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(54) **DRYING SYSTEM AND LAUNDRY TREATMENT APPARATUS**

(57) A drying system includes an air duct arranged above a drum assembly and connected to the drum assembly, and a heat pump system. An evaporator and a condenser of the heat pump system are sequentially arranged between an air inlet end and an air outlet end of the air duct; a compressor of the heat pump system is arranged at middle portion below the drum assembly, spaced apart from a vertical axial plane of the drum assembly, and its input port and output port are connected to the evaporator and the condenser through pipe, respectively. An air duct is arranged above the drum assembly, and a compressor is arranged in middle below the drum assembly, spaced apart from the vertical axial plane of the drum assembly. That is, the compressor is arranged on one side below the drum assembly, and the space on both sides below the drum assembly can be fully utilized to lay out the drying system, so the layout is more compact, and it is beneficial to reduce the overall size of the laundry treatment apparatus. A laundry treatment apparatus with the drying system is also provided.

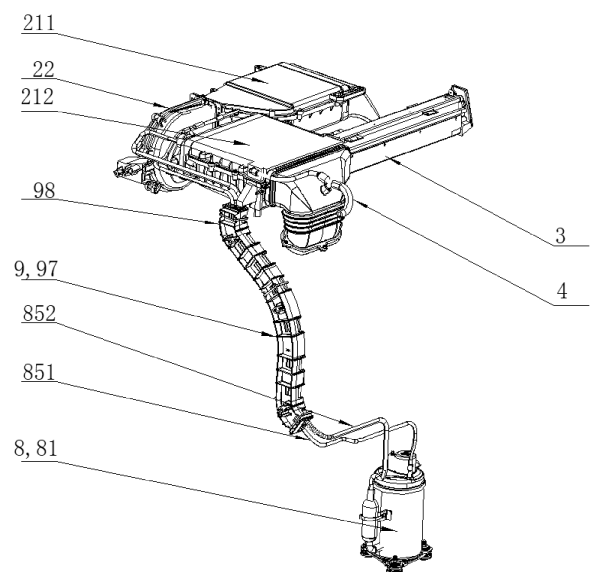


Figure 15

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Description

Technical Field

[0001] The present invention belongs to the technical field of laundry treatment, and specifically relates to a drying system, and also relates to a laundry treatment apparatus with the drying system.

Background

[0002] User's requirements for quality of life are getting higher and higher with social progress and technological development, and the laundry treatment apparatus being as a common household appliance in life is required to have more functions by user. Therefore, the functions of the laundry treatment apparatus are becoming more comprehensive and diverse, and the size of the laundry treatment apparatus is becoming smaller and smaller. Among them, the laundry treatment apparatus that can dry washed laundry is widely welcomed because it can better adapt to rainy and humid weather and can shorten the drying time of laundry in the later stage. At the same time, since the demand for ultra-thin laundry treatment apparatus has increased significantly, it is an important direction for the development of the laundry treatment apparatus which has the maximum washing capacity in a smaller body.

[0003] The laundry treatment apparatus with drying function generally includes a drying system and a drum assembly arranged in the housing of the laundry treatment apparatus. The drum assembly is installed in the housing through a shock absorber, and the drying system is connected to the drum assembly. Conventionally, the drying system includes an air duct and a heat pump system. A condenser and an evaporator of the heat pump system are arranged inside the air duct, and the compressor is arranged outside the air duct. In existing laundry treatment apparatus, the compressor of the heat pump system is generally arranged rear of the drum assembly, which occupies a lot of internal space of the housing. For example, Chinese patent application CN201610181823.8 discloses a laundry dryer, in which the entire heat pump unit is arranged below the drum assembly, and the compressor is arranged in rear below the drum assembly. Chinese patent application CN201510384704.8 discloses a drying system and a laundry dryer, in which the air duct and the heat pump unit are integrated and arranged above the drum assembly, and the compressor is arranged above and rear the drum assembly. The above arrangement is not conducive to reducing the overall size of the laundry treatment apparatus.

[0004] Therefore, it is a problem to be solved urgently by those skilled in the art that a drying system can ensure the drying effect, make full use of the internal space of the housing, and avoid increasing the overall size of the laundry treatment apparatus.

[0005] In view of this, the present invention is proposed.

Summary

[0006] The present invention provides a drying system. An air duct is arranged above the drum assembly, and a compressor is arranged in middle below the drum assembly, spaced apart from the vertical axial plane of the drum assembly. That is, the compressor is arranged on one side below the drum assembly, and the space on both sides below the drum assembly can be fully utilized to lay out the drying system, so the layout is more compact, and the problems are solved poor compactness of the internal structure and large overall size of the existing laundry treatment apparatus with drying function.

[0007] In order to solve the above problem, the basic solution adopted by the present invention is as follows.

[0008] A drying system includes an air duct arranged above a drum assembly and connected to the drum assembly, and a heat pump system. An evaporator and a condenser of the heat pump system are arranged between an air inlet end and an air outlet end of the air duct.

[0009] A compressor of the heat pump system is arranged at middle portion below the drum assembly, and spaced apart from a vertical axial plane of the drum assembly. An input port and an output port of the compressor are connected to the evaporator and the condenser through pipe, respectively.

[0010] As an embodiment, the pipe is extended toward a rear side of the drum assembly from the output port and/or the input port of the compressor, extended upward along a rear side of the drum assembly, and connected to an input port of the condenser and/or an output port of the evaporator. The pipe is spaced apart from the rear side of the drum assembly.

[0011] As an embodiment, the drying system also includes a supporting member, which is arranged behind the drum assembly and spaced apart from the rear side of the drum assembly. The supporting member is extended along an extending direction of the pipe, and a side of the supporting member is provided with a supporting groove extending along the length direction, and the pipe is clamped into the supporting groove of the supporting member.

[0012] Preferably, the pipe includes a first pipe connected between the output port of the compressor and the input port of the condenser, and a second pipe connected between the output port of the compressor and the output port of the evaporator. The first pipe and the second pipe are arranged in parallel, and the supporting member is provided with two supporting grooves corresponding to the first pipe and the second pipe respectively.

[0013] As an embodiment, the supporting groove is arranged on a side of the supporting member close to the drum assembly, and a claw is arranged at an opening of

the supporting groove. The claw is extended toward an interior of the supporting groove from an end of a groove wall away from a groove bottom for limiting the pipe.

[0014] Preferably, the claw is arranged on a partition plate between the first supporting groove and the second supporting groove.

[0015] As an embodiment, a heat insulation sleeve is sleeved on the pipe, at least at a position corresponding to the supporting groove, and the claw is cooperated with the heat insulation sleeve in a limiting manner.

[0016] Preferably, a limiting block is sleeved on an outer periphery of the heat insulation sleeve for clamping the heat insulation sleeve. A shape of the limiting block is matched to a shape of the supporting groove, and the limiting block is fixed in the supporting groove by the claw.

[0017] As an embodiment, a notch corresponding to the claw is arranged on the groove wall of the supporting groove away from the partition plate.

[0018] A fixing hoop is sleeved on the outer periphery of the supporting member from the notch; Preferably, limiting blocks are arranged at intervals along a length direction of the pipe, and fixing hoops are configured to correspond to the limiting blocks one by one.

[0019] As an embodiment, the supporting member includes:

a supporting member body, bending along a direction away from an axis of the drum assembly;
supporting member joints, arranged at both ends of the supporting member body and extending along a radial direction of the drum assembly toward an edge of the rear side of the drum assembly.

[0020] As an embodiment, the air duct includes a first air duct arranged above the drum assembly and extending in a front-rear direction, a second air duct extending in a left-right direction from a rear end of the first air duct, and a fan connected between the first air duct and the second air duct; the condenser and the evaporator are respectively arranged in the first air duct and the second air duct.

[0021] Preferably, a side wall of an end of the first air duct close to the second air duct is contracted inward in a direction toward the fan. One end of the second air duct close to the first air duct is extended downwards and in a direction toward the first air duct, and has a front side wall and a rear side wall being contracted inward. The first pipe is extended forward from an upper side of one end of the second air duct close to the first air duct and is connected to the condenser in the first air duct; the second pipe is extended into an inside of the second air duct from one side of the second air duct close to the fan and is connected to the evaporator.

[0022] Preferably, an air distribution plate is arranged inside the first air duct and between an air outlet end of the fan, for controlling the airflow to flow evenly through the condenser.

[0023] As an embodiment, each of the condenser and

the evaporator is fin-type heat sink, includes an input pipe and an output pipe extending along a length direction of the air duct, and a heat exchange pipe with a wavy shape connected between the input pipe and the output pipe.

[0024] Preferably, the heat exchange pipe is set to be flat and extended along the length direction of the air duct, and multiple groups of heat exchange pipes are arranged at intervals along the length direction of the air duct.

[0025] The present invention also provides a laundry treatment apparatus installed with the above-mentioned drying system, including a housing. The air duct is installed on a top wall of the housing, the compressor is installed on a bottom wall of the housing, and the pipe is installed on a rear wall of the housing through the supporting member.

[0026] After adopting the above solutions, the present invention have the following advantages compared with the prior art:

1. In the present invention, air duct is arranged above the drum assembly, and a compressor is arranged in middle below the drum assembly, spaced apart from the vertical axial plane of the drum assembly. That is, the compressor is arranged on one side below the drum assembly, and the space on both sides below the drum assembly can be fully utilized to lay out the drying system, so the layout is more compact, and it is beneficial to reduce the overall size of the laundry treatment apparatus.

2. In the present invention, the air duct is installed on the top wall of the housing of the laundry treatment apparatus, and the pipe is installed on the housing of the laundry treatment apparatus through the supporting member, thereby avoiding eccentric movement of the drum assembly during operation from impacting the pipes, to keep the installation stability of the copper pipe well, and further keep the reliability of the drying system.

3. In the present invention, by providing the heat insulation sleeve, the energy loss of the refrigerant in the heat pump system 8 can be avoided, and the temperature of the pipe can be prevented from affecting other components, thereby improving the overall working stability of the laundry treatment apparatus.

[0027] At the same time, the present invention has a simple structure, significant effect, and is suitable for promotion and use.

[0028] The specific Embodiments of the present invention are described in further detail below with reference to the accompanying drawings.

Description of Drawings

[0029] The accompanying drawings are part of the present invention and are used to provide a further understanding of the present application. The exemplary em-

bodiments of the present invention and their descriptions are used to explain the present invention, but do not constitute an improper limitation of the present invention. The drawings described below are only some embodiments. For those skilled in art, other drawings can be obtained based on these drawings without creative work. In the drawings:

Figure 1 is a structural diagram of a drum assembly in an Embodiment of the present invention;
 Figure 2 is a structural diagram of assembling a drying system in an Embodiment of the present invention;
 Figure 3 is a cross-sectional view at A-A in Figure 2 of an Embodiment of the present invention;
 Figure 4 is an enlarged view of A in position in Figure 3 of an Embodiment of the present invention;
 Figure 5 is a cross-sectional view at B-B in Figure 2 of an Embodiment of the present invention;
 Figure 6 is a structural diagram of a drying system in an Embodiment of the present invention;
 Figure 7 is a top view of a drying system in an Embodiment of the present invention;
 Figure 8 is a cross-sectional view at C-C in Figure 7 of an Embodiment of the present invention;
 Figure 9 is a structural diagram of a filtering device in an Embodiment of the present invention;
 Figure 10 is a cross-sectional view of a filtering device in an Embodiment of the present invention;
 Figure 11 is a structural diagram of assembling a pull-out part and a filter screen in an Embodiment of the present invention;
 Figure 12 is an exploded view of a filter screen in an Embodiment of the present invention;
 Figure 13 is a structural diagram of an internal structure of a second air duct in an Embodiment of the present invention;
 Figure 14 is a cross-sectional view of a corner of a second air duct in an Embodiment of the present invention;
 Figure 15 is a structural diagram of a drying system with a heat pump system in an Embodiment of the present invention;
 Figure 16 is a structural diagram of an installation structure of a heat pump system and an air duct in an Embodiment of the present invention;
 Figure 17 is a structural diagram of a supporting member in an Embodiment of the present invention;
 Figure 18 is an enlarged view of position B in Figure 17 of an Embodiment of the present invention.

Description of main components in the figures:

[0030]

1. Drum assembly; 11. Air inlet; 111. Air inlet connector; 12. Air outlet; 121. First extension portion; 2. Drying system; 21. Air duct; 211. First air duct; 2111.

First guide portion; 212. Second air duct; 2121. Second guide portion; 2122. Mounting protrusion; 2123. Mounting ring; 2124. Corrugated pipe section; 2125. Mounting groove; 2126. Second extension portion; 22. Fan; 23. Guide pipe; 3. Filtering device; 31. Filter screen; 311. Filter screen body; 312. Support frame; 3121. First frame; 3122. Second frame; 313. Transmission part; 3131. Third groove; 314. Positioning groove; 32. Pull-out mechanism; 321. Shell; 322. Pull-out part; 3221. Fifth groove; 3222. Positioning rib; 323. Decorative plate; 324. Plate; 325. Transmission device; 3251. First rack; 3252. Second rack; 3253. Gear; 4. Filter screen cleaning structure; 41. Electric scraper; 42. Spraying device; 421. First spray pipe; 422. Second spray pipe; 4221. First flushing port; 4222. Second flushing port; 5. Condensation structure; 6. Heating structure; 7. Water box; 71. Detergent box; 72. Front decorative plate; 8. Heat pump system; 81. Compressor; 82. Condenser; 83. Evaporator; 84. Capillary tube; 851. First pipe; 852. Second pipe; 853. Third pipe; 9. Supporting member; 91. First supporting groove; 92. Second supporting groove; 93. Partition plate; 94. Limiting block; 95. Claw; 96. Fixing hoop; 97. Supporting member body; 98. Supporting member connector; 99. Notch.

[0031] It should be noted that these drawings and descriptions are not intended to limit the scope of the invention in any way, but rather to illustrate the solutions of the present application to those skilled in the art by reference to specific embodiments.

Detailed Description

[0032] In order to make the purpose, technical solutions and advantages of the embodiments of the present application clearer, the technical solutions in the embodiments are clearly and completely described below in conjunction with the drawings in the embodiments of the present application. The following embodiments are used to illustrate the present application but are not used to limit the scope of the present application.

[0033] In the description of the present application, it should be noted that the directions or positional relationships indicated by terms such as "upper", "lower", "front", "back", "left", "right", "vertical", "inside" and "outside" are based on the directions or positional relationships shown in the accompanying drawings, and are only for the convenience of describing the present application and simplifying the description, rather than indicating or implying that the device or element referred to must have a specific direction, be constructed and operated in a specific direction, and therefore cannot be understood as a limitation on the present application.

[0034] In the description of the present application, it should be noted that, unless otherwise clearly specified and limited, the terms "installed", "connected", and "con-

nected" should be understood in a broad sense, for example, it can be a fixed connection, a detachable connection, or an integral connection; it can be a mechanical connection or an electrical connection; it can be a direct connection or an indirect connection through an intermediate medium. For ordinary technicians in this field, the specific meanings of the above terms in the present application can be understood according to specific circumstances.

[0035] As shown in Figures 1 to 18, in the Embodiment of the present invention, a drying system 2 is applied to a laundry treatment apparatus and is used for drying laundry in the laundry treatment apparatus.

[0036] The drying system 2 includes an air duct 21. The air duct 21 is arranged above the drum assembly 1. An air inlet end and an air outlet end of the air duct 21 are respectively connected to the drum assembly 1. A fan 22 is arranged in the air duct 21, and airflow circulates between the air duct 21 and the drum assembly 1 under the action of the fan 22 to dry laundry in the drum assembly 1.

[0037] A heating structure 6 and a condensation structure 5 are arranged in the air duct 21. Air is heated by the heating structure 6 and flows into the drum assembly 1, and the heated air takes away the moisture in laundry after contacting laundry in the drum, thereby drying laundry in the drum assembly 1.

[0038] As shown in Figures 15 to 18, in the Embodiment, the air duct 21 is arranged above the drum assembly 1 and installed on a top wall of the housing. An air inlet 11 and an air outlet 12 are arranged on a top of the drum assembly 1, and the air inlet end of the air duct 21 is connected to the air outlet 12 of the drum assembly 1, and the air outlet end of the air duct 21 is connected to the air inlet 11 of the drum assembly 1.

[0039] The air inlet 11 and the air outlet 12 of the drum assembly 1 are respectively arranged at a front end and at a rear end of the top of the drum assembly 1, and the air inlet 11 and the air outlet 12 are located on both sides of a central axis of the drum assembly 1. The air duct 21 is configured to be L-shaped. The air duct 21 is extended along an axial direction of the drum assembly 1 from the air inlet 11 to the rear end of the drum assembly 1 to a position being flush with the air outlet 12, and then extended laterally to connect with the air outlet 12. Specifically, in the Embodiment, the air duct 21 includes a first air duct 211 extending rearward along the axial direction from the air inlet 11, and a second air duct 212 extending laterally from a rear end of the first air duct 211 and connected to the air outlet 12.

[0040] In the Embodiment, the drying system 2 also includes a heat pump system 8. The condensation structure 5 is an evaporator 83 of the heat pump system 8, and the heating structure 6 is a condenser 82 of the heat pump system 8. The heat pump system 8 also includes a compressor 81 and a throttling device arranged outside the air duct 21. The compressor 81, the condenser 82, the throttling device, and the evaporator 83 are sequentially

connected through pipes, and refrigerant is configured to circulate between the compressor 81, the condenser 82, the throttling device, and the evaporator 83 to heat and dry the airflow.

[0041] The evaporator 83 and the condenser 82 of the heat pump system 8 are sequentially arranged between the air inlet end and the air outlet end of the air duct 21. Specifically, the condenser 82 is arranged in the first air duct 211, the evaporator 83 is arranged in the second air duct 212, and the compressor 81 of the heat pump system 8 is arranged at middle portion below the drum assembly 1 and is spaced apart from a vertical axial plane of the drum assembly 1. An input port and an output port of the compressor are respectively connected to the evaporator 83 and the condenser 82 through pipes. Specifically, a bottom of the compressor 81 is fixedly connected to a bottom wall of the housing of the laundry treatment apparatus through bolts.

[0042] By arranging the air duct 21 above the drum assembly 1, and arranging the compressor 81 in the middle below the drum assembly 1 and spaced apart from the vertical axial plane of the drum assembly 1, that is, arranging the compressor 81 on one side below the drum assembly 1, the space on both sides below the drum assembly 1 can be fully utilized to lay out the drying system 2. So the layout is more compact and facilitating the reduction of the overall size of the laundry treatment apparatus.

[0043] In the Embodiment, the pipe is specifically configured as a copper pipe for conveying refrigerant. The pipe is extended from the output port and/or input port of the compressor 81 towards the rear side of the drum assembly 1, extended upward along the rear of the drum assembly 1, and is connected to the input port of the condenser 82 and/or the output port of the evaporator 83. The pipeline is spaced apart from the rear side of the drum assembly 1, thereby avoiding eccentric movement of the drum assembly 1 during operation from impacting the pipes, to keep the installation stability of the copper pipe well, and further keep the reliability of the drying system 2.

[0044] Specifically, the pipe includes a first pipe 851 connected between the output port of the compressor 81 and the input port of the condenser 82, a second pipe 852 connected between the output port of the compressor 81 and the output port of the evaporator 83, and a third pipe 853 connected between the output port of the condenser 82 and the input port of the evaporator 83. The throttling device is arranged in the third pipe 853. Preferably, the throttling device is a capillary tube 84 arranged in a middle of the third pipe 853.

[0045] Preferably, in the Embodiment, a supporting member 9 is provided for fixing the pipe. The supporting member 9 is arranged behind the drum assembly 1 and is spaced apart from the rear of the drum assembly 1. The supporting member 9 is extended along the extending direction of the pipe, and a side of the supporting member is provided with a supporting groove extending along its

length direction, and the pipe is clamped into the supporting groove of the supporting member 9.

[0046] In this Embodiment, the supporting member 9 includes a supporting member body 97 and supporting member joints 98 arranged at both ends of the supporting member body 97. Specifically, a drive module drivingly connected to a drive shaft of an inner drum is arranged on the rear of the outer drum of the drum assembly 1. The supporting member body 97 is bent toward a direction away from the axis of the drum assembly 1 for not disturbing the drive module. The supporting member joints 98 are arranged at both ends of the supporting member body 97 and extended radially towards the edge of the rear side of the drum assembly 1. Thus, the layout can be made more reasonable, which is beneficial to reducing the overall thickness of the laundry treatment apparatus. At the same time, it can be avoided dead corner at the bend on the pipe, and it is improved in the smooth circulation of refrigerant.

[0047] Preferably, the first pipe 851 and the second pipe 852 are arranged in parallel. The supporting member 9 is provided with two supporting grooves corresponding to the first pipe 851 and the second pipe 852, respectively. The first pipe 851 and the second pipe 852 are respectively arranged into the first supporting groove 91 and the second supporting groove 92.

[0048] As shown in Figure 17 and Figure 18, in the Embodiment, the supporting groove is arranged on the side of the supporting member 9 close to the drum assembly 1. Specifically, the first supporting groove 91 and the second supporting groove 92 are both arranged on the front of the supporting member 9. The first supporting groove 91 and the second supporting groove 92 are separated by a partition plate 93 extending along a length direction of the supporting member 9. The first pipe 851 and the second pipe 852 are respectively arranged into the first supporting groove 91 and the second supporting groove 92.

[0049] A claw 95 is arranged at an opening of the supporting groove. The claw 95 is extended from one end of a groove wall of the supporting groove away from a groove bottom towards an inner side of the supporting groove for limiting the pipe.

[0050] Preferably, in the Embodiment, the claw 95 is arranged on the partition plate 93 between the first and second supporting grooves. A plurality of claws 95 is arranged at intervals along the length direction of the supporting member 9, and the pipe is clamped into the supporting groove through the claws 95.

[0051] As shown in Figure 18, in the Embodiment, the groove wall of the supporting groove is provided with a notch 99. The notch 99 is extended from the opening of supporting groove towards the groove bottom. The claw 95 includes a neck portion and a claw portion, the neck portion of the claw 95 is extended from a bottom of the notch 99 towards a direction away from the groove bottom of the supporting groove, and the claw portion is extended from an end of the neck portion towards an

inside of the supporting groove.

[0052] Preferably, the neck portion of the claw 95 is extended upward to a position being flush with upper end of the groove wall of the supporting groove on both sides of the notch 99.

[0053] In the Embodiment, the notches 99 on the partition plate 93, the groove wall of a first mounting groove 2125 away from the partition plate 93, and the groove wall of the second mounting groove 2125 away from the partition plate 93 correspond to each other one by one, and the claw 95 is arranged at the notch 99 on the partition plate 93. By providing the notch 99 on the groove wall away from the partition plate 93, it is improved in smoothly arranging the pipe.

[0054] In the Embodiment, a side of the claw portion of the claw 95 away from the groove bottom of the supporting groove is set as an inclined surface inclined towards the groove bottom of the supporting groove from a root of the claw portion to an end of the claw portion, which further improves in smoothly arranging the pipe. A side of the claw 95 close to the groove bottom of the supporting groove is set as an inclined surface inclined towards the groove bottom of the supporting groove from a root of the claw portion to an end of the claw portion, or is set as a plane perpendicular to the partition plate 93, so as to ensure the clamping effect of the claw 95 on the pipe.

[0055] The end of the claw portion of the claw 95 being connected to the neck portion is the root of the claw portion, and the end of the claw portion is away from the neck portion. The end of the neck portion of the claw 95 connected to the inner wall of the notch 99 is the root of the neck portion, and the end of the neck portion is away from the connection position.

[0056] In the Embodiment, a heat insulation sleeve is sleeved on the pipe at least at the position corresponding to the supporting groove, and the claw 95 is cooperated with the heat insulation sleeve. By providing the heat insulation sleeve, the energy loss of the refrigerant in the heat pump system 8 can be avoided, and the temperature of the pipe can be prevented from affecting other components, thereby improving the overall working stability of the laundry treatment apparatus.

[0057] Preferably, in the Embodiment, the groove bottom of the supporting groove is set as a plane, and the groove wall of the supporting groove is perpendicular to the groove bottom, that is, a cross section of the supporting groove perpendicular to its length direction is U-shaped. A limiting block 94 is also arranged in the supporting member 9. A shape of the limiting block 94 is a rectangular block matched to the shape of the supporting groove. The side wall of the limiting block 94 is in close contact with the inner wall of the supporting groove. A distance between a front side and a rear side of the limiting block 94 is the same as a distance between the claw portion of the claw 95 and the groove bottom of the supporting groove, and the limiting block 94 is limited in the supporting groove by the claw 95. The limiting block 94 is sleeved on an outer periphery of

the heat insulation sleeve and clamps the heat insulation sleeve.

[0058] Preferably, in the Embodiment, the heat insulation sleeve is made of a soft material, and more preferably, the heat insulation sleeve is made of an elastic material. A through hole is arranged in a middle of the limiting block 94, and a diameter of the through hole is less than or equal to a diameter of the heat insulation sleeve and greater than a diameter of the pipe. An opening communicating with the through hole is arranged on the side of the limiting block 94 away from the groove bottom of the supporting groove, and a width of the opening is less than the diameter of the through hole and greater than the diameter of the pipe. The heat insulation sleeve is arranged into the through hole from the opening.

[0059] Preferably, in the Embodiment, the diameter of the through hole is less than the diameter of the heat insulation sleeve and greater than the diameter of the pipe. The heat insulation sleeve is arranged into the through hole and undergoes elastic deformation, to tighten the heat insulation sleeve in the through hole, thereby realizing the positioning between the pipe and the heat insulation sleeve.

[0060] In the Embodiment, the limiting block 94 is made of a heat insulation material. Specifically, the limiting block 94 can be made of a ceramic material. Preferably, a plurality of limiting blocks 94 are arranged at intervals along the length direction of the supporting member 9. Specifically, at least one limiting block 94 is respectively arranged at both ends of the supporting groove and in the middle portion of the supporting groove.

[0061] In the Embodiment, a fixing hoop 96 is sleeved on the outer periphery of the supporting member 9 from the notch 99. The fixing hoop is sleeved on the outer periphery of the supporting member 9 and is perpendicular to the length direction of the supporting member 9, so as to further improve the fixing effect of the pipe and prevent the pipe from detaching from the groove opening of the supporting groove.

[0062] Preferably, in the Embodiment, a plurality of limiting blocks 94 are arranged at intervals along the length direction of the pipe, and the fixing hoop 96 corresponds to the limiting blocks 94 one by one.

[0063] Preferably, a position notch 99 matched to the width of the fixing hoop 96 is arranged on the side of the supporting member 9 away from the supporting groove, and the fixing hoop 96 is arranged at the positioning notch 99, so as to improve the positioning effect of the fixing hoop 96. The positioning notch 99 corresponds to the middle portion of the notch 99.

[0064] In the Embodiment, a cross section of the supporting member 9 along the width direction is H-shaped. Specifically, an extending wall is arranged at the rear side edge of the supporting member 9, and the extending wall is extended rearward from the rear side of the supporting member 9 along a left side and a right side of the supporting member 9. The extending wall is perpendicular to the

rear side surface of the supporting member 9. The positioning notch 99 is arranged at the end of the extending wall.

[0065] Preferably, in the Embodiment, a reinforcing rib is arranged on the left side of the supporting member 9, and/or arranged on the right side of the supporting member 9, and/or arranged on the rear side of the supporting member 9.

[0066] In the Embodiment, the supporting member 9 is installed on the rear wall of the housing of the laundry treatment apparatus.

[0067] Specifically, the supporting member 9 is clamped on and/or connected by screw to the rear wall of the housing of the laundry treatment apparatus. Preferably, the supporting member 9 is first pre-positioned with the rear wall of the housing in a manner of snap-fit, and then fixed by screw.

[0068] The rear side of the supporting member 9 is provided with a claw and a screw post, and the rear wall of the housing is provided with a port matching with the claw and a screw hole corresponding to the screw post. Preferably, a plurality of claws and screw posts are arranged at intervals along the length direction of the supporting member 9. Further preferably, the reinforcing ribs are provided between the rear side of the supporting member 9 and the claw, and between the rear side of the supporting member 9 and the screw post, respectively.

[0069] Preferably, in the Embodiment, the supporting member 9 is made of a heat insulation material.

[0070] In the Embodiment, the drum assembly 1 is installed in the housing by shock absorbing rods and suspension springs, and one shock absorbing rod is provided on each of the left side and the right side of the front end and the left side and the right side of the rear end of the drum assembly 1. The compressor 81 is arranged below the drum assembly 1, between the two shock absorbing rods arranged in the front-rear direction. Specifically, in the Embodiment, the compressor 81 is arranged on a side of the vertical axial plane of the drum assembly 1 away from the first air duct 211.

[0071] In the Embodiment, the first air duct 211 and the second air duct 212 are connected through a fan 22, an air inlet end of the fan 22 is configured to face the second air duct 212, and an air outlet end of the fan 22 is configured to face the first air duct 211.

[0072] One end of the second air duct 212 close to the first air duct 211 is bent and extended downward in the direction close to the first air duct 211; specifically, the end of the second air duct 212 is provided with a guide pipe 23 connected to the air inlet end of the fan 22, a first end of the guide pipe 23 is connected to the end of the second air duct 212, and a second end of the guide pipe 23 is connected to the air inlet end of the fan 22. The guide pipe 23 is bent and extended downward from the first end to the second end. Preferably, the second end of the guide pipe 23 is connected to the air inlet end of the fan 22 in a direction perpendicular to the side of the volute close to the air outlet 12.

[0073] In the Embodiment, a left side and a right side of the guide pipe 23 is gradually narrowed from the first end to the second end, and the widths of the left side and the right side of the guide pipe 23 that contract inward from the first end to the second end are the same.

[0074] A shape of one end of the first air duct 211 away from the air inlet 11 is matched with a shape of the air outlet end of the fan 22, a top of the volute is flush with a top of the first air duct 211, and a bottom wall and a left wall and a right wall of the end of the first air duct 211 are configured to smoothly contract inward in a direction close to the fan 22. The inward contraction of the side wall of the end of the first air duct 211 close to the second air duct 212 is greater than the inward contraction of the side wall away from the second air duct 212.

[0075] The first pipe 851 and the third pipe 853 are extended into the first air duct 211 from the rear to the front through the side wall of the first air duct 211 close to the second air duct 212, and are connected to the input port and the output port of the condenser 82 in the first air duct 211. The second pipe 852 and the third pipe 853 are extended into the second air duct 212 through the left side wall and the right side wall of the guide pipe 23 in a direction away from the fan 22, and are connected to the output port and the input port of the evaporator 83 in the second air duct 212.

[0076] In the Embodiment, the left side and the right side of the guide pipe 23 are the left side and the right side in the extending direction of the second air duct 212, specifically, the side of the guide pipe 23 close to an opening of the drum assembly 1, and the side of the guide pipe 23 close to the rear the drum assembly 1.

[0077] Preferably, the first pipe 851 is extended forward from an upper side of one end of the second air duct 212 close to the first air duct 211, and is connected to the condenser 82 in the first air duct 211. The input port and the output port of the evaporator 83 are respectively arranged on the front side and the rear side of the second air duct 212.

[0078] The second pipe 852 and the third pipe 853 are extended into the second air duct 212 from one side of the second air duct 212 close to the fan 22, and are connected to the evaporator 83. The first pipe 851 and the third pipe 853 are extended into the first air duct 211 from one side of the first air duct 211 close to the fan 22, and are connected to the condenser 82. The capillary tube 84 is arranged at a corner between the first air duct 211 and the second air duct 212.

[0079] Preferably, in the Embodiment, an air distribution plate 2112 is arranged inside the first air duct 211 and between the air outlet end of the fan 22 and the first air duct, for controlling the airflow to flow evenly through the condenser 82.

[0080] Specifically, a plurality of air distribution plates 2112 can be arranged at intervals along a width direction of the first air duct 211, and air distribution channels are formed between the air distribution plates 2112 and the left wall and the right walls of the first air duct 211, and

between two adjacent air distribution plates 2112, respectively. First ends of air distribution channels have a same area with each, relative to the air outlet end of the fan 22, and second ends of air distribution channels have a same area with each other, relative to a heating area of the condenser 82. Therefore, the heating efficiency of the condenser 82 for the airflow can be improved.

[0081] In the Embodiment, the condenser 82 and the evaporator 83 are both fin-type heat sinks. Each of the condenser 82 and the evaporator 83 includes an input pipe and an output pipe extending along the length direction of the air duct 21, and a wavy heat exchange pipe connected between the input pipe and the output pipe, and heat exchange fins are arranged on the heat exchange pipe.

[0082] Preferably, the heat exchange pipe is set to be flat and extended along the length direction of the air duct 21, and multiple groups of the heat exchange pipes are arranged at intervals along the length direction of the air duct 21.

[0083] Preferably, the bottom of the air duct 21 is provided with limiting grooves corresponding to each group of heat exchange pipes.

[0084] Preferably, in the Embodiment, a condensed water channel is arranged on a side of the limiting grooves at the bottom of the second air duct 212 away from the first air duct 211, and each of the limiting grooves is connected to the condensed water channel. The condensed water channel is formed by recessing downward from the bottom of the second air duct 212, and a bottom wall of the condensed water channel is set as an inclined surface, and the bottom of the condensed water channel is provided with a condensed water port. The condensed water port is connected to the drum assembly 1 or connected to the drain pipe.

Embodiment 2

[0085] As shown in Figures 1 to 14, in the Embodiment of the present invention, a drying system 2 is applied to a laundry treatment apparatus and is used for drying laundry in the laundry treatment apparatus.

[0086] The drying system 2 is connected to a drum assembly 1 of a laundry treatment apparatus. The drying system 2 includes an air duct 21, a fan 22, a condensation structure 5, and a heating structure 6. A drying airflow is driven by the fan 22 to circulate between the air duct 21 and the drum assembly 1. Air is heated by the heating structure 6 and blown into the drum assembly 1, and the hot air comes into contact with laundry in the drum and takes away the moisture in laundry, thereby drying laundry in the drum assembly 1.

[0087] In the Embodiment, the fan 22 can be arranged separately, or be integrated inside the air duct 21. Preferably, in the Embodiment, the fan 22 is arranged separately.

[0088] In the Embodiment, the drying system 2 is arranged above the drum assembly 1.

[0089] Specifically, as shown in Figure 1, the drum assembly 1 is provided with an air inlet 11 and an air outlet 12. An air inlet end of the air duct 21 is connected to the air outlet 12 of the drum assembly 1, and an air outlet end of the air duct 21 is connected to the air inlet 11 of the drum assembly 1. The air inlet 11 and the air outlet 12 are both arranged on a top of the drum assembly 1, and the air duct 21 and the fan 22 are respectively fixed on an inner wall of a top of the housing of the laundry treatment apparatus.

[0090] Preferably, in the Embodiment, the air inlet 11 and the air outlet 12 of the drum assembly 1 are respectively arranged at a front end and a rear end of the top of the drum assembly 1, and the air inlet 11 and the air outlet 12 are located on both sides of a central axis of the drum assembly 1. The air duct 21 is set to be L-shaped. The air duct 21 is extended along an axial direction of the drum assembly 1 from the air inlet 11 to the rear end of the drum assembly 1, and then extended laterally to the air outlet 12 and connected to the air outlet 12.

[0091] Specifically, as shown in Figure 2, in the Embodiment, the air duct 21 includes a first air duct 211 extending rearward along the axial direction from the air inlet 11, and a second air duct 212 extending laterally from a rear end of the first air duct 211 and connected to the air outlet 12.

[0092] In the Embodiment, the air duct 21 being L-shaped can provide a space for the upper part of the drum assembly 1, so that the overall structure of the drying system 2 is arranged in the space on both sides of the upper part of the drum assembly 1, which can fully utilize the gap between the housing and the drum assembly 1. So the overall arrangement of the laundry treatment apparatus is more compact, accordingly it is reduced in the overall size of the laundry treatment apparatus.

[0093] In the Embodiment, the air outlet 12 is arranged on one side of the top of the drum assembly 1, so the condensed water can flow downward along the inner wall of an outer drum from the air outlet 12, and it is avoided the situation where the condensed water enters an inner drum and wets laundry. Thereby it is improved in the drying effect.

[0094] The drum assembly 1 includes an inner drum and an outer drum coaxially sleeved outside the inner drum. The drying system 2 is connected to the outer drum.

[0095] The air inlet 11 is arranged on a door gasket of the drum assembly and is set as a strip-shaped port extending along a circumference direction of the drum assembly 1. The door gasket is provided with an air inlet connector 111 arranged around the air inlet 11 and extending outward in a radial direction of the drum assembly 1. The air outlet end of the air duct 21 is connected to the air inlet connector 111.

[0096] Preferably, in the Embodiment, the air inlet connector 111 is extended outward in the radial direction of the door gasket from an edge of the air inlet 11, and the air

inlet connector 111 is set as a flat shape matching with a shape of the air inlet 11.

[0097] In the Embodiment, an end of the first air duct 211 is inserted into the air inlet connector 111 and fixed with the air inlet connector 111 by a pipe hoop.

[0098] In the Embodiment, the end of the first air duct 211 connected to the air inlet connector 111 is provided with a first guide portion 2111. A diameter of the first guide portion 2111 is gradually decreased toward the air inlet 11. A shape of an end of the first guide portion 2111 near the air inlet 11 is matched with a shape of an end of the air inlet connector 111. The end of the air inlet connector 111 away from the door gasket is bent backward and extended, and sleeved with the end of the air inlet 11.

[0099] Preferably, in the Embodiment, an inner wall of the air inlet connector 111 is coplanar with an inner wall of the end of the first guide portion 2111.

[0100] The first guide portion 2111 is bent in a direction from back to front, toward the central axis of the drum assembly 1, to guide the airflow flowing into the air inlet 11.

[0101] The first guide portion 2111 near the air inlet 11 is bent downward from the side to the middle to connect with the air inlet connector 111.

[0102] Specifically, the first air duct 211 as a whole is a pipe with a rectangular cross-section. A side of the first air duct 211 facing the drum assembly 1 is set as an arc-shaped recess with a same curvature as an outer wall of the drum assembly 1. The arc-shaped recess is arranged between a bottom wall of the first air duct 211 and a side wall of the first air duct close to the central axis of the drum assembly 1. A side wall of the first air duct 211 above the arc-shaped recess is smoothly connected to a side of the narrow port of the first air duct 211 close to the central axis, and an end of the arc-shaped recess is smoothly connected to a side of the wide port close to the central axis. A top wall of the first air duct 211 is smoothly connected to the side of the wide port away from the central axis. A side wall of the first air duct 211 away from the central axis and the bottom wall of the arc-shaped recess away from the central axis are smoothly connected to the side of the narrow port away from the central axis.

[0103] In the Embodiment, an end of the second air duct 212 connected to the air outlet 12 is provided with a second guide portion 2121. The second guide portion 2121 is bent toward the central axis of the drum assembly 1 and connected to the air outlet 12.

[0104] Specifically, the second air duct 212 is set as a pipe with a rectangular cross-section, and the air outlet 12 is set as a trapezoid-shaped port extending in the axial direction from the rear end of the outer drum to the front end of outer drum. The second guide portion 2121 is arranged between an end of the second air duct 212 and the air outlet 12 on the outer drum. A diameter of the second guide portion 2121 is gradually decreased toward the air outlet 12.

[0105] In the Embodiment, the second guide portion

2121 is bent toward the central axis of the drum assembly 1. In the bending and extending direction, a side of the second guide portion 2121 close to the front end of the drum assembly 1 is oblique to the rear end of the drum assembly 1.

[0106] Preferably, in the Embodiment, the second guide portion 2121 includes a first pipe section, a second pipe section, and a third pipe section that are spliced together or integrally formed. The first pipe section, the second pipe section, and the third pipe section are sequentially arranged toward the air outlet 12. Specifically, the first pipe section is bent and extended downward in a direction away from the first air duct 211. At least a top wall of the first pipe section is set as an arc shape, and a front side of the first pipe section is bent and extended backward in the direction away from the first air duct 211. The second pipe section is extended vertically downward from a port of the first pipe section. Preferably, the second pipe section is set as a corrugated pipe for buffering the vibration of the drum assembly 1. The third pipe section is bent and extended from a port of the second pipe section toward the central axis of the drum assembly 1, and a port of the third pipe section is connected to the air outlet 12.

[0107] In the Embodiment, the air outlet 12 of the drum assembly 1 is provided with a first extension portion 121. The first extension portion 121 is arranged around the air outlet 12, and the first extension portion 121 is extended radially away from the central axis of the drum assembly 1. Preferably, the first extension portion 121 is extended from an edge of the air outlet 12.

[0108] The port of the third pipe section is provided with a mounting groove 2125. A shape of the mounting groove 2125 is matched with a shape of the first extension portion 121. An end of the second guide portion 2121 is sleeved on the first extension portion 121 through the mounting groove 2125.

[0109] Preferably, in the Embodiment, an outer wall of the third pipe section is provided with a mounting protrusion 2122, and the mounting protrusion 2122 is extended along a circumference of the second guide portion 2121. The outer wall of the third pipe section is also sleeved with a mounting ring 2123, and the mounting ring 2123 is connected to the drum assembly 1 and presses the mounting protrusion 2122 against the drum assembly 1.

[0110] Preferably, in the Embodiment, the outer wall of the drum assembly 1 is provided with a threaded post. The threaded post and the mounting ring 2123 are vertically abutted against each other. The threaded post is provided with a threaded hole, the mounting ring 2123 is provided with a through hole corresponding to the threaded hole on the threaded post, and a screw passes through the through hole and are tightened on the threaded post, so that the mounting ring 2123 is fixed on the drum assembly 1.

[0111] In the Embodiment, a shape of the air outlet 12 is matched with a shape of the inner wall of the end of the third pipe section. After the second guide portion 2121 is connected to the outer drum, the inner wall of the air outlet

12 and the inner wall of the end of the second guide portion 2121 are smoothly transitioned.

[0112] Preferably, in the Embodiment, an outer edge of a side of the mounting protrusion 2122 away from the drum assembly 1 is provided with a second extension portion 2126 extending radially away from the drum assembly 1. The second extension portion 2126 is spaced apart from the outer wall of the end of the second guide portion 2121. A diameter of the mounting ring 2123 is the same as that of the outer wall of the end of the second guide portion 2121, a side of the mounting ring 2123 close to the drum assembly 1 is set as a groove shape, and a groove wall on an inner periphery of the mounting ring 2123 is inserted into a space between the second extension portion 2126 and the outer wall of the second guide portion 2121. The groove wall on an outer periphery of the mounting ring 2123 is sleeved on an outer periphery of the mounting protrusion 2122. Preferably, a groove bottom of the mounting ring 2123 is abutted against an end of the second extension portion 2126.

[0113] In the Embodiment, the outer periphery of the mounting ring 2123 is provided with a plate outwardly extending, and the plate corresponds to the threaded post one by one, and the through hole is arranged on the plate.

[0114] Preferably, in the Embodiment, a side of the plate close to the drum assembly 1 is set as a groove shape matched with a shape of the top of the threaded post, and the plate is sleeved on the top of the threaded post.

[0115] Preferably, in the Embodiment, the threaded post is arranged close to the mounting ring 2123, and a width of the plate is gradually decreased from a connecting end to an extension end.

[0116] In the Embodiment, the first air duct 211 and the second air duct 212 are connected with each other by a fan 22. Specifically, the first air duct 211 is connected to an air outlet end of the fan 22, and the second air duct 212 is connected to an air inlet end of the fan 22.

[0117] In the Embodiment, a laundry treatment apparatus includes a heat pump system. The heat pump system includes a condenser, an evaporator, a compressor, and an expansion valve, the condenser is arranged in the first air duct 211 for heating the airflow entering the drum assembly 1, and the evaporator is arranged in the second air duct 212 for condensing the airflow flowing out of the drum assembly 1.

[0118] In the Embodiment, the first air duct 211 and the second air duct 212 are set separately from each other. Specifically, the first air duct 211 includes a heating section and a first guide portion 2111, and the second air duct 212 includes a condensing section and a second guide portion 2121.

[0119] The heating section and the condensing section respectively include a main body and an upper cover. The main body and the upper cover of the heating section are buckled together to form a heating cavity, and the main body and the upper cover of the condensing section are buckled together to form a condensing cavity. The con-

denser is arranged in the heating cavity, and the evaporator is arranged in the condensing cavity.

[0120] Preferably, in the Embodiment, the condenser and the evaporator are both a fin-type heat exchanger.

[0121] In the Embodiment, a contour of the condenser is matched with a shape of the heating cavity, and a contour of the evaporator is matched with a shape of the condensing cavity.

[0122] In the Embodiment, a laundry treatment apparatus is equipped with the above-mentioned drying system 2.

[0123] Preferably, in the Embodiment, the air duct 21 is set as an L-shape, the first air duct 211 is arranged on an upper right side of the drum assembly 1 and extended horizontally from front to rear and the second air duct 212 is arranged on an upper rear side of the drum assembly 1 and extended toward the left from a rear end of the first air duct 211.

Embodiment 3

[0124] As shown in Figures 1 to 14, in the Embodiment of the present invention, a drying system 2 is applied to a laundry treatment apparatus and is used to dry laundry in the drum assembly 1 of the laundry treatment apparatus.

[0125] The drying system 2 is in communication with the drum assembly 1 of the laundry treatment apparatus. Specifically, the drum assembly 1 includes an inner drum for holding laundry to be washed and an outer drum coaxially arranged outside the inner drum. The drying system 2 is in communication with the outer drum of the drum assembly 1.

[0126] In the Embodiment, the drying system 2 includes a first air duct 211, a second air duct 212, and a fan 22 connected between the first air duct 211 and the second air duct 212. The drying airflow is driven by the fan 22 to flow to the first air duct 211 from the second air duct 212.

[0127] As shown in Figure 1, the outer drum is provided with an air inlet 11 for connecting to an end of the first air duct 211 away from the fan 22, and an air outlet 12 for connecting to an end of the second air duct 212 away from the fan 22. The air inlet 11 is arranged at a front side of a top of the outer drum, the air outlet 12 is arranged at a rear side of the top of the outer drum, and the fan 22 is arranged above the rear of the outer drum. A position where the fan 22 is arranged corresponds to the air inlet 11 in an axial direction of the outer drum and corresponds to the air outlet 12 in a transverse direction. The first air duct 211 is connected between the air inlet 11 of the drum assembly 1 and an outlet end of the fan 22, and the second air duct 212 is connected between an inlet end of the fan 22 and the air outlet 12 of the drum assembly 1.

[0128] That is, the air inlet 11 and the air outlet 12 are located on both sides of the central axis of the drum assembly 1 in the transverse direction. The first air duct 211 is extended in an axial direction of the drum assembly 1 and is connected between the air inlet 11 and the outlet

end of the fan 22. The second air duct 212 is extended in the transverse direction and is connected between the air outlet 12 and the inlet end of the fan 22. When the fan 22 is running, the airflow flows out from the air outlet 12 of the drum assembly 1, and sequentially flows through the second air duct 212, the fan 22, the first air duct 211, and then returns to the drum assembly 1.

[0129] In the Embodiment, an extension in the axial direction refers to extending in a front-rear direction, and an extension in the transverse direction refers to extending in a left-right direction.

[0130] Preferably, in the Embodiment, the fan 22 is arranged vertically above the drum assembly 1, and a top of the fan 22 is coplanar with a top of the first air duct 211 and a top of the second air duct 212.

[0131] By arranging the fan 22 vertically above the drum assembly 1, the drying system 2 can fully occupy a space on both sides of an upper of the drum assembly 1. At the same time, the air duct 21 can be completely placed above the drum assembly 1, so that the arrangement is more compact and the overall size of the laundry treatment apparatus can be reduced. In addition, the top of the fan 22 is coplanar with the top of the first air duct 211 and the second air duct 212, so the drying system 2 can be easily installed while having a compact structure. Accordingly the working stability of the drying system 2 can be improved.

[0132] Preferably, in some Embodiments, a side of the first air duct 211, and/or the second air duct 212, and/or the fan 22 is provided with a plate outwardly extending, and an inner wall of a top of the housing of the laundry treatment apparatus is provided with a threaded post corresponding to the plate. A screw passes through the plate and is connected to the threaded post to fix the drying system 2 on the inner wall of the top of the housing.

[0133] In the Embodiment, the fan 22 is a volute fan 22, and includes a volute and a drive motor. The drive motor is installed on the volute, and a working end of the drive motor is extended into the volute. The working end of the drive motor is provided with an impeller, and the drive motor drives the impeller to rotate to drive the airflow to flow. Specifically, the air inlet end of the fan 22 is coaxially arranged on a side of the volute opposite to the second air duct 212, the drive motor is coaxially arranged on the side of the volute opposite to the second air duct 212, and an air outlet end of the fan 22 is extended in the axial direction of the drum assembly 1 toward the front of the drum assembly 1.

[0134] Specifically, in the Embodiment, the first air duct 211 is arranged on an upper right side of the drum assembly, and extended horizontally from front to rear. The second air duct is arranged on an upper rear side of the drum assembly, and extended horizontally to a left from a rear end of the first air duct. The air inlet end of the fan is configured to face the left. The impeller is arranged in the volute, and an axis of the impeller is extended in a left-right direction.

[0135] The volute is arranged vertically, and the air inlet end of the fan 22 is arranged at the front of a top of the volute and extended in a tangential direction of the volute, so as to ensure that the top of the fan 22 is coplanar with the top of the first air duct 211 and the top of the second air duct 212.

[0136] In the Embodiment, the first air duct 211 and the second air duct 212 are both extended in the horizontal direction. The motor can be arranged vertically, or be inclined, that is, there is a certain angle between the axis of the impeller and the horizontal direction.

[0137] In the Embodiment, the impeller is coaxial with the volute.

[0138] In some Embodiments, the fan 22 is arranged vertically. Specifically, the air inlet end of the fan 22 is configured to directly face the second air duct 212, and the top of the volute is coplanar with the top of the first air duct 211 and the top of the second air duct 212. After the drying system 2 is installed, the top of the fan 22 is in contact with the inner wall of the top of the housing.

[0139] In some Embodiments, the fan 22 is arranged obliquely. Specifically, the upper end of the fan 22 is inclined toward the center axis of the drum assembly 1, and/or the lower end of the fan 22 is inclined away from the center axis of the drum assembly 1.

[0140] Preferably, in the Embodiment, the fan 22 is inclined to the maximum extent that the air inlet end of the fan 22 faces the center axis of the drum assembly 1, that is, an axis of the air inlet end of the fan 22 is extended in a radial direction of the drum assembly 1. At this time, a diameter of the volute of the fan 22 can be the largest.

[0141] In the Embodiment, a lower end of the fan 22 is lower than a top of the drum assembly 1, and an upper end of the fan 22 is higher than the top of the drum assembly 1. Specifically, the upper end of the fan 22 is a same height with the top of the first air duct 211 and the top of the second air duct 212. Preferably, in the Embodiment, the fan 22 is arranged vertically, or the top of the fan 22 is set as a plane coplanar with the top of the first air duct 211 and the top of the second air duct 212, so that the top of the fan 22 is in contact with the inner wall of the top of the housing. Thereby the stability of installing the drying system 2 is ensured, and it is reduced in the vibration during the operation of the fan 22 to make the operation of the drying system 2 more stable.

[0142] Preferably, in the Embodiment, the specific arrangement pattern of the fan 22 is determined according to a longitudinal length of the fan 22. If the longitudinal length of the fan 22 is long, or the laundry treatment apparatus needs a fan 22 with a large longitudinal length, the fan 22 can be set in an inclined pattern. If the longitudinal length of the fan 22 is small, or the laundry treatment apparatus needs a fan 22 with a small longitudinal length, the fan 22 can be set in a vertical form.

[0143] In the Embodiment, the longitudinal length of the fan 22 refers to the longitudinal length in a state where the air outlet end of the fan 22 faces forward, that is, the longitudinal length of the fan 22 refers to the diameter of

the volute.

[0144] In the Embodiment, an end of the second air duct 212 is provided with a guide pipe 23 connected to the air inlet end of the fan 22. A first end of the guide pipe 23 is connected to the end of the second air duct 212, and a second end of the guide pipe 23 is connected to the air inlet end of the fan 22.

[0145] The second air duct 212 is set as a flat pipe with a rectangular cross-section, the air inlet end of the fan 22 is set as a circular opening coaxial with the volute, the first end of the guide pipe 23 is set as a rectangle matching with to the end of the second air duct 212, and the second end of the guide pipe 23 is set as a circle matching with the shape of the air inlet end of the fan 22.

[0146] Preferably, in the Embodiment, a diameter of the air inlet end of the fan 22 is smaller than a transverse width of an end of the second air duct 212 away from the air outlet 12, and is larger than a longitudinal width of the end of the second air duct 212 away from the air outlet 12. A left side and a right side of the guide pipe 23 is gradually narrowed from the first end to the second end, and an upper side and a lower side of the guide pipe 23 is gradually expanded from the first end to the second end.

[0147] Preferably, the widths of the left side and the right side of the guide pipe 23 that contract inward from the first end to the second end are the same.

[0148] The guide pipe 23 is extended downward in a direction from the first end to the second end. Preferably, the second end of the guide pipe 23 is connected to the air inlet end of the fan 22 in a direction perpendicular to a side of the volute close to the air outlet 12. By providing the guide pipe 23, the arrangement of the laundry treatment apparatus is compact, and the airflow smoothly flows and is prevented from turbulence.

[0149] In the Embodiment, a side of the guide pipe 23 near the fan 22 is provided with an opening communicating with the outside. The opening is in communication with atmosphere outside the air duct 21 and is used to allowing external airflow to flow into the air duct 21 under the action of the fan 22.

[0150] Preferably, the opening is oriented towards the rear of the drum assembly 1, and the opening is in communication with the outside of the housing through a pipe. In the Embodiment, the pipe is provided with an air valve, and the control unit of the laundry treatment apparatus can control to open and close the air valve to control the external airflow to flow in or not.

[0151] In the Embodiment, the second air duct 212 is configured as a split structure, and includes a main body and an upper cover that are buckled together. The guide pipe 23 is configured as an integrated structure. The end of the guide pipe 23 is sleeved on the outside of an end of the second air duct 212 away from the air outlet 12 and fixed with each other with a pipe hoop, thereby the overall structure of the second air duct 212 is stable. Preferably, the inner wall of the guide pipe 23 and the inner wall of the end of the second air duct 212 away from the air outlet 12 are smoothly transitioned.

[0152] The air outlet end of the fan 22 is oriented towards the front of the drum assembly 1, and the first air duct 211 is extended towards the front of the drum assembly 1 from the air outlet end of the fan 22.

[0153] In the Embodiment, the shape of an end of the first air duct 211 away from the air inlet 11 is matched with the shape of the air outlet end of the fan 22. The top of the volute is flush with the top of the first air duct 211. A bottom wall, a left wall and a right wall of the end of the first air duct 211 are smoothly inclined inward in a direction toward the fan 22.

[0154] Preferably, in the Embodiment, a degree of inward inclination of the walls of the end of the first air duct 211 close to the second air duct 212 is greater than a degree of inward inclination of the walls of another end of the first air duct 211 away from the second air duct 212.

[0155] In the Embodiment, a first flange extending outward perpendicularly is provided at a port of the end of the first air duct 211 away from the air inlet 11, and a second flange extending outward perpendicularly is provided at a port of the air outlet end of the fan 22. The first air duct 211 and the fan 22 are installed and sealed through the first flange and the second flange.

[0156] The first flange and the second flange can be connected with each other in any way, such as bolt connection, welding, or snap-fit connection.

[0157] The first flange and the second flange are extended circumferentially along the port of the end the first air duct 211 and the port of the air outlet end of the fan 22, respectively. Specifically, the first flange and the second flange are respectively arranged on the left and right walls and the bottom wall of the port of the end of the first air duct 211 and the port of the air outlet end of the fan 22, so that the top of the fan 22 and the top of the first air duct 211 can be better in contact with the inner wall of the top of the housing.

[0158] Preferably, in the Embodiment, a sealing structure is provided between any two adjacent components of the drying system 2 to ensure the overall sealing performance of the drying system 2.

[0159] In the Embodiment, a heating structure 6 is arranged in the first air duct 211, and a condensation structure 5 is arranged in the second air duct 212. The airflow is driven by the fan 22 to circulate between the air duct 21 and the drum assembly 1. Air is heated by the heating structure 6 and blown into the drum assembly 1, and the heated air comes into contact with laundry in the drum and takes away the moisture in laundry, thereby drying laundry in the drum assembly 1. The airflow flowing out of the drum assembly 1 is condensed and dried under the action of the condensation structure 5, and the condensed airflow flows back into the fan 22 and the first air duct 211 for heating and circulation.

[0160] A condensed water outlet is provided at a lowest position of the second air duct 212. The condensed water generated on the condensation structure 5 drips into the second air duct 212, flows to the lowest position of the second air duct 212, and is discharged from the con-

densed water outlet.

[0161] In some Embodiments, the condensed water outlet is connected to a drainage pipeline of the laundry treatment apparatus. Preferably, a one-way valve is provided at the condensed water outlet, so that external airflow can be prevented from entering the air duct 21 from the condensed water outlet during the operation of the drying system 2.

[0162] Preferably, in the Embodiment, the drying system 2 also includes a filter assembly. The filter assembly includes a filter screen 31 arranged in the second air duct 212, and the filter screen 31 is used to filter the lint entering the drying system 2 to prevent the lint from entering the fan 22.

[0163] Further preferably, in the Embodiment, the filter screen 31 is arranged at the end of the second air duct 212 away from the first air duct 211.

Embodiment 4

[0164] As shown in Figures 1 to 14, in the Embodiment of the present invention, a drying system 2 is applied to a laundry treatment apparatus for drying laundry in the drum assembly 1 of the laundry treatment apparatus.

[0165] The drying system 2 is in communication with the drum assembly 1 of the laundry treatment apparatus. Specifically, the drum assembly 1 includes an inner drum for holding laundry to be washed and an outer drum coaxially sleeved outside the inner drum. The drying system 2 is connected to the outer drum of the drum assembly 1.

[0166] The drying system 2 includes an air duct 21, and the drum assembly 1 is provided with an air inlet 11 and an air outlet 12 for communicating with the air duct 21. Specifically, the air inlet 11 is arranged at a top front end of the drum assembly 1, and the air outlet 12 is arranged at a top rear end of the drum assembly 1. The air inlet 11 and the air outlet 12 are laterally located on both sides of a central axis of the drum assembly 1. The air duct 21 includes a first air duct 211 extending rearward from the air inlet 11 along an axial direction of the drum assembly 1, and a second air duct 212 extending laterally from a rear end of the first air duct 211 and connected to the air outlet 12.

[0167] The drying system 2 also includes a filtering device 3. The filtering device 3 includes a filter screen 31 arranged in the air duct 21 for filtering lint entering the air duct 21. The filter screen 31 is detachably installed in the air duct 21. The filtering device 3 also includes a pull-out mechanism 32 for detaching the filter screen 31.

[0168] In the Embodiment, the filter screen 31 is arranged in the air duct above a rear side of the drum assembly 1 and is taken out from a side of the housing. If a conventional pull-out mechanism is used, the pull-out part needs to be pulled out a long distance to pull out the filter screen. In the Embodiment, the pull-out mechanism is provided to address this defect.

[0169] Specifically, in the Embodiment, the second air

duct 212 is extended horizontally in the left-right direction on the top rear side of the drum assembly. The filter screen 31 is arranged in the second air duct 212 and extended in a front-rear direction. A pull-out part of the pull-out mechanism is drawn from a front side of the housing. For a conventional pull-out mechanism, a front end of the pull-out part needs to be pulled out by a distance between the pull-out part and the rear side of the second air duct for pulling out the filter screen. In the Embodiment, the filter screen can be pulled out by pulling out for a smaller distance.

[0170] In the Embodiment, the filter screen 31 is arranged in an end of the second air duct 212 close to the air outlet 12 of the drum assembly 1. The filter screen 31 is set at a certain angle to an extension direction of the second air duct 212, and covers the cross-section of the filter screen 31 along a width direction, so that the airflow flowing through the second air duct 212 is filtered by the filter screen 31. The extension direction of the filter screen 31 may be perpendicular to the extension direction of the second air duct 212. Or the extension direction of the filter screen 31 may not be perpendicular to the extension direction of the second air duct 212, as long as the projection of the filter screen 31 can cover the cross-section of the second air duct 212.

[0171] The filter screen 31 in the second air duct 212 is configured to be pulled out from one side of the second air duct 212, so user can pull out and place the filter screen 31. The pull-out mechanism 32 is arranged on the side of the second air duct 212 and connected to the filter screen 31, so that the filter screen 31 can be pulled out and placed by the pull-out mechanism 32.

[0172] Preferably, in the Embodiment, an opening for pulling out or placing the filter screen 31 is arranged on a front side of the second air duct 212, and user pulls out and places the filter screen 31 from a front of the laundry treatment apparatus.

[0173] Specifically, the pull-out mechanism 32 includes a shell 321 and a pull-out part 322 installed in the shell 321. The shell 321 is configured as a rectangular shape and extended along a pull-out direction of the filter screen 31 from the opening for pulling out or placing the filter screen 31. The pull-out part 322 is slidably arranged in the shell 321, and the pull-out part 322 is connected to the filter screen 31, and the pull-out part 322 is extended in the shell 321 along the pull-out direction of the filter screen 31. Thus, user can pull out and place the filter screen 31 through the pull-out part 322 to disassemble, replace, maintain, and clean the filter screen 31.

[0174] The existing pull-out part 322 is generally directly connected to the end of the filter screen 31. When user takes out the filter screen 31, the pull-out part 322 needs to be completely pulled out first, and then the pull-out part 322 is continuously pulled to make the filter screen 31 be pulled out, so the pulling length is the sum of the lengths of the pulling part 322 and the filter screen 31. Therefore, it is very inconvenient to be disassembled, and user's experience is seriously affected.

[0175] In the Embodiment of the present invention, the pull-out part 322 of the pull-out mechanism 32 is configured to be drawably arranged in the shell 321 from an end of the shell 321 away from the air duct 21, and is connected to the filter screen 31 through a transmission device 325. During the pulling process of the pull-out part 322, the filter screen 31 is driven to slide relative to the pull-out part 322 and pulled out. In the Embodiment, the filter screen 31 in the air duct 21 is pulled out by using the pull-out mechanism 32. By setting the pull-out part 322 of the pull-out mechanism 32 to be connected to the filter screen 31 through the transmission device 325, the filter screen 31 is driven to slide relative to the pull-out part 322. The movement of the pull-out part 322 by user drives the filter screen 31 to move in the same direction at a faster speed, thereby shortening the moving length of the pull-out part 322 when user disassembles and maintains the filter screen 31, and improving user's experience.

[0176] Preferably, in the Embodiment, the second air duct 212 is a flat pipe extending horizontally, and has a cross-section of rectangular. The opening for pulling out and placing the filter screen 31 is formed on a front side of the second air duct 212, and the pull-out direction of the filter screen 31 is perpendicular to the extension direction of the second air duct 212. That is, the filter screen 31 is pulled in the front-rear direction.

[0177] The shell 321 is arranged on the front of the second air duct 212 and extended horizontally in the front-rear direction. A rear end of the shell 321 is connected to the opening on the second air duct 212. At least part of the front end of the filter screen 31 is extended into the shell 321 and is connected to the pull-out part 322 in a transmission way. The pull-out part 322 is driven to pull the filter screen 31 out of the shell 321.

[0178] In the Embodiment, the pull-out part 322 is connected to the filter screen 31 through the transmission device 325, and the transmission device 325 is a device including a gear 3253 and a rack, specifically including a first rack 3251, a second rack 3252, and a gear 3253.

[0179] In some Embodiments, the first rack 3251 is installed on the shell 321 and extended along the pull-out direction of the pull-out part 322. The second rack 3252 is installed on the filter screen 31 and is parallel to the first rack 3251, and the first rack 3251 and the second rack 3252 are arranged opposite to each other. The gear 3253 is installed on the pull-out part 322 through a rotating shaft and is arranged between the first rack 3251 and the second rack 3252, and is meshed with the first rack 3251 and the second rack 3252 on both sides for transmission.

[0180] Thus, when user pulls the pull-out part 322, the gear 3253 is driven to rotate under the action of the first rack 3251, and the filter screen 31 is driven to move in the same direction relative to the pull-out part 322 through the second rack 3252. That is, during the movement of the pull-out part 322, the gear 3253 and the racks drive the filter screen 31 to synchronously move in the same direction at a faster speed, thereby shortening the moving length of the pull-out part 322 when user disassembles

bles and maintains the filter screen 31.

[0181] In the Embodiment, one gear 3253 is provided. The moving speed of the filter screen 31 relative to the shell 321 is twice the moving speed of the pull-out part 322 relative to the shell 321.

[0182] Optionally, in the Embodiment, two gears 3253 are provided, and two gears are coaxially set and synchronously rotated. The two gears 3253 are respectively meshed with the first rack 3251 and the second rack 3252. Thus, the speed difference between the filter screen 31 and the pull-out part 322 can be changed by changing the size of the two gears 3253, that is, the moving speed of the filter screen 31 relative to the pull-out part 322 is changed.

[0183] In other Embodiments, the first rack 3251 of the transmission device 325 is installed on the pull-out part 322 and extended along the pull-out direction of the pull-out part 322. The second rack 3252 is installed on the filter screen 31 and is parallel to the first rack 3251 and opposite to the first rack 3251. The gear 3253 is installed on the shell 321. The gear includes a first gear 3253 and a second gear 3253 that are coaxially set and synchronously rotating, and a third gear 3253 arranged between the first gear 3253 and the first rack 3251, or arranged between the second gear 3253 and the second rack 3252. One of the first gear 3253 and the second gear 3253 is meshed with the first rack 3251 or the second rack 3252 through the third gear 3253, and the other of the first gear 3253 and the second gear 3253 is directly meshed with the first rack 3251 or the second rack 3252.

[0184] In the Embodiment, the function of the third gear 3253 is to keep the moving direction of the filter screen 31 consistent with the moving direction of the pull-out part 322.

[0185] Optionally, in the Embodiment, the pull-out part 322 drives the first gear 3253 and the second gear 3253 to rotate synchronously in the first direction through the first rack 3251. The second gear 3253 drives the third gear 3253 to rotate in the second direction, and the third gear 3253 drives the filter screen 31 to move in the same direction as the pull-out part 322 through the second rack 3252.

[0186] In the Embodiment, a ratio of diameters of the first gear 3253 and the second gear 3253 is equal to a ratio of a displacement of the pull-out part 322 relative to the shell 321 and a displacement of the filter screen 31 relative to the shell 321.

[0187] Optionally, in the Embodiment, a width of the second air duct 212 is less than or equal to a distance between the end of the filter screen 31 and the front end of the shell 321. Preferably, the diameter of the second gear 3253 is twice the diameter of the first gear 3253.

[0188] In the Embodiment, the pull-out part 322 is configured as a plate shape, the filter screen 31 is arranged on a first side of the pull-out part 322, and the transmission device 325 is arranged on a second side of the pulling part 322.

[0189] Specifically, the pull-out part 322 is configured

as a strip-shaped plate perpendicular to the extension direction of the second air duct 212. The filter screen 31 is arranged longitudinally on the first side of the pull-out part 322. A lower end of the filter screen 31 is provided with a transmission part 313 extending transversely, and at least part of the transmission part is extended to the second side of the pull-out part 322. The transmission device 325 is arranged between the transmission part 313, the shell 321, and the pull-out part 322.

[0190] The shell 321 is provided with a channel extending along the pull-out direction of the filter screen 31. The top of the shell 321 is provided with a first groove that cooperates with an upper end of the pull-out part 322, and a second groove being parallel to the first sliding groove and cooperating with an upper end of the filter screen 31. The shape of the bottom of the shell 321 is matched with the shape of the lower end of the filter screen 31. The transmission part 313 at the lower end of the filter screen 31 is provided with a third groove 3131 that cooperates with a lower end of the pull-out part 322.

[0191] That is, the filter screen 31 and the pull-out part 322 are arranged in parallel in the shell 321, and the upper end of the filter screen 31 and the upper end of the pull-out part 322 are parallel to each other. The shape of the lower end of the filter screen 31 is matched with the shape of the bottom of the shell 321, and the two components are slidably arranged. The lower end of the pull-out part 322 is abutted against the transmission part 313 at the lower end of the filter screen 31. The top of the transmission part 313 is provided with a third groove 3131 matched with the lower end of the pull-out part 322. Through the above arrangement, the filter screen 31, the shell 321, and the pull-out part 322 can be matched with each other, so the overall structure is compact and it is improved in the smoothness of the pull-out.

[0192] In the Embodiment, the shell 321 is set as a structure with C-shaped cross-section covering the filter screen 31 and the pull-out part 322, the filter screen 31 is arranged on a closed side of the shell 321, the pull-out part 322 is arranged on an open side of the shell 321, and the upper and lower ends of the filter screen 31 are slidably fitted with inner walls of the top and the bottom of the shell 321 respectively.

[0193] The first rack 3251 is arranged on the inner wall of the shell 321 corresponding to the second side of the pull-out part 322. The side wall of the first rack 3251 close to the pull-out part 322 is in contact with and slidably fitted with the second side of the pull-out part 322. A side of the upper end of the first rack 3251 close to the pull-out part 322 is provided with a guide rib upwardly extending, and the second side of the pull-out part 322 is provided with a fifth groove 3221 matched with the guide rib. An opening of the fifth groove 3221 is oriented downward, and the fifth groove 3221 is sleeved on the guide rib. Thus, the guiding performance between the pull-out part 322 and the shell 321 is further improved.

[0194] Preferably, in the Embodiment, the filter screen 31 and the pull-out part 322 are arranged at intervals.

One of the filter screen 31 and the pull-out part 322 is provided with a positioning groove 314, and the other is provided with a positioning rib 3222 matched with the positioning groove. When the pull-out part 322 is pulled out, the positioning rib 3222 is inserted into the positioning groove 314.

[0195] Specifically, the positioning groove 314 is arranged at a side of the front end of the filter screen 31 close to the pull-out part 322, and the positioning rib 3222 is arranged at a front end of a first side of the pull-out part 322. When the pull-out part 322 is pulled out, the filter screen 31 is synchronously pulled out. When the pull-out part 322 is pulled out to the maximum position, the filter screen 31 moves to the front end of the pull-out part 322, and the positioning rib 3222 is inserted into the positioning groove 314.

[0196] Preferably, in the Embodiment, the end of the positioning groove 314 relative to the positioning rib 3222 is provided with a guide opening, a width of which is gradually increased in the direction toward the positioning rib 3222, so that it is improved in the smoothness of the insertion process of the positioning rib 3222.

[0197] More preferably, an insertion port of the positioning rib 3222 and the positioning groove 314 are clamped with each other or interference-fitted to improve user's sense in pulling out the pull-out part 322.

[0198] In the Embodiment, the filter screen 31 includes a support frame 312 and a filter screen body 311 arranged on the support frame 312, and the transmission part 313 is arranged on the support frame 312. The support frame 312 is mainly used to carry the filter screen 31.

[0199] Specifically, the support frame 312 is slidably arranged in the shell 321 and is connected with the pull-out part 322 in a transmission way. The filter screen body 311 is fixed in the support frame 312.

[0200] The support frame 312 includes a first frame 3121 and a second frame 3122. The first frame 3121 is used for connecting with the pull-out mechanism 32 in a transmission way. The transmission device 325 is arranged between the first frame 3121 and the pull-out part 322, and the second frame 3122 is slidably arranged in the first frame 3121 and is used for supporting the filter screen body 311.

[0201] In the Embodiment, an inner side of the first frame 3121 is provided with a fourth groove extending in a pull-out direction. The second frame 3122 is embedded in an inner circumference of the first frame 3121, and the outer edge is provided with a mounting protrusion 2122 matched with the fourth sliding groove. The filter screen body 311 is installed on the second frame 3122.

[0202] In the Embodiment, a length of the filter screen body 311 is matched with a width of the second air duct 212. The length of the second frame 3122 is greater than the length of the filter screen body 311 and less than a length of the first frame 3121. The filter screen body 311 is fixed at a rear end of the second frame 3122. A front end of the filter screen body 311 is provided with a handle part for user to disassemble the filter screen body 311.

[0203] In the Embodiment, the side of the second frame 3122 away from the pull-out part 322 is provided with a groove for matching with the filter screen body 311 and being used for embedding the filter screen body 311.

5 The filter screen body 311 is provided with a positioning protrusion in an outward extension direction and a wall of the groove is provided with a positioning hole, and the positioning hole corresponds to the positioning protrusion one by one. When the filter screen body 311 is installed, the positioning protrusion is engaged in the positioning hole.

10 **[0204]** Preferably, in the Embodiment, one positioning protrusion is arranged at the front end of the filter screen body 311. Or multiple positioning protrusions are arranged at the front end of the filter screen body 311 at intervals.

[0205] In the Embodiment, when the filter screen body 311 needs to be disassembled, user can first pull out the pull-out part 322, and the first frame 3121 moves outward synchronously in the pull-out process. When the pull-out part 322 moves to a proper position, the positioning protrusion is engaged with the positioning groove 314. At this time, user can remove the filter screen 31 through the handle part.

25 **[0206]** In the Embodiment, the first frame 3121 is independent from the second frame 3122, and the second frame 3122 can be taken off from the first frame 3121. Specifically, the side of the fourth groove away from the pull-out part 322 is provided with a notch corresponding to the mounting protrusion 2122, and the second frame 3122 is detachably installed in the first frame 3121 through the notch. In the Embodiment, the second frame 3122 is slidably arranged in the first frame 3121. When the filter screen 31 is installed, the second frame 3122 slides to abut against the rear end of the first frame 3121 to ensure that the filter screen body 311 covers the entire cross-section of the second air duct 212.

30 **[0207]** In disassembling the filter screen body 311 for maintaining, only the filter screen body 311 can be taken out, or the second frame 3122 can be taken out together with the filter screen body 311 as a whole. Specifically, when the second frame 3122 moves to abut against the front end of the first frame 3121, the mounting protrusion 2122 is aligned with the notch, and the second frame 3122 can be taken out, so that it is more convenient for disassembling and assembling the filter screen body 311.

35 **[0208]** Preferably, an elastic member can also be arranged between the first frame 3121 and the second frame 3122, so that the second frame 3122 is kept in a position abutting against the rear end of the first frame 3121. Accordingly the filtering device 3 is kept for reliably working.

40 **[0209]** Preferably, the filter screen body 311 has flexible properties.

45 **[0210]** Specifically, the filter screen body 311 includes an elastic frame, and the elastic frame is provided with a plurality of openings, and a plurality of filter screens are respectively arranged at the openings respectively. By

setting the filter screen body 311 in flexible elastic property, it is convenient for user to disassemble the filter screen body 311 and prevent the filter screen body 311 from being stuck.

[0211] Preferably, a top wall, a bottom wall, and a rear wall of the second air duct 212 are respectively provided with grooves for matching with an upper end, a lower end, and a rear end of the filter screen 31. When the filter screen 31 is inserted, the upper end, the lower end, and the rear end of the filter screen 31 are respectively inserted into the corresponding grooves. More preferably, the upper end and the lower end of the filter screen 31 are slidably engaged with the groove bottom of the groove of the top wall and the groove bottom of the groove of the bottom wall respectively. After the filter screen 31 is inserted, the rear end of the filter screen 31 abuts against the groove bottom of the groove of the rear wall of the second air duct.

Embodiment 5

[0212] As shown in Figures 1 to 14, in the Embodiment of the present invention, a laundry treatment apparatus includes a housing and a drum assembly 1 installed in a housing. The drum assembly 1 includes an inner drum for holding and washing laundry to be washed, and an outer drum coaxially sleeved outside the inner drum for holding washing water. The inner drum is configured to rotate to wash and dehydrate laundry to be washed.

[0213] The laundry treatment apparatus further includes a drying system 2. The drying system 2 includes an air duct 21 communicating with the drum assembly 1 and a fan 22 arranged on the air duct 21 for driving the circulation of airflow. The drum assembly 1 includes an air inlet 11 and an air outlet 12. Two ends of the air duct 21 are respectively connected to the air inlet 11 and the air outlet 12 of the drum assembly 1. The fan 22 drives the airflow to circulate between the drum assembly 1 and the air duct 21.

[0214] In the Embodiment, the laundry treatment apparatus further includes a filtering device 3 for filtering lint.

[0215] Preferably, the filtering device 3 can be used to filter washing water or to filter airflow. In the Embodiment, the filtering device 3 filtering the airflow is taken as an example for description.

[0216] The filtering device 3 includes a filter screen 31 arranged in the air duct 21 and a pull-out mechanism 32 arranged outside the air duct 21 for pulling out for disassembling and assembling the filter screen 31.

[0217] In the Embodiment, the drying system 2 is arranged above the drum assembly 1. The air duct 21 includes a first air duct 211 longitudinally extending and a second air duct 212 horizontally extending, and the filter screen 31 is arranged in the second air duct 212. Specifically, the filter screen 31 is arranged in the second air duct 212 from a front side of the second air duct 212 in a pull-out manner. The pull-out mechanism 32 includes a pull-out part 322 extending in a front-rear direction, and a

rear end of the pull-out part 322 is connected to a front end of the filter screen 31. A front end of the pull-out part 322 is extended to a panel of the housing of the laundry treatment apparatus, and the pull-out part 322 is pulled out from the panel.

[0218] The housing is also provided with a detergent box 71 for storing detergent. The detergent box 71 is arranged in the front part of the housing in a pull-out manner. Specifically, the detergent box 71 can be pulled out from the panel of the housing.

[0219] A front end of the detergent box 71 is provided with a front decorative plate 72 for matching with the panel and shielding the detergent box 71. The material, color, and/or gloss of the front decorative plate 72 are consistent with the panel. When the detergent box 71 is closed, the front decorative plate 72 is embedded on the panel, and a periphery of the front decorative plate 72 smoothly transitions with the panel.

[0220] In the Embodiment, the panel is provided with a decorative plate 323 for shielding the pull-out mechanism 32. The material, color, and/or gloss of the decorative plate 323 are consistent with the panel. When the pull-out part 322 of the pull-out mechanism 32 is reset, the decorative plate 323 is embedded on the panel, and a periphery of the decorative plate 323 smoothly transitions with the panel.

[0221] In the Embodiment, the panel can also be divided into two areas, that is, a main control board area for controlling the laundry treatment apparatus and a front decorative plate 72 area for pulling out the detergent box 71.

[0222] The panel can also be divided into three areas, that is, a main control board area for controlling the laundry treatment apparatus, a front decorative plate 72 area for pulling out the detergent box 71, and a decorative plate 323 area for pulling out the filtering device 3.

[0223] In the Embodiment, the main control board area can be provided with a control switch, a display screen, a knob, control buttons, and/or a touch screen, etc. A main control board is communicatively connected to A control computer board of the laundry treatment apparatus for user to input control commands and to provide feedback to user on the working status of the laundry treatment apparatus.

[0224] In the Embodiment, the detergent box 71 is arranged on a side of the pull-out mechanism 32 of the filtering device 3.

[0225] In some Embodiments, the front decorative plate 72 of the detergent box 71 is as the decorative plate 323 for shielding the pull-out mechanism 32.

[0226] Specifically, the pull-out mechanism 32 is arranged on a side of the detergent box 71 and adjacent to the detergent box 71. The front decorative plate 72 of the detergent box 71 is extended toward the side where the pull-out mechanism 32 is located. When the detergent box 71 is closed, the front decorative plate 72 of the detergent box 71 shields the pull-out mechanism 32.

[0227] In the Embodiment, one opening is formed on the panel, and the shape of the opening is matched with the shape of the front decorative plate 72. A pull-out port for the pull-out part 322 and a pull-out port for the detergent box 71 are both arranged in the opening, so that there are only the front decorative plate 72 are a and the main control board area on the panel. Accordingly it is further improved in the aesthetics of the panel.

[0228] In the Embodiment, the pull-out part 322 of the pull-out mechanism 32 can be pulled out synchronously together with the detergent box 71, or can be pulled out independently from the detergent box 71.

[0229] Specifically, the implementation manner of the pull-out part 322 being pulled out synchronously with the detergent box 71 is as follows.

[0230] A pull-out direction of the pull-out part 322 is the same as a pull-out direction of the detergent box 71. The front end of the pull-out part 322 is connected to the front decorative plate 72 of the detergent box 71. When user pulls out the detergent box 71, the pull-out part 322 is driven to be synchronously pulled out through a connection structure of the front decorative plate 72 with the front end of the pull-out part 322, and the filter screen 31 is pulled out synchronously.

[0231] By setting the front end of the pull-out part 322 to be connected to the front decorative plate 72 of the detergent box 71, the pull-out mechanism 32 and the detergent box 71 can be synchronously pulled out, and user can check the state of the filter screen 31 when every time detergent is added. So user can timely discover the problems of the filter screen 31, and timely clean and maintain the filter screen 31, to keeping the working stability of the filter screen 31.

[0232] In the Embodiment, another connection structure can also be arranged between the pull-out part 322 and the detergent box 71, as long as the detergent box 71 and the pull-out part 322 can be synchronously pulled out.

[0233] Preferably, in the Embodiment, for the implementation manner of the detergent box 71 and the pull-out part 322 being pulled out synchronously, the pull-out mechanism 32 is arranged on a left side or a right side of the detergent box 71.

[0234] In the Embodiment, the implementation manner of the pull-out part 322 being pulled out independently of the detergent box 71 is as follows.

[0235] The front end of the pull-out part 322 is spaced apart from the front decorative plate 72 of the detergent box 71, and there is no connection structure. After the detergent box 71 is pulled out, the front end of the pull-out part 322 covered by the front decorative plate 72 is exposed, and user can pull out the filter screen 31 through the pull-out part 322.

[0236] By the above arrangements, a path length of the pull-out part 322 being pulled out is less than or equal to that of the detergent box 71 being pulled out, to ensure that the filter screen 31 can be pulled out.

[0237] Preferably, in the Embodiment, during a pull-out

process of the detergent box 71, the pull-out path of the pull-out part 322 is not disturbed by the front decorative plate 72 of the detergent box 71, so that there is a sufficient space for pulling out the filter screen 31 by the pull-out part 322.

[0238] Specifically, the front decorative plate 72 of the detergent box 71 constitutes the decorative plate 323 for shielding the pull-out mechanism 32. When the detergent box 71 is pulled out, the front decorative plate 72 is driven to slide toward a side away from the pull-out mechanism 32.

[0239] In the Embodiment, the pull-out path of the detergent box 71 can be set to be inclined toward a side away from the pull-out mechanism 32 from the rear end to the front end, so that the front decorative plate 72 of the detergent box 71 moves toward the side of the pull-out mechanism 32 during the pull-out process of the detergent box 71, and the pull-out path of the pull-out part 322 cannot be disturbed. The front decorative plate 72 is prevented from hindering to pull out the pull-out part 322.

[0240] Preferably, in the Embodiment, the pull-out path of the pull-out part 322 can also be set to be inclined toward a side away from the detergent box 71 from the rear to the front, so that the pull-out path of the pull-out part 322 cannot be disturbed after the detergent box 71 is pulled out by a small length.

[0241] Preferably, the pull-out mechanism 32 is arranged on a left side or a right side of the detergent box 71.

[0242] In some Embodiments, the decorative plate 323 for shielding the pull-out mechanism 32 is arranged independently of the front decorative plate 72 of the detergent box 71, and is spaced apart from the front decorative plate 72.

[0243] In the Embodiment, the panel is provided with openings for respectively accommodating the front decorative plate 72 and the decorative plate 323. The decorative plate 323 for shielding the pull-out mechanism 32 can be hinged in the corresponding opening, or can be connected to the front end of the pull-out part 322.

[0244] Preferably, in the Embodiment, the decorative plate 323 is connected to the front end of the pull-out part 322. When the pull-out part 322 is reset, the decorative plate 323 is embedded in the corresponding opening.

[0245] Preferably, in the Embodiment, the front end of the pull-out part 322 is provided with a plate 324, and the plate 324 can be fixed to the front end of the pull-out part 322 in any way. Specifically, in the Embodiment, the plate 324 is fixed to the front end of the pull-out part 322 by a screw, and user pulls the pull-out part 322 through the plate 324.

[0246] Preferably, the plate 324 is connected to the front decorative plate 72 of the detergent box 71, or is spaced apart from the front decorative plate 72; or, the plate 324 is connected to the decorative plate 323.

[0247] The plate 324 is connected with the decorative plate 323 or the front decorative plate 72. Specifically, one of the decorative plate 323 or the front decorative

plate 72 and the plate 324 is provided with a claw, and the other is correspondingly provided with an opening, and the claw is correspondingly engaged in the opening.

[0248] In the Embodiment, the plate 324 being connected to the front decorative plate 72 of the detergent box 71 is taken as an example that the pull-out part 322 is linked with the detergent box 71. The plate 324 being connected to the decorative plate 323 is taken as an example that the decorative plate 323 is independent of the front decorative plate 72.

[0249] Preferably, in the Embodiment, the claw is arranged on an inner side of the decorative plate 323 or the front decorative plate 72, and the plate 324 is correspondingly provided with the opening, so that the integrity of the decorative plate 323 and the front decorative plate 72 can be kept, and the overall aesthetics of the laundry treatment apparatus can be further improved.

[0250] Preferably, an elastic element is arranged on the side of the plate 324, and a groove matching with the elastic element is arranged on the front side of the housing. The plate 324 is connected with the housing through the elastic element.

[0251] In the Embodiment, the elastic element is arranged at a lower of the plate 324, and the elastic element is integrally formed with the plate 324. The elastic element is protruded toward a rear side of the laundry treatment apparatus.

[0252] Preferably, the elastic element is arranged on the plate 324 in the Embodiment where the pull-out part 322 is pulled out independently. For the Embodiment in which the pull-out part 322 is linked with the detergent box 71, there is no the elastic element arranged on the plate 324, and the pull-out part 322 is kept stable through the connection structure between the detergent box 71 and the housing.

[0253] In the Embodiment, a channel for pulling out the pull-out part 322 and the filter screen 31 is arranged in the housing. The channel is arranged between the air duct 21 and the panel. The rear side of the pull-out part 322 is connected to the front end of the filter screen 31 through a transmission device 325. The filter screen 31 is driven to slide relative to the pull-out part 322 and to be pulled out during the process of pulling out the pull-out part 322.

[0254] Specifically, the pull-out mechanism 32 also includes a shell 321, and the shell 321 is provided with a channel for the pull-out part 322 and the filter screen 31 to slide. The transmission device 325 includes a gear 3253 and a rack. Preferably, a moving direction of the filter screen 31 is the same as a moving direction of the pull-out part 322, and a moving speed of the filter screen 31 is twice a moving speed of the pull-out part 322.

Embodiment 6

[0255] As shown in Figures 1 to 14, in the Embodiment of the present invention, a drying system 2 is applied to a laundry treatment apparatus for drying laundry in the laundry treatment apparatus.

[0256] The laundry treatment apparatus includes a housing and a drum assembly 1 installed in the housing. The drum assembly 1 includes an inner drum for holding and washing laundry to be washed, and an outer drum coaxially sleeved outside the inner drum for holding washing water. The inner drum is configured to rotate to wash and dehydrate laundry to be washed.

[0257] The drying system 2 is in communication with the drum assembly 1. Specifically, the drying system 2 is arranged above the drum assembly 1. An air inlet 11 is arranged at a front of a top of the drum assembly 1, and an air outlet 12 is arranged at a rear of a top of the drum assembly 1. The drying system 2 includes an air duct 21 arranged above the drum assembly 1, an air inlet end of the air duct 21 is connected to the air outlet 12 of the drum assembly 1, and an air outlet end of the air duct 21 is connected to the air inlet 11 of the drum assembly 1. The airflow is driven to circulate in the air duct 21 and the drum assembly 1 to dry laundry in the drum assembly 1.

[0258] In the Embodiment, the air duct 21 is provided with a filtering device 3 for filtering lint in the airflow, and the filtering device 3 includes a filter screen 31 arranged in the air duct 21.

[0259] In daily use, after the laundry treatment apparatus runs the drying function several times, some lint is accumulated on the filter screen 31. In order to keep the stability of the drying effect, user needs to take out the filter screen 31 for cleaning.

[0260] In order to improve the intelligence level of the laundry treatment apparatus and improve user's experience, in the Embodiment of the present invention, a filter screen cleaning structure 4 for cleaning the filter screen 31 is arranged in the air duct 21.

[0261] Specifically, the filter screen cleaning structure 4 includes an electric scraper 41 and a spraying device 42, the electric scraper 41 is used to scrape and collect the lint on the filter screen 31, and the spraying device 42 is used to flush the lint collected on the filter screen 31, so as to clean the lint out of the air duct 21.

[0262] In the Embodiment, the air duct 21 is set as a flat pipe with a rectangular cross-section. The filter screen 31 is arranged in the air duct 21 and is pulled out from a front side of the air duct 21, configured to cover the cross-section of the air duct 21, and used to filter the airflow flowing through the filter screen.

[0263] The electric scraper 41 includes a scraper body and a driver for driving the scraper body to move back and forth.

[0264] In the Embodiment, the scraper body is arranged along a width direction of the filter screen 31, and a side of the scraper body close to the filter screen 31 is elastically abutted against the filter screen 31. Specifically, the scraper body includes a sliding seat and a flexible part arranged on the sliding seat. The sliding seat is slidably connected with the air duct 21 and is connected with the driver in a transmission way. The flexible part is extended toward the filter screen 31 from the side of the sliding seat close to the filter screen 31, and an extension

length is greater than or equal to a gap between the sliding seat and the filter screen 31, that is, the scraper body is elastically abutted against the filter screen 31 through the flexible part. Therefore, in the process of the driver driving the scraper body to reciprocate along the length direction of the filter screen 31, the flexible part scrapes off the lint on the filter screen 31 and collects the lint on both ends of the filter screen 31 for cleaning.

[0265] A working end of the driver is connected with the scraper body in a transmission way, and is used to drive the scraper body to reciprocate along the length direction of the filter screen 31.

[0266] In the Embodiment, a top and a bottom of the scraper body are respectively contact with an inner wall of a top and an inner wall of a bottom of the air duct 21. A slide rail is arranged between the top and/or the bottom of the scraper body and the inner wall of the air duct 21. The scraper body reciprocates between inner walls of a front and a rear of the air duct 21 under the driving of the driver to remove the lint on the filter screen 31.

[0267] In the Embodiment, the slide rail is arranged on the top of the air duct 21, and a slide block matched with the slide rail is arranged on the top of the sliding seat. The slide block is embedded in the slide rail and slides along the slide rail. The bottom of the sliding seat is connected with the working end of the driver in a transmission way.

[0268] In the Embodiment, the driver can be an electric cylinder, an air cylinder, or a motor, etc.

[0269] Preferably, the scraper body is driven by a motor and transmitted through a screw. Specifically, the screw is extended along the width direction of the air duct 21 and is parallel to an extension direction of the filter screen 31. Both ends of the screw are axially fitted with a front wall and a rear wall of the air duct 21. The screw penetrates the sliding seat and is fitted with threads of the sliding seat. At least part of one end of the screw is extended to the outside of the air duct 21 and is connected with the working end of the motor by a transmission way. The working end of the motor rotates to drive the screw to rotate, and the screw drives the scraper body to slide back and forth.

[0270] In the Embodiment, the screw is spaced apart from the bottom wall of the air duct 21 to allow water to flow through.

[0271] In the Embodiment, the side of the scraper body close to the filter screen 31 is extended along the width direction of the filter screen 31. A length of the side of the scraper body close to the filter screen 31 is greater than or equal to the width of the filter screen 31, that is, the side of the scraper body close to the filter screen 31 is in the width direction of the filter screen 31.

[0272] Preferably, in the Embodiment, the flexible part is set as a brush or a flexible plate.

[0273] Further preferably, in the Embodiment, the flexible plate is as a silicone plate or a rubber plate.

[0274] In the Embodiment, the filter screen 31 is extended in a front-rear direction, and a length direction of the filter screen 31 is the width direction of the air duct 21.

[0275] In the Embodiment, the spraying device 42 includes a first spray pipe 421 arranged on one side of the filter screen 31 and extending along the length direction of the filter screen 31, and the first spray pipe 421 is provided with spray openings facing the filter screen 31.

[0276] The first spray pipe 421 can be arranged upstream of the filter screen 31, that is, arranged on the side of the filter screen 31 close to the air inlet end of the air duct 21. Or the first spray pipe 421 can be arranged downstream of the filter screen 31, that is, arranged on the side of the filter screen 31 away from the air inlet end of the air duct 21.

[0277] Preferably, in the Embodiment, the inner wall of the air duct 21 at the bottom of the filter screen 31 is provided with a slope inclined downward in a direction toward the air inlet end of the air duct 21, that is, the inner wall of the bottom of the air duct 21 corresponding to the filter screen 31 is provided with a slope inclined downward in the direction toward the air inlet end of the air duct 21, so that water sprayed into the air duct 21 flows towards the air outlet 12 of the drum assembly 1.

[0278] Preferably, in the Embodiment, the first spray pipe 421 is arranged in the air duct 21 upstream of the filter screen 31 and extended along the length direction of the filter screen 31, and the side of the first spray pipe 421 close to the filter screen 31 is provided with spray openings facing the filter screen 31, and water is sprayed from the spray openings to wash the filter screen 31.

[0279] The spray openings are arranged along an axial direction of the first spray pipe 421 at intervals, and one end of the first spray pipe 421 is extended to the outside of the air duct 21 and is connected to a water inlet pipe of the laundry treatment apparatus.

[0280] Preferably, the filter screen 31 is inclined toward an upstream direction of the air duct 21 from top to bottom. Correspondingly, the scraper body is set as a trapezoid with a width gradually decreased from top to bottom.

[0281] In the Embodiment, an end of the first spray pipe 421 close to the water inlet pipe is a first end, and an end away from the water inlet pipe is a second end. Diameters of the spray openings are gradually decreased along the axial direction of the first spray pipe 421, to ensure that the water output of each of the spray openings in the same row is the same.

[0282] Preferably, in the Embodiment, the spray openings are arranged in one row, and the spray openings on the first spray pipe 421 correspond to the top of the filter screen 31.

[0283] Alternatively, the spray openings are arranged in multiple rows along a circumferential direction of the first spray pipe 421, the uppermost spray openings correspond to the top of the filter screen 31, and the lowermost spray openings correspond to the bottom of the filter screen 31.

[0284] Preferably, in the Embodiment, the spray openings are arranged in multiple rows along a circumferential direction of the first spray pipe 421, and the diameters of

the spray openings are gradually decreased along a direction from top to bottom, so that water can be sprayed on the overall of the filter screen 31, and it is avoided that the lint is accumulated between the bottom of the filter screen 31 and the inner wall of the bottom of the air duct 21. Thereby it is improved in the cleaning effect of the filter screen 31.

[0285] Preferably, in the Embodiment, each two spray openings of adjacent two rows are not the same cross-section in the circumferential direction of the first spray pipe 421.

[0286] Preferably, in the Embodiment, the spraying device 42 also includes a second spray pipe 422 near the air inlet end of the air duct 21, and the second spray pipe 422 is provided with a flushing opening for flushing the lint in the air duct 21 upstream of the filter screen 31.

[0287] Specifically, the air duct 21 is arranged above the drum assembly 1, the air outlet 12 of the drum assembly 1 is arranged on one side of the top of the drum assembly 1, and the air inlet end of the air duct 21 is bent downward and connected to the air outlet 12 of the drum assembly 1. The second spray pipe 422 is extended into the air duct 21 from a corner of the air inlet end of the air duct 21.

[0288] In the Embodiment, the second spray pipe 422 is extended into the air duct 21 from the top wall at a corner of the air inlet end of the air duct 21, an end of the second spray pipe 422 is extended to a middle of the air duct 21, and the flushing opening is arranged at the end of the second spray pipe 422. Preferably, the second spray pipe 422 is extended into the air duct 21 in a direction perpendicular to the extension direction of the air duct 21 from a middle of the top wall at the corner of the air inlet end of the air duct 21.

[0289] The flushing opening includes a first flushing port 4221 extending along an axial direction of the second spray pipe 422 and facing the inner wall of the air duct 21 at the air inlet end close to the filter screen 31, and a second flushing opening 4222 extending along a circumferential direction of the second spray pipe 422 and facing the inner wall of the air duct 21 at the air inlet end away from the filter screen 31.

[0290] In the Embodiment, a diameter of the second flushing opening 4222 is larger than a diameter of the first flushing opening. The flushing opening can also be provided with only the second flushing opening 4222 without the first flushing opening 4221.

[0291] Preferably, the first flushing opening 4221 is in a circular shape, and the second flushing opening 4222 is in a fan-shaped shape.

[0292] By setting the spraying device 42 including the first spray pipe 421 and the second spray pipe 422, the lint is sprayed to be detached from the filter screen 31 by water from the first spray pipe 421, and flows towards the air inlet end of the air duct 21 under the flushing action of water. Water from the second spray pipe 422 flushes the lint remaining on the inner wall at the corner of the air inlet end of the air duct 21 and at the port of the air inlet end of

the air duct 21. So all the lint detached from the filter screen 31 is cleaned out.

[0293] In the Embodiment, the laundry treatment apparatus is provided with a water box 7, and the detergent box 71 is slidably arranged in the water box 7. The water box 7 is provided with a water distribution plate, and the first spray pipe 421 and the second spray pipe 422 are connected to the water distribution plate of the water box 7.

[0294] Preferably, in the Embodiment, the first spray pipe 421 and the second spray pipe 422 share a same water supply pipe for supplying water. Specifically, an end of the water supply pipe is connected to the water distribution plate of the water box 7, and another end of the water supply pipe is connected to the first spray pipe 421 and the second spray pipe 422 through a diversion device. Preferably, the diversion device can be a tee.

[0295] The Embodiment of the present invention also discloses a control method for the above-mentioned laundry treatment apparatus. Specifically, the laundry treatment apparatus includes a washing program and a drying program. In running the drying program in the laundry treatment apparatus, if it is detected that the filter screen 31 is blocked, the electric scraper 41 can be controlled to run to scrape the lint on the filter screen 31 and gather the lint to the end of the filter screen 31 to ensure the normal running of the drying program. Then, in running the washing program in the laundry treatment apparatus, the spraying device 42 runs to flush the gathered lint into the drum assembly 1 and discharge the lint from a drain pipe of the laundry treatment apparatus.

[0296] Preferably, in the Embodiment, the lint gathered on the filter screen 31 is flushed during the draining stage in washing process, and the lint is flushed into the outer drum of the drum assembly 1 and discharged through the drain pipe.

[0297] Preferably, in the Embodiment, the electric scraper 41 can run synchronously during the operation of the spraying device 42 to improve the cleaning effect of the filter screen 31.

[0298] Preferably, in the Embodiment, a water level detection element is also arranged in the drum assembly 1.

[0299] When the spraying device 42 is working, the water level in the outer drum is obtained.

[0300] A flow rate of the spraying device 42 is controlled according to the water level in the outer drum, so that the water level in the outer drum is lower than a bottom of the inner drum.

[0301] In the Embodiment, by detecting the water level in the outer drum and adjusting the flow rate of the spraying device 42 according to the water level in the outer drum, the water level for flushing the lint can always be lower than the bottom of the inner drum, thereby the lint is prevented from sticking to laundry, and the cleaning effect of laundry is ensured.

[0302] In the Embodiment, the laundry treatment apparatus can be a dryer or a washing machine with a drying

function.

[0303] The above description is only a preferred embodiment of the present application, and does not limit the present application. Although the present application has disclosed preferred embodiments, it is not intended to limit the present application. Without departing from the scope of the technical solution of the present application, anyone in the field of this patent application can be hinted to make some changes or modifications as equivalent embodiments by the above technical content. Any simple modification, equivalent change and modification made to the above embodiments according to the substantive content of the present application still belong to the scope of the solution of the present application.

Claims

1. A drying system, including an air duct (21) arranged above a drum assembly (1) and connected to the drum assembly (1), and a heat pump system (8), wherein an evaporator (83) and a condenser (82) of the heat pump system (8) are arranged between an air inlet end and an air outlet end of the air duct (21); a compressor (81) of the heat pump system (8) is arranged at middle portion below the drum assembly (1), and spaced apart from a vertical axial plane of the drum assembly (1), and an input port and an output port of the compressor (81) are connected to the evaporator (83) and the condenser (82) through a pipe, respectively.
2. The drying system according to claim 1, wherein the pipe is extended toward a rear side of the drum assembly (1) from the output port and/or the input port of the compressor (81), extended upwards along a rear side of the drum assembly (1), and connected to an input port of the condenser (82) and/or an output port of the evaporator (83), and the pipe is spaced apart from the rear side of the drum assembly (1).
3. The drying system according to claim 2, wherein the drying system also includes a supporting member (9) arranged behind the drum assembly (1) and spaced apart from the rear side of the drum assembly (1);

the supporting member (9) is extended along a extending direction of the pipe, and a side of the supporting member is provided with a supporting groove extending along a length direction of the supporting member (9), and the pipe is clamped within the supporting groove of the supporting member (9); preferably, the pipe includes a first pipe (851) connected between the output port of the compressor (81) and the input port of the condenser (82), and a second pipe (852) connected be-

tween the output port of the compressor (81) and the output port of the evaporator (83); the first pipe (851) and the second pipe (852) are arranged in parallel, and the supporting member (9) is provided with two supporting grooves corresponding to the first pipe (851) and the second pipe (852), respectively.

4. The drying system according to claim 3, wherein the supporting groove is arranged on a side of the supporting member (9) close to the drum assembly (1), and a claw (95) is arranged at an opening of the supporting groove, the claw (95) is extended toward an interior of the supporting groove from an end of a groove wall away from a groove bottom, for limiting the pipe; preferably, the claw (95) is arranged on a partition plate (93) between the first supporting groove and the second supporting groove.
5. The drying system according to claim 4, wherein a heat insulation sleeve is sleeved on the pipe, at least at a position corresponding to the supporting groove, and the claw (95) is cooperated with the heat insulation sleeve in a limiting manner; preferably, the drying system includes a limiting block (94) sleeved on an outer periphery of the heat insulation sleeve for clamping the heat insulation sleeve; a shape of the limiting block (94) is matched with a shape of the supporting groove, and the limiting block (94) is fixed in the supporting groove by the claw (95).
6. The drying system according to claim 5, wherein a notch (99) corresponding to the claw (95) is arranged on a groove wall of the supporting groove away from the partition plate (93); a fixing hoop (96) is sleeved on an outer periphery of the supporting member (9) from the notch (99); preferably, limiting blocks (94) are arranged at intervals along a length direction of the pipe, and the fixing hoops (96) are configured to correspond to the limiting blocks (94) one by one.

7. The drying system according to any one of claims 3 to 6, wherein, the supporting member (9) includes:

a supporting member body (97), bending along a direction away from an axis of the drum assembly (1);
a supporting member joint (98), arranged at both ends of the supporting member body (97) and extending along a radial direction of the drum assembly (1) towards an edge of the rear side of

the drum assembly.

8. The drying system according to any one of claims 1 to 6, wherein the air duct (21) includes a first air duct (211) arranged above the drum assembly (1) and extending in a front-rear direction, a second air duct (212) extending in a left-right direction from a rear end of the first air duct (211), and a fan (22) connected between the first air duct (211) and the second air duct (212); the condenser (82) and the evaporator (83) are respectively arranged in the first air duct (211) and the second air duct (212);

preferably, a side wall of an end of the first air duct (211) close to the second air duct (212) is contracted inwards in a direction toward the fan (22);
one end of the second air duct (212) close to the first air duct (211) is extended downwards and in a direction toward the first air duct (211), and has a front side wall and a rear side wall being contracted inwards;
the first pipe (851) is extended forward from an upper side of one end of the second air duct (212) close to the first air duct (211) and is connected to the condenser (82) within the first air duct (211); the second pipe (852) is extended into the second air duct (212) from one side of the second air duct (212) close to the fan (22) and is connected to the evaporator (83);
preferably, an air distribution plate (2112) is arranged inside the first air duct (211), between an air outlet end of the fan (22), for controlling air-flow to flow evenly through the condenser (82).

9. The drying system according to any one of claims 1 to 6, wherein,

each of the condenser (82) and the evaporator (83) is fin-type heat sink, and includes an input pipe and an output pipe extending along a length direction of the air duct (21), and a heat exchange pipe with a wavy shape connected between the input pipe and the output pipe;
preferably, the heat exchange pipe is set to be flat and extending along the length direction of the air duct (21), and multiple groups of heat exchange pipes are arranged at intervals along the length direction of the air duct (21).

10. A laundry treatment apparatus equipped with the drying system according to any one of claims 1 to 9, comprising a housing, wherein the air duct (21) is installed on a top wall of the housing, the compressor (81) is installed on a bottom wall of the housing, and the pipe is installed on a rear wall of the housing through the supporting member (9).

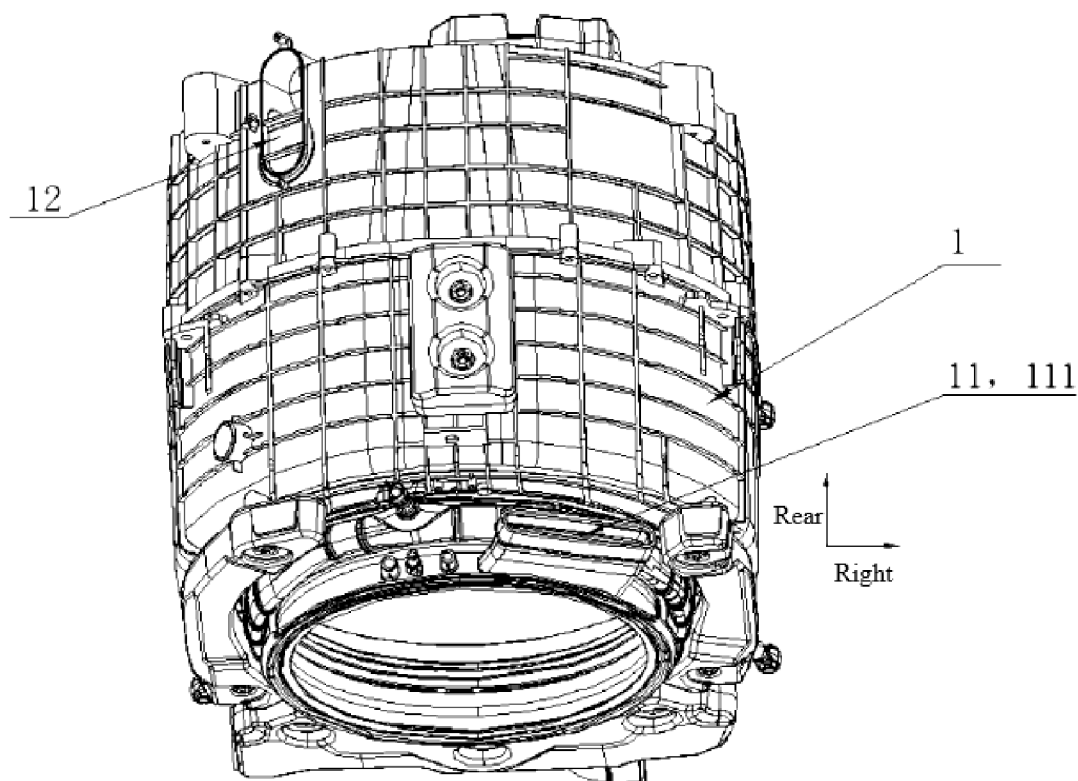


Figure 1

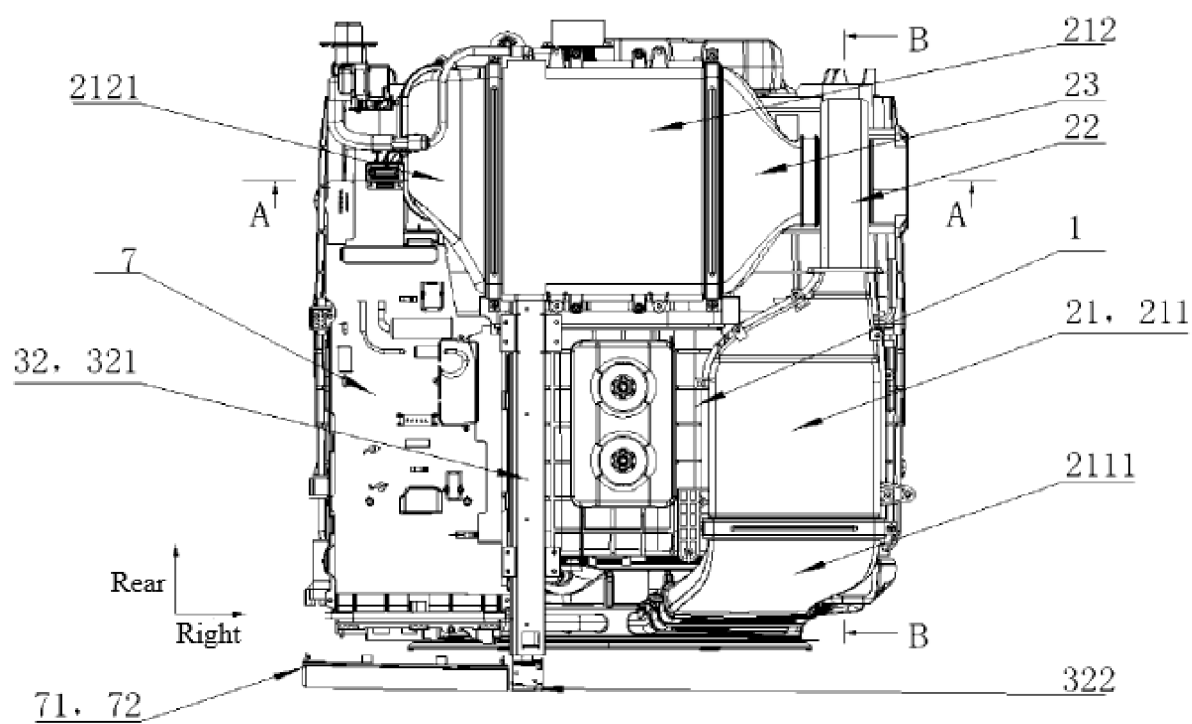


Figure 2

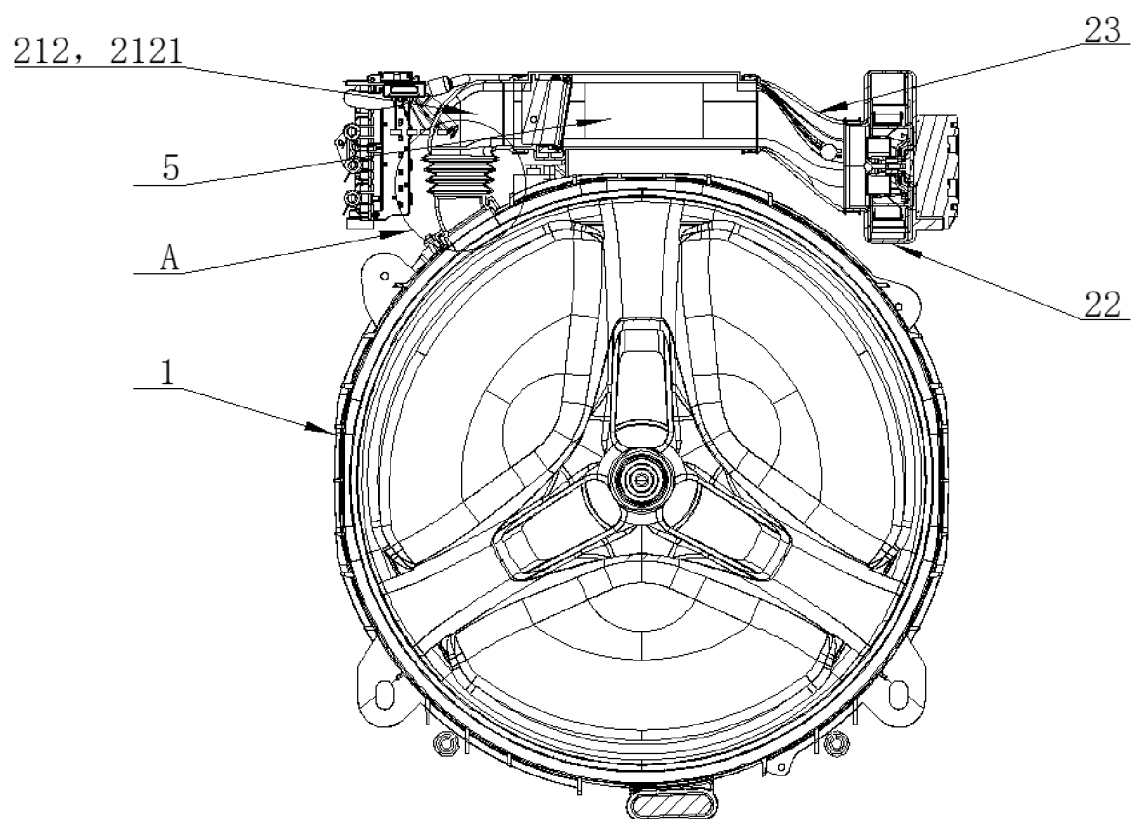


Figure 3

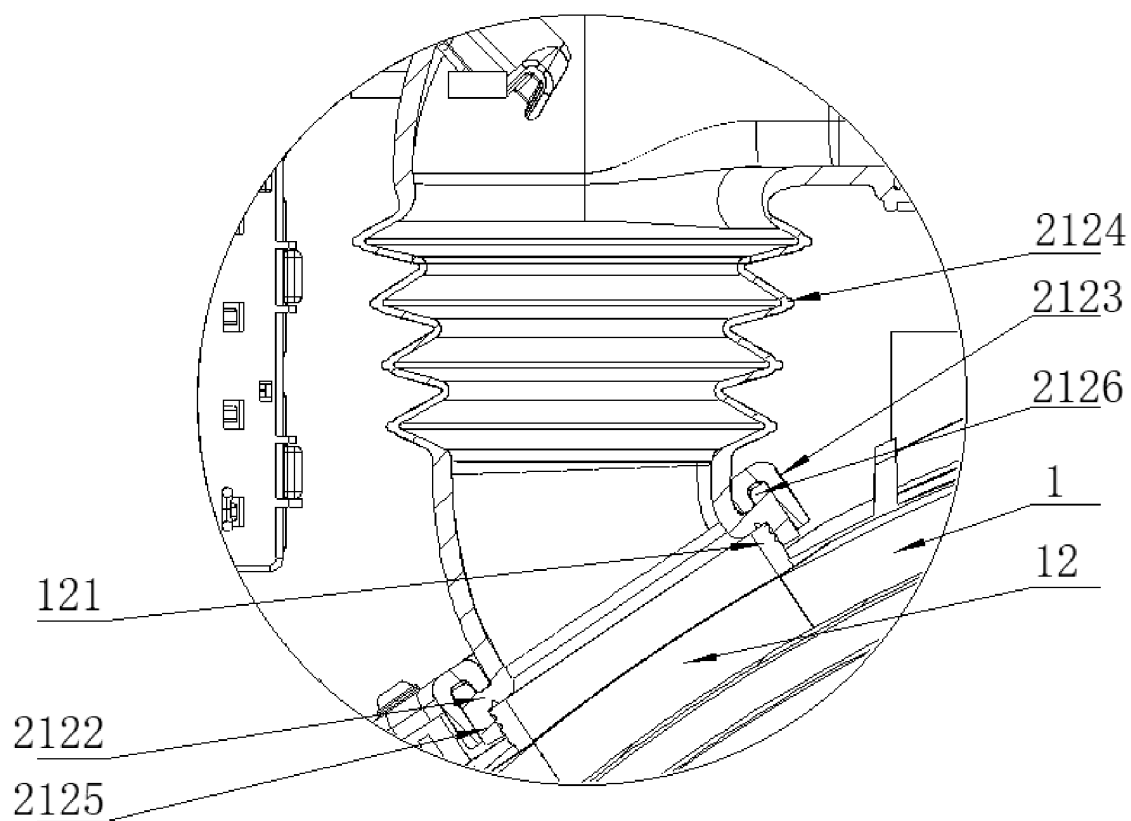


Figure 4

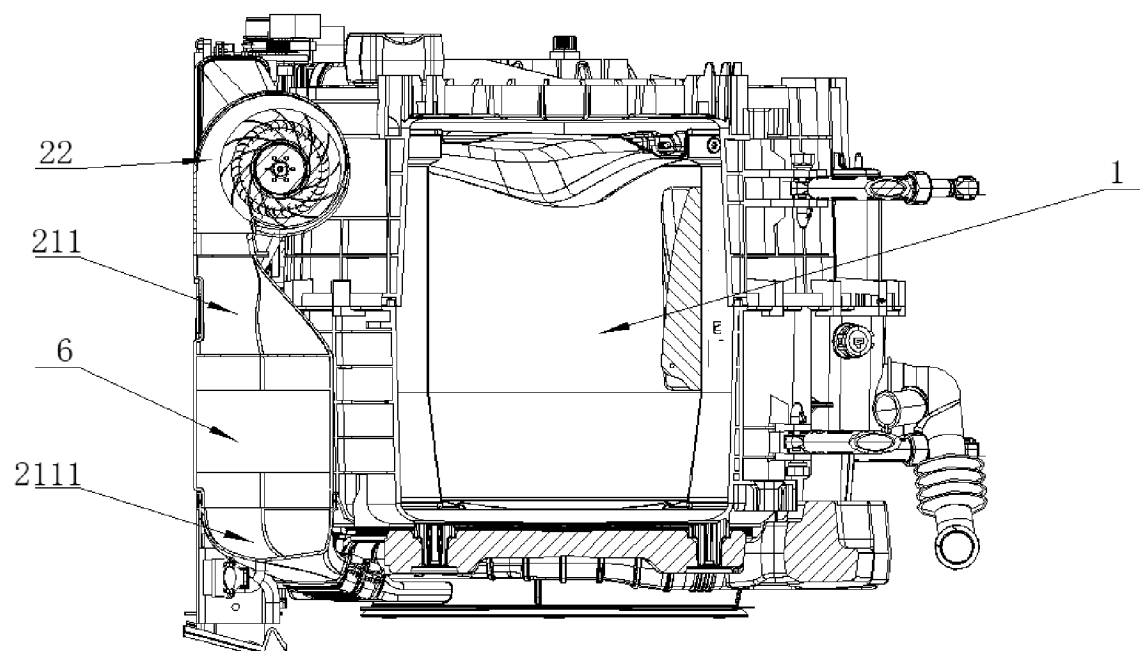


Figure 5

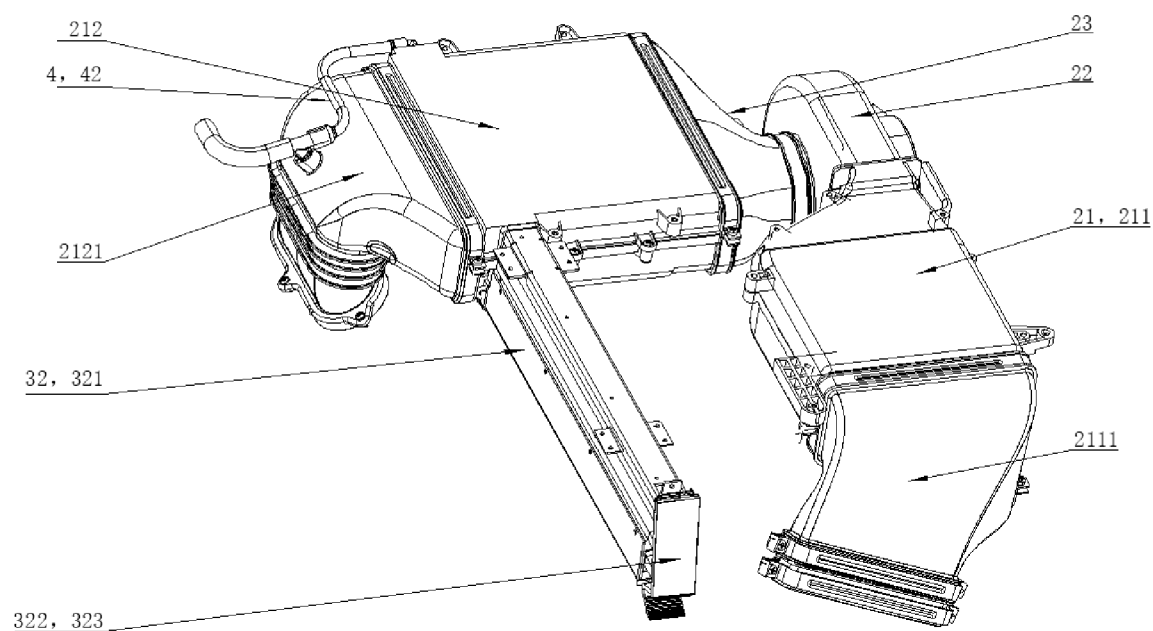


Figure 6

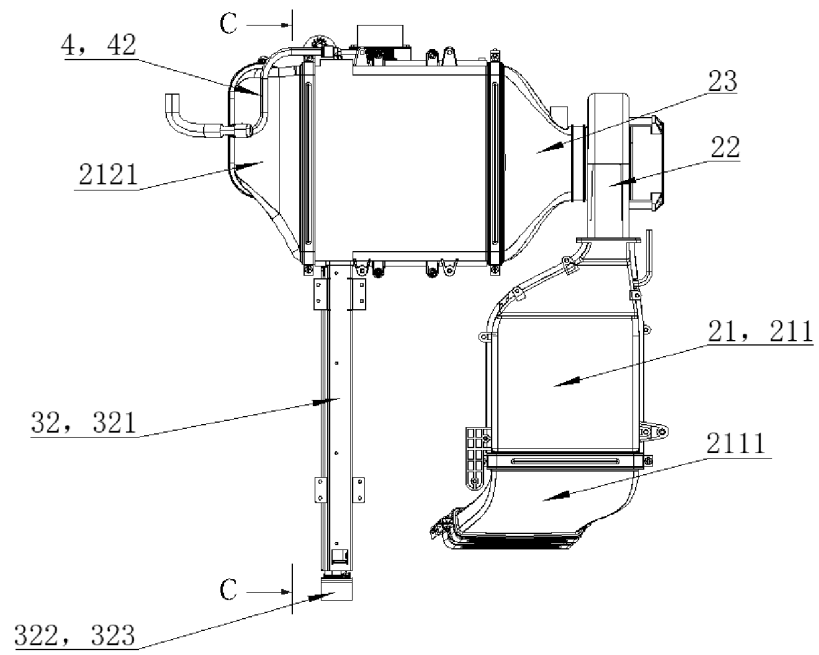


Figure 7

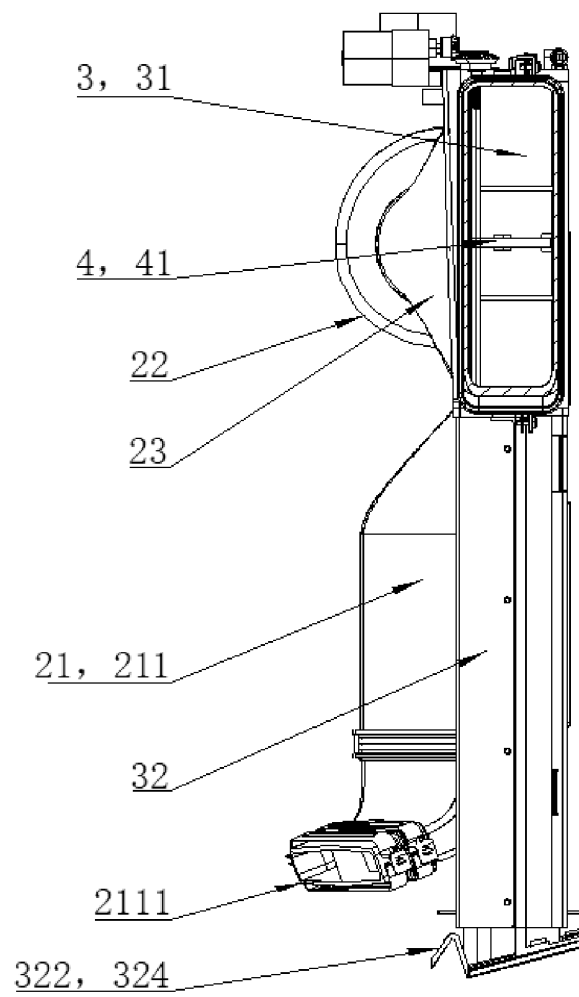


Figure 8

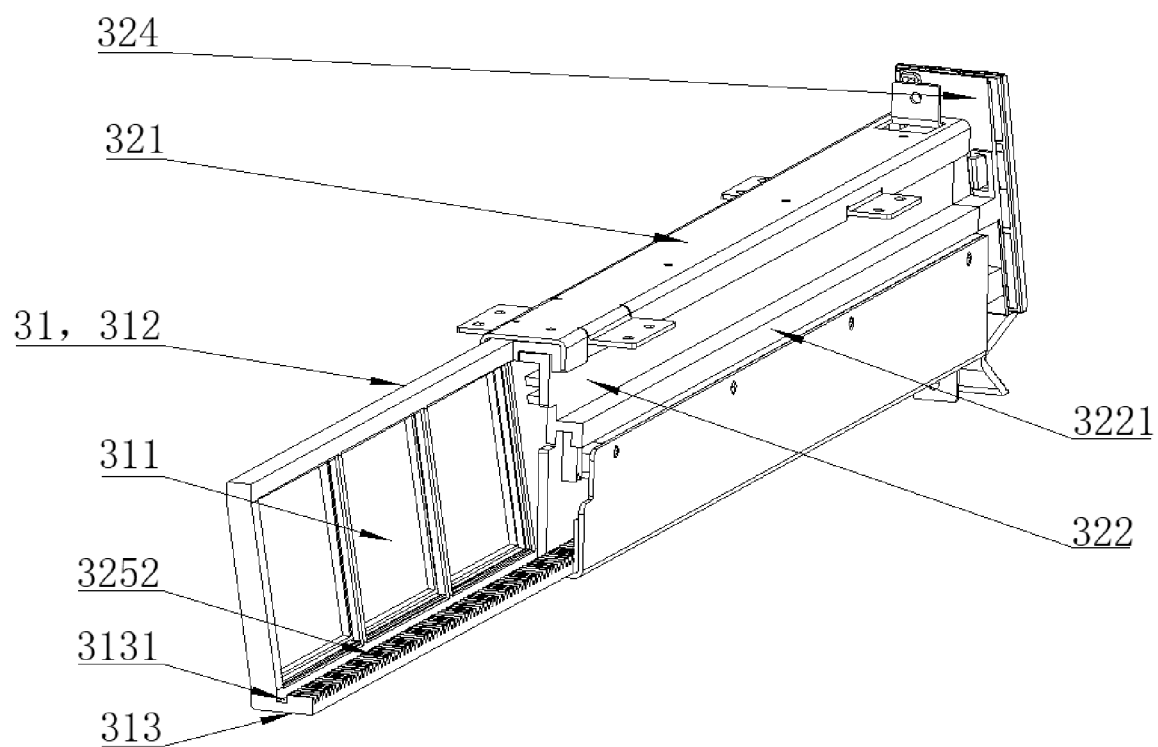


Figure 9

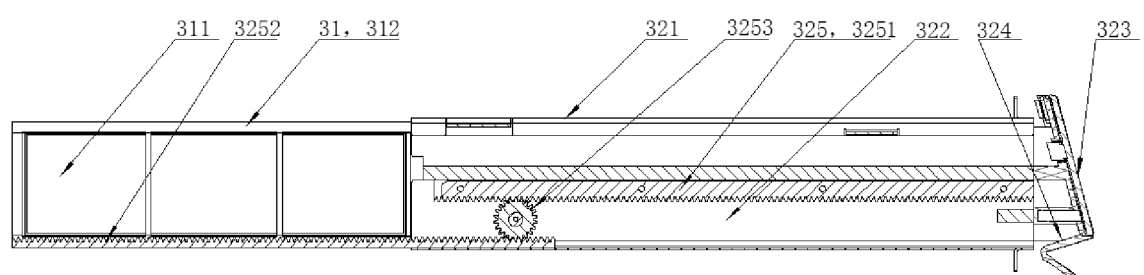


Figure 10

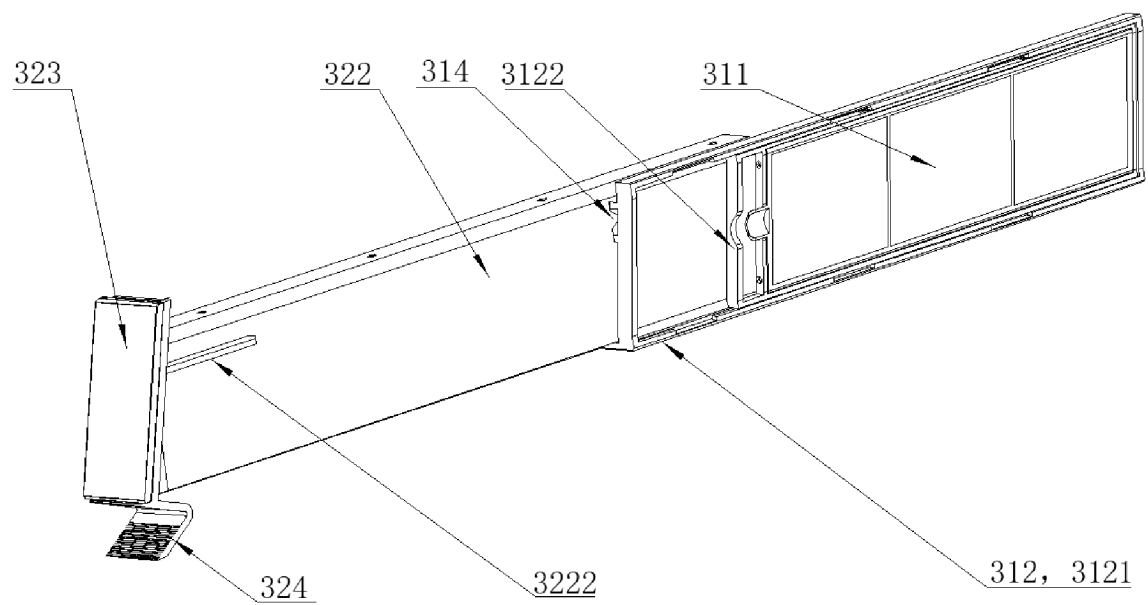


Figure 11

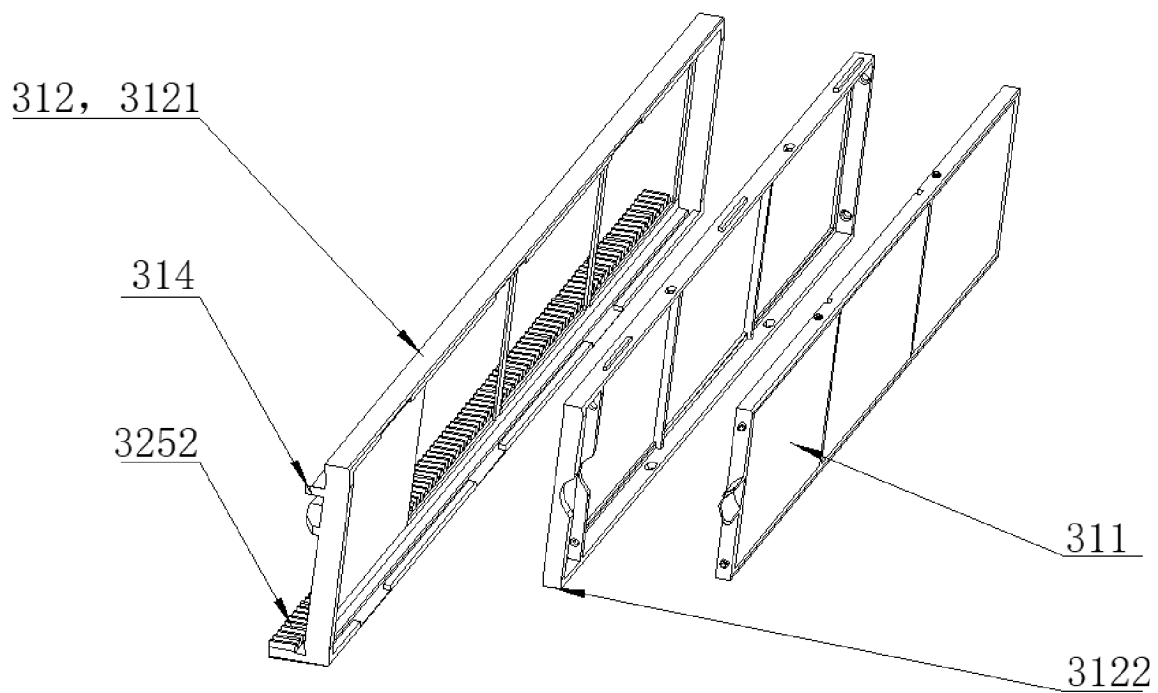


Figure 12

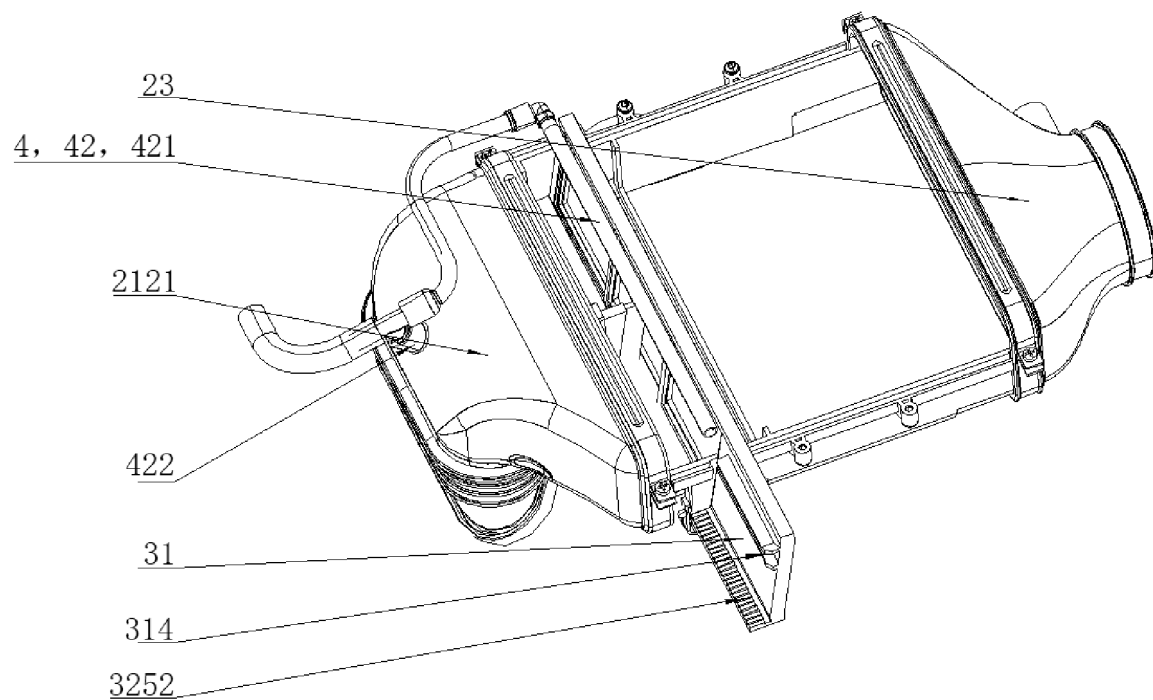


Figure 13

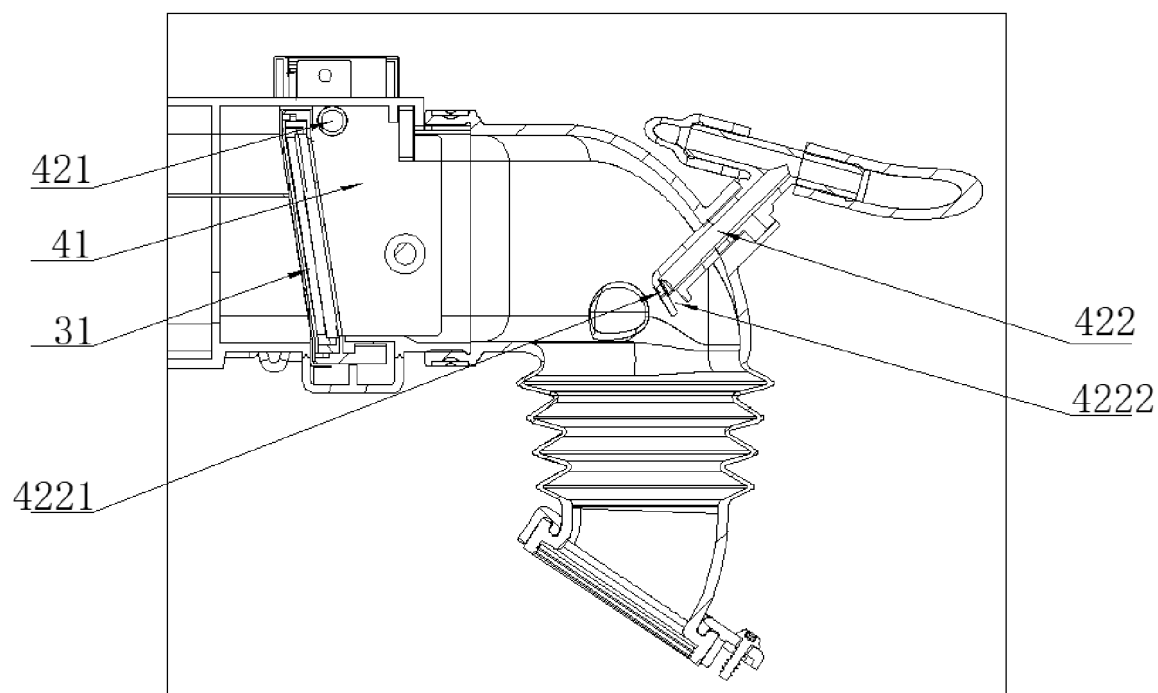


Figure 14

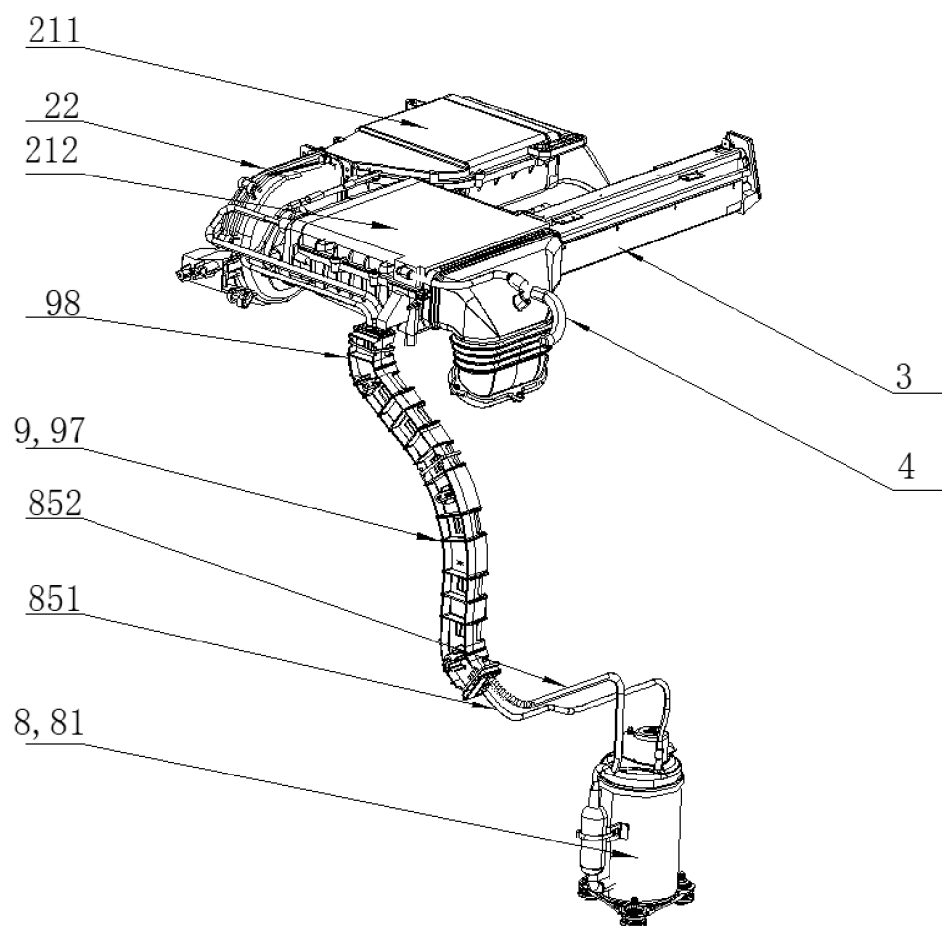


Figure 15

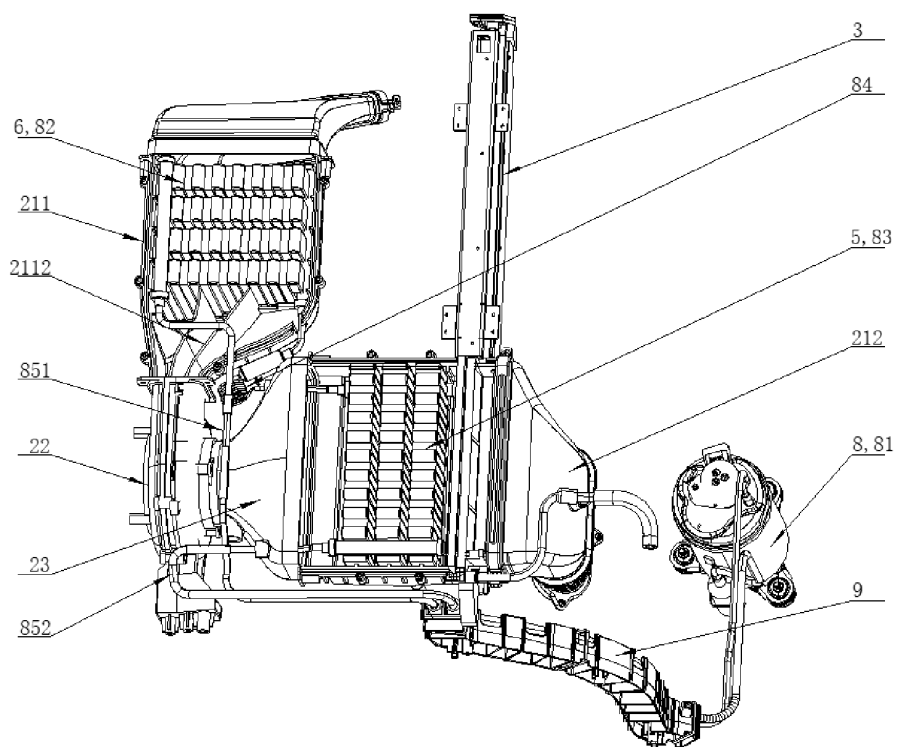


Figure 16

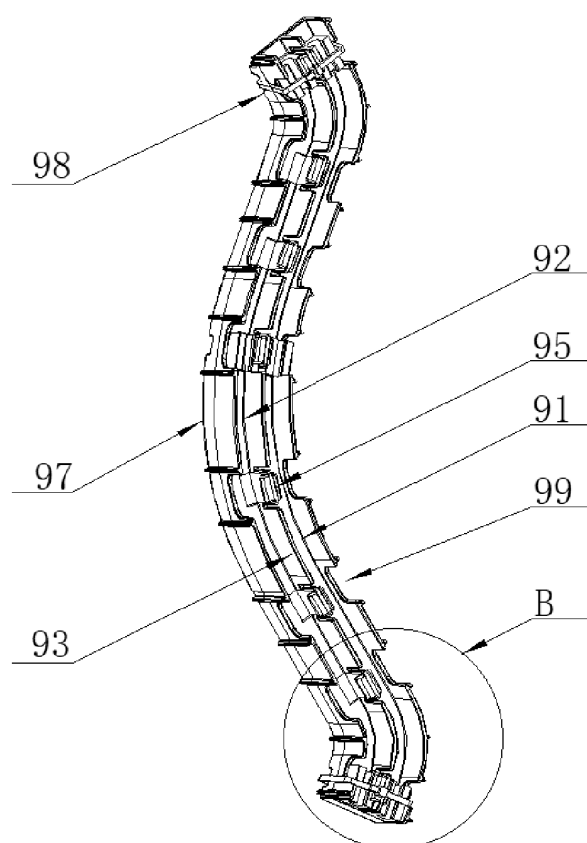


Figure 17

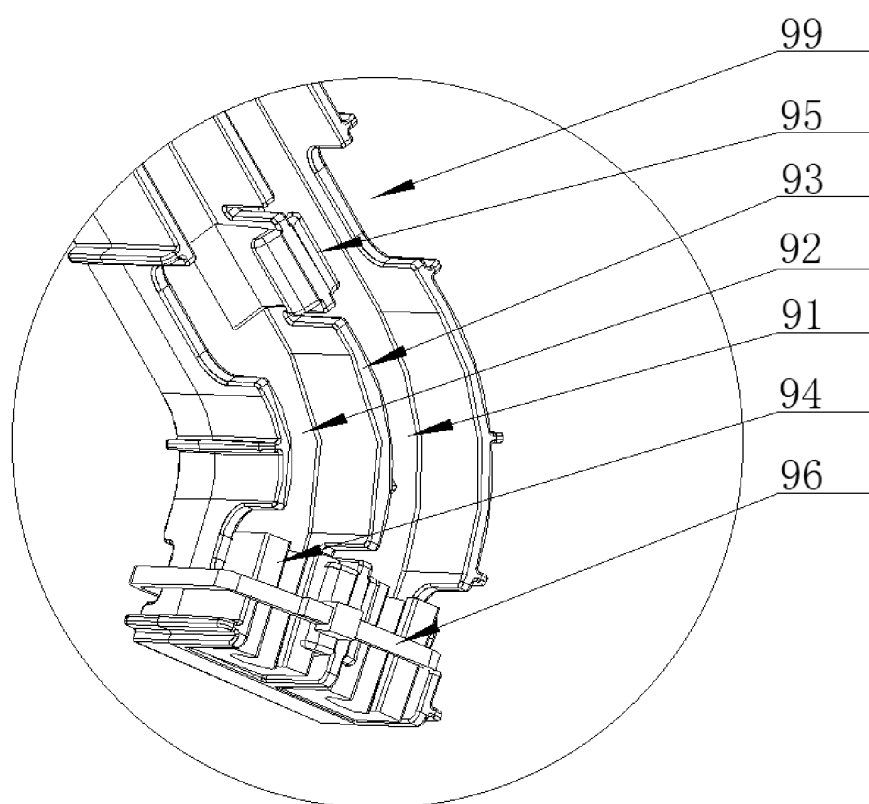


Figure 18

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/115409

A. CLASSIFICATION OF SUBJECT MATTER

D06F58/20(2006.01)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)

IPC: D06F

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

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

CNTXT, ENTXT, ENTXTC, VEN, CNKI: 海尔, 压缩机, 下方, 下部, 下侧, 支撑, 箍, compressor, under, support, hoop

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 205501683 U (HANGZHOU SANHUA HOME APPLIANCE THERMAL MANAGEMENT SYSTEM CO., LTD.) 24 August 2016 (2016-08-24) description, paragraphs 51-132, and figures 1-12	1-2, 8, 9
Y	CN 205501683 U (HANGZHOU SANHUA HOME APPLIANCE THERMAL MANAGEMENT SYSTEM CO., LTD.) 24 August 2016 (2016-08-24) description, paragraphs 51-132, and figures 1-12	3-7, 10
Y	CN 112095280 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD. et al.) 18 December 2020 (2020-12-18) description, paragraphs 33-74, and figures 1-8	3-7, 10
PX	CN 221000262 U (QINGDAO HAIER LAUNDRY ELECTRIC APPLIANCES CO., LTD. et al.) 24 May 2024 (2024-05-24) description, paragraphs 60-333, and figures 1-18	1-10
A	CN 107815813 A (HANGZHOU SANHUA HOME APPLIANCE THERMAL MANAGEMENT SYSTEM CO., LTD.) 20 March 2018 (2018-03-20) entire document	1-10

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

12 November 2024

Date of mailing of the international search report

22 November 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/115409

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 114059263 A (GREE ELECTRIC APPLIANCES INC. OF ZHUHAI) 18 February 2022 (2022-02-18) entire document	1-10
A	CN 214245014 U (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 21 September 2021 (2021-09-21) entire document	1-10
A	US 2019106832 A1 (WHIRLPOOL CORP.) 11 April 2019 (2019-04-11) entire document	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2024/115409

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REFERENCES CITED IN THE DESCRIPTION

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