller C. The brackets 3131 may be formed of a metal material.

[0179] FIG. 9(b) illustrates a state in which the controller is installed in the controller installation unit.

[0180] As shown in this figure, the controller C may be installed at a predetermined angle with the base bottom 311.

[0181] For example, the controller C may be disposed to be inclined toward a water reservoir 326. Accordingly, if water leaks to the upper portion of the controller C, the water may quickly escape the controller C, and the bottom surface of the circulation duct 320 may be molded to be inclined toward the water reservoir 326.

[0182] The controller C may include supporters 3132 that are formed to protrude from the side surface of the controller C.

[0183] The controller installation unit 313 may include ribs 3134 that protrude from both side surfaces of the installation unit. The supporters 3132 of the controller may be held on the upper portions of the ribs 3134.

[0184] The supporters 3132 of the controller may support the entire load of the controller C. When the supporters 3132 of the controller are supported by the upper surfaces of the ribs 3134, the controller C may be spaced apart from the base bottom 311 by a predetermined distance.

[0185] The ribs 3134 may be formed integrally with the base unit 310. The ribs 3134 may be formed together with the base unit 310 when the base unit 310 is injection-molded, and may be provided integrally with the base bottom 311, the circulation duct 320, etc.

[0186] A protrusion 3133 formed to protrude may be provided on the front surface of the controller C. In addition, a guide that protrudes rearward may be provided on the inner surface of the controller installation unit 313. The protrusion may be coupled to the guide. The protrusion may be inserted into the guide. When the controller is inserted into the controller installation unit, the controller may be aligned in the correct position by coupling the protrusion to the guide.

[0187] In addition, the positions of both side surfaces of the controller may be determined in the above-described manner in which the supporters are placed on the ribs. The controller may be coupled to the correct position of the controller installation unit without a separate fastening member using the above coupling process.

[0188] FIG. 10 illustrates the structure of the air discharge unit 323 of the clothing treatment apparatus of the present disclosure.

[0189] The base unit 310 may include the air discharge unit 323 that discharges treated air toward the fan housing.

[0190] The air discharge unit 323 may be provided to allow the fan housing 350 to communicate with the inside of the circulation duct 320 or the duct body 321. The air discharge unit 323 may be provided in a bell mouth shape. The air discharge unit 323 provided in the bell mouth shape may reduce air flow loss and improve air circulation efficiency.

[0191] The air discharge pipe 3232 of the air discharge unit 323 may be provided in a pipe shape, and during the mold removal process based on the parting line 3233, the mold disposed in front of the parting line 3233 may be withdrawn forward and the mold disposed at the rear of the parting line 3233 may be withdrawn rearward.

[0192] The fan installation unit 350 may be coupled to the air discharge pipe 3232 to be supported thereby. The fan housing 351 may have a coupling hole coupled to the outer circumferential surface of the air discharge pipe 3232, and the blower fan 353 may be disposed in the coupling hole.

[0193] The fan housing 351 may include the discharge duct 352 that extends from the outer circumferential surface of the blower fan 353 or the outside to the discharge hole 232.

[0194] The fan housing 351 and the discharge duct 352 may form a flow path in which the blower fan 353 is accommodated and air moves.

[0195] A motor that rotates the blower fan 353 may be coupled to the outside of the fan housing 351 to be supported thereby.

[0196] FIG. 11 illustrates the structure of the base cover of the clothing treatment apparatus of the present disclosure.

[0197] The base cover 360 may be provided to be coupled to the upper surface of the circulation duct 320 so as to prevent the inside of the circulation duct 320 from being exposed.

[0198] The base cover 360 may include an inflow body 361 coupled to the upper surface of the circulation duct 320 to allow the inner case 200 to communicate with the circulation duct 320, and a shielding body 363 extending from the inflow body 361 to shield the circulation duct 320.

[0199] The inflow body 361 may be provided in a duct shape to allow the inflow hole 231 of the inner case to communicate with the inside of the circulation duct 320. The inflow body 361 may be provided to protrude farther upward than the shielding body 363.

[0200] The inflow body 361 may be disposed ahead of the evaporator 341 so as not to face the evaporator 341 and the condenser 343, and may be disposed ahead of the partition 3211.

[0201] The inflow body 361 may serve as an inflow duct that moves air of the inner case 200 to the circulation duct 320.

[0202] The inflow body 361 may be provided with the inflow part 362 through which the air of the inner case 200 may pass.

[0203] Specifically, the base cover 360 may include a first rib 362a extending in the width direction of the inflow body 361, and a second rib 362b spaced apart rearward from the first rib 362a and extending in the width direction of the inflow body 361.

[0204] The first rib 362a and the second rib 362b may be provided in parallel. The first rib 362a and the second rib 362b may be provided in a plate shape extending in the vertical direction, and the height thereof may correspond to the height of the inflow body 361.

[0205] The front surface of the inflow body 361 and the first rib 362a may form a first inlet 3621, the first rib 362a and the second rib 362b may form a second inlet 3623, and the second rib 362b and the rear surface of the inflow body 361 may form a third inlet 3622.

[0206] The first inlet 3621 and the third inlet 3622 may be provided with the same area, and the second inlet 36222 may be provided with a smaller area than the first inlet 3621 and the third inlet 3622.

[0207] The base cover 360 may include a damper unit 364 provided to open and close the inflow part 362, and a driver 365 coupled to the damper unit 364 to control opening and closing of the damper unit 364.

[0208] The damper unit 364 may include a first damper 3641 provided to open and close the first inlet 3621, and a second damper 3642 provided to open and close the third inlet 3622.

[0209] The first damper 3641 may be provided in a plate shape with an area corresponding to the first inlet 3621, and may be rotatably coupled to both side surfaces of the inflow body 361 within the first inlet 3621.

[0210] The second damper 3642 may be provided in a plate shape with an area corresponding to the third inlet 3622, and may be rotatably coupled to both side surfaces of the inflow body 361 within the third inlet 3622.

[0211] The second inlet 3623 may be provided with a cut-off filter 366 that allows air to pass therethrough but may filter out foreign substances, such as fine dust and lint.

[0212] The cut-off filter 366 may be provided to be inserted into the second inlet 3623 to divide the first inlet 3621 and the third inlet 3622. The cut-off filter 366 may be disposed to extend from the second inlet 3623 to come into contact with the bottom surface of the circulation duct 320.

[0213] The cut-off filter 366 may be provided as a filter capable of filtering moisture. For example, the cut-off filter 366 may be provided as a HEPA filter, or the like.

[0214] A shielding member that shields the second inlet 3623 when the cut-off filter 366 is inserted thereinto may be further coupled to the second inlet 3623.

[0215] The driver 365 may include a motor that provides power to selectively rotate the first damper 364 and the second damper 365, and a plurality of gear members that is engaged with the motor and rotates to selectively rotate the first damper 364 and the second damper 365.

[0216] The first inlet 3611 and the third inlet 3622 may be selectively opened due to the driver 365.

[0217] Due to the driver 365, air accommodated in the inner case 200 may be introduced into the circulation duct 320 along the first inlet 3621, or may be introduced into the circulation duct 320 along the third inlet 3622.

[0218] Of course, the driver 365 may control the first damper 3641 and the second damper 3642 to open both the first inlet 3611 and the third inlet 3622, and may control the first damper 3641 and the second damper 3642 to shield both the first inlet 3611 and the third inlet 3622.

[0219] The driver 365 may be provided in any structure as long as it may be provided to rotate the first damper 3641 and the second damper 3642. For example, the driver 365 may be provided as a combination of a motor, a driving gear rotated by the motor, and driven gears coupled to the first damper and the second damper and rotated due to rotation of the driving gear.

[0220] The base cover 360 may include the shielding body 363 that extends from the inflow body 361 and is capable of shield the evaporator 341 and the condenser 343. The shielding body 363 may be provided in a plate shape.

[0221] The base cover 360 may be detachably coupled to the upper surface of the circulation duct 320 through an inflow hook 3612 extending from the lower surface of the inflow body 361.

[0222] The circulation duct 320 may be provided with a coupling part detachably coupled to the inflow hook 3612.

[0223] FIG. 12 illustrates the structure of the external air duct.

[0224] Referring to FIG. 12(a), the external air duct 370 may be coupled to the base unit 310.

[0225] The external air duct 370 may be provided to communicate with the external air intake part 322.

[0226] The external air duct 370 may include an external air damper 373 that opens and closes the external air intake part 322, and an external air driver 374 that rotates the external air damper 373 to selectively open the external air intake part 322.

[0227] The external air damper 373 may be provided in a plate shape that may seal the external air intake part 322, and may be rotatably coupled to both side surfaces of the external air intake part 322.

[0228] The external air driver 374 may be provided as an actuator coupled to the external air duct 370 or the circulation duct 320 to rotate the external air damper 373.

[0229] The outdoor air duct 370 may include an extension duct 372 that extends forward from the external air intake part 322 in front of the external air intake part 322, and an intake duct 371 that extends forward from the extension duct 372 and allows external air to be introduced.

[0230] The intake duct 371 may be provided to extend from the lower portion of the extension duct 372, and the water supply tank 3 and the drain tank 4 may be disposed on the upper portion of the intake duct 371. The water supply tank 3 and the drain tank 4 may be coupled to or placed on the intake duct 371.

[0231] The intake duct 371 may include an external air hole 3711 formed at one end or a free end thereof so that external air is suctioned through the external air hole 3711, and a partition rib 3712 provided to partition the external air hole 3711.

[0232] The external air hole 3711 may be provided to be disposed below the door 40 so as not to be shielded by the door 40.

[0233] The partition rib 3712 may be provided to partition the inside of the external air hole 3711 so as to prevent foreign substances or a user's body from being inserted into the external air hole 3711.

[0234] Referring to FIG. 12(b), when the external air driver 374 rotates the external air damper 373 to open the external air intake part 322, the intake duct 371 and the circulation duct 320 may communicate with each other.

[0235] At this time, when the blower fan 352 is operated, air outside the cabinet may be introduced into the circulation duct 320. When the compressor 342 is operated, the external air may be dehumidified while passing through the circulation duct 320, and be supplied to the inside of the inner case 200.

[0236] The door 40 may further include a discharge hole through which air inside the inner case 200 is discharged to the outside, and a discharge damper that selectively opens and closes the discharge hole. The discharge hole may be provided to face the accommodation space of the inner case 200.

[0237] Thereby, the dehumidified air may be discharged through the discharge hole.

[0238] In addition, the external air may be filtered while passing through the cut-off filter 366, and be discharged again to the outside of the cabinet 100.

[0239] FIG. 13 illustrates the flow of air flowing through the circulation duct.

[0240] Referring to FIG. 13(a), the external air damper 373 may be controlled to shield the external air intake part 322, the first damper 3641 may be controlled to open the first inlet 3621, and the second damper 3642 may be controlled to shield the third inlet 3622.

[0241] When the blower fan 352 is operated, the air inside the inner case 200 may be introduced into the first inlet 3621 to be filtered while passing through the cut-off filter 366.

[0242] When the compressor 342 is operated, the air having passed through the cut-off filter 366 may be dehumidified and heated while passing through the evaporator 341 and the condenser 343.

[0243] The air having passed through the heat exchangers may pass through the fan installation unit 350 and be supplied to the inside of the inner case 200.

[0244] This state may be a state in which steam is not supplied to the inner case 200. This is because, if steam is supplied to the inner case 200, the moisture wets the cut-off filter 366, and the performance of the cut-off filter 366 may not be guaranteed.

[0245] As a result, in a state in which steam is not supplied to the inner case 200, before steam is supplied to the inside of the inner case 200, or if the humidity is low even after steam is supplied to the inside of the inner case 200, the air inside the inner case 200 may pass through the first inlet 3641 and the cut-off filter 366 to filter out foreign substances, such as lint.

[0246] Referring to FIG. 13(b), the external air damper 373 may be controlled to shield the external air intake part 322, the first damper 3641 may be controlled to shield the first inlet 3621, and the second damper 3642 may be controlled to open the third inlet 3622.

[0247] When the blower fan 352 is operated, the air inside the inner case 200 may be introduced into the third inlet 3622. Since the third inlet 3622 is provided downstream from the cut-off filter 366, the air introduced into the third inlet 3622 may not pass through the cut-off filter 366.

[0248] When the compressor 342 is operated, the air having passed through the cut-off filter 366 may be dehumidified and heated while passing through the evaporator 341 and the condenser 343.

[0249] The air having passed through the heat exchangers may pass through the fan installation unit 350 and be supplied to the inside of the inner case 200.

[0250] As a result, in a state in which steam is supplied to the inner case 200 or if the humidity inside the inner case 200 is very high, the air inside the inner case 200 may be introduced into the third inlet 3622, and be prevented from being introduced into the first inlet 3621, thereby preventing the cut-off filter 366 from being exposed to moisture.

[0251] Referring to FIG. 13(c), the external air damper 373 may be controlled to open the external air intake part 322, the first damper 3641 may be controlled to shield the first inlet 3621, and the second damper 3642 may be controlled to shield the third inlet 3622.

[0252] When the blower fan 352 is operated, the air inside the inner case 200 may be prevented from being introduced into the inflow part 362, and only the air outside the cabinet 100 may be introduced into the circulation duct 320 and pass through the cut-off filter 366. Thereby, foreign substances, such as fine dust, contained in the external air may be filtered out by the cut-off filter 366.

[0253] When the compressor 342 is operated, the air having passed through the cut-off filter 366 may be dehumidified and heated while passing through the evaporator 341 and the condenser 343.

[0254] The air having passed through the heat exchangers may pass through the fan installation unit 350 and be supplied to the inside of the inner case 200, thereby supplying fresh hot air to clothes.

[0255] At this time, if a device for discharging the air inside the inner case 200 to the outside is provided, the air outside the cabinet may be discharged in a purified and dehumidified state while passing through the cut-off filter 366 and the heat supply 340.

[0256] As a result, the clothing treatment apparatus of the present disclosure may determine the flow directions

of the air inside the inner case 200 and the air outside the cabinet by controlling the external air driver 374 and the inflow drier 365 through the controller C.

[0257] FIG. 14 illustrates the installation structure of the steam supply.

[0258] The steam supply 800 may be placed on the base cover 360 to be supported thereby.

[0259] The steam supply 800 may include a steam case 810 that is placed on the base cover 360 and stores water to generate steam.

[0260] The steam supply 800 may further include an installation bracket 870 that may fix the steam case 810 to the base cover 360.

[0261] The installation bracket 870 may be coupled to the base cover 360 to fix the steam case 810.

[0262] The installation bracket 870 may include a lower panel 871 that supports the lower surface of the steam case 810, and side panels 872 that support both side surfaces of the steam case 810 on the lower panel 871.

[0263] The installation bracket 870 may further include one or more fixing clips 873 that extend from the side panels 872 to prevent the steam case 810 from being detached.

[0264] The fixing clips 873 may be detachably provided on the upper portion or the side surfaces of the steam case 810.

[0265] The compressor 342 may be disposed below the steam supply 800.

[0266] The installation bracket 870 may be provided to block transfer of heat generated from the compressor or heat generated from the refrigerant compressed by the compressor to the steam supply 800.

[0267] The installation bracket 870 may also block transfer of fire to the steam supply 800 in the event of a fire occurring in the compressor 342.

[0268] Meanwhile, the base cover 360 may include a fastener 3631 that is provided on the shielding body 360 and detachably coupled to the steam supply 800. The fastener 3631 may be provided in a structure that is detachably coupled to a protrusion protruding from the lower portion of the steam case 810.

[0269] Accordingly, even if a large amount of water is accommodated in the steam case 810, the steam case 810 may be stably placed on the base cover 360.

[0270] In addition, since the steam case 810 is disposed above the circulation duct 320 and a distance from the inner case 200 is shorter, condensation of steam generated in the steam case 810 before reaching the inner case 200 may be minimized.

[0271] FIG. 15 illustrates the detailed structure of the steam supply.

[0272] Referring to FIG. 15(a), the steam supply 800 may include the steam case 810 that may receive and store water to generate steam, and a heater unit 840 accommodated in the steam case 810 to heat water to generate steam.

[0273] The steam case 810 may be provided in the form of a case with an open upper portion to accommodate the heater unit 840.

[0274] The steam supply 800 may further include a case cover 820 coupled to the steam case 810 to prevent the heater unit 840 from being exposed to the outside and prevent the water from leaking.

[0275] A water level sensor 850 that detects the water level of the steam case 810 and a steam sensor 60 that detects the temperature inside the steam case 810 or detects whether steam is generated in the steam case 810 may be installed on the case cover 820.

[0276] Referring to FIG. 15(b), the steam case 810 may include a case body 811 that provides a space configured to store the water and accommodate the heater unit 840.

[0277] The case body 811 is provided with an open upper portion so that various parts may be easily installed in the case body 811.

[0278] The case body 811 may include a heater insertion hole 8111 formed through one side thereof so that the heater unit 840 may be inserted into or withdrawn from the heat insertion hole 8111.

[0279] The case body 811 may include a recovery pipe 814 configured to discharge water accommodated in the case body 811 to the outside.

[0280] The recovery pipe 814 may be kept closed by a shielding plug 8141 so as to be opened only when removing residual water in the steam case 810, and may include a shielding clip 8142 that maintains the coupled state of the shielding plug 8141 to the recovery pipe 814 to prevent the shielding plug 8141 from being separated arbitrarily.

[0281] Accordingly, when repairing the steam case 800 or preventing freezing of the steam case 800, water inside the steam case 800 may be discharged through the recovery pipe 814.

[0282] Meanwhile, a heater fixing unit 830 that may support or fix the heater unit 840 may be installed in the case body 811. The heater fixing unit 830 may include a fixing clip 831 that fixes the heater unit 840, and a clip fastening member 833 that fixes the fixing clip 831 to the case body 811.

[0283] The fixing clip 831 may be provided to accommodate or surround at least a portion of the heater unit 840.

[0284] The steam supply 800 may be provided with a water supply pipe 815 that supplies water. The water supply pipe 815 may be provided to communicate with the water supply tank 30 to receive water therefrom.

[0285] The water supply pipe 815 may be provided on the case cover 820, or may be disposed on the upper portion of the steam case 810. Accordingly, counterflow of water through the water supply pipe 815 may be prevented.

[0286] The steam supply 800 may be provided with a steam pipe 813 that discharges steam generated by operation of the heater unit 840 to the outside. The steam pipe 813 may be provided on the upper portion of the case cover 820 to prevent water from being discharge into the steam pipe 813. The steam pipe 813 may communicate

with the steam hole 233 of the inner case 200.

[0287] The case cover 820 may be provided with a water level sensor hole 854 in which the water level sensor may be installed.

[0288] The water level sensor 850 may include one or more contact protrusions 852 that are inserted into the water level sensor hole 854 and immersed in water to detect the water level, and a sensor body 851 that is coupled to the water level sensor hole 854 or supported by the case cover 820 to maintain the contact protrusions 852 in a floating state within the steam case 810.

[0289] The sensor body 851 may be coupled to the case cover 820 through a sensor fastening member 853.

[0290] Meanwhile, the case cover 820 may be provided with an insertion hole 64 in which the steam sensor 860 may be installed. The steam sensor 860 may include a detection device 861 inserted into the insertion hole 864 to detect whether steam is generated in the steam case 810, a support 863 that fixes the detection device 861 to the case cover 20, and a coupling member 862 that couples the support 863 to the case cover 820.

[0291] The detection device 861 may be provided as a humidity sensor or a temperature sensor to detect whether steam is generated in the steam case 810.

[0292] Further, the case cover 820 may be provided with cover hooks 821 that may extend forward and be coupled to the base cover 860.

[0293] In addition, fixing protrusions 822 that may fix the lower portion of the inner case 200 or a separate discharge unit 900 may be provided at the rear portion of the case cover 820.

[0294] The heater unit 840 may be inserted into the heater insertion hole 8111 to be accommodated in the steam case 810, and be provided to receive power to heat water.

[0295] The heater unit 840 may be provided as a sheath heater, etc., and may be controlled by a controller 700 to be repeatedly operated and stopped.

[0296] The heater unit 840 may include a first heater 841 that receives first power to heat water, and a second heater 842 that receives power greater than the first power to heat water.

[0297] As a result, the second heater 842 may be provided to heat a larger amount of water than the first heater 841 to generate a larger amount of steam.

[0298] The first heater 841 and the second heater 842 may be provided to consume respective power amounts divided from the maximum heater power amount allowed for the heater unit 840. That is, if the first heater 841 is provided to consume a portion of the maximum heater power amount, the second heater 842 may be provided to consume the remainder of the maximum heater power amount.

[0299] For example, if the maximum heater power amount generally allowed for the heater unit 840 is 1,500 W, the first heater 841 may be provided to consume 600 W, and the second heater 842 may be provided to consume 880 W. 20 W may be left considering errors, etc.

[0300] Of course, the heater unit 840 may include three or more heaters. For example, the heater unit 840 may include the first heater 841, the second heater 842, and a third heater 843, and the first heater 841, the second heater 842, and the third heater 843 may be provided to consume respective power amounts divided from the maximum heater power amount.

[0301] Hereinafter, the heater unit 340 will be described as including the first heater 841 and the second heater 842.

[0302] The first heater 841 and the second heater 842 may be formed as a U-shaped metal pipe.

[0303] The heater unit 840 may include a heater sealer 843 that may fix the first heater 841 and the second heater 842 and seal the heater insertion hole 8111, and may include a terminal unit 844 that supplies current to the first heater 841 and the second heater 842.

[0304] The terminal unit 844 may include a first terminal 844a that supplies current to the first heater 841, and a second terminal 844b that supplies current to the second heater 842.

[0305] The first heater 841 and the second heater 842 may be disposed at the same height. Therefore, the first heater 841 and the second heater 842 may be provided to heat water of the same water level to generate steam.

[0306] Accordingly, the controller 700 may control a steam amount generated using both or selectively the first heater 841 and the second heater 842, and a power amount consumed.

[0307] FIG. 16 illustrates the clothing treatment apparatus of the present disclosure in which a light emitting unit and a sensor unit are installed.

[0308] In the conventional clothing treatment apparatuses, there was a problem in that clothes fell off of a hanger during the clothing treatment process.

[0309] As a result, a user was not able to recognize the clothes having fallen off of the hanger during the clothing treatment process, and if the fallen clothes blocked a steam or hot air injection hole, the clothes were damaged.

[0310] Furthermore, the user was not able to take active measures because the user could recognized that the clothes had fallen off after the clothing treatment process had been completed and thus the clothes were not properly treated, and product satisfaction was lowered.

[0311] In order to solve these problems, the present disclosure may provide the clothing treatment apparatus including the cabinet 100 having the opening in the front portion thereof, the inner case 200 provided in the cabinet 100 to provide the space configured to accommodate clothes, the door 40 coupled to the cabinet to open and close the opening, the hanger unit 510 provided in the upper portion of the inner case to hold the clothes, the machine compartment 300 provided below the bottom surface of the inner case 200 to supply at least one of hot air or steam to the inside of the inner case 200, a light emitting unit 600 provided in one of the inner case 200, the door 40, and the machine compartment 300 to emit

light to the inside of the inner case 200, and a sensor unit 700 provided in one of the inner case 200, the door, and the machine compartment to detect whether the clothes having fallen off of the hanger unit 510 block at least a portion of the light emitted from the light emitting unit 600.

[0312] The clothing treatment apparatus of the present disclosure may determine whether the clothes have fallen by utilizing the sensor unit 700 detecting a change in illuminance as long as the light emitted from the light emitting unit 600 reaches the sensor unit 700 regardless of where the light emitting unit 600 and the sensor unit 700 are provided.

[0313] The clothing treatment apparatus may include the light emitting unit 600 provided to emit light toward the inside of the inner case 200.

[0314] The light emitting unit 600 may emit any wavelength of light as long as the sensor unit 700 can detect the same. For example, the wavelength of the light emitted from the light emitting unit 600 may be in the ultraviolet spectrum, the visible spectrum, or the like.

[0315] The wavelength of the light emitted from the light emitting unit 600 is most preferably in the visible spectrum rather than the infrared spectrum, the ultraviolet spectrum, etc. Infrared light may penetrate objects, and thus pass through clothes even if the clothes have fallen, whereas visible light is electromagnetic waves that are visible to the human eye, and is not capable of penetrating objects. In addition, use of visible light is more appropriate for detecting clothes having fallen using blocking of light, and may protect user eyesight.

[0316] The light source of the light emitting unit 600 may be provided as any device that emits light, such as an LED or a light bulb.

[0317] The clothing treatment apparatus may include the sensor unit 700 that receives the light emitted from the light emitting unit 600.

[0318] The sensor unit 700 may be provided as an illuminance sensor that detects a change in the illuminance of the light emitted from the light emitting unit 600. Illuminance is a measure of brightness, and when a large amount of light is incident, the illuminance increases, and conversely, when a small amount of light is incident, the illuminance decreases.

[0319] The sensor unit 700 may detect at least one of whether the light emitted from the light emitting unit 600 is received or the intensity of the light.

[0320] The sensor unit 700 may be provided at a position where it is capable of completely receiving the light emitted from the light emitting unit 600. The detailed installation positions of the light emitting unit 600 and the sensor unit 700 will be described later.

[0321] At least one light emitting unit 600 and at least one sensor unit 700 may be provided.

[0322] If two or more light emitting units 600 are provided, the amount of light received by the sensor unit 700 increases, and thus, it is possible to more accurately determine whether clothes have fallen.

[0323] The clothing treatment apparatus of the present disclosure may determine whether clothes have fallen from a change in the illuminance of light detected by the sensor unit 700 when the clothes have fallen during the clothing treatment process.

[0324] For example, the sensor unit 700 is disposed closer to the bottom surface of the inner case 200 than the hanger unit, the sensor unit 700 detects a first value when the clothes have not fallen, and the controller C may determine that the clothes have fallen when the sensor unit 700 detects a value smaller than the first value.

[0325] FIG. 17 illustrates division of spatial areas of the inner case of the clothing treatment apparatus of the present disclosure.

[0326] The inner case 200 may include a first spatial area V1, a second spatial area V2, and a third spatial area V3 that are divided depending on height.

[0327] The first spatial area V1 may be defined as a space between a first position a and a second position b.

[0328] The first position a may be an area corresponding to the upper surface of the inner case 200 or the lower surface of the hanger unit 510.

[0329] The second position b may be spaced apart downward from the first position a by a first height h1.

[0330] The second position b may be spaced apart downward from the first position a by 1/3 of a length from the first position a to a fourth position d or the height of the inner case 200.

[0331] The height of the first spatial area V1 may be a first height h1.

[0332] The first height h1 may be greater than or equal to the length of the hanger in the height direction.

[0333] The first height h1 may be 1/3 of the length from the first position a to the fourth position d.

[0334] The hanger unit 150 may be installed in the first spatial area V1.

[0335] Clothes that are shorter and smaller than the first height when held on the hanger unit 510, such as a top, baby's clothes, or a skirt, may be disposed in the first spatial area V1.

[0336] The second spatial area V2 may be disposed below the first spatial area V1 and may be defined as a space between the second position b and a third position c provided below the second position b.

[0337] The second spatial area V2 may include the central portion of the inner case 200 in the height direction.

[0338] Clothes having a relatively normal length, such as a shirt or a jacket, may be disposed in the first spatial area V1 and the second spatial area V2 when held on the hanger unit 510.

[0339] The third spatial area V3 may be disposed below the second spatial area V2 and may be defined as a space between the third position c and the fourth position d.

[0340] Clothes having a long length, such as a coat or pants, may be disposed in the first spatial area V1, the second spatial area V2, and the third spatial area V3 when held on the hanger unit 510.

[0341] Fallen clothes may be disposed in the third spatial area V3 below the second spatial area V2. Specifically, the fallen clothes may be disposed in the lower portion of the third spatial area V3.

[0342] The light emitting unit 600 and the sensor unit 700 may be provided in at least one of the first spatial area V1, the second spatial area V2, or the third spatial area V3.

[0343] The sensor unit 700 may be provided below the first position a. Alternatively, the sensor unit 700 may be provided above the fourth position d.

[0344] Accordingly, when the light emitting unit 600 maintains the ON state, if the sensor unit 700 detects that the light emitting unit 600 is blinking, it may be determined that the clothes have fallen.

[0345] FIG. 18 illustrates one embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0346] The clothing treatment apparatus or the controller C may determine whether clothes have fallen by detecting a decrease in illuminance by the sensor unit 700. If clothes have fallen, the fallen clothes block light emitted from the light emitting unit 600. Therefore, since the light emitted from the light emitting unit 600 may not reach the sensor unit 700, the sensor unit 700 may detect an abnormal decrease in illuminance.

[0347] That is, the sensor unit 700 may be disposed closer to the bottom surface of the inner case 200 than the hanger unit. When the light emitting unit 600 is turned on and emits light, the sensor unit 700 may detect the first value as an illuminance value of the light emitting unit 600 when the clothes do not fall. At this time, if the sensor unit 700 detects a value smaller than the first value as the illuminance value of the light emitting unit 600 or does not detect the illuminance value of the light emitting unit 600, the controller C may determine that the clothes have fallen.

[0348] The light emitting unit 600 and the sensor unit 700 may be arranged in the width direction or the forward and rearward directions based on the bottom surface of the inner case 200. Accordingly, a portion of the light emitted from the light emitting unit 600 may be blocked by the clothes having fallen on the bottom surface of the inner case 200.

[0349] For example, the sensor unit 700 may be disposed on the rear surface of the inner case 200 and the light emitting unit 600 may be disposed in front of the sensor unit 700, or the sensor unit 700 may be disposed on one side surface of the inner case 200 and the light emitting unit 600 may be disposed on one side surface of the sensor unit 700.

[0350] The sensor unit 700 and the light emitting unit 600 may be provided on different surfaces among the inner surfaces of the inner case 200.

[0351] The sensor unit 700 may be provided on a surface facing the surface on which the light emitting unit 600 is disposed.

[0352] Here, since the light emitted from the light emitting unit 600 should not reach the sensor unit 700 due to the fallen clothes, the light emitting unit 600 and the sensor unit 700 are preferably provided to face each other.

[0353] For example, the light emitting unit 600 and the sensor unit 700 may be provided on both side surfaces of the inner case 200 to face each other.

[0354] Alternatively, each of the light emitting unit 600 and the sensor unit 700 may be provided on at least one of the rear surface of the inner case 200 or the door so as to face each other.

[0355] One embodiment of the clothing treatment apparatus in which the light emitting unit 600 is provided on the door and the sensor unit 700 is provided on the rear surface of the inner case 200 is described.

[0356] The light emitting unit 600 may be disposed in the middle of the door in the width direction. Accordingly, a non-detectable area where the light emitting unit 600 is not detectable may be reduced as much as possible regardless of the position of the sensor unit 700. That is, the blind spot of the sensor unit 700 may be minimized, and thus the sensor unit 700 may detect the fallen clothes regardless of the position of the fallen clothes, and may receive more light emitted from the light emitting unit 600.

[0357] The light emitting unit 600 and the sensor unit 700 may be provided in the same spatial area. For example, the light emitting unit 600 and the sensor unit 700 may be provided in the third spatial area V3. Since clothes are located in the third spatial area V3 when the clothes have fallen, the light emitting unit 600 and the sensor unit 700 are preferably provided in the third spatial area V3.

[0358] The light emitting unit 600 and the sensor unit 700 may be disposed below the hanger unit 510. Further, the light emitting unit 600 and the sensor unit 700 may be provided below the height e of the lowest end of the clothes. That is, the light emitting unit 600 and the sensor unit 700 may be disposed closer to the bottom surface of the inner case 200 than the hanger unit 510.

[0359] In addition, the light emitting unit 600 and the sensor unit 700 may be disposed above the bottom surface of the inner case 200. Accordingly, the clothing treatment apparatus or the controller C may determine whether clothes have fallen while minimizing influence of clothes hanging above.

[0360] Therefore, if the sensor unit 700 determines whether clothes have fallen by detecting a decrease in the illuminance of light due to the fallen clothes, it is possible to determine whether the clothes have fallen using only the decrease of the illuminance of the light blocked by the fallen clothes without being affected by the length of the clothes, etc.

[0361] In addition, if the sensor unit 700 determines whether clothes have fallen by detecting a decrease in the illuminance of light due to the fallen clothes, it is possible to determine whether the clothes have fallen more easily and accurately even when a plurality of pieces of clothes is provided.

[0362] Further, usage of the light emitting unit 600 and the sensor unit 700 may be minimized, thereby being capable of reducing material costs, etc.

[0363] FIG. 19 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0364] Each of the light emitting unit 600 and the sensor unit 700 may be provided on at least one of the upper portion or the lower portion of the inner case 200 so as to face each other.

[0365] The light emitting unit 600 may be provided on the upper surface of the inner case 200.

[0366] Otherwise, the light emitting unit 600 may be provided below the hanger unit 510.

[0367] The sensor unit 700 may be provided on the bottom surface of the inner case 200 so as to be shielded by clothes when the clothes have fallen.

[0368] Alternatively, the sensor unit 700 may be provided in the machine compartment or in the inflow body. This may be advantageous in repair and power supply.

[0369] Unlike the above description, the light emitting unit 600 may be provided below the inner case 200, and the sensor unit 700 may be provided in the upper portion of the inner case 200. In this case, the light emitting unit 600 may be provided in the machine compartment, or may be provided in the inflow body.

[0370] For example, the light emitting unit 600 and the sensor unit 700 may be provided to face each other in a straight line in the height direction.

[0371] Specifically, when the clothes have fallen, the sensor unit 700 is shielded thereby, and a portion of light emitted from the light emitting unit 600, that reaches the sensor unit 700, is blocked. As a result, the clothing treatment apparatus or the controller C may determine whether clothes have fallen by detecting a decrease in the illuminance of light by the sensor unit 700.

[0372] Detection of the decrease in the illuminance by the sensor unit 700 conceptually includes that the sensor unit 700 does not detect the illuminance itself of the light emitting unit 60.

[0373] At least one light emitting unit 600 and at least one sensor unit 700 may be provided. Particularly, the more sensor units 700 there are, the more preferable it is. In most cases, since when clothes have fallen, they have fallen around an area where they were hung due to gravity, a plurality of sensor units 700 may be provided to more accurately determine whether the clothes have fallen.

[0374] For example, three sensor units 700 may be provided on the bottom surface of the inner case 200. The sensor units 700 may include a first sensor unit 710, a second sensor unit 720, and a third sensor unit 730.

[0375] The first sensor unit 710, the second sensor unit 720, and the third sensor unit 730 may be provided in a line.

[0376] At least one of the first sensor unit 710, the second sensor unit 720, or the third sensor unit 730 may be provided to face the light emitting unit 600.

[0377] When clothes have fallen, the clothes may have fallen on at least one of the first sensor unit 710, the second sensor unit 720, or the third sensor unit 730 and thus shield the at least one of the first sensor unit 710, the second sensor unit 720, or the third sensor unit 730.

[0378] Accordingly, the clothing treatment apparatus or the controller C may determine whether clothes have fallen by detecting a decrease in illuminance by at least one of the first sensor unit 710, the second sensor unit 720, or the third sensor unit 730.

[0379] In addition, it is possible to determine whether clothes have fallen using only the decrease of the illuminance of the light blocked by the fallen clothes without being affected by the length and number of the clothes, etc.

[0380] FIG. 20 illustrates one embodiment of a reflection unit of the clothing treatment apparatus of the present disclosure.

[0381] Further, if the light emitting unit 600 and the sensor unit 700 are provided to face each other, light emitted from the light emitting unit 600 travels straight and reaches the sensor unit 700. Therefore, if clothes have fallen into an area other than an area where the light emitted from the light emitting unit 600 travels straight toward the sensor unit 700, the sensor unit 700 may not detect a change in illuminance because the light is not blocked by the clothes.

[0382] The clothing treatment apparatus may include a first fall area S1 provided between the light emitting unit 600 and the sensor unit 700, and a non-detectable area X defined as an area other than the first fall area S1.

[0383] If the clothes have fallen into the first fall area S1, the fallen clothes block the light emitted from the light emitting unit 600 and the sensor unit 700 may detect a decrease in illuminance, but if the clothes have fallen into the non-detectable area, the fallen clothes do not block the light emitted from the light emitting unit 600 and the sensor unit 700 may not detect a decrease in illuminance.

[0384] However, if even a small portion of the fallen clothes is within the first fall area S1, the light emitted from the light emitting unit 600 is blocked by the portion of the clothes and the sensor 700 may detect a decrease in illuminance.

[0385] In order to determine whether clothes have fallen regardless of where the clothes have fallen by minimizing the non-detectable area X, the clothing treatment apparatus may further include a reflection unit 400.

[0386] The reflection unit 400 may be provided as at least one reflector that reflects light emitted from the light emitting unit 600.

[0387] The reflector may be provided on a surface other than the surfaces on which the light emitting unit 600 and the sensor unit 700 are provided among the inner surfaces of the inner case 200.

[0388] For example, the reflection unit 400 may include a first reflector 410 provided on one side surface of the inner case 200, and a second reflector 420 provided on a

surface facing the surface on which the first reflector 410 is provided.

[0389] Each of the first reflector 410 and the second reflector 420 may be provided on the center of one surface of the inner case 200 in the width direction. Accordingly, a second fall area S2 and a third fall area S3 may be additionally secured to reduce the non-detectable area X.

[0390] The first reflector 410 and the second reflector 420 may be provided to face each other.

[0391] For example, each of the first reflector 410 and the second reflector 420 may be provided on the center of one surface of the inner case 200 in the width direction.

[0392] The clothing treatment apparatus may further include the second fall area S2 formed by the light emitted from the light emitting unit 600 that is reflected by the first reflector 410 and reaches the sensor unit 700, and the third fall area S3 formed by the light emitted from the light emitting unit 600 that is reflected by the second reflector 420 and reaches the sensor unit 700.

[0393] If the reflection unit 400 is provided, the area of the non-detectable area X is reduced compared to if the reflection unit 400 is not provided. If clothes have fallen and a portion of the clothes is located in one of the first fall area S1, the second fall area S2, and the third fall area S3, the light emitted from the light emitting unit 600 may be blocked by the fallen clothes and the sensor unit 700 may detect a decrease in the illuminance of the light emitting unit 600.

[0394] Accordingly, the clothing treatment apparatus may determine whether clothes have fallen even if the clothes have fallen into any area of the bottom surface of the inner case 200 by minimizing the non-detectable area X.

[0395] FIG. 21 illustrates a filter unit of the clothing treatment apparatus of the present disclosure.

[0396] The clothing treatment apparatus 1 may further include a filter unit 380 in the upper portion of the machine compartment 300 to prevent dust from entering the inside of the circulation duct 320.

[0397] The filter unit 380 may be mounted on the inflow body 361 to filter out dust introduced into the inflow body 361.

[0398] The filter unit 380 may include a body filter 386 mounted on the upper portion of the inflow body 361 of the base cover 360 to shield a portion of the upper surface of the inflow body 361. The body filter 386 may be formed of a mesh material that may block large dust particles and allow light to pass therethrough.

[0399] The filter unit 380 may further include a body cover 385 on which the body filter 386 is placed. The body cover 385 may be mounted on the upper portion of the inflow body. The body cover 385 may shield one surface of each of the upper portions of the first inlet 3621 and the third inlet 3622. Portions of the body cover 385 that shield the upper surfaces of the first inlet 3621 and the third inlet 3622 may be provided through perforation. The body cover 385 may block large dust particles when the body filter 386 is not installed, thereby being capable of preventing dust from entering the inside of the circulation duct 320.

[0400] The filter unit 380 may further include a filter fixing unit 384 to fix the body cover 385 and the body filter 386. The filter fixing unit 384 may be provided on the upper portion of the base cover 360. The circumferential surface of the body cover 385 may be coupled to the filter fixing unit 384, and may be attached to or detached from the filter fixing unit 384.

[0401] The clothing treatment apparatus may further include a filter cover 382 on the upper portion of the body cover 385. The filter cover 382 may be provided to have a larger width than the width of the body cover 385. The filter cover 382 may shield one surface of the body filter 386. The lower surface of the filter cover 382 may be formed as a lattice-shaped injection molded product. The filter cover 382 may be provided to be spaced apart from the bottom surface of the inner case 200 so that air inside the inner case 200 may be introduced into the circulation duct 320.

[0402] A blocking cover 381 may be provided on the upper portion of the filter cover 382. The blocking cover 381 may completely shield the open upper surface of the machine compartment 300.

[0403] FIG. 22 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0404] In the conventional clothing treatment apparatuses, there was a problem in that a device configured to detect the falling of clothes and a device configured to detect attachment or detachment of the filter unit 380 had to be separately provided. As a result, the conventional clothing treatment apparatuses required a plurality of parts and had inconvenience of having to determine and control the parts separately by the controller C.

[0405] A change in illuminance of light may be detected without directly contacting a sensor, and regardless of where the light emitting unit 600 and the sensor unit 700 are provided, the light emitted from the light emitting unit 600 only needs to reach the sensor unit 700. Therefore, if light is used, it is possible to simultaneously determine whether clothes have fallen and whether the filter unit 380 is attached or detached using at least one light emitting unit 600 or at least one sensor unit 700.

[0406] Detection of attachment or detachment of the filter unit 380 may conceptually include detection of attachment or detachment of the body filter 385.

[0407] The present disclosure provides the clothing treatment apparatus including the cabinet 100 having the opening in the front portion thereof, the inner case 200 provided in the cabinet 100 to provide the space configured to accommodate clothes, the door 40 coupled to the cabinet 100 to open and close the opening, the hanger unit 510 provided in the upper portion of the inner case to hold the clothes, the machine compartment 300 provided below the bottom surface of the inner case 200 and including the inflow body 361 into which air is intro-

duced from the inner case and the discharge duct that discharges air to the inner case 200, the filter unit 380 mounted on the inflow body 361 to filter out dust introduced into the inflow body 361, the light emitting unit 600 provided in one of the inner case 200, the door 40, the inflow body 361, and the discharge duct to emit light toward the filter unit 380 and the inside of the inner case 200, and the sensor unit 700 provided in the inner case 200 or the door 40 to detect the light emitted from the light emitting unit 600 and having passed through the filter unit 380, and further including the controller C that determines whether the clothes have fallen and whether the filter unit 380 is attached or detached depending on the amount of the light emitted from the light emitting unit 600, detected by the sensor unit 700.

[0408] The clothing treatment apparatus of the present disclosure may determine whether the clothes have fallen or whether the filter unit 380 is attached or detached through a change in the illuminance of the light detected by the sensor unit 700. For example, the clothing treatment apparatus or the controller C may determine whether the clothes have fallen or whether the filter unit 380 is attached or detached through the fact that when clothes have fallen, the illuminance of the light decreases due to the fallen clothes, and when the body filter 386 is not installed, the illuminance of the light increases.

[0409] For example, the sensor unit 700 may detect the first value from the light emitted from the light emitting unit 600 when the clothes do not fall, and the controller C may determine that the clothes have fallen if the sensor unit 700 detects a value smaller than the first value.

[0410] Furthermore, if the sensor unit 700 detects a value greater than the first value from the light emitted from the light emitting unit 600, it may be determined that the filter unit 380 is not installed on the inflow body 361. One sensor unit 700 may be provided to determine at least one of whether the clothes have fallen, whether the filter unit 380 is attached or detached, or the contamination level of the filter unit 380.

[0411] Further, the sensor unit 700 may determine the contamination level of the filter unit 380 by detecting a gradual decrease in the illuminance of the light emitted from the light emitting unit 600. The sensor unit 700 may detect a second value from the light emitted from the light emitting unit 600 when the filter unit 380 is not contaminated.

[0412] The second value may be greater than the first value, and the controller C may determine that the filter unit 380 is contaminated if a value smaller than the second value and greater than the first value is detected.

[0413] The light emitting unit 600 and the sensor unit 700 may be provided at any positions as long as the sensor unit 700 does not detect the light emitted from the light emitting unit 600 due to the fallen clothes or the body filter 386. The detailed positions and structures of the light emitting unit 600 and the sensor unit 700 will be described later.

[0414] FIG. 23 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0415] At least one light emitting unit 600 may be provided.

[0416] As shown in this figure, the at least one light emitting unit 600 may include a first light emitting unit 610 provided to emit light toward fallen clothes and a second light emitting unit 620 provided to emit light toward the body filter 386.

[0417] The first light emitting unit 610 may be provided in the first spatial area to emit light toward the inside of the inner case 200. Since light has straightness, the first light emitting unit 610 is preferably provided in the first spatial area to face the sensor unit 700. Accordingly, the light emitted from the light emitting unit may be blocked by the fallen clothes.

[0418] Specifically, the first light emitting unit 610 may be provided on the upper surface of the inner case 200. Alternatively, the first light emitting unit 610 may be provided under the hangers to minimize influence of hanging clothes.

[0419] The second light emitting unit 620 may be provided below the body filter 386 to emit light toward the body filter 386. Specifically, the second light emitting unit 620 may be provided on the rear surface of the inflow body 361. That is, the light emitting unit may be provided to emit light toward the upper portion of the third inlet.

[0420] Thereby, the second light emitting unit 620 may be provided close to the center of the clothing treatment apparatus to uniformly emit light toward the body filter 386. In addition, deterioration of the performance of the light emitting unit 600 due to dust, etc. filtered out by the body filter 386 may be prevented, and exposure of the user's eyes to light may be prevented. Further, power supply and repair may be facilitated, and when determining whether clothes have fallen, influence of clothes hanging in the inner case 200 may be minimized.

[0421] In order to determine whether the body filter 386 is attached or detached using the light emitting unit 600 and the sensor unit 700, the light emitting unit 600 should be provided so that the light emitted from the light emitting unit 600 may penetrate the body filter 386 and be detected by the sensor unit 700.

[0422] Accordingly, the light emitting unit 600 and the sensor unit 700 may be provided with the body filter 386 interposed therebetween. Thereby, the light emitting unit 600 may be provided so that the light emitted from the light emitting unit 600 may penetrate the body filter 386 and be detected by the sensor unit 700.

[0423] The sensor unit 700 may be provided above the body filter 386. Accordingly, the light emitting unit 600 may be provided so that the light emitted from the light emitting unit 600 may penetrate the body filter 386 and be detected by the sensor unit 700. Specifically, the sensor unit 700 may be provided between the bottom surface of the inner case 200 and the filter unit 380. The sensor unit 700 may be provided on the bottom surface of the inner

case 200. Alternatively, the sensor unit 700 may be provided on one surface of the body cover.

[0424] The clothing treatment apparatus or the controller C whether clothes have fallen by detecting a change in the illuminance of light emitted from the first light emitting unit 610 by the sensor unit 700.

[0425] The clothing treatment apparatus or the controller C whether the filter is attached or detached or the contamination level of the filter by detecting a change in the illuminance of light emitted from the second light emitting unit 620 by the sensor unit 700.

[0426] Therefore, one sensor unit 700 may be provided to simultaneously determine whether clothes have fallen, whether the filter is attached or detached, and the contamination level of the filter. Accordingly, material costs and manufacturing costs of the clothing treatment apparatus may be reduced, and the clothing treatment apparatus may efficiently detect whether the clothes have fallen using one sensor unit 700.

[0427] FIG. 24 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0428] This figure is a cross-sectional view of the clothing treatment apparatus cut in the forward and rearward directions.

[0429] As shown in this figure, the light emitting unit 600 and the sensor unit 700 may be provided in different positions so as not to face each other.

[0430] Since when clothes have fallen, the clothes are present in the third spatial area, and the sensor unit 700 detects that light is blocked by the fallen clothes, the sensor unit 700 is preferably provided in the lower portion of the inner case 200, i.e., the third special space.

[0431] Hereinafter, detachable provision of the body filter 386 in the inflow hole 231 of the filter unit 380 and detection thereof will be described. However, this is only one embodiment, and attachment or detachment of other components of the filter unit 380 may be detected.

[0432] In addition, in order to determine whether the body filter 386 is attached or detached using the light emitting unit 600 and the sensor unit 700, the light emitting unit 600 should be provided so that light emitted from the light emitting unit 600 penetrates the body filter 386 and is detected by the sensor unit 700.

[0433] Therefore, the light emitting unit 600 and the sensor unit 700 may be provided with the body filter 386 interposed therebetween. Accordingly, the light emitting unit 600 may be provided so that the light emitted from the light emitting unit 600 may penetrate the body filter 386 and be detected by the sensor unit 700.

[0434] A position C in the inner case 200 is an area corresponding to the lower portion of the inner case 200. The position C may correspond to an area adjacent to the lower end of one side surface of the inner case 200 close to the lower surface of the inner case 200.

[0435] For example, the position C may be provided at the lower portion of the door 40 close to the lower surface of the inner case 200. In addition, the position C may be the lower surface of the inner case 200.

[0436] A position E may include an area below the body filter 386.

[0437] For example, the position E may be disposed in the inflow duct of the circulation duct 320.

[0438] In addition, the position E may be provided on one surface of the inflow body 361. The position E may be provided in at least one of the first inlet 3621, the second inlet 3622, or the third inlet 3623. The position E may be provided on the front surface or the rear surface of the inflow body 361.

[0439] As shown in this figure, the light emitting unit 600 may be provided at the position E, and the sensor unit 700 may be provided at the position C.

[0440] The light emitting unit 600 may be provided below the body filter 386. Accordingly, deterioration of the performance of the light emitting unit 600 due to dust, etc. filtered out by the body filter 386 may be prevented, and exposure of the user's eyes to light may be prevented. Further, power supply and repair may be facilitated, and when determining whether clothes have fallen, influence of clothes hanging in the inner case 200 may be minimized.

[0441] Since the clothes are likely to fall to the rear portion of the inner case 200 when the clothes have fallen, the light emitted from the light emitting unit 600 preferably traverses the inner case 200 in the forward and rearward directions. The light emitting unit 600 may be provided so that the light emitted therefrom is directed to the rear portion of the inner case 200. Accordingly, the sensor unit 700 is also preferably provided on the rear surface of the inner case 200 to face the inside of the inner case 200.

[0442] Meanwhile, the light emitted from the light emitting unit 600 should penetrate the body filter 386 and reach the sensor unit 700 so that the sensor unit 700 may detect a change in illumination to determine whether the clothes have fallen, whether the body filter 386 is attached or detached, or the contamination level. Therefore, in the case in which the light emitting unit 600 and the sensor unit 700 are provided so as not to face each other, the clothing treatment apparatus may further include the reflection unit to guide the light emitted from the light emitting apparatus 600 to the sensor unit 700.

[0443] The reflection unit may be provided at any position and in any structure, shape, etc., as long as it guides the light emitted from the light emitting unit 600 to the sensor unit 700. The detailed structure and position of the reflection unit will be described later.

[0444] FIG. 25 illustrates another embodiment of the positions of the light emitting unit and the sensor unit of the clothing treatment apparatus of the present disclosure.

[0445] The light emitting unit 600 and the sensor unit 700 may be provided at any positions as long as the sensor unit 700 detects the light emitted from the light emitting unit 600.

[0446] As shown in this figure, the light emitting unit 600 may be provided at the position E, and the sensor unit 700 may be provided at the position C.

[0447] The sensor unit 700 may be disposed closer to the filter unit 280 than the hanger unit.

[0448] The light emitting unit 600 and the sensor unit 700 may be provided with the body filter 386 interposed therebetween. Accordingly, the light emitting unit 600 may be provided so that the light emitted from the light emitting unit 600 may penetrate the body filter 386 and be detected by the sensor unit 700.

[0449] The light emitting unit 600 may be provided below the body filter 386. Accordingly, deterioration of the performance of the light emitting unit 600 due to dust, etc. filtered out by the body filter 386 may be prevented, and exposure of the user's eyes to light may be prevented.

[0450] Further, power supply and repair may be facilitated, and influence of clothes hanging in the inner case 200 may be minimized.

[0451] The light emitting unit 600 is disposed in the inflow body 361, and the sensor unit 700 may be provided in the inner case 20 or the door 40.

[0452] The light emitting unit 600 may be provided on the rear surface of the inflow body 361 to emit light to the upper portion of the inflow body 361 among the position E. That is, the light emitting unit 600 may be provided to emit light to the upper portion of the first inlet or the third inlet. The shielding member configured to shield the second inlet may be further coupled to the second inlet of the inflow body 361. Therefore, the light emitting unit 600 may be provided so that the light may not be emitted to the upper portion of the second inlet, and may thus be provided on the front or rear surface rather than the side surface of the inflow body 361.

[0453] The light emitting unit 600 may further include a light installation unit in which a light source may be installed. The light installation unit may be provided by penetrating the front or rear surface of the inflow body 361.

[0454] Since the light emitting unit 600 is provided below the body filter 386, the clothing treatment apparatus or the controller C may determine not only whether the body filter 386 is attached or detached but also the contamination level of the body filter 386 using the fact that the sensor unit 700 detects a change in the illuminance of the light emitted from the light emitting unit 600.

[0455] Meanwhile, the machine compartment may be provided to be located in the left side of the clothing treatment apparatus. The center of the machine compartment in the width direction and the center of the clothing treatment apparatus in the width direction may not be the same. The center of the clothing treatment apparatus in the width direction may be provided on the right side of the machine compartment.

[0456] Therefore, the light emitting unit 600 may be provided on the same line as the center of the clothing treatment apparatus in the width direction not the center of the machine compartment in the width direction.

[0457] One light emitting unit 600 and one sensor unit 700 may be provided. Accordingly, material costs and manufacturing costs of the clothing treatment apparatus may be reduced, and the clothing treatment apparatus may efficiently detect whether the clothes have fallen using one sensor unit 700.

[0458] The inner case 200 has a longer length from the machine compartment to the rear surface of the inner case 200 than the length from the machine compartment to the door 40. Therefore, the light emitting unit 600 is preferably provided so that the light emitted therefrom is directed to the rear portion of the inner case 200.

[0459] A position D in the inner case may include an area that is located below the lower surface of the inner case 200 or the upper surface of the filter unit 380 and above the body filter 386. The position D may include the lower surface of the filter cover 382.

[0460] For example, the position D may correspond to the center of the lower surface of the filter cover 382 in the width direction. The position D may be provided at the exact center of the filter cover 382. The position D may be provided one surface above the body cover 385. The position D may be provided on the front surface or the rear surface of the body cover 385.

[0461] Accordingly, the sensor unit 700 may be disposed at the position D.

[0462] In addition, the sensor unit 700 may be provided on the rear surface of the inner case 200 to face the inside of the inner case 200 among the position D.

[0463] The sensor unit 700 may be provided at the center of the rear surface of the inner case 200 in the width direction. Accordingly, the sensor unit 700 and the light emitting unit 600 may be provided in a straight line at the center of the inner case 200 in the width direction.

[0464] Contrary to the above description, the light emitting unit 600 may be provided on the rear surface of the inner case 200, and the sensor unit 700 may be provided on the rear surface of the inflow body 361.

[0465] In order for the clothing treatment apparatus or the controller C to determine whether the body filter 386 is attached or detached or the contamination level of the body filter 386, the light emitted from the light emitting unit 600 should penetrate the body filter 386, and thus the light emitting unit 600 is preferably provided below the body filter 386.

[0466] If the light emitting unit 600 is provided below the body filter 386, the light may not reach the sensor unit 700 provided on the rear surface of the inner case 200 due to the angle of the light emitted from the light emitting unit 600 and a step between the body cover 385 and the inner case 200.

[0467] In order for the sensor unit 700 to detect a change in the illuminance of the light emitted from the light emitting unit 600, the light emitted from the light emitting unit 600 should be guided toward the lower portion of the inner case 200 and ultimately reach the sensor unit 700.

[0468] Therefore, in order to guide the light emitted from the light emitting unit 600 to the sensor unit 700 and secure the amount of illuminance required for detection, the reflection unit 400 that is disposed above the light emitting unit 600 and the filter unit 380 to guide the light emitted from the light emitting unit 600 to the sensor unit 700 may be further provided.

[0469] The reflection unit 400 may be provided in a number and at a position and angle that enable the reflection unit 400 to reflect the light emitted from the light emitting unit 600 so that the sensor unit 700 may detect the reflected light.

[0470] The reflection unit 400 may be provided to reflect the light emitted from the light emitting unit 600 to guide the reflected light to the sensor unit 700, regardless of where the light emitting unit 600 and the sensor unit 700 are provided.

[0471] The reflection unit 400 is provided above the light emitting unit 600 to be disposed in a straight line with the light emitting unit 600. The light emitting unit 600 may be provided so that the light emitted therefrom directly reaches the reflection unit 400.

[0472] The reflection unit 400 may be provided above the body filter 386. The reflection unit 400 may be provided on one surface of the body cover 385.

[0473] The reflection unit 400 may be disposed between the filter cover 382 and the body filter 386.

[0474] The reflection unit 400 may be provided on the lower surface of the filter cover 382. In order to overcome the step between the body cover 385 and the bottom surface of the inner case 200 and allow the reflection unit 400 to guide the light emitted from the light emitting unit 600 to the sensor unit 700 provided on the rear surface of the inner case 200, the reflection unit 400 is preferably provided on the lower surface of the filter cover 382.

[0475] If the reflection unit 400 is provided on the lower surface of the filter cover 382, the filter cover 382 may further include a reflection unit 400 installation unit for installing the reflection unit 400 on the lower surface of the filter cover 382. The detailed structure of the filter cover 382 will be described later.

[0476] One light emitting unit 600 and one sensor unit 700 may be provided.

[0477] The light emitting unit 600 may be provided on the rear surface of the inflow body 361 to be located at the center of the clothing treatment apparatus in the width direction.

[0478] The sensor unit 700 may be provided at the center of the rear surface of the inner case 200 in the width direction.

[0479] FIG. 26 illustrates the structure of the first reflector.

[0480] The reflection unit 400 may include the first reflector 410 provided on the same line in the height direction as the light emitting unit 600.

[0481] The first reflector 410 may be provided on the lower surface of the filter cover 382.

[0482] The first reflector 410 may be provided at the center of the filter cover 382 in the width direction.

[0483] The light emitting unit 600, the sensor unit 700, and the first reflector 410 may be disposed in a straight line, and the first reflector 410 may be provided with a first reflective surface 411 that directly reflects the light emitted from the light emitting unit 600 to the sensor unit 700.

[0484] The first reflective surface 411 may be provided to face the rear portion of the clothing treatment apparatus.

[0485] The first reflector 410 may be provided with hooks 414 that may be coupled to the filter cover 382.

[0486] The clothing treatment apparatus may further include a first route R1 in which the light emitted from the light emitting unit 600 is guided to the sensor unit 700 via the first reflective surface 411.

[0487] The first route R1 may pass through the lower portion of the inner case 200. The first route R1 may be close to the bottom surface of the inner case 200.

[0488] If clothes have fallen, the fallen clothes block light passing through the first route R1. Accordingly, the sensor unit 700 may detect an abnormal decrease in illuminance, and the clothing treatment apparatus or the controller C may determine that the clothes have fallen.

[0489] FIG. 27 illustrates another embodiment of the reflection unit of the clothing treatment apparatus of the present disclosure.

[0490] FIG. (a) is an exploded perspective view of the filter unit 380, and FIG. (b) is a cross-sectional view of the machine compartment cut in the horizontal direction.

[0491] The first reflector 410 alone may not sufficiently transmit the light emitted from the light emitting unit 400 to the sensor unit 700.

[0492] Accordingly, as shown in FIG. (a), the reflection unit 400 may further include the second reflector 420 and a third reflector 430 disposed symmetrically on both sides of the first reflector 410 in order to sufficiently transmit the light emitted from the light emitting unit 600 to the sensor unit 700.

[0493] The second reflector 420 and the third reflector 430 may be provided on the lower surface of the filter cover 382 close to both side surfaces of the filter cover 382.

[0494] Here, the first reflector 410 may further include a second reflective surface 412 that reflects the light from the light emitting unit 600 to the second reflector 420, and a third reflective surface 413 that reflects the light from the light emitting unit 600 to the third reflector 430.

[0495] In addition, the second reflector 420 may have a fourth reflective surface 421 that reflects the light reflected by the second reflective surface 412 toward the sensor unit 700. The third reflector 430 may have a fifth reflective surface 431 that reflects the light reflected by the third reflective surface 413 toward the sensor unit 700. Thus, the light reflected by the fourth and fifth reflective surfaces 421 and 431 may be detected by the sensor unit 700.

[0496] That is, the first reflector 410 may reflect the light

emitted from the light emitting unit 600 toward the second reflector 420 and the third reflector 430. The light reflected by the second reflector 420 and the third reflector 430 may be detected by the sensor unit 700.

[0497] The clothing treatment apparatus may further include a second route R2 in which the light emitted from the light emitting unit 600 is guided to the sensor unit 700 via the second reflective surface 412 of the first reflector 410 and the fourth reflective surface 421 of the second reflector 420.

[0498] The clothing treatment apparatus may further include a third route R3 in which the light emitted from the light emitting unit 600 is guided to the sensor unit 700 via the third reflective surface 413 of the first reflector 410 and the fifth reflective surface 431 of the third reflector 430.

[0499] If the clothes have fallen, the fallen clothes block the light passing through the second route R2 and the third route R3. Accordingly, the sensor unit may detect an abnormal decrease in illuminance, and the clothing treatment apparatus or the controller C may determine that the clothes have fallen. In addition, if the filter is not installed, the light emitted from the light emitting unit 600 reaches the sensor unit 700 along the second route R2 and the third route R3. Accordingly, the sensor unit 700 may detect an abnormal increase in illuminance, and the clothing treatment apparatus or the controller C may determine that the filter is detached.

[0500] FIG. 28 illustrates another embodiment of the reflection unit of the clothing treatment apparatus of the present disclosure.

[0501] If the reflection unit 400 includes the first reflector 410, the second reflector 420, and the third reflector 430, as shown in FIG. 27, when the clothes have fallen to block at least one of the first route R1, the second route R2, or the third route R3, the sensor unit 700 may detect about 0-66% of the light emitted from the light emitting unit 600. However, when the body filter 386 is installed and the clothes do not fall, the sensor unit 700 may detect about 60-70% of the light emitted from the light emitting unit 600. Therefore, there is an overlapping range of the amounts of light detected by the sensor unit 700 when the clothes have fallen and when the clothes do not fall, and if about 66% or less of the light is detected, it is not possible to detect whether clothes have fallen, and thus there is a possibility that the accuracy of determining whether the clothes have fallen will decrease.

[0502] Therefore, in order to eliminate the overlapping range, the clothing treatment apparatus may be provided such that, if the light emitting unit 600 is provided below the body filter 386 and the sensor unit 700 is provided in the inner case 200 or the door 40 to be disposed closer to the filter unit 380 than the hanger unit 510, the reflection unit 400 includes only the second reflector 420 and the third reflector 430 without the first reflector 410.

[0503] The second reflector 420 and the third reflector 430 are provided so that the light emitted from the light emitting unit 600 may pass through the second route R2 and the third route R3 via the body filter 386.

[0504] If the clothes have fallen onto the bottom surface of the inner case 200, the clothes may block at least one of the second route R2 or the third route R3.

[0505] Therefore, the controller C may determine whether the clothes have fallen by detecting a change in the illuminance of the light emitted from the light emitting unit 600 by the sensor unit 700.

[0506] Specifically, when the body filter 386 is installed and the clothes do not fall, the sensor unit 700 may detect about 60-70% of the light emitted from the light emitting unit 600. At this time, if the clothes have fallen and block at least one of the second route R2 or the third route R3, the sensor unit 700 may detect about 0-50% of the light.

[0507] Thereby, there is no overlapping range of the amounts of light detected by the sensor unit 700 when the clothes have fallen and when the clothes do not fall, and thus the controller C may accurately determine whether the clothes have fallen and whether the body filter 386 is attached or detached with only the second reflector 420 and the third reflector 430 disposed on both sides of the filter cover 382.

[0508] FIG. 29 illustrates the clothes fall area of the clothing treatment apparatus of the present disclosure.

[0509] If the light emitting unit 600 is installed in the machine compartment or below the body filter, the light emitted from the light emitting unit 600 is emitted to the rear portion of the inner case 200, and thus, an area that is covered by the filter cover 382 and is not detectable by the sensor unit 700, i.e., the non-detectable area X, may be created. If clothes have fallen into the non-detectable area X, the fallen clothes may not block the light emitted from the light emitting unit 600 and the sensor unit 700 may not detect a decrease in illuminance.

[0510] Therefore, the reflection unit 400 that disperses the light emitted from the light emitting unit 600 in at least two directions so that the sensor unit 700 detects that the clothes having fallen onto the bottom surface block the light emitted from the light emitting unit 600 may be further provided.

[0511] As shown in FIG. 29(a), since clothes may have fallen into the rear portion of the inner case or the area of the fallen clothes is greater than the non-detectable area X and thus the possibility that the clothes have fallen only into a portion of the non-detectable area X is higher, even if the light emitting unit 600 is installed in the machine compartment 300 or below the body filter 366, the sensor unit 700 may detect a change in the illuminance of the light emitted from the light emitting unit 600.

[0512] However, as shown in FIG. 29(b), if clothes having a very small volume, such as a scarf, have fallen or clothes have fallen into the front portion of the inner case 200, the area of the fallen clothes is narrower than the non-detectable area X, and thus the clothes may have fallen into the non-detectable area X.

[0513] Therefore, as shown in FIG. 29(c), in order to minimize the non-detectable area X of the sensor unit 700, the reflection units 400 may be disposed on both

sides of the sensor unit 700 and the light emitting unit 600 between the sensor unit 700 and the light emitting unit 600.

[0514] The second reflector 420 and the third reflector 430 may be disposed close to both sides of the filter cover 382. In addition, the second reflector 420 and the third reflector 430 may be disposed close to the rear surface of the filter cover 382 to minimize the non-detectable area X of the sensor unit 700.

[0515] Accordingly, the second reflector 420 and the third reflector 430 may be disposed as close to the sides and rear surface of the filter cover 382 as possible to minimize the non-detectable area X.

[0516] The reflection units 400 may be disposed closer to the light emitting unit 600 than the sensor unit 700.

[0517] The sensor unit 700 and the light emitting unit 600 may be disposed in the forward and rearward directions with respect to the bottom surface, and the reflection units 400 may be disposed in the width direction with respect to the bottom surface.

[0518] The plurality of reflection units 400 may be disposed symmetrically with respect to the sensor unit 700.

[0519] The plurality of reflection units 400 may be disposed symmetrically with respect to the sensor unit 700 and the light emitting unit 600.

[0520] FIG. 30 illustrates the structure of the filter cover of the clothing treatment apparatus of the present disclosure.

[0521] The lower perspective view of the filter cover 382 and the bottom view of the filter cover 382 provided with the reflection units 400 are illustrated.

[0522] The filter cover 382 may have a first reflector installation unit 3821a configured to install the first reflector 410 on the lower surface of the filter cover 382.

[0523] The filter cover 382 may further include a second reflector installation unit 3821b configured to install the second reflector 420 on the lower surface of the filter cover 382, and a third reflector installation unit 3821c configured to install the third reflector 430 on the lower surface of the filter cover 382. The second reflector installation unit 3821b and the third reflector installation unit 3821c may be provided symmetrically on both sides of the first reflector installation unit 3821a.

[0524] The filter cover 382 may have link installation units 3822 configured to install links 383 detachably coupled to the filter fixing unit 384 on the lower surface of the filter cover 382.

[0525] The filter cover 382 may have hooks 3823 supported by the filter fixing unit 384 on the lower surface of the filter cover 382.

[0526] The filter cover 382 may have an aroma sheet installation unit 3824 configured to install an aroma sheet capable of deodorizing air on the lower surface of the filter cover 382.

[0527] FIG. 31 illustrates a control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.

[0528] The conventional clothing treatment apparatuses could not determine whether clothes have fallen before or during clothing treatment, and thus had to perform a cycle without termination even if the clothes have fallen.

[0529] Specifically, the conventional clothing treatment apparatus started a clothing treatment step after a course input/change step in which a user selected a course, and continued to perform the clothing treatment step until a set time has passed without stopping the clothing treatment step even if the clothes have fallen.

[0530] Therefore, the conventional clothing treatment apparatus had a risk of damage to the clothes due to hot and humid air injected in a steam cycle during the clothing treatment step if the clothes have fallen and blocked the steam injection port.

[0531] In addition, there was a problem in that steam was not properly injected toward the inside of the inner case 200 so that clothes that did not fall and was hanging were not properly treated.

[0532] Furthermore, even if attachment or detachment of the filter could be detected, there was a problem in that the clothing treatment process was carried out even if the filter was not installed due to user error, resulting in introduction of dust into the machine compartment.

[0533] Therefore, it became necessary to stop the cycle and control whether a subsequent cycle would proceed upon detecting falling of the clothes or non-installation of the filter.

[0534] The present disclosure provides the clothing treatment apparatus that has the light emitting unit 600 that radiates light to the inside of the inner case 200 and the sensor unit 700 capable of sensing an illuminance value of the light radiated from the light emitting unit 600, and may stop the clothing treatment step if the clothing treatment apparatus or the controller C detects abnormal illuminance.

[0535] The clothing treatment step refers to a step in which at least one of the heater unit 840, the compressor 342, or the fan 353 is operated to treat the clothes.

[0536] The case in which abnormal illuminance is detected refers to a case in which the illuminance value recognized by the sensor unit 700 significantly increases or decreases compared to the reference value when the light emitting unit 600 radiates light.

[0537] The case in which the sensor unit 700 detects abnormal illuminance includes any of a case in which the sensor unit 700 recognizes a change in illuminance and a case in which the clothing treatment apparatus or the controller C is not capable of recognizing a change in illuminance because light does not reach the sensor unit 700, based on the illuminance value of the light emitting unit 600 initially recognized by the clothing treatment apparatus or the controller C or the illuminance value of the light emitting unit 600 that is recognizable by the sensor unit 700 when the filter unit 380 is normally installed while the clothes are not held on the hanger unit 510 at all.

[0538] The reference value may be defined as the illuminance value recognized by the sensor unit 700 when the clothes are not held on the hanger unit 510 at all or the clothes do not fall from the hanger unit 510, the body filter 386 is installed, and light emitted from the light emitting unit 600 passes through the body filter 386 and is completely received by the sensor unit 700.

[0539] Specifically, when the clothes have fallen, the light emitted from the light emitting unit 600 is blocked by the fallen clothes, the sensor unit 700 may recognize an illuminance value smaller than the reference value, and the clothing treatment apparatus or the controller C may detect a decrease in illuminance. When the body filter 386 is not installed, the sensor unit 700 may detect an illuminance value greater than the reference value, and the clothing treatment apparatus or the controller C may detect an increase in illuminance.

[0540] On the other hand, if light does not reach sensor unit 700 at all, i.e., if the sensor unit 700 is shielded so that the light emitted from the light emitting unit 600 does not reach the sensor unit 700, an illuminance value significantly smaller than the reference value may be recognized.

[0541] As described above, an abnormal illuminance detection step A1 in which the clothing treatment apparatus or the controller C is capable of detecting abnormal illuminance may be performed. The abnormal illuminance detection step A1 may be performed at any time before or during the clothing treatment step after the clothing treatment apparatus is turned on.

[0542] That is, the abnormal illuminance detection step A1 may be performed at any time before operation of at least one of the steam generator 800 or the compressor 342 or during the operation of at least one of the steam generator 800 or the compressor 342 after the clothing treatment apparatus is turned on.

[0543] The clothing treatment step may include operation of a least one of the heater unit 840, the compressor 342, or the blower fan 350.

[0544] Meanwhile, the clothing treatment apparatus may have the senor unit 700, as described above, and the sensor unit 700 is preferably provided as an illuminance sensor.

[0545] In addition, the clothing treatment apparatus may have the light emitting unit 600 that emits light toward the sensor unit 700 or the inside of the inner case 200. The sensor unit 700 may be provided to detect the light emitted from the light emitting unit 600.

[0546] Therefore, in the above-described abnormal illuminance detection step A1, the clothing treatment apparatus may simultaneously determine whether clothes have fallen and whether the filter is attached or detached by detecting a change in the illuminance of the light emitted from the light emitting unit 600 through the sensor unit 700. Specifically, if the light is blocked by the fallen clothes and the sensor unit 700 recognizes an illuminance value smaller than the reference value, it may be determined that the clothes have fallen, and if the light reaches the sensor unit 700 due to non-installation of the filter and the sensor unit 700 recognizes an illuminance value greater than the reference value, it may be determined that the filter is not installed.

[0547] The controller C may be provided to perform a shutdown step A2 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down if either falling of the clothes or non-installation of the filter unit 380 is detected in the abnormal illuminance detection step A1.

[0548] If abnormal illuminance is detected in the abnormal illuminance detection step A1, when the shutdown step A2 is performed, the clothing treatment apparatus of the present disclosure may terminate the process without performing the subsequent cycle. The termination includes both stopping the course selected by the user and never starting the course. For example, if the user selects a general clothing treatment course and an increase in illuminance or a decrease in illuminance is detected during operation of the heater unit 840, the operation of the heater 840 may be stopped. Alternatively, if an increase in illuminance or a decrease in illuminance is detected before the operation of the heater unit 840, the operation of the heater 840 may not start.

[0549] Meanwhile, separately from the abnormal illuminance detection step A1, the clothing treatment apparatus may perform a filter contamination level measurement step. The sensor unit 700 may detect a gradual decrease in illuminance depending on the contamination level of the body filter 386 to determine a filter contamination level.

[0550] In addition, the clothing treatment apparatus may perform a filter sterilization step using the light emitting unit 600 and the sensor unit 700 separately from the abnormal illuminance detection step.

[0551] The filter sterilization step may be automatically performed after the clothing treatment step has been completed. The user may turn on/off a function of automatically performing the filter sterilization.

[0552] If the function of automatically performing the filter sterilization is turned off, the filter sterilization step may be performed by user's setting after the clothing treatment cycle has been terminated. The filter sterilization step may be performed only when a filter sterilization course is input in the course input/change step.

[0553] If the filter sterilization step is performed, a step using at least one of heat pump systems (the compressor 342, the heater unit 840, etc.) may not be performed.

[0554] Regardless of whether the function of automatically performing the filter sterilization is turned on/off, the filter sterilization step may be performed whenever the filter sterilization course is input in the course input/change step during standby (when storing clothes).

[0555] Therefore, the clothing treatment apparatus of the present disclosure may perform at least one of clothes fall detection, filter attachment/detachment detection, filter contamination level measurement, or filter sterilization through the same light emitting unit 600 and

the same sensor unit 700.

[0556] Accordingly, the four operations, i.e., the clothes fall detection, the filter attachment/detachment detection, the filter contamination level measurement, and the filter sterilization, may be simultaneously performed using the same light emitting unit 600 and the same sensor unit 700, thereby being capable of reducing material costs and enabling simple control.

[0557] FIG. 32 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.

[0558] As described above, in the abnormal illuminance detection step, if abnormal illuminance is detected and the cycle is stopped, there is a problem in that the clothing treatment does not proceed as expected by the user, thereby causing inconvenience.

[0559] Therefore, if abnormal illuminance is detected and the cycle is stopped in the abnormal illuminance detection step, it is necessary to enable the user to recognize the same.

[0560] An abnormal illuminance detection step B1 in which the clothing treatment apparatus or the controller C may detect abnormal illuminance may be performed. The abnormal illuminance detection step B1 may be performed at any time before or during the clothing treatment step after the clothing treatment apparatus is turned on.

[0561] Further, the clothing treatment apparatus may have the sensor unit 700, as described above, and the sensor unit 700 is preferably provided as an illuminance sensor.

[0562] In addition, the clothing treatment apparatus may have the light emitting unit 600 that emits light toward the sensor unit 700. The sensor unit 700 may be provided to detect the light emitted from the light emitting unit 600.

[0563] Therefore, in the abnormal illuminance detection step B1, the clothing treatment apparatus may detect a change in the illuminance of the light emitted from the light emitting unit 600 through the sensor unit 700 to simultaneously determine whether clothes have fallen and whether the filter is attached or detached.

[0564] Accordingly, if abnormal illuminance is detected in the abnormal illuminance detection step B1, the cycle may be immediately stopped B2 by shutting down the operation of at least one of the heater unit 840 or the compressor 342, and then a notification step B3 in which information corresponding to the detection of the abnormal illuminance is transmitted to the user may be further performed.

[0565] The display that displays information transmitted from the controller C may be provided on the cabinet 100 or the door 40, and the controller C may display one of the fallen state of the clothes and the uninstalled state of the filter unit 380 on the display.

[0566] In the notification step B3, the user may be notified of stoppage of the cycle due to at least one of falling of the clothes, non-installation of the filter, or inability of the sensor unit 700 to detect a change in illuminance. This allows the user to recognize the falling of the clothes, the non-installation of the filter, or the inability of the sensor unit 700 to detect a change in illuminance, and may prevent the clothing treatment step from being performed in the fallen state of the clothes or the uninstalled state of the filter to prevent damage to the clothes.

[0567] On the other hand, if abnormal illuminance is not detected in the abnormal illuminance detection step, a clothing treatment step B4 may be started or continued. Specifically, although not shown, when the user turns on the clothing treatment apparatus and power is supplied thereto, the course input/change step may be performed. In the course input/change step, the user may select and input a desired course through an input unit I. When the user selects the desired course, the compressor, the heater unit 840, moving hangers, etc. start to operate accordingly. For example, when the general clothing treatment course is selected, the heater unit 840 starts to operate to generate steam.

[0568] FIG. 33 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.

[0569] The control method of the clothing treatment apparatus of the present disclosure may include a filter attachment/detachment detection step C1 in which the sensor unit 700 detects a change in the illuminance of the light emitted from the light emitting unit 600.

[0570] In the abnormal illuminance detection step, the clothing treatment apparatus or the controller C may simultaneously determine whether clothes have fallen and whether the filter is attached or detached by detecting a change in the illuminance of the light emitted from the light emitting unit 600 through the sensor unit 700. Specifically, if the light is blocked by the fallen clothes and the sensor unit 700 recognizes an illuminance value smaller than the reference value, it may be determined that the clothes have fallen, and if the light reaches the sensor unit 700 due to non-installation of the filter and the sensor unit 700 recognizes an illuminance value greater than the reference value, it may be determined that the filter is not installed.

[0571] That is, the abnormal illuminance detection step may include an illuminance change detection step and a light blocking detection step. The illuminance change detection step may include an illuminance increase detection step C1 and an illuminance decrease detection step C2. In the illuminance increase detection step C1, it may be determined whether the filter is attached or detached, and in the illuminance decrease detection step C2, it may be determined whether the clothes have fallen. The illuminance increase detection step C1 and the illuminance decrease detection step C2 may be performed simultaneously.

[0572] However, the illuminance increase detection step C2 is preferably performed first after the clothing treatment apparatus is turned on. This is because, if the sensor unit 700 is not able to receive the light emitted from the light emitting unit 600 due to falling of the clothes, the

sensor unit 700 may not be able to recognize an illuminance value. That is, in the abnormal illuminance detection step, determination as to whether the body filter 386 is attached or detached by detecting an illuminance value greater than the reference value by the sensor unit 700 may be first performed.

[0573] In the above illuminance increase detection step C1 and the illuminance decrease detection step C2, if the controller C detects that the filter unit 380 is not installed, the controller C may shut down the operation of at least one of the heater unit 840 or the compressor 342 even if it is determined that the clothes have not fallen.

[0574] In the illuminance increase detection step C1, if the controller C detects that the filter unit 380 is installed, the controller C may allow the compressor 342 to be operated even if it is detected that the clothes have fallen.

[0575] If an increase in illuminance is detected in the illuminance increase detection step C1, a shutdown step C3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process C3 without performing a subsequent cycle. The termination includes both stopping a course selected by the user and never starting the course. For example, if the user selects the general clothing treatment course and an increase in illuminance is detected during the operation of the heater unit 840, the operation of the heater 840 may be stopped. Alternatively, if an increase in illuminance is detected before the operation of the heater unit 840, the operation of the heater 840 may not start.

[0576] If the increase in illuminance is detected in the illuminance increase detection step C1, the subsequent clothing treatment step may be stopped and a notification step C4 may be further performed. In the notification step C4, the user may be notified that the body filter 386 is not installed. This allows the user to recognize that the body filter 386 is not installed, and may thus prevent large foreign substances from entering the circulation duct and allow the user to select whether to perform the clothing treatment step.

[0577] On the other hand, if it is determined that the body filter 386 is properly installed because an illuminance change is not detected in the illuminance increase detection step C1, the illuminance decrease detection step C2 may be performed thereafter. The sensor unit 700 may recognize an illumination value smaller than the reference value due to the fallen clothes during clothing treatment, and determine that the clothes have fallen.

[0578] If a decrease in illuminance is detected in the illuminance decrease detection step C2, the shutdown step C3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing the subsequent cycle. The termination includes both stopping the course selected by the user and never starting the course. For example, if the user selects the general clothing treatment course and a decrease in illuminance is detected during the operation of the heater unit 840, the operation of the heater 840 may be stopped. Alternatively, if a decrease in illuminance is detected before the operation of the heater unit 840, the operation of the heater 840 may not start.

[0579] If falling of clothes is detected in the illuminance decrease detection step C2, the clothing treatment step may be stopped and a notification step C4 may be performed thereafter. In the notification step C4, the user may be notified that the clothes have fallen. This allows the user to recognize that the clothes have fallen, and may thus prevent the clothing treatment step from being performed in the fallen state of the clothes to prevent damage to the clothes.

[0580] On the other hand, if falling of clothes is not detected in the illuminance decrease detection step C3, a clothing treatment step C5 may be continuously performed without stopping.

[0581] FIG. 34 illustrates another control method of the clothing treatment apparatus of the present disclosure when detecting abnormal illuminance.

[0582] This figure illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0583] Even if clothes have not fallen during clothing treatment, there may be a case in which the light emitted from the light emitting unit 600 does not reach the sensor unit 700 from the beginning due to long clothes, or the like. In this case, the sensor unit 700 may not detect a change in illuminance.

[0584] Therefore, there is a need to enable the sensor unit 700 to detect a change in illuminance only when light reaching the sensor unit 700 is not blocked from the beginning.

[0585] Therefore, the present disclosure provides the clothing treatment apparatus that may detect a change in illuminance only when light reaches the sensor unit 700 and the clothing treatment apparatus or the controller C may detect the change in illuminance.

[0586] The controller C may be provided to perform the shutdown step C3 in which the operation of at least one of the heater unit 380 or the compressor 342 is shut down and stands by, if the light emitted from the light emitting unit 600 is blocked and does not reach the sensor unit 700 before the at least one of the heater unit 840 or the compressor 342 is operated.

[0587] Meanwhile, as described above, the abnormal illuminance detection step may include an illuminance change detection step D2 and a light blocking detection step D1.

[0588] In order to solve the above problem, the light blocking detection step D1 is preferably performed first during the abnormal illuminance detection step. In the light blocking detection step D1, if the light emitted from the light emitting unit 600 is blocked by long clothes or the like and does not reach the sensor unit 700, the clothing treatment apparatus may determine that the light emitted from the light emitting unit 600 is blocked.

[0589] If the light is blocked in the light blocking detection step D1, a shutdown step D3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing a subsequent cycle. The termination includes both stopping a course selected by the user and never starting the course.

[0590] In addition, if the sensor unit 700 is not able to detect light, the cycle may be immediately stopped and a notification step (not shown) may be further performed. In the notification step (not shown), the user may be notified of stoppage of the clothing treatment step due to inability to detect a change in illuminance. At this time, the user may confirm falling of the clothes or attachment or detachment of the filter by himself or herself. This allows the user to be aware of stoppage of clothing treatment.

[0591] On the other hand, if light is not blocked by long clothes or the like and the sensor unit 700 is able to completely detect the light emitted from the light emitting unit 600 in the light blocking detection step D1, the illuminance change detection step D2 may be performed.

[0592] In the illuminance change detection step D2, the clothing treatment apparatus or the controller C may simultaneously determine whether clothes have fallen and whether the filter is attached or detached by detecting a change in the illuminance of the light emitted from the light emitting unit 600 through the sensor unit 700. Specifically, if the light is blocked by the fallen clothes and the sensor unit 700 recognizes an illuminance value smaller than the reference value, it may be determined that the clothes have fallen, and if the light reaches the sensor unit 700 due to non-installation of the filter and the sensor unit 700 recognizes an illuminance value greater than the reference value, it may be determined that the filter is not installed.

[0593] The illuminance change detection step D2 may be performed at any time before or during the clothing treatment step after the clothing treatment apparatus is turned on.

[0594] If an increase in illuminance or a decrease in illuminance is detected in the illuminance change detection step D2 and the clothing treatment apparatus determines that the clothes have fallen or the filter is not installed, the shutdown step D3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing the subsequent cycle. The termination includes both stopping a course selected by the user and never starting the course. For example, if the user selects the general clothing treatment course and an abnormal increase in illuminance or an abnormal decrease in illuminance is detected while the heater unit 840 is in operation, the operation of the heater unit 840 may be stopped. Alternatively, if an abnormal increase in illuminance or an abnormal decrease in illuminance is detected before the heater unit 840 is operated, the heater unit 840 may not start to operate.

[0595] On the other hand, if no change in illuminance is detected in the illuminance change detection step D2, the clothing treatment step may be started or continued. Specifically, although not shown in this figure, when the user turns on the clothing treatment apparatus and power is supplied thereto, the course input/change step (not shown) may be performed. In the course input/change step, the user may select and input a desired course through the input unit I. When the user selects the desired course, the compressor, the heater unit 840, the moving hangers, etc. start to operate accordingly. For example, when the general clothing treatment course is selected, the heater unit 840 starts to operate to generate steam.

[0596] FIG. 35 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0597] If the light is blocked from the sensor unit 700 until the clothing treatment step is capable of being sufficiently performed, and the clothing treatment step is not started or is stopped, as described above, a problem in that the clothing treatment step is not capable of proceeding contrary to the user's intention may occur.

[0598] For example, there is a case in which the light emitted from the light emitting unit 600 does not reach the sensor unit 700 due to long clothes or the like. Even in this case, if abnormal illuminance is detected and the clothing treatment step is not performed, there is a problem in that the clothing treatment step on the long clothes or the like is not capable of proceeding, contrary to the user's intention.

[0599] In addition, in the abnormal illuminance detection step, the clothing treatment apparatus is generally turned on and then first detects whether the light is blocked. Therefore, the clothing treatment apparatus may not be able to determine whether the illuminance increases or decreases due to the sensor unit 700 blocked by the long clothes or the like in the illuminance change detection step.

[0600] In order to solve the above problem, even though the sensor unit 700 is not able to detect a change in illuminance because the light emitted from the light emitting unit 600 is blocked from the beginning, if the user determines that the clothing treatment step is capable of being sufficiently performed, it is necessary to allow the user to continue the course.

[0601] The clothing treatment apparatus of the present disclosure may perform a power supply step E1 by inputting a power command to supply power from a power supply unit or the like.

[0602] The clothing treatment apparatus of the present disclosure may be provided so that the user is able to select whether to proceed with the course if the sensor unit 700 is not able to detect light after the power supply step E1 or from the initial stage of the cycle.

[0603] Specifically, the clothing treatment apparatus of the present disclosure may perform a light blocking detection step E2 in which the sensor unit 700 detects abnormal illuminance after the power supply step E1. In the light blocking detection step E2, if the light emitted

from the light emitting unit 600 is blocked by long clothes or the like and does not reach the sensor unit 700, the clothing treatment apparatus may determine that the light emitted from the light emitting unit 600 is blocked.

[0604] If it is determined that the light is blocked in the light blocking detection step E2, a shutdown step E3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing a subsequent cycle. The termination includes both stopping a course selected by the user and never starting the course. For example, if the user selects the general clothing treatment course and an abnormal increase in illuminance or an abnormal decrease in illuminance is detected while the heater unit 840 is in operation, the operation of the heater unit 840 may be stopped. Alternatively, if an abnormal increase in illuminance or an abnormal decrease in illuminance is detected before the heater unit 840 is operated, the heater unit 840 may not start to operate.

[0605] In addition, if the sensor unit 700 is not able to detect light, the cycle may be immediately stopped and then a notification step E4 may be further performed. In the notification step E4, the user may be notified of stoppage of the clothing treatment step due to inability to detect a change in illuminance. At this time, the user may confirm falling of the clothes or attachment or detachment of the filter by himself or herself. This allows the user to be aware of stoppage of clothing treatment.

[0606] After the notification step E4, the clothing treatment apparatus may further perform a confirmation step E5 in which a massage to ask the user whether to proceed with the course is displayed on the display and a confirmation command is received. In the confirmation step E5, the user may select and input whether to continue a subsequent course through the input unit I. At this time, the user may select to continue the course if the sensor unit 700 is not able to detect light due to long clothes or the like. As a result, the user may allow clothes to be treated depending on the user's intention.

[0607] On the other hand, if light is not blocked by long clothes or the like and the sensor unit 700 is able to completely detect the light emitted from the light emitting unit 600 in the light blocking detection step E2, the illuminance change detection step may be performed.

[0608] Although not shown in this figure, the course input/change step (not shown) may be generally performed after power is supplied to the clothing treatment apparatus. In the course input/change step, the user may select and input a desired course through the input unit I. When the user selects the desired course, the clothing treatment step, such steam injection, drying, etc., may be performed. In the clothing treatment step, the compressor, the heater(s), the moving hangers, etc. start to operate. For example, if the general clothing treatment course is selected, the heaters start to operate to generate steam.

[0609] If the user selects to continue the subsequent cycle in the confirmation step E5, a course input/change step E6 and a clothing treatment step E7 may be resumed.

[0610] On the other hand, if the user selects not to continue the course, the course selected by the user may be terminated without being conducted. The clothing treatment apparatus may be completely turned off a certain period of time after the course ends. Accordingly, even if the user does not see the notification and does not recognize that the course is not being conducted, there is no need to unnecessarily turn on the clothing treatment apparatus, thereby being capable of minimizing energy waste.

[0611] Therefore, even if the sensor unit 700 wants to treat clothes having a long enough length to block the light emitted from the light emitting unit 600, the clothing treatment step may be performed as intended by the user.

[0612] FIG. 36 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0613] This embodiment from a power input step F1 to a confirmation step F5 may be the same as the above-described embodiment.

[0614] If the user confirms by himself or herself whether clothes have fallen or the body filter is attached or detached or does not want a subsequent cycle to proceed due to non-installation of the body filter 386, the user may open the door 40 without selecting whether to proceed with the cycle, and may remove long clothes or the like or check the body filter.

[0615] Therefore, if the user selects not to proceed with the subsequent cycle or makes no selection, the clothing treatment apparatus of the present disclosure may perform a door open detection step F6-1 to detect whether the door 40 is open, after the confirmation step F5. That is, the control method up to the confirmation step F5 is the same as the above description.

[0616] If the clothing treatment apparatus detects that the door 40 is open in the door open detection step F6-1, a light blocking detection step F2 may be performed again. If the long clothes are still present in the light blocking detection step F2 and the light reaching the sensor unit 700 is blocked, the subsequent course may not start.

[0617] On the other hand, if the user opens the door 40 and removes the long clothes in the light blocking detection step F2, the sensor unit 700 is able to detect light so that the illuminance change detection may be performed. In the illuminance change detection step, the clothing treatment apparatus may simultaneously determine whether clothes have fallen and whether the filter is attached or detached by detecting a change in the illuminance of the light emitted from the light emitting unit 600 through the sensor unit 700. Specifically, if the light is blocked by the fallen clothes and the sensor unit 700 recognizes an illuminance value smaller than the reference value, it may be determined that the clothes have fallen, and if the light reaches the sensor unit 700 due to

non-installation of the filter and the sensor unit 700 recognizes an illuminance value greater than the reference value, it may be determined that the filter is not installed.

[0618] On the contrary, if the clothing treatment apparatus does not detect opening of the door 40 in the door open detection step F6-1 after the confirmation step F5, a subsequent course may not start at all. In addition, the clothing treatment apparatus may be turned off after a certain period of time.

[0619] If the user selects to continue the subsequent cycle in the confirmation step F5, a course input/change step F6-2 and a clothing treatment step F7 may be performed.

[0620] FIG. 37 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0621] When using the clothing treatment apparatus, there may be a case in which the user intentionally does not install the body filter 386 in order to clean and replace the body filter 386. Even in this case, if the sensor unit 700 detects an abnormal increase in illuminance and the subsequent clothing treatment step is not performed, a problem in that inconvenience is caused contrary to the user's intention may occur.

[0622] Therefore, in order to solve the above problem, the present disclosure provides the clothing treatment apparatus that asks the user to directly confirm whether the filter is installed and whether a subsequent cycle is to proceed.

[0623] Specifically, immediately after supply of power to the clothing treatment apparatus G1, a filter attachment/detachment detection step G2 in which the sensor unit 700 determines whether the body filter 386 is attached or detached may be performed. If the sensor unit 700 detects an abnormal increase in illuminance in the filter attachment/detachment detection step G2, it may be determined that the body filter 386 is not installed.

[0624] If the clothing treatment apparatus determines that the filter is not installed because the abnormal increase in illuminance is detected in the filter attachment/-detachment detection step G2, a shutdown step G3 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing the subsequent cycle. The termination includes never starting the course. For example, if the user selects the general clothing treatment course and an abnormal increase in illuminance or an abnormal decrease in illuminance is detected while the heater unit 840 is in operation, the operation of the heater unit 840 may be stopped. Alternatively, if an abnormal increase in illuminance or an abnormal decrease in illuminance is detected before the heater unit 840 is operated, the heater unit 840 may not start to operate.

[0625] If the sensor unit 700 detects an abnormal increase in illuminance in the filter attachment/detachment detection step G2, the shutdown step G3 may be immediately performed and then a notification step G4 may be further performed. In the notification step G4, the user may be notified of stoppage of the clothing treatment step due to non-installation of the filter. In addition, the user may confirm attachment or detachment of the filter by himself or herself. This allows the user to be aware of non-installation of the filter.

[0626] The clothing treatment apparatus may perform a filter confirmation step G5 in which the user is asked to confirm whether to proceed with the course after the notification step G4. In the filter confirmation step G5, the user may select and input whether to continue the subsequent course through the input unit I. At this time, the user may select to continue the course even if the filter is not installed on purpose. This allows the user to treat the clothes depending on the user's intention.

[0627] If the user selects to continue the subsequent cycle in the confirmation step G5, a course input/change step G6 and a clothing treatment step G7 may be performed. In the course input/change step G6, the user may select and input a desired course through the input unit I. When the user selects the desired course, the clothing treatment step, such as steam injection, drying, etc., may be performed. In the clothing treatment step, the compressor, the heater(s), the moving hangers, etc. start to operate. For example, if the general clothing treatment course is selected, the heaters start to operate to generate steam.

[0628] On the other hand, if the user selects not to continue the course in the confirmation step G5, the course selected by the user may be terminated without being conducted. The clothing treatment apparatus may be completely turned off a certain period of time after the course ends. Accordingly, even if the user does not see the notification and does not recognize that the course is not being conducted, there is no need to unnecessarily turn on the clothing treatment apparatus, thereby being capable of minimizing energy waste.

[0629] Meanwhile, if it is determined that the filter is installed because an abnormal increase in illuminance is not detected in the filter attachment/detachment detection step G2, the course input/change step G6 and the clothing treatment step G7 may be performed, as described above.

[0630] Accordingly, even if the sensor unit 700 of the clothing treatment apparatus is covered from the beginning and it is not possible to determine whether the filter is attached or detached, the user may confirm by himself or herself the body filter 386 and select whether to proceed with the clothing treatment step depending on the user's intention, thereby increasing accuracy.

[0631] FIG. 38 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0632] If the user confirms by himself or herself whether the body filter 386 is attached or detached or does not want a subsequent cycle to proceed due to non-installation of the body filter 386, the user may open the door 40 without selecting whether to proceed with a

subsequent cycle, and may confirm for himself or herself whether the body filter 386 is attached or detached.

[0633] Therefore, if the user selects not to proceed with the subsequent cycle or makes no selection in a confirmation step H5, the clothing treatment apparatus may perform a door open detection step H6-1 to detect whether the door 40 is open, after the confirmation step H5. The control method up to the confirmation step H5 is the same as the above description.

[0634] If the clothing treatment apparatus detects that the door 40 is open in the door open detection step H6-1, an illuminance increase detection step H2 may be performed again. If the body filter 386 is still not installed in the illuminance increase detection step H2 and an increase in illuminance is detected, a subsequent course may not start.

[0635] On the other hand, if the clothing treatment apparatus does not detect opening of the door 40 in the door open detection step H6-1 after the confirmation step H5, the subsequent course may not start at all. In addition, the clothing treatment apparatus may be completely turned off after a certain period of time.

[0636] If the user selects to continue the subsequent cycle in the confirmation step H5, a course input/change step H6-2 and a clothing treatment step H7 may be performed.

[0637] FIG. 39 illustrates one embodiment of the control method of the clothing treatment apparatus of the present disclosure.

[0638] Even if the sensor unit 700 is out of order or has an error, is not operated normally, and is not able to detect abnormal illuminance, there may be a case in which it it determined that the sensor unit 700 detects abnormal illuminance. At this time, if the subsequent clothing treatment process is stopped or is not performed, a problem in that inconvenience is caused may occur.

[0639] Therefore, in order to solve the above problem, the present disclosure provides the clothing treatment apparatus that allows the user to select whether to proceed with a subsequent cycle if abnormal illuminance is detected and the cycle is stopped.

[0640] The clothing treatment apparatus performs an abnormal illuminance detection step I1 in which a case in which an illuminance value recognized by the sensor unit 700 increases or decreases from a reference value or a case in which light does not reach the sensor unit 700 and thus the sensor unit 700 is not able to recognize a change in illuminance is detected. The reference value may be defined as an illuminance value recognized by the sensor unit 700 when the body filter is installed and the light emitted from the light emitting unit 600 passes through the body filter and is completely received by the sensor unit 700.

[0641] The abnormal illuminance detection step I1 may be performed at any time before or during the clothing treatment step after the clothing treatment apparatus is turned on, even if it is not the initial stage of the cycle.

[0642] If abnormal illuminance is detected in the abnormal illuminance detection step I1, a shutdown step I2 in which the operation of at least one of the heater unit 840 or the compressor 342 is shut down may be performed to terminate the process without performing a subsequent cycle. The termination includes both stopping a course selected by the user and never starting the course. For example, if the user selects the general clothing treatment course and an abnormal increase in illuminance or an abnormal decrease in illuminance is detected while the heater unit 840 is in operation, the operation of the heater unit 840 may be stopped. Alternatively, if an abnormal increase in illuminance or an abnormal decrease in illuminance is detected before the heater unit 840 is operated, the heater unit 840 may not start to operate.

[0643] If abnormal illuminance is detected in the abnormal illuminance detection step I1, the cycle may be immediately stopped I2 and then a notification step I3 may be further performed.

[0644] In the notification step I3, the user may be notified of stoppage of the cycle due to at least one of falling of the clothes, non-installation of the filter, or inability of the sensor unit 700 to detect a change in illuminance. This allows the user to recognize the falling of the clothes, the non-installation of the filter, or the inability of the sensor unit 700 to detect a change in illuminance, and may prevent the clothing treatment step from being performed in the fallen state of the clothes or the uninstalled state of the filter to prevent damage to the clothes.

[0645] The clothing treatment apparatus may perform a confirmation step I4 in which the user is asked to confirm whether to proceed with the subsequent cycle after the notification step I3. In the confirmation step I4, the user may select and input whether to continue the subsequent course through the input unit I. At this time, the user may determine by himself or herself that clothes have not fallen or the body filter 386 is properly installed, and may select to continue the course. This allows the user to treat the clothes depending on the user's intention.

[0646] If the user selects not to continue the course in the confirmation step I4, the subsequent cycle may be terminated without being conducted. The clothing treatment apparatus may be completely turned off a certain period of time after the course ends. Accordingly, even if the user does not see the notification and does not recognize that the course is not being conducted, there is no need to unnecessarily turn on the clothing treatment apparatus, thereby being capable of minimizing energy waste.

[0647] Although not shown in this figure, if abnormal illuminance is not detected in the abnormal illuminance detection step I1, the clothing treatment step may be started or continued. Specifically, although not shown in this figure, when the user turns on the clothing treatment apparatus and power is supplied thereto, the course input/change step (not shown) may be performed.

In the course input/change step (not shown), the user may select and input a desired course through the input unit I. When the user selects the desired course, the compressor, the heater(s), the moving hangers, etc. start to operate accordingly. For example, when the general clothing treatment course is selected, the heater(s) start to operate to generate steam.

[0648] Accordingly, even if the sensor unit 700 is not operated normally and abnormal illuminance detection is not performed accurately, the clothing treatment step may be performed as intended by the user.

[0649] Although the present disclosure has been illustrated and described in relation to specific embodiments, it will be apparent to those skilled in the art that the present disclosure may be variously improved and changed without departing from the technical idea of the present disclosure provided by the following claims.

Claims

1. A clothing treatment apparatus comprising:

a cabinet having an opening formed in a front portion thereof;
an inner case provided in the cabinet to provide a space configured to accommodate clothes;
a door coupled to the cabinet to open and close the opening;
a hanger unit provided in an upper portion of the inner case to hold the clothes;
a machine compartment provided to communicate with the inner case and comprising a heater configured to generate steam to be supplied to the inner case and a compressor configured to compress a refrigerant provided to exchange heat with air supplied to the inner case;
a light emitting unit provided in one of the inner case, the door, and the machine compartment to emit light toward an inside of the inner case;
a sensor unit provided in the inner case or the door to detect the light emitted from the light emitting unit; and
a controller provided to control at least one of the heater, the compressor, or the sensor unit,
wherein the controller is provided to shut down operation of at least one of the heater or the compressor if the sensor unit is not able to detect the light emitted from the light emitting unit prior to the operation of the at least one of the heater or the compressor.

2. The clothing treatment apparatus according to claim 1, further comprising a display provided on the cabinet or the door to display clothing treatment information transmitted from the controller,
wherein the clothing treatment information comprises a stopped state of the operation of the at least one of the heater or the compressor.

3. The clothing treatment apparatus according to claim 2, wherein the controller is configured to display the stopped state of the operation of the at least one of the heater or the compressor on the display after shutting down the operation of the at least one of the heater or the compressor.

4. The clothing treatment apparatus according to claim 2, wherein the controller is configured to display the clothing treatment information on the display simultaneously with shutting down the operation of the at least one of the heater or the compressor.

5. The clothing treatment apparatus according to claim 2, wherein the clothing treatment information further comprises asking whether to reoperate one of the heater and the compressor in a fallen state of the clothes.

6. The clothing treatment apparatus according to claim 5, further comprising an input unit provided on the door or the cabinet to receive a driving command to reoperate the one of the heater and the compressor even in a state in which the sensor unit is configured to be not able to detect the light emitted from the light emitting unit.

7. The clothing treatment apparatus according to claim 6, wherein the controller is configured to reoperate the one of the heater and the compressorbased on the driving command being input to the input unit.

8. The clothing treatment apparatus according to claim 6, wherein the controller is configured to shut down the operation of the one of the heater and the compressor based on the driving command being not input to the input unit.

9. The clothing treatment apparatus according to claim 1, further comprising a door detection unit provided in the cabinet or the door to detect opening of the door,
wherein the controller is configured to reoperate the one of the heater and the compressor if the door detection unit detects that the door is configured to be opened after the operation of the one of the heater or the compressor is configured to shut down.

10. The clothing treatment apparatus according to claim 9, further comprising a filter unit provided in the machine compartment to filter out dust introduced from the inner case to the machine compartment,
wherein the controller, if the one of the heater and the compressor is reoperated, determines whether the filter is attached or detached by detecting an increase in an amount of the light emitted from the

light emitting unit by the sensor unit, and determines whether the clothes have fallen by detecting a decrease in the amount of the light emitted from the light emitting unit by the sensor unit.

11. The clothing treatment apparatus according to claim 10, wherein the light emitting unit and the sensor unit are configured to be disposed below the hanger unit.

12. The clothing treatment apparatus according to claim 11, wherein:

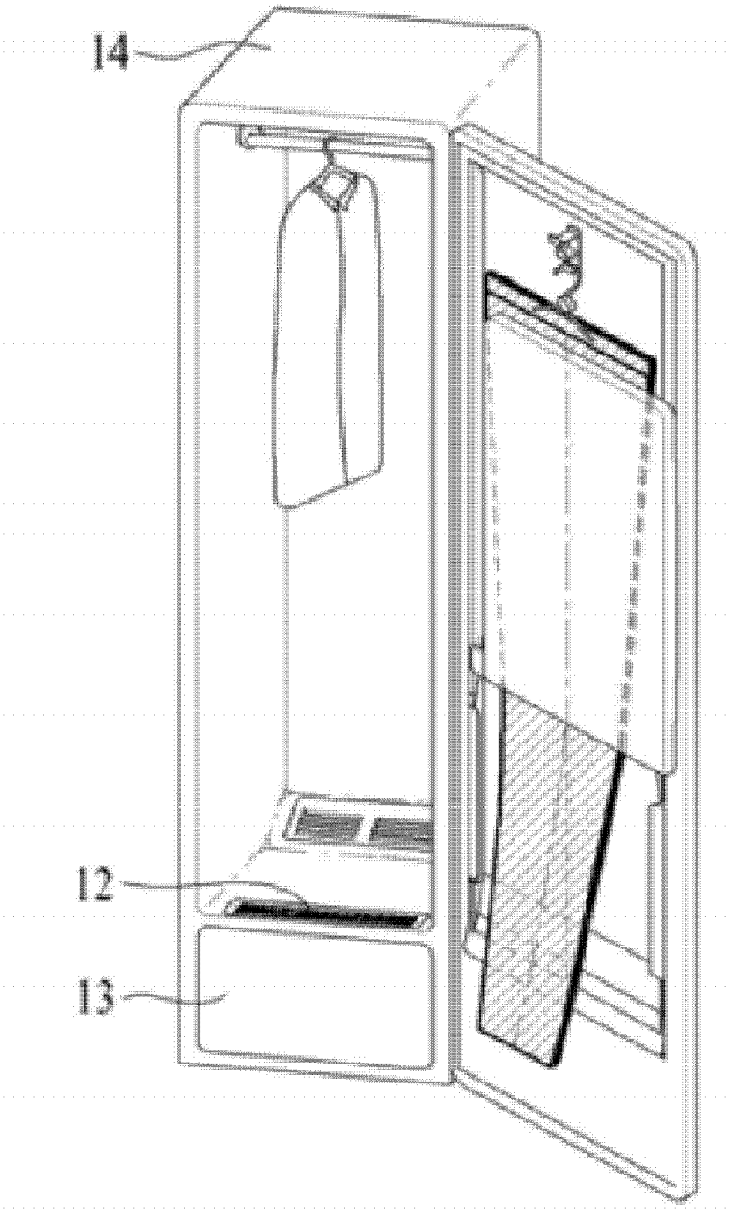
the machine compartment further comprises an inflow body configured to communicate with a bottom surface of the inner case to allow air to be introduced thereinto, a circulation duct provided with a heat exchanger configured to heat the air introduced from the inflow body to generate hot air, and a discharge duct configured to allow the circulation duct to communicate with the inside of the inner case and disposed farther rearward than the inflow body;
the light emitting unit is provided on the inflow body; and
the sensor unit is provided on a rear surface of the inner case.

13. The clothing treatment apparatus according to claim 12, further comprising a reflection unit disposed above the light emitting unit and provided to guide the light emitted from the light emitting unit to the sensor unit.

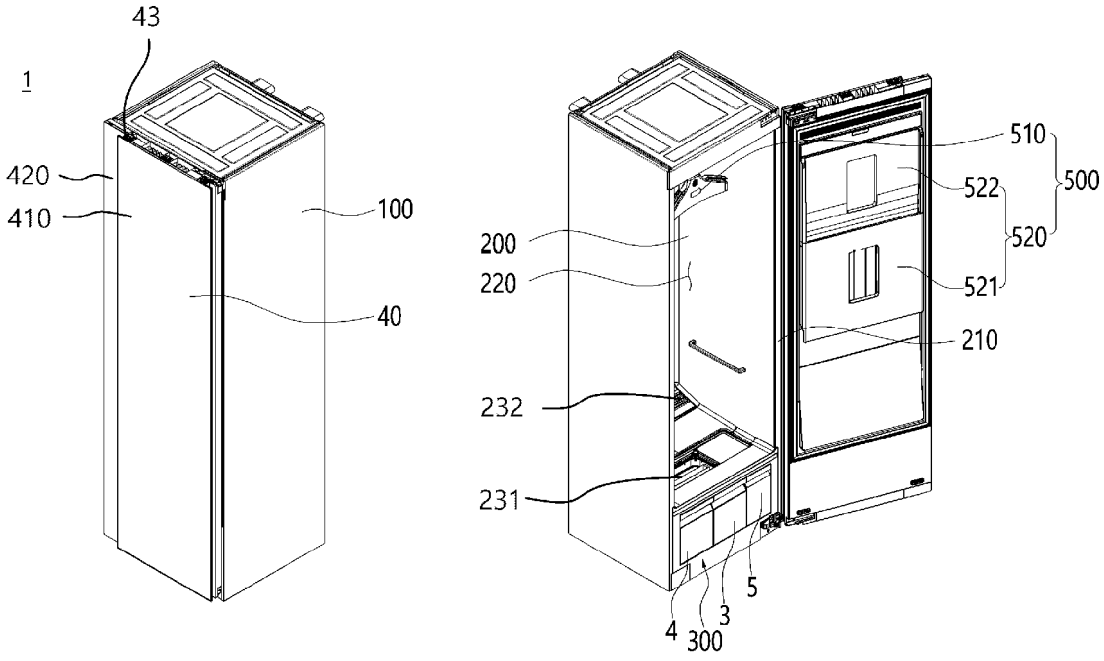
14. The clothing treatment apparatus according to claim 13, wherein the machine compartment further comprises:

a body filter mounted on the inflow body; and
a filter cover disposed above the body filter,
wherein the reflection unit comprises side reflectors disposed on both sides of the filter cover.

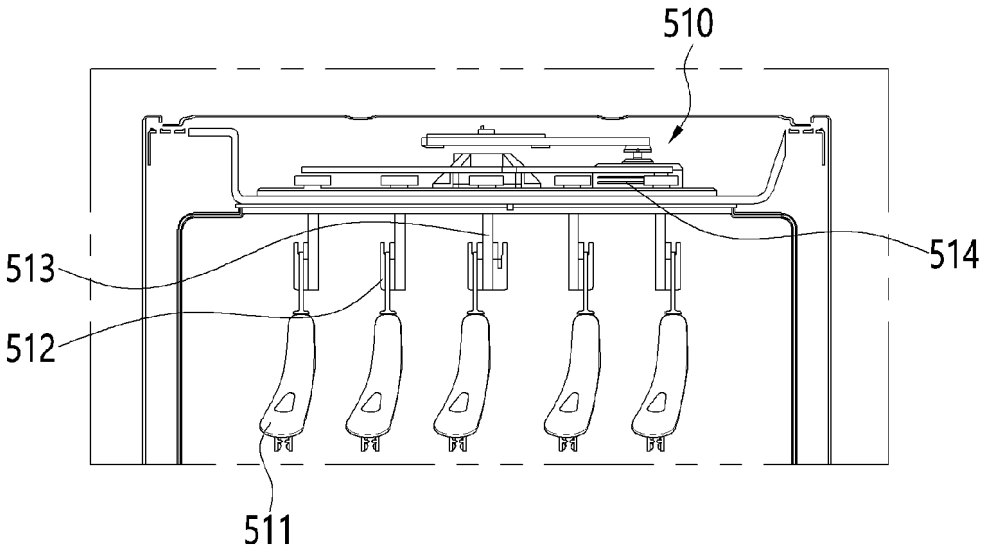
[Fig 1]



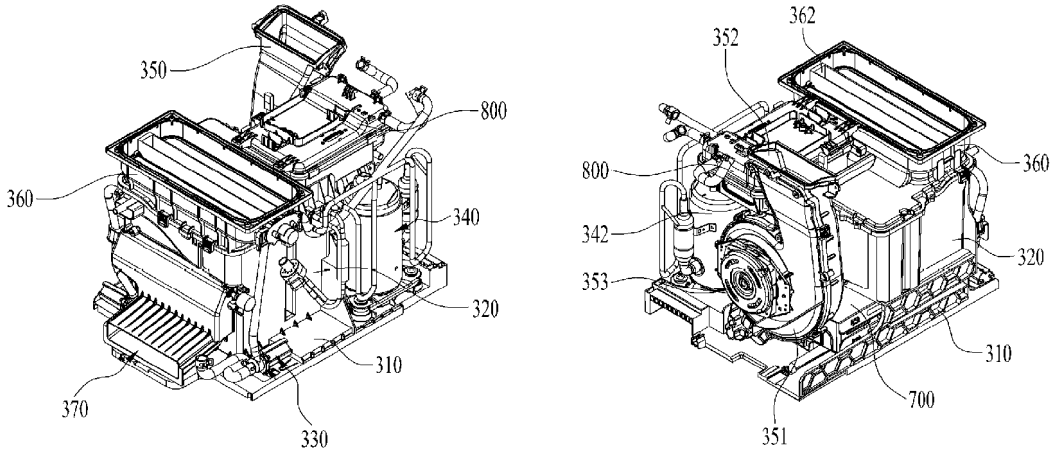
[Fig 2]


43
1
420
410
100
40
(a)
510
500
522
520
521
210
200
220
232
231
5
4
300
3
(b)

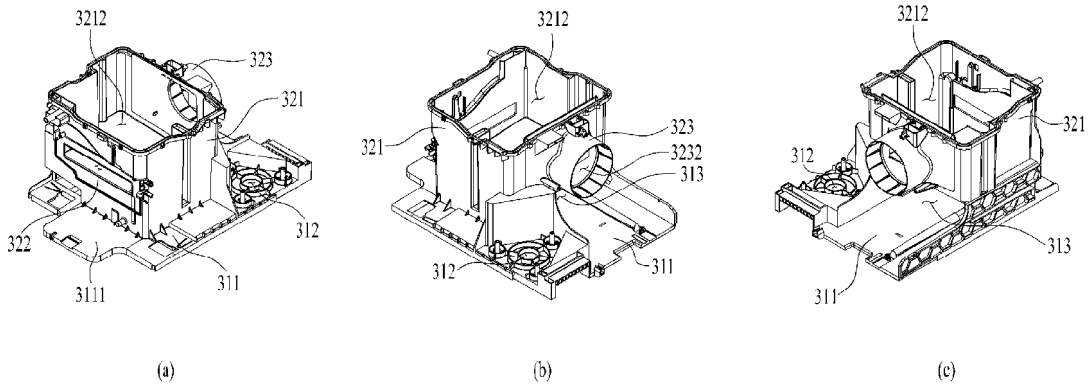
[Fig 3]


510
513
512
514
511

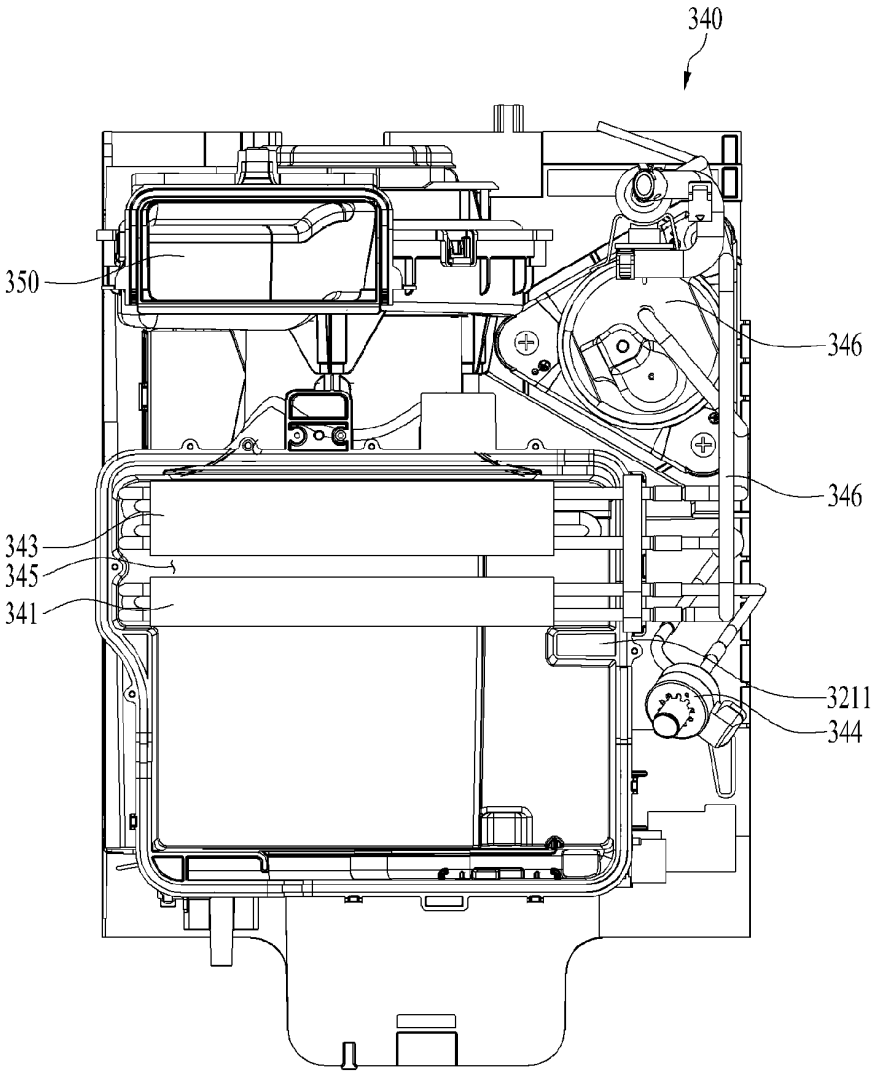
[Fig 4]


350
800
360
340
320
310
370
330
362
352
800
360
342
320
353
310
700
351
(a)
(b)

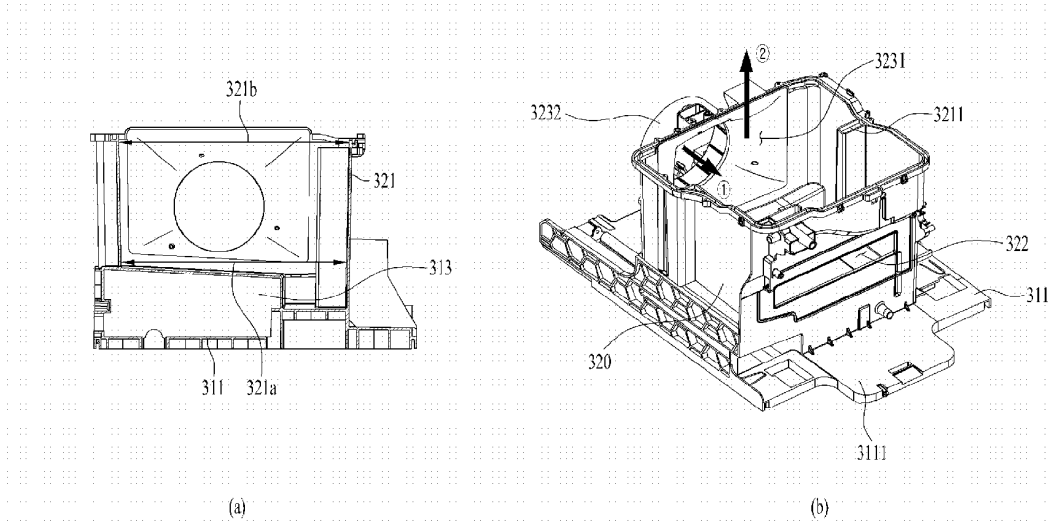
[Fig 5]


3212
323
321
322
312
3111
311
3212
321
323
3232
313
312
311
3212
321
312
313
311
(a)
(b)
(c)

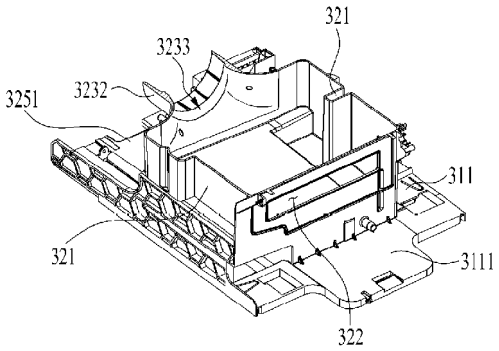
[Fig 6]

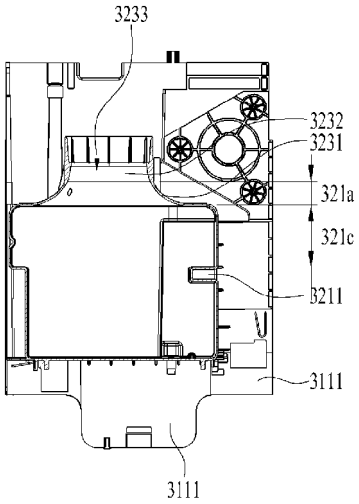

340
350
346
346
343
345
341
3211
344

[Fig 7]

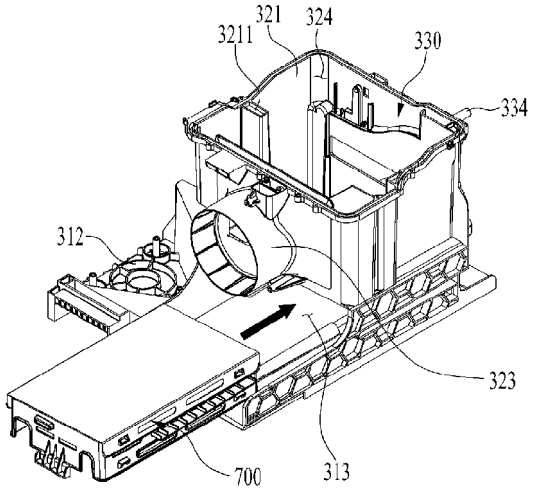

321b
321
313
311
321a
(a)
②
3231
3232
3211
①
322
311
320
3111
(b)

[Fig 8]

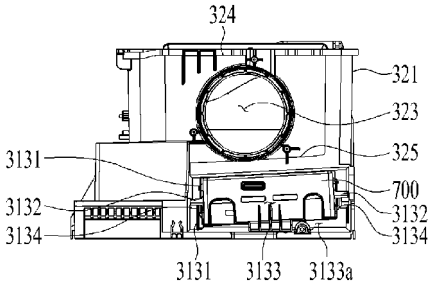

321
3233
3232
3251
311
321
3111
322


3233
3232
3231
321a
321c
3211
3111
3111

[Fig 9]

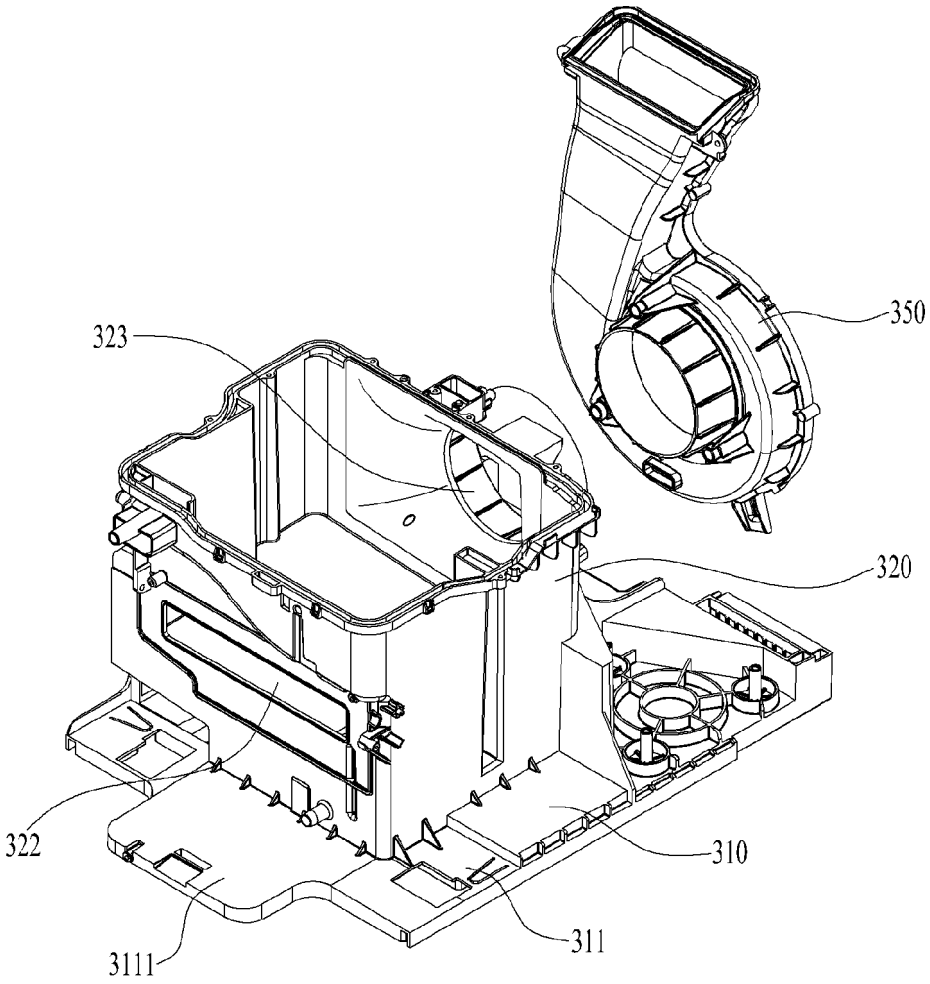

321
324
3211
330
334
312
323
700
313

(a)

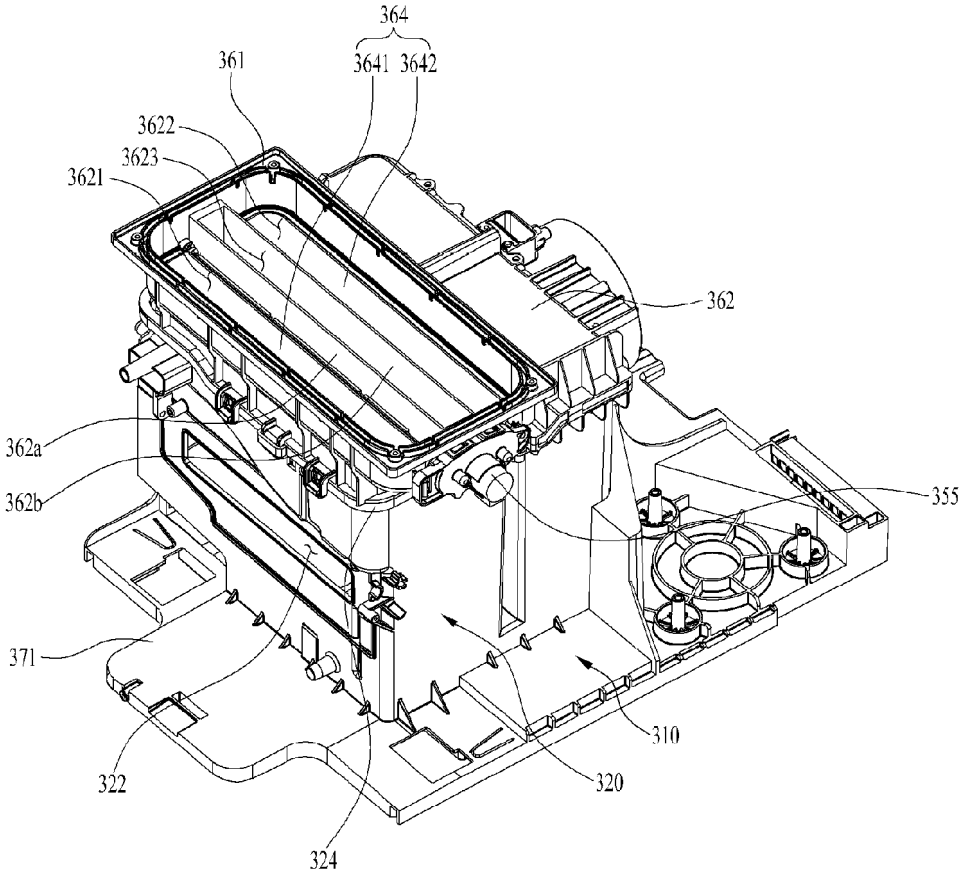

324
321
323
325
3131
700
3132
3132
3134
3134
3131
3133
3133a

(b)

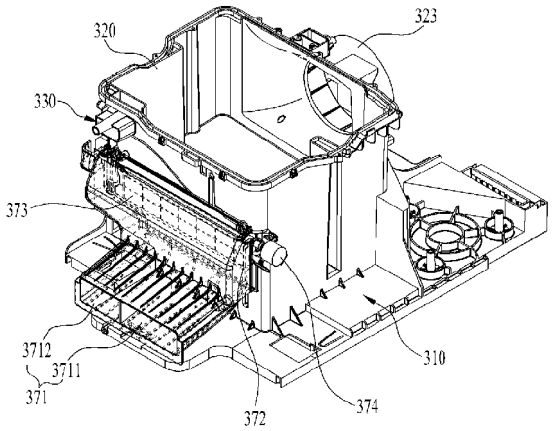
[Fig 10]



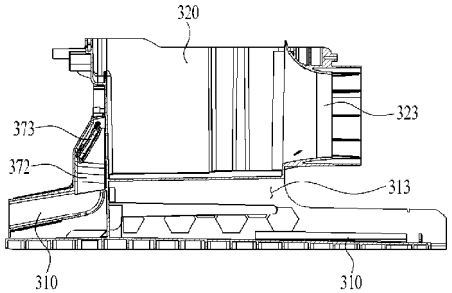
[Fig 11]



[Fig 12]

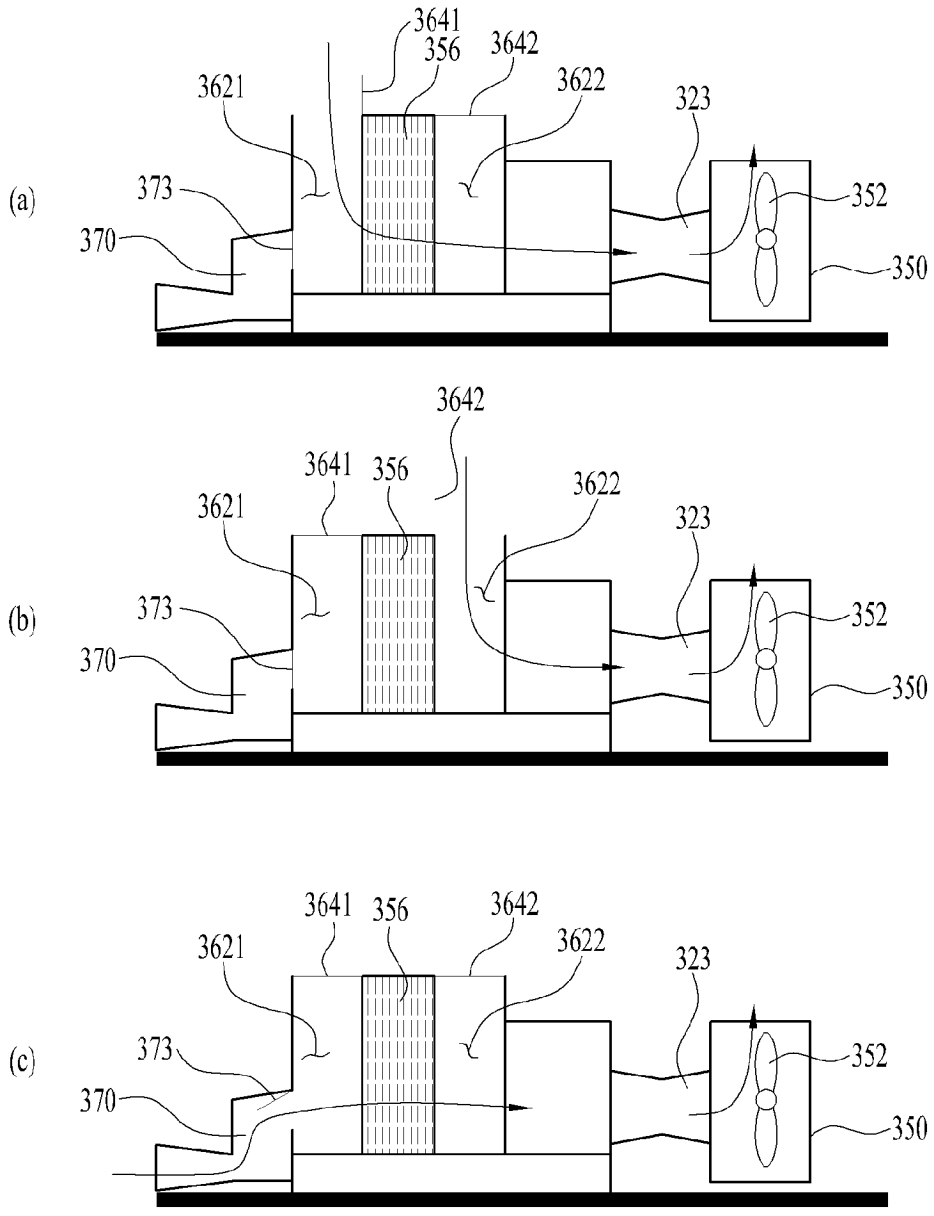


(a)

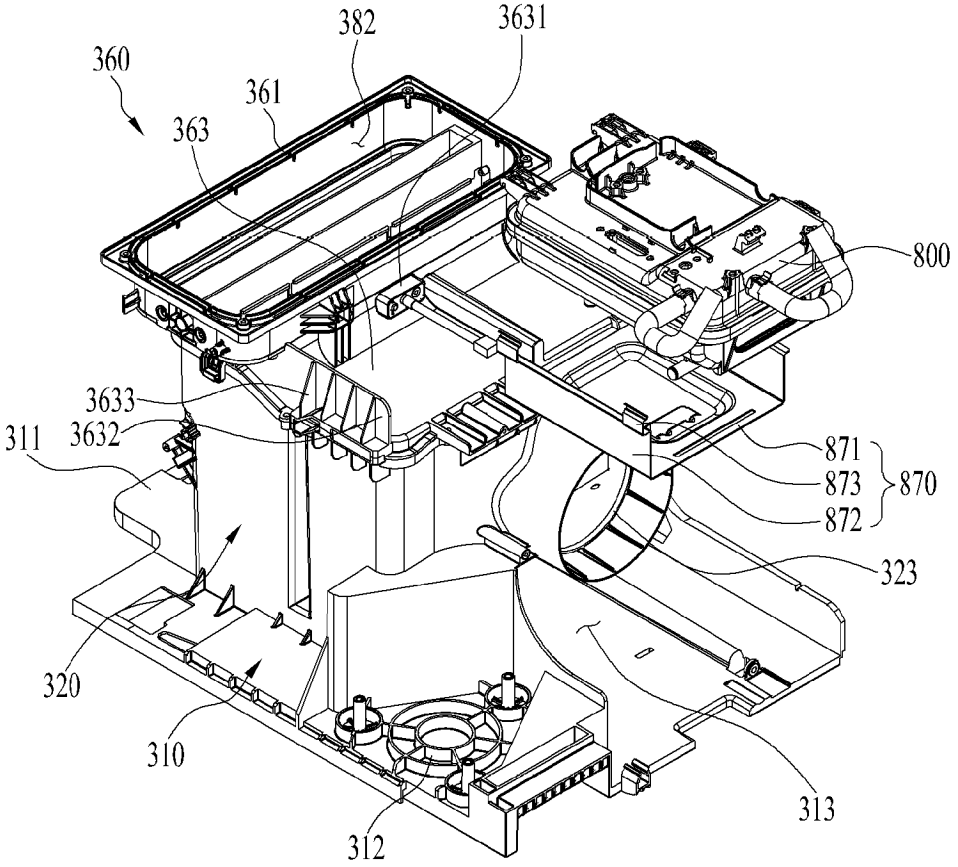


(a)

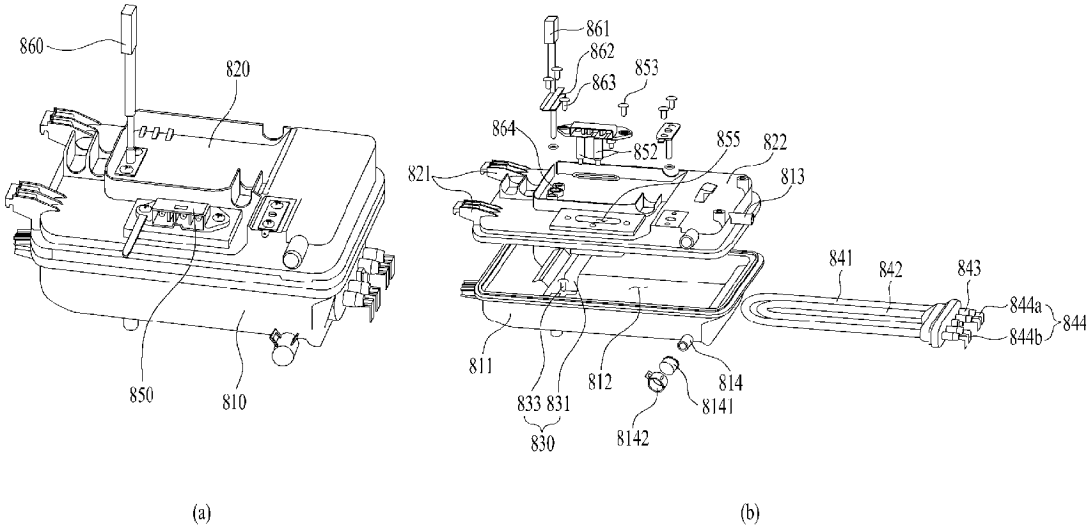
[Fig 13]


(a)
3641
356
3642
3622
3621
323
373
352
370
350
(b)
3642
3641
356
3622
3621
323
373
352
370
350
(c)
3641
356
3642
3622
3621
323
373
352
370
350

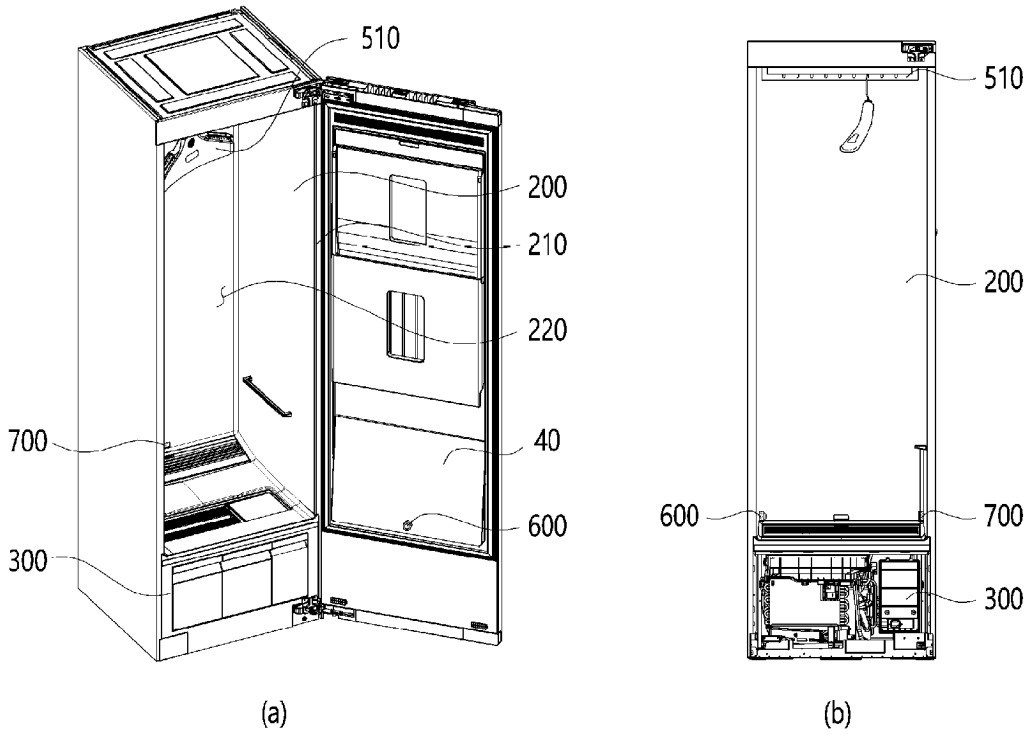
[Fig 14]


382
3631
360
361
363
800
3633
3632
311
871
873
870
872
323
320
310
313
312

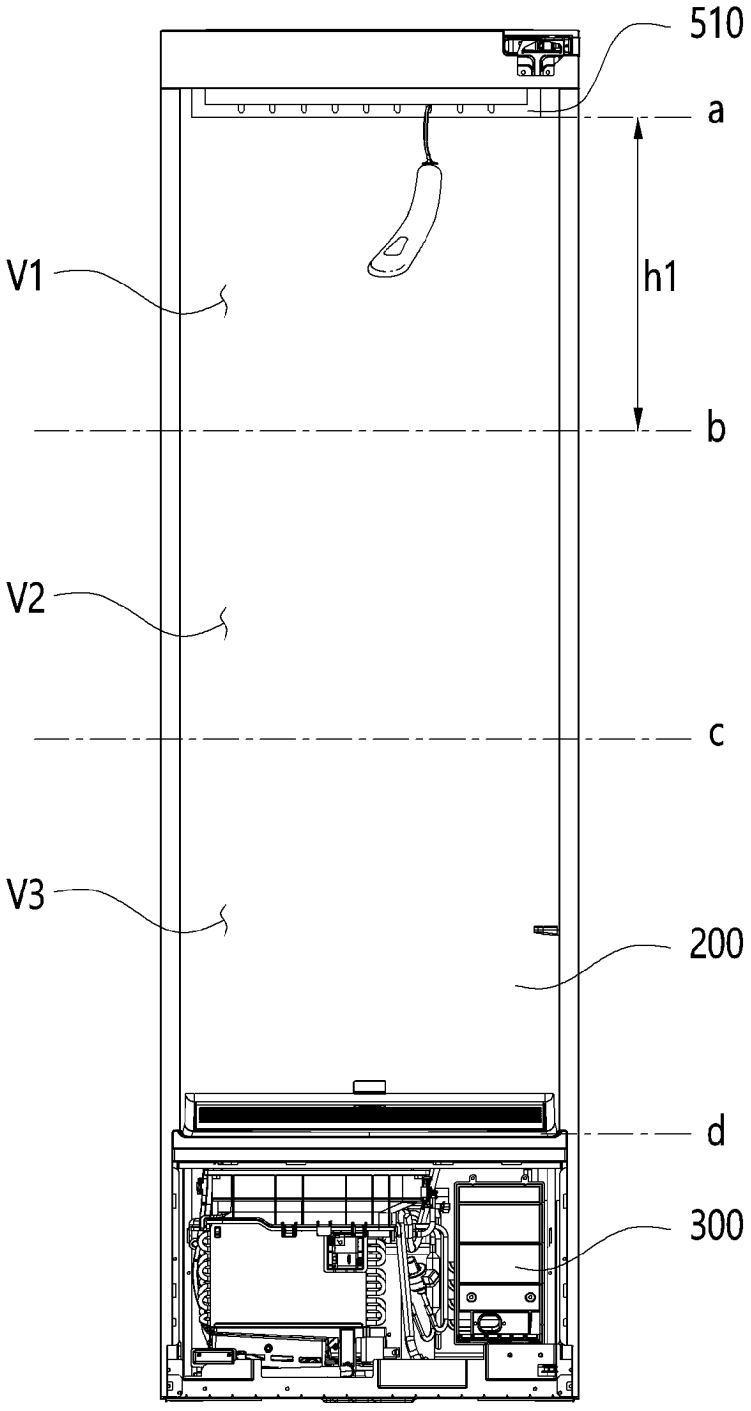
[Fig 15]


860
820
850
810
(a)
861
862
863
853
864
852
855
822
821
813
841
842
843
844a
844b
844
811
812
814
833 831
8141
830
8142
(b)

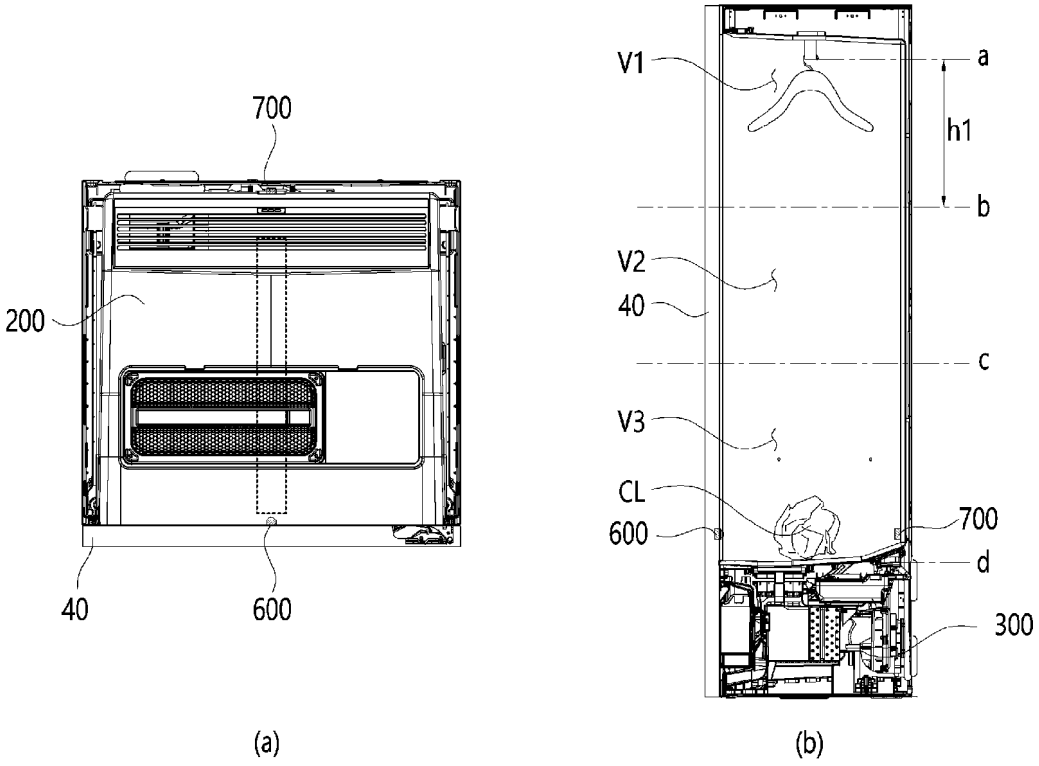
[Fig 16]



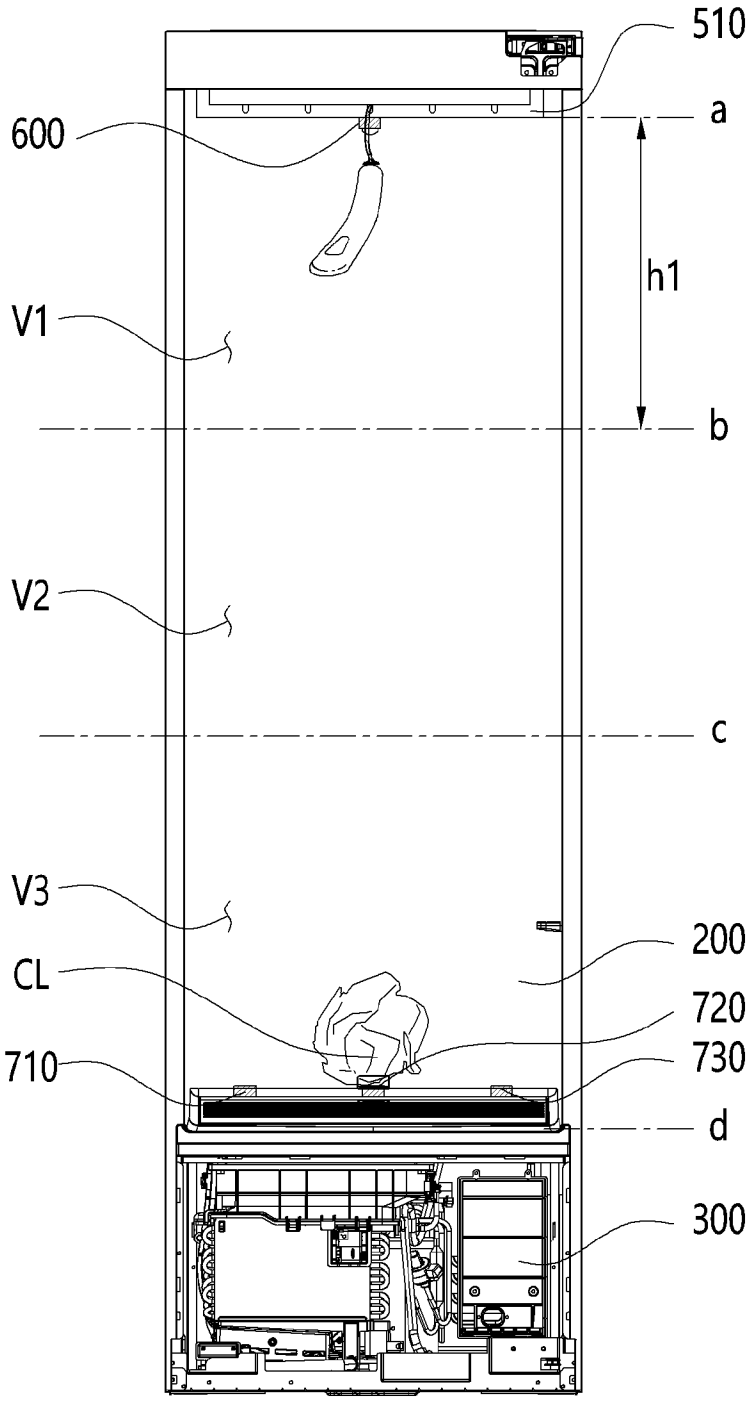
[Fig 17]



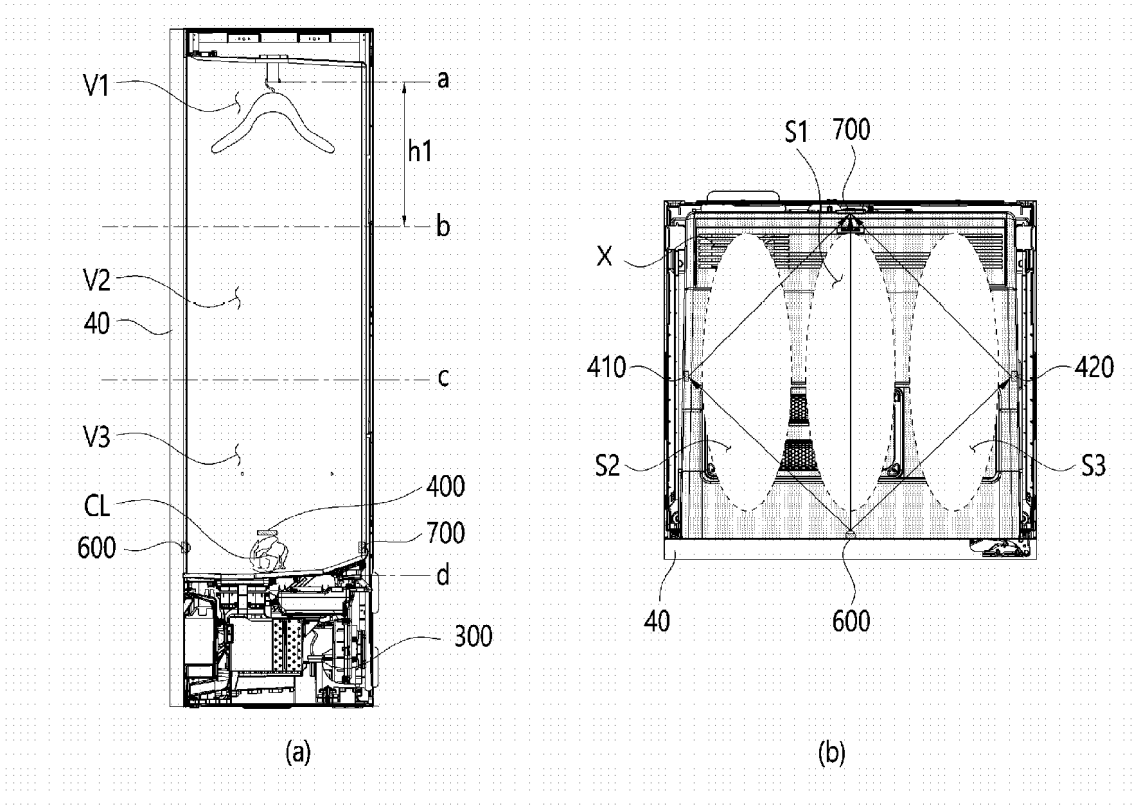
[Fig 18]



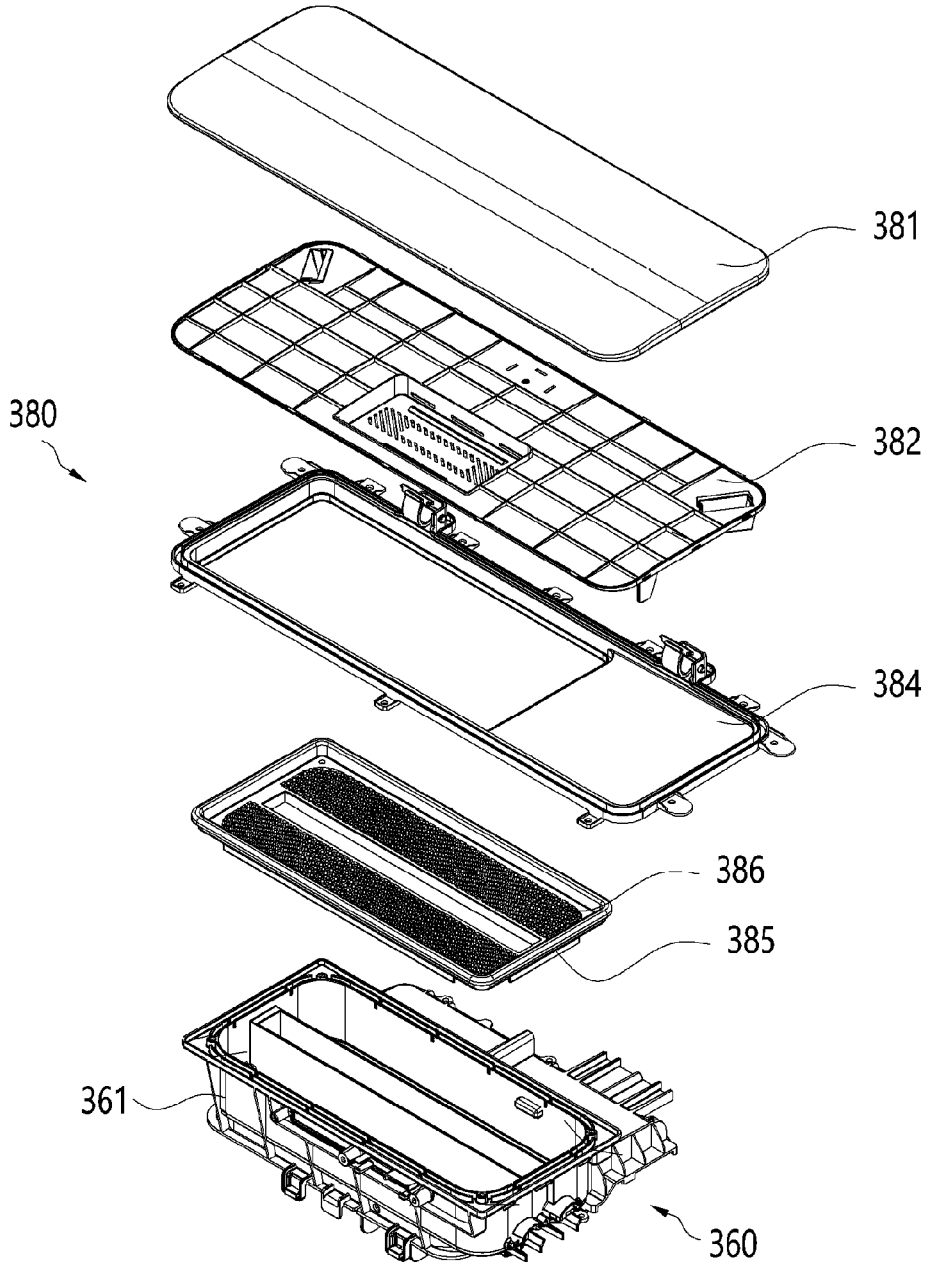
[Fig 19]



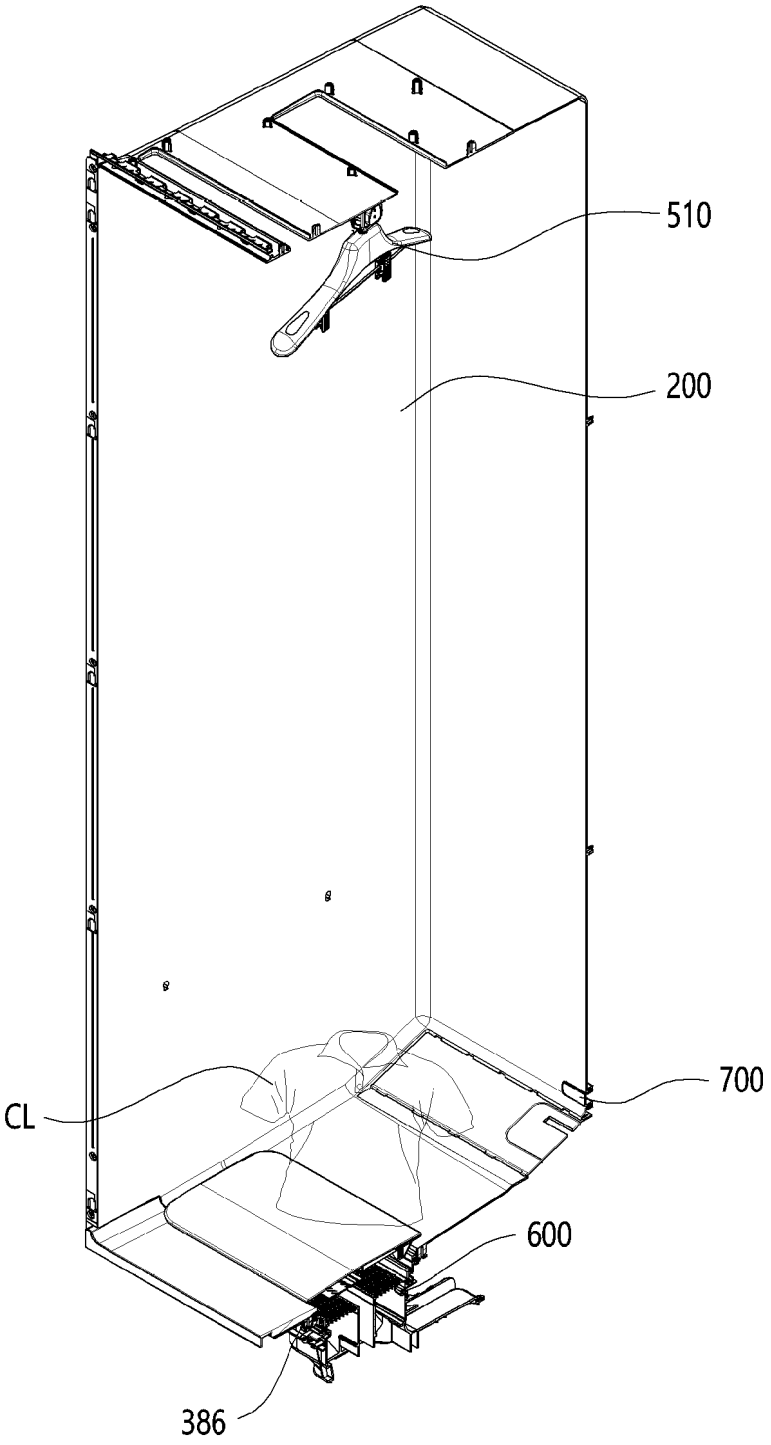
[Fig 20]


V1
a
h1
b
V2
40
c
V3
CL
600
400
700
d
300
(a)
S1
700
X
410
420
S2
S3
40
600
(b)

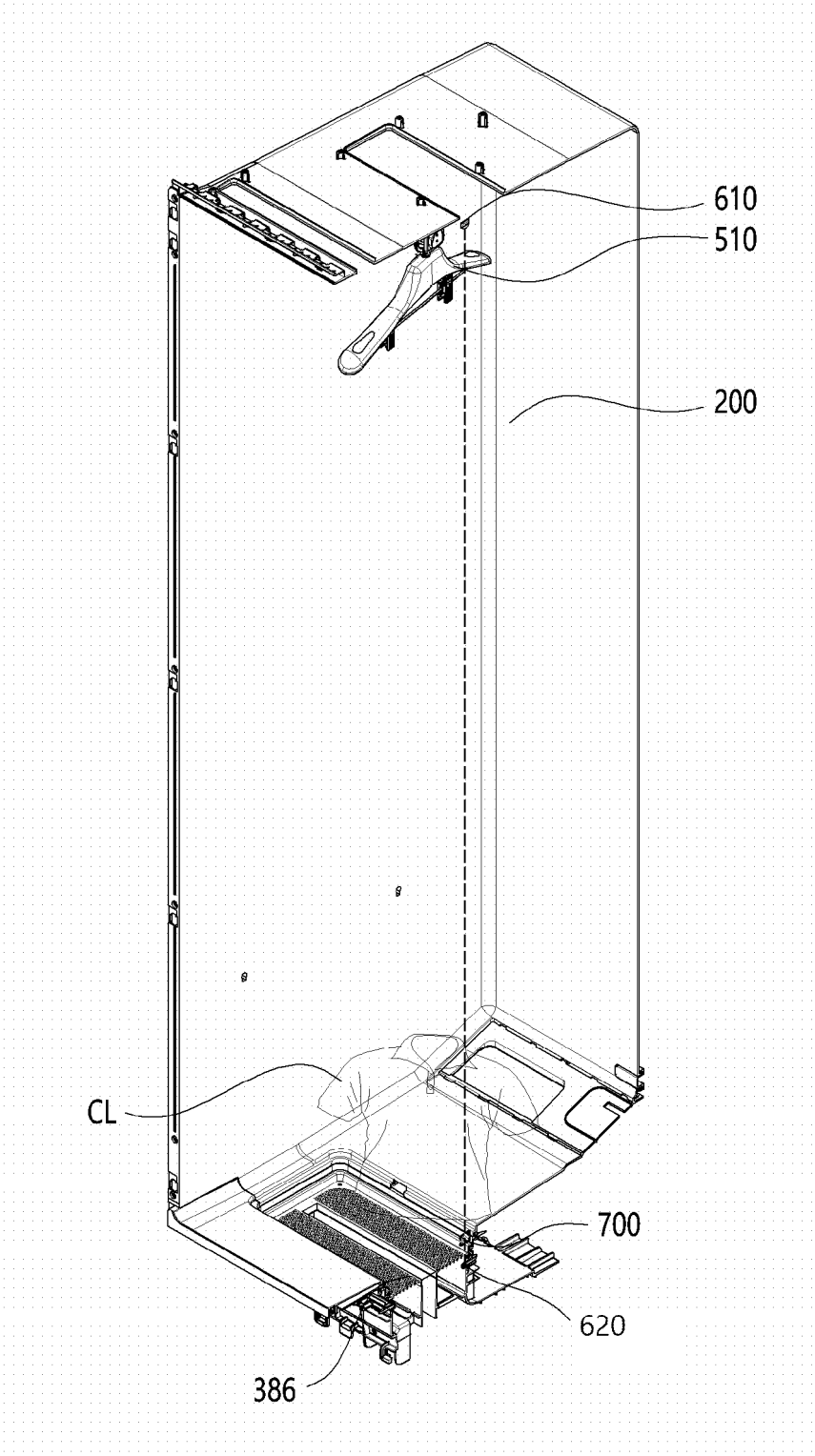
[Fig 21]



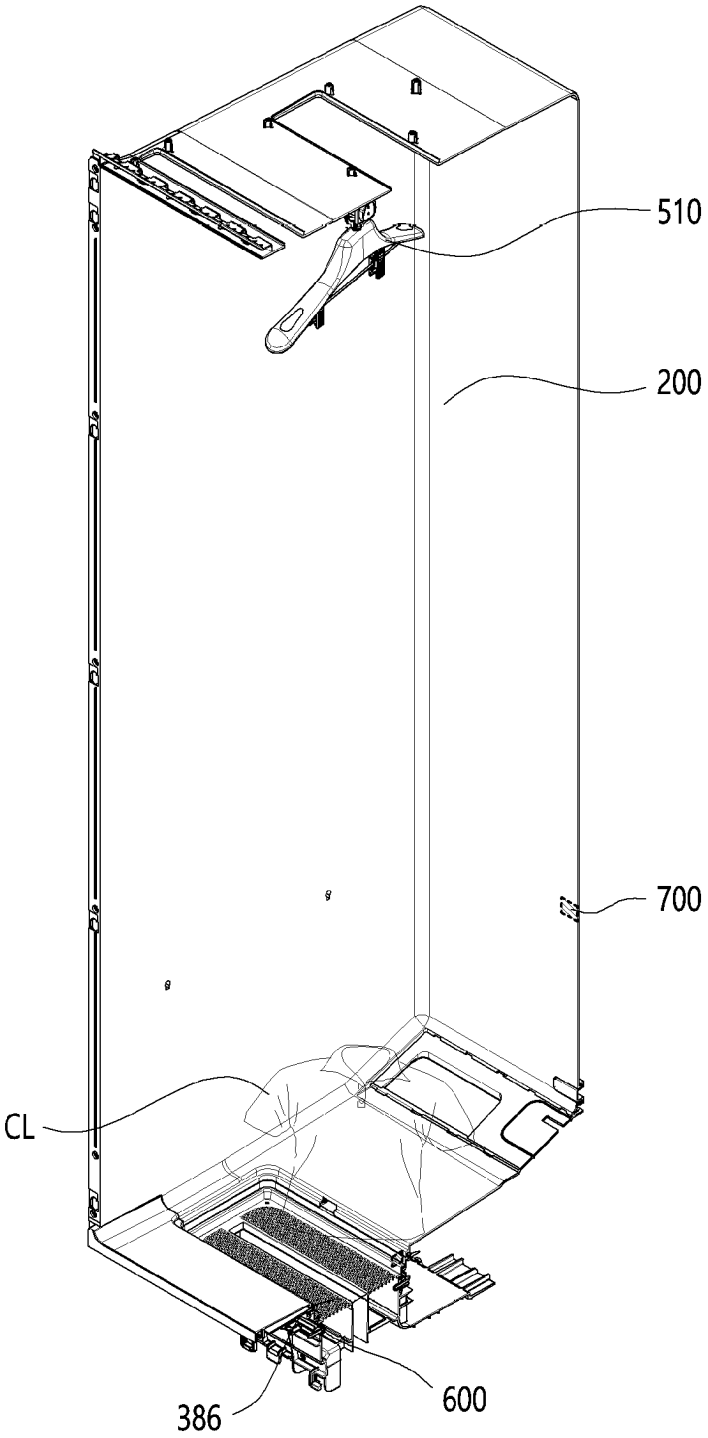
[Fig 22]



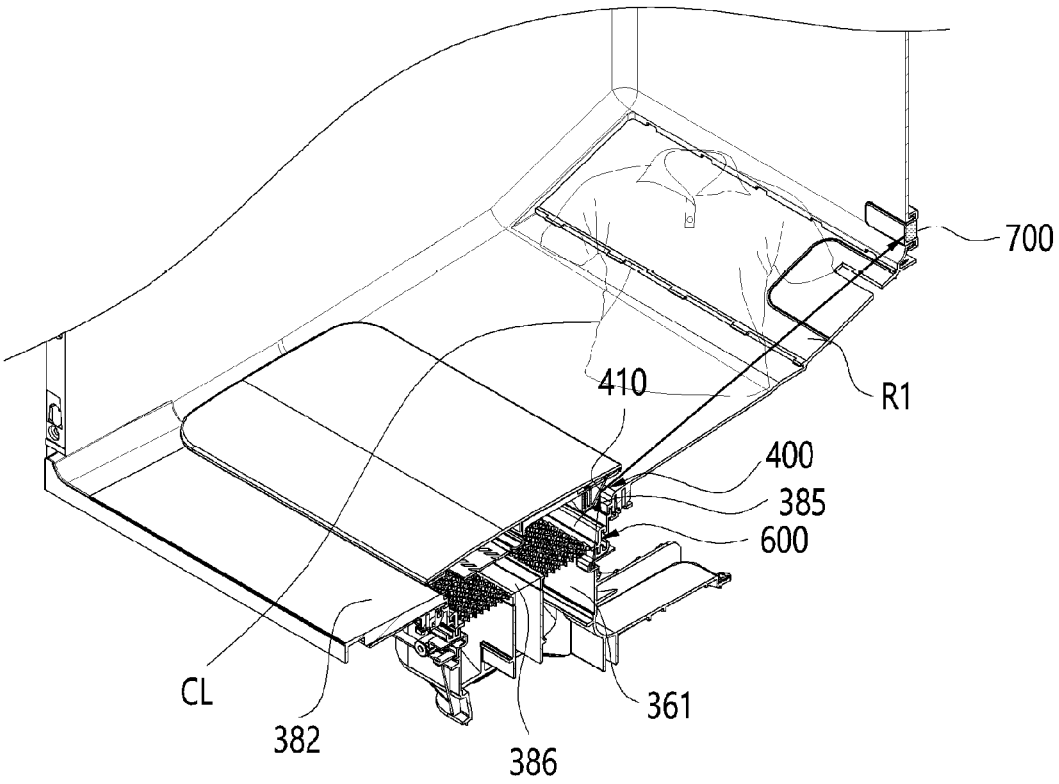
[Fig 23]



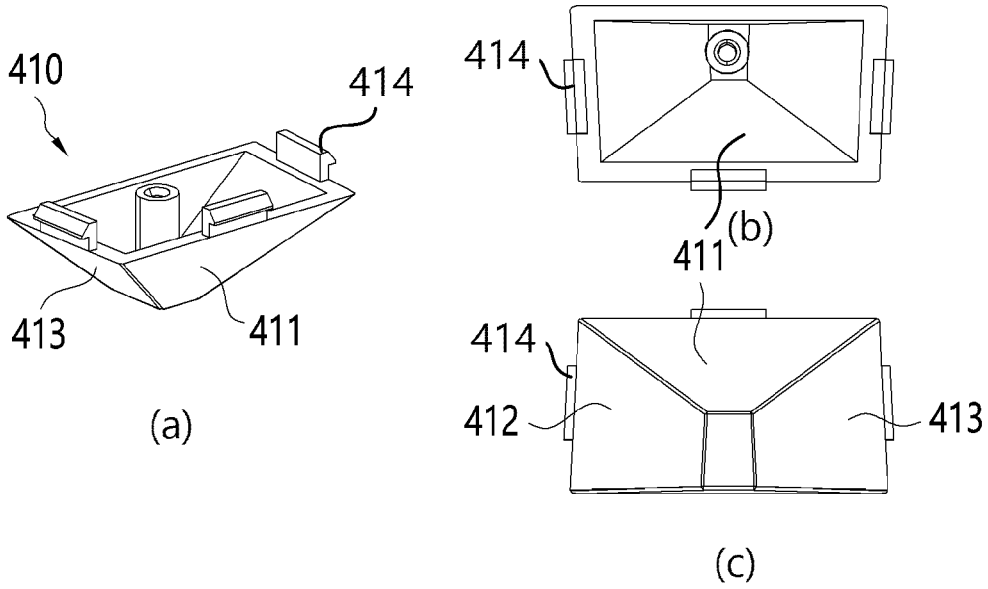
[Fig 24]



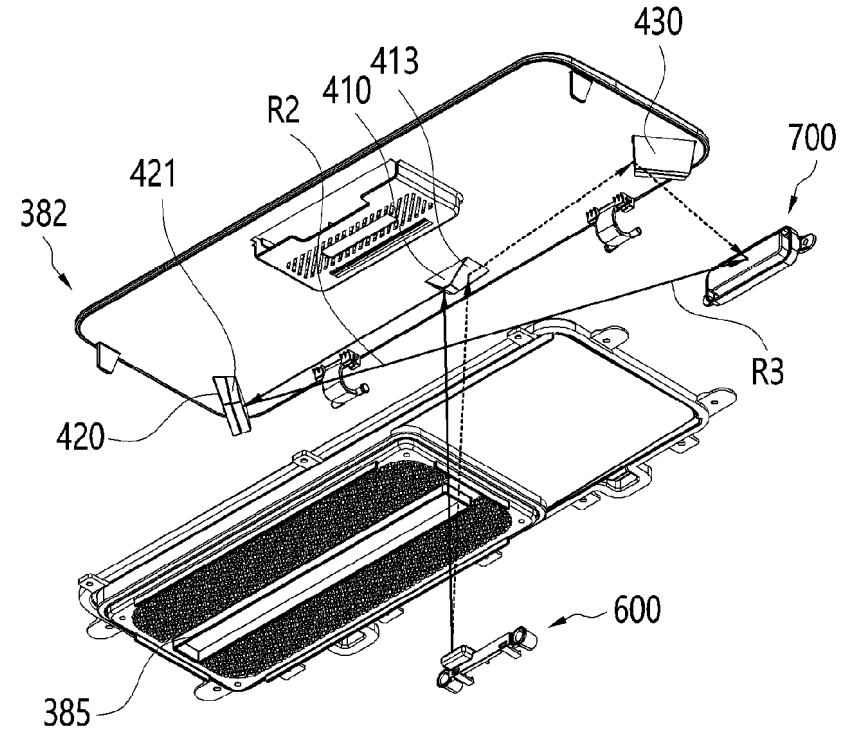
[Fig 25]


700
410
R1
400
385
600
CL
382
386
361

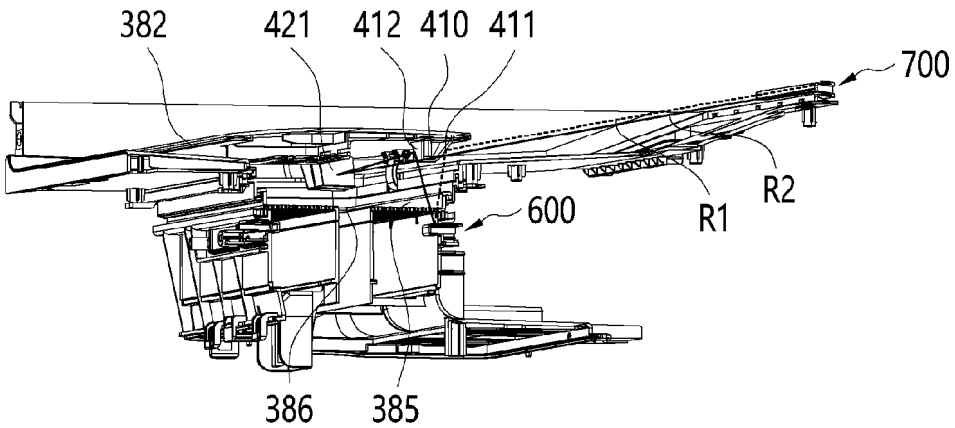
[Fig 26]


410
414
413
411
(a)
414
(b)
411
414
412
413
(c)

[Fig 27]

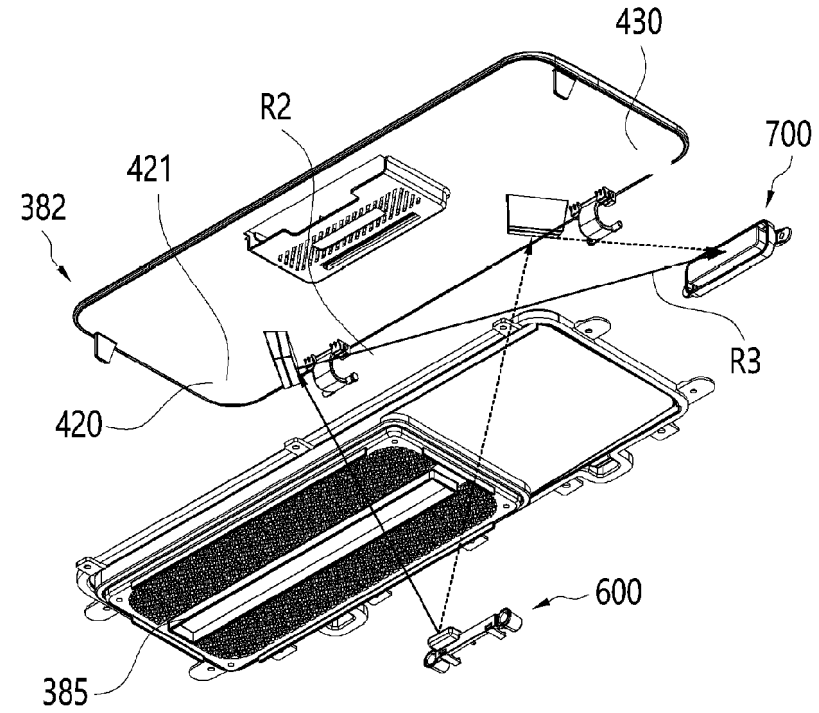

430
413
410
R2
700
421
382
R3
420
600
385

(a)

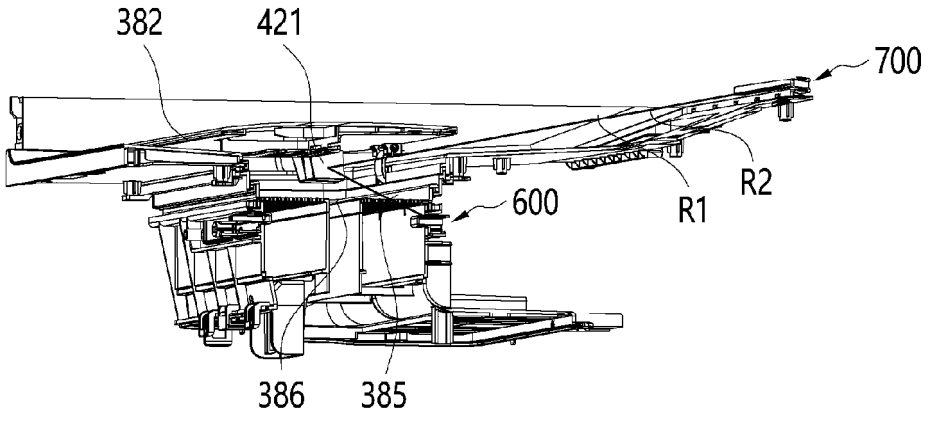

382
421
412
410
411
700
R2
R1
600
386
385

(b)

[Fig 28]

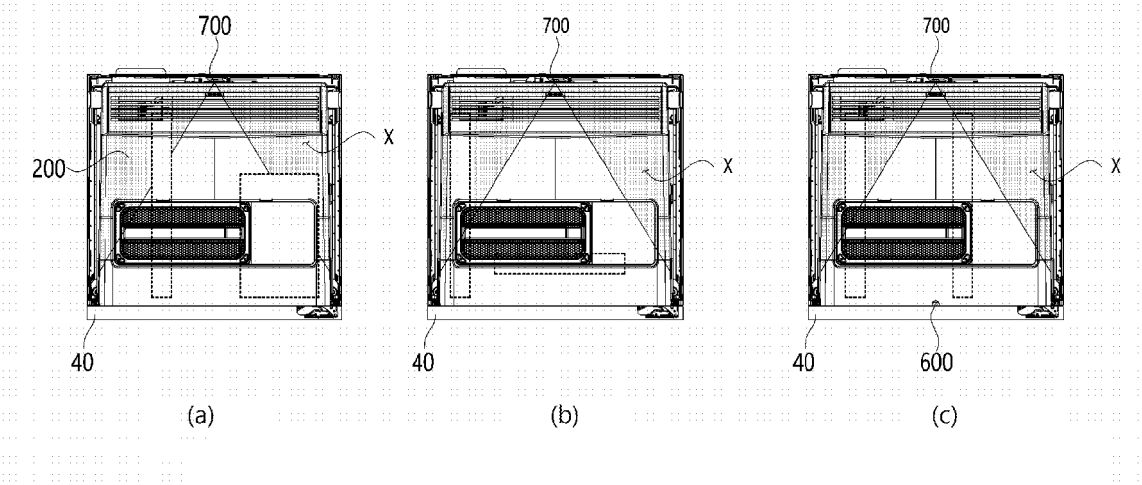


(a)

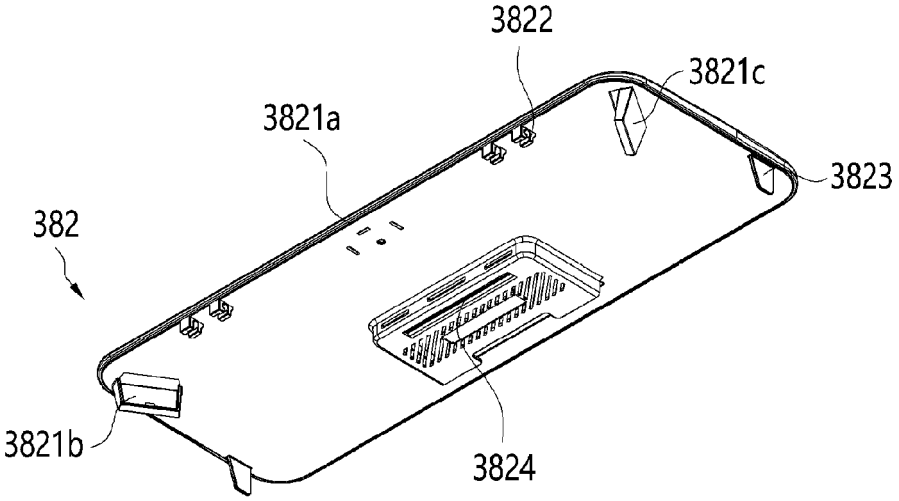


(b)

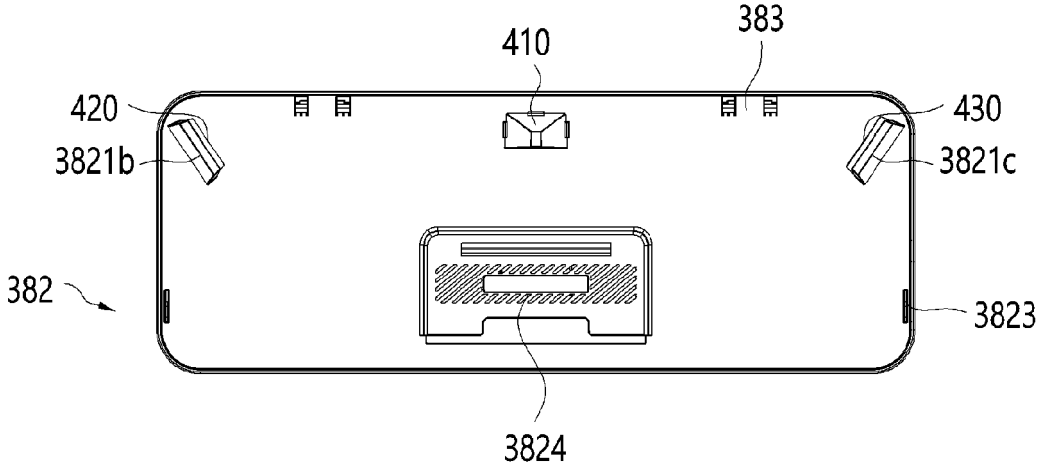
[Fig 29]



[Fig 30]



(a)



(b)

FIG. 31

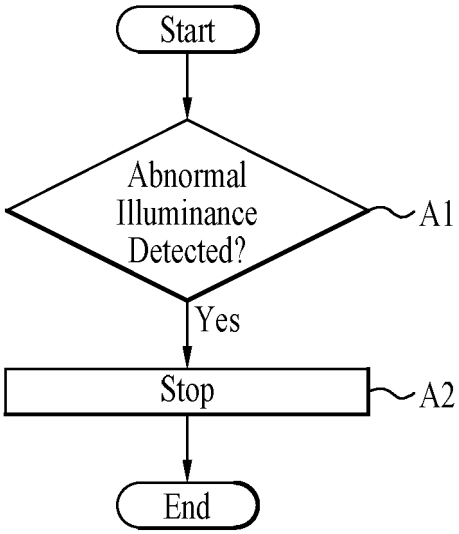


FIG. 32

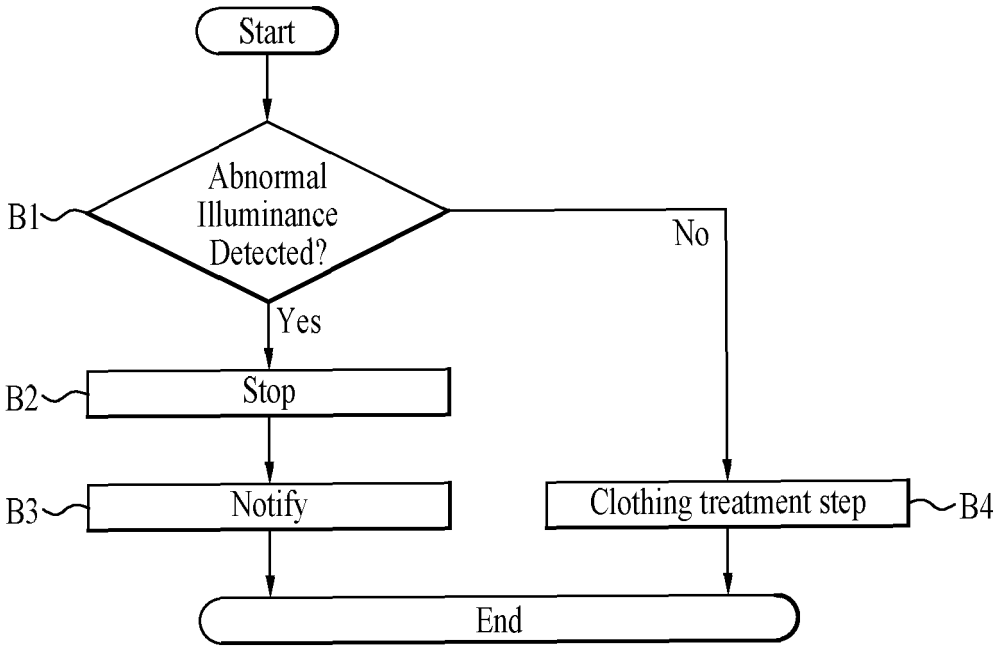

Start
Abnormal Illuminance Detected?
B1
No
Yes
B2
Stop
B3
Notify
Clothing treatment step
B4
End

FIG. 33

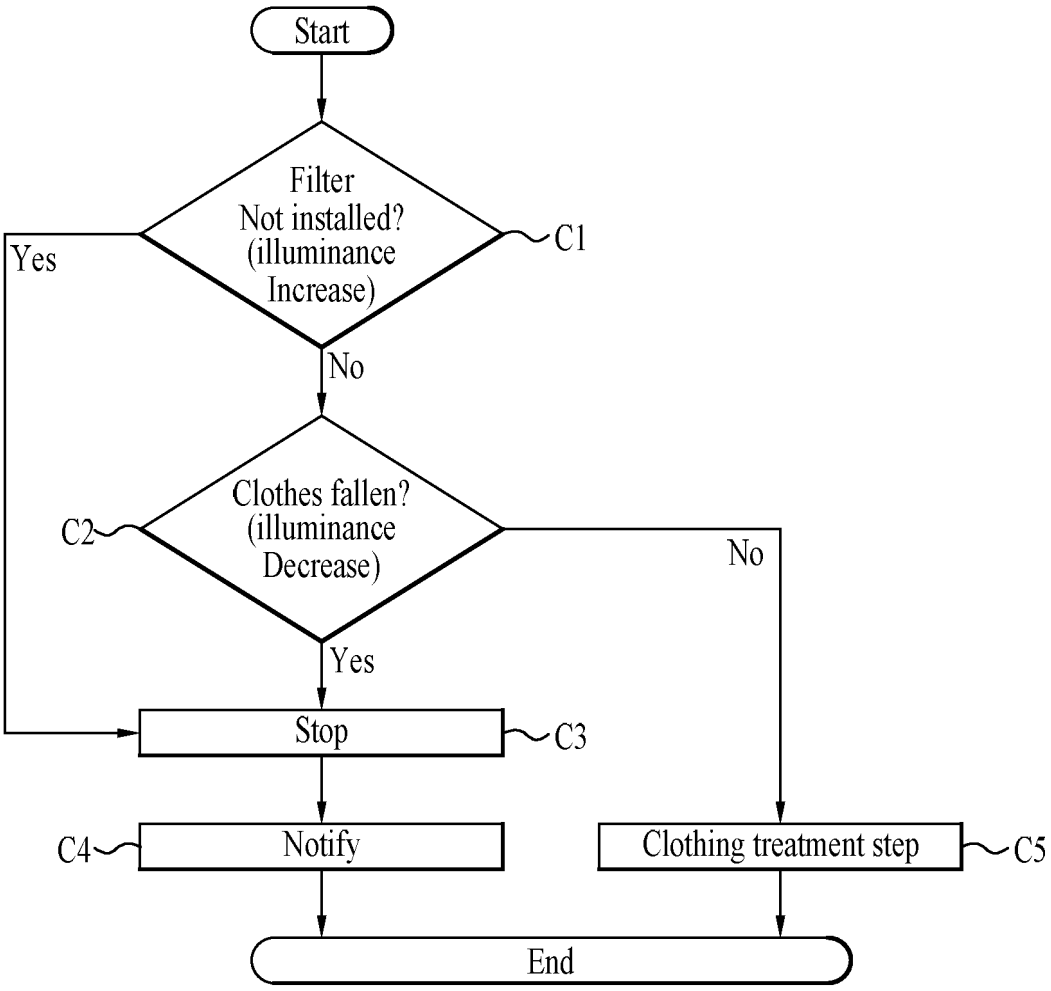

Start
Filter
Not installed?
(illuminance
Increase)
C1
Yes
No
Clothes fallen?
(illuminance
Decrease)
C2
No
Yes
Stop
C3
C4
Notify
Clothing treatment step
C5
End

FIG. 34

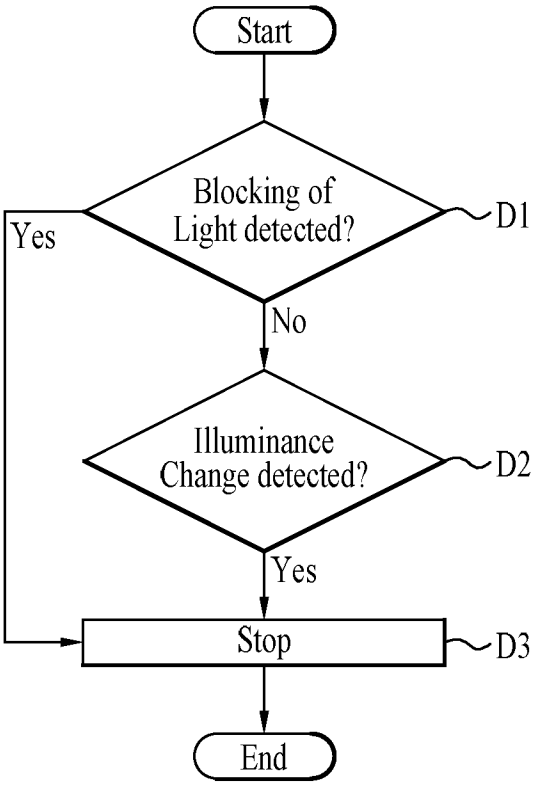

Start
Blocking of Light detected?
D1
Yes
No
Illuminance Change detected?
D2
Yes
Stop
D3
End

FIG. 35

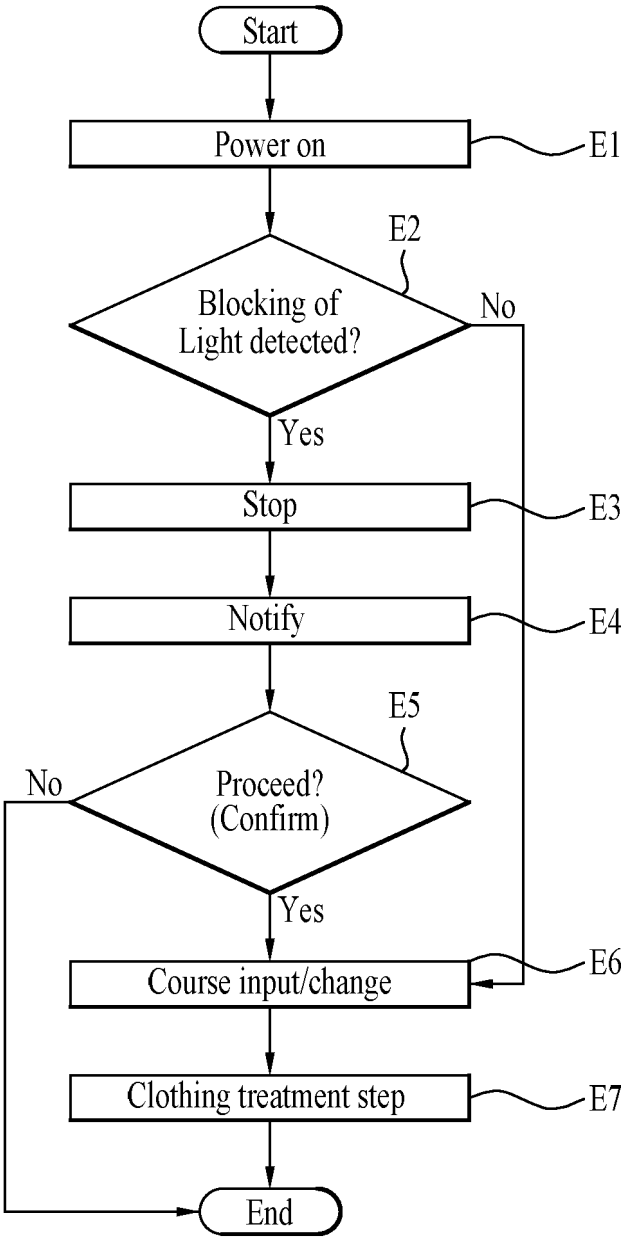

Start
Power on
E1
E2
Blocking of Light detected?
No
Yes
Stop
E3
Notify
E4
E5
No
Proceed? (Confirm)
Yes
Course input/change
E6
Clothing treatment step
E7
End

FIG. 36

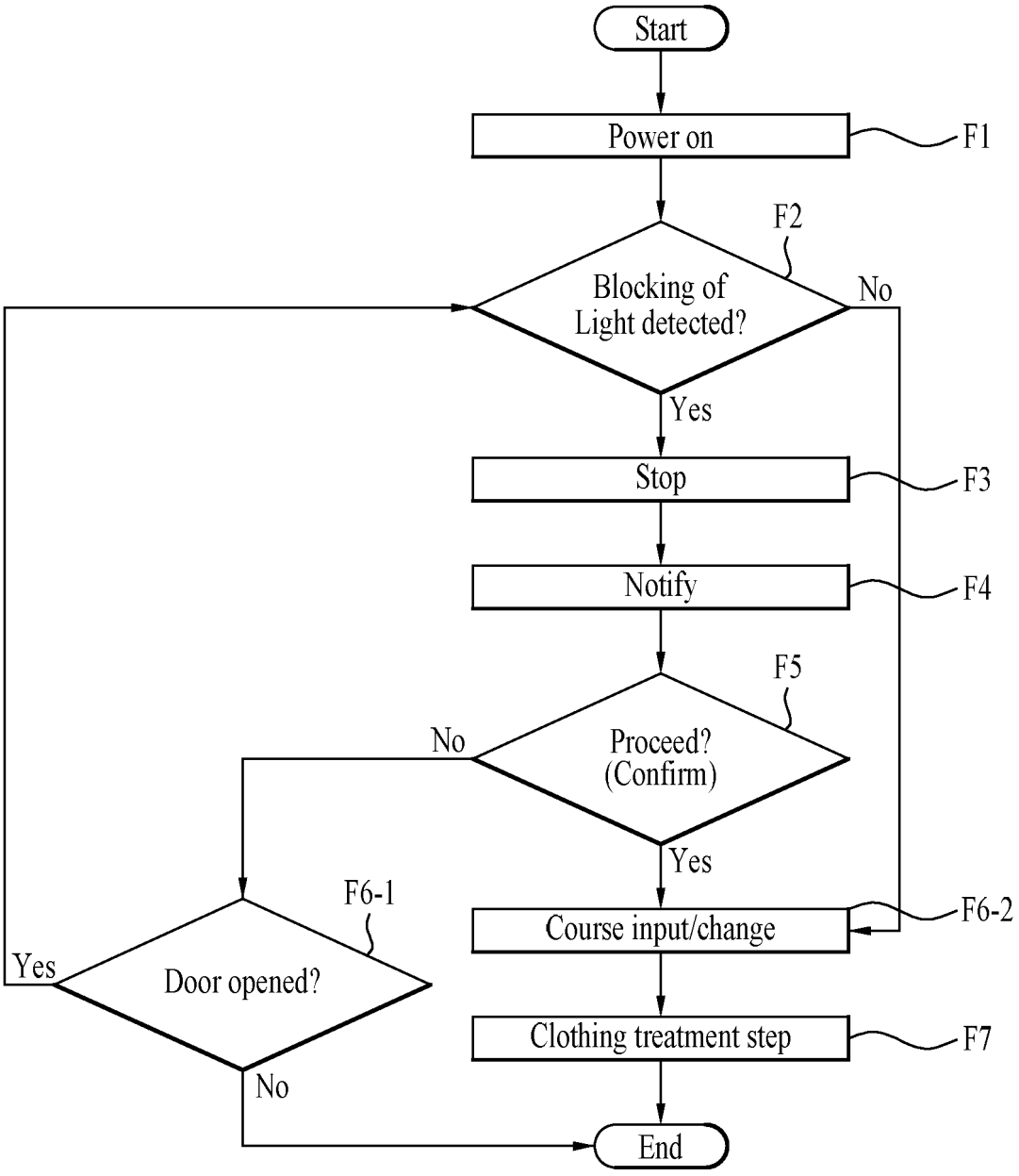

Start
Power on
F1
F2
Blocking of Light detected?
No
Yes
Stop
F3
Notify
F4
F5
Proceed? (Confirm)
No
Yes
F6-1
Door opened?
Yes
No
Course input/change
F6-2
Clothing treatment step
F7
End

FIG. 37

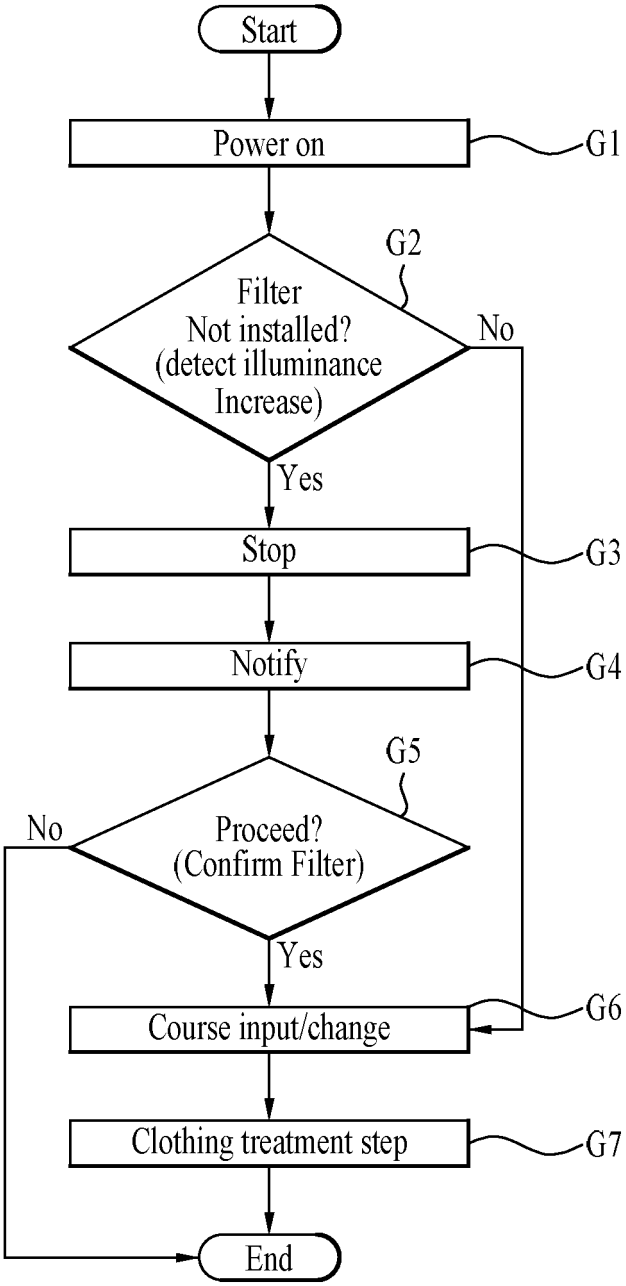

Start
Power on
G1
G2
Filter
Not installed?
(detect illuminance
Increase)
No
Yes
Stop
G3
Notify
G4
G5
No
Proceed?
(Confirm Filter)
Yes
Course input/change
G6
Clothing treatment step
G7
End

FIG. 38

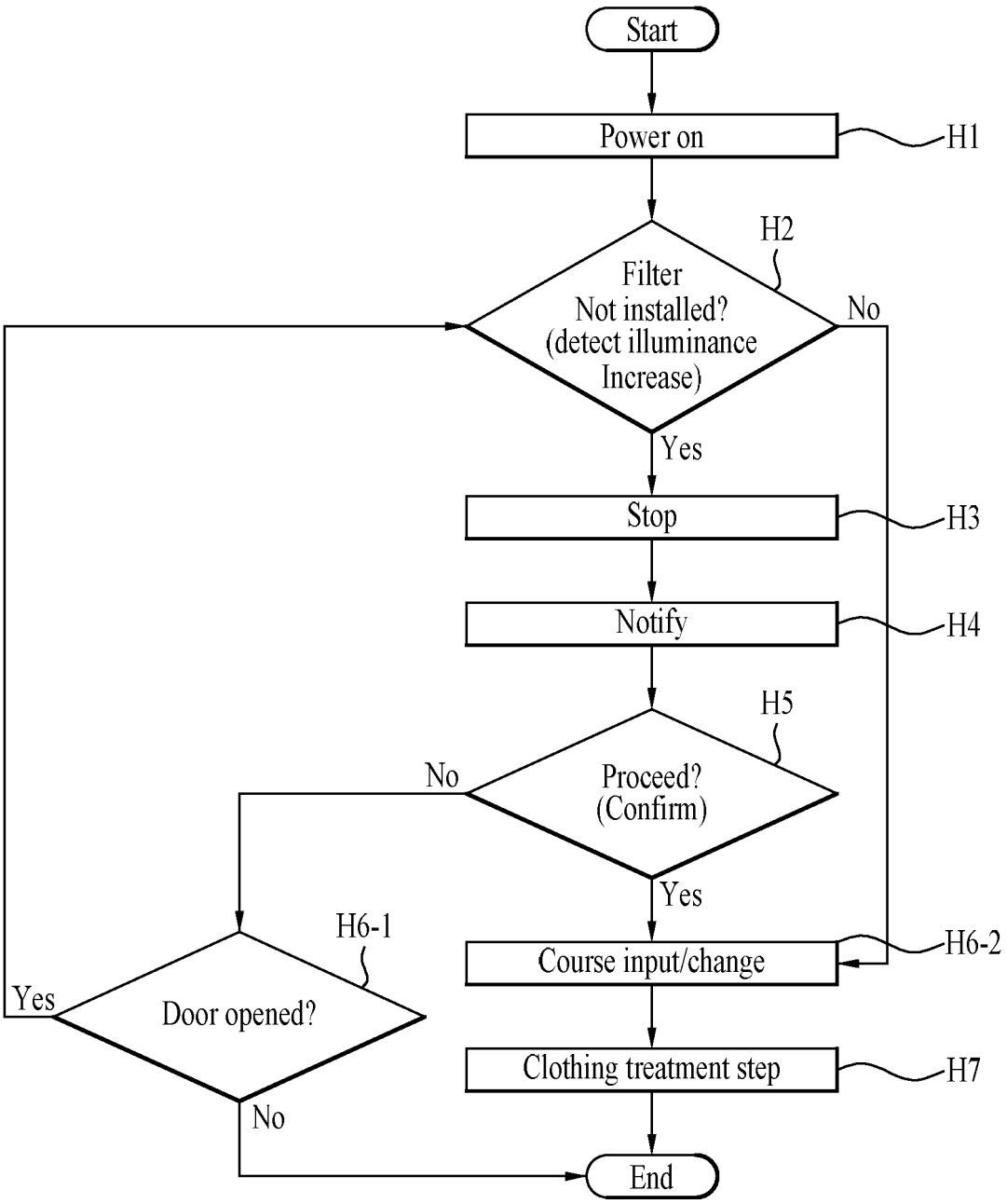
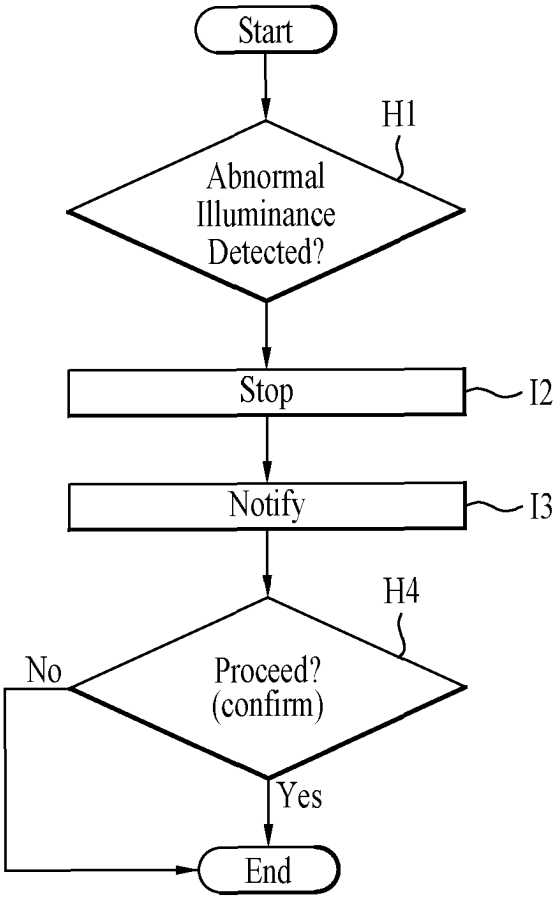

Start
Power on
H1
H2
Filter
Not installed?
(detect illuminance
Increase)
No
Yes
Stop
H3
Notify
H4
H5
Proceed?
(Confirm)
No
Yes
H6-1
Door opened?
Yes
No
Course input/change
H6-2
Clothing treatment step
H7
End

FIG. 39


Start
H1
Abnormal Illuminance Detected?
Stop
I2
Notify
I3
H4
Proceed? (confirm)
No
Yes
End

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/008235

A. CLASSIFICATION OF SUBJECT MATTER

D06F 58/38(2020.01)i; **D06F 34/34**(2020.01)i; **D06F 34/20**(2020.01)i; **D06F 58/12**(2006.01)i; **D06F 58/26**(2006.01)i; **D06F 58/20**(2006.01)i; **D06F 58/22**(2006.01)i; **D06F 34/14**(2020.01)i; **D06F 105/62**(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F 58/38(2020.01); D06F 25/00(2006.01); D06F 33/02(2006.01); D06F 58/10(2006.01); D06F 58/26(2006.01); D06F 58/28(2006.01); D06F 58/30(2020.01); D06F 73/00(2006.01); D06F 87/00(2006.01)

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

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 의류처리장치(laundry treating apparatus), 의류(clothes), 낙하(drop), 센서부(sensor part), 히터(heater), 압축기(compressor)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
DY	KR 10-2020-0065886 A (SAMSUNG ELECTRONICS CO., LTD.) 09 June 2020 (2020-06-09) See paragraphs [0058]-[0113] and figures 1-4.	1-4
DA		5-14
Y	JP 2022-076255 A (WISEPLANT INC.) 19 May 2022 (2022-05-19) See paragraph [0057] and figures 2-3 and 9.	1-4
A	KR 10-2011-0067754 A (LG ELECTRONICS INC.) 22 June 2011 (2011-06-22) See paragraphs [0038]-[0042] and figures 2-3.	1-14
A	KR 10-0316348 B1 (RINNAI CORPORATION et al.) 22 December 2001 (2001-12-22) See claims 1-10 and figures 1-4.	1-14
A	JP 2012-239585 A (SHARP CORP.) 10 December 2012 (2012-12-10) See claims 1-6 and figures 1-6.	1-14

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 September 2023	**04 October 2023**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/008235

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-2020-0065886 A	09 June 2020	US 2022-0034023 A1	03 February 2022
		WO 2020-111616 A1	04 June 2020
JP 2022-076255 A	19 May 2022	JP 7060270 B1	26 April 2022
KR 10-2011-0067754 A	22 June 2011	KR 10-1710390 B1	27 February 2017
KR 10-0316348 B1	22 December 2001	JP 2000-084295 A	28 March 2000
		KR 10-2000-0023102 A	25 April 2000
JP 2012-239585 A	10 December 2012	None	

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 1020200057545 **[0006]**
- KR 1020200065886 **[0008]**
- KR 1019950008839 **[0019]**