(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 481 103 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.12.2024 Bulletin 2024/52

(21) Application number: **23756614.6**

(22) Date of filing: **15.02.2023**

(51) International Patent Classification (IPC):
D06F 58/22 *(2006.01)* ***D06F 58/08*** *(2006.01)*
D06F 58/20 *(2006.01)* ***D06F 58/24*** *(2006.01)*
D06F 58/26 *(2006.01)* ***D06F 58/34*** *(2020.01)*
D06F 34/14 *(2020.01)*

(52) Cooperative Patent Classification (CPC):
D06F 34/14; D06F 58/08; D06F 58/20; D06F 58/22; D06F 58/24; D06F 58/26; D06F 58/34

(86) International application number:
PCT/KR2023/002177

(87) International publication number:
WO 2023/158202 (24.08.2023 Gazette 2023/34)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **18.02.2022 KR 20220021395**

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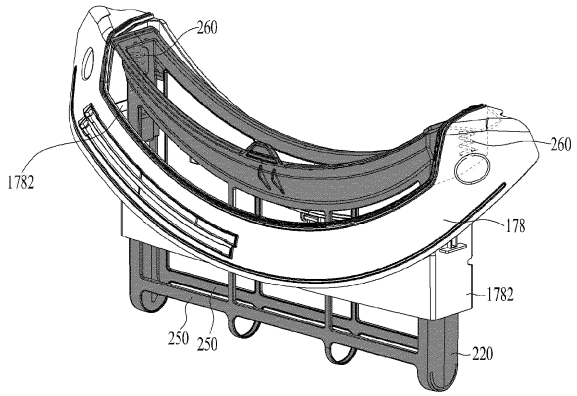
(54) CLOTHING PROCESSING APPARATUS

(57) The present invention relates to a clothing processing apparatus capable of drying clothes, the clothing processing apparatus comprising a plurality of filters which remove foreign matter from air circulating in the clothing processing apparatus, wherein the clothing processing apparatus can physically induce the plurality of filters to be coupled simultaneously or all together.

【FIG 7】



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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a clothing processing apparatus , and more particularly to a clothing processing apparatus including a filter cartridge configured to remove foreign substances from air.

BACKGROUND ART

[0002] Recently, a clothing processing apparatus designed to perform a drying procedure capable of removing moisture from laundry has been suggested. The conventional clothing processing apparatus is configured to supply hot air to a drum receiving laundry therein to dry the laundry, thereby not only remarkably reducing time required to dry the laundry but also performing disinfection and sterilization of the laundry.

[0003] The conventional clothing processing apparatus may use an electrical heater in order to supply hot air to the drum. Accordingly, it is possible to create hot air by installing a heater at a duct communicating with the drum to heat the air introduced into the drum.

[0004] Recently, a clothing processing apparatus designed to heat air introduced into a drum using a heat pump system has been suggested. The clothing processing apparatus is able to create dry and hot air by cooling air discharged from laundry to condense moisture using an evaporator and by heating the air again using a condenser.

[0005] The clothing processing apparatus equipped with the heat pump system has advantages of having higher energy efficiency than a clothing processing apparatus equipped with an electrical heater, of being simplified in installation, and of being easier to repair and replace.

[0006] However, the conventional clothing processing apparatus develops a problem in that air discharged from laundry directly collides with an evaporator and thus foreign substances such as lint adhere to the evaporator. Accordingly, there is a problem in that the foreign substances adhering to the evaporator hinder heat exchange between cool refrigerant flowing through the evaporator and the air discharged from the drum, thereby deteriorating drying efficiency.

[0007] Particularly, when foreign substances remaining in the evaporator are decomposed by bacteria or the like, there is a problem in that the laundry received in the drum is also contaminated.

[0008] In order to prevent this problem, a clothing processing apparatus equipped with a filter portion configured to filter foreign substances such as lint or dust which may be introduced into the evaporator has been suggested (see Korea Unexamined Patent Publication No. 10-2017-0009657).

[0009] The clothing processing apparatus is provided with a filter portion detachably mounted thereon, thereby filtering foreign substances and enabling a user to separate the filter portion and remove foreign substances collected in the filter portion.

[0010] The filter portion may be embodied as double filters configured to filter foreign substances having different sizes in order to improve foreign substance removal ability. The double filters are able to filter lint or dust having different sizes.

[0011] In the case of double type filter portion, the inner filter should be mounted after the outer filter is mounted. However, the conventional clothing processing apparatus has the high possibility that the clothing processing apparatus is used in the state of only the outer filter or the inner filter being mounted due to user's carelessness.

[0012] Particularly, because the outer filter is mounted on the mounting portion, which is formed at the introduction port so as to have a stepped shape, so as not be exposed to the outside, there are many cases in which a user uses the clothing processing apparatus in the state in which only the inner filter is mounted on the mounting portion.

[0013] Consequently, there is a problem in that fine lint and dust having passed through the inner filter cannot be filtered by the outer filter and lint and dust generated from laundry is introduced into the drum receiving laundry therein or accumulates in a heat exchanger.

[0014] In order to solve this problem, a clothing processing apparatus designed to be operated only when both the outer filter and the inner filter are mounted together has been suggested (Korea Unexamined Patent Publication No. 10-2021-0128702).

[0015] The clothing processing apparatus is constructed such that a magnet is installed at the filter portion and a sensor such as a Hall sensor configured to sense the magnet is installed at the mounting portion. Accordingly, the clothing processing apparatus can be operated only when the sensor senses the magnet of the filter portion, thereby inducing a user to couple the filter portion to the mounting portion.

[0016] However, because the clothing processing apparatus is constructed such that the inner filter and the outer filter are respectively provided with magnets and the sensor must sense all of the two magnets or the state of the two magnets overlapping each other, there is a problem in that it is difficult to exactly determine whether the inner filter and the outer filter are mounted.

[0017] Accordingly, when one of the magnets is disposed at the same level as the sensor in the case in which only the inner filter is mounted or only the outer filter is mounted, there is a problem in that the clothing processing apparatus is operated because the sensor wrongly determines that all of the magnets disposed at the inner filter and the outer filter are positioned.

[0018] Furthermore, when the magnet provided at the inner filter does not exactly overlap the magnet provided at the outer filter due to tolerance in installation, there is a problem in that the clothing processing apparatus is not operated because the sensor cannot sense sufficient

magnetic force even when both the inner filter and the outer filter are installed.

[0019] In other words, in the case in which a plurality of magnets are used as in the conventional clothing processing apparatus , there is a problem in that reliability of the sensor is not normally assured because resolution of the sensor is lowered.

[0020] Furthermore, the conventional clothing processing apparatus also proposes a configuration in which a cantilever-type magnet is provided in the outer filter and the inner filter pushes out the cantilever-type magnet such that the sensor determines mounting of the two filters by sensing only the one magnet.

[0021] However, in the case in which the cantilever is bent due to the weight of the magnet or is bent toward the sensor at a certain angle due to temporary vibration even when the inner filter is not mounted to the outer filter, there is a problem in that the sensor senses the magnet of the bent cantilever, thus incorrectly determining that the inner filter is mounted.

[0022] Furthermore, there is a problem in that the cantilever interferes with introduction and retraction of the inner filter or breaks.

[0023] As a result, the conventional clothing processing apparatus determines whether both the inner filter and the outer filter are mounted, not in a physical manner but in an electronic control manner using the sensor and the magnet, there is a problem in that it is impossible to assure reliability.

DISCLOSURE

TECHNICAL TASK

[0024] An object to be solved according to the present disclosure is to provide a clothing processing apparatus capable of determining whether both an outer filter and an inner filter are coupled, in a physical manner.

[0025] An object to be solved according to the present disclosure is to provide a clothing processing apparatus which enables a user to determine whether the outer filter or the inner filter is not coupled, in a physical manner.

[0026] An object to be solved according to the present disclosure is to provide a clothing processing apparatus which makes it impossible for the outer filter or the inner filter alone to be mounted.

[0027] An object to be solved according to the present disclosure is to provide a clothing processing apparatus which, even when a magnet is installed at the outer filter or the inner filter, prevents the magnet or a component supporting the magnet from interfering movement of the outer filter or from being moved to the sensor by the weight thereof.

TECHNICAL SOLUTIONS

[0028] In order to solve above-mentioned objects, the present disclosure provides a clothing processing apparatus including a double type filter portion. The double type filter portion may be constructed such that one of the two filters cannot be completely mounted until the other of the two filters is mounted. In other words, in order to complete mounting of all of the filters, all of the filters should be disposed.

[0029] For example, the filter portion may include an outer filter which is seated on a mounting portion so as to remove foreign substances introduced into a circulation duct, and an inner filter mounted on the mounting such that at least a portion of the inner filter is received in the outer filter. The outer filter may be separable at at least partially from the mounting portion until the inner filter is mounted on the mounting portion.

[0030] Specifically, operation of the clothing processing apparatus may be blocked while mounting of the outer filter is not completed. For example, the clothing processing apparatus according to the present disclosure may include a signal generator coupled to the filter portion so as to generate an external signal, a sensor provided at the mounting portion so as to sense the signal generator, and a controller configured to permit operation of at least one of the heat supply portion or the driving portion when the sensor senses the signal generator, and the signal generator may be installed at the outer filter.

[0031] The outer filter may include an elastic portion configured to separate the outer filter when the outer filter alone is mounted. Accordingly, the outer filter may not be completely mounted when the inner filter is not mounted.

[0032] Specifically, the outer filter may include a seating body seated on the mounting portion, and an insertion body which extends from the seating body to be inserted at at least a portion thereof into the mounting portion and at which a mesh member is installed, and the seating body may include an elastic portion.

[0033] The elastic portion may be configured to cause the seating body to be taken out of the mounting portion, thereby preventing the door from closing the opening.

[0034] To this end, the seating body may be capable of projecting to an inside of the introduction port by means of the elastic portion. The seating body may include a seating portion which extends outwards from the insertion body and is seated on an upper surface of the mounting portion, and the elastic portion may be coupled to a lower surface of the seating portion so as to come into contact with the upper surface of the mounting portion.

[0035] The inner filter may include a coupler configured to fix the outer filter to the mounting portion to prevent separation of the outer filter.

[0036] For example, the inner filter may include a support body seated on the seating body and pressing the elastic portion, and a reception body which extends from the support body and at which a mesh member is installed, at least a portion of the reception body being inserted into the outer filter, and the coupler may fix the support body to the mounting portion and maintain the pressed state of the elastic portion.

[0037] The mounting portion may include a mounting

groove which is formed through an inner circumferential surface of the introduction port and by which the filter portion is supported, and a mounting body which extends to the circulation duct from the mounting groove and which receive the filter portion, the sensor being installed on an outer circumferential surface of the mounting body, and the coupler may include a coupling hook which projects from a lateral surface of the support body and is detachably coupled to an inner surface of the mounting groove.

[0038] Specifically, the coupler may include a coupling rib which is provided at the support body so as to be reciprocated to the inner surface of the mounting groove, and the coupling hook may be formed at a distal end of the coupling rib.

[0039] The coupler may include a plurality of coupling ribs which are reciprocated to the inner surface of the mounting groove from two lateral surfaces of the support body, and an elastic member provided between the plurality of coupling ribs so as to push the plurality of ribs toward the two lateral surfaces of the support body, and the coupling hook may be formed at a distal end of each of the plurality of coupling ribs.

[0040] Each of the plurality of coupling ribs may include a push portion to which the elastic member is coupled, and an extension rib which extends toward a corresponding one of the two lateral surfaces of the support body and the distal end of which is provided with the coupling hook, and the support body may include a guide case which receives the elastic member at an upper surface thereof and which exposes the push portions through two lateral sides thereof.

[0041] The plurality of coupling ribs may be spaced apart from each other by a distance corresponding to a distance the coupling hooks in the guide case are separated from the mounting groove.

[0042] The support body may include movement rails which extend in a width direction thereof and guide the plurality of coupling ribs.

[0043] The sensor may be disposed at a position corresponding to the signal generator when the coupler fixes the support body to the mounting portion.

[0044] In order to solve the above-mentioned objects, one of the outer filter and the inner filter may be completely mounted on the mounting portion when the other of the outer filter and the inner filter is mounted on the mounting portion.

[0045] The inner filter may be shakable and thus not be fixed when the inner filter alone is mounted on the mounting portion.

[0046] The inner filter may include a support body seated on an upper surface of the outer filter, and a reception body which extends from the support body and at least a portion of which is inserted into the outer filter or the mounting portion, and the support body may be shakable on an upper surface of the mounting portion when the support body is mounted on the mounting portion.

[0047] The outer filter may receive the inner filter therein and fix the inner filter.

[0048] The outer filter may include a seating body seated on the mounting portion without shaking, and an insertion body which extends from the seating body and is seated on the mounting portion and which receives the reception body, and at least a portion of an inner surface of the insertion body may contact and support an outer surface of the reception body.

[0049] The outer filter may be removeable from the mounting portion when the inner filter is not mounted on the mounting portion.

[0050] The inner filter may be fixed to the mounting portion in a state of pressing the outer filter.

[0051] In order to solve the above-mentioned objects, the clothing processing apparatus according to the present disclosure may be constructed such that the signal generator is reciprocatedalong one surface of one of the mounting portion, the outer filter and the inner filter.

[0052] The signal generator may be moved toward the sensor when the outer filter or the inner filter is seated on the mounting portion.

[0053] The signal generator may be provided on an inner circumferential surface of the mounting portion, and may be moved in an up-and-down direction toward the sensor by the outer filter.

[0054] The signal generator may be provided on an inner surface of the outer filter so as to be moved downwards by the inner filter.

[0055] The inner filter may include an upper protrusion which projects from an outer surface thereof and which pushes the signal generator downwards.

[0056] The signal generator may be provided on an outer surface of the inner filter so as to be moved upwards by the outer filter.

[0057] The outer filter may include a lower protrusion which projects from an inner surface thereof and which pushes the signal generator upwards.

[0058] The signal generator may include a magnet interacting with the sensor, a guide rail installed at an inner surface of the mounting portion, the outer filter, and the inner filter, and a restoring portion installed at the guide rail so as to push the magnet upwards or downwards.

ADVANTAGEOUS EFFECTS

[0059] The present disclosure has an effect of being capable of accurately sensing or determining whether both the outer filter and the inner filter are mounted.

[0060] The present disclosure has an effect of being capable of determining whether both the outer filter and the inner filter are coupled, in a physical manner.

[0061] The present disclosure has an effect of being capable of determining whether the outer filter or the inner filter is not coupled, in a physical manner.

[0062] The present disclosure has an effect of inducing a user to mount both the outer filter and the inner filter.

[0063] The present disclosure has an effect of assuring reliability and durability even when movement of the magnet and the sensor configured to sense the movement are utilized.

DESCRIPTION OF DRAWINGS

[0064]

FIG. 1 illustrates a structure of a filter of a conventional clothing processing apparatus ;
FIG. 2 illustrates the appearance of the clothing processing apparatus according to an embodiment of the present disclosure;
FIG. 3 illustrates the internal structure of the clothing processing apparatus according to the present disclosure;
FIG. 4 illustrates the state in which a filter portion according to an embodiment of the present disclosure is mounted;
FIG. 5 illustrates the state in which the filter portion is taken out;
FIG. 6 illustrates the detailed structure of the filter portion 10;
FIG. 7 illustrates an embodiment in which both an outer filter 200 and an inner filter 100 are capable of being mounted on a mounting portion 178;
FIG. 8 illustrates the detailed structure of the outer filter 200;
FIG. 9 illustrates an embodiment in which an elastic portion 260 is compressed;
FIG. 10 illustrates the state in which the inner filter 100 and the outer filter 200 are seated;
FIG. 11 illustrates a detailed embodiment of a coupler 160;
FIG. 12 illustrates operation of a coupling rib;
FIG. 13 illustrates an embodiment of a signal generator and a sensor of the laundry treatment according to the present disclosure;
FIG. 14 illustrates operation of the signal generator and the sensor which are shown in FIG. 13;
FIG. 15 illustrates another embodiment of the signal generator and the sensor;
FIG. 16 illustrates a structure in which the inner filter 100 shown in FIG. 15 moves the magnet 320 downwards;
FIG. 17 illustrates a further embodiment of the signal generator and the sensor; and
FIG. 18 illustrates a structure in which the outer filter 200 shown in FIG. 17 moves the magnet 320 upwards.

BEST MODE FOR DISCLOSURE

[0065] Hereinafter, embodiments disclosed in this specification will be described in detail with reference to the accompanying drawings. In this specification, the same or equivalent components may be denoted by the same reference numbers even in different drawings, and a description thereof will not be repeated. Singular forms as used herein are intended to include plural forms as well, unless the context clearly indicates otherwise. Furthermore, in the following description of embodiments disclosed herein, if it is decided that a detailed description of known functions or configurations related to the present disclosure would make the subject matter of the present disclosure unclear, such detailed description is omitted. The accompanying drawings are used merely to assist in easy understanding of various technical features, and it should be understood that the technical idea presented in this specification should not be construed as being limited by the accompanying drawings.

[0066] Hereinafter, a clothing processing apparatus according to an embodiment of the present disclosure will be described in detail with reference to the accompanying drawings.

[0067] FIG. 2 illustrates the appearance of the clothing processing apparatus according to the embodiment of the present disclosure.

[0068] The clothing processing apparatus according to the present disclosure includes a cabinet 1, a drum 2 which is rotatably provided in the cabinet and provides a space configured to store laundry therein, a circulation duct 3 defining a flow channel configured to supply the air, discharged from the drum 2, back to the drum 2, and a heat exchanger portion 4 configured to dehumidify and heat the air into the circulation duct 3 and to supply the dehumidified air to the drum 2.

[0069] The cabinet 1 may include a front panel 11 defining the front surface of the clothing processing apparatus . The front panel 11 may be provided with an opening 111 communicating with the drum 2 and a door 112 rotatably coupled to the cabinet so as to open and close the opening 111.

[0070] The front panel 11 may be provided with a control panel 117. The control panel 117 may be provided with an input portion 118, through which control commands are input from a user, and a display portion 119 to which information, such as control commands which are selectable by the user, is output.

[0071] The control panel 117 may further include a controller or may be connected to the controller. The controller may control the input portion 118 and the display portion 119 or may control all electronic components such as a driving portion, the heat exchanger portion, a washer 6 and a sensor 400 which will be described later.

[0072] The controller may generate a command for activating the clothing processing apparatus . For example, the controller may control at least one of the driving portion or the heat exchanger portion to enable the clothing processing apparatus to perform a drying procedure configured to remove moisture from the laundry.

[0073] The input portion 118 may include a power supply request portion configured to request supply of power, a course input portion configured to enable a user to select a desired course among a plurality of courses,

and an execution request portion configured to request initiation of the course selected by the user.

[0074] A command for operating the clothing processing apparatus may be input through the input portion 118, and may be transmitted to the controller. The controller may control various electronic components of the clothing processing apparatus in response to the command.

[0075] The display portion 119 may include one of a display panel capable of outputting text and graphics and a speaker capable of outputting voice signals and sound.

[0076] FIG. 3 illustrates the internal structure of the clothing processing apparatus according to the present disclosure.

[0077] The clothing processing apparatus 100 according to the present disclosure includes a cabinet 1, a drum 2 which is rotatably provided in the cabinet and provides a space configured to store laundry therein, a circulation duct 3 defining a flow channel configured to supply the air, discharged from the drum 2, back to the drum 2, and a heat exchanger portion 4 configured to dehumidify and heat the air into the circulation duct 3 and to supply the dehumidified air to the drum 2.

[0078] When the drum 2 includes a drum body 21 having the form of a circular cylinder which is open at the front and rear surfaces thereof, the cabinet 1 may be provided therein with a first support 17 configured to rotatably support the front surface of the drum 2 and a second support 19 configured to rotatably support the rear surface of the drum 2.

[0079] The first support 17 may include a first fixed body 171 which is fixed in the cabinet 1, and an introduction port 173 which is formed through the first fixed body so as to allow the opening 111 to communicate with the inside of the drum body 21.

[0080] The first support 17 may further include a first support body 175 which is provided at the first fixed body 171 and is inserted into the front side of the drum body 21.

[0081] The first fixed body 171 may be formed to have any shape as long as it includes the introduction port 173 and the first support body 175. The first support body 175 may be formed to have the form of a pipe which projects toward the drum body 21 from the first fixed body 171. The diameter of the first support body 175 may be set to be larger than the diameter of the introduction port 173 but smaller than the diameter of the front surface of the drum body 21. Here, the introduction port 173 may be positioned in the space defined by the first support body 175.

[0082] The first support 17 may further include a connecting body 177 connecting the opening 111 to the introduction port 173. The connecting body 177 may be formed to have the form of a pipe which extends toward the opening 111 from the introduction port 173. The connecting body 177 may be provided with a mounting portion 178 communicating with the circulation duct 3. The mounting portion 178 may be a passage which allows the air in the drum body 21 to flow to the circulation duct 3, and may be formed through the connecting body 177.

[0083] The mounting portion 178 may be constructed so as to allow the introduction port 173 to communicate with the circulation duct 3, and may be formed to have the form of a duct which is depressed at one end thereof from the introduction port 173.

[0084] The mounting portion 178 may be constructed so as to allow the air to be introduced thereinto from the drum 2. The introduced air may flow to the circulation duct 3 through the mounting portion 178.

[0085] The second support 19 may include a second fixed body 191 fixed in the cabinet 1, and a second support body 195 which is provided at the second fixed body 191 and is inserted into the rear surface (a second open surface) of the drum body 21. The second support 19 may be provided with an air inflow hole 198 which is formed through the second fixed body 191 so as to allow the inside of the drum body 21 to communicate with the inside of the cabinet 1. Here, the circulation duct 3 may connect the mounting portion 178 to the air inflow hole 198.

[0086] The circular cylindrical drum body 21, which is hollow, may be rotated by means of the driving portion having various forms. FIG. 3 illustrates an example in which the driving portion 28 includes a motor 23 fixed in the cabinet 1, a pulley 25 which is rotatable by means of the motor, and a belt 27 connecting the circumferential surface of the pulley 25 to the circumferential surface of the drum body 21.

[0087] The first support 17 may be provided with a first roller 179 configured to rotatably support the circumferential surface of the drum body 21, and the second support 19 may be provided with a second roller 199 configured to rotatably support the circumferential surface of the drum body.

[0088] The circulation duct 3 may include an exhaust duct 31 connected to the mounting portion 178, a supply duct 33 connected the air inflow hole 198, and a connecting duct 35 connecting the exhaust duct to the supply duct.

[0089] The heat exchanger portion 4 may be embodied as any of various devices capable of sequentially performing dehumidification and heating of the air introduced into the circulation duct 3. For example, the heat exchanger portion 4 may be embodied as a heat pump system.

[0090] The heat exchanger portion 4 may include a fan 49 configured to move air through the circulation duct 3, a first heat exchanger (a heat adsorber) 41 configured to remove moisture from the air introduced into the circulation duct 3, and a second heat exchanger (a heat radiator) 43 which is provided in the circulation duct 3 so as to heat the air having passed through the first heat exchanger 41.

[0091] The fan 49 may include an impeller 491 provided in the circulation duct 3 and an impeller motor 493 configured to rotate the impeller 491 (see FIG. 4). The impeller 491 may be provided at any of the exhaust duct

31, the connecting duct 35 and the supply duct 33. FIG. 3 illustrates an example in which the impeller 491 is provided at the supply duct 33 (an example in which the impeller 491 is positioned behind the heat radiator).

[0092] The evaporator 41 may be composed of a plurality of metal plates which are arranged in the width direction (the Y-axis direction) or the height direction (the Z-axis direction) of the connecting duct 35, and the condenser 43 may be composed of a plurality of metal plates which are arranged in the width direction or the height direction of the connecting duct. The evaporator 41 and the condenser 43 may be sequentially arranged in a direction of the supply duct 33 from the exhaust duct 31 in the connecting duct 35, and may be connected to each other via a refrigerant pipe 48 defining a circulation channel for refrigerant.

[0093] The refrigerant may be moved along the refrigerant pipe 48 by means of a compressor 45 positioned outside the circulation duct 3. The refrigerant pipe 48 may be provided with a pressure regulator 47 configured to regulate the pressure of the refrigerant having passed through the condenser 43.

[0094] The evaporator 41 is a device configured to transmit the heat of the air introduced into the exhaust duct 31 to the refrigerant to cool the air while evaporating the refrigerant. The condenser 43 is a device configured to transmit the heat of the refrigerant having passed through the compressor 45 to the air to heat the air while condensing the refrigerant. Here, the moisture contained in the air may be collected on the bottom surface of the connecting duct 35 along the surface of the evaporator 41 while passing through the evaporator 41.

[0095] In order to collect the water removed from the air which passes through the evaporator 41, the clothing processing apparatus 100 may be provided with a water collector.

[0096] The water collected in the water collector may be collected in a reservoir 7 so as to be discharged at a time later. The reservoir 7 may include a storage body 72 which is detachably provided at the cabinet 1 so as to provide a space configured to store water therein, and an inflow hole 722 which is formed through the storage body 72 so as to allow the water discharged from a reservoir supply pipe 633 to be introduced into the storage body 72.

[0097] The storage body 72 may be embodied as a drawer-type tank which is drawn out of the cabinet 1. Here, the front panel 11 of the cabinet must be provided with a reservoir mounting groove into which the storage body 72 is inserted. A panel 71 may be fixed to the front surface of the storage body 72. The panel 71 may be detachably coupled to the reservoir mounting groove so as to form a portion of the front panel 11.

[0098] The panel 71 may further be provided with a groove 711 into which a user hand is inserted. Here, the panel 71 may also serve as a handle which enables the storage body 72 to be drawn out of or inserted into the cabinet.

[0099] The inflow hole 722 may be configured to receive the water discharged from a nozzle 722a fixed to the cabinet 1. The nozzle 722a may be fixed to an upper panel 13 of the cabinet such that the nozzle 722a is positioned above the inflow hole 722 when the storage body 72 is inserted into the cabinet 1.

[0100] The reservoir 7, which has the above-mentioned configuration, may be constructed such that the water contained in the storage body 72 can be discarded by drawing the storage body 72 out of the cabinet 1 and then turning or tilting the storage body 72 such that the inflow hole 722 is positioned at a lower level. In order to allow the water contained in the storage body 72 to be easily discharged through the inflow hole 722, the storage body 72 may further include a communication hole 721 formed through the upper surface of the storage body 72.

[0101] The heat exchanger portion 4 may be configured to condense the moisture in the air circulated in the evaporator 41. Accordingly, because the moisture is removed in the evaporator 41 even when the air is circulated in the drum 2, it is possible to continually dry the laundry in the drum 2.

[0102] The moisture condensed in the evaporator 41 may be first collected in the water collector 37 and then be secondly collected in the reservoir 7. The water collector 37 may be positioned in the connecting duct 35, and may be separately provided in a space isolated from the connecting duct 35.

[0103] In order to minimize accumulation of foreign substances (such as lint), discharged from the drum body 21, in the evaporator 41 and the condenser 43, the clothing processing apparatus 100 may further include at least one of a filter portion or a second filter portion which filter the air.

[0104] The filter portion 10 may be embodied as a device configured to filter the air introduced into the exhaust duct 31 from the drum body 21, and the second filter portion 5 may be embodied as a device which is positioned between the filter portion 10 and the evaporator 41 so as to filter the air having passed through a second filter. The diameter of filtering holes formed in the filter portion 5 may be set to be smaller than the diameter of filtering holes formed in the filter portion 10.

[0105] The filter portion 10 may be detachably inserted into the exhaust duct 31 through the mounting portion 178.

[0106] The second filter portion 5 may be detachably provided at the connecting duct 35. Here, the front panel 11 of the cabinet may be provided with a drawing hole 113 (see FIG. 3) through which the second filter portion 5 is drawn out, and a drawing hole door 114 configured to open and close the drawing hole, and the circulation duct 3 may be provided with a duct through hole through which the second filter portion 5 is inserted. Accordingly, a user can separate the second filter portion 5 from the clothing processing apparatus and then can remove foreign substances remaining in the second filter portion 5 and wash a first filter.

[0107] The second filter portion 5 may include second filter portion bodies 51, 53, 57 and 58 which are inserted into the drawing hole 113 and the duct through hole 34 and are positioned between the filter portion 10 and the evaporator 41, and second filter portion members 531, 551 and 571 which are provided at the second filter portion bodies so as to filter fluid (air and water) which flows to the evaporator 41 and a water collector body 371.

[0108] Each of the second filter portion bodies may have various forms depending on the shape of the connecting duct 35 in cross-section (Y-Z plane and X-Z plane)

[0109] Here, the second filter portion body may include a front surface 51 which is constructed so as to close the duct through hole 34, a rear surface 53 positioned between the front surface and the evaporator 41, a bottom surface connecting the front surface to the rear surface, and a first lateral surface 57 and a second lateral surface 58 which define left and right surfaces of the second filter portion body.

[0110] The front surface 51 may be provided with a lock 513 which is detachably coupled to a lock fastener 16 provided at the cabinet. The lock 513 may be embodied as a bar which is rotatably coupled to the front surface 51 of the second filter portion body, and the lock fastener 16 may be formed to have a groove in which the free end of the bar is received.

[0111] The lock 513 is preferably composed of a pair of locks which are provided at two opposite sides of the front surface 51, and the lock fastener 16 is preferably composed of a pair of lock fasteners which are provided at two opposite sides of the filter mounting groove 113.

[0112] In order to allow the second filter portion body to be easily inserted into of separated from the connecting duct 35, the front surface 51 may further be provided with a handle 511.

[0113] The rear surface 53 and the bottom surface 55 may be respectively provided with a first filter member 531 and a second filter member 551 which filter the fluid (air and water) introduced into the second filter portion body. The rear surface 53 may be provided with a rear surface through hole which allows the inside of the second filter portion body to communicate with the internal space in the circulation duct 3. The first filter member 531 may be provided in the rear surface through hole. The bottom surface 55 may be provided with a bottom surface through hole which allows the inside of the second filter portion body to communicate with the internal space in the circulation duct 3. The second filter member 551 may be provided in the bottom surface through hole. Consequently, the first filter member 531 may be a device configured to filter the fluid (air and water) supplied to the evaporator 41, and the second filter member 551 may be a device configured to filter the fluid supplied to the water collector body 371

[0114] The first lateral surface 57 and the second lateral surface 58 may connect the front surface 51, the rear surface 53 and the bottom surface 55 to one another.

[0115] The second filter portion 5, which is constructed as described above, may communicate with the exhaust duct 31 through the upper surface of the second filter portion body or the second lateral surface 58.

[0116] The second filter portion 5 may be connected to the exhaust duct 31 through an upper surface through hole formed through the upper surface of the second filter portion body and a lateral surface through hole formed through the second lateral surface 58.

[0117] The first filter member 531 may be inclined to an angle ranging from 90 to 100 degrees toward the front surface of the evaporator based on the bottom surface 55 of the second filter portion body. The reason for this is to allow foreign substances remaining in the first filter member to easily move to the bottom surface 55 when water is sprayed to the first filter member 531 through a moving portion 6 which will be described later.

[0118] The second filter member 551 may be inclined downwards at an angle ranging from 10 to 20 degrees towards the first filter member 531 from the front surface 51 (the second filter member may be inclined upwards by an angle ranging from 10 to 20 degrees toward the drawing hole from the lower end of the first filter member). When the second filter member 551 is inclined downwards toward the first filter member 531, the connecting point between the first filter member 531 and the second filter member 551 becomes the lowermost point in the space defined by the first filter member, with the result that foreign substances in the second filter portion 5 may concentrate on the connecting point between the first filter member 531 and the second filter member 551. When the foreign substances concentrate on the connecting point between the first filter member 531 and the second filter member 551, a user can more easily remove the foreign substances in the second filter portion 5.

[0119] However, when the foreign substances concentrate on the connecting point between the first filter member 531 and the second filter member 551, there may be a case in which a long period of time is taken to discharge the water sprayed through the moving portion 6 to the water collector body 371. In order to solve the problem, the first lateral surface 57 may further be provided with a bypass hole, which allows the inside of the second filter portion 5 to communicate with water collector body 371, and a third filter member 571 provided at the bypass hole.

[0120] The bypass hole and the third filter member 571 may be positioned higher than the highest end of the second filter member 551 but lower than the lowest end of the first filter member 531. Consequently, the clothing processing apparatus is able to minimize a phenomenon in which the water sprayed to the second filter portion 5 is not collected to the water collector body 371 due to the foreign substances remaining in the second filter portion 5.

[0121] The clothing processing apparatus 100 may include the moving portion 6 configured to utilize the water stored in the water collector body 371, and a

discharger 900 which is coupled to the moving portion 6 so as to receive the water to wash the evaporator 41 of the first filter 5.

[0122] The water stored in the water collector body 371 may be separately collected in the reservoir 7, and may be selectively moved to the moving portion 6.

[0123] The moving portion 6 may be embodied as a device configured to spray the water stored in the water collector body 371 to wash at least one of the second filter portion 5 or the evaporator 41.

[0124] The moving portion 6 may be provided at the circulation duct 3 so as to supply water the discharger 900 configured to supply water to the second filter portion 5 or the evaporator 41. The moving portion 6 may include a wash pump 61 configured to move the water stored in the water collector body 371 to the discharger 900.

[0125] The wash pump 61 may be connected to the water collector body 371 via a first connecting pipe 611 and to the discharger 65 via a second connecting pipe 613. When the clothing processing apparatus is constructed such that the water in the water collector body 371 is moved to the discharger 65 and the reservoir 7 by means of only one wash pump 61, the clothing processing apparatus 100 may further include a channel converter 63. In this case, the channel converter 63 may be connected to the wash pump 61 via the second connecting pipe 613, the discharger 65 may be connected to the channel converter 63 via a sprayer supply pipe 631, and the reservoir 7 may be connected to the channel converter 63 via a reservoir supply pipe 633.

[0126] Here, the reservoir supply pipe 633 should be configured to connect the nozzle 722a to the channel converter 63.

[0127] The channel converter 63 may include a valve configured to control opening and closing of the sprayer supply pipe 631 and the reservoir supply pipe 633. Accordingly, because the clothing processing apparatus 100 includes the valve provided at the channel converter 63, it is possible to supply the water stored in the water collector body 371 to the discharger 65 or the reservoir 7.

[0128] The sprayer supply pipe 631 may be coupled to the connecting duct 35, specifically to one surface of the connecting duct 35 corresponding to the upper surface of the evaporator 41. Consequently, the water supplied to the sprayer supply pipe 631 may be discharged to the evaporator 41 of the first filter 5, thereby removing foreign substances from the evaporator 41 or the second filter portion 5.

[0129] The moving portion 6 may receive not only the water condensed in the evaporator 41 but also fresh water from a water supply 300. In this case, a pipe directly connecting the water supply 300 to the moving portion 6 may be provided. For example, an additional pipe connecting a steamer 200 to the moving portion 6.

[0130] The clothing processing apparatus 100 may include a dryness sensor to determine dryness of laundry and thus to determine the halting time of operation of the heat exchanger portion 4. The dryness sensor may be embodied as at least one of an electrode sensor, which comes into contact with laundry to measure an amount of moisture contained in laundry, or a humidity sensor configured to measure humidity of the air introduced into the circulation duct 3 from the drum 2.

[0131] The clothing processing apparatus 100 is able to determine dryness of laundry by observing electrical resistance measured when the electrode sensor is connected to the laundry. Because an amount of moisture contained in the air introduced into the circulation duct 3 decreases as dryness of laundry increases, the clothing processing apparatus 100 is able to determine dryness of the laundry by observing humidity of the air introduced into the circulation duct 3 via the humidity sensor

[0132] The drum body 21 may further include a drum rear surface which is coupled to the rear surface of the drum body so as to close the rear surface, and the driving portion may be coupled to the drum rear surface so as to directly rotate the drum body 21. Here, the driving portion may be coupled to the second support 19 and be supported thereby.

[0133] The present disclosure is described based on an example in which the driving portion includes the motor 23 fixed in the cabinet 1, the pulley 25 rotated by the motor, and the belt 27 connecting the circumferential surface of the pulley 25 to the circumferential surface of the drum body 21.

[0134] The first support 17 may include a first roller 179 configured to rotatably support the circumferential surface of the drum body 21, and the second support 19 may include a second roller 199 configured to rotatably support the circumferential surface of the drum body.

[0135] A water collector 126 of a base 12 may include a water collecting chamber 127 which is fixed to the bottom surface of the connecting duct 35 so as to communicate with the inside of the connecting duct 35. In order to prevent the heat absorber 41 and the heat radiator 43 from contacting the water (condensed water) stored in the water collecting chamber 127, the water collecting chamber 127 may further include a heat exchanger support 128 therein. The heat exchanger support 128 may maintain the distance between heat absorber 41 and the heat radiator 43 and the bottom surface of the water collecting chamber 127.

[0136] The heat exchanger support 128, which supports the heat absorber 41 and the heat radiator 43, may be provided with a plurality of support plate through holes (not shown) which are formed so as to correspond to the position of the heat absorber. The support plate through holes may guide the water generated in the heat absorber 41 and/or the water used to wash the heat absorber 41 to the water collecting chamber 127.

[0137] Meanwhile, the laundry dryer 100 according to the present disclosure may further include a washer 6 configured to wash the heat absorber 41 using the water stored in the water collecting chamber 127, and a water discharger 7 configured to discharge the water in the water collecting chamber 127 to the outside.

[0138] The washer 6 may be embodied as a device configured to spray the water contained in the water collecting chamber 127 to the heat absorber 41. The washer 6 may include the sprayer 65 which is provided at the circulation duct 3 so as to supply water the heat absorber 41, and the pump 61 configured to move the water stored in the water collecting chamber 127 to the sprayer 65.

[0139] The pump 61 may supply the water discharged from the water collecting chamber 127 to the sprayer 65 through the second connecting pipe 613. The pump 61 may be positioned adjacent to the water collecting chamber 127 so as to move the water in the water collecting chamber 127, or may be connected to the water collecting chamber via the first connecting pipe 611.

[0140] When the laundry dryer 100 is configured so as to move the water in the water collecting chamber 127 to the sprayer 65 and the water discharger 7 by means of only the pump 61, the clothing processing apparatus 100 may further include the channel converter 63.

[0141] Here, the channel converter 63 may be connected to the pump 61 via the second connecting pipe 613, the sprayer 65 may be connected to the channel converter 63 via the sprayer supply pipe 631, and the water discharger 7 may be connected to the channel converter 63 via the water discharger supply pipe 633.

[0142] The channel converter 63 may include the valve (not shown) configured to control opening and closing of the sprayer supply pipe 631 and the water discharger supply pipe 633. Accordingly, the laundry dryer 100 may control the valve provided at the channel converter 63 to supply the water stored in the water collecting chamber 127 to the sprayer 65 or to the water discharger 7.

[0143] The water discharger 7 may include the storage body 72 which is detachably provided at the cabinet 1 and provides a space configured to store water therein, and the inflow hole 722 which is formed through the storage body 72 so as to introduce the water, discharged from the water discharger supply pipe 633, into the storage body 72.

[0144] The storage body 72 may be embodied as a drawer-type tank which is drawn out of the cabinet 1. Here, the front panel 11 of the cabinet must be provided with the water discharger mounting groove into which the storage body 72 is inserted. The panel 71 may be fixed to the front surface of the storage body 72. The panel 71 may be detachably coupled to the reservoir mounting groove so as to form a portion of the front panel 11.

[0145] The panel 71 may further be provided with the groove 711 into which a user hand is inserted. Here, the pane 71 may also serve as a handle which enables the storage body 72 to be drawn out of or be inserted into the cabinet.

[0146] The inflow hole 722 may receive the water discharged from the nozzle 722a fixed the cabinet 1. The nozzle 722a may be fixed to the upper panel 13 of the cabinet such that the nozzle 722a is positioned above the introduction port 722 when the storage body 72 is inserted into the cabinet 1. Here, the water discharger supply pipe 633 should be configured to connect the nozzle 722a to the channel converter 63.

[0147] The water discharger 7, which has the above-mentioned configuration, may be constructed such that the water contained in the storage body 72 can be discarded by drawing the storage body 72 out of the cabinet 1 and then turning or tilting the storage body 72 such that the inflow hole 722 is positioned at a lower level.

[0148] In order to allow the water contained in the storage body 72 to be easily discharged through the inflow hole 722, the storage body 72 may further include a communication hole 721 formed through the upper surface of the storage body 72.

[0149] The laundry dryer 100 may further include a water collector water level sensor (not shown) configured to measure the water level in the water collecting chamber 127. The water collector water level sensor is able to prevent the water in the water collecting chamber 127 from flowing back to the connecting duct 35 by determining the time at which the water stored in the water collecting chamber 127 is moved to the storage body 72.

[0150] The laundry dryer 100 may further include the dryness sensor (not shown) configured to determine dryness of laundry. The dryness sensor may be embodied as at least one of an electrode sensor (not shown), which comes into contact with laundry to measure an amount of moisture contained in laundry, or a humidity sensor (not shown) configured to measure humidity of the air introduced into the circulation duct 3 from the drum 2.

[0151] The laundry dryer 100 may further include a temperature sensor (not shown) configured to measure the temperature of the air introduced into the circulation duct 3.

[0152] The drum 2, the circulation duct 3, the heat exchanger 4, the washer 6, the water discharger 7 and the like, which are described above, may be installed at and supported by the base 12 positioned at the lower side of the cabinet 1. The condensed water created in the heat exchanger 4 and the washing water which is used in the washer 6 to wash the heat absorber 41 may be collected in the water collecting chamber 127 of the water collector 126, and may then be supplied to the sprayer 65 or the water discharger 7 by means of the pump 61.

[0153] In order to minimize accumulation of foreign substances (such as lint), discharged from the drum body 21, in the heat absorber 41 and the heat radiator 43, the clothing processing apparatus may further include the filter portion 10.

[0154] The filter portion 10, which is configured to remove foreign substances discharged from the drum 2, may be easily exposed through the introduction port 173 so as to enable a user to remove accumulated foreign substances as needed.

[0155] The filter portion 10 may be detachably inserted into the exhaust duct 31 through the mounting portion 178 so as to remove lint contained in the air introduced into the

mounting portion 178.

[0156] Therefore, frequency with which the second filter portion 5 needs to be replaced or taken out can be remarkably reduced.

[0157] Hereinafter, the structures of the mounting portion 178 and the filter portion 10 will be described in detail with reference to the accompanying drawings.

[0158] FIG. 4 illustrates the state in which the filter portion according to the present disclosure is mounted.

[0159] The mounting portion 178, to which the filter portion 10 is installed, may be formed at the lower portion of the connecting body 177 of the first support 17.

[0160] The mounting portion 178 may communicate with the circulation duct 3 through the connecting body 177.

[0161] The mounting portion 178 may communicate with the introduction port 173 and the circulation duct 3 to define a flow channel through which the air discharged from the drum 2 first passes.

[0162] The mounting portion 178 may be constructed to have the form of a duct in the first support 17, and may provide a space in which the filter portion 10 is accommodated and mounted.

[0163] The filter portion 10 may be mounted on the mounting portion 178 so as to allow air to pass therethrough but to remove lint and foreign substances contained in the air.

[0164] The filter portion 10 may include an inner filter 100 which is mounted on the mounting portion 178 so as to remove foreign substances from the air discharged from the drum 2.

[0165] The inner filter 100 may be mounted to the mounting portion 178 so as to define the inner circumferential surface of the introduction port 173 without projecting toward the inside of the introduction port 173 from the inner circumferential surface of the introduction port 173.

[0166] The inner filter 1100 may be constructed to have a surface area or shape corresponding to the shape of the inlet of the mounting port 178.

[0167] The filter portion 10 may further include an outer filter 200 which is mounted on the mounting portion 178 below the inner filter 100 so as to remove foreign substances.

[0168] The outer filter 200 may be disposed downstream of the inner filter 100 so as to remove lint and foreign substances which have not been removed by the inner filter 100.

[0169] Consequently, the filter portion 10 is capable of more reliably remove foreign substances such as lint from the air discharged from the drum 2.

[0170] When the outer filter 200 is mounted on the mounting portion 178, the outer filter 200 may not be exposed from the introduction port 173.

[0171] FIG. 5 illustrates the state in which the filter portion is taken out.

[0172] The filter portion 10 may be detachably mounted on the mounting portion 178.

[0173] The filter portion 10 may remove foreign substances in the state of being mounted on the mounting portion 178, and may allow the removed foreign substances to be discharged in the state of being withdrawn from the mounting portion 178.

[0174] The mounting portion 178 may include a mounting groove 1781, which is formed through the lower surface of the connecting body 177 or the introduction port 173 so as to define the inlet of the mounting portion 178 and to allow the air in the drum to be introduced thereinto, and a mounting body 1782 defining the inner circumferential surface of the mounting portion 178.

[0175] The mounting groove 1781 may have a larger surface area than the mounting body 1782, and the mounting body 1782 may form a stepped portion at the mounting groove 1781 and may extend to the circulation duct 3.

[0176] The surface area of the inlet of the mounting body 1782 may be smaller than the surface area of the mounting groove 1781, and the upper surface of the mounting body 1782 may support the lower portion of the filter portion 10.

[0177] The filter portion 10 may be supported by the mounting body 1782 so as to prevent the filter portion 10 from escaping to the circulation duct 3.

[0178] At least a portion of the inner filter 100 may be accommodated in outer filter 200.

[0179] Therefore, the space which is occupied by the inner filter 100 and the outer filter 200 may be reduced as much as possible, thereby minimizing the volume of the filter portion 10.

[0180] Furthermore, it is possible to enable the inner filter 100 and the outer filter 200 to be simultaneously withdrawn from or mounted on the mounting portion 178.

[0181] FIG. 6 illustrates the detailed structure of the filter portion 10.

[0182] The inner filter 100 may include a support body 110, which is seated on the mounting portion 178 and supported thereby, and a reception body 120, which extends downwards from the support body 110 and at least a portion of which is accommodated in the outer filter 200 or the mounting portion 178.

[0183] The support body 110 may be constructed so as to correspond to the shape and the surface area of the mounting groove 1781, and may define a portion of the introduction port 173.

[0184] The support body 110 may include an open surface 112 formed in the upper surface thereof through which air and foreign substances are introduced, and a plurality of screen ribs 111 shielding at least a portion of the open surface 112.

[0185] The screen ribs 111 may be configured to block introduction of large-volume objects such as laundry in addition to air or small-volume foreign substances such as lint. The screen ribs 111 may be arranged in the open surface 112 like a mesh.

[0186] The upper surface of the support body 110 may be provided with a coupler 160 configured to couple the support body 110 to the mounting portion 178 or to guide

the installation and pulling direction of the inner filter 100.

[0187] The surface area of the support body 110 may be larger than the surface area of the reception body 120.

[0188] The support body 110 may include a seating surface 113, which is formed at the lower portion thereof and extends outwards from the upper surface of the reception body 120. The seating surface 113 may be supported by the upper portion of the mounting groove 1781 so as to prevent the inner filter 100 from falling into the mounting groove 1781.

[0189] The reception body 120 may be constructed to have the form of a box which extends from the lower portion of the support body 110, and may provide therein a space in which foreign substances accumulates.

[0190] The reception body may include a through hole formed in most of the surface area thereof, and a mesh portion 140 which is coupled to the through hole so as to remove foreign substances at the surface thereof.

[0191] The mesh portion 140 may be constructed to have the form of a mesh coupled to the through hole formed in the reception body 120. The mesh portion 140 may be formed to occupy most of the surface area of the reception body 120. Due to the mesh portion 140, the reception body 120 may look a frame supporting the mesh portion 140.

[0192] The reception body 120 may include a first reception body 121, which extends from the lower portion of the support body 110 and removes foreign substances, and a second reception body 122, which is rotatably coupled to the lower portion of the first reception body 121 so as to define a space, in which foreign substances accumulate, together with the first reception body 121.

[0193] In other words, the first reception body 121 and the second reception body 122 may be separated from each other such that the inside of the reception body 120 is opened. Consequently, a user can remove foreign substances which are removed through the first reception body 121 and the second reception body 122 and accumulate in the reception body 120.

[0194] Of course, not only the reception body 120 but also the support body 110 may be divided and separated. The support body 110 may be composed of a portion coupled to the first reception body 121 and a portion coupled to the second reception body 122, which are detachably coupled to each other.

[0195] The inner filter 100 may further include a reinforcing portion 150 which serves to reinforce the rigidity of the first reception body 121 and the second reception body 122.

[0196] The reinforcing portion 140 may prevent deformation of the first reception body 121 and the second reception body 122 when the first reception body 121 and the second reception body 122 are inserted into the mounting portion 178.

[0197] The reinforcing portion 150 may be disposed parallel to the width direction of the support body 110, and may be constructed to have the form of a rib. The reinforcing portion 150 may also serve as a hinge about which the first reception body 121 and the second reception body 122 are rotated.

[0198] Although the drawing illustrates an embodiment in which the first reception body 121 and the second reception body 122 extend from the lower portion of the support body 110 to define a wedge shape, the first reception body 121 and the second reception body 122 may be formed to have any shape as long as the first reception body 121 and the second reception body 122 can define therebetween a space for accumulation of foreign substances.

[0199] The outer filter 200 may include a seating body 210 mounted on the mounting portion 178, and an insertion body 220 which extends downwards from the seating body 210 such that at least a portion of the insertion body 220 is inserted into the mounting portion 178 or the insertion body 220 receives the inner filter 100 therein.

[0200] The seating body 210 may include an open surface 211 formed in the upper side thereof through which air and foreign substances are introduced, and a seating portion 213 which is seated on the upper portion of the mounting body 1782 and supported thereby.

[0201] The open surface 211 may have such a surface area that the reception body 120 of the inner filter 100 is inserted and accommodated in the outer filter 200.

[0202] The seating portion 213 may have a surface area larger than the surface area of the mounting body 1782 but smaller than the surface area of the mounting groove 1781 such that the seating portion 213 is seated on the upper surface of the mounting body 1782 and supported thereby when the seating portion 213 is accommodated in the mounting groove 1781.

[0203] The insertion body 220 may extend downwards from the inner circumferential surface of the seating portion 213 so as to be inserted into the mounting body 1782.

[0204] The insertion body 220 may be constructed to have the form of a case having a space in which foreign substances accumulate.

[0205] A through hole may be formed in most of the surface area of the insertion body 220, and a mesh portion 240 may be coupled to the through hole in order to remove foreign substances. The mesh portion 240 may be made of a mesh or the like which allows air to pass therethrough but removes foreign substances.

[0206] The mesh size of the mesh portion 240 may be smaller than the mesh size of the mesh portion 140.

[0207] Accordingly, the inner filter 100 may remove relatively large substances while the outer filter 200 may remove relatively small foreign substances, thereby maximizing the filtration performance of the filter portion 100.

[0208] The insertion body 220 may include a first insertion body 221 which extends from the lower portion of the seating body 210 and removes foreign substances, and a second insertion body 222 which is rotatably coupled to the lower portion of the first insertion body 221 and defines a space, in which foreign substances

accumulate, together with the first insertion body 221.

[0209] In other words, the insertion body 220 may be constructed such that the first insertion body 221 and the second insertion body 222 may be separated from each other such that the inside of the insertion body 220 is opened. Consequently, a user can remove foreign substances which are removed through the first insertion body 221 and the second insertion body 222.

[0210] Of course, not only the insertion body 220 but also the seating body 210 may be divided and separated. The seating body 210 may be composed of a portion coupled to the first insertion body 221 and a portion coupled to the second insertion body 222, which are detachably coupled to each other.

[0211] The outer filter 200 may further include a reinforcing portion 250 which serves to reinforce the rigidity of the first insertion body 221 and the second insertion body 222 and which maintains the shapes of the first insertion body 221 and the second insertion body 222 when the first insertion body 221 and the second insertion body 222 are inserted into the mounting portion 178.

[0212] The reinforcing portion 250 may be formed to have the form of a rib which extends in the width direction of the seating body 210.

[0213] As described above, because the size of the foreign substances removed through the inner filter 100 is different from the size of the foreign substances removed through the outer filter 200, the inner filter 100 and the outer filter 200 must be mounted on the mounting portion 178 together.

[0214] For example, if the inner filter 100 alone is mounted on the mounting portion 178, all of relatively small foreign substances pass through the inner filter 100, whereby it is impossible to assure the function of the filter portion 10. Meanwhile, if the outer filter 100 alone is mounted on the mounting portion 178, foreign substances intensively accumulate on the outer filter 200, thereby causing a problem in that the outer filter 200 makes it difficult for the air discharged from the drum 2 to be introduced into the circulation duct 3.

[0215] Therefore, it is necessary to operate the clothing processing apparatus in the state in which both the inner filter 100 and the outer filter 200 are mounted on the mounting portion 178 together.

[0216] FIG. 7 illustrates an embodiment which enables both the outer filter 200 and the inner filter 100 to be mounted on the mounting portion 178 together.

[0217] In order to operate the clothing processing apparatus , both the inner filter 100 and the outer filter 200 should be mounted together.

[0218] Specifically, one of the inner filter 100 and the outer filter 200 of the clothing processing apparatus according to the present disclosure can be completely mounted only when the other of the inner filter 100 and the outer filter 200 is mounted on the mounting portion 178.

[0219] In other words, mounting of the filter portion on the mounting portion 178 cannot be completed by the inner filter 100 alone, and cannot be completed by the outer filter 200 alone.

[0220] For example, it is physically impossible for the inner filter 100 to be completely mounted on the mounting portion 178 without the outer filter 200.

[0221] Meanwhile, it is physically impossible for the outer filter 200 to be completely mounted on the mounting portion 178 without the inner filter 100.

[0222] The fact that the inner filter 100 and the outer filter 200 are not completely mounted on the mounting portion 178 may mean that the inner filter 100 and the outer filter 200 are shaken or vibrate when mounted on the mounting portion 178.

[0223] In addition, the fact that the inner filter 100 and the outer filter 200 are not completely mounted on the mounting portion 178 may mean that the inner filter 100 and the outer filter 200 are not completely mounted on the mounting portion 178 and are thus taken out toward the introduction port 173.

[0224] Accordingly, when only one of the inner filter 100 and the outer filter 200 is mounted on the mounting portion 178, a user can recognize that the filter portion 10 is not completely mounted. As a result, the clothing processing apparatus according to the present disclosure is able to induce a user to mount the other of the inner filter 100 and the outer filter 200 to the mounting portion 178.

[0225] In addition, the clothing processing apparatus according to the present disclosure enables a user to physically recognize whether the inner filter 100 or the outer filter 200 alone is mounted before determining whether or not the filter portion 10 is mounted using a sensor or a signal generator in an electrical control manner.

[0226] Accordingly, even when power is not supplied to the clothing processing apparatus , it is possible to check whether the inner filter 100 or the outer filter 200 alone is mounted.

[0227] Referring to FIG. 7, the outer filter 200 may be withdrawn from the mounting portion 178 when the inner filter 100 is not mounted on the mounting portion 178.

[0228] The outer filter 200 may be withdrawn from the mounting portion 178 toward the introduction port 173. In other words, at least a portion of the outer filter 200 may escape from the mounting portion 178 when the inner filter 100 is not mounted on the mounting portion 178.

[0229] The outer filter 200 may project from the mounting portion 178 to such an extent as to hinder closing of the opening 111 by the door 112. Accordingly, because the door 112 interferes with the outer filter 200 and thus cannot close the opening 111 when the outer filter 200 alone is mounted on the mounting portion 178, the clothing processing apparatus cannot be operated.

[0230] Accordingly, when the outer filter 200 alone is mounted on the mounting portion 178, a user may find that the outer filter 200 is not completely mounted on the mounting portion 178 and may thus recognize that mounting of the inner filter 100 is required.

[0231] Furthermore, even without considering whether

the outer filter 200 or the inner filter 100 is mounted, it is possible to determine whether or not the outer filter 100 is completely mounted by determining whether or not the door 112 is closed.

[0232] The outer filter 200 may further include an elastic portion 260 which is supported by the mounting portion 178 so as to cause the outer filter 200 to be separated from the mounting portion 178. The elastic portion 260 may be embodied as an elastic element such as a spring, and may cause the outer filter 200 to be withdrawn from the mounting portion 178.

[0233] FIG. 8 illustrates the detailed structure of the outer filter 200.

[0234] The outer filter 200 may include the seating body 210 seated on the mounting portion 178, and the insertion body 220 which extends from the seating body so as to be at least partially inserted into the mounting portion and to which a mesh member configured to remove foreign substances is installed.

[0235] The elastic portion 260 may be coupled to the seating body 210 so as to cause the seating body to be separated from the mounting portion 178.

[0236] Of course, the elastic portion 260 may also be coupled to the upper surface of the mounting portion 178 so as to push out the seating body 210.

[0237] The seating body 210 may further include the seating portion 213 which extends outwards from the insertion body 220 and is seated on the upper surface of the mounting portion.

[0238] The seating portion 213 may be seated on the upper surface of the mounting body 1782, and the insertion body 220 may be accommodated in the mounting body 1782.

[0239] The seating portion 213 may be formed to have a shape parallel to the upper surface of the mounting body 1782, and may be engaged therewith.

[0240] The elastic portion 260 may serve to push out the lower surface of the seating portion 213 and the mounting portion 178 away from each other.

[0241] The elastic portion 260 may be supported by the lower surface of the seating portion 213 and the upper surface of the mounting body 1782.

[0242] The mounting portion 178 may further include a support surface 1783 which extends toward the inner circumferential surface of the mounting groove 1781 from the upper surface of the mounting body 1782.

[0243] The elastic portion 260 may be coupled to one of the support surface 1783 and the lower surface of the seating portion 213 while being in contact with the other of the support surface 1783 and the lower surface of the seating portion 213.

[0244] In the case in which the elastic portion 260 is coupled to the lower surface of the seating portion 213, the elastic portion 260 may be coupled to the lower surfaces of the two lateral sides of the seating portion 213.

[0245] Therefore, it is possible to prevent the seating body 210 from being inclined in one direction and being withdrawn from the mounting portion 178.

[0246] The elastic portion 260 may have a sufficient length such that the seating body 210 is positioned higher than the mounting groove 1781.

[0247] The outer filter 200 may include a signal generator 300 configured to generate signals, and the mounting portion 178 may include the sensor 400 configured to sense the signal generator 300.

[0248] The sensor 400 may be embodied as a Hall sensor, and the signal generator 300 may include a magnetic body capable of generating a magnetic field.

[0249] The signal generator 300 may be coupled to the insertion body 220, and may be provided at the lateral surface of the insertion body 220.

[0250] The sensor 400 may be disposed on the outer surface of the mounting body 1782 so as to prevent interference with the outer filter 200.

[0251] When the outer filter 200 is completely mounted on the mounting portion 178, the sensor 400 and the signal generator 300 may be disposed at the same level.

[0252] When the sensor 400 senses the signal generator 300, the controller may operate the clothing processing apparatus .

[0253] Accordingly, when the elastic portion 260 pushes the seating portion 213 upwards, with the result that the outer filter 200 is withdrawn from the mounting portion 178, the signal generator 300 may be spaced apart from the sensor 400, whereby the clothing processing apparatus cannot be operated.

[0254] Furthermore, the controller may be set to prevent operation of the clothing processing apparatus in the state in which the door 112 opens the opening 111.

[0255] Therefore, according to the present disclosure, when the outer filter 200 alone is inserted into the mounting portion 178 without the inner filter 100, the outer filter 200 cannot be completely mounted on the mounting portion 178 and the clothing processing apparatus cannot be operated.

[0256] If the signal generator 300 is not installed at the inner filter 100, the clothing processing apparatus cannot be operated when the inner filter 100 alone is mounted on the mounting portion 178 without the outer filter 200.

[0257] Consequently, the clothing processing apparatus according to the present disclosure may be operated only when both the inner filter 100 and the outer filter 200 are mounted on the mounting portion 178, and may forcibly induce the inner filter 100 and the outer filter 200 to be mounted on the mounting portion 178 together.

[0258] FIG. 9 illustrates the state in which the elastic portion 260 is compressed.

[0259] When the seating body 210 is pushed downwards, the elastic portion 260 may be compressed. The seating body 210 may be pushed towards the mounting portion 178 by external force applied from a user or the like, or may be pushed toward the mounting portion 178 by the inner filter 100 seated on the upper end of the seating body 210.

[0260] When the seating body 210 is pushed, the in-

sertion body 220 may further be inserted into the mounting body 1782.

[0261] Here, the signal generator 300 coupled to the insertion body 220 may be moved downwards together with the insertion body 220, and may be disposed at a position corresponding to the sensor 400. Consequently, the clothing processing apparatus may be converted into the operable state.

[0262] Meanwhile, when the external force applied to the seating body 210 is released, the seating body 210 may be withdrawn from the mounting portion 178 by the elastic force of the elastic portion 260.

[0263] Here, because the sensor 400 is spaced apart from the signal generator 300 and thus the sensor cannot sense the signal generator 300, the clothing processing apparatus may be converted into the inoperable state.

[0264] Therefore, the inner filter 100 may maintain the state in which the outer filter 200 is mounted on the mounting portion 178 while overcoming the restoring force of the elastic portion 260.

[0265] FIG. 10 illustrates the state in which the inner filter 100 and the outer filter 200 are seated.

[0266] FIG. 10(a) illustrates the state in which the inner filter 100 and the outer filter 200 are mounted. FIG. 10(b) illustrates the state in which the inner filter 100 and the outer filter 200 are completely mounted on the mounting portion 178.

[0267] The inner filter 100 may further include the coupler 160 configured to fix the support body 110 to the mounting portion 178 to maintain the compressed state of the elastic portion 260.

[0268] The inner filter 100 may be accommodated and seated in the outer filter 200.

[0269] When the inner filter 100 pushes the outer filter 200, the elastic portion 260 may be compressed, and the seating body 210 of the outer filter 200 may be seated on the mounting body 1782.

[0270] Here, the coupler 160 may couple the inner filter 100 to the mounting portion 178 to maintain the positions of the inner filter 100 and the outer filter 200. As a result, the outer filter 200 may be completely mounted on the mounting portion 178, and the inner filter 100 may also be completely mounted on the mounting portion 178 by means of the coupler 160.

[0271] The coupler 160 may be detachably coupled to the mounting portion 178, and may fix the inner filter 100 to the mounting portion 178.

[0272] The coupler 160 may be coupled to the inner surface of the mounting groove 1781 which is positioned higher than the mounting body 1782.

[0273] The coupler 160 may include a coupling hook 1613 which is capable of projecting from the support body 110 and which projects at least one of the two lateral surfaces of the support body 110.

[0274] The inner filter 100 may include the seating surface 113 which is seated in the mounting groove 1781.

[0275] The two lateral surfaces of the seating surface 113 may be formed so as to define a portion of the inner circumferential surface of the introduction port 173.

[0276] The seating surface 113 may shield the inlet of the mounting portion 178 and may define a portion of the connecting body 177.

[0277] When the inner filter 100 is completely mounted on the mounting portion 178, the inner circumferential surface of the connecting body 177 and the upper surface of the support body 110 may define a continuous surface, and the upper surface of the support body 110 may define a portion of the introduction port 173.

[0278] Accordingly, the components such as a door gasket, which is provided at the door 112 so as to be inserted into the introduction port 173, may not interfere with the support body 110.

[0279] As a result, the door 112 may close the opening 111 without interfering with the support body 110. Meanwhile, when the inner filter 100 is completely mounted on the mounting portion 178 by means of the coupler 160, the compressed state of the elastic portion 260 may be maintained. Because the inner filter 110 is fixed to the mounting portion 178, the elastic portion 260 cannot push out the outer filter, and can be maintained in the state of pressing against the outer filter 200. Therefore, the outer filter 200 may not be taken out toward the introduction port 173, and may be maintained in the state of being completely mounted on the mounting portion 178.

[0280] Specifically, the support body 110 may be seated on the seating body 210 so as to transmit external force compressing the elastic portion 260, and the coupler 160 may project from two sides of the support body 110.

[0281] The reception body 120, which extends from the support body 110 and at which the mesh member is installed, may be at least partially inserted into the outer filter 200 while the support body 110 is seated on the seating body 210.

[0282] The inner filter 100 may be formed to have a shape corresponding to the shape of the mounting groove 1781.

[0283] Here, if the inner filter 100 alone is mounted on the mounting portion, the inner filter may not be engaged with the mounting portion or may be shaken in the mounted state.

[0284] For example, although the outer surface of the inner filter may be formed to have a shape corresponding to the mounting groove 1781, the lower surface of the inner filter 100 and the inlet of the mounting groove 1781 may be shakable.

[0285] The cross-sectional area of the reception body 120 may be greatly smaller than the cross-sectional area of the mounting duct 1782 such that the reception body 120 can be shaken forwards and backwards when the reception body 120 alone is accommodated in the mounting duct 1782.

[0286] For example, the inner filter 100 may be swung like a pendulum based on the coupler 160.

[0287] Although the surface of the support body 110 may be constructed so as to provide the feeling of an

appearance unified with the connecting body 177, the seating surface 113 of the support body 110 and the outer circumferential surface of the mounting groove 1781 may not be exactly engaged with each other.

[0288] For example, although the seating surface 113 may be constructed so as to shield the mounting groove 1781, the seating surface 113 may be shaken on the outer circumferential surface of the mounting groove 1781 when the reception body 120 is shaken.

[0289] The lower surface of the seating surface 113 may be curved based on the thickness direction or the forward/backward direction of the introduction port 111, and the periphery of the mounting groove 1781 may also be constructed such that the seating surface 113 is shakable.

[0290] Accordingly, when the reception body 120 is shaken in the mounting duct 1782, the support body 110 may also be shakable in the mounting groove 1781.

[0291] Therefore, because the inner filter 100 cannot be fixed to the mounting groove 1781, a user is able to recognize that the outer filter 200 is required and thus to couple the inner filter 100 to the outer filter 200.

[0292] The outer filter 200 may receive the inner filter 100 therein such that the inner filter 100 cannot be shaken.

[0293] Furthermore, the outer filter 200 cannot be shaken once the outer filter 200 is seated on the mounting portion 178.

[0294] For example, the upper surface of the seating body 210 of the outer filter 200 may be formed to have a shape corresponding to the lower surface of the support body 110 of the inner filter 100 or the lower surface of the seating surface 113 of the support body 110. Accordingly, the seating body 210 may be in surface contact with the support body 110 or the seating surface 113 so as to support the support body 110.

[0295] Furthermore, the lower surface of the seating body 210 may be formed to have a shape corresponding to the upper surface of the mounting duct 1782 such that the lower surface of the seating body 210 is seated on the upper surface of the mounting duct 1782 in a surface contact state.

[0296] Therefore, the seating body 210 may be fixed to the mounting portion 178 in the state of being incapable of shaking.

[0297] The cross-section of the outer circumferential surface of the insertion body 220 may have a shape corresponding to the inner cross-section of the mounting body 1782 such that the insertion body 220 is supported by the mounting body 1782 in a state of being in contact therewith.

[0298] Furthermore, at least a portion of the inner surface of the insertion body 220 may be in surface contact with the outer surface of the reception body 120 so as to support the outer surface of the reception body 120.

[0299] At least a portion of the inner surface of the insertion body 220 may be in surface contact with the two surfaces (or the front and rear surfaces) of the reception body 120 so as to support the two surfaces of the reception body 120.

[0300] Consequently, the reception body 120 may be fixed without shaking once the reception body 120 is accommodated in the insertion body 220.

[0301] For example, the cross-section of the inner circumferential surface of the insertion body 220 may be formed to have a shape corresponding to the cross-section of the outer circumferential surface of the receiving body 120 and the cross-sectional area of the inner circumferential surface of the insertion body 220 may also correspond to the cross-sectional area of the outer circumferential surface of the receiving body 120 such that the reception body 120 is fixed in the insertion body 220 without independent movement.

[0302] Accordingly, the outer filter 200 may maintain the state in which the inner filter 100 is fixed to the mounting portion 178.

[0303] As a result, in order to completely physically mount and fix the inner filter 100 to the mounting portion 178, the outer filter 200 should be mounted on the mounting portion 178. In addition, in order to maintain the state in which the outer filter 200 is physically mounted on the mounting portion 178, the inner filter 100 should be mounted on the mounting portion 178.

[0304] If the signal generator 300 is not installed at the inner filter 100 but only at the outer filter 200, a user may be induced to mount the outer filter 200 on the mounting portion 178 because the clothing processing apparatus cannot be operated with the inner filter 100 alone.

[0305] The coupler 160 of the inner filter 100 may include a guide case 115 configured to control the coupling hook 1613 to be mounted on or separated from the mounting portion 178, as indicated in region A, and may further include a component configured to selectively couple the mounting portion 178 and the coupling hook 1613 to each other, as indicated in region B.

[0306] FIG. 11 illustrates a detailed embodiment of the coupler 160.

[0307] The coupler 160 may include a coupling rib 161 which is reciprocated to the support body 110 in the support body 110

[0308] The coupling hook 1613 may be formed at the distal end of the coupling rib 161.

[0309] The support body 110 may include a movement rail 114 formed in or on the inner surface thereof so as to support the coupling rib 161 so as to be reciprocated.

[0310] The movement rail 114 may extend in the width direction of the support body 110.

[0311] The coupling rib 161 may be composed of a plurality of coupling ribs which are reciprocably movable between the two lateral surfaces of the support body and the inner surface of the mounting groove. The coupling hook 161 may include a plurality of coupling hooks which are formed at respective distal ends of the plurality of coupling ribs 161.

[0312] The plurality of coupling ribs 161 may be movable toward the lateral surfaces of the support body 110

based on the guide case 115.

[0313] In other words, the coupling ribs 161, which are disposed at one side of the guide case 115, may be reciprocated with respect to one lateral surface of the support body 110 whereas the coupling ribs 161, which are disposed at the other side of the guide case 115, may be reciprocated to the other lateral surface of the support body 110.

[0314] The mounting portion 178 may further include coupling holes 1785 formed in the inner surface of the mounting groove 1781 such that the coupling hooks 1613 formed at the distal ends of the coupling ribs 161 are accommodated in and coupled to the coupling holes 1785.

[0315] The coupling ribs 161 may move to the coupling holes 1785 such that the coupling hooks 1631 is inserted into the coupling holes 1785 to a sufficient depth. As a result, even when vibration or temporary impact generated by the drum 2 or the like is applied to the coupling hooks 1631, it is possible to prevent the coupling hooks 1631 from being separated from the coupling holes 1785. Therefore, it is possible to maintain the state in which the filter portion 10 is seated on the mounting portion 178, and it is possible to prevent the clothing processing apparatus from being unintentionally halted.

[0316] Meanwhile, the coupling ribs 161 may move to the guide case 115 to completely retract the coupling hooks 1631 from the coupling holes 1785. Consequently, it is possible to prevent the mounting portion 178 from breaking when the inner filter 100 is separated from the mounting portion 178.

[0317] The coupler 160 may further include an elastic member 162 which is disposed between the plurality of coupling ribs 161 so as to push out the plurality of coupling ribs toward the two lateral surfaces of the support body.

[0318] The elastic member 162 may push out the coupling ribs 161 to insert the coupling hooks 1613 into respective coupling holes 1785, and may be installed at the guide case 115 so as to push out the coupling ribs 161.

[0319] When the coupling ribs 161 are retracted from the respective coupling holes 1785, the elastic member 162 may be compressed between the plurality of coupling ribs 161, thereby generating force for pushing out the coupling ribs 161.

[0320] Accordingly, when external force from a user is transmitted to coupling ribs 161, the coupling ribs 161 may be separated from the mounting portion 178 while compressing the elastic member 162. Meanwhile, when the external force is released, the coupling ribs 161 may be moved back toward the outside of the support body 110 by means of the elastic member 162.

[0321] Specifically, each of the plurality of coupling ribs 161 may include a push portion 1611 to which the elastic member 162 is coupled, and an extension rib 1612 which extends to one of the two lateral surfaces of the support body 110 from the lower portion of the push portion 1611 and which is provided at the distal end thereof with the coupling hook 1613.

[0322] The push portion 1611 may be exposed to the guide case 115 so as to allow a user to press the push portion. The push portion 1611 may be reciprocably movable in the guide case 115, and may be exposed to one of the two lateral surfaces of the guide case 115.

[0323] The extension rib 1612 may extend to one of the two lateral surfaces of the support body 110 from the lower portion of the push portion 1611.

[0324] The extension rib 1612 may be moved together with the push portion 1611.

[0325] The elastic member 162 may be accommodated in the guide case 115 so as to be disposed between the plurality of push portions 1611.

[0326] The movement rail 114 may be formed to have a shape corresponding to the extension rib 1612, and may slidably support the extension rib 1612.

[0327] The coupling rib 161 may be supported by the guide case 115 and the movement rail 114 so as to be reciprocated.

[0328] The guide case 115 may support the upper portion and the front surface or the rear surface of the push portion 1611, and may be formed to have the form of a duct which is open at the two lateral surfaces thereof so as to allow the lateral surface of the push portion 1611 to be exposed through the open surface.

[0329] The lateral surface of the push portion 1611 may be exposed through the opening 112, and the shield rib 111 may be spaced apart from the guide case 115 by a predetermined distance so as to assure a space through which a user presses the lateral surface of the push portion 1611.

[0330] The plurality of coupling ribs 161 may have the same length, and the guide case 115 may be disposed in the center of the support body 110. Consequently, a user is able to move the plurality of coupling ribs 161 using the same force.

[0331] When the coupling rib 161 is seated in the coupling hole 1785, the signal generator 300 disposed at the filter portion 10 may be disposed at the same level as the sensor 400 coupled to the mounting portion 178 so as to overlap each other.

[0332] When the coupling rib 161 is separated from the coupling hole 1785, the filter portion 10 may be retracted from the mounting portion 178 and may be disposed higher than the sensor 400 by the restoring force of the elastic portion 260.

[0333] The push portion 1611, the extension rib 1612, and the coupling hook 1613 may be integrally formed, and may be made of resin or the like.

[0334] The guide case 115 may have a space configured to receive the elastic member 162.

[0335] The plurality of coupling ribs 161 may be spaced apart from each other in the guide case 115 by a retraction distance the coupling hooks 1613 are completely retracted or separated from the mounting grooves. The elastic member 162 may have a longer length than the retraction distance, and the guide case 115 may also

have a longer width than the retraction distance.

[0336] When the coupling hooks 1613 are inserted into respective coupling holes 1785, the coupling ribs 161 may provide force to continuously press the elastic portion 260. In other words, because the rigidity of the coupling ribs 161 is higher than the elastic force of the elastic portion 260, it is possible to maintain the state in which the elastic portion 260 is sufficiently pressed.

[0337] Consequently, the coupler 160 may maintain the state in which the outer filter 200 is mounted on the mounting portion 178.

[0338] FIG. 12 illustrates operation of the coupling ribs.

[0339] The coupling ribs 161 may include a plurality of coupling ribs, and may be supported by the guide case 115 and the movement rail 114.

[0340] The guide case 115 may support the coupling ribs 161 such that the push portions of the coupling ribs 161 are reciprocated in the width direction.

[0341] The plurality of coupling ribs 161 may be spaced apart from each other by a distance corresponding to the retraction distance or more.

[0342] The push portions 1611, which are provided at respective coupling ribs 161, may also be reciprocably movable in the guide case 115 by the retraction distance.

[0343] Referring to FIG. 12(a), each of the push portions 1611 may be constructed to have the form of a case which is open at one side thereof so as to receive at least a portion of the elastic member 162 therein. The push portion 1611 may include a holding protrusion 1611d configured to retain the position of the elastic member 162

[0344] The push portion 1611 may include a connecting surface 1611c, which extends from the extension rib 1612 or is coupled to the extension rib 1612, a press surface 1611b, which extends from the connecting surface 1611 c so as to be pressed by a user and at which the holding protrusion 1611d is installed, and an extension surface 1611a, which extends from the press surface 1611b so as to be supported by the guide case 115.

[0345] An open surface may be positioned at the side of the push portion 1611 opposed to the press surface 1611b. Consequently, the open surfaces of the plurality of push portions 1611 may face each other.

[0346] The inner surfaces of the extension ribs 1612 and the push portions 1611 may be spaced apart from each other by a distance twice the retraction distance or more.

[0347] The reason for this is because each of the extension ribs 1612 can be separated from a corresponding coupling hole 1785 when the extension rib 1612 is moved by the retraction distance or more. Accordingly, the left extension rib 1612 can be moved to the right by the retraction distance or more, and the right extension rib 1612 can also be moved to the left by the retraction distance or more.

[0348] Referring to FIG. 12(b), when a user presses the press surfaces 1611b, which are exposed at the two lateral sides of the guide case 115, the left push portion 1611 and the right push portion 1611 come close to each other. Accordingly, the plurality of extension ribs 1612 may come close to each other, and the coupling hooks 1613 may be retracted from respective coupling holes 1785.

[0349] The elastic portion 162 may be compressed as the plurality of push portions 1611 comes close to each other.

[0350] The elastic portion 162 may serve to push out the push portions 1611 when the external force applied to the push surfaces 1611b is released.

[0351] Accordingly, the coupler 160 may be operated even without separate electronic control. A user may mount or separate the inner filter 100 to or from the mounting portion 178 by selectively pressing the press surfaces 1611b of the push portions 1611 which are exposed through the two lateral sides of the guide case 115.

[0352] By means of the coupler 160, mounting of the outer filter 200 to the mounting portion 178 may be completed or released.

[0353] The clothing processing apparatus according to the present disclosure is able to induce both the inner filter 100 and the outer filter 200 to be simultaneously coupled in an electronic control manner, in addition to the above-mentioned physical manner.

[0354] For example, the clothing processing apparatus according to the present disclosure may be set to be operated only when both the inner filter 100 and the outer filter 200 are simultaneously mounted.

[0355] As described above, the signal generator 300 configured to generate a signal may be installed at at least one of the inner filter 100, the outer filter 200 or the mounting portion 178, and the mounting portion 178 may include the sensor 400 configured to sense the signal generator 300 to determine whether or not the filter portion 10 is mounted.

[0356] The signal generator 300 may be reciprocated along one surface of one of the mounting portion, the outer filter and the inner filter. The signal generator 300 may be moved in a sliding manner such that the signal generator 300 overlaps the sensor 400 or is completely spaced apart from the sensor 400

[0357] Therefore, the sensor 400 may precisely sense variation in position of the signal generator 300, thereby making it possible to more precisely determine whether or not the filter portion 10 is mounted.

[0358] When the signal generator 300 moves in the height direction or in the insertion and retraction direction of the filter portion 10, the signal generator 300 may move in the state of contacting the filter portion 10 without interfering with insertion and retraction of the filter portion 10.

[0359] The signal generator 300 may be moved toward the sensor 400 when the outer filter 100 or the inner filter 200 is mounted on the mounting portion 178. Furthermore, the signal generator 300 may be moved so as not to overlap the sensor 400 when the outer filter 100 or the

inner filter 200 is withdrawn from the mounting portion 178.

[0360] As a result, it is possible to assure reliability and responsivity of the signal generator 300.

[0361] Referring to FIGs. 13 to 18, the signal generator 300 may include a magnet 320 configured to generate a magnetic field, a guide rail 310 having a space in which the magnet 320 is reciprocated, and a restoring portion 330, which is installed at the guide rail 310 so as to support the magnet 320.

[0362] The guide rail 310 may extend from a position at which the guide rail 310 overlaps the sensor 400 to a position at which the guide rail 310 does not overlap the sensor 400.

[0363] For example, the guide rail 310 may be positioned such that one end thereof overlaps the sensor 400 and the other end thereof does not overlap the sensor 400.

[0364] The magnet 320 may be received in the guide rail 310, and may be reciprocated between one end and the other end of the guide rail 310.

[0365] Although the magnet 320 may be disposed at a position on the guide rail 310 at which the magnet 320 does not overlap the sensor 400, the magnet 320 may be moved to a position at which the magnet 320 overlaps the sensor 400 by the filter portion 10.

[0366] The restoring portion 330 may be received in the guide rail 310 so as to push the magnet 320 to a position at which the magnet 320 does not overlap the sensor 400. The restoring portion 330 may be made of an elastic element such as a spring.

[0367] The sensor 400 may be provided on the outer surface of the mounting duct 1782 so as not to overlap a certain region of the guide rail 310.

[0368] Of course, the sensor 400 may also be provided on the inner surface of the mounting duct 1782 as long as the sensor 400 does not interfere with movement of the filter portion 10.

[0369] FIG. 13 illustrates an embodiment of the signal generator and the sensor of the clothing processing apparatus according to the present disclosure.

[0370] Both the signal generator 300 and the sensor 400 may be installed at the mounting portion 178.

[0371] The signal generator 300 may be provided on the inner circumferential surface of the mounting portion 178, and may be moved toward the sensor 400 in an up-and-down direction by the outer filter 200.

[0372] The guide rail 310 of the signal generator 300 may be provided at the mounting duct 1782. The guide rail 310 may be exposed to the inside of the mounting duct 1782, and may project toward the outside of the mounting duct 1782.

[0373] The guide rail 310 may extend downwards from the upper surface of the mounting duct 1782, and may be disposed lower than the seating body 210 when the seating body 210 is supported by the mounting duct 1782.

[0374] When the outer filter 200 is coupled, the magnet 320 may come into contact with the outer filter 200 and may be moved to the lower portion of the guide rail 310.

[0375] Accordingly, because both the signal generator and the sensor are installed at the mounting portion 178, it is possible to relatively simply manufacture the filter portion 10 and to easily perform repair and replacement of the filter portion 10.

[0376] FIG. 14 illustrates operation of the signal generator and the sensor shown in FIG. 13.

[0377] FIG. 14(a) illustrates the cross-section when the outer filter 200 begins to be mounted on the mounting portion 178. FIG. 14(b) illustrates the cross-section when viewed from the front.

[0378] The guide rail 310 may be constructed to have the form of a duct in which the magnet 320 is exposed to the inside of the mounting duct 1782.

[0379] The guide rail 310 may extend downwards from a position lower than the support surface 1783.

[0380] A portion of the magnet 320 may be received in the guide rail 310, and another portion of the magnet 320 may project to the inside of the mounting duct 1782 from the guide rail 310 so as to come into contact with one of the seating body 210 or the insertion body 220.

[0381] The restoring portion 330 may be supported by the lower surface of the inside of the guide rail 310 so as to push the magnet 320 upwards.

[0382] The sensor 400 may be disposed outside the guide rail 310 so as to overlap the guide rail 310 in the state of being biased to the lower portion of the guide rail 310.

[0383] When the outer filter 200 is mounted so as to press the magnet 320, the sensor 400 may be disposed at a position at which the sensor 400 faces the magnet 320.

[0384] The sensor 400 may be disposed outside the mounting duct 1782.

[0385] When the outer filter 200 is inserted into the mounting duct 1782, the outer filter 200 may press the magnet 320.

[0386] For example, the lower surface of the seating body 210 may press the magnet 320. Of course, another component of the outer filter 200, such as the insertion body 220, may also press the magnet 320.

[0387] Consequently, when the outer filter 200 is inserted into the mounting duct 1782 until the seating portion 213 is seated on the upper surface of the mounting duct 1782, the lower surface of the seating body 210 may move the magnet 320 downwards such that the magnet 320 overlaps the sensor 400.

[0388] Accordingly, the sensor 400 may determine that the outer filter 200 is completely mounted on the mounting portion 178 by sensing the magnet 320.

[0389] Here, in the case in which the outer filter 200 is provided with the elastic portion 260, when the elastic portion 260 pushes the outer filter 200 upwards, the magnet 320 may be moved upwards by means of the restoring portion 330 because the outer filter 200 cannot press the magnet 320 anymore.

[0390] Therefore, the sensor 400 may not sense the magnet 320, and the controller may recognize that the outer filter 200 is not completely mounted on the mounting portion 178.

[0391] Furthermore, because the inner filter 100 should be completely mounted on the mounting portion 178 in order to completely mount the outer filter 200, the controller may determine whether both the inner filter 100 and the outer filter 200 are simultaneously mounted by means of the signal generator 300.

[0392] As a result, the controller may recognize that at least one of the inner filter 100 or the outer filter 200 is not mounted on the mounting portion 178 and may not permit operation of the clothing processing apparatus , by sensing only that the sensor 400 does not sense the magnet 320.

[0393] As a result, a user may be induced to mount both the inner filter 100 and the outer filter 200 on the mounting portion 178.

[0394] FIG. 15 illustrates another embodiment of the signal generator and the sensor.

[0395] The signal generator 300 may be installed at the outer filter 200.

[0396] The signal generator 300 may be provided on the inner surface of the outer filter 200 so as to be moved downwards by the inner filter 100.

[0397] The sensor 400 may be installed at the mounting portion 178. The sensor 400 may be installed at such a position at which the sensor 400 senses the signal generator 300 when the outer filter 200 is completely mounted on the mounting portion 178 and then the inner filter 100 is mounted in the outer filter 200.

[0398] Specifically, the signal generator 300 may be installed in the outer filter 200.

[0399] The guide rail 310 may be provided on the inner surface of the insertion body 220 such that the magnet 320 is exposed to the inside of the insertion body 220. The guide rail 310 may extend in an up-and-down direction on the inner surface of the insertion body 220.

[0400] In the case in which the insertion body 220 is divided into two bodies, the guide rail 310 may be coupled to only one of the two divided insertion bodies 220 so as not to interfere with separation and coupling of the two divided insertion bodies 220.

[0401] The magnet 320 may be moved in an up-and-down direction along the guide rail 310 in the state in which at least a portion of the magnet 320 is received in the guide rail 310.

[0402] The restoring portion 330 may be coupled to the inner and lower surface of the guide rail 310 so as to push the magnet 320 upwards.

[0403] At least a portion of the magnet 320 may project from the guide rail 310 so as to come into contact with the inner filter 100. The guide rail 310 may be formed to have a form of a slit supporting the two lateral surfaces of the magnet t320, and may further include a stepped portion to prevent the magnet 320 from escaping outwards.

[0404] Accordingly, when the inner filter 100 is received in the outer filter 200, the inner filter 100 may move the magnet 320 to the lower portion of the guide rail 310.

[0405] Here, the outer filter 200 with the inner filter 100 received therein is mounted on the mounting portion 178, the magnet 320 may be disposed at a position corresponding to the sensor 400.

[0406] Consequently, the sensor may sense the magnet 320, and the controller may recognize that both the inner filter 100 and the outer filter 200 are simultaneously coupled to the mounting portion 178.

[0407] However, when the outer filter 200 without the inner filter 100 received therein is mounted on the mounting portion 178, the magnet 320 may not overlap the sensor 400 because the guide rail 310 is moved upwards. Furthermore, when the inner filter 100 alone is mounted on the mounting portion 178, the sensor 400 may not sense the magnet 320.

[0408] Accordingly, the controller may recognize that at least one of the inner filter 100 or the outer filter 200 is not mounted on the mounting portion 178 and may not permit operation of the clothing processing apparatus , by sensing only that the sensor 400 does not sense the magnet 320.

[0409] As a result, a user may be induced to mount both the inner filter 100 and the outer filter 200 on the mounting portion 178.

[0410] FIG. 16 illustrates the configuration in which the inner filter 100 moves the magnet 320 downwards.

[0411] The inner filter 100 may press the magnet 320 in the course of being received in the outer filter 200.

[0412] The inner filter 100 may include an upper protrusion 125 which projects from the outer surface of the inner filter 100 to push the magnet 320 of the signal generator 300 downwards.

[0413] For example, the reception body 120 may press the magnet 320.

[0414] The upper protrusion 125 may be provided on the outer surface of the reception body 120 so as to come into contact with the magnet 320.

[0415] At least a portion of the upper protrusion 125 may come into contact with the magnet 310 while the inner filter 100 is inserted into the outer filter 200. The upper protrusion 125 may be positioned so as to lower the magnet 310 to the maximum when the inner filter 100 is completely received in the outer filter 200.

[0416] The upper protrusion 125 may project outwards from the lateral surface of the reception body 120 such that the upper protrusion 125 does not interfere with reception of the reception body 120 in the outer filter 200.

[0417] When the upper protrusion 125 presses the magnet 320, the restoring portion 330 may be compressed.

[0418] Here, when the outer filter 200 is mounted on the mounting portion 178, the magnet 320 may be positioned so as to overlap the sensor 400.

[0419] FIG. 17 illustrates a further embodiment of the signal generator and the sensor.

[0420] The signal generator 300 may be installed at the inner filter 100.

[0421] The signal generator 300 may be provided on the outer surface of the inner filter 100 so as to be moved upwards by the outer filter 200.

[0422] The sensor 400 may be installed at the mounting portion 178. The sensor 400 may be installed at a position at which the sensor 400 senses the signal generator 300 when the outer filter 200 is completely mounted on the mounting portion 178 and the inner filter 100 is mounted to the outer filter 200.

[0423] Specifically, the signal generator 300 may be installed outside the inner filter 100.

[0424] The guide rail 310 may be provided on the outer surface of the reception body 120 such that the magnet 320 is exposed to the outside of the reception body 120. The guide rail 310 may extend in an up-and-down direction on the outer surface of the reception body 120.

[0425] In the case in which the reception body 120 is divided into two bodies, the guide rail 310 may be coupled to only one of the two divided reception bodies 120 so as not to interfere with separation and coupling of the two divided reception bodies 120.

[0426] The magnet 320 may be moved in an up-and-down direction along the guide rail 310 in the state in which at least a portion of the magnet 320 is received in the guide rail 310.

[0427] The restoring portion 330 may be coupled to the inner and upper surface of the guide rail 310 so as to push the magnet 320 downwards.

[0428] At least a portion of the magnet 320 may project from the guide rail 310 so as to come into contact with the outer filter 200. The guide rail 310 may be formed to have a form of a slit supporting the two lateral surfaces of the magnet 320, and may further include a stepped portion to prevent the magnet 320 from escaping outwards.

[0429] Accordingly, when the inner filter 100 is received in the outer filter 200, the outer filter 200 may move the magnet 320 to the upper portion of the guide rail 310.

[0430] Here, the outer filter 200 with the inner filter 100 received therein is mounted on the mounting portion 178, the magnet 320 may be disposed at a position corresponding to the sensor 400.

[0431] Consequently, the sensor may sense the magnet 320, and the controller may recognize that both the inner filter 100 and the outer filter 200 are simultaneously coupled to the mounting portion 178.

[0432] However, when the outer filter 200 without the inner filter 100 received therein is mounted on the mounting portion 178, the sensor 400 may not sense the magnet 320.

[0433] Furthermore, when the inner filter 100 alone is mounted on the mounting portion 178, the magnet 320 does not overlap the sensor 400 because the magnet 320 is not moved upwards.

[0434] Accordingly, the controller may recognize that at least one of the inner filter 100 or the outer filter 200 is not mounted on the mounting portion 178 and may not permit operation of the clothing processing apparatus , by sensing only that the sensor 400 does not sense the magnet 320.

[0435] As a result, a user may be induced to mount both the inner filter 100 and the outer filter 200 on the mounting portion 178.

[0436] FIG. 18 illustrates the configuration in which the outer filter 200 shown in FIG. 17 moves the magnet 320 upwards.

[0437] The outer filter 200 may press the magnet 320 in the course of receiving the inner filter 100.

[0438] For example, the insertion body 220 may press the magnet 320.

[0439] The outer filter 200 may include a lower protrusion 225 which projects from the inner surface of the outer filter 200 to push the magnet 320 of the signal generator 300 upwards.

[0440] The insertion body 220 may further include the lower protrusion 225 on the inner surface thereof, which comes into contact with the magnet 320.

[0441] At least a portion of the lower protrusion 225 may come into contact with the magnet 310 while the inner filter 100 is inserted into the outer filter 200. The lower protrusion 225 may be positioned so as to raise the magnet 310 to the maximum when the inner filter 100 is completely received in the outer filter 200.

[0442] The lower protrusion 225 may project inwards from the lateral surface of the insertion body 220 but may not come into contact with the inner filter 100. Accordingly, the lower protrusion 225 may not interfere with reception of the inner filter 100 in the outer filter 200.

[0443] When the lower protrusion 225 presses the magnet 320, the restoring portion 330 may be compressed.

[0444] Here, when the outer filter 200 is mounted on the mounting portion 178, the magnet 320 may be positioned so as to overlap the sensor 400.

[0445] It will be apparent to those skilled in the art that various modifications and variations can be made in the present disclosure without departing from the spirit or scope of the present disclosure. Thus, it is intended that the present disclosure covers the modifications and variations of this present disclosure provided they come within the scope of the appended claims and their equivalents.

Claims

1. A laundry treatment apparatus comprising:

a cabinet having an opening at a front surface thereof;

a drum comprising an introduction port communicating with the opening and receiving laundry therein;

a driving unit received in the cabinet so as to

rotate the drum;
a circulation duct configured to circulate air discharged from the introduction port at an outside of the drum to supply the air to the drum;
a heat supply comprising at least one heat exchanger installed in the circulation duct so as to condense moisture in the air or to heat the air;
a mounting portion configured to allow the introduction port to communicate with the circulation duct to guide the air in the drum to the circulation duct; and
a filter unit removably coupled to the mounting portion so as to remove foreign substances from the air,
wherein the filter unit comprises:

an outer filter seated on the mounting portion so as to remove foreign substances introduced into the circulation duct; and
an inner filter mounted on the mounting portion such that at least a portion of the inner filter is received in the outer filter, and wherein the outer filter is configured such that at least a portion thereof escapes from the mounting portion until the inner filter is mounted on the mounting portion.

2. The laundry treatment apparatus of claim 1, further comprising:

a signal generator coupled to the filter unit so as to generate an external signal;
a sensor provided at the mounting portion so as to sense the signal generator; and
a controller configured to permit operation of at least one of the heat supply or the driving unit when the sensor senses the signal generator,
wherein the signal generator is installed at the outer filter.

3. The laundry treatment apparatus of claim 1, wherein the outer filter comprises:

a seating body seated on the mounting portion; and
an insertion body which extends from the seating body to be inserted at at least a portion thereof into the mounting portion and at which a mesh member is installed, and
wherein the laundry treatment apparatus comprises an elastic portion coupled to the seating body so as to separate the seating body from the mounting portion.

4. The laundry treatment apparatus of claim 3, further comprising a door rotatably coupled to the cabinet so as to open and close the opening,
wherein the elastic portion is configured to cause the seating body to be taken out of the mounting portion, thereby preventing the door from closing the opening.

5. The laundry treatment apparatus of claim 4, wherein the seating body is capable of proj ecting to an inside of the introduction port by means of the elastic portion.

6. The laundry treatment apparatus of claim 3, wherein the seating body comprises a seating portion which extends outwards from the insertion body and is seated on an upper surface of the mounting portion, and
wherein the elastic portion is coupled to a lower surface of the seating portion so as to come into contact with the upper surface of the mounting portion.

7. The laundry treatment apparatus of claim 3, wherein the inner filter comprises:

a support body seated on the seating body and pressing the elastic portion; and
a reception body which extends from the support body and at which a mesh member is installed, at least a portion of the reception body being inserted into the outer filter, and
wherein the laundry treatment apparatus further comprises a coupler configured to fix the support body to the mounting portion and to maintain the pressed state of the elastic portion.

8. The laundry treatment apparatus of claim 7, wherein the mounting portion comprises:

a mounting hole which is formed through an inner circumferential surface of the introduction port and by which the filter unit is supported; and
a mounting body which extends to the circulation duct from the mounting hole and which receive the filter unit, the sensor being installed on an outer circumferential surface of the mounting body, and
wherein the coupler comprises a coupling hook which projects from a lateral surface of the support body and is removably coupled to an inner surface of the mounting hole.

9. The laundry treatment apparatus of claim 8, wherein the coupler comprises a coupling rib which is provided at the support body so as to be reciprocatingly moved to the inner surface of the mounting hole, and wherein the coupling hook is formed at a distal end of the coupling rib.

10. The laundry treatment apparatus of claim 8, wherein the coupler comprises:

a plurality of coupling ribs which are reciprocatingly moved to the inner surface of the mounting hole from two lateral surfaces of the support body; and
an elastic member provided between the plurality of coupling ribs so as to push the plurality of ribs toward the two lateral surfaces of the support body, and
wherein the coupling hook is formed at a distal end of each of the plurality of coupling ribs.

11. The laundry treatment apparatus of claim 10, wherein each of the plurality of coupling ribs comprises:

a push portion to which the elastic member is coupled; and
an extension rib which extends toward a corresponding one of the two lateral surfaces of the support body and the distal end of which is provided with the coupling hook, and
wherein the support body comprises a guide case which receives the elastic member at an upper surface thereof and which exposes the push portions through two lateral sides thereof.

12. The laundry treatment apparatus of claim 11, wherein the plurality of coupling ribs are spaced apart from each other by a distance corresponding to a distance the coupling hooks in the guide case are separated from the mounting hole.

13. The laundry treatment apparatus of claim 10, wherein the support body comprises movement rails which extend in a width direction thereof and guide the plurality of coupling ribs.

14. The laundry treatment apparatus of claim 7, wherein the sensor is disposed at a position corresponding to the signal generator when the coupler fixes the support body to the mounting portion.

15. A laundry treatment apparatus comprising:

a cabinet having an opening at a front surface thereof;
a drum comprising an introduction port communicating with the opening and receiving laundry therein;
a driving unit received in the cabinet so as to rotate the drum;
a circulation duct configured to circulate air discharged from the introduction port at an outside of the drum to supply the air to the drum;
a heat supply comprising at least one heat exchanger installed in the circulation duct so as to condense moisture in the air or to heat the air;
a mounting portion configured to allow the introduction port to communicate with the circulation duct to guide the air in the drum to the circulation duct; and
a filter unit removably coupled to the mounting portion so as to remove foreign substances from the air,
wherein the filter unit comprises:

an outer filter seated on the mounting portion so as to remove foreign substances introduced into the circulation duct; and
an inner filter mounted on the mounting portion such that at least a portion of the inner filter is received in the outer filter, and
wherein one of the outer filter and the inner filter is completely mounted on the mounting portion only when another of the outer filter and the inner filter is mounted on the mounting portion.

16. The laundry treatment apparatus of claim 15, wherein the inner filter is shakable when the inner filter alone is mounted on the mounting portion.

17. The laundry treatment apparatus of claim 16, wherein the inner filter comprises:

a support body seated on an upper surface of the outer filter; and
a reception body which extends from the support body and at least a portion of which is inserted into the outer filter or the mounting portion, and
wherein the support body is shakable on an upper surface of the mounting portion when the support body is mounted on the mounting portion.

18. The laundry treatment apparatus of claim 17, wherein the outer filter receives the inner filter therein and fixes the inner filter.

19. The laundry treatment apparatus of claim 18, wherein the outer filter comprises:

a seating body seated on the mounting portion without shaking; and
an insertion body which extends from the seating body and is seated on the mounting portion and which receives the reception body, and
wherein at least a portion of an inner surface of the insertion body contacts and supports an outer surface of the reception body.

20. The laundry treatment apparatus of claim 15, wherein the outer filter is removeable from the mounting portion when the inner filter is not mounted on the mounting portion.

21. The laundry treatment apparatus of claim 20, where-

in the outer filter is taken out of the mounting portion toward the introduction port.

22. The laundry treatment apparatus of claim 20, further comprising a door rotatably coupled to the cabinet so as to open and close the opening,
wherein the inner filter is fixed to the mounting portion in a state of pressing the outer filter.

23. The laundry treatment apparatus of claim 20, wherein the outer filter projects from the mounting portion to prevent the door from closing the opening.

24. A laundry treatment apparatus comprising:

a cabinet having an opening at a front surface thereof;
a drum comprising an introduction port communicating with the opening and receiving laundry therein;
a driving portion accommodated in the cabinet to rotate the drum;
a circulation duct configured to circulate air discharged from the introduction port at an outside of the drum to supply the air to the drum;
a heat supply portion comprising at least one heat exchanger installed in the circulation duct so as to condense moisture in the air or to heat the air;
a mounting portion configured to allow the introduction port to communicate with the circulation duct to guide the air in the drum to the circulation duct;
a filter portion detachably coupled to the mounting portion to remove foreign substances from the air;
a signal generator coupled to the filter portion to generate an external signal;
a sensor provided at the mounting portion to sense the signal generator; and
a controller configured to permit operation of at least one of the heat supply portion or the driving portion in case that the sensor senses the signal generator,
wherein the filter portion comprises:

an outer filter seated on the mounting portion to remove foreign substances introduced into the circulation duct; and
an inner filter mounted on the mounting portion such that at least a portion of the inner filter is accommodated in the outer filter, and
wherein the signal generator is provided to be reciprocatingly move along one surface of one of the mounting portion, the outer filter and the inner filter and is provided to move toward the sensor in case that the outer filter or the inner filter is seated on the mounting portion.

25. The laundry treatment apparatus of claim 24, wherein the signal generator is provided on an inner circumferential surface of the mounting portion, and is moved in an up-and-down direction toward the sensor by the outer filter.

26. The laundry treatment apparatus of claim 25, wherein the signal generator is provided on an inner surface of the outer filter so as to be moved downwards by the inner filter.

27. The laundry treatment apparatus of claim 26, wherein the inner filter comprises an upper protrusion which projects from an outer surface thereof and which pushes the signal generator downwards.

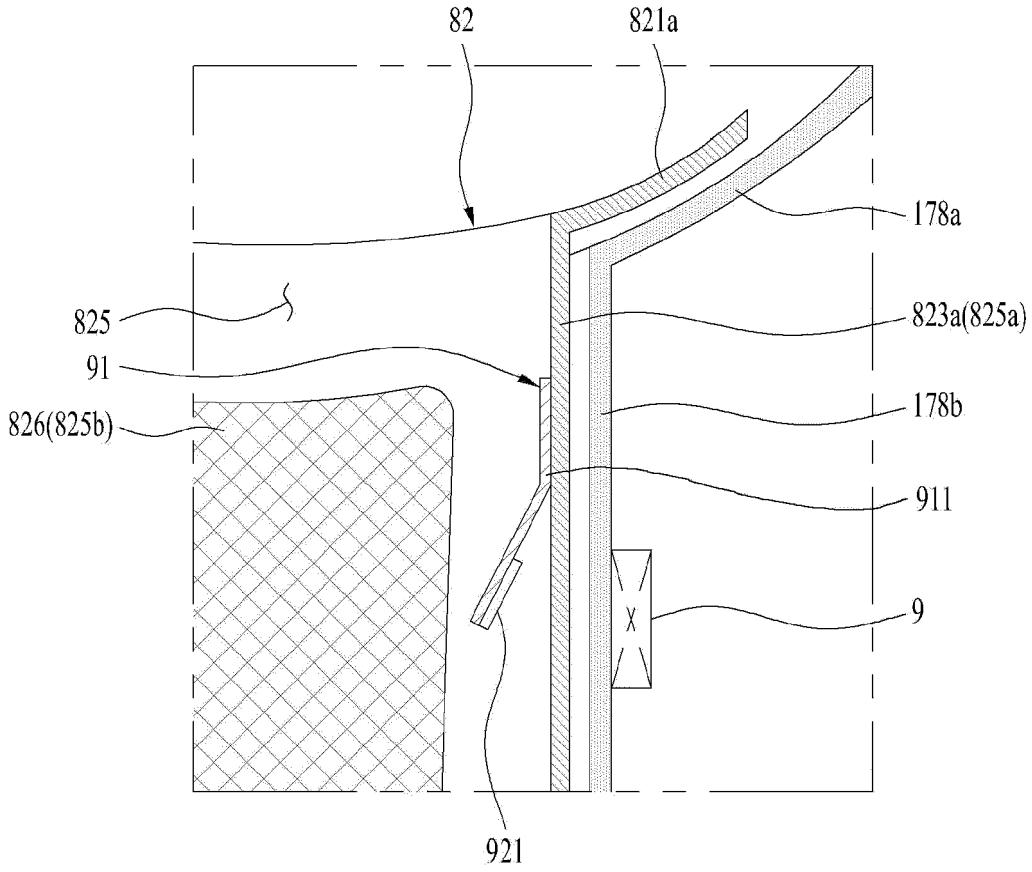
28. The laundry treatment apparatus of claim 25, wherein the signal generator is provided on an outer surface of the inner filter so as to be moved upwards by the outer filter.

29. The laundry treatment apparatus of claim 28, wherein the outer filter comprises a lower protrusion which projects from an inner surface thereof and which pushes the signal generator upwards.

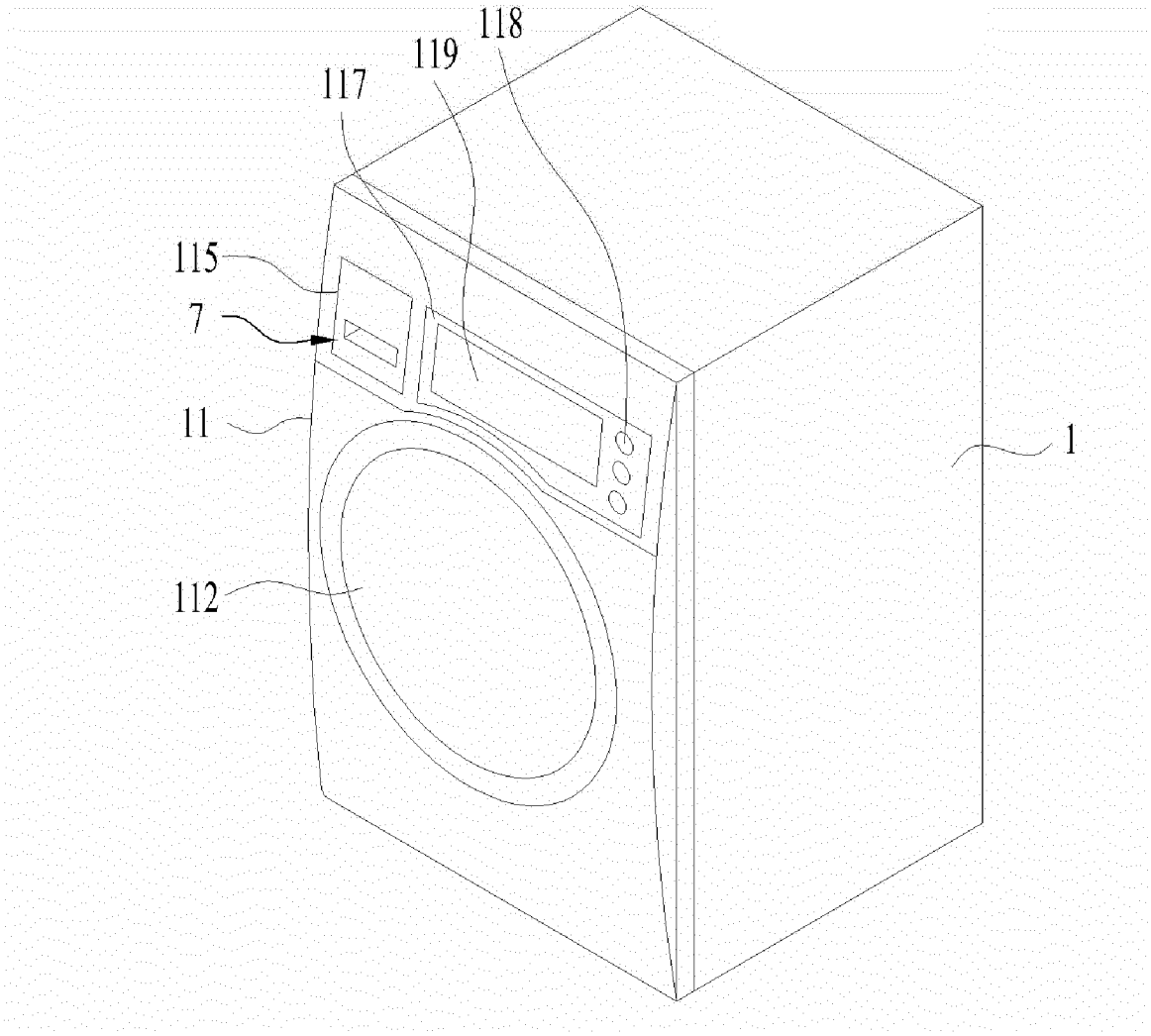
30. The laundry treatment apparatus of claim 25, wherein the signal generator comprises:

a magnet interacting with the sensor;
a guide rail installed at an inner surface of the mounting portion, the outer filter, and the inner filter; and
a restoring portion installed at the guide rail so as to push the magnet upwards or downwards.

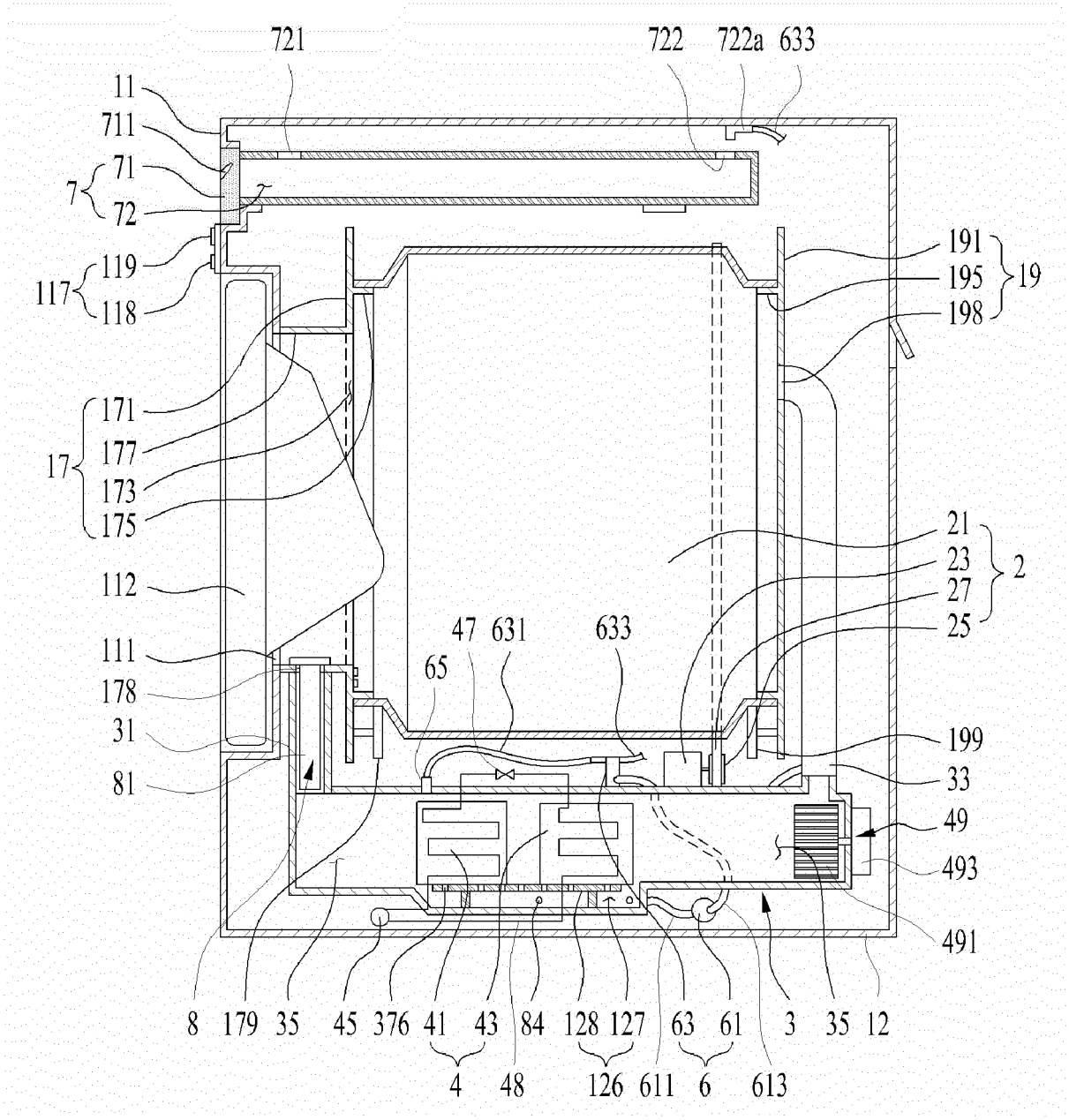
【FIG 1】



【FIG 2】



【FIG 3】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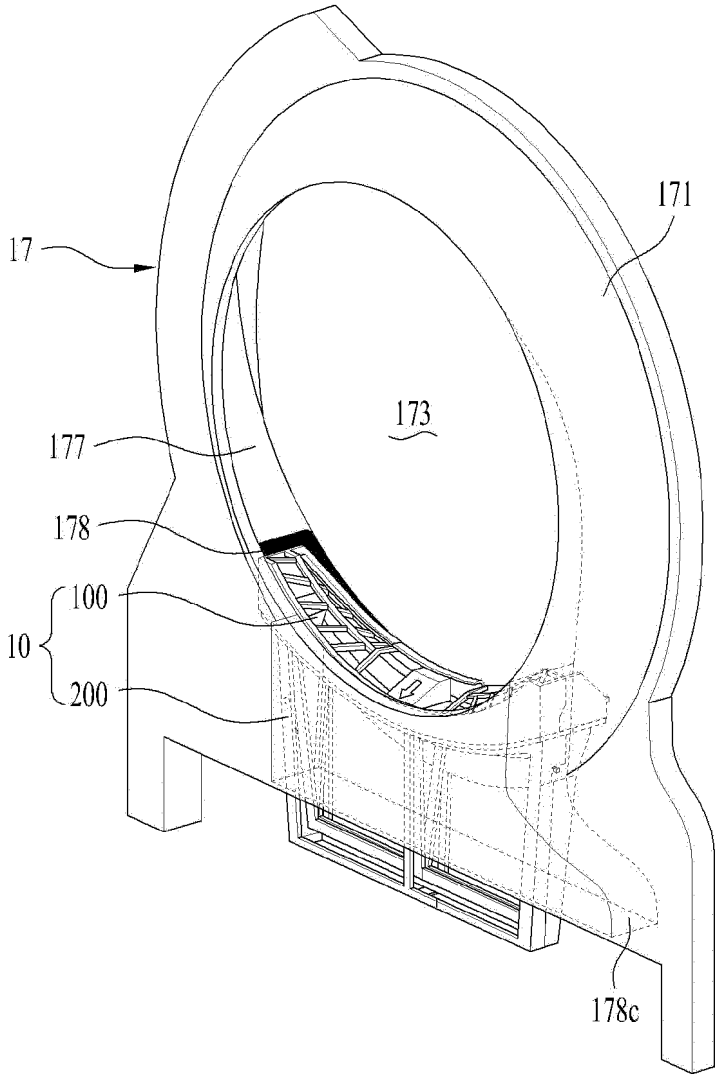
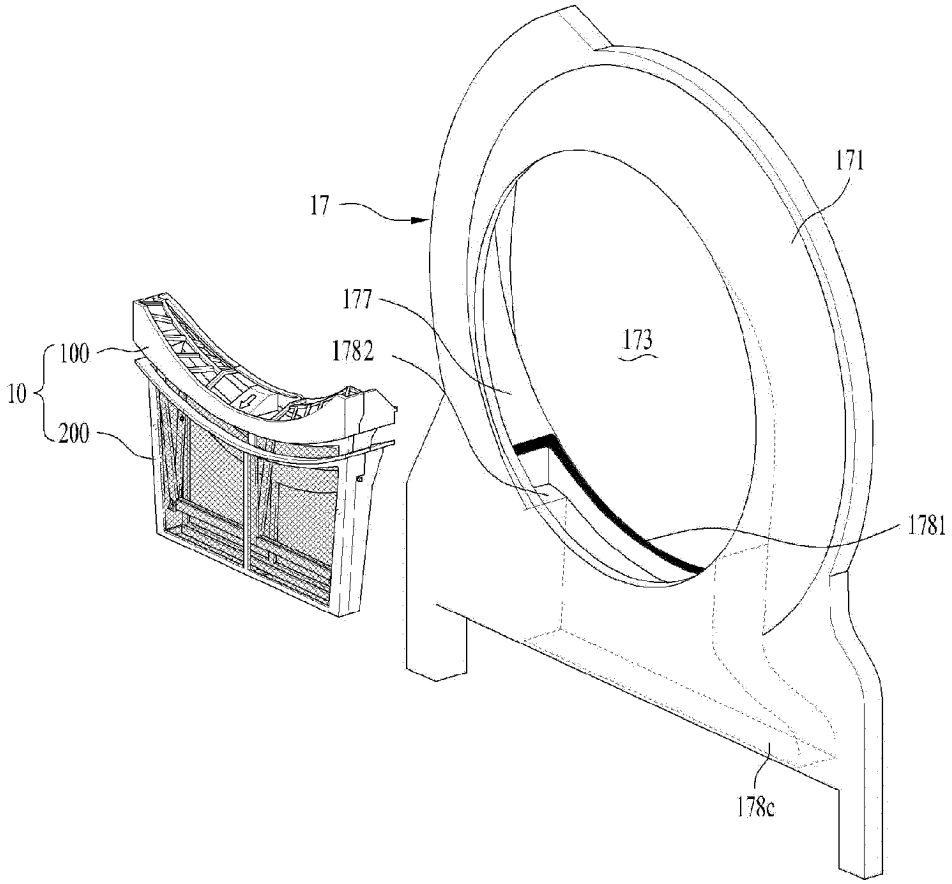
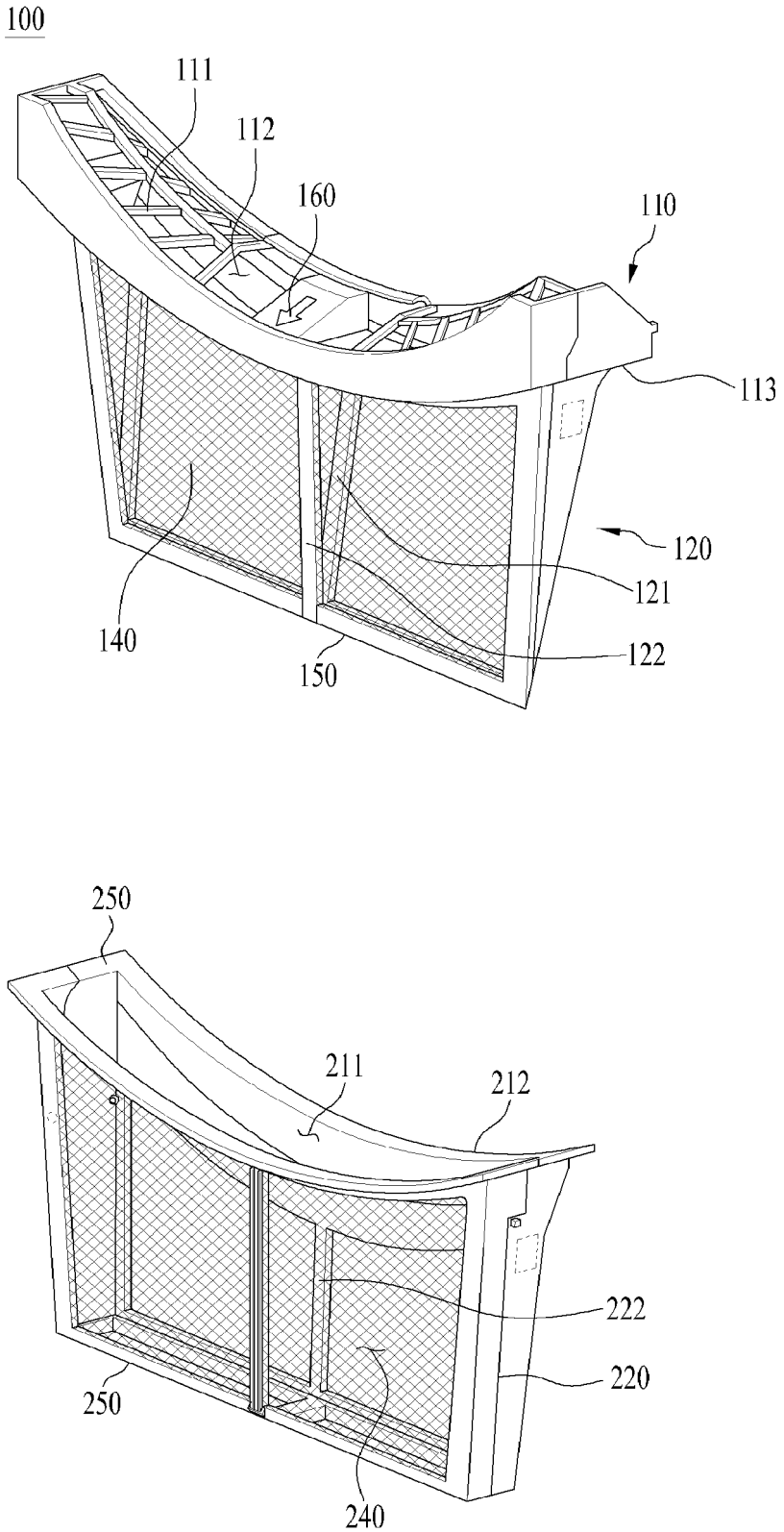
【FIG 4】



【FIG 5】



【FIG 6】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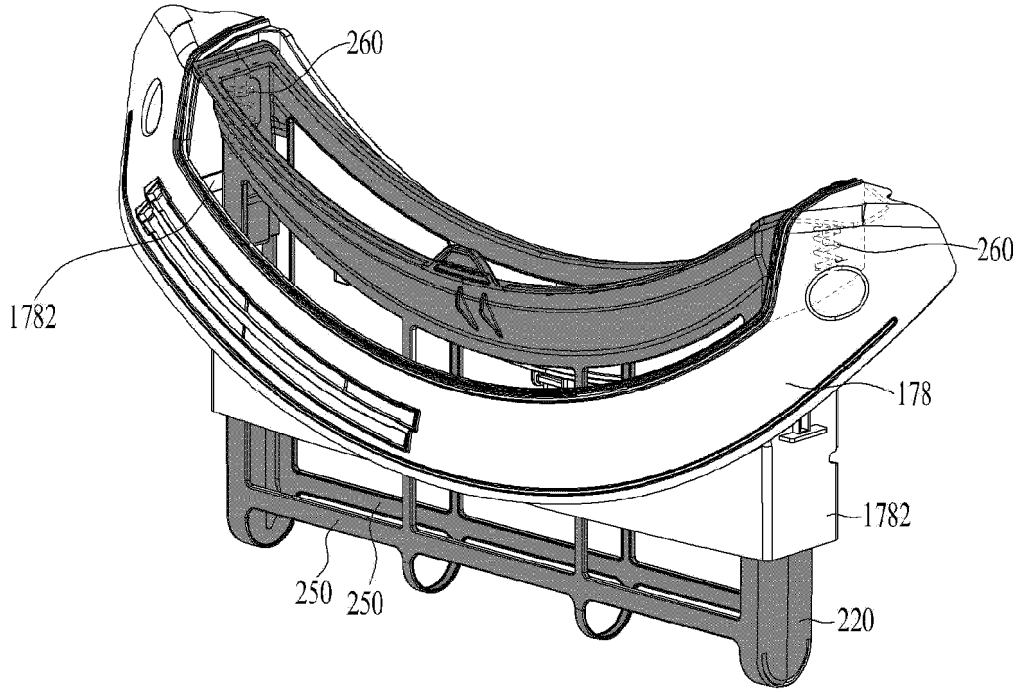
【FIG 7】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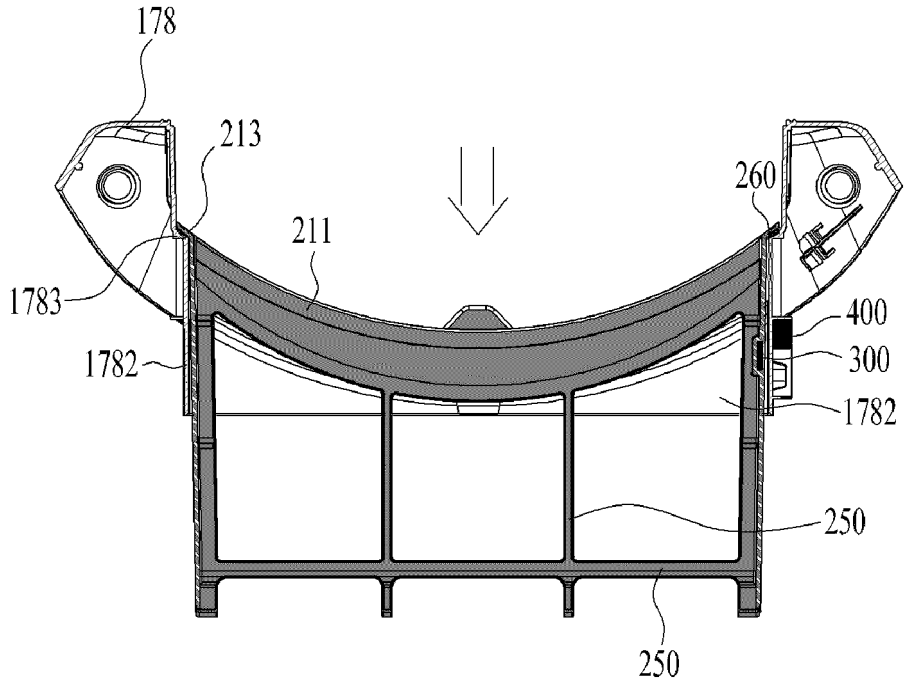
【FIG 8】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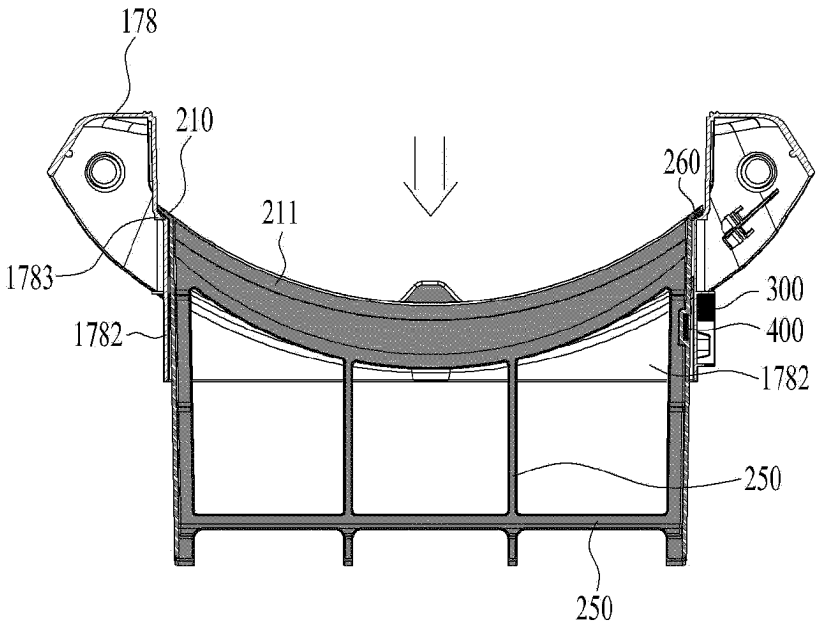
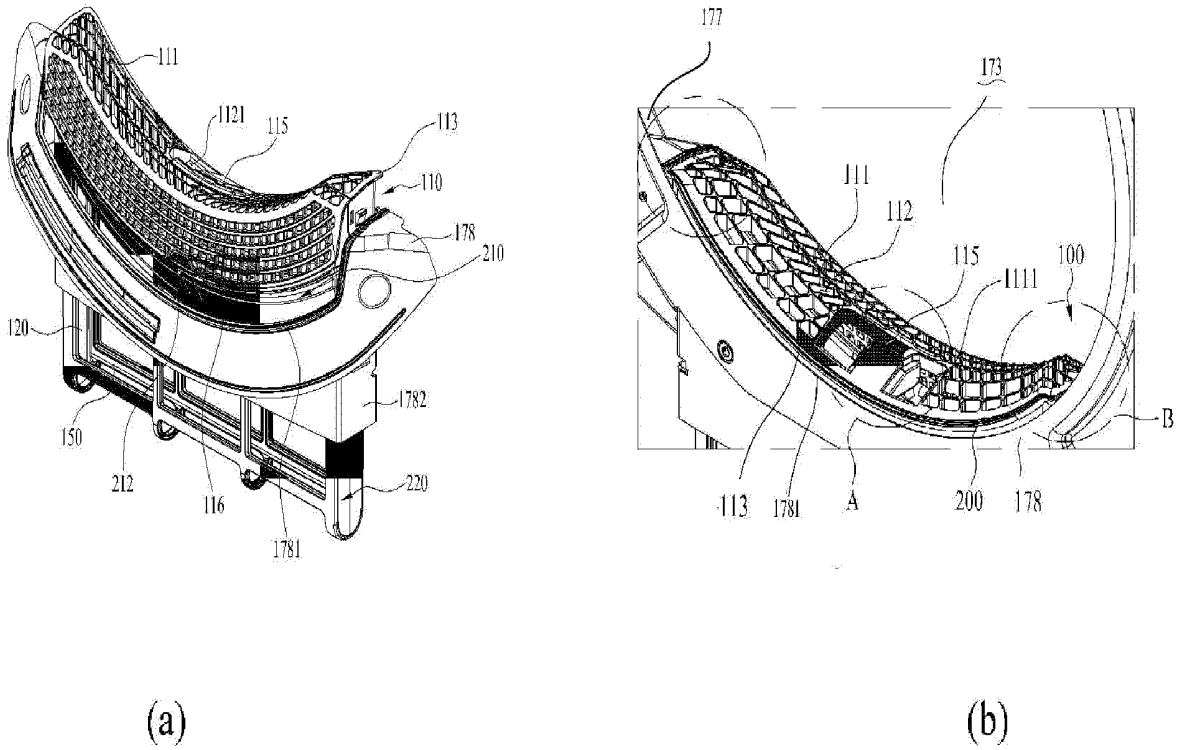
【FIG 9】



【FIG 10】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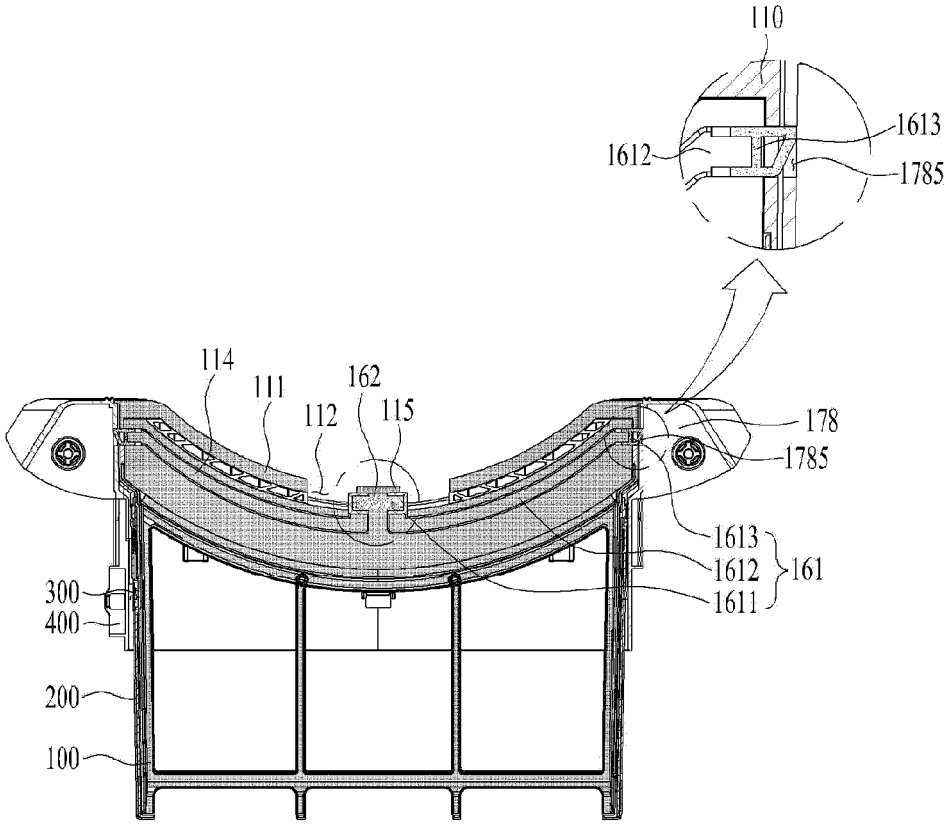
(a) (b)

【FIG 11】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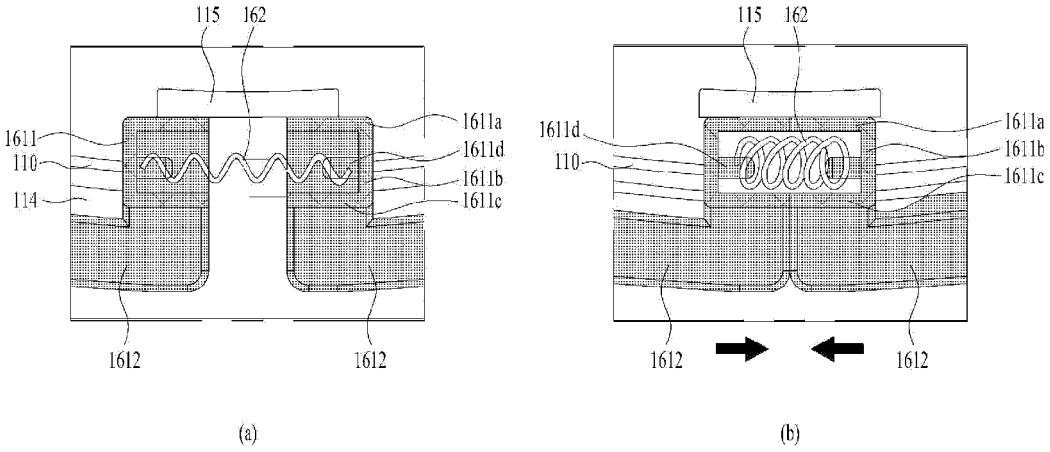
【FIG 12】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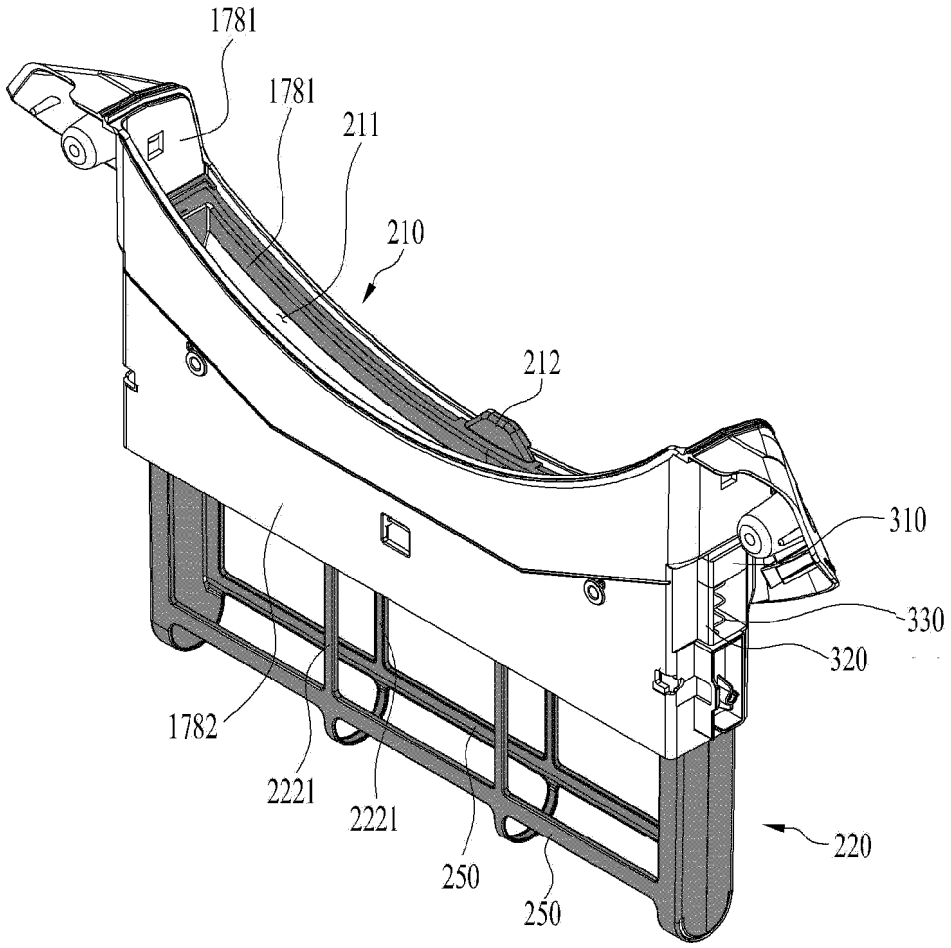
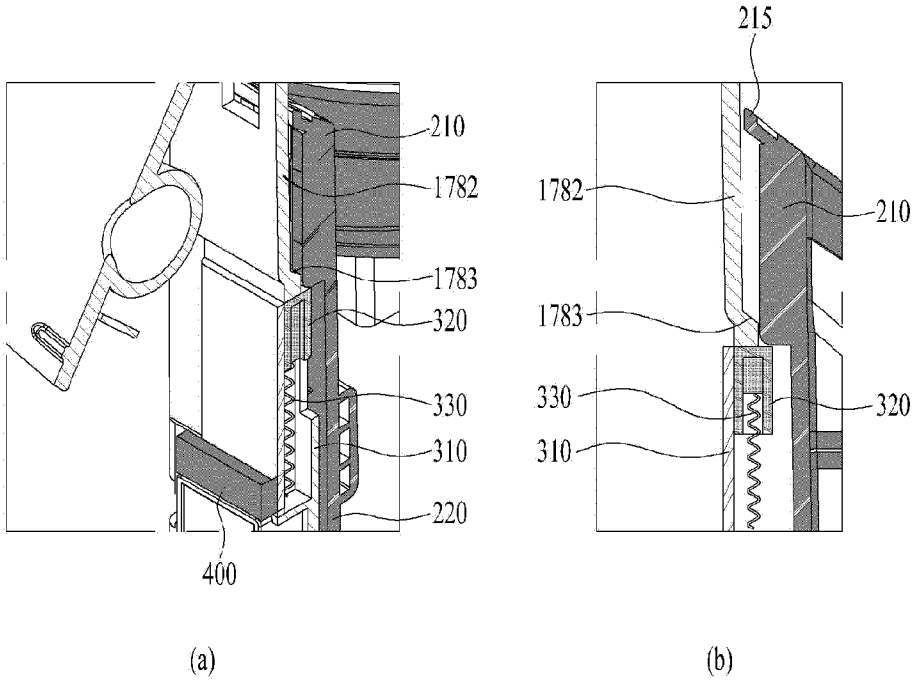
(b)

【FIG 13】



【FIG 14】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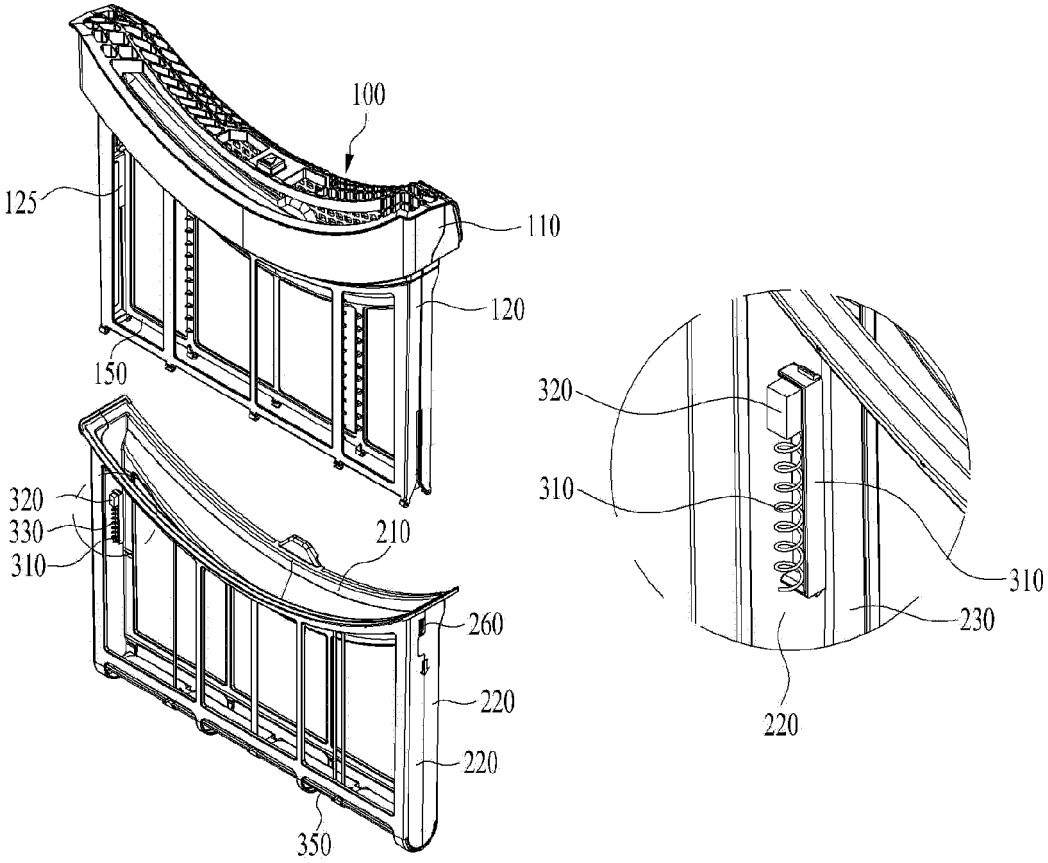
(b)

【FIG 15】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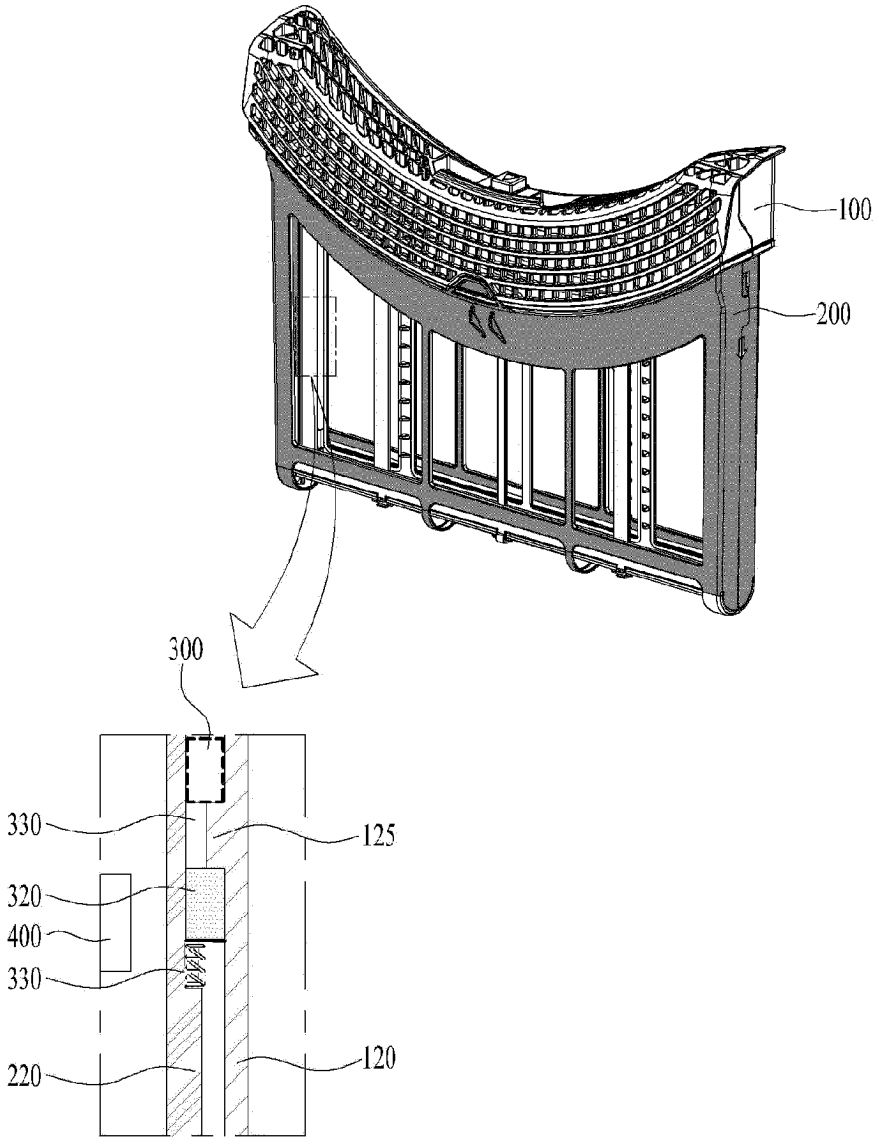
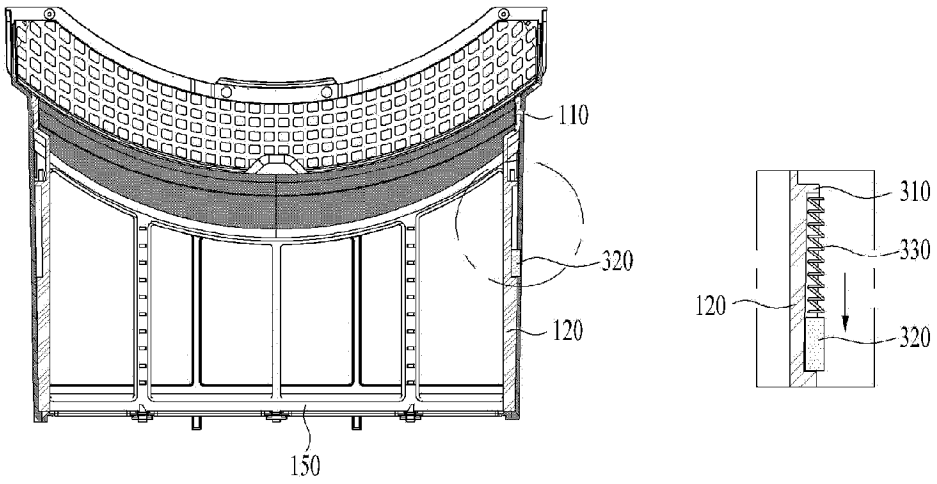
【FIG 16】



【FIG 17】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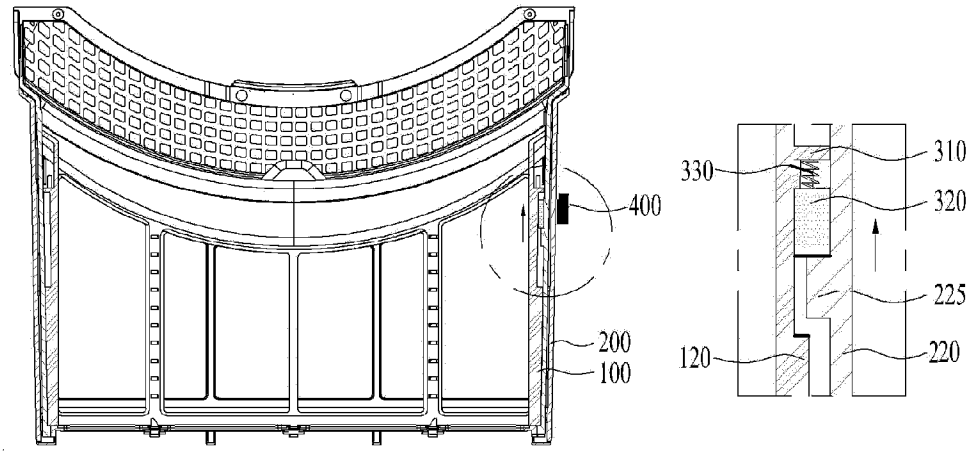
【FIG 18】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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002177

A. CLASSIFICATION OF SUBJECT MATTER

D06F 58/22(2006.01)i; **D06F 58/08**(2006.01)i; **D06F 58/20**(2006.01)i; **D06F 58/24**(2006.01)i; **D06F 58/26**(2006.01)i; **D06F 58/34**(2020.01)i; **D06F 34/14**(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F 58/22(2006.01); A47L 9/30(2006.01); D06F 33/30(2020.01); D06F 58/02(2006.01); D06F 58/04(2006.01); D06F 58/28(2006.01); F26B 21/00(2006.01)

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

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

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

eKOMPASS (KIPO internal) & keywords: 의류(clothes, laundry), 건조기(dryer), 린트(lint), 필터(filter), 감지(sensing)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 6400406 B2 (TOSHIBA LIFESTYLE PRODUCTS & SERVICES CORP.) 03 October 2018 (2018-10-03) See paragraphs [0011]-[0057] and figures 2 and 4.	1,2,15-21
Y		3-8,14,22-30
A		9-13
Y	KR 10-2020-0046411 A (LG ELECTRONICS INC.) 07 May 2020 (2020-05-07) See paragraphs [0045]-[0095] and figure 6.	3-8,14,22-30
Y	KR 10-2021-0128703 A (LG ELECTRONICS INC.) 27 October 2021 (2021-10-27) See paragraph [0099] and figure 5.	6
A	JP 2021-514215 A (ELECTROLUX PROFESSIONAL AB (PUBL)) 10 June 2021 (2021-06-10) See paragraphs [0014]-[0033].	1-30

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
30 May 2023	**31 May 2023**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208**	
Facsimile No. **+82-42-481-8578**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/002177

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0064528 A1 (KIM, Kyung Tae) 12 March 2009 (2009-03-12) See paragraphs [0030]-[0071].	1-30

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/002177

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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		US 2022-0034017 A1	03 February 2022
		WO 2020-085695 A1	30 April 2020
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JP 2021-514215 A	10 June 2021	EP 3743552 A1	02 December 2020
		JP 7208243 B2	18 January 2023
		US 2021-0047776 A1	18 February 2021
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US 2009-0064528 A1	12 March 2009	CN 101187141 A	28 May 2008
		CN 101187141 B	16 June 2010
		CN 101187141 C	28 May 2008
		KR 10-2009-0024464 A	09 March 2009

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 1020170009657 **[0008]**
- KR 1020210128702 **[0014]**