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CLOTHING TREATMENT SYSTEM

Abstract

This clothing treatment system comprises a first clothing treatment apparatus and a second clothing treatment apparatus provided on the first clothing treatment apparatus. The second clothing treatment system comprises: a housing; a drum to be provided in the housing to be rotatable; a heat exchanger to be provided in the housing; a first opening to be provided in the front surface of the housing to be connected to the drum; a second opening to be provided in the front surface of the housing so as to access the heat exchanger; and a cover door which includes a rotating shaft extending along the vertical direction of the clothing treatment system. The cover door opens/closes the second opening that is provided on the front surface of the housing by rotating about the rotating shaft.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION [0001] This application is a continuation application is a continuation application, under 35 U.S.C. § 111 (a), of international application No. PCT/KR2023/018367, filed Nov. 15, 2023, which claims priority under 35 U. S. C. § 119 to Korean Patent Application No. 10-2022-0157697, filed Nov. 22, 2022, and Korean Patent Application No. 10-2023-0017359, filed Feb. 9, 2023, the disclosures of which are incorporated herein by reference in their entireties.

TECHNICAL FIELD
[0002] The present disclosure relates to a clothing treatment system including at least one clothing treatment apparatus.
BACKGROUND ART
[0003] A clothing treatment apparatus is an apparatus for treating and/or managing clothes. The clothing treatment apparatus may include a washing machine and a dryer.
[0004] A washing machine is an apparatus that performs washing through friction between laundry, water, and detergent put into a tub by stirring the laundry, water, and detergent together using a driving force of a driving motor. A procedure to be performed by the washing machine may include a washing process of supplying detergent and water to the tub accommodating laundry and washing the laundry while rotating a drum, a rinsing process of supplying water to the tub and rotating the drum to rinse the laundry, and a dewatering process of discharging the water from the tub and rotating the drum to remove moisture from the laundry, regardless of the type of washing machine.
[0005] A dryer is an apparatus that dries an object with high-temperature dry air. The dryer dries an object by allowing hot air to pass through a drum while rotating the drum in which the object is accommodated at low speed. A procedure to be performed by the dryer may include a drying process of drying an object.
[0006] For convenience of use, a plurality of clothing treatment apparatuses may be connected and used.
DISCLOSURE
Technical Problem
[0007] One aspect of the present disclosure provides a clothing treatment system including a first clothing treatment apparatus and/or a second clothing treatment apparatus including a cover door that is provided to be rotatable 180 degrees or more around a rotating shaft extending in a vertical direction.
[0008] One aspect of the present disclosure provides a clothing treatment system that allows a cover door of a second clothing treatment apparatus arranged above a first clothing treatment apparatus to be laterally opened and thus prevents structural interference with the first clothing treatment apparatus in response to opening of the cover door.
[0009] One aspect of the present disclosure provides a clothing treatment system capable of

facilitating withdrawal and insertion of a filter device or a dehumidifying device.
[0010] The technical objectives of the disclosure are not limited to the above, and other objectives that are not described above will be clearly understood by those skilled in the art from the above detailed description.
Technical Solution
[0011] A clothing treatment system according to the disclosure includes a first clothing treatment apparatus and a second clothing treatment apparatus provided on an upper side of the first clothing treatment apparatus. The second clothing treatment apparatus includes: a housing, a drum rotatable while inside the housing, a heat exchanger provided inside the housing, a first opening provided on a front surface of the housing to be connected to the drum, a second opening provided on the front surface of the housing to allow access to the heat exchanger, and a cover door including a rotating shaft extending along a vertical direction of the clothing treatment system, and configured to open and close the second opening that is provided on the front surface of the housing by rotating around the rotating shaft.

Description

DESCRIPTION OF DRAWINGS
[0012] FIG. **1** illustrates a clothing treatment system according to an embodiment.
[0013] FIG. **2** illustrates a first clothing treatment apparatus of the clothing treatment system according to an embodiment.
[0014] FIG. **3** illustrates a cross-sectional view of the first clothing treatment apparatus of the clothing treatment system according to an embodiment.
[0015] FIG. **4** illustrates a second clothing treatment apparatus of the clothing treatment system according to an embodiment.
[0016] FIG. **5** illustrates a cross-sectional view of the second clothing treatment apparatus, on which a filter device is mounted, in the clothing treatment system according to an embodiment.
[0017] FIG. **6** is a control block diagram of the first clothing treatment apparatus according to an embodiment.
[0018] FIG. **7** is a control block diagram of the second clothing treatment apparatus according to an embodiment.
[0019] FIG. **8** is a control block diagram of the clothing treatment system according to an embodiment.
[0020] FIG. **9** illustrates the second clothing treatment apparatus, on which the filter device is mounted, with a cover door open, in the clothing treatment system according to an embodiment.
[0021] FIG. **10** illustrates the filter device of the second clothing treatment apparatus of the clothing treatment system according to an embodiment.
[0022] FIG. **11** illustrates the second clothing treatment apparatus, on which a dehumidifying device is mounted, with the cover door open, in the clothing treatment system according to an embodiment.
[0023] FIG. **12** illustrates a cross-section of the second clothing treatment apparatus, on which the dehumidifying device is mounted, in the clothing treatment system according to an embodiment.
[0024] FIG. **13** illustrates a base of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0025] FIG. **14** illustrates a state in which the cover door covers a device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0026] FIG. **15** illustrates a state in which the cover door opens to expose the device accommodating part of the second clothing treatment apparatus in the clothing treatment system

according to an embodiment.
[0027] FIG. **16** illustrates a state in which the cover door and the device accommodating part of the second clothing treatment apparatus are dissembled in the clothing treatment system according to an embodiment.
[0028] FIG. **17** is a plan view of a state in which the cover door covers the device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0029] FIG. **18** is a plan view of a state in which the cover door is rotated 90 degrees with respect to the device accommodating portion of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0030] FIG. **19** is a plan view of a state in which the cover door is rotated 180 degrees with respect to the device accommodating portion of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0031] FIG. **20** illustrates a rear view of the cover door and the device accommodating part of the second clothes apparatus and a portion of the housing in the clothing treatment system according to an embodiment.
[0032] FIG. **21** illustrates an enlarged view of portion A of FIG. **20**.
[0033] FIG. **22** illustrates a rear view of the cover door and the device accommodating part of the second clothes apparatus and a portion of the housing in the clothing treatment system according to an embodiment.
[0034] FIG. **23** illustrates an enlarged view of portion B of FIG. **22**.
[0035] FIG. **24** illustrates a state in which a cover door covers a device accommodating part of a second clothing treatment apparatus in a clothing treatment system according to an embodiment.
[0036] FIG. **25** illustrates a state in which the cover door opens to expose the device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.
[0037] FIG. **26** illustrates an enlarged view of a portion of FIG. **24** viewed at a different angle.
[0038] FIG. **27** illustrates an enlarged view of a portion of FIG. **25** viewed at a different angle.

MODES OF THE INVENTION

[0039] Various embodiments and terms in this document are not intended to limit the technical features described in this document to specific embodiments, and should be understood to include various modifications, equivalents, or substitutes of the embodiments.
[0040] In connection with the description of the drawings, like reference numbers may be used for like or related elements.
[0041] The singular form of a noun corresponding to an item may include one item or a plurality of items, unless the relevant context clearly dictates otherwise.
[0042] In this document, each of phrases such as “A or B,” “at least one of A and B,” “at least one of A or B,” “A, B or C,” “at least one of A, B and C,” and “at least one of A, B, or C” may include any one of the items listed together in the corresponding one of the phrases, or all possible combinations thereof.
[0043] The term “and/or” includes any combination of a plurality of related components or any one of a plurality of related components.
[0044] Terms such as “first,” “second,” “primary,” and “secondary” may simply be used to distinguish a given component from other corresponding components, and do not limit the corresponding components in any other respect (e.g., importance or order).
[0045] When any (e.g., first) component is referred to as being “coupled” or “connected” to another (e.g., second) component with or without the terms “functionally” or “communicatively”, this means that the any component may be connected to the other component directly (e.g., by a wire), wirelessly, or through a third component.
[0046] The terms “comprises” and “has” are intended to indicate that there are features, numbers,

steps, operations, components, parts, or combinations thereof described in this document, and do not exclude the presence or addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[0047] When any component is referred to as being “connected”, “coupled”, “supported” or “in contact” with another component, this includes a case in which the components are indirectly connected, coupled, supported, or in contact with each other through a third component as well as directly connected, coupled, supported, or in contact with each other.

[0048] When any component is referred to as being located “on” or “over” another component, this includes not only a case in which any component is in contact with another component but also a case in which another component is present between the two components.

[0049] A washing machine according to various embodiments may perform washing, rinsing, dewatering, and drying processes. A washing machine is an example of a clothing treatment apparatus, and the clothing treatment apparatus is a concept encompassing an apparatus for washing clothes (objects to be washed, objects to be dried), an apparatus for drying clothes, and an apparatus capable of washing and drying clothes.

[0050] A washing machine according to various embodiments may include a top-loading washing machine in which a laundry inlet for putting in or taking out laundry is provided to face upward or a front-loading washing machine in which a laundry inlet is provided to face forward. A washing machine according to various embodiments may include a washing machine of another loading method other than a top-loading washing machine and a front-loading washing machine.

[0051] In the case of a top-loading washing machine, laundry may be washed using a water current occurred by a rotating body such as a pulsator. In the case of a front-loading washing machine, laundry may be washed by rotating a drum to repeatedly raise and drop laundry. The front-loading washing machine may include a drying coupled washing machine capable of drying laundry accommodated inside a drum. The drying coupled washing machine may include a hot air supply device for supplying high-temperature air into the drum and a condensing device for removing moisture from air discharged from the drum. For example, the drying coupled washing machine may include a heat pump device. A washing machine according to various embodiments may include a washing machine using a washing method other than the above-described washing method.

[0052] Hereinafter, a clothing treatment system according to various embodiments will be described in detail with reference to the accompanying drawings.

[0053] FIG. **1** illustrates a clothing treatment system according to an embodiment. FIG. **2** illustrates a first clothing treatment apparatus of the clothing treatment system according to an embodiment. FIG. **3** illustrates a cross-sectional view of the first clothing treatment apparatus of the clothing treatment system according to an embodiment. FIG. **4** illustrates a second clothing treatment apparatus of the clothing treatment system according to an embodiment. FIG. **5** illustrates a cross-sectional view of the second clothing treatment apparatus of the clothing treatment system according to an embodiment.

[0054] As illustrated in FIG. **1**, a clothing treatment system **1** may include a first clothing treatment apparatus **10** and a second clothing treatment apparatus **60** mounted on the first clothing treatment apparatus **10**. The second clothing treatment apparatus **60** may be provided on one side of the first clothing treatment apparatus **10**. For example, the second clothing treatment apparatus **60** may be mounted at an upper end of the first clothing treatment apparatus **10**.

[0055] The first clothing treatment apparatus **10** may be a washing machine or a dryer. For example, the first clothing treatment apparatus **10** may be a washing machine.

[0056] Referring to FIGS. **2** and **3**, the first clothing treatment apparatus **10** according to various embodiments may include a first housing **11** accommodating various components therein. The first housing **11** may be provided in the form of a box having a laundry inlet **12** formed on one side thereof.

[0057] The first clothing treatment apparatus **10** may include a first front frame **11***a* forming a front surface thereof. The laundry inlet **12** may be formed on the first front frame **11***a*.
[0058] The first clothing treatment apparatus **10** may include a first door **13** provided to open and close the laundry inlet **12**. The first door **13** may be rotatably mounted to the first housing **11** by a first hinge **14**. At least one portion of the first door **13** may be provided to be transparent or translucent so that the inside of the first housing **11** may be seen.
[0059] The first clothing treatment apparatus **10** may include a tub **20** provided inside the first housing **11** to store water. The tub **20** may be provided in a substantially cylindrical shape with a tub opening **22** formed on one side thereof, and disposed inside the first housing **11** such that the tub opening **22** is disposed to correspond to the laundry inlet **12**.
[0060] The tub **20** may be connected to the first housing **11** by a damper **29**. The damper **29** may absorb vibration occurred when a first drum **30** rotates to damp the vibration transferred to the first housing **11**.
[0061] The first clothing treatment apparatus **10** may include the first drum **30** provided to accommodate laundry.
[0062] The first drum **30** may be disposed inside the tub **20** such that a first drum opening **32** provided on one side thereof corresponds to the laundry inlet **12** and the tub opening **22**. Laundry may be accommodated in the first drum **30** or taken out of the first drum **30** by sequentially passing through the laundry inlet **12**, the tub opening **22**, and the first drum opening **32**.
[0063] The first drum **30** may perform respective operations according to washing, rinsing, and/or dewatering processes while rotating inside the tub **20**. A plurality of passing holes **34** is formed on a cylindrical wall of the first drum **30** so that water stored in the tub **20** may flow into the first drum **30** or flow out of the first drum **30**. At least one first lifter **35** may be installed on an inner circumferential surface of the first drum **30** so that laundry may be raised and dropped when the first drum **30** rotates.
[0064] The first clothing treatment apparatus **10** may include a first driving device **40** configured to rotate the first drum **30**. The first driving device **40** may include a first driving motor **41** and a first rotating shaft **42** provided to transmit a driving force generated by the first driving motor **41** to the first drum **30**. The first rotating shaft **42** may pass through the tub **20** to be connected to the first drum **30**.
[0065] The first driving device **40** may perform each operation according to the washing, rinsing, and/or dewatering, or drying process by forward or reversely rotating the first drum **30**.
[0066] The first clothing treatment apparatus **10** may include a water supply device **50** configured to supply water to the tub **20**. The water supply device **50** may include a water supply pipe **51** and a water supply valve **52** provided on the water supply pipe **51**. The water supply pipe **51** may be connected to an external water supply source. The water supply pipe **51** may extend from an external water supply source to a detergent supply device **53** and/or the tub **20**. Water may be supplied to the tub **20** through the detergent supply device **53**. Water may be supplied to the tub **20** without passing through the detergent supply device **53**.
[0067] The water supply valve **52** may open or close the water supply pipe **51** in response to an electrical signal of a first controller **23** (see FIG. **6**). The water supply valve **52** may allow water to be supplied to the tub **20** or block water from being supplied to the tub **20**, from the external water supply source. The water supply valve **52** may include, for example, a solenoid valve opening or closing in response to an electrical signal.
[0068] The first clothing treatment apparatus **10** may include the detergent supply device **53** configured to supply detergent to the tub **20**. The detergent supply device **53** may include a manual detergent supply device requiring a user to put detergent to be used for each washing, and an automatic detergent supply device storing a large amount of detergent and automatically putting a predetermined amount of detergent during washing. The detergent supply device **53** may include a detergent box for storing detergent. The detergent supply device **53** may be configured to supply

the detergent into the tub **20** during a water supply process. Water supplied through the water supply pipe **51** may be mixed with the detergent by passing through the detergent supply device **53**. Water mixed with detergent may be supplied into the tub **20**. The detergent may be used as a term encompassing detergent for pre-washing, detergent for main washing, fabric softener, bleach, and the like, and the detergent box may be divided into a detergent storage area for pre-washing, a detergent storage area for main washing, a fabric softener storage area, and a bleaching agent storage area.

[0069] The first clothing treatment apparatus **10** may include a drainage device **54** configured to discharge water accommodated in the tub **20** to the outside. The drainage device **54** may include a drain pipe **55** extending from a bottom of the tub **20** to the outside of the first housing **11**, a drain valve **56** provided on the drain pipe **55** to open and close the drain pipe **55**, and a pump **57** provided on the drain pipe **55**. The pump **57** may pump water in the drain pipe **55** to the outside of the first housing **11**.

[0070] According to various embodiments, the first clothing treatment apparatus **10** may further include a heater for heating water stored in the tub **20**.

[0071] According to various embodiments, the first clothing treatment apparatus **10** may further include a heater for heating water that is supplied through the water supply device **50**.

[0072] The second clothing treatment apparatus **60** may be a washing machine or a dryer. For example, the second clothing treatment apparatus **60** may be a dryer.

[0073] Referring to FIGS. **4** and **5**, the second clothing treatment apparatus **60** according to various embodiments may include a second housing **61** accommodating various components therein. The second housing **61** may be provided in the form of a box in which an object inlet **62** is formed on one side thereof. In this specification, the object inlet **62** may refer to a first opening **62**.

[0074] The second clothing treatment apparatus **60** may include a second front frame **61***a* forming a front surface thereof. The object inlet **62** may be formed on the second front frame **61***a*.

[0075] The second clothing treatment apparatus **60** may include a second door **63** provided to open and close the object inlet **62**. The second door **63** may be rotatably mounted to the second housing **61** by a second hinge **64**. At least one portion of the second door **63** may be provided to be transparent or translucent so that the inside of the second housing **61** may be seen.

[0076] The second clothing treatment apparatus **60** may include a second drum **70** provided to accommodate an object. The second drum **70** may be disposed inside the second housing **61** such that a second drum opening **72** provided on one side thereof corresponds to the object inlet **62**. The object may be accommodated in the second drum **70** or taken out of the second drum **70** by sequentially passing through the object inlet **62** and the second drum opening **72**. The second drum **70** may be rotatably provided inside the second housing **61**.

[0077] The second clothing treatment apparatus **60** may include a second driving device **73** configured to rotate the second drum **70**. The second driving device **73** may include a second driving motor and a second rotating shaft provided to transmit a driving force generated by the second driving motor to the second drum **70**.

[0078] The second drum **70** may include an air inlet **71** through which air is introduced into the second drum **70**. Air inside the second drum **70** may be discharged to the outside of the second drum **70** through the second drum opening **72**. The air inlet **71** may be positioned on a side opposite to one side of the second drum **70** where the second drum opening **72** is positioned. For example, the air inlet **71** may be positioned at the rear of the second drum **70**, and the second drum opening **72** may be positioned at the front of the second drum **70**.

[0079] High-temperature dry air may be introduced into the second drum **70** through the air inlet **71** to dry the object accommodated in the second drum **70**. Air containing a large amount of moisture after drying the object may be discharged from the second drum **70** through the second drum opening **72**.

[0080] At least one second lifter **74** may be provided inside the second drum **70**. The second lifter

74 may raise and drop the object so that the object comes into contact with the hot air while floating in an inner space of the second drum **70**.

[0081] Inside the second housing **61**, a heat pump **80** configured to heat and condense air may be provided. An evaporator **81**, a condenser **82**, a compressor **83**, an expansion device, and the like constituting the heat pump **80** may be disposed below the second drum **70**. Refrigerant may be circulated through a series of processes leading to compression-condensation-expansion-evaporation. Specifically, the heat pump **80** may include the evaporator **81**, the condenser **82**, the compressor **83**, and the expansion device. The evaporator **81** and the condenser **82** may exchange heat with air.

[0082] The compressor **83** compresses and discharges the refrigerant in a high-temperature and high-pressure state, and the discharged refrigerant may be introduced into the condenser **82**. The condenser **82** may condense the compressed refrigerant and dissipate heat to the surroundings through the condensation process. The expansion device may expand the high-temperature and high-pressure refrigerant condensed in the condenser **82** to a low-pressure state. The evaporator **81** may evaporate the expanded refrigerant and take heat from the surroundings through the evaporation process.

[0083] As an operating RPM of the compressor **83** increases, an amount of heat radiated to the surroundings through the condensation process of the condenser **82** may increase.

[0084] When an object is put into the second clothing treatment apparatus **60** and operated in a drying mode, high-temperature and high-humidity air discharged from the second drum **70** may pass through the evaporator **81**. Accordingly, the high-temperature and high-humidity air discharged from the second drum **70** may be cooled while passing through the evaporator **81** and thus changed into low-temperature dry air. At this time, condensed water may be generated as the high-temperature and high-humidity air is cooled in the evaporator **81**. The condensed water may be moved to a recovery water container or drained to the outside of the second housing **61**. Air in a low-temperature dry state after passing through the evaporator **81** may pass through the condenser **82**. Accordingly, the low-temperature dry air discharged from the evaporator **81** may be heated while passing through the condenser **82** and thus changed into high-temperature dry air. The high-temperature dry air may be introduced into the second drum **70** through the air inlet **71** to dry the object. As the object is dried, high-temperature and high-humidity air containing a large amount of moisture may be discharged through the second drum opening **72**. The discharged air may pass through the evaporator **81** again. In summary, air may dry an object accommodated in the second drum **70** while circulating inside the second housing **61**.

[0085] In the drying mode, a closed type flow path may be formed inside the second housing **61** of the second clothing treatment apparatus **60**. The closed type flow path may be an air movement path (refer to arrows in FIG. **5**) formed to circulate air inside the second housing **61** through the heat pump **80** and the second drum **70**. The closed type flow path may not communicate with the outside of the second housing **61** so that air outside the second housing **61** does not flow in or out. That is, the flow of air may form a closed loop.

[0086] The second clothing treatment apparatus **60** may include a heater **86** provided in the closed type flow path. The heater **86** may be implemented through a heating coil, but is not limited thereto, and may be implemented through various known devices. The heater **86** may further heat the air heated while passing through the condenser **82** or heat the air sucked in from the outside without being heated through the heat pump **80**.

[0087] Referring to FIGS. **4** and **5**, the second clothing treatment apparatus **60** may include a housing opening **69** provided on a front surface of the second housing **61** to allow access to the evaporator **81** of the heat pump **80**. A filter device **102** may be mounted inside the second housing **61** through the housing opening **69**. Specifically, the filter device **102** may be detachably mounted on a device accommodating part **120** formed inside the second housing **61** through the housing opening **69**. When the filter device **102** is mounted on the accommodating part **68**, the second

clothing treatment apparatus **60** may perform the drying mode (drying operation) for drying objects such as clothes. In addition, a cover door **110** may be provided on the front surface of the second housing **61** to open and close the housing opening **69**. In this specification, the housing opening (**69**) may refer to a second opening (**69**).

[0088] In a state in which the cover door **110** closes the housing opening **69**, as a front surface of the cover door **110** and the front surface of the second housing **61** are connected, a surface connected smoothly without a step is formed. When the filter device **102** is not mounted inside the second housing **61**, the user may access the evaporator **81** disposed at the front between the heat exchangers **81** and **82** through the housing opening **69**. When the dryer is used for a long time, foreign substances such as lint may be attached to the heat exchangers **81** and **82**, and the user may remove these foreign substances through the housing opening **69**.

[0089] The filter device **102** may be detachably mounted on the second clothing treatment apparatus **60**. Specifically, the filter device **102** may be detachably mounted inside the second housing **61** through the housing opening **69**. The filter device **102** may be mounted on the device accommodating part **120** or may be separate from the device accommodating part **120**.

[0090] A fan **90** may be disposed below the second drum **70**. The fan **90** may circulate air inside the second housing **61**. The fan **90** may form a circulating airflow passing through the second drum **70** inside the second housing **61**.

[0091] The second clothing treatment apparatus **60** may include a fan motor (**91** in FIG. **7**) configured to rotate the fan **90**. The fan **90** may be rotated by a driving force generated from the fan motor **91**.

[0092] According to various embodiments, the fan motor **91** for rotating the fan **90** and a second drum motor **91**, **73***a* for rotating the second drum **70** may be the same configuration.

[0093] In an embodiment, one of the motors **91** and **73***a* may be connected to rotating shafts different from each other to simultaneously rotate the fan **90** and the second drum **70**.

[0094] When one of the motors **91** and **73***a* is connected to rotating shafts different from each other to simultaneously rotate the fan **90** and the second drum **70**, a rotational speed of the fan **90** and a rotational speed of the second drum **70** may be different from each other. For example, the rotational speed of the fan **90** may be faster than the rotational speed of the second drum **70**.

[0095] According to various embodiments, the fan motor for rotating the fan **90** and the second drum motor **73***a* for rotating the second drum **70** may be provided separately from each other.

[0096] A leg **140** may be provided on a lower surface of the second clothing treatment apparatus **60**. The leg **140** may be provided on the lower surface of the second clothing treatment apparatus **60** to support the second clothing treatment apparatus **60**.

[0097] FIG. **6** is a control block diagram of the first clothing treatment apparatus according to an embodiment.

[0098] Referring to FIG. **6**, in an embodiment, the first clothing treatment apparatus **10** may include a first user interface device **15**, the first driving device **40**, the water supply device **50**, the drainage device **54**, a first sensor device **18**, first communication circuitry **19**, and the first controller **23**.

[0099] The first user interface device **15** may provide a user interface for interaction between the user and the first clothing treatment apparatus **10**.

[0100] The first user interface device **15** may include at least one first input interface **16** and at least one first output interface **17**.

[0101] In an embodiment, the first user interface device **15** may be disposed on one side of the first housing **11**, but the position of the first user interface device **15** is not limited thereto.

[0102] The at least one first input interface **16** may convert sensory information received from the user into an electrical signal.

[0103] The at least one first input interface **16** may include a power button, an operation button, a course selection dial (or course selection button), and washing/rinsing/dewatering setting buttons.

The at least one first input interface **16** may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial, and/or a microphone, and the like.

[0104] The at least one first output interface **17** may transfer various data related to operations of the first clothing treatment apparatus **10** to the user by generating sensory information.

[0105] For example, the at least one first output interface **17** may transfer information related to a washing course, an operating time of the first clothing treatment apparatus **10**, and washing/rinsing/dewatering settings to the user. Information on the operations of the first clothing treatment apparatus **10** may be output through a screen, indicator, voice, and the like. The at least one first output interface **17** may include, for example, a liquid crystal display (LCD) panel, a light emitting diode (LED) panel, a speaker, and the like.

[0106] The washing course may include washing settings (e.g., washing temperature, number of rinsing, dewatering intensity, etc.) preset by a designer of the first clothing treatment apparatus **10** depending on the type (e.g., blanket, underwear, etc.) and material (e.g., wool, etc.) of laundry. For example, standard washing may include washing settings that may be applied to most laundry, and blanket washing may include an optimized washing setting for washing a blanket. The washing course may be classified into, for example, standard washing, strong washing, delicate clothing washing, blanket washing, baby clothing washing, towel washing, small amount washing, boiling washing, power saving washing, outdoor clothing washing, rinsing/dewatering, dewatering, and the like.

[0107] According to various embodiments, the washing course may include a plurality of courses tailored to user needs. For example, the washing course may include an energy saving course, a time saving course, a low noise course, and the like.

[0108] The energy saving course corresponds to a course for minimizing energy required to perform a washing cycle. When the first clothing treatment apparatus **10** performs the washing cycle corresponding to the energy saving course, an operation of the heater for heating water stored in the tub **20** may be minimized.

[0109] The time saving course corresponds to a course for minimizing the time required to perform the washing cycle. When the first clothing treatment apparatus **10** performs the washing cycle corresponding to the time saving course, the number of times of washing process, rinsing process, and/or dewatering process may be minimized, or the time required for washing process, rinsing process, and/or dewatering process may be minimized.

[0110] The low noise course corresponds to a course for minimizing noise occurred from the first clothing treatment apparatus **10** while performing the washing cycle. When the first clothing treatment apparatus **10** performs the washing cycle corresponding to the low noise course, a maximum RPM of the first drum **30** may be minimized in the washing process, the rinsing process and/or the dewatering process.

[0111] In the present disclosure, courses depending on special needs of the user, such as the energy saving course, the time saving course, and the low noise course, may be defined as specialized courses.

[0112] In the present disclosure, the courses other than the specialized courses (e.g., standard courses) may be defined as general courses.

[0113] A first memory **25** may store algorithms of a plurality of the washing courses corresponding to the plurality of washing courses. The algorithms of the plurality of washing courses refer to algorithms for controlling a plurality of components (e.g., the first driving device **40**, the water supply device **50**, the drainage device **54**, and/or the heater) in the washing cycle.

[0114] A first processor **24** may perform a washing course based on an algorithm of an operation course set based on a user input among the algorithms of the plurality of washing courses stored in the first memory **25**.

[0115] The first driving device **40** may include the first drum motor **41** for providing a driving

force for rotating the first drum **30**. The first driving device **40** may operate based on a control signal of the first controller **23**.
[0116] The water supply device **50** may include the water supply valve **52** provided to open and close the water supply pipe **51** extending from an external water supply source to the detergent supply device **53** and/or the tub **20**. The water supply valve **52** may be opened and closed based on a control signal of the first controller **23**.
[0117] The drainage device **54** may include the drainage pump **57** provided to discharge water from the tub **20** to the outside of the washing machine housing **11**. The drainage pump **57** may operate based on a control signal of the first controller **23**.
[0118] The first sensor device **18** may include at least one sensor provided to obtain information related to an operating state of the first clothing treatment apparatus **10**.
[0119] For example, the first sensor device **18** may include at least one of a water level sensor provided to detect a water level of the tub **20**, a sensor provided to detect an operating state of the first driving device **40**, a flow sensor provided to detect a flow rate introduced into the tub **20** through the water supply device **50**, and a sensor provided to detect an operating state of the drainage device **54**.
[0120] According to various embodiments, the first sensor device **18** may include at least one sensor provided to detect a weight of laundry accommodated in the first drum **30**.
[0121] According to various embodiments, the first sensor device **18** may include a vibration sensor provided to detect a vibration value of the tub **20**. The vibration sensor may detect vibration of the tub **20**. Specifically, the vibration sensor may detect vibration of the tub **20** occurred by rotation of the first drum **30** during the washing cycle (e.g., the dewatering process). Eccentricity of the first drum **30** may occur due to unbalance of laundry disposed inside the first drum **30**, and vibration of the tub **20** may occur due to the eccentricity of the first drum **30**. When a rotational speed of the first drum **30** increases in a state in which the laundry is disposed to be unbalanced, the vibration of the tub **20** may increase, and the noise caused by the vibration of the tub **20** may also increase.
[0122] According to various embodiments, even when the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** operate together, the vibration of the tub **20** may increase due to frequency resonance.
[0123] The vibration sensor may output a vibration signal related to vibration of the tub **20**. An amplitude of the vibration signal may be defined as a vibration value when the tub **20** vibrates.
[0124] In an embodiment, the first controller **23** may convert a vibration signal in a time domain output from the vibration sensor into a vibration signal in a frequency domain, and process the vibration signal in the frequency domain. The vibration sensor may include a six-axis sensor capable of detecting displacement in six axes (X, Y, Z, Pitch, Roll, and Yaw).
[0125] The sensor provided to detect the operating state of the first driving device **40** may include, for example, a current sensor measuring a driving current applied to the first drum motor **41**, but is not limited thereto.
[0126] The sensor provided to detect the operating state of the drainage device **54** may include, for example, a current sensor provided to measure a driving current applied to the drainage pump **57**, but is not limited thereto.
[0127] The first clothing treatment apparatus **10** may include the first communication circuitry **19** for wired and/or wireless communication with external devices (e.g., servers, user devices, and/or other home appliances).
[0128] The user devices and/or other home appliances may include various electronic devices such as smartphones, notebooks, laptops, smart watches, IoT hub devices, other home appliances such as a television and/or the second clothing treatment apparatus **60**, holder-type tablets, and speakers.
[0129] The first communication circuitry **19** may include a short-range communication module and/or a long-range communication module.

[0130] The first communication circuitry **19** may transfer data to an external device or receive data from an external device. For example, the first communication circuitry **19** may establish communication with servers, user devices, and/or other home appliances, and transfer/receive various types of data.
[0131] To this end, the first communication circuitry **19** may support establishment of a direct (e.g., wired) communication channel or wireless communication channel between external devices, and communication through the established communication channel. According to an embodiment, the first communication circuitry **19** may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module (e.g., a local area network (LAN) communication module, or a power line communication module). A corresponding communication module among these communication modules may communicate with external devices through a first network (e.g., a short-range communication network such as Bluetooth, wireless fidelity (Wi-Fi) direct, and infrared data association (IrDA)) or a second network (e.g., a long-range communication network such as a legacy cellular network, a 5G network, a next-generation telecommunications network, the Internet, and a computer network (e.g. LAN or WAN)). These various types of communication modules may be integrated as one component (e.g., a single chip) or implemented as a plurality of separate components (e.g., a plurality of chips).
[0132] The short-range wireless communication modules may include, but are not limited to, a Bluetooth communication module, a Bluetooth low energy (BLE) communication module, a near field communication module, a WLAN (Wi-Fi) communication module, a ZigBee communication module, an infrared data association (IrDA) communication module, a Wi-Fi direct (WFD) communication module, an ultra-wideband (UWB) communication module, an Ant+ communication module, a microwave (uWave) communication module, and the like.
[0133] The long-range communication modules may include communication modules that perform various types of long distance communications, and may include mobile communication circuitry. The mobile communication circuitry transfers and receives radio signals with at least one of a base station, an external terminal, and a server on a mobile communication network.
[0134] In an embodiment, the first communication circuitry **19** may communicate with an external device such as a server, user device, and other home appliance through a nearby access point (AP). The access point may connect a local area network (LAN) to which the first clothing treatment apparatus **10** and/or a user device and/or other home appliance are connected, to a wide area network (WAN) to which a server is connected. The first clothing treatment apparatus **10** and/or the user device and/or the other home appliance may be connected to the server through the wide area network (WAN).
[0135] The first controller **23** may control various components (e.g., the first driving device **40**, the water supply device **50**, and the drainage device **54**) of the first clothing treatment apparatus **10**. The first controller **23** may control various components of the first clothing treatment apparatus **10** to perform at least one process including water supply, washing, rinsing, and/or dewatering depending on the user input. For example, the first controller **23** may control the first drum motor **41** of the first driving device **40** to adjust the rotational speed (RPM) of the first drum **30**, control the water supply valve **52** of the water supply device **50** to supply water to the tub **20**, or control the drainage pump **57** of the drainage device **54** to discharge water in the tub **20** to the outside.
[0136] The first controller **23** may include hardware such as a CPU, a microcomputer and a memory, and software such as a control program. For example, the first controller **23** may include algorithms for controlling operations of the components in the first clothing treatment apparatus **10**, the at least one first memory **25** for storing data in the form of a program, and the at least one first processor **24** for performing the above-described operations and operations, which will be described later, using data stored in the at least one first memory **25**. The first memory **25** and the

first processor **24** may be implemented as separate chips. The first processor **24** may include one or more processor chips or may include one or more processing cores. The first memory **25** may include one or more memory chips or may include one or more memory blocks. The first memory **25** and the first processor **24** may be implemented as a single chip.

[0137] FIG. **7** is a control block diagram of the second clothing treatment apparatus according to an embodiment.

[0138] Referring to FIG. **7**, in an embodiment, the second clothing treatment apparatus **60** may include a second user interface device **75**, the second driving device **73**, the heater **86**, and the fan motor **91**, the heat pump **80**, second communication circuitry **94**, a second sensor device **79**, and a second controller **97**.

[0139] The second user interface device **75** may provide a user interface for interaction between the user and the second clothing treatment apparatus **60**.

[0140] The second user interface device **75** may include at least one second input interface **76** and at least one second output interface **77**.

[0141] In an embodiment, the second user interface device **75** may be disposed on one side of the second housing **61**, but the position of the second user interface device **75** is not limited thereto.

[0142] The at least one second input interface **76** may convert sensory information received from the user into an electrical signal.

[0143] The at least one second input interface **76** may include a power button, an operation button, a course selection dial (or course selection button), and a drying setting button. The at least one second input interface **76** may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial, and/or a microphone, and the like.

[0144] The at least one second output interface **77** may transfer various data related to operations of the second clothing treatment apparatus **60** to the user by generating sensory information.

[0145] For example, the at least one second output interface **77** may transfer information related to a drying course, an operating time of the second clothing treatment apparatus **60** and a drying setting to the user. Information on the operations of the second clothing treatment apparatus **60** may be output through a screen, indicator, voice, and the like. The at least one second output interface **77** may include, for example, a liquid crystal display (LCD) panel, a light emitting diode (LED) panel, a speaker, and the like.

[0146] The drying course may include drying settings (e.g., drying temperature, drying time, drying intensity, etc.) preset by a designer of the second clothing treatment apparatus **60** depending on the type (e.g., blanket, underwear, etc.) and material (e.g., wool, etc.) of an object. For example, standard drying may include drying settings that may be applied to most objects, and blanket drying may include an optimized drying setting for drying a blanket. The drying course may be classified into, for example, standard drying, strong drying, delicate clothing drying, blanket drying, baby clothing drying, towel drying, small amount drying, power saving drying, outdoor clothing drying, and the like.

[0147] According to various embodiments, the drying course may include a plurality of courses tailored to user needs. For example, the drying course may include an energy saving course, a time saving course, a low noise course, and the like.

[0148] The energy saving course corresponds to a course for minimizing energy required to perform a drying process. When the second clothing treatment apparatus **60** performs the drying process corresponding to the energy saving course, an operation of the heater **86** may be minimized.

[0149] The time saving course corresponds to a course for minimizing the time required to perform the drying process. When the second clothing treatment apparatus **60** performs the drying process corresponding to the time saving course, an operating time of the heater **86** and/or an operating frequency of the compressor **83** may increase.

[0150] The low noise course corresponds to a course for minimizing noise occurred from the second clothing treatment apparatus **60** while performing the drying process. When the second clothing treatment apparatus **60** performs the drying process corresponding to the low noise course, a maximum RPM of the second drum **70** may be minimized.
[0151] In the present disclosure, courses depending on special needs of the user, such as the energy saving course, the time saving course, and the low noise course, may be defined as specialized courses.
[0152] In the present disclosure, the courses other than the specialized courses (e.g., standard courses) may be defined as general courses.
[0153] A second memory **99** may store algorithms of a plurality of the drying courses corresponding to the plurality of drying courses. The algorithms of the plurality of drying courses refer to algorithms for controlling a plurality of components (e.g., the second driving device **73**, the heater **86**, the fan motor **91**, and/or the compressor **83**) in the drying process.
[0154] A second processor **98** may perform a drying process based on an algorithm of an operation course set based on the user input among the algorithms of the plurality of drying courses stored in the second memory **99**.
[0155] The second driving device **73** may include the second drum motor **73***a* providing a driving force for rotating the second drum **70**. The second driving device **73** may operate based on a control signal of the second controller **97**.
[0156] According to various embodiments, the second controller **97** may control the second driving device **73** based on the algorithm of the operation course selected by the user.
[0157] The heater **86** may further heat the air heated while passing through the condenser **82** or heat the air sucked in from the outside without being heated through the heat pump **80**.
[0158] The heater **86** may operate based on a control signal of the second controller **97**.
[0159] According to various embodiments, the second controller **97** may control the heater **86** based on the algorithm of the operation course selected by the user.
[0160] The fan motor **91** may rotate the fan **90** for circulating air in the second housing **61**.
[0161] The fan motor **91** may operate based on a control signal of the second controller **97**.
[0162] According to various embodiments, the second controller **97** may control the fan motor **91** based on the algorithm of the operating course selected by the user.
[0163] As described above, the fan motor **91** for rotating the fan **90** and the second drum motor **73***a* for rotating the second drum **70** may be the same configuration.
[0164] In an embodiment, when one of the motors **91** and **73***a* is connected to rotating shafts different from each other to simultaneously rotate the fan **90** and the second drum **70**, the second controller **97** may drive one of the motors **91** and **73***a* at a target RPM corresponding to a target RPM of the fan **90** or a target RPM of the second drum **70**.
[0165] According to various embodiments, when the fan motor **91** for rotating the fan **90** and the second drum motor **73***a* for rotating the second drum **70** are provided separately from each other, the second controller **97** may drive the fan motor **91** based on the target RPM of the fan **90**, and drive the second drum motor **73***a* based on the target RPM of the second drum **70**.
[0166] The heat pump **80** configured to generate hot air to be supplied to the second drum **70** may include the compressor **83** compressing the refrigerant.
[0167] The compressor **83** may operate based on a control signal of the second controller **97**.
[0168] According to various embodiments, the second controller **97** may control the compressor **83** based on the algorithm of the operation course selected by the user.
[0169] The second sensor device **79** may include at least one sensor provided to obtain information related to an operating state of the second clothing treatment apparatus **60**.
[0170] According to various embodiments, the second sensor device **79** may include at least one sensor provided to detect a weight of an object accommodated in the second drum **70**.
[0171] According to various embodiments, the second sensor device **79** may include a temperature

sensor provided to detect a temperature in the second housing **61** and/or a sensor provided to detect an operating state of the second driving device **73**.
[0172] The temperature sensor detecting the temperature in the second housing **61** may be provided anywhere inside the second housing **61**. According to various embodiments, the temperature sensor may be provided on an outlet side of the condenser **82** or may be provided on a downstream side of the heater **86**.
[0173] According to various embodiments, the second sensor device **79** may include a vibration sensor provided to detect a vibration value of the second housing **61**.
[0174] The second clothing treatment apparatus **60** may include the second communication circuitry **94** for wired and/or wireless communication with external devices (e.g., servers, user devices, and/or other home appliances).
[0175] The user devices and/or other home appliances may include various electronic devices such as smartphones, notebooks, laptops, smart watches, IoT hub devices, other home appliances such as a television and/or the second clothing treatment apparatus **60**, holder-type tablets, and speakers.
[0176] The second communication circuitry **94** may include a short-range communication module and/or a long-range communication module.
[0177] The second communication circuitry **94** may transfer data to an external device or receive data from an external device. For example, the second communication circuitry **94** may establish communication with servers, user devices, and/or other home appliances, and transfer/receive various types of data.
[0178] To this end, the second communication circuitry **94** may support establishment of a direct (e.g., wired) communication channel or wireless communication channel between external devices, and communication through the established communication channel. According to an embodiment, the second communication circuitry **94** may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module (e.g., a local area network (LAN) communication module, or a power line communication module). A corresponding communication module among these communication modules may communicate with external devices through a first network (e.g., a short-range communication network such as Bluetooth, wireless fidelity (Wi-Fi) direct, and infrared data association (IrDA)) or a second network (e.g., a long-range communication network such as a legacy cellular network, a 5G network, a next-generation telecommunications network, the Internet, and a computer network (e.g. LAN or WAN)). These various types of communication modules may be integrated as one component (e.g., a single chip) or implemented as a plurality of separate components (e.g., a plurality of chips).
[0179] The short-range wireless communication modules may include, but are not limited to, a Bluetooth communication module, a Bluetooth low energy (BLE) communication module, a near field communication module, a WLAN (Wi-Fi) communication module, a ZigBee communication module, an infrared data association (IrDA) communication module, a Wi-Fi direct (WFD) communication module, an ultra-wideband (UWB) communication module, an Ant+ communication module, a microwave (uWave) communication module, and the like.
[0180] The long-range communication modules may include communication modules that perform various types of long distance communications, and may include mobile communication circuitry. The mobile communication circuitry transfers and receives radio signals with at least one of a base station, an external terminal, and a server on a mobile communication network.
[0181] In an embodiment, the second communication circuitry **94** may communicate with an external device such as a server, user device, and other home appliance through a nearby access point. The access point may connect a local area network (LAN) to which the second clothing treatment apparatus **60** and/or a user device and/or other home appliance are connected, to a wide area network (WAN) to which a server is connected. The second clothing treatment apparatus **60**

and/or the user device and/or the other home appliance may be connected to the server through the wide area network (WAN).

[0182] The second controller **97** may control various components (e.g., the second driving device **73**, the heater **86**, the fan motor **91**, and/or the compressor **83**) of the second clothing treatment apparatus **60**. The second controller **97** may control various components of the second clothing treatment apparatus **60** to perform the drying process depending on the user input. For example, the second controller **97** may control the second drum motor **73***a* of the second driving device **73** to adjust the rotational speed (RPM) of the second drum **70**, control the operation of the heater **86** to quickly heat air in the second drum **70**, control an operation of the compressor **83** to generate hot air to be supplied to the second drum **70**, or control an operation of the fan motor **91** to circulate hot air generated by the heat pump **80** into the second drum **70**.

[0183] The second controller **97** may include hardware such as a CPU, a microcomputer and a memory, and software such as a control program. For example, the second controller **97** may include algorithms for controlling operations of the components in the second clothing treatment apparatus **60**, the at least one second memory **99** for storing data in the form of a program, and the at least one second processor **98** for performing the above-described operations and operations, which will be described later, using data stored in the at least one second memory **99**. The second memory **99** and the second processor **98** may be implemented as separate chips. The second processor **98** may include one or more processor chips or may include one or more processing cores. The second memory **99** may include one or more memory chips or may include one or more memory blocks. The second memory **99** and the second processor **98** may be implemented as a single chip.

[0184] FIG. **8** is a control block diagram of the clothing treatment system according to an embodiment.

[0185] Referring to FIG. **8**, the clothing treatment system **1** according to an embodiment may include the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60**.

[0186] The first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** may be operatively and/or electrically connected to each other.

[0187] A variety of information obtained from the first clothing treatment apparatus **10** may be transferred to the second clothing treatment apparatus **60**, and a variety of information obtained from the second clothing treatment apparatus **60** may be transferred to the first clothing treatment apparatus **10**.

[0188] In an embodiment, the clothing treatment system **1** may include a user interface device **105**.

[0189] The user interface device **105** may be provided in the first clothing treatment apparatus **10** and/or the second clothing treatment apparatus **60**.

[0190] In an embodiment, the user interface device **105** may be disposed on one side surface of the first housing **11**.

[0191] The user interface device **105** of the clothing treatment system **1**, which is a component for controlling both the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60**, may be defined as the integrated user interface device **105**.

[0192] In an embodiment, as the clothing treatment system **1** includes the user interface device **105**, the first clothing treatment apparatus **10** may not include the first user interface device **15** for controlling only the first clothing treatment apparatus **10**.

[0193] In an embodiment, as the clothing treatment system **1** includes the user interface device **105**, the second clothing treatment apparatus **60** may not include the second user interface device **75** for controlling only the second clothing treatment apparatus **60**.

[0194] According to various embodiments, even when the clothing treatment system **1** includes the user interface device **105**, the first clothing treatment apparatus **10** may include the first user interface device **15** for controlling only the first clothing treatment apparatus **10**. As another example, even when the clothing treatment system **1** includes the user interface device **105**, the

second clothing treatment apparatus **60** may include the second user interface device **75** for controlling only the second clothing treatment apparatus **60**. As another example, even when the clothing treatment system **1** includes the user interface device **105**, the first clothing treatment apparatus **10** may include the first user interface device **15** for controlling only the first clothing treatment apparatus **10**, and the second clothing treatment apparatus **60** may include the second user interface device **75** for controlling only the second clothing treatment apparatus **60**.
[0195] That is, in an embodiment, the clothing treatment system **1** may include the user interface device **105** for controlling the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60**, and the first user interface device **15** for controlling the first clothing treatment apparatus **10** and/or the second user interface device **75** for controlling the second clothing treatment apparatus **60**.
[0196] The user interface device **105** may provide a user interface for interaction between the user and the clothing treatment system **1**. The user interface for interaction between the user and the clothing treatment system **1** may refer to user interfaces for interaction between the user and the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60**.
[0197] The user interface device **105** may include at least one input interface **106** and at least one output interface **107**.
[0198] The at least one input interface **106** may convert sensory information received from the user into an electrical signal and transfer the electrical signal to the first clothing treatment apparatus **10** and/or the second clothing treatment apparatus **60**.
[0199] The at least one input interface **106** may include a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial, and/or a microphone, and the like.
[0200] In an embodiment, the at least one input interface **106** may transmit a control command corresponding to a user input to the first controller **23** of the first clothing treatment apparatus **10** and the second controller **97** of the second clothing treatment apparatus **60**.
[0201] The at least one output interface **107** may transfer various data related to operations of the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** to the user by generating sensory information.
[0202] The at least one output interface **107** may include, for example, a liquid crystal display (LCD) panel, a light emitting diode (LED) panel, a speaker, and the like.
[0203] A panel on which the at least one input interface **106** and the at least one output interface **107** are formed may be defined as a control panel **101**. The at least one input interface **106** and the at least one output interface **107** may be provided on the control panel **101**.
[0204] The first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** may communicate with each other through the first communication circuitry **19** of the first clothing treatment apparatus **10** and the second communication circuitry **94** of the second clothing treatment apparatus **60**.
[0205] In an embodiment, the first communication circuitry **19** and the second communication circuitry **94** may directly communicate with each other using a D2D wireless communication module (e.g., a Bluetooth module).
[0206] In an embodiment, the first communication circuitry **19** and the second communication circuitry **94** may communicate with each other through a server using a wide area network (WAN).
[0207] According to various embodiments, the first communication circuitry **19** and the second communication circuitry **94** may include wired communication modules (e.g., communication connectors and/or communication wires), and the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** may be connected to each other by wires.
[0208] According to various embodiments, the user interface device **105** may further include a connection circuit board **108**. The connection circuit board **108** may be implemented as a printed circuit board.

[0209] The connection circuit board **108** may include a communication wire and/or a communication connector to be connected to the first communication circuitry **19** and the second communication circuitry **94**.
[0210] The connection circuit board **108** may connect the first communication circuitry **19** and the second communication circuitry **94** by a wire.
[0211] Each of the first communication circuitry **19** and the second communication circuitry **94** may be connected to the connection circuit board **108**.
[0212] The connection circuit board **108** may mediate data exchange between the first controller **23** and the second controller **97**.
[0213] For example, the connection circuit board **108** may transfer a signal transferred from the first controller **23** through the first communication circuitry **19** to the second controller **97** through the second communication circuitry **94**.
[0214] As another example, the connection circuit board **108** may transfer a signal transferred from the second controller **97** through the second communication circuitry **94** to the first controller **23** through the first communication circuitry **19**.
[0215] According to various embodiments, the connection circuit board **108** may transfer course information selected by the at least one input interface **106** to the first controller **23** through the first communication circuitry **19**.
[0216] According to various embodiments, the connection circuit board **108** may transfer course information selected by the at least one input interface **106** to the second controller **97** through the second communication circuitry **94**.
[0217] According to the present disclosure, as the user interface device **105** includes the connection circuit board **108**, communication between the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** may be smoothly performed, and at the same time, communication between the user interface device **100** and the first clothing treatment apparatus **10** and the second clothing treatment apparatus **60** may be smoothly performed.
[0218] FIG. **9** illustrates the second clothing treatment apparatus, on which the filter device is mounted, with a cover door open, in the clothing treatment system according to an embodiment. FIG. **10** illustrates the filter device of the second clothing treatment apparatus of the clothing treatment system according to an embodiment.
[0219] Referring to FIG. **9**, the direction along the X-axis may be defined as a forward-backward direction, the direction along the Y-axis may be defined as a left-right direction, and the direction along the Z-axis may be defined as an up-down direction. Meanwhile, the terms “front-back direction”, “left-right direction”, “up-down direction”, etc. used in the following description are defined based on the drawings, and should not be construed as limiting the shape and position of each component.
[0220] Referring to FIG. **9**, in the clothing treatment system according to an embodiment, the cover door **110** may be provided to open laterally by 180 degrees or more. In FIG. **9**, the cover door **110** is illustrated as opening from left to right, but the disclosure is not limited thereto. The cover door may be provided to open from right to left by 180 degrees or more.
[0221] As described above, in the clothing treatment system **1** according to an embodiment, the second clothing treatment apparatus **60** may be arranged above the first clothing treatment apparatus **10**. Since the cover door **110** of the second clothing treatment apparatus **60** arranged above the first clothing treatment apparatus **10** is configured to be open laterally by 180 degrees or more, the cover door **110** may be prevented from structurally interfering with the first clothing treatment apparatus **10** when the cover door **110** is opened.
[0222] When a cover door is opened downward by rotating around a rotating shaft extending in a horizontal direction, the cover door may interfere with structures, such as a control panel of the first clothing treatment apparatus arranged below the second clothing treatment apparatus. As a result, the cover door may not open 90 degrees or more. Without the cover door being opened 90 degrees

or more, the cover door may interfere with the above described filter device or a dehumidifying device, which will be described below, when the filter device or the dehumidifying device is introduced into or withdrawn from the device accommodating part through the housing opening. As a result, inconvenience may occur when the filter device or the dehumidifying device is introduced or withdrawn.

[0223] According to the present disclosure, the cover door **110** of the second clothing treatment apparatus **60** is configured to open laterally, so that the cover door **110** may not structurally interfere with the first clothing treatment apparatus **10** when the cover door **110** is opened. Since the cover door **110** is fully opened without structural interference with the first clothing treatment apparatus **10**, the filter device **102** or the dehumidifying device **103** may be easily introduced into the device accommodating part **120** through the housing opening **69** or may be easily withdrawn from the device accommodating part **120** after opening the cover door **110**.

[0224] Referring to FIG. **10**, the filter device **102** may include a body **102***a*. The filter device **102** may include a front cover **102***b* coupled to a front side of the body **102***a*.

[0225] The body **102***a* may be provided in an approximately box shape. An inlet through which air is introduced and an outlet through which air is discharged may be formed in the body **102***a*.

[0226] A filter member **102***c* may be provided at the rear of the body **102***a* of the filter device **102**. The filter member **102***c* may filter out foreign substances in the air introduced toward the heat exchanger **81 82**.

[0227] A fixing member **102***d* may be provided on a front surface of the front cover **102***b* of the filter device **102**. The fixing member **120***d* may fix the filter device **102** to the second clothing treatment apparatus **60**.

[0228] Upon the filter device **102** being mounted on the second clothing treatment apparatus **60** according to an embodiment, the second clothing treatment apparatus **60** may perform the drying operation described with reference to FIG. **5**.

[0229] FIG. **11** illustrates the second clothing treatment apparatus, on which a dehumidifying device is mounted, with the cover door open, in the clothing treatment system according to an embodiment. FIG. **12** illustrates a cross-section of the second clothing treatment apparatus, on which the dehumidifying device is mounted, in the clothing treatment system according to an embodiment. FIG. **13** illustrates a base of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.

[0230] Referring to FIG. **11**, a dehumidifying device **103** may be mounted on the second clothing treatment apparatus **60**. As described above, the cover door **110** may be opened 180 degrees laterally so as not to structurally interfere with the first clothing treatment apparatus **10**.

[0231] One of the filter device **102** and the dehumidifying device **103** may be mounted on the second clothing treatment apparatus **60**. The dehumidifying device **103** may be detachably mounted on the second clothing treatment apparatus **60**. The dehumidifying device **103** may be mounted inside the second housing **61** through the housing opening **69** provided on the front of the cabinet **10**.

[0232] The dehumidifying device **103** and the filter device **102** may be provided to be interchangeable with each other. In other words, the user may mount the dehumidifying device **103** or the filter device **102** on the second clothing treatment apparatus **60** depending on the function (a dehumidifying operation or a drying operation) to be used.

[0233] Hereinafter, a dehumidifying operation of the second clothing treatment apparatus **60** according to an embodiment will be described.

[0234] Referring to FIG. **13**, the dehumidifying device **103** may be provided on a base **65** forming the lower surface of the second clothing treatment apparatus **60**. The dehumidifying device **103** may be detachably mounted on the base **60**.

[0235] As the dehumidifying device **103** is mounted on the second clothing treatment apparatus **60**, the second clothing treatment apparatus **60** may have an open flow path. Here, the open flow path

may be an air movement path (see arrows in FIG. **12** in which external air is drawn into the second clothing treatment apparatus **60**, passes through the heat exchanger **81**, **82** and the second drum **70**, and then exit the second clothing treatment apparatus **60**. Alternatively, the open flow path may be an air movement path in which external air is drawn into the second clothing treatment apparatus **60**, passes through the heat exchanger **81**, **82**, and then exits the second clothing treatment apparatus **60**. Opposite ends of the open flow path may each be connected to the outside of the second housing **61**, and the air flow may form an open loop.

[0236] Referring to FIG. **12**, when the filter device **50** is removed and the dehumidifying device **103** is mounted on the second clothing treatment apparatus **60**, a closed flow path may be converted into an open flow path. Accordingly, the second clothing treatment apparatus **60** may perform a dehumidifying operation. That is, the dryer may be converted from a drying mode to a dehumidifying mode.

[0237] FIG. **14** illustrates a state in which the cover door covers a device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment. FIG. **15** illustrates a state in which the cover door opens to expose the device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment. FIG. **16** illustrates a state in which the cover door and the device accommodating part of the second clothing treatment apparatus are dissembled in the clothing treatment system according to an embodiment.

[0238] The cover door **110** and the device accommodating part **120** of the second clothing treatment apparatus **60** in the clothing treatment system **1** according to an embodiment will be described with reference to referring to FIGS. **14** to **16**.

[0239] Referring to FIG. **14**, the cover door **110** may be provided to cover the front of the device accommodating part **120**. The device accommodating part **120** may be provided on the inner side of the housing opening **69** of the second housing **61**. The device accommodating part **120** may be provided at the front side of the heat exchanger **81**, **82** on the base **65**. More specifically, the device accommodating part **120** may be arranged in front of the evaporator **81** on the base **65**.

[0240] Referring to FIGS. **14** and **15**, the cover door **110** may open or close an accommodating hole **121** of the device accommodating part **120**. The cover door **110** may open or close the accommodating hole **121** by rotating relative to the device accommodating part **120**.

[0241] Referring to FIG. **15**, the cover door **110** may include a coupling protrusion **111**. The coupling protrusion **111** may protrude from an inner surface of the cover door **110**. The device accommodating part **120** may include a coupling protrusion holder **122** corresponding to the coupling protrusion **111**. The coupling protrusion **111** and the coupling protrusion holder **122** may be provided to be coupled to each other. While the coupling protrusion **111** and the coupling protrusion holder **122** are coupled, the cover door **110** may be maintained in a closed state. While the coupling protrusion **111** and the coupling protrusion holder **122** are coupled, the coupling protrusion **111** may be fixed by the coupling protrusion holder **122**. When the cover door **110** is pushed forward, the fixation of the coupling protrusion **111** and the coupling protrusion holder **122** may be released. After the fixation of the coupling protrusion **111** and the coupling protrusion holder **122** is released, the cover door **110** may be opened. The coupling protrusion **111** and the coupling protrusion holder **122** may be fixed or released by a push operation. The coupling protrusion **111** and the coupling protrusion holder **122** may be provided in various forms as long as they have a structure of being fixed and released by a push operation. Unlike FIG. **15**, the device accommodating part **120** may include a coupling protrusion, and the cover door **110** may include a coupling protrusion holder.

[0242] The cover door **110** may include a rotating shaft **112** extending in a vertical direction. The rotating shaft **112** may be provided adjacent to one end of the cover door **110**. The rotating shaft **112** may include a support part **112***b* fixed to the inner surface of the cover door **110** and a rotating part **112***a* provided to be rotatable relative to the support part **112***b*. The support parts **112***b* may be

provided on upper and lower portions of the rotating part **112***a*, respectively, to rotatably support the rotating part **112***a*. The rotating part **112***a* and the support part **112***b* may be provided in various forms as long as they have a structure that allows relative rotation.

[0243] The device accommodating part **120** may include the accommodating hole **121** into which the filter device **102** or the dehumidifying device **103** is inserted. The device accommodating part **120** may be provided in a rectangular hexahedron shape with the front and rear sides open. At least a portion of the filter device **102** or the dehumidifying device **103** may be inserted into the accommodating hole **121** and accommodated in the device accommodating part **120**.

[0244] Referring to FIG. **16**, the cover door **110** may further include a hinge link **113** connecting the rotating shaft **112** to a point outside the cover door **110**. The hinge link **113** may connect the rotating part **112***a* of the rotating shaft **112** to a point outside the cover door **110**. The hinge link **113** may extend in an approximately oval shape.

[0245] The cover door **110** may further include a link stopper **114** provided at one end of the hinge link **113**. The link stopper **114** may limit a forward movement range of the cover door **110**. The link stopper **114** may be provided so as not to pass through a link hole **123** of the device accommodating part **120**, thereby preventing the cover door **110** from being separated from the device accommodating part **120**.

[0246] The device accommodating part **120** may include a link hole **123** into which the hinge link **113** is inserted. The hinge link **113** may be inserted into the link hole **123**. The hinge link **113** may be moved within the link hole **123**. The link stopper **114** may be provided so as not to pass through the link hole **123**. A width d1 of the link hole **123** in the upper to lower direction may be provided to be larger than a width d2 of the hinge link **113** in the upper to lower direction. The width d1 of the link hole **123** in the upper to lower direction may be provided to be smaller than a width d3 of the link stopper **114** in the upper to lower direction.

[0247] According to an embodiment, the cover door **110** may include a pair of hinge links **113***a* and **113***b* and a pair of link stoppers **114***a* and **114***b*. The pair of hinge links **113***a* and **113***b* may include a first hinge link **113***a* and a second hinge link **113***b* positioned below the first hinge link **113***a*. A first link stopper **114***a* may be provided at one end of the first hinge link **113***a*, and a second link stopper **114***b* may be provided at one end of the second hinge link **113***b*.

[0248] The device accommodating part **120** may include a pair of link holes **123***a* and **123***b*. The pair of link holes **123***a* and **123***b* may include a first link hole **123***a* and a second link hole **123***b* provided below the first link hole **123***b*. The first hinge link **113***a* may be inserted into the first link hole **123***a*. The second hinge link **113***b* may be inserted into the second link hole **123***b*.

[0249] However, the number and arrangement of the hinge links, link stoppers, and link holes are not limited thereto. The hinge links, link stoppers, and link holes may be provided in one unit or in three or more units thereof.

[0250] FIG. **17** is a plan view of a state in which the cover door covers the device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment. FIG. **18** is a plan view of a state in which the cover door is rotated 90 degrees with respect to the device accommodating portion of the second clothing treatment apparatus in the clothing treatment system according to an embodiment. FIG. **19** is a plan view of a state in which the cover door is rotated 180 degrees with respect to the device accommodating portion of the second clothing treatment apparatus in the clothing treatment system according to an embodiment.

[0251] Hereinafter, an opening operation of the cover door **110** according to an embodiment will be described with reference to FIGS. **17** to **19**.

[0252] Referring to FIG. **17**, while the cover door **110** is closed, the hinge link **113** and the link stopper **114** may be located on the side of the cover door **110**. In addition, the distance from the rotating shaft **112** to the front surface of the cover door **110** in the front-rear direction may be s2.

[0253] Referring to FIG. **18**, the cover door **110** may be rotated 90 degrees with respect to the device accommodating part **120**. When the cover door **110** rotates 90 degrees with respect to the

device accommodating part **120**, the rotating part **112***a* may not rotate with respect to the support part **112***b*. That is, the cover door **110** may rotate 90 degrees with respect to the device accommodating part **120** without having a relative rotation of the rotating part **112***a* and the support part **112***b*.

[0254] As illustrated in FIG. **18**, in a state in which the cover door **110** rotates 90 degrees with respect to the device accommodating part **120**, the cover door **110** and the rotating shaft **112** may be spaced a predetermined distance forward from the device accommodating part **120**. Specifically, the rotating shaft **112** may move forward by s1 from the position of the rotating shaft **112** when the cover door **110** is closed. When the cover door **110** is moved forward of the device accommodating part **120**, the hinge link **113** may slide within the link hole **123**. As the hinge link **113** slides within the link hole **123**, the cover door **110** may move forward of the device accommodating part **120**. When the cover door **110** moves forward, the link stopper **114** is caught on the link hole **123**, which restricts the forward movement of the cover door **110**. As a result, the forward movement of the cover door **110** may be restricted, and the position of the rotating shaft **112** may be fixed.

[0255] Referring to FIG. **19**, the cover door **110** may be further opened by 90 degrees or more from a state in which the cover door **110** is rotated 90 degrees relative to the device accommodating part **120**. The cover door **110** may rotate 90 degrees or more around the rotating shaft **112** that has moved forward of the device accommodating part **120**. Through this, the cover door **110** may be rotated 180 degrees or more with respect to the device accommodating part **120**. As the cover door **110** rotates 180 degrees or more with respect to the device accommodating part **120**, the cover door **110** may be positioned on the side of the housing opening **69** when the accommodating hole **121** and the housing opening **69** are open. The cover door **110** may open the accommodating hole **121** and the housing opening **69** by moving forward of the accommodating hole **121** and the housing opening **69** and then rotating around the rotating shaft **112**.

[0256] The cover door **110** may move forward of the device accommodating part **120** and then rotate around the rotating shaft **112**. In a state in which the cover door **110** is moved forward of the device accommodating part **120**, the position of the rotating shaft **112** may be fixed. After the position of the rotating shaft **112** is fixed, the cover door **110** may rotate around the rotating shaft **112**. More specifically, when the rotating shaft **112** moves forward by s1, the rotating part **112***a* of the rotating shaft **112** may be fixed. After the rotating part **112***a* is fixed, the support part **112***b* may rotate relative to the rotating part **112***a*, allowing the cover door **110** to rotate around the rotating shaft **112**.

[0257] According to an embodiment, when the cover door **110** is open, the front surface of the cover door **110** may move forward by s1-s2 compared to when the cover door **110** is closed. Through this, the cover door **110** is open, the cover door **110** may be positioned in front of the second front frame **61***a* of the second housing **61**.

[0258] FIG. **20** illustrates a rear view of the cover door and the device accommodating part of the second clothes apparatus and a portion of the housing in the clothing treatment system according to an embodiment. FIG. **21** illustrates an enlarged view of portion A of FIG. **20**. FIG. **22** illustrates a rear view of the cover door and the device accommodating part of the second clothes apparatus and a portion of the housing in the clothing treatment system according to an embodiment. FIG. **23** illustrates an enlarged view of portion B of FIG. **22**.

[0259] Referring to FIGS. **20** and **21**, the hinge link **113** may be inserted into the link hole **123**. As described above, the width d2 of the hinge link **113** in the upper to lower direction is set smaller than the width d1 of the link hole **123** in the upper to lower direction, so that the hinge link **113** may slide within the link hole **123**. Through this, the cover door **110** may move forward of the device accommodating part **120**. In addition, the cover door **110** may be opened 90 degrees with respect to the device accommodating part **120** before rotating around the rotating shaft **112**.

[0260] Referring to FIGS. **22** and **23**, the forward movement of the cover door **110** may be restricted by the link stopper **114** of the cover door **110** being caught on the link hole **123**. In other

words, when the link stopper **114** is caught on the link hole **123**, the cover door **110** may no longer move forward.

[0261] As described above, the width d3 of the link stopper **114** in the upper to lower direction is set to be larger than the width d1 of the link hole **123** in the upper to lower direction, so that the link stopper **114** may not pass through the link hole **123** and may be caught on the link hole **123**. By the link stopper **114** being caught on the link hole **123**, the position of the rotating shaft **112** may be fixed, and after the position of the rotating shaft **112** is fixed, the cover door **110** may be further rotated 90 degrees or more around the rotating shaft **112**. Through this, the cover door **110** may be rotated 180 degrees or more with respect to the device accommodating part **120**.

[0262] FIG. **24** illustrates a state in which a cover door covers a device accommodating part of a second clothing treatment apparatus in a clothing treatment system according to an embodiment. FIG. **25** illustrates a state in which the cover door opens to expose the device accommodating part of the second clothing treatment apparatus in the clothing treatment system according to an embodiment. FIG. **26** illustrates an enlarged view of a portion of FIG. **24** viewed at a different angle. FIG. **27** illustrates an enlarged view of a portion of FIG. **25** viewed at a different angle.

[0263] Hereinafter, a cover door **210** and a device accommodating part **220** of a second clothing treatment apparatus in a clothing treatment system according to an embodiment will be described with reference to FIGS. **24** to **27**

[0264] Referring to FIGS. **24** to **27**, the cover door **210** may be provided to close or open an accommodating hole **221** of the device accommodating part **220**. The cover door **210** may be rotatably coupled to the device accommodating part **220**. The cover door **210** may be rotated approximately 180 degrees with respect to the device accommodating part **220**.

[0265] The cover door **210** may include a coupling protrusion **211** protruding from an inner surface of the cover door **210**. The device accommodating part **220** may include a coupling protrusion holder **222** corresponding to the coupling protrusion **211**. The coupling protrusion **211** may be fixed to the coupling protrusion holder **222** by being pushed toward the coupling protrusion holder **222**. The coupling protrusion **211** may be released from the coupling protrusion holder **222** by being pushed toward the coupling protrusion holder **222**.

[0266] The cover door **210** may include a link hinge **213** extending from an inner surface of the cover door **210** and a rotating shaft **212** provided at one end of the link hinge **213**.

[0267] The device accommodating part **220** may include a hinge guide **224** protruding outwardly from one side of the device accommodating part **220** and a link hole **223** formed on the one side of the device accommodating part **220**. The hinge guide **224** may include a guide hole **225** into which the rotating shaft **212** is inserted.

[0268] According to an embodiment, the link hinge **213** may extend in a substantially oval shape from the inner surface of the cover door **210**. The link hinge **213** may connect the inner surface of the cover door **210** to the rotating shaft **212**.

[0269] The rotating shaft **212** may be inserted into the guide hole **225** of the hinge guide **224**. The rotating shaft **212** may be provided to move within the guide hole **225**. The rotating shaft **212** may be provided to be movable from one end of the guide hole **225** to the other end of the guide hole **225**. The hinge guide **224** and the guide hole **225** may be provided in a shape of a portion of an approximately ellipse.

[0270] When the rotating shaft **212** moves from one end of the guide hole **225** to the other end of the guide hole **225**, the link hinge **213** may move from the outside of the device accommodating part **220** through the link hole **223** to the inside of the device accommodating part **220**. When the rotating shaft **212** moves from the other end of the guide hole **225** to the one end of the guide hole **225**, the link hinge **213** may move from the inside of the device accommodating part **220** through the link hole **223** to the outside of the device accommodating part **220**. The one end of the guide hole **225** may include a portion adjacent to the one end of the guide hole **225**, and the other end of the guide hole **225** may include a portion adjacent to the other end of the guide hole **225**.

[0271] Referring to FIGS. **26** and **27**, in a state in which the cover door **210** is closed, the rotating shaft **212** may be located at one end of the guide hole **225**. The guide hole **225** may extend along an oval shape, and the one end of the guide hole **225** may refer to a front end of the guide hole **225** or a portion adjacent to the front end of the guide hole **225**.
[0272] In a state in which the cover door **210** is open, the rotating shaft **212** may be located at the other end of the guide hole **225**. The other end of the guide hole **225** may be connected to one side surface of the device accommodating part **220**. The other end of the guide hole **225** may refer to a rear end of the guide hole **225** or a portion adjacent to the rear end of the guide hole **225**.
[0273] When the cover door **210** is opened, the rotating shaft **212** may slide along the guide hole **225**. The cover door **210** may open the accommodating hole **221** of the device accommodating part **220** by rotating around the rotating shaft **212**. According to an embodiment, the cover door **210** may be provided to be rotatable approximately 180 degrees with respect to the device accommodating part **220**.
[0274] The link hinge **213** may include a first link hinge **213***a*, a second link hinge **213***b* provided below the first link hinge **213***a*, and a third link hinge **213***c* provided below the second link hinge **213***b*. The rotating shaft **212** may be connected to the first link hinge **213***a*, the second link hinge **213***b*, and the third link hinge **213***c*, and may extend in the upper to lower direction.
[0275] The link hole **223** may include a first link hole **223***a* into which the first link hinge **213***a* is inserted, a second link hole **223***b* provided below the first link hole **223***a* and into which the second link hinge **213***b* is inserted, and a third link hole **223***c* provided below the second link hole **223***b* and into which the third link hinge **213***c* is inserted.
[0276] The hinge guide **224** may include a first hinge guide **224***a* and a second hinge guide **224***b*.
[0277] The first hinge guide **224***a* may be provided to support an upper end of the rotating shaft **212**. The first hinge guide **224***a* may include a first guide hole **225***a*. A portion adjacent to the upper end of the rotating shaft **212** may be inserted into the first guide hole **225***a*. The portion adjacent to the upper end of the rotating shaft **212** may slide along the first guide hole **225***a*.
[0278] The second hinge guide **224***b* may be provided to support a portion adjacent to a lower end of the rotating shaft **212**. The second hinge guide **224***b* may include a second guide hole **225***b*. The portion adjacent to the lower end of the rotating shaft **212** may be inserted into the second guide hole **225***b*. The portion adjacent to the lower end of the rotating shaft **212** may slide along the second guide hole **225***b*.
[0279] The first link hinge **213***a*, the second link hinge **213***b*, and the third link hinge **213***c* may be provided between the first hinge guide **224***a* and the second hinge guide **224***b*. In other words, the first link hinge **213***a*, the second link hinge **213***b*, and the third link hinge **213***c* may be provided below the first hinge guide **224***a* and above the second hinge guide **224***b*.
[0280] A clothing treatment system according to an embodiment includes a first clothing treatment apparatus **10** and a second clothing treatment apparatus **60** provided on an upper side of the first clothing treatment apparatus. The second clothing treatment apparatus includes: a housing **61**, a drum **70** rotatably provided inside the housing, a heat exchanger **81** provided inside the housing, a first opening **62** provided on a front surface of the housing to be connected to the drum, a second opening **69** provided on the front surface of the housing to allow access to the heat exchanger, and a cover door **110** including a rotating shaft **112** extending in a vertical direction and configured to open and close the second opening by rotating around the rotating shaft.
[0281] A rotation angle of the cover door may be greater than or equal to 180 degrees such that, when the second opening is open, the cover door may be positioned on a side of the second opening.
[0282] The cover door may be provided to be spaced a predetermined distance forward from the second opening when the second opening is open.
[0283] The cover door may be configured to open the second opening by moving forward of the second opening and subsequently rotating around the rotating shaft.

[0284] Upon the cover door moving forward of the second opening, the rotating shaft may be secured in position, which may allow the cover door to rotate around the rotating shaft.
[0285] The cover door may further includes a hinge link **113** connecting the rotating shaft to a point outside the cover door.
[0286] The cover door may further include a link stopper **114** provided at one end of the hinge link.
[0287] The link stopper may be configured to limit a forward movement range of the cover door.
[0288] The second clothing treatment apparatus may further include a device accommodating part **120** including a link hole **123**, into which the hinge link is inserted, and provided at an inner side of the second opening.
[0289] The link stopper may be configured to be caught on the link hole.
[0290] The forward movement of the cover door may be restricted by the link stopper being caught on the link hole.
[0291] A width of the link hole in an upper to lower direction may be d1, a width of the hinge link in the upper to lower direction may be d2, and a width of the link stopper in the upper to lower direction may be d3, and d2, d1, and d3 may satisfy d2<d1<d3.
[0292] The rotating shaft of the cover door may include a rotating part **112***a* configured to rotate relative to the cover door and a support part **112***b* configured to rotatably support the rotating part.
[0293] The hinge link may be extended in an oval shape from the rotating shaft to the point outside the cover door.
[0294] The cover door may further include a coupling protrusion **111**.
[0295] The device accommodating part may further include a coupling protrusion holder **122** configured to fix or release the coupling protrusion.
[0296] The second clothing treatment apparatus may further include a filter device **102** configured to filter out foreign substances contained in air moving from the drum to the heat exchanger and detachably coupled to the device accommodating part.
[0297] The second clothing treatment apparatus may further include a dehumidifying device **103** configured to guide air discharged from the drum to an outside of the housing and guide air from the outside of the housing to the heat exchanger, and detachably coupled to the device accommodating part.
[0298] One of the filter device and the dehumidifying device may be accommodated in the device accommodating part.
[0299] According to the concept of the present disclosure, a clothing treatment system including a first clothing treatment apparatus and/or a second clothing treatment apparatus including a cover door that is provided to be rotatable 180 degrees or more around a rotating shaft extending in a vertical direction can be provided.
[0300] According to the concept of the present disclosure, a clothing treatment system that allows a cover door of a second clothing treatment apparatus arranged above a first clothing treatment apparatus to be laterally opened and thus prevents structural interference with the first clothing treatment apparatus in response to opening of the cover door can be provided.
[0301] According to the concept of the present disclosure, a clothing treatment system capable of facilitating withdrawal and insertion of a filter device or a dehumidifying device can be provided.
[0302] According to the concept of the present disclosure, a clothing treatment system capable of reducing the number of parts and the number of processes required when coupling a first clothing treatment apparatus and a second clothing treatment apparatus and thus facilitating the coupling of the first clothing treatment apparatus and the second clothing treatment apparatus can be provided.
[0303] According to the concept of the present disclosure, a clothing treatment system provided with a reduced height and improved space utilization and usability of the second clothing treatment apparatus can be provided.
[0304] According to the concept of the present disclosure, a clothing treatment system capable of improving installability by allowing a second clothing treatment apparatus to be coupled to a first

clothing treatment apparatus in front of the first clothing treatment apparatus can be provided.
[0305] The effects of the present invention are not limited to those described above, and other effects that are not described above will be clearly understood by those skilled in the art from the above detailed description.
[0306] While the specific embodiments of the preset invention have been illustrated and described above, the present invention is not limited to the above-described embodiments and may be variously modified and made by those skilled in the art without departing from the gist of the technological sprit of the present invention defined by the appended claims.

Claims

1. A clothing treatment system comprising a first clothing treatment apparatus; and a second clothing treatment apparatus to be provided on an upper side of the first clothing treatment apparatus, wherein the second clothing treatment apparatus includes: a housing, a drum rotatable while inside the housing, a heat exchanger to be provided inside the housing, a first opening to be provided on a front surface of the housing to be connected to the drum, a second opening to be provided on the front surface of the housing to allow access to the heat exchanger, and a cover door, including a rotating shaft extending along a vertical direction of the clothing treatment system, configured to open and close the second opening that is provided on the front surface of the housing by rotating around the rotating shaft.
2. The clothing treatment system of claim 1, wherein a rotation angle of the cover door is greater than or equal to 180 degrees such that, based on the second opening being open, the cover door is positioned on a side of the second opening.
3. The clothing treatment system of claim 1, wherein the cover door is provided to be spaced a predetermined distance forward from the second opening based on the second opening being open.
4. The clothing treatment system of claim 1, wherein the cover door is configured to open the second opening by being moved forward of the second opening and subsequently being rotated around the rotating shaft.
5. The clothing treatment system of claim 4, wherein based on the cover door being moved forward of the second opening, the rotating shaft is secured in position, which allows the cover door to rotate around the rotating shaft.
6. The clothing treatment system of claim 1, wherein the cover door further includes a hinge link to connect the rotating shaft to a point outside the cover door.
7. The clothing treatment system of claim 6, wherein the cover door further includes a link stopper to be provided at one end of the hinge link, and while the link stopper is provided at the one end of the hinge link, the link stopper is configured to limit a forward movement range of the cover door.
8. The clothing treatment system of claim 7, wherein the second clothing treatment apparatus further includes a device accommodating part including a link hole, into which the hinge link is insertable, and provided at an inner side of the second opening.
9. The clothing treatment system of claim 8, wherein the link stopper is configured to be caught on the link hole, and the forward movement range of the cover door is restricted by the link stopper being caught on the link hole.
10. The clothing treatment system of claim 8, wherein a width of the link hole along an upper to lower direction is d1, a width of the hinge link along the upper to lower direction is d2, and a width of the link stopper along the upper to lower direction is d3, and d2, d1, and d3 satisfy $d2<d1<d3$.
11. The clothing treatment system of claim 1, wherein the rotating shaft of the cover door includes a rotating part configured to rotate relative to the cover door and a support part, which is rotatable, and configured to support the rotating part.
12. The clothing treatment system of claim 6, wherein the hinge link is in an oval shape and extends from the rotating shaft to the point outside the cover door.

13. The clothing treatment system of claim 8, wherein the cover door further includes a coupling protrusion, and the device accommodating part further includes a coupling protrusion holder configured to fix or release the coupling protrusion.

14. The clothing treatment system of claim 8, wherein the second clothing treatment apparatus further includes: a filter device configured to filter out foreign substances from air moving from the drum to the heat exchanger, the filter device being coupleable to and decoupleable from the device accommodating part, and a dehumidifying device configured to guide air discharged from the drum to an outside of the housing and guide air from the outside of the housing to the heat exchanger, and the dehumidifying device being coupleable to and decoupleable from the device accommodating part.

15. The clothing treatment system of claim 14, wherein one of the filter device and the dehumidifying device is accommodated in the device accommodating part.