

LAUNDRY TREATMENT DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

5 **[0001]** The present application is based on and claims priority to Chinese Patent Application No. 202010206424. 9, filed on March 23, 2020, the entire content of which is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to the technical field of laundry treatment apparatus, and more particularly, to a laundry treatment apparatus.

BACKGROUND

10 **[0003]** In the related art, a packaging structure of a double-tub laundry treatment apparatus includes a supporting foam arranged above and below the whole machine and a protective foam arranged around the whole machine. This packaging structure increases a volume of the packaged whole machine, especially a size of the whole machine in a height direction, which leads to an unstable transportation and increases difficulty of transportation. Further, due to a
15 low strength of the supporting foam and a large weight of the whole machine, it is easy to crush the supporting foams.

[0004] In view of the above, there is a fixing method in the related art, in which an upper tub and a lower tub are connected by a connection member, and a transporting screw is provided, and the transporting screw passes through the connection member and is connected to a frame
20 to ensure the stable transportation of the laundry treatment apparatus. However, in this method, since an overall center of gravity of the laundry treatment apparatus is relatively high, a probability of deformation of the transporting screw is high, and it is difficult to ensure a safe transportation.

SUMMARY

25 **[0005]** Embodiments of the present disclosure seek to solve at least one of the problems

existing in the related art to at least some extent. Accordingly, embodiments of the present disclosure provide a laundry treatment apparatus which is more stable and safer in transportation.

[0006] According to embodiments of the present disclosure, a laundry treatment apparatus including: a supporting frame; a first laundry treatment device disposed on the supporting frame; and a second laundry treatment device disposed on the supporting frame and located below the first laundry treatment device. The supporting frame has a transportation fixing rod detachably provided thereon, and the transportation fixing rod is connected to a laundry treatment tub of the first laundry treatment device.

[0007] The inventor of the present disclosure found that the second laundry treatment device located at a lower part has a low probability of shaking in a great extent during transportation due to its lower center of gravity, while the first laundry treatment apparatus located at an upper part has a high probability of shaking in a great extent due to its higher center of gravity. In the laundry treatment apparatus according to the embodiments of the present disclosure, by arranging the transportation fixing rod on the supporting frame, the first laundry treatment device located at a high position can be fixed to the supporting frame by the transportation fixing rod. In this way, it is possible to prevent the laundry treatment apparatus from overturning or prevent a tub body of the laundry treatment apparatus from being collided and deformed due to a fact that the first laundry treatment device with a higher center of gravity greatly shakes during a transportation, thereby ensuring safety and stability during the transportation. Further, the transportation fixing rod can be removed after the transportation is completed to ensure a normal operation of the laundry treatment apparatus.

[0008] According to some embodiments of the present disclosure, the first laundry treatment device and the second laundry treatment device are independent of each other; and/or, the transportation fixing rod is disposed on a top of the supporting frame and is located directly or obliquely above the laundry treatment tub of the first laundry treatment device.

[0009] According to some embodiments of the present disclosure, the laundry treatment tub of the first laundry treatment device has a mounting lug provided on an outer peripheral wall thereof. The transportation fixing rod passes through the mounting lug.

[0010] In some embodiments, the mounting lug has a first reinforcing rib provided on an outer surface thereof. The first reinforcing rib is connected to the outer peripheral wall of the laundry treatment tub of the first laundry treatment device.

[0011] According to some embodiments of the present disclosure, the supporting frame includes a connection frame located on a top thereof. The transportation fixing rod has two ends

connected to the connection frame and a middle connected to the laundry treatment tub of the first laundry treatment device.

[0012] In some embodiments, the connection frame includes: two top cross beams arranged oppositely to each other; a first upper connection plate having two ends connected to one end of one of the two top cross beams and one end of the other one of the two top cross beams, respectively; and a second upper connection plate having two ends each connected to the other end of one of the two top cross beams and the other end of the other one of the two top cross beams, respectively. At least one of the first upper connection plate and the second upper connection plate is connected to the transportation fixing rod.

[0013] In some embodiments, the first upper connection plate has a first through hole defined therein. The transportation fixing rod passes through the first through hole and has a first limiting portion provided on one end thereof. The first upper connection plate has a first elastic gasket provided on a side thereof facing away from the second upper connection plate. The first elastic gasket is located between the first limiting portion and the first upper connection plate.

[0014] In some examples, the second upper connection plate has a supporting member mounted thereon. The supporting member is arranged oppositely to the first upper connection plate. The transportation fixing rod has one end connected to the first upper connection plate and another end connected to the supporting member.

[0015] In some examples, the transportation fixing rod is formed as a screw. The supporting member has a threaded hole in screw thread fit with the other end of the transportation fixing rod.

[0016] In some examples, the second upper connection plate has two ends connected to an upper surface of the other end of one of the two top cross beams and an upper surface of the other end of the other one of the two top cross beams, respectively. The second upper connection plate has a mounting flanging provided on a side thereof facing away from the first upper connection plate. The mounting flanging is bent upwards. The supporting member is connected to the mounting flanging.

[0017] In some specific examples, the mounting flanging has a first insertion portion extending in a direction facing away from the first upper connection plate, and the supporting member has a first socket into which the first insertion portion is inserted. And/or, each of the mounting flanging and the supporting member has a first perforation. The mounting flanging and the supporting member are connected to each other by a first fastener passing through the first perforation.

[0018] In some embodiments, the second upper connection plate has a second insertion portion extending downwards, and each of the two top cross beams has a second socket defined therein. The second insertion portion is inserted into the second socket; and/or, each of the second upper connection plate and the two top cross beams has a second perforation defined therein, and the second upper connection plate and each of the two top cross beams are connected to each other by a second fastener passing through the second perforation.

[0019] In some embodiments, the laundry treatment apparatus also includes a rear enclosure door mounted at a rear of the supporting frame and has a second through hole. The rear enclosure door has a transportation bolt detachably provided thereon. The transportation bolt passes through the second through hole and is threadedly connected to the laundry treatment tub of the first laundry treatment device.

[0020] In some embodiments, the first upper connection plate has a third insertion portion extending in a direction facing away from the second upper connection plate, and the rear enclosure door has a third socket into which the third insertion portion is inserted; and/or, each of the first upper connection plate and the rear enclosure door has a third perforation. The first upper connection plate and the rear enclosure door are connected to each other by a third fastener passing through the third perforation.

[0021] In some embodiments, the first upper connection plate has two ends connected to a rear surface of one end of one of the two top cross beams and a rear surface of one end of the other one of the two top cross beams, respectively. The first upper connection plate has a connection flanging provided on an upper side thereof. The connection flanging is bent towards the second upper connection plate and connected to an upper surface of one end of each of the two top cross beams.

[0022] In some examples, the connection flanging has a fourth insertion portion extending downwards, and each of the two top cross beams has a fourth socket defined therein. The fourth insertion portion is inserted into the fourth socket; and/or each of the connection flanging and the two top cross beams has a fourth perforation defined therein. The connection flanging and each of the two top cross beams are connected to each other by a fourth fastener passing through the fourth perforation.

[0023] Additional aspects and advantages of the present disclosure will be provided at least in part in the following description, or will become apparent at least in part from the following description, or can be learned from practicing of the present disclosure.

BRIEF DESCRIPTION OF DRAWINGS

[0024] The above and/or additional aspects and advantages of the present disclosure will become more apparent and more understandable from the following description of embodiments in conjunction with the accompanying drawings, in which:

- 5 **[0025]** FIG. 1 is an assembly view illustrating a laundry treatment apparatus according to an embodiment of the present disclosure;
- [0026]** FIG. 2 is a schematic partially structural view of FIG. 1;
- [0027]** FIG. 3 is an enlarged view of a part A illustrated in FIG. 2;
- [0028]** FIG. 4 is an enlarged view of a part B illustrated in FIG. 2;
- 10 **[0029]** FIG. 5 is another schematic partially structural view of FIG. 1;
- [0030]** FIG. 6 is an enlarged view of a part C illustrated in FIG. 5;
- [0031]** FIG. 7 is an enlarged view of a part D illustrated in FIG. 5;
- [0032]** FIG. 8 is an exploded view illustrating a laundry treatment apparatus according to an embodiment of the present disclosure;
- 15 **[0033]** FIG. 9 is a schematic partially structural view of FIG. 8;
- [0034]** FIG. 10 is another schematic partially structural view of FIG. 8;
- [0035]** FIG. 11 is a schematic structural view illustrating a transportation bolt and an elastic gasket of a laundry treatment apparatus according to an embodiment of the present disclosure;
- [0036]** FIG. 12 is a schematic structural view illustrating a laundry treatment tub of a
- 20 laundry treatment apparatus according to an embodiment of the present disclosure; and
- [0037]** FIG. 13 is an enlarged view of a part E illustrated in FIG. 12.
- [0038]** Reference Signs:
- [0039]** laundry treatment apparatus 100,
- [0040]** supporting frame 10,
- 25 **[0041]** base 11,
- [0042]** first vertical beam 121, second vertical beam 122, third vertical beam 123, fourth vertical beam 124, positioning snap 1241,
- [0043]** connection cross beam 13,
- [0044]** connection frame 14,
- 30 **[0045]** top cross beam 141, second socket 1412, fourth socket 1414,
- [0046]** first upper connection plate 142, first through hole 1420, connection flanging 1421, third insertion portion 1422, third perforation 1423, fourth insertion portion 1424, fourth perforation 1425,

[0047] second upper connection plate 143, mounting flanging 1430, first insertion portion 1431, a first perforation 1432, second insertion portion 1433, second perforation 1434,
 [0048] supporting member 144, threaded hole 1441, first socket 1442,
 [0049] first fastener 151, second fastener 152, third fastener 153, fourth fastener 154,
 5 [0050] rear enclosure door 20, second through hole 21, third socket 22, positioning hole 23,
 [0051] first laundry treatment device 30, laundry treatment tub 31, mounting lug 311, fixing post 312, fixing hole 313, first reinforcing rib 32, second reinforcing rib 33,
 [0052] transportation fixing rod 40, first limiting portion 41, first elastic gasket 42, transportation bolt 50, second limiting portion 51, second elastic gasket 52, first sleeve 521,
 10 second sleeve 522, gasket 53.

DESCRIPTION OF EMBODIMENTS

[0053] Embodiments of the present disclosure are described below in detail, examples of the embodiments are shown in accompanying drawings, and throughout the description, the same or similar reference signs represent the same or similar components or the components
 15 having the same or similar functions. The embodiments described below with reference to the accompanying drawings are exemplary and merely used to explain the present disclosure, rather than being construed as a limitation on the present disclosure.

[0054] A laundry treatment apparatus 100 according to embodiments of the present disclosure will be describe below with reference to FIG. 1 to FIG. 13.

20 [0055] As illustrated in FIG. 1 to FIG. 10, the laundry treatment apparatus 100 according to embodiments of the present disclosure includes a supporting frame 10, a first laundry treatment device 30 disposed on the supporting frame 10, and a second laundry treatment device (not illustrated) disposed on the supporting frame 10 and located below the first laundry treatment device 30. Here, one of the first laundry treatment device 30 and the second laundry
 25 treatment device may be a washing device and the other may be a drying device, or both may be washing devices, or both may be drying devices.

[0056] Further, the supporting frame 10 has a transportation fixing rod 40 detachably provided thereon. The transportation fixing rod 40 is connected to a laundry treatment tub 31 of the first laundry treatment device 30, and the laundry treatment tub 31 may have a front
 30 loader structure. When the laundry treatment apparatus 100 needs to be transported, the transportation fixing rod 40 may be fixed on the supporting frame 10, and the supporting frame 10 and the laundry treatment tub 31 of the first laundry treatment device 30 are fixed together

by the transportation fixing rod 40 to prevent the first laundry treatment device 30 with a higher center of gravity from shaking greatly during transportation. Further, after the transportation is completed, the transportation fixing rod 40 is disassembled and stored for a reuse when the laundry treatment apparatus 100 is transported for a long distance in the future.

5 **[0057]** In the laundry treatment apparatus 100 according to the embodiments of the present disclosure, by arranging the transportation fixing rod 40 on the supporting frame 10, the first laundry treatment device 30 located at a higher position can be fixed to the supporting frame 10 by the transportation fixing rod 40. In this way, it is possible to prevent the laundry treatment apparatus 100 from overturning or prevent a tub body of the laundry treatment apparatus 100
10 from being collided and deformed due to a fact that the first laundry treatment device 30 with a higher center of gravity greatly shakes during the transportation, thereby ensuring safety and stability during the transportation. Further, the transportation fixing rod 40 may be removed after the transportation is completed to ensure a normal operation of the laundry treatment apparatus 100.

15 **[0058]** In some embodiments, the first laundry treatment device and the second laundry treatment device are independent of each other. The phrase “the first laundry treatment device and the second laundry treatment device are independent of each other” may at least includes a case where the first laundry treatment device and the second laundry treatment devices are not directly connected to each other, that is, there is no connection member for directly connecting
20 the first and second laundry treatment devices therebetween. Of course, the first laundry treatment device and the second laundry treatment device may be indirectly connected to each other. For example, each of the first laundry treatment device and the second laundry treatment devices may be supported on the supporting frame 10 by a connection assembly (e.g., a shock absorbing rod and/or a hanging spring, etc.).

25 **[0059]** In some embodiments, the transportation fixing rod 40 is disposed on a top of the supporting frame 10, and is located directly above the laundry treatment tub 31 of the first laundry treatment device 30, thereby fixing a middle upper part of the laundry treatment tub 31 and the top of the supporting frame 10 together.

30 **[0060]** In order to prevent the transportation fixing rod 40 from occupying a space directly above the laundry treatment tub 31 to reduce an overall height of the laundry treatment apparatus 100, as illustrated in FIG. 1 and FIG. 2, in other embodiments, the transportation fixing rod 40 is disposed on the top of the supporting frame 10, and is located obliquely above the laundry treatment tub 31 of the first laundry treatment device 30, thereby fixing an oblique upper part of the laundry treatment tub 31 and the top of the supporting frame 10 together to

ensure safety and stability during the transportation.

[0061] According to some embodiments of the present disclosure, the laundry treatment tub 31 of the first laundry treatment device 30 has a mounting lug 311 provided on an outer peripheral wall thereof. The transportation fixing rod 40 passes through the mounting lug 311.

5 As illustrated in FIG. 1 and FIG. 2, in this embodiment, the mounting lug 311 has a mounting hole defined therein. The mounting hole has a central axis extending in an axial direction of the laundry treatment tub 31 (a front-rear direction as illustrated in FIG. 2). The transportation fixing rod 40 passes through the mounting hole and is connected to the supporting frame 10. The transportation fixing rod 40 may restrict a linear displacement of the first laundry treatment
10 device 30 in an up-down direction and/or a left-right direction, thereby ensuring the safety and stability of the laundry treatment apparatus 100 during the transportation.

[0062] As illustrated in FIG. 2, in some embodiments, the mounting lug 311 has a first reinforcing rib 32 provided on an outer surface thereof, and the first reinforcing rib 32 is connected to the outer peripheral wall of the laundry treatment tub 31 of the first laundry
15 treatment device 30. For example, the first reinforcing rib 32 is arranged on each of a front surface and a rear surface of the mounting lug 311. In this way, a structural strength of the mounting lug 311 can be improved, thereby further improving a connection reliability between the laundry treatment tub 31 and the supporting frame 10.

[0063] As illustrated in FIG. 1 to FIG. 8, according to some embodiments of the present
20 disclosure, the supporting frame 10 includes a connection frame 14 located at a top thereof. The transportation fixing rod 40 has two ends connected to the connection frame 14 and a middle connected to the laundry treatment tub 31 of the first laundry treatment device 30. In this way, an installation reliability between the transportation fixing rod 40 can be improved, thereby ensuring the safety and stability of the laundry treatment apparatus 100 during the transportation.
25 In addition, an installation of the transportation fixing rod 40 is simple in structure and convenient to be assembled and disassembled.

[0064] In some embodiments, the connection frame 14 includes: two top cross beams 141 arranged oppositely to each other in a first direction (the left-right direction as illustrated in FIG. 1 and FIG. 8); a first upper connection plate 142 having two ends (a left end and a right end as
30 illustrated in FIG. 1 and FIG. 8) connected to one end (a rear end as illustrated in FIG. 1 and FIG. 8) of one of the two top cross beams 141 and one end (a rear end as illustrated in FIG. 1 and FIG. 8) of the other one of the two top cross beams, respectively; and a second upper connection plate 143 having two ends (a left end and a right end as illustrated in FIG. 1 and FIG. 8) each connected to the other end (a front end as illustrated in FIG. 1 and FIG. 8) of one

of the two cross top beams 141 and the other end (a front end as illustrated in FIG. 1 and FIG. 8) of the other one of the two top cross beams, respectively. The first upper connection plate 142 and the second upper connection plate 143 are arranged oppositely to each other in a second direction (a front-rear direction as illustrated in FIG. 1 and FIG. 8).

5 **[0065]** Further, at least one of the first upper connection plate 142 and the second upper connection plate 143 is connected to the transportation fixing rod 40. That is, the transportation fixing rod 40 may be connected to the first upper connection plate 142, or may be connected to the second upper connection plate 143, or may be connected to each of the first upper connection plate 142 and the second upper connection plates 143. In this way, the assembly and
10 disassembly of the transportation fixing rod 40 is facilitated.

[0066] As illustrated in FIG. 1 and FIG. 5, in some embodiments, the first upper connection plate 142 has a first through hole 1420 defined therein. The transportation fixing rod 40 passes through the first through hole 1420 and has a first limiting portion 41 provided on one end thereof. The first upper connection plate 142 has a first elastic gasket 42 provided on a side
15 thereof facing away from the second upper connection plate 143. At least a part of the first elastic gasket 42 is located between the first limiting portion 41 and the first upper connection plate 142. The transportation fixing rod 40 may be formed as a screw, and the first limiting portion 41 may be formed as a head portion of the screw.

[0067] In some embodiments, during locking, the first elastic gasket 42 is deformed to
20 allow a part of the first elastic gasket 42 to be positioned between the first limiting portion 41 and the first upper connection plate 142, and to allow the other part of the first elastic gasket 42 to be pressed into the first through hole 1420 in an interference fit with the first through hole 1420, thereby providing the fixing. In this way, a connection reliability between the transportation fixing rod 40 and the first upper connection plate 142 can be ensured.

25 **[0068]** As illustrated in FIG. 2 and FIG. 3, in some examples, the second upper connection plate 143 has a supporting member 144 mounted thereon. The supporting member 144 is arranged oppositely to the first upper connection plate 142. The transportation fixing rod 40 is connected to the first upper connection plate 142 at one end thereof and to the supporting member 144 at the other end thereof. By mounting the supporting member 144 on the second
30 upper connection plate 143, there is no need to process a connection structure to be connected to the transportation fixing rod 40 on the second upper connection plate 143, which simplifies a processing technology of the second upper connection plate 143 and can employ a material with higher strength to manufacture the supporting member 144 of a smaller size. Therefore, a connection reliability between the transportation fixing rod 40 and the supporting frame 10 is

improved, and the cost is reduced.

[0069] As illustrated in FIG. 1, FIG. 2, FIG. 8 and FIG. 10, in some examples, the transportation fixing rod 40 is formed as a screw. The supporting member 144 has a threaded hole 1441 in screw thread fit with the other end of the transportation fixing rod 40. When the transportation fixing rod 40 is mounted or dismounted, only one end of the transportation fixing rod 40 needs to be operated to be screwed to and loosened from the supporting member 144, which is convenient for operation.

[0070] As illustrated in FIG. 2 to FIG. 4, in some examples, the second upper connection plate 143 has two ends (left and right ends as illustrated in FIG. 2) each connected to an upper surface of the other end (a front end as illustrated in FIG.2) of one of the two top cross beams and the other end (a front end as illustrated in FIG.2) of the other one of the two top cross beams, respectively. The second upper connection plate 143 has a mounting flanging 1430 provided on a side (a front side of the second upper connection plate 143 as illustrated in FIG. 2) thereof facing away from the first upper connection plate 142. The mounting flanging 1430 is bent upwards relative to the second upper connection plate 143. The supporting member 144 is connected to the mounting flanging 1430, which is simple in structure and convenient for connection.

[0071] As illustrated in FIG. 3, in some examples, each of the mounting flanging 1430 and the supporting member 144 has a first perforation 1432. A first fastener 151 passes through the first perforation 1432 of the mounting flanging 1430 and the first perforation 1432 of the supporting member 144 to connect the mounting flanging 1430 and the supporting member 144 by the first fastener 151. For example, the first perforation 1432 of the mounting flanging 1430 may be a first threaded hole, and the first fastener 151 is formed as a first screw in screw thread fit with the first perforation 1432.

[0072] In some examples, the mounting flanging 1430 has a first insertion portion 1431 extending in a direction facing away from the first upper connection plate 142. The supporting member 144 has a first socket 1442 into which the first insertion portion 1431 is inserted. In some embodiments, as illustrated in FIG. 3, the first insertion portion 1431 may be formed as a first insertion plate extending horizontally forwards, or may be formed as a first inserting plate extending upwards firstly and then rearwards. The supporting member 144 is hung on the mounting flanging 1430 to further ensure a connection reliability therebetween.

[0073] As illustrated in FIG. 4, in some embodiments, the second upper connection plate 143 has a second insertion portion 1433 extending downwards, and each of the two top cross beams 141 has a second socket 1412 defined therein. The second insertion portion 1433 is

inserted into the second socket 1412 downwards to ensure a connection reliability between the second upper connection plate 143 and the top cross beam 141.

[0074] In some embodiments, each of the second upper connection plate 143 and the two top cross beams 141 has a second perforation 1434 defined therein. A second fastener 152 passes through the second perforation 1434 of each of the second upper connection plate 143 and each top cross beam 141. In this way, the second upper connection plates 143 and each of the two top cross beams 141 are connected to each other by the second fastener 152. For example, the second perforation 1434 of the top cross beam 141 may be formed as a second threaded hole, and the second fastener 152 may be formed as a second screw in screw thread fit with the second threaded hole.

[0075] As illustrated in FIG. 1, FIG. 5 to FIG. 7 and FIG. 10, in some embodiments, the laundry treatment apparatus 100 further includes a rear enclosure door 20 mounted at a rear part of the supporting frame 10 and having a second through hole 21. The rear enclosure door 20 has a transportation bolt 50 detachably provided thereon. The transportation bolt 50 passes through the second through hole 21 and is threadedly connected to the laundry treatment tub 31 of the first laundry treatment device 30.

[0076] Therefore, by arranging the transportation bolt 50 on the rear enclosure door 20 and fixing the first laundry treatment device 30 located at a high position and the rear enclosure door 20 together by the transportation bolt 50, it is possible to further ensure the safety and stability during the transportation. After the transportation is completed, the transportation bolt 50 can be removed to ensure that the laundry treatment apparatus 100 can be operated normally.

[0077] As illustrated in FIG. 5, FIG. 10 and FIG. 11, in some examples, the transportation bolt 50 has a second limiting portion 51 provide on one end thereof, and a second elastic gasket 52 is arranged between the second limiting portion 51 and the laundry treatment tub 31 of the first laundry treatment device 30. By arranging the second elastic gasket 52 between the second limiting portion 51 and the laundry treatment tub 31, a contact area between the second limiting portion 51 and the rear enclosure door 20 can be increased to prevent the transportation bolt 50 from crushing the rear enclosure door 20 and ensure an installation reliability of the transportation bolt 50.

[0078] As illustrated in FIG. 11, in some examples, the second elastic gasket 52 includes a first sleeve 521 and a second sleeve 522 that are sequentially connected to each other in an axial direction of the transportation bolt 50. An outer size of the first sleeve 521 is greater than a size of the second through hole 21. After being mounted, the first sleeve 521 is abutted against an edge of the second through hole 21, and is positioned between the second sleeve 522 and the

second limiting portion 51. An outer size of the second sleeve 522 is less than or equal to the size of the second through hole 21. The second sleeve 522 passes through the second through hole 21 and is positioned between the first sleeve 521 and the laundry treatment tub 31 of the first laundry treatment device 30. During the locking, the second elastic gasket 52 is deformed to allow the second sleeve 522 to be in interference fit with the second through hole 21, thereby providing the fixing.

[0079] As illustrated in FIG. 12 and FIG. 13, a rear end surface of the laundry treatment tub 31 of the first laundry treatment device 30 has a plurality of fixing posts 312 arranged at intervals. Each of the fixing posts has a fixing hole 313 extending in an axial direction thereof. The transportation bolt 50 is engaged with the fixing hole 313. In this way, a connection between the laundry treatment tub 31 and the rear enclosure door 20 is realized.

[0080] The laundry treatment tub 31 has a reinforcing structure provided on an outer surface thereof to enhance a structural strength of the laundry treatment tub 31. In some embodiments, at least a part of the reinforcing structure may be provided at the rear end surface of the laundry treatment tub 31. The reinforcing structure includes a circumferential rib extending in a circumferential direction thereof and a radial rib extending in a radial direction thereof.

[0081] In order to ensure a structural strength of each fixing post 312, and further ensure the installation reliability of the transportation bolt 50, each of the fixing posts 312 has a plurality of second reinforcing ribs 33 provided on a peripheral wall thereof. The plurality of second reinforcing ribs 33 is arranged at intervals. The second reinforcing ribs 33 may be connected to the reinforcing structure. That is, the second reinforcing ribs 33 may be connected to at least one of the circumferential rib and the radial rib. Of course, the reinforcing structure provided on the rear end surface of the laundry treatment tub 31 may also be directly connected to the peripheral wall of the fixing post 312.

[0082] In some embodiments, the first upper connection plate 142 has a third insertion portion 1422 extending in a direction facing away from the second upper connection plate 143. The rear enclosure door 20 has a third socket 22 into which the third insertion portion 1422 is inserted. In some embodiments, as illustrated in FIG. 5 and FIG. 6, the third insertion portion 1422 may be formed as a third insertion plate horizontally extending rearwards, or may be formed as a third inserting plate extending rearwards firstly and then upwards. The rear enclosure door 20 is hung on the first upper connection plate 142 to further ensure a connection reliability therebetween.

[0083] In some embodiments, each of the first upper connection plate 142 and the rear enclosure door 20 has a third perforation 1423. A third fastener 153 passes through the third

perforation 1423 of each of the first upper connection plate 142 to connect the first upper connection plate 142 and the rear closing door 20 by the third fastener 153. For example, the rear enclosure door 20 covers over a lower edge of the first upper connection plate 142. The third perforation 1423 of the first upper connection plate 142 is formed as a third threaded hole, and the third fastener 153 is formed as a second screw in screw thread fit with the third threaded hole.

[0084] As illustrated in FIG. 5 and FIG. 10, in some embodiments, the first upper connection plate 142 has two ends connected to a rear surface of one end of one of the two top cross beams 141 and a rear surface of one end of the other one of the two top cross beams, respectively. The first upper connection plate 142 has a connection flanging 1421 provided on an upper side thereof. The connection flanging is bent towards the second upper connection plate 143 and connected to an upper surface of one end of each of the two top cross beams 141. Thus, the structure is simple and the connection is reliable.

[0085] In some examples, the connection flanging 1421 has a fourth insertion portion 1424 extending downwards. Each of the two top cross beams 141 has a fourth socket 1414 defined therein. The fourth insertion portion 1424 is inserted downwards into the fourth socket 1414. In this way, a connection reliability between the first upper connection plate 142 and the two top cross beams 14.

[0086] In some examples, each of the connection flanging 1421 and each top cross beam 141 has a fourth perforation 1425 defined therein. A fourth fastener 154 passes through the fourth perforation 1425 of each of the connection flanging 1421 and the two top cross beams 141 to connect the connection flanging 14 and the two top cross beams 141 by the fourth fastener 154. For example, the fourth perforation 1425 of each top cross beam 141 may be formed as a fourth threaded hole, and the fourth fastener 154 may be formed as a fourth screw in screw thread fit with the fourth threaded hole.

[0087] As illustrated in FIG. 1 and FIG. 8, according to some embodiments of the present disclosure, the supporting frame 10 includes a square base 11, four vertical beams and a square connection frame 14. Each of the four vertical beams extends upwards from each of four corners of the square base 11, respectively. The vertical beam is connected to the square base 11 at a lower end thereof. The square connection frame 14 is connected to upper ends of the four vertical beams.

[0088] The four vertical beams include a first vertical beam 121, a second vertical beam 122, a third vertical beam 123, and a fourth vertical beam 124 that are respectively extend in an up-down direction. Each of the first vertical beam 121, the second vertical beam 122, the third

vertical beam 123, and the fourth vertical beam 124 is connected to the square connection frame 14 at an upper end thereof and connected to the base 11 at a lower end thereof. Therefore, the whole structure is convenient in connection and stable in structure.

[0089] In some examples, the supporting frame 10 also includes a plurality of connection cross beams 13. Each of the plurality of connection cross beams 13 is connected to a middle of each of two adjacent vertical beams at both ends thereof. In this way, the structural strength of the supporting frame 10 can be further improved, thereby ensuring a structural stability of the supporting frame.

[0090] The laundry treatment tub 31 may be hung on an upper part (such as the square connection frame 14) of the supporting frame 10 by a connection assembly (such as a hanging spring). In addition, the laundry treatment tub 31 may be supported at a middle part (such as the connection cross beam 13) of the supporting frame 10 by a vibration damping assembly, thereby ensuring an installation reliability of the laundry treatment tub 31.

[0091] As illustrated in FIG. 1 and FIG. 5 to FIG. 7, the rear enclosure door 20 is mounted at a rear side of the supporting frame 10. The rear enclosure door 20 is connected to each of the third vertical beam 123 and the fourth vertical beam 124 at both ends thereof. In some embodiments, a right end of the rear enclosure door 20 and the third vertical beam 123 may be connected to the fixing member, and a left end of the rear enclosure door 20 and the fourth vertical beam 124 may also be connected to the fixing member. The left end of the rear enclosure door 20 has a positioning hole 23 defined therein, and the fourth vertical beam 124 has a positioning snap 1241 defined thereon. The positioning snap 1241 is engaged with the positioning hole 23, thereby further ensuring a connection reliability between the rear enclosure door 20 and the supporting frame 10.

[0092] In the description of the present disclosure, it should be understood that the orientation or position relationship indicated by the terms “center,” “longitudinal,” “transverse,” “length,” “width,” “thickness,” “upper,” “lower,” “front,” “rear,” “left,” “right,” “vertical,” “horizontal,” “top,” “bottom,” “inner,” “outer,” “axial,” “radial,” “circumferential,” etc., is based on the orientation or position relationship shown in the drawings, and is only for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the defined device or element must have a specific orientation or must be constructed and operated in a specific orientation. Thus, the orientation or position relationship indicated by these terms cannot be understood as limitations on the present disclosure.

[0093] Other configurations and operations of the laundry treatment apparatus 100

according to the embodiments of the present disclosure are known to those of ordinary skill in the art, which will be omitted herein.

[0094] In the description of this specification, descriptions with reference to the terms “an embodiment”, “some embodiments”, “illustrative embodiments”, “an example”, “a specific example”, “some examples”, etc., mean that specific features, structure, materials, or characteristics described in conjunction with the embodiment or example are included in at least one embodiment or example of the present disclosure. In this specification, the schematic representations of the above terms do not necessarily refer to the same embodiment or example. Moreover, the described specific features, structures, materials or characteristics may be combined in any one or more embodiments or examples in a suitable manner.

[0095] Although embodiments of the present disclosure have been illustrated and described, it is conceivable for those skilled in the art that various changes, modifications, replacements, and variations can be made to these embodiments without departing from the principles and spirit of the present disclosure. The scope of the present disclosure shall be defined by the claims as appended and their equivalents.

CLAIMS

What is claimed is:

1. A laundry treatment apparatus, comprising:
 - a supporting frame;
 - a first laundry treatment device disposed on the supporting frame; and
 - a second laundry treatment device disposed on the supporting frame and located below the first laundry treatment device,wherein the supporting frame has a transportation fixing rod detachably provided thereon, the transportation fixing rod being connected to a laundry treatment tub of the first laundry treatment device.
2. The laundry treatment apparatus according to claim 1,
 - wherein the first laundry treatment device and the second laundry treatment device are independent of each other; and/or
 - wherein the transportation fixing rod is disposed on a top of the supporting frame and is located directly or obliquely above the laundry treatment tub of the first laundry treatment device.
3. The laundry treatment apparatus according to claim 1 or 2, wherein the laundry treatment tub of the first laundry treatment device has a fixing lug provided on an outer peripheral wall thereof, and wherein the transportation fixing rod passes through the fixing lug.
4. The laundry treatment apparatus according to claim 3, wherein the fixing lug has a first reinforcing rib provided on an outer surface thereof, the first reinforcing rib being connected to the outer peripheral wall of the laundry treatment tub of the first laundry treatment device.
5. The laundry treatment apparatus according to any one of claims 1 to 4, wherein the supporting frame comprises a connection frame located on a top thereof, and wherein the transportation fixing rod has two ends connected to the connection frame and a middle connected to the laundry treatment tub of the first laundry treatment device.
6. The laundry treatment apparatus according to claim 5, wherein the connection frame comprises:
 - two top cross beams arranged oppositely to each other;
 - a first upper connection plate having two ends connected to one end of one of the two top cross beams and one end of the other one of the two top cross beams, respectively; and
 - a second upper connection plate having two ends each connected to the other end of one

of the two top cross beams and the other end of the other one of the two top cross beams, respectively,

wherein at least one of the first upper connection plate and the second upper connection plate is connected to the transportation fixing rod.

7. The laundry treatment apparatus according to claim 6,

wherein the first upper connection plate has a first through hole defined therein, and wherein the transportation fixing rod passes through the first through hole and has a first limiting portion provided on one end thereof; and

wherein the first upper connection plate has a first elastic gasket provided on a side thereof facing away from the second upper connection plate, the first elastic gasket being located between the first limiting portion and the first upper connection plate.

8. The laundry treatment apparatus according to claim 6 or 7, wherein the second upper connection plate has a supporting member mounted thereon, the supporting member being arranged oppositely to the first upper connection plate, and wherein the transportation fixing rod has one end connected to the first upper connection plate and another end connected to the supporting member.

9. The laundry treatment apparatus according to claim 8, wherein the transportation fixing rod is formed as a screw, and wherein the supporting member has a threaded hole in screw thread fit with the other end of the transportation fixing rod.

10. The laundry treatment apparatus according to claim 8 or 9, wherein the second upper connection plate has two ends connected to an upper surface of the other end of one of the two top cross beams and an upper surface of the other end of the other one of the two top cross beams, respectively, wherein the second upper connection plate has a mounting flanging provided on a side thereof facing away from the first upper connection plate, the mounting flanging being bent upwards, and wherein the supporting member is connected to the mounting flanging.

11. The laundry treatment apparatus according to claim 10,

wherein the mounting flanging has a first insertion portion extending in a direction facing away from the first upper connection plate, and wherein the supporting member has a first socket into which the first insertion portion is inserted; and/or

wherein each of the mounting flanging and the supporting member has a first perforation, and wherein the mounting flanging and the supporting member are connected to each other by a first fastener passing through the first perforation.

12. The laundry treatment apparatus according to any one of claims 6 to 11,

wherein the second upper connection plate has a second insertion portion extending downwards, and wherein each of the top cross beams has a second socket defined therein, the second insertion portion being inserted into the second socket; and/or

wherein each of the second upper connection plate and the two top cross beams has a second perforation defined therein, and wherein the second upper connection plate and each of the two top cross beams are connected to each other by a second fastener passing through the second perforation.

13. The laundry treatment apparatus according to any one of claims 6 to 13, further comprising a rear enclosure door mounted at a rear of the supporting frame and having a second through hole,

wherein the rear enclosure door has a transportation bolt detachably provided thereon, the transportation bolt passing through the second through hole and being threadedly connected to the laundry treatment tub of the first laundry treatment device.

14. The laundry treatment apparatus according to claim 13,

wherein the first upper connection plate has a third insertion portion extending in a direction facing away from the second upper connection plate, and wherein the rear enclosure door has a third socket into which the third insertion portion is inserted; and/or

wherein each of the first upper connection plate and the rear enclosure door has a third perforation, and wherein the first upper connection plate and the rear enclosure door are connected to each other by a third fastener passing through the third perforation.

15. The laundry treatment apparatus according to claim 13, wherein the first upper connection plate has two ends connected to a rear surface of one end of one of the two top cross beams and a rear surface of one end of the other one of the two top cross beams, respectively, and wherein the first upper connection plate has a connection flanging provided on an upper side thereof, the connection flanging being bent towards the second upper connection plate and connected to an upper surface of one end of each of the two top cross beams.

16. The laundry treatment apparatus according to claim 15,

wherein the connection flanging has a fourth insertion portion extending downwards, and wherein each of the two top cross beams has a fourth socket defined therein, the fourth insertion portion being inserted into the fourth socket; and/or

wherein each of the connection flanging and the two top cross beams has a fourth perforation defined therein, and wherein the connection flanging and each of the two top cross beams are connected to each other by a fourth fastener passing through the fourth perforation.