

CONNECTING BEAM, LAUNDRY TREATMENT DEVICE AND SUPPORT FRAME THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] The present application claims a priority to Chinese Patent Application No.
5 202010063084.9, filed by Wuxi Little Swan Electric Co., LTD. on January 19, 2020.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of laundry treatment technologies, and more particularly, to a connection crossbeam, a laundry treatment device and a support frame thereof.

BACKGROUND

10 [0003] In the related art, washing tubs of a twin-tub washing machine are usually mounted directly on an inner side wall of a frame through a vibration damping structure. When the washing machine is in operation, vibrations of the washing tubs would exert a great tangential force on the inner side wall of the frame, resulting in a break in a connection portion between
15 the frame and the washing tubs. As a result, the washing tubs are easily destabilized, which affects the normal use of the washing machine. Therefore, there is room for improvement.

SUMMARY

[0004] The present disclosure aims to solve at least one of the technical problems in the related art. To this end, embodiments of the present disclosure is to provide a connection
20 crossbeam that has high stability and reliability.

[0005] Embodiments of the present disclosure also provides a support frame of a laundry

treatment device.

[0006] Embodiments of the present disclosure also provides a laundry treatment device.

[0007] According to embodiments in a first aspect of the present disclosure, a connection crossbeam includes: a connection crossbeam body adapted to be fixed on a support structure of a laundry treatment device and having an inclined support surface; and a support base disposed on the inclined support surface. A vibration damping rod connected to the laundry treatment device is to be mounted on the support base.

[0008] With the connection crossbeam according to the embodiments of the present disclosure, by arranging the inclined support surface on the connection crossbeam body, the support base for mounting the vibration damping rod can be obliquely supported on the connection crossbeam body. The inclined support surface may make forces exerted on the connection crossbeam body be more reasonable. The connection crossbeam body can also provide a support for the support base without occupying too much mounting space to improve stability and reliability of the connection crossbeam.

[0009] With the connection crossbeam according to the embodiments of the present disclosure, the inclined support surface is located on an inner side of the connection crossbeam body, and gradually extends obliquely and inwardly in a top-to-bottom direction.

[0010] With the connection crossbeam according to the embodiments of the present disclosure, the connection crossbeam body is at least partially recessed towards an inner side of the connection crossbeam body to form a crossbeam protrusion on an inner side surface of the connection crossbeam body and a crossbeam recess on an outer side surface of the connection crossbeam body.

[0011] In some embodiments, the crossbeam protrusion extends in a length direction of the connection crossbeam body.

[0012] In some embodiments, the crossbeam protrusion is at least partially recessed towards an outer side of the connection crossbeam body to form at least one reinforcing recess on an inner side surface of the connection crossbeam and at least one reinforcing protrusion on an outer side surface of the connection crossbeam.

[0013] In some embodiments, the at least one reinforcing recess includes a plurality of reinforcing recesses arranged at intervals in the length direction of the connection crossbeam

body.

[0014] In some embodiments, the support base is located above the at least one reinforcing recess.

[0015] In some embodiments, the crossbeam protrusion has a top wall and at least one side wall, and each of the top wall and the at least one side wall extends in the length direction of the connection crossbeam body. One of the at least side wall of the crossbeam protrusion is located above the top wall of the crossbeam protrusion and has a surface formed as the inclined support surface.

[0016] According to embodiments in a second aspect of the present disclosure, a support frame of a laundry treatment device includes: a base; a first vertical beam and a second vertical beam that are arranged on two corners at a front side of the base, each of the first vertical beam and a second vertical beam extending upwardly from the base; a third vertical beam and a fourth vertical beam that are arranged on two corners at a rear side of the base, each of the third vertical beam and the fourth vertical beam extending upwardly from the base, wherein the first vertical beam and the fourth vertical beam are located at a left side of the base, and the second vertical beam and the third vertical beam are located at a right side of the base; and a first connection crossbeam and a second connection crossbeam, the first connection crossbeam having two ends connected to a middle part of the first vertical beam and a middle part of the fourth vertical beam, and the second connection crossbeam having two ends connected to a middle part of the second vertical beam and a middle part of the fourth vertical beam. Each of the first connection crossbeam and the second connection crossbeam is the connection crossbeam according to the embodiments in the first aspect of the present disclosure. By employing the above connection crossbeam, a force exerted on the support frame is more reasonable, which facilitates assembly of the support frame and a washing tub and ensures structural stability and reliability.

[0017] According to embodiments in a third aspect of the present disclosure, a laundry treatment device includes the support frame of the laundry treatment device according to the embodiments in the second aspect of the present disclosure. By employing the above support frame, the washing tub is easy to be mounted and has good stability, which improves stability of the laundry treatment device and enhances market competitiveness of the laundry treatment device.

[0018] 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

5 **[0019]** 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 taken in conjunction with the accompanying drawings, in which:

[0020] FIG. 1 is a schematic structural view of a laundry treatment device according to an embodiment of the present disclosure, in which a door assembly is in a closed position;

10 **[0021]** FIG. 2 is a schematic structural view of a laundry treatment device according to an embodiment of the present disclosure, in which a door assembly is in an open position;

[0022] FIG. 3 is a schematic structural view of a housing assembly according to an embodiment of the present disclosure;

[0023] FIG. 4 is a schematic assembled structural view of a front closure door and a support
15 frame according to an embodiment of the present disclosure;

[0024] FIG. 5 is a schematic structural view of a front closure door from one view according to an embodiment of the present disclosure;

[0025] FIG. 6 is a front view of a front closure door according to an embodiment of the present disclosure;

20 **[0026]** FIG. 7 is a top view of a front closure door according to an embodiment of the present disclosure;

[0027] FIG. 8 is a schematic structural view of a front closure door from another view according to an embodiment of the present disclosure;

[0028] FIG. 9 is an enlarged view of a structure A in FIG. 8;

25 **[0029]** FIG. 10 is an enlarged view of a structure B in FIG. 8;

[0030] FIG. 11 is a schematic structural view of a support frame according to an embodiment of the present disclosure;

[0031] FIG. 12 is an enlarged view of a structure C in FIG. 11;

[0032] FIG. 13 is an enlarged view of a structure D in FIG. 11;

[0033] FIG. 14 is an enlarged view of a structure E in FIG. 11;

[0034] FIG. 15 is an enlarged view of a structure F in FIG. 11;

[0035] FIG. 16 is a schematic assembled structural view of a side plate and a support frame
5 according to an embodiment of the present disclosure;

[0036] FIG. 17 is an enlarged view of a structure O in FIG. 16;

[0037] FIG. 18 is a schematic structural view of a mounting crossbeam from one view
according to an embodiment of the present disclosure;

[0038] FIG. 19 is a schematic structural view of a mounting crossbeam from another view
10 according to an embodiment of the present disclosure;

[0039] FIG. 20 is a schematic structural view of a detergent box according to an
embodiment of the present disclosure;

[0040] FIG. 21 is an exploded view of a detergent box according to an embodiment of the
present disclosure;

15 **[0041]** FIG. 22 is an enlarged view of a structure G in FIG. 21;

[0042] FIG. 23 is an enlarged view of a structure N in FIG. 21;

[0043] FIG. 24 is a schematic structural view of a dispensing device according to an
embodiment of the present disclosure;

[0044] FIG. 25 is a schematic structural view of a dispensing assembly according to an
20 embodiment of the present disclosure;

[0045] FIG. 26 is an exploded view of a dispensing assembly according to an embodiment
of the present disclosure;

[0046] FIG. 27 is a schematic view of a partial structure of a dispensing assembly according
to an embodiment of the present disclosure;

25 **[0047]** FIG. 28 is a top view of the structure illustrated in FIG. 27;

[0048] FIG. 29 is a cross-sectional view taken along line I-I in FIG. 28, in which a liquid
discharge flow channel is in a non-communication state;

[0049] FIG. 30 is a cross-sectional view taken along line I-I in FIG. 28, in which a liquid
discharge flow channel is in a communication state;

30 **[0050]** FIG. 31 a schematic structural view of a dispensing lid body according to an

embodiment of the present disclosure;

[0051] FIG. 32 is an assembled view of a dispensing box and a dispensing pump according to an embodiment of the present disclosure;

[0052] FIG. 33 is a cross-sectional view taken along line J-J in FIG. 32;

5 **[0053]** FIG. 34 is a cross-sectional view taken along line K-K in FIG. 32;

[0054] FIG. 35 is an assembled view of a dispensing box and a mounting base according to an embodiment of the present disclosure;

[0055] FIG. 36 is a cross-sectional view taken along line L-L in FIG. 35;

[0056] FIG. 37 is a side view of the structure illustrated in FIG. 35;

10 **[0057]** FIG. 38 is a cross-sectional view taken along line M-M in FIG. 37; and

[0058] FIG. 39 is a schematic structural view of a laundry treatment device according to another embodiment of the present disclosure.

[0059] Reference Signs:

[0060] Laundry treatment device 100, housing assembly 200, dispensing device 300, door
15 assembly 400, tub assembly 500,

[0061] Front closure door 10, first laundry accessing opening 101, second laundry accessing opening 102, detergent box socket 103, upper edge 1031 of a detergent box socket, lower edge 1032 of a detergent box socket, first side plate 11, main body segment 12, second side plate 13,

20 **[0062]** First mounting recess 141, second mounting recess 142, third mounting recess 143, positioning protruding rib 15, first connection flange 16, first connection hole 161, second connection flange 17, mounting flange 18, engagement portion 181, second connection hole 182,

[0063] Support frame 20,

25 **[0064]** Base 21, first vertical beam 221, limiting member 2211, second vertical beam 222, third vertical beam 223, fourth vertical beam 224,

[0065] Connection crossbeam 23, connection crossbeam body 231, inclined support surface 2311, crossbeam protrusion 2312, top wall 23121 of a crossbeam protrusion, side wall 23122 of a crossbeam protrusion, crossbeam recess 2313, reinforcing recess 2314, support base 232,
30 second mounting through hole 233,

[0066] First connection frame 241, fixation portion 2411, first fixation hole 2412, reinforcing protrusion 2413, second fixation hole 2414, second connection frame 242, third connection frame 243, fourth connection frame 244,

[0067] Mounting crossbeam 25, mounting crossbeam body 251, detergent box mounting
5 region 2511, first mounting portion 2512, second mounting portion 2513, transition flange 2514, second perforation hole 2515, fourth recess 2516, reinforcing protrusion 25161, bracket 252, positioning hole 2521,

[0068] Detergent box 30, positioning protrusion 301, connection lug 302, first perforation hole 303,

10 **[0069]** Fixed cavity 31, accommodation chamber 310, rear wall 3101, lower side wall 3103, transition wall 3104, first port 311, second port 312, liquid accumulation groove 313, guide rail 314, guide rib 3141, connection rib 3142, support platform 315, first annular protruding rib 316, second annular protruding rib 317,

[0070] Movable cavity 32, view window 321, mounting recess chamber 322, holding
15 member 323, lid body 324, support protrusion 325,

[0071] Dispensing assembly 40,

[0072] Dispensing box 41,

[0073] Dispensing box body 4101, main fitting opening 41011, first fitting opening 41012, second fitting opening 41013, water inlet 41014, liquid inlet 41015, liquid through opening
20 41016, first limiting base 41017,

[0074] Dispensing lid body 4102, via hole 41021, annular protruding rib 41022, protective protruding rib 41023, side opening 41024,

[0075] Main flow channel 411, first extension segment 4111, second extension segment 4112, middle connection segment 4113, first flow channel 412, second flow channel 413, liquid
25 inlet flow channel 414, liquid discharge flow channel 415, temporary storage chamber 416, liquid discharge recess 417,

[0076] First dispensing portion 418, second dispensing portion 419, first dispensing opening 4191, second dispensing opening 4192,

[0077] Liquid discharge member 42, movable member 421, movable rod 4211, anti-
30 separation protrusion 4212, second limiting base 4213, blockage portion 422, elastic member

423,

[0078] Switching valve 43, main switching opening 431, first switching opening 432, second switching opening 433, valve core 434,

[0079] Dispensing pump 44, pump inlet 441, pump outlet 442, pump entrance 443,

5 **[0080]** Mounting base 45, mounting chamber 451, liquid passage opening 452, dispensing pump mounting portion 453,

[0081] Level detection member 46, positive post 461, negative post 462,

[0082] Side plate 50, mounting groove 51, bottom wall 5101 of a mounting groove, first mounting through hole 511, mounting opening 512,

10 **[0083]** First door 61, second door 62, first washing tub 63, second washing tub 64,

[0084] Handle 70, handle housing 71, covering portion 72.

DESCRIPTION OF EMBODIMENTS

[0085] 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 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 limitation on the present disclosure.

15 **[0086]** 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,” “clockwise,” “counterclockwise,” “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
25 simplifying the description, rather than indicating or implying that the associated 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. In addition, the features defined by the

terms “first” and “second” may explicitly or implicitly include at least one of the features. In the description of the present disclosure, “plurality” means at least two, unless otherwise defined.

[0087] In the description of the present disclosure, it should be noted that, unless otherwise clearly specified and defined, terms such as “installed,” “mounted,” “connected to,” “connected with” and the like should be understood in a broad sense. For example, it may be a fixed connection or a detachable connection or integral connection; it may be a mechanical connection or an electrical connection or mutual communication; it may be a direct connection or an indirect connection by an intermediate; and it may be an internal communication between two components. For those of ordinary skill in the art, the specific meaning of the above-mentioned terms in the present disclosure can be understood according to specific circumstances.

[0088] A connection crossbeam 23 according to embodiments of the present disclosure will be described below with reference to FIG. 1 to FIG. 39.

[0089] As illustrated in FIG. 11 to FIG. 17, the connection crossbeam 23 according to an embodiment of the present disclosure includes a connection crossbeam body 231 and a support base 232. The connection crossbeam body 231 is adapted to be fixed on a support structure of a laundry treatment device 100, e.g., supported on a vertical beam, or supported on a front beam and a rear beam of the laundry treatment device 100. The connection crossbeam body 231 has an inclined support surface 2311. The inclined support surface 2311 is a surface that extends obliquely with respect to a vertical surface or a horizontal surface. The support base 232 is disposed on the inclined support surface 2311, and a vibration damping device such as a vibration damping rod is to be mounted on the support base 232.

[0090] That is, the vibration damping device such as the vibration damping rod may have one end connected to a washing tub of the laundry treatment device 100 and another end fixed to the support base 232. In an embodiment, when the connection crossbeam 23 according to this embodiment is applied in a laundry treatment device having a first laundry treatment module and a second laundry treatment module, the connection crossbeam 23 may be connected to a vertical beam of a frame of the laundry treatment device. A vibration damping device, e.g., the vibration damping rod, of the first laundry treatment module located at an upper side may

be directly supported on the inclined support surface 2311. The inclined support surface 2311 is inclined towards the first laundry treatment module to cause the inclined support surface 2311 to be substantially perpendicular to a support rod. Therefore, a shear force exerted by the support rod on a support crossbeam 23 can be reduced. Compared with mounting the support base 232 on a vertical support surface, supporting the support base 232 on an inclined surface can reduce a tangential force exerted by the vibration damping rod of the washing tub on the connection crossbeam body 231, and prevent a disconnection due to sliding, relative to the connection crossbeam body 231, of the support base 232. In addition, the connection crossbeam body 231 can further provide a supporting to the vibration damping rod of the washing tub to further improve structural stability.

[0091] When the support base 232 is mounted directly on a horizontal support surface, a size of the connection crossbeam body 231 in a horizontal direction needs to be further increased, in which case a large mounting space of the laundry treatment device 100 may be occupied. In addition, increasing the size of the connection crossbeam body 231 may also lead to an increase in costs. Consequently, in the embodiments of the present disclosure, the support base 232 is disposed on the inclined support surface 2311. Therefore, compared with the support base 232 being mounted directly on the horizontal support surface, a structure of the support base 232 being disposed on the inclined support surface 2311 would not increase a size of a mounting crossbeam body 251, which avoids an increase in costs and also facilitates mounting of the mounting crossbeam body 251 on the laundry treatment device 100.

[0092] With the connection crossbeam 23 according to the embodiments of the present disclosure, by forming the inclined support surface 2311 on the connection crossbeam body 231, the support base 232 for mounting the vibration damping rod can be obliquely supported on the connection crossbeam body 231. The inclined support surface 2311 may allow forces exerted on the connection crossbeam body 231 more reasonable. The connection crossbeam body 231 may also provide a supporting to the support base 232 without occupying too much mounting space, thereby improving stability and reliability of the connection crossbeam 23.

[0093] As illustrated in FIG. 15, according to an embodiment of the present disclosure, the inclined support surface 2311 is located at an inner side of the connection crossbeam body 231. That is, the inclined support surface 2311 is located at a side of the connection crossbeam body

231 close to a center of the laundry treatment device 100. The inclined support surface 2311 gradually obliquely extends towards the side close to the center of the laundry treatment device 100 in a top-to-bottom direction to support the support base 232 at the inner side of the connection crossbeam body 231 (i.e., the side close to the center of the laundry treatment device 100). Since the vibration damping device such as the vibration damping rod may be directly supported at the inner side of the connection crossbeam body 231 during mounting of the vibration damping rod, the vibration damping device is easily to be mounted. In addition, the support base 232 has a good support effect on the vibration damping rod.

[0094] The inventors verified through experimental analysis that the inclined support surface 2311 has an optimal support effect on the support base 232 and the vibration damping rod when an included angle between the inclined support surface 2311 and a vertical plane ranges from 20° to 35°. In some embodiments, the included angle between the inclined support surface 2311 and the vertical plane may be 25°, 27°, or 30°, which decreases a thickness (a distance in a leftward-rightward direction illustrated in FIG. 15) of the connection crossbeam body 231 on a basis of ensuring structural stability, thereby reducing a space occupied by mounting of the connection crossbeam body 231.

[0095] As illustrated in FIG. 11 and FIG. 15, according to an embodiment of the present disclosure, the connection crossbeam body 231 is at least partially recessed towards inside of the connection crossbeam body 231 to form a crossbeam protrusion 2312 on an inner side surface of the connection crossbeam body 231 and a crossbeam recess 2313 on an outer side surface of the connection crossbeam body 231. Therefore, a strength of the connection crossbeam body 231 can be improved without increasing a size of the connection crossbeam body 231. In addition, an assembling of the vibration damping rod can be facilitated.

[0096] As illustrated in FIG. 15, in some examples, the crossbeam protrusion 2312 extends in a length direction of the connection crossbeam body 231. That is, a length of the crossbeam protrusion 2312 is lengthened to enlarge a mountable position for the support base 232, and facilitate fixation of the vibration damping rod of the washing tub at any position of the mounting crossbeam body 251.

[0097] As illustrated in FIG. 15, in some examples, the crossbeam protrusion 2312 is at least partially recessed towards outside of the connection crossbeam body 231 to form at least

one reinforcing recess 2314 on the inner side surface of the connection crossbeam 23 and at least one reinforcing protrusion 2413 on the outer side surface of the connection crossbeam 23. The at least one reinforcing recess 2314 may be fabricated by stamping the crossbeam protrusion 2312, in which case not only structural strength can be enhanced in a simple and conventional manufacturing process, but also feasibility and versatility of the laundry treatment device can be increased.

[0098] As illustrated in FIG. 15, in some examples, the at least one reinforcing recess includes a plurality of reinforcing recesses arranged at intervals in the length direction of the connection crossbeam body 231. By providing the plurality of reinforcing recesses 2314, it is possible to ensure that structural strength of the connection crossbeam body 231 in its length direction is uniform, thereby further improving overall structural strength of the connection crossbeam 23.

[0099] As illustrated in FIG. 15, in some examples, overall structural strength near the at least one reinforcing recess 2314 is relatively high. Therefore, the support base 232 is disposed above the at least one reinforcing recess 2314 to further improve stability and reliability of mounting of the support base 232.

[00100] As illustrated in FIG. 15, in some examples, the crossbeam protrusion 2312 has a top wall 23121 and side walls 23122 located at both sides of the top wall 23121. Here, the top wall 23121 of the crossbeam protrusion 2312 may be a vertical surface. One side wall 23122 of the crossbeam protrusion 2312 may be located above the top wall 23121 of the crossbeam protrusion 2312, and the other side wall 23122 of the crossbeam protrusion 2312 may be located below the top wall 23121 of the crossbeam protrusion 2312. Each of the top wall 23121 and the side walls 23122 of the crossbeam protrusion 2312 extends in the length direction (a forward-backward direction as illustrated in FIG. 15) of the connection crossbeam body 231. A surface of the side wall 23122 located above the top wall 23121 of the crossbeam protrusion 2312 is formed as the inclined support surface 2311. The inclined support surface 2311 gradually obliquely extends inwards in the top-to-bottom direction. The support base 232 is supported at an inner side of a top of the crossbeam protrusion 2312 to facilitate the mounting of the vibration damping rod and improve stability after being mounted.

[00101] A support frame 20 of the laundry treatment device 100 according to the

embodiments of the present disclosure includes a base 21, a first vertical beam 221 and a second vertical beam 222, a third vertical beam 223 and a fourth vertical beam 224, and two connection crossbeams 23 (e.g., a first connection crossbeam and a second connection crossbeam).

[00102] The first vertical beam 221 and the second vertical beam 222 are arranged on two corners at a front side of the base 21. Each of the first vertical beam 221 and the second vertical beam 222 extends upwardly from the base 21. The third vertical beam 223 and the fourth vertical beam 224 are arranged on two corners at a rear side of the base 21. Each of the third vertical beam 223 and the fourth vertical beam 224 extends upwardly from the base 21. The first vertical beam 221 and the fourth vertical beam 224 are located on a left side of the base 21.

The second vertical beam 222 and the third vertical beam 223 are located on a right side of the base 21. One of the connection crossbeams 23 has two ends connected to a middle part of the first vertical beam 221 and a middle part of the fourth vertical beam 224. The other of the connection crossbeams 23 has two ends connected to a middle part of the second vertical beam 222 and a middle part of the fourth vertical beam 224. By employing the connection crossbeam 23 as described above, a force exerted on the support frame 20 is more reasonable, which facilitates assembly between the support frame 20 and the washing tub and ensures the structural stability and reliability.

[00103] In some embodiments, the support base 232 includes at least two support members that are spaced apart from each other. One end of the vibration damping rod is inserted between the two support members and fastened, via a bolt, between the two support members to achieve fixed mounting of the vibration damping rod.

[00104] The connection crossbeam 23 may have one or more support bases 232 provided thereon. Numbers of the support bases 232 on opposite connection crossbeams 23 may be the same or different. In an embodiment, the numbers of the support bases may be determined based on a volume and a maximum allowable weight of the washing tub and the present disclosure is not limited thereto.

[00105] A laundry treatment device 100 according to embodiments of the present disclosure will be described below in connection with FIG. 1 to FIG. 39.

[00106] The laundry treatment device 100 includes a housing assembly 200, a door assembly 400, a dispensing device 300, and a tub assembly 500. The dispensing device 300 includes a

detergent box 30. The door assembly 400 includes a first door 61 and a second door 62. The tub assembly 500 includes a first washing tub 63 and a second washing tub 64. The first washing tub 63 is located above the second washing tub 64. The first door 61 is located above the second door 62, and corresponds to the first washing tub 63 for opening or closing the first washing tub 63. The second door 62 corresponds to the second washing tub 64 for opening or closing the second washing tub 64.

[00107] The housing assembly 200 includes a front closure door 10. The front closure door 10 according to embodiments of the present disclosure will be described below in connection with FIG. 4 to FIG. 10.

[00108] As illustrated in FIG. 4 to FIG. 10, according to an embodiment of the present disclosure, the front closure door 10 has a width direction extending in a leftward-rightward direction, a height direction extending in an upward-downward direction, and a thickness direction extending in a forward-backward direction. In addition, the front closure door 10 also has a detergent box socket 103. The detergent box socket 103 penetrates the front closure door 10 in the forward-backward direction. In the width direction of the front closure door 10, the detergent box socket 103 is located in a middle part of the front closure door 10.

[00109] Here, a projection of the front closure door 10 on a horizontal plane (the horizontal plane here refers to a plane perpendicular to the upward-downward direction) has different sizes in the forward-backward direction. In an embodiment, in the forward-backward direction, a size of a middle part of the projection (i.e., a size of a region where the detergent box socket 103 is located in the forward-backward direction) is greater than a size of an end portion of each of both ends of the projection (i.e., a size of each of a left end portion and a right end portion of the front closure door 10 in the forward-backward direction). Suppose that the size of the region where the detergent box socket 103 is located in the forward-backward direction is H , and the size of each of the left end portion and the right end portion of the front closure door 10 in the forward-backward direction is h . A ratio of H to h is limited to be any of 1.2 to 2.5. That is, the ratio of H to h may be 1.2, 1.6, 2.0, 2.4, etc., to prevent H from being too great or h from being too small, for a reason that H being too great or h being too small may lead to poor aesthetics of an overall structure and compromise a visual experience of a user, and also, to prevent H from being too small, for a reason that a thickness at the detergent box insertion opening 103

being too small may affect mounting of the detergent box 30.

[00110] Therefore, by designing the front closure door 10 into a structure having a thick middle part, it is possible for the detergent box 30 to be easily inserted into the middle part of the front closure door 10 to increase a size of the detergent box 30 in the forward-backward direction and volume of the detergent box 30. Further, it is possible to reduce interference of the detergent box 30 with other members of the laundry treatment device 100, thereby facilitating mounting of the detergent box 30. In addition, the front closure door 10 has thin end portions. Therefore, an overall thickness appears to be thin when viewed laterally, in which manner the overall structure seems to be more aesthetically pleasing and the visual experience of the user may be improved.

[00111] As illustrated in FIG. 6 and FIG. 7, according to an embodiment of the present disclosure, the front closure door 10 includes a first side plate 11, a main body segment 12, and a second side plate 13 sequentially in the leftward-rightward direction. The first side plate 11 has one end formed as one end of the front closure door 10 (a left end as illustrated in FIG. 6) and another end connected to one end of the main body segment 12. The second side plate 13 has one end formed as another end of the front closure door 10 (a right end as illustrated in FIG. 6) and another end connected to the other end of the main body segment 12. The main body segment 12 is located in the middle part of the front closure door 10. The detergent box socket 103 is located on the main body segment 12. In addition, a size of the main body segment 12 in the forward-backward direction is greater than a size of the left end or the right end of the front closure door 10. Therefore, an engagement between the main body segment 12 and the detergent box 30 may be facilitated without affecting aesthetics of the overall structure.

[00112] As illustrated in FIG. 7, in some examples, a front side surface of each of the first side plate 11 and the second side plate 13 in the leftward-rightward direction gradually extends backwards in a direction close to the main body segment 12 to a direction facing away from the main body segment 12. That is, the front side surface of the first side plate 11 may be an inclined surface or a curved surface, and the front side surface of the second side plate 13 may be an inclined surface or a curved surface. In this case, the front closure door 10 has a shape that is thick in the middle and thin on both sides. In addition, the front side surface of the front closure door 10 may be a smooth surface to improve the aesthetics of the front closure door 10.

[00113] As illustrated in FIG. 6 and FIG. 7, in some examples, the main body segment 12 has a width s in the leftward-rightward direction, where s is greater than a size of each of the first side plate 11 and the second side plate 13 in the leftward-rightward direction. Thus, it is possible to prevent s from being too small, which would result in a reduction in a size of the detergent box socket 103 and a larger inclined surface of the front side surface of the front closure door 10. In this case, the visual effect may be affected.

[00114] According to an embodiment of the present disclosure, the front closure door 10 has at least one laundry accessing opening. The detergent box socket 103 may be arranged at a position close to the at least one laundry accessing opening, and thus the overall structure is compact. In addition, it is convenient for a detergent in the detergent box 30 to be dispensed to a laundry treatment chamber and reduce a length of a detergent dispensing path, thereby improving dispensing efficiency.

[00115] As illustrated in FIG. 5 and FIG. 6, in some examples, the laundry accessing opening includes a first laundry accessing opening 101 and a second laundry accessing opening 102 located below the first laundry accessing opening 101. The detergent box socket 103 is located between the first laundry accessing opening 101 and the second laundry accessing opening 102 and directly below the first laundry accessing opening 101. Here, since the detergent in the detergent box 30 may flow into a laundry treatment chamber corresponding to the second laundry accessing opening 102 under an action of gravity, the detergent needs to be dispensed to a laundry treatment chamber corresponding to the first laundry accessing opening 101 by a dispensing pump 44. In order to lower costs by reducing a pumping force of the dispensing pump 44, it is designed that a distance between the detergent box socket 103 and the first laundry accessing opening 101 is defined less than a distance between the detergent box socket 103 and the second laundry accessing opening 102. Such a design also conforms to a layout of the overall structure to allow the front closure door 10 and the laundry treatment device 100 to have a more compact structure and facilitate use of the user.

[00116] As illustrated in FIG. 5 and FIG. 6, in some examples, the front closure door 10 has a first mounting recess 141 recessed backwards on a front side surface thereof. The first mounting recess 141 extends in a circumferential direction of the first laundry accessing opening 101 and forms a circular region. The first laundry accessing opening 101 is also

designed to have a circular shape. A center of circle of the first laundry accessing opening 101 is higher than a center of circle of the first mounting recess 141. That is, the first laundry accessing opening 101 is arranged higher than the first mounting recess 141, which causes a larger space for mounting the detergent box to be formed below the first laundry accessing opening 101. The detergent box socket 103 is disposed within the first mounting recess 141 and has a lower edge 1032 of a circular arc shape. In some examples, the lower edge 1032 of the detergent box socket 103 is close to a lower edge of the first mounting recess 141. That is, a distance between the lower edge 1032 of the detergent box socket 103 and the lower edge of the first mounting recess 141 is less to increase the size of the detergent box socket 103. In some embodiments, the lower edge of the detergent box socket 103 overlaps with the lower edge of the first mounting recess 141, and the detergent box socket 103 has an upper edge 1031 extending in the leftward-rightward direction. By providing the first mounting recess 141, the detergent box 30 would not protrude from the front side surface of the front closure door 10 after being inserted into the first mounting recess 141. The front closure door 10 has a front side formed as a smooth surface to improve the aesthetics of the overall structure. In addition, the detergent box socket 103 is increased in size, which in turn increases the size of the detergent box 30 to accommodate more detergent.

[00117] As illustrated in FIG. 5, in a further example, the first mounting recess 141 is partially recessed backwards to form a second mounting recess 142 located above the detergent box socket 103. The laundry treatment device 100 has a door partially mounted at the second mounting recess 142. In this case, the mounted door would not protrude too much from the front side surface of the front closure door 10, thereby improving structural aesthetics. The second mounting recess 142 is partially recessed backwards to form a third mounting recess 143 into which a rotation shaft of the door is mounted. Thus, the door can be easily closed. Meanwhile, it is possible to ensure that the door is abutted against the second mounting recess 142 when the door is closed, thereby improving engagement reliability. The remaining parts of the door may be assembled to the first mounting recess 141 to cover a front side surface of the detergent box 30 by the door of the laundry treatment device, and thus the detergent box 30 can be hidden. Therefore, the laundry treatment device has a more pleasant and neater outer surface.

[00118] As illustrated in FIG. 8, according to an embodiment of the present disclosure, the

front closure door 10 has a positioning protruding rib 15 provided on a rear side surface thereof. The positioning protruding rib 15 extends in a circumferential direction of the detergent box socket 103. Further, the positioning protruding rib 15 protrudes from the rear side surface of the front closure door 10 and extends backwards. In this way, the positioning protruding rib 15 can provide a guiding to the detergent box 30 when mounting the detergent box 30, and a support to the detergent box 30 when mounting the detergent box 30 in place, thereby enhance structural strength at the detergent box socket 103. In addition, an arrangement of the positioning protruding rib 15 can eliminate unsmoothness, burrs, etc., at the detergent box socket 103, thereby avoiding a risk of the user being scratched during operation.

[00119] As illustrated in FIG. 8 and FIG. 9, in some examples, the front closure door 10 has a first connection flange 16 provided on a rear side of an upper end thereof, and the first connection flange extends downwardly. The first connection flange 16 extends in the width direction of the front closure door 10. The first connection flange 16 has a plurality of first connection holes 161 defined therein. The plurality of first connection holes 161 is arranged at intervals in a length direction of the first connection flange 16.

[00120] As illustrated in FIG. 9, in some examples, the front closure door 10 has a mounting flange 18 provided at each of a left side and a right side thereof. The two mounting flanges 18 are located at a rear side of the front closure door 10 and each extend in a direction close to each other. In an embodiment, the mounting flange 18 at the left side of the front closure door 10 extends rightwards, and the mounting flange 18 at the right side extends leftwards.

[00121] The mounting flange 18 has an engagement portion 181 and a second connection hole 182 that are provided thereon. The engagement portion 181 is formed as a limiting hole. The limiting hole has an upper part and a lower part. The upper part has a size less than that of the lower portion. The second connection hole 182 is located at an upper end of the mounting flange 18.

[00122] As illustrated in FIG. 8 and FIG. 10, in some examples, the front closure door 10 has a second connection flange 17 provided on a rear side of a lower end thereof, and the second connection flange 17 extending downwardly. Further, the second connection flange 17 includes a fixation hole to facilitate fixation of the lower end of the front closure door 10.

[00123] The housing assembly 200 also includes a support frame 20, and the support frame

20 according to embodiments of the present disclosure will be described below in connection with FIG. 11 to FIG. 18.

[00124] As illustrated in FIG. 11, the support frame 20 includes a base 21, a plurality of vertical beams extending upwardly from the base 21 (a first vertical beam 221, a second vertical beam 222, a third vertical beam 223, and a fourth vertical beam 224 as illustrated in FIG. 11), and connection frames (a first connection frame 241, a second connection frame 242, a third connection frame 243, and a fourth connection frame 244 as illustrated in FIG. 11) located at a top of the support frame 20. The first vertical beam 221 and the second vertical beam 222 are spaced apart from each other in the leftward-rightward direction. The third vertical beam 223 and the fourth vertical beam 224 are spaced apart from each other in the leftward-rightward direction. Each of the first vertical beam 221, the second vertical beam 222, the third vertical beam 223, and the fourth vertical beam 224 has an upper end connected to the connection frame and a lower end connected to the base 21.

[00125] The first vertical beam 221 may have a structure formed by combining two vertical beams with each other to facilitate fabrication and molding. The first vertical beam 221 may also have a structure formed by one vertical beam to facilitate assembly. A specific structure of the first vertical beam 221 may be determined as desired. The same is true for the second vertical beam 222, the third vertical beam 223, and the fourth vertical beam 224, and thus details thereof will be omitted herein.

[00126] As illustrated in FIG. 11, the support frame 20 also includes a connection crossbeam 23 including a connection crossbeam body 231 and a support base 232. One connection crossbeam body 231 is connected to the first vertical beam 221 and the fourth vertical beam 224 at both ends thereof, respectively, and another connection crossbeam body 231 is connected to the second vertical beam 222 and the third vertical beam 223 at both ends thereof, respectively.

[00127] As illustrated in FIG. 11 and FIG. 15, in some examples, the connection crossbeam body 231 is partially recessed towards inside of the connection crossbeam body 231 to form a crossbeam protrusion 2312 on an inner side surface of the connection crossbeam body 231 and a crossbeam recess 2313 on an outer side surface of the connection crossbeam body 231.

[00128] As illustrated in FIG. 15, the crossbeam protrusion 2312 protrudes rightwards, and

has a top wall 23121 and side walls 23122 located at both sides of the top wall 23121. The top wall of the crossbeam protrusion 2312 is a vertical surface. One side wall 23122 of the crossbeam protrusion 2312 is located above the top wall 23121 of the crossbeam protrusion 2312, and one side wall 23122 of the crossbeam protrusion 2312 is located below the top wall 23121 of the crossbeam protrusion 2312. Each of the top wall 23121 and the side walls 23122 of the crossbeam protrusion 2312 extends in a length direction of the connection crossbeam body 231. A surface of the side wall 23122 located above the top wall 23121 of the crossbeam protrusion 2312 is formed as an inclined support surface 2311. The inclined support surface 2311 gradually obliquely extends inwards in a top-to-bottom direction towards a side close to a center of the support frame 20. An included angle between the inclined support surface 2311 and a vertical plane is 25°. The support base 232 is supported on the inclined support surface 2311.

[00129] In addition, as illustrated in FIG. 15, the crossbeam protrusion 2312 is at least partially recessed towards outside of the connection crossbeam body 231 to form at least one reinforcing recess 2314 on the inner side surface of the connection crossbeam 23 and at least one reinforcing protrusion 2413 on the outer side surface of the connection crossbeam 23. Therefore, the structural strength of the connection crossbeam 23 can be further improved.

[00130] As illustrated in FIG. 15 to FIG. 17, in some examples, the connection crossbeam body 231 is formed into a vertical surface at a lower portion thereof. The connection crossbeam body 231 has a second mounting through hole 233 defined in a lower edge thereof. The housing assembly 200 also includes a side plate 50 having an outer side surface recessed inwardly to form a mounting groove 51. A bottom wall 5101 of the mounting groove 51 has a first mounting through hole 511 and a mounting opening 512 that are defined thereon. The first mounting through hole 511 is located above and spaced apart from the mounting opening 512. Further, the first mounting through hole 511 is positioned to correspond to the second mounting through hole 233. In this manner, a fixed connection between the connection crossbeam 23 and the side plate 50 can be realized by a fastener passing through the first mounting through hole 511 and the second mounting through hole 233. The side plate 50 has a front part and a rear part that are fixedly connected to the vertical beams. The side plate 50 also has an upper part and a lower part fixedly connected to the connection frame and the base 21, respectively. Therefore, the side

plate 50 is fixed secured. In addition, the mounting opening 512 is configured for an installation of a handle 70 for easy carrying by a user. In addition, during the carrying, a force exerted on the handle 70 is partially transferred to the connection crossbeam 23 to avoid deformation of the side plate 50.

5 **[00131]** The support frame 20 also includes a mounting crossbeam 25. A structure of the mounting crossbeam 25 and an assembly of the mounting crossbeam 25 according to embodiments of the present disclosure will be described below in connection with FIG. 18 and FIG. 19.

10 **[00132]** According to an embodiment of the present disclosure, the mounting crossbeam 25 includes a mounting crossbeam body 251 and a bracket 252. The mounting crossbeam body 251 has a mounting notch defined in a top portion thereof. The mounting notch is formed as a detergent box mounting region 2511 for mounting the detergent box 30. The bracket 252 is disposed on a bottom edge of the mounting notch and is positioned to correspond to the detergent box mounting region 2511. The bracket 252 is configured to support the detergent
15 box 30 when the detergent box 30 is mounted within the detergent box mounting region 2511.

20 **[00133]** As illustrated in FIG. 18 and FIG. 19, according to an embodiment of the present disclosure, the mounting crossbeam body 251 has a length direction extending in a transverse direction (a leftward-rightward direction as illustrated in FIG. 18), and a width direction extending in a longitudinal direction (an upward-downward direction as illustrated in FIG. 18).
The bracket 252 has a length direction extending in the leftward-rightward direction and a width direction extending backwards in a forward-backward direction. The term “backwards” herein refers to a direction from the mounting crossbeam body 251 to an inside of the support frame 20. In this manner, the bracket 252 is formed as a horizontally extending plate. Therefore, after the detergent box 30 is mounted in place, the bracket 252 can provide a satisfying support to
25 the detergent box 30 and improve stability of the detergent box 30.

30 **[00134]** As illustrated in FIG. 18, in some examples, the bracket 252 is connected to the mounting crossbeam body 251 at a front side thereof and faces away from the mounting crossbeam body 251 at a rear side thereof. Therefore, it is possible to prevent mounting of the front closure door 10 from being affected due to protruding of the bracket 252 from the front side of the mounting crossbeam body 251. The bracket 252 has a plurality of positioning holes

2521 defined thereon. The plurality of positioning holes 2521 is arranged at intervals in the length direction of the bracket 252.

[00135] As illustrated in FIG. 18, according to an embodiment of the present disclosure, the mounting crossbeam body 251 has a first mounting portion 2512 and a second mounting portion 2513 that are provided thereon. The first mounting portion 2512 and the second mounting portion 2513 are arranged at a top of a side portion edge of the mounting notch and spaced apart from each other in the length direction of the bracket 252. The bracket 252 is located between the first mounting portion 2512 and the second mounting portion 2513. Each of the first mounting portion 2512 and the second mounting portion 2513 has a second perforation hole 2515 defined therein.

[00136] As illustrated in FIG. 18, in some examples, in the width direction of the bracket 252, the first mounting portion 2512 is formed as a mounting protrusion extending in a direction facing away from the bracket 252 (towards a front side illustrated FIG. 18), and the second mounting portion 2513 is also formed as a mounting protrusion extending in the direction facing away from the bracket 252 (towards the front side illustrated in FIG. 18). By providing the mounting protrusions, on the one hand, structural strength at a connection position can be improved to avoid, e.g., deformation of the mounting portion by a force, and on the other hand, different extending directions of the mounting protrusions and the bracket 252 allow a front part and a rear part of the detergent box 30 to be fixed simultaneously, thereby improving mounting stability of the detergent box 30.

[00137] As illustrated in FIG. 19, in some examples, the mounting notch has a transition flange 2514 provided on each of both side edges thereof. The transition flange 2514 and the bracket 252 are in a transitional connection to each other. Here, the transition flange 2514 and the bracket 252 are located at a same side of the mounting crossbeam body 251. By disposing the transition flange 2514 at the mounting notch, on the one hand, the mounting notch is made smooth and burr-free to avoid scratching an operator, and on the other hand, structural strength of the mounting notch can be improved. Further, the transition flange 2514 can provide a guiding to the mounting of the detergent box 30. The transition flange 2514 can also provide a supporting to the detergent box 30 after the detergent box 30 is mounted in place, thereby improving reliability and stability of the mounting of the detergent box 30.

[00138] As illustrated in FIG. 18, in some examples, the mounting crossbeam body 251 is partially recessed backwards to form a plurality of fourth recesses 2516. Some of the plurality of fourth recesses 2516 are located at a lower side of the mounting crossbeam body 251 and extend in a horizontal direction (a leftward-rightward direction illustrated in FIG. 18), some of the plurality of fourth recesses 2516 are located at a left side of the mounting crossbeam body 251, and other fourth recesses 2516 are located at a right side of the mounting crossbeam body 251. The fourth recesses 2516 located at the left side and the right side extend in the upward-downward direction, and each have a fixation hole or a positioning flange provided thereon. Each of the first vertical beam 221 and the second vertical beam 222 has an engagement hole defined therein. The engagement hole corresponds to the fixation hole or the positioning flange. In this manner, the mounting crossbeam body 251 is fixedly connected to the vertical beams, and the bracket 252 and the mounting crossbeam body 251 are integrally formed. Therefore, mounting of the mounting crossbeam 25 can be realized.

[00139] In addition, the fourth recess 2516 also has a reinforcing protuberance 25161 provided thereon. The reinforcing protuberance 25161 protrudes forwards to enhance structural strength of the fourth recess 2516. In an extension direction of the fourth recess 2516, the fixation hole or the positioning flange is staggered from the reinforcing protuberance 25161.

[00140] After the mounting crossbeam 25 is mounted in place, the front closure door 10 may be fixedly connected to the support frame 20. An assembly of the support frame 20 and the front closure door 10 according to the embodiments of the present disclosure will be described below in connection with FIG. 4 to FIG. 14.

[00141] As illustrated in FIG. 11, according to an embodiment of the present disclosure, the first connection frame 241 has a fixation portion 2411 provided thereon. The fixation portion 2411 is formed as a fixation flange extending upwards. The fixation flange has a plurality of first fixation holes 2412 defined therein. The plurality of first fixation holes 2412 is arranged at intervals in a length direction of the fixation flange and corresponds to the plurality of first connection holes 161 in a one-to-one correspondence.

[00142] As illustrated in FIG. 12, in some examples, the fixation portion 2411 has second fixation holes 2414 defined on both ends thereof. Each of two parts of the fixation flange at a middle part thereof protrudes forwards to form at least one reinforcing protrusion 2413. The at

least one reinforcing protrusion 2413 is located between every two adjacent first fixation holes 2412. By disposing the at least one reinforcing protrusion 2413 between every two adjacent first fixation holes 2412, on the one hand, the structural strength of the fixation flange can be improved to improve post-engagement stability, and on the other hand, alignment and positioning of the first fixation holes 2412 and the first connection holes 161 can be facilitated to improve assembly efficiency of the front closure door 10 and the fixation flange.

[00143] As illustrated in FIG. 13, in some examples, each of the first vertical beam 221 and the second vertical beam 222 has a limiting member 2211 provided thereon. Here, the limiting member 2211 may be a limiting screw. The limiting hole has a lower part greater than a head portion of the limiting screw in size and an upper part smaller than a head portion of a shank of the limiting screw. The first vertical beam 221 or the second vertical beam 222 has a mounting hole defined therein. The shank of the limiting screw is fixed at the mounting hole. The head portion of the limiting screw is spaced apart from the vertical beam.

[00144] During mounting of the front closure door 10, the front closure door 10 is hung on the fixation flange by the first connection flange 16. After the front closure door 10 is hung on the fixation flange, a first fastener, which may be a bolt, passes through the first fixation hole 2412 and the first connection hole 161 from the rear side of the front closure door 10 to connect the fixation flange and the first connection flange 16. The fixation flange is located between the first connection flange 16 and the front side of the front closure door 10, and prevents the front closure door 10 from moving downwardly. Therefore, the front closure door 10 hung on the fixation flange has enhanced stability. In addition, the first fastener is invisible from the front side of the front closure door 10, and thus the aesthetics of the overall structure can be improved.

[00145] Here, when the front closure door 10 is hung on the fixation flange, the limiting screw on the vertical beam is firstly inserted into the lower part of the limiting hole. As the front closure door 10 moves downwards, the limiting screw moves downwards relative to the limiting hole. After the front closure door 10 is hung in place, the limiting screw is inserted into the upper part of the limiting hole, and an edge of the limiting hole is sandwiched between the head portion of the limiting screw and the corresponding vertical beam.

[00146] In some embodiments, a second fastener, which may be a bolt, passes through the second fixation hole 2414 and the second connection hole 182 to connect the fixation portion

2411 to the mounting flange 18. In this manner, the fixation portion 2411 is assembled to the first connection flange 16 and the mounting flange 18 simultaneously. That is, each of two sides and the upper end of the front closure door 10 is fixed to an upper end of the support frame 20. Thus, it is possible to improve the stability of the mounting of the front closure door 10, thereby further improving the overall structural strength.

[00147] Finally, the second connection flange 17 on the lower part of the front closure door 10 is connected to the base 21 by a third fastener. Here, the third fastener may be a bolt. A plurality of third fasteners that is arranged at intervals in a length direction of the second connection flange 17 may be provided to improve fixation reliability of the lower end of the front closure door 10.

[00148] After the front closure door 10 is assembled in place, the detergent box socket 103 on the front closure door 10 is positioned to correspond to the detergent box mounting region 2511 on the mounting crossbeam 25 for mounting the detergent box 30. A structure of the detergent box 30 and mounting of the detergent box 30 according to embodiments of the present disclosure will be described below in connection with FIG. 20 to FIG. 23.

[00149] According to an embodiment of the present disclosure, the detergent box 30 includes a stationary cavity 31 and a movable cavity 32. The stationary cavity 31 has an accommodation chamber 310. The movable cavity 32 is disposed within the accommodation chamber 310. The accommodation chamber 310 has an opening opened at a front side thereof. The movable cavity 32 is movable within the accommodation chamber 310 when pushed or pulled. The stationary cavity 31 includes a first port 311 and a second port 312. The movable cavity 32 has two dispensing chambers (the two dispensing chambers may be storage spaces for a laundry treatment agent). The two dispensing chambers are in communication with the two ports in a one-to-one correspondence when the movable cavity 32 and the fixed cavity 31 are mounted in place.

[00150] As illustrated in FIG. 21, according to an embodiment of the present disclosure, the movable cavity 32 has a dispensing opening and a lid body 324 that are provided on a top portion thereof. The dispensing opening is in communication with the dispensing chamber. The lid body 324 is configured to open and close the dispensing opening. The movable cavity 32 has a visual window 321 provided on a front part thereof. The user may observe, via the visual

window 321, a liquid level in the dispensing chamber, in which case timely replenishment of a detergent can be facilitated, and user experience of the user can be improved. The movable cavity 32 has a mounting recess 322 provided at a front side thereof. A holding member 323 is disposed within the mounting recess. Here, the holding member 323 is rotatable within the mounting recess. When the holding member 323 is undesired, the holding member 323 can be hidden within the mounting recess to improve visual experience of the user. When the movable cavity 32 needs to be pushed or pulled, the holding member 323 can be rotated out of the mounting recess for easy operation and use.

[00151] As illustrated in FIG. 21, according to an embodiment of the present disclosure, the stationary cavity 31 includes a rear wall 3101 and a circumferential wall extending in a circumferential direction of the rear wall 3101. The circumferential wall of the stationary cavity 31 includes an upper side wall, a lower side wall 3103, and a transition wall 3104. Both ends of the upper side wall are connected to both ends of the lower side wall 3103 by the transition wall 3104. The lower side wall 3103 is formed into an arc-shaped surface. The accommodation chamber 310 is defined by the rear wall 3101 and the circumferential wall of the stationary cavity 31. A port is disposed on the rear wall 3101 of the stationary cavity 31 and extends forwards.

[00152] As illustrated in FIG. 22, according to an embodiment of the present disclosure, a liquid accumulation groove 313 is defined on the lower side wall 3103 of the stationary cavity 31. The liquid accumulation groove 313 is located below the first port 311 and the second port 312, and is capable of receiving a detergent flowing out of the first port 311 and the second port 312. The detergent flows downwards under an action of gravity and is accumulated within the liquid accumulation groove 313.

[00153] As illustrated in FIG. 22, the lower side wall 3103 of the stationary cavity 31 also has a guide rail 314. The guide rail 314 includes two parallel guide ribs 3141 that are spaced apart from each other. Each guide rib 3141 extends in the forward-backward direction. The two guide ribs 3141 has front ends connected to each other in a rounded transition manner. A plurality of connection ribs 3142 that is spaced apart from each other is arranged between the two guide ribs 3141. The movable cavity 32 has a guide groove defined on an outer wall surface thereof. The guide groove is slidingly engaged with the guide rail 314. Therefore, it is possible

to guide the mounting of the movable cavity 32 and prevent misplacement of the movable cavity 32 from affecting an engagement between the port and the dispensing chamber. Meanwhile, the slidable engagement between the guide groove and the guide rail 314 also facilitates pushing and pulling of the movable cavity 32 in the forward-backward direction. Of course, the guide rail 314 may also be disposed on the outer wall surface of the movable cavity 32, and the guide groove may be disposed on an inner wall surface of the stationary cavity 31, in which case the guide groove may be slidably engaged with the guide rail 314.

[00154] As illustrated in FIG. 23, according to an embodiment of the present disclosure, a support platform 315 is disposed on the transition wall 3104 of the stationary cavity 31, and a support protrusion 325 is disposed on the outer wall surface of the movable cavity 32. The support protrusion 325 is supported on the support platform 315 that extends in the forward-backward direction. When the movable cavity 32 is pushed or pulled, the support platform 315 can also guide the movable cavity 32, thereby preventing the movable cavity 32 from shaking or rotating within the accommodation chamber 310.

[00155] As illustrated in FIG. 23, according to an embodiment of the present disclosure, a first annular protruding rib 316 and a second annular protruding rib 317 are disposed on a front side of the stationary cavity 31. The first annular protruding rib 316 extends in a circumferential direction of a front side opening, and the second annular protruding rib 317 also extends in the circumferential direction of the front side opening. The second annular protruding rib 317 is located at an inner side of the first annular protruding rib 316. An annular groove is defined between the second annular protruding rib 317 and the first annular protruding rib 316. When the movable cavity 32 and the stationary cavity 31 are mounted in place, an edge of the movable cavity 32 is located within the annular groove.

[00156] As illustrated in FIG. 20, in some embodiments, the stationary cavity 31 has a positioning protuberance 301 provided at an outer side thereof. The positioning protuberance 301 protrudes from a lower side surface of the stationary cavity 31 and extends downwards. The stationary cavity 31 has a connection lug 302 disposed at each of both ends thereof that are located at the outer side. Here, the connection lug 302 has a first perforation hole 303 defined therein.

[00157] During the mounting of the detergent box 30, the positioning protuberance 301 is

configured to be inserted into the positioning hole 2521 in the mounting crossbeam 25. The plurality of positioning holes 2521 is engaged with the positioning protuberances 301 to avoid a rotation of the detergent box 30. By passing the fastener through the first perforation hole 303 and the second perforation hole 2515, the stationary cavity 31 is connected to the first mounting portion 2512 and the second mounting portion 2513 at both ends thereof, respectively. In this manner, the detergent box 30 can be firmly secured, thereby preventing the detergent box 30 from moving upwards out of the detergent box mounting region 2511. The detergent box 30 has a lower portion supported on the bracket 252 and two ends fixedly connected to the mounting crossbeam body 251. Thus, it is possible to realize multi-orientation fixation of the detergent box 30 and improve the stability of the detergent box 30.

[00158] As illustrated in FIG. 24, the dispensing device 300 also includes a dispensing assembly 40. After the detergent box 30 is mounted in place, each of the first port 311 and the second port 312 of the detergent box 30 is in communication with the dispensing assembly 40 via a connection pipe. Here, as illustrated in FIG. 39, two detergent boxes 30 may be provided. The two detergent boxes 30 are spaced apart from each other to facilitate storage of different detergents. Of course, one detergent box 30 may also be provided, with different storage regions divided within the movable cavity 32 of the detergent box 30 to store different types of detergents. The dispensing assembly 40 according to the embodiments of the present disclosure will be described below in connection with FIG. 25 to FIG. 38.

[00159] As illustrated in FIG. 25 to FIG. 28, according to an embodiment of the present disclosure, the dispensing assembly 40 includes a dispensing box 41. The dispensing box 41 includes a dispensing box body 4101 and a dispensing lid body 4102. The dispensing lid body 4102 is arranged to cover over the dispensing box body 4101. A main flow channel 411, a first flow channel 412, and a second flow channel 413 are defined between the dispensing lid body 4102 and the dispensing box body 4101. The first flow channel 412 is in communication with the first washing tub 63. The second flow channel 413 is in communication with the second washing tub 64. The main flow channel 411 is in switchable communication with one of the first flow channel 412 and the second flow channel 413. The dispensing box body 4101 and the dispensing lid body 4102 may be fabricated through a welding process to ensure sealing performance of the main flow channel 411, the first flow channel 412, and the second flow

channel 413.

[00160] Here, the main flow channel 411 includes a first extension segment 4111, a middle connection segment 4113, and a second extension segment 4112. The first extension segment 4111 extends in a length direction of the second flow channel 413 and is located between the first flow channel 412 and the second flow channel 413. The second extension segment 4112 extends in the length direction of the second flow channel 413 and is located at a side of the second flow channel 413 facing away from the first flow channel 412. The middle connection segment 4113 has two ends in communication with the first extension segment 4111 and the second extension segment 4112, respectively. Therefore, a water inlet 41014, and a pump inlet 443 in communication with a pump outlet 442 may be located on the second extension segment 4112. An external water source connection pipe, a water inlet valve, the dispensing pump 44, etc., may be disposed at a side of the second extension segment 4112 to avoid the external water source connection pipe, the water inlet valve, the dispensing pump 44, etc., from being disposed at an end of the first extension segment 4111. Therefore, a length of the dispensing assembly 40 in an extending direction of the first extension segment 4111 can be shortened, thereby decreasing an occupied space during the mounting. Meanwhile, the overall structure can be made more compact.

[00161] As illustrated in FIG. 27 and FIG. 33, according to an embodiment of the present disclosure, the dispensing box body 4101 includes a water inlet 41014, a liquid inlet 41015, a temporary storage chamber 416, a liquid passing opening 41016, and a liquid inlet flow channel 414. The water inlet 41014 is in communication with the main flow channel 411. Water from an external water source enters the main flow channel 411 through the water inlet 41014. Two liquid inlets 41015 and two liquid inlet flow channels 414 are provided. One end (a front end illustrated in FIG. 28) of each of the two liquid inlets 41015 is in communication with the first port 311 and the second port 312 of the detergent box 30, respectively, and the other end (a rear end illustrated in FIG. 28) of each of the two liquid inlets 41015 is in communication with the two liquid inlet flow channels 414 through two temporary storage chambers 416, respectively. That is, each of the two temporary storage chambers 416 is in communication with the liquid inlet 41015 and the liquid inlet flow channel 414. As illustrated in FIG. 33, the liquid passing opening 41016 is located at a bottom wall of the temporary storage chamber 416. That is, the

temporary storage chamber 416 is in communication with the liquid inlet flow channel 414 through the liquid passing opening 41016, and is located between the liquid inlet 41015 and the liquid inlet flow channel 414 in a liquid flow direction. Therefore, a liquid enters the temporary storage chamber 416 first. The dispensing pump 44 is configured to pump the liquid in the temporary storage chamber 416.

[00162] As illustrated in FIG. 27 and FIG. 33, in some examples, the main flow channel 411, the first flow channel 412, the second flow channel 413, and the temporary storage chamber 416 are arranged in a same plane, and the liquid inlet flow channel 414 is located below the main flow channel 411, the first flow channel 412, the second flow channel 413, and the temporary storage chamber 416. In this manner, a space of the dispensing box 41 in a vertical direction can be fully utilized to improve the space utilization.

[00163] As illustrated in FIG. 33 and FIG. 34, according to an embodiment of the present disclosure, the dispensing lid body 4102 includes a via hole 41021. The via hole 41021 has an annular protruding rib 41022 provided on an edge thereof. The annular protruding rib 41022 protrudes beyond an upper surface and a lower surface of the dispensing lid body 4102. The upper surface of the dispensing lid body 4102 has a protective protruding rib 41023 provided thereon. The protective protruding rib 41023 extends in a circumferential direction of the annular protruding rib 41022, and has a side opening 41024 defined by both ends thereof.

[00164] As illustrated in FIG. 31, the dispensing assembly 40 also includes two level detection members 46 that each includes a positive post 461 and a negative post 462. Each of the positive post 461 and the negative post 462 is inserted into the via hole 41021 and tightly connected to the annular protruding rib 41022 at a corresponding position. The positive post 461 is surrounded by one protective protruding rib 41023. The negative post 462 is surrounded by one protective protruding rib 41023. A lower end of each of the positive post 461 and the negative post 462 extends into the temporary storage chamber 416.

[00165] When the temporary storage chamber 416 contains the liquid, both the positive post 461 and the negative post 462 are in contact with the liquid to allow the positive post 461 and the negative post 462 to be electrically connected to each other. Therefore, current information is detectable. When the temporary storage chamber 416 contains no liquid, the positive post 461 and the negative post 462 cannot be electrically connected to each other. Therefore, the

current information is undetectable. In this manner, a level of the liquid in the temporary storage chamber 416 can be determined based on whether the current information is detectable, thereby ensuring accuracy and reliability of a detection result.

[00166] In addition, since the temporary storage chamber 416 is unmovable, a risk of wiring obstruction or wiring breakage is avoided, which ensures the accuracy and reliability of the detection result and prolongs a service life of the dispensing device 300. By providing the protective protruding rib 41023, it is possible to protect the level detection member to prevent a detection effect from being affected due to a contact of the level detection member in other structures or wetting of the level detection member. The protective protruding rib 41023 can also limit a position of the level detection member to prevent the detection effect from being affected by a movement of the level detection member. Therefore, use experience of the dispensing device 300 can be improved, and market competitiveness of the laundry treatment device can be enhanced.

[00167] As illustrated in FIG. 31, according to an embodiment of the present disclosure, the dispensing box 41 includes a first dispensing portion 418 and a second dispensing portion 419. The first dispensing portion 418 is in communication with the first flow channel 412 and the first washing tub 63. That is, the first dispensing portion 418 is located between the first flow channel 412 and the first washing tub 63, and is configured to allow a detergent or washing water in the first flow channel 412 to flow into the first washing tub 63.

[00168] As illustrated in FIG. 36 and FIG. 38, the second dispensing portion 419 is in communication with the second flow channel 413 and the second washing tub 64. The second dispensing portion 419 includes a first dispensing port 4191 and a second dispensing port 4192. The first dispensing port 4191 is defined on the dispensing lid body 4102 and in communication with a spray port of the second washing tub 64. The second dispensing port 4192 is defined on the dispensing box body 4101 and in communication with a corrugated water inlet pipe of the second washing tub 64. Therefore, the second washing tub 64 may realize double water intakes. Multi-orientation and three-dimensional water flows can be formed within the second washing tub 64 to improve a washing effect, thereby further increasing washing efficiency and laundry cleanliness.

[00169] According to an embodiment of the present disclosure, the dispensing box 41 also

has a liquid discharging recess 417 and a liquid discharging flow channel 415 provided on a bottom thereof. The liquid discharging recess 417 is located below the main flow channel 411. The liquid discharging flow channel 415 is in communication with a bottom wall of the liquid discharging recess 417 at an upper end thereof, and is configured to discharge a residual liquid in the main flow channel 411, thereby avoiding a risk such as a burst of the dispensing box 41 due to freezing of the residual liquid.

[00170] In some examples, the liquid discharging flow channel 415 allows a small amount of liquid to flow therethrough. In an embodiment, the liquid discharging flow channel 415 has a radial size of around 1.5 mm. When the liquid is supplied from the main flow channel 411 to the first flow channel 412 or the second flow channel 413, a large amount of liquid is supplied. Therefore, only a small amount of the liquid flows out from the liquid discharging flow channel 415, and most of the liquid flows into the first flow channel 412 or the second flow channel 413 through switching of a switching valve 43. When the main flow channel 411 stops supplying the liquid to the first flow channel 412 or the second flow channel 413, the residual liquid, which cannot flow out by means of the switching valve 43 without a pressure, flows into and out of the liquid discharging flow channel 415 under an action of its gravity, thereby avoiding the risk such as the burst of the dispensing box 41 due to freezing of the residual liquid.

[00171] As illustrated in FIG. 27, according to an embodiment of the present disclosure, the dispensing assembly 40 also includes a liquid discharge member 42 that is disposed in the dispensing box 41 and configured to control opening and closing of the liquid discharge flow channel 415. In an embodiment, in a state where the dispensing assembly 40 dispenses a liquid into the first washing tub 63 or the second washing tub 64, the liquid discharge member 42 closes the liquid discharge flow channel 415, and thus the liquid in the main flow channel 411 may only flow to the first flow channel 412 or the second flow channel 413; and in a state where the dispensing assembly 40 stops dispensing a liquid into the first washing tub 63 and the second washing tub 64, the liquid discharge member 42 opens the liquid discharge flow channel 415, and thus the liquid in the main flow channel 411 may be discharged from the liquid discharge flow channel 415.

[00172] Therefore, when no liquid is dispensed by the dispensing assembly 40, the liquid discharge flow channel 415 is opened. The liquid in the main flow channel 411 may be

discharged from a drainage channel to prevent a residual of the liquid, and further, to avoid a risk such as a burst of the dispensing box 41 due to freezing of the residual liquid under a low temperature.

[00173] As illustrated in FIG. 28 and FIG. 29, according to an embodiment of the present disclosure, in a state where a pressure of the liquid in the main flow channel 411 is lower than a predetermined value, the liquid discharge member 42 opens the liquid discharge flow channel 415, in which case it is ensured that the liquid in the main flow channel 411 can be discharged from the liquid discharge flow channel 415 when the liquid is under a low pressure; and in a state where the pressure of the liquid in the main flow channel 411 is greater than the predetermined value, the liquid discharge member 42 closes the liquid discharge flow channel 415. That is, when the main flow channel 411 contains a sufficient amount of liquid, the liquid in the main flow channel 411, instead of being discharged from the liquid discharge flow channel 415, flows to the first flow channel 412 or the second flow channel 413 by means of the switching valve 43 to supply the liquid to the first washing tub 63 or the second washing tub 64 in time.

[00174] As illustrated in FIG. 28, according to an embodiment of the present disclosure, the liquid discharge member 42 includes a movable member 421, an elastic member 423, and a blockage portion 422. The movable member 421 includes a movable rod 4211 extending in the upward-downward direction. The movable rod 4211 has an upper end connected to the blockage portion 422 and a lower end provided with an anti-separation protrusion 4212 to prevent the movable rod 4211 from being separated from the liquid discharge flow channel 415 during its movement.

[00175] The upper end of the movable rod 4211 includes a second limiting base 4213. The liquid discharge flow channel 415 has a first limiting base 41017 provided therein. The first limiting base 41017 is located at a bottom of the liquid discharge flow channel 415 and connected to an inner wall of the liquid discharge flow channel 415 by a rib. A liquid discharge gap is defined between the first limiting base 41017 and the inner wall of the liquid discharge flow channel 415. The second limiting base 4213 is arranged directly opposite to the first limiting base 41017. The elastic member 423 may be a spring and sleeved over the movable rod 4211. The elastic member 423 abuts against the first limiting base 41017 and the second

limiting base 4213 at both ends thereof, respectively, and is configured to push the blockage portion 422 normally to open an inlet of the liquid discharge flow channel 415.

[00176] As illustrated in FIG. 29, in the state where the dispensing assembly 40 dispenses the liquid into the first washing tub 63 or the second washing tub 64, due to a high liquid flow pressure, the elastic member 423 is compressed under the liquid flow pressure. The inlet of the liquid discharge flow channel 415 is closed by a blockage member, and the liquid discharge flow channel 415 is therefore closed. In this manner, the liquid in the main flow channel 411 may only flow into the first flow channel 412 or the second flow channel 413. As illustrated in FIG. 30, in the state where the dispensing assembly 40 stops dispensing the liquid into the first washing tub 63 and the second washing tub 64, the liquid flow pressure is lower, and thus the elastic member 423 cannot be compressed. The blockage member moves backwards by the elastic member 423 to open the inlet of the liquid discharge flow channel 415. Therefore, the liquid discharge flow channel 415 is opened. The liquid in the main flow channel 411 can be discharged from the liquid discharge flow channel 415 to avoid the residual of the liquid.

[00177] As illustrated in FIG. 26 to FIG. 36, according to an embodiment of the present disclosure, the dispensing assembly 40 further includes a mounting base 45 fixedly connected to the support frame 20. The mounting base 45 has a dispensing pump mounting portion 453 provided at a rear side thereof, and includes a mounting chamber 451 and a liquid passage opening 452. The liquid passage opening 452 is in communication with the mounting chamber 451 and the second washing tub 64.

[00178] The dispensing box 41 is mounted within the mounting chamber 451. The second dispensing opening 4192 is in communication with the mounting chamber 451. The liquid discharge flow channel 415 of the dispensing box 41 is in communication with the mounting chamber 451. A liquid flowing out of the dispensing opening, a liquid overflowing from the dispensing box 41, or a liquid left in the dispensing box 41 may also flow into the mounting chamber 451, and may be introduced to the corrugated pipe of the second washing tub 64 through the liquid passage opening 452.

[00179] As illustrated in FIG. 26 to FIG. 34, in some examples, the dispensing assembly 40 also includes a dispensing pump 44 disposed on the dispensing pump mounting portion 453 and in communication with the dispensing box 41.

[00180] The dispensing pump 44 is connected between the liquid inlet flow channel 414 and the main flow channel 411. In an embodiment, a plurality of dispensing pumps 44 in a same quantity as the detergent storage regions may be provided. In an embodiment, when two detergent storage regions are provided for storing a detergent and a softener, respectively, two dispensing pumps 44 may be provided. Each of the two dispensing pumps 44 includes a pump inlet 441 and a pump outlet 442. Two pump inlets 441 are in communication with the two liquid inlet flow channels 414 in a one-to-one correspondence to be in communication with two dispensing chambers in a one-to-one correspondence. Two pump outlets 442 are in communication with the main flow channel 411 by the two pump inlets 443 to pump a liquid entering from the liquid inlet 41015 into the main flow channel 411. Water from the external water source enters the main flow channel 411 from the water inlet 41014, flushes the liquid pumped into the main flow channel 411 by the dispensing pump 44 to flow into the first washing tub 63 and the second washing tub 64 along the main flow channel 411. Here, the two pump inlets 443 are located on a bottom wall of the main flow channel 411 and are spaced apart from each other in an extension direction of the main flow channel 411.

[00181] In addition, each of the pump inlet 441 and the pump outlet 442 has a one-way valve provided thereon to ensure a one-way flow of the liquid. Under control of the dispensing pump 44, one liquid may flow into the liquid inlet flow channel from one pump inlet 441 and into the main flow channel 411 from the pump outlet 442 corresponding to the pump inlet 441. The dispensing pump 44 may also control another liquid to flow into the liquid inlet flow channel from the other pump inlet 441 and into the main flow channel 411 from the pump outlet 442 corresponding to the pump inlet 441.

[00182] As illustrated in FIGS. 37 and 38, according to an embodiment of the present disclosure, as described above, the dispensing assembly 40 also includes a switching valve 43 mounted at a right side of the dispensing box 41 and including a main switching opening 431, a first switching opening 432, and a second switching opening 433. The main switching opening 431 may be in communication with the first switching opening 432 or with the second switching opening 433.

[00183] Here, the dispensing box 41 also includes a main fitting opening 41011, a first fitting opening 41012, and a second fitting opening 41013. The main fitting opening 41011 is located

at a right end of the first extension segment 4111. The first fitting opening 41012 is located at a right end of the first flow channel 412. The second fitting opening 41013 is located at a right end of the second flow channel 413. All three fitting openings are located on a right side wall of the dispensing box 41. The main fitting opening 41011 is in communication with the main flow channel 411 and the main switching opening 431. The first fitting opening 41012 is in communication with the first flow channel 412 and the first switching opening 432. The second fitting opening 41013 is in communication with the second flow channel 413 and the second switching opening 433. That is, by arranging the switching valve 43 on the dispensing box 41, the main fitting opening 41011 corresponds to the main switching opening 431, the first fitting opening 41012 corresponds to the first switching opening 432, and the second fitting opening 41013 corresponds to the second switching opening 433. That is, a flow of water can be realized by switching of the switching valve 43.

[00184] As illustrated in FIG. 38, in some examples, the switching valve 43 may be a solenoid valve. When the solenoid valve is energized, a valve core 434 moves leftwards to close the first switching opening 432. In this case, the main switching opening 431 is in communication with the second switching opening 433. Therefore, the main fitting opening 41011 may be in communication with the second fitting opening 41013 to allow the main flow channel 411 to be in communication with the second flow channel 413. Hence, the detergent or washing water may flow into the second washing tub 64. When the solenoid valve is de-energized, the valve core 434 moves rightwards to an initial position to close the second switching opening 433. In this case, the main switching opening 431 is in communication with the first switching opening 432. Therefore, the main fitting opening 41011 may be in communication with the first fitting opening 41012 to allow the main flow channel 411 to be in communication with the first flow channel 412. As a result, the detergent or washing water can flow into the first washing tub 64. The flow channels may be switched through the energizing or de-energizing of the solenoid valve. Water or a liquid may be supplied to the first washing tub 63 even when the solenoid valve is de-energized, which not only simplifies the structure, but also saves power. Accordingly, market competitiveness of the laundry treatment device can be enhanced.

[00185] With the laundry treatment device 100 according to the embodiments of the present

disclosure, the first washing tub 63 and the second washing tub 64 may be used separately or synchronously. Both washing tubs have a function of automatically dispensing the detergent. In addition, the dispensing assembly 40 introduces the water with one water inlet valve. Through the switching valve 43 and a clever design of flow channels in the detergent box 30, the detergent may be dispensed into each of the two washing tubs. The first washing tub 63 may be used for washing and treatment of laundry of infants and children or special laundry. An upper-lower division can achieve a purpose of healthy washing, avoid cross-contamination of bacteria on laundry of adults and infants, and also reduce occurrences of cross-contamination of underwear or outerwear clothing. An upper-lower layout of the two washing tubs takes up little space and makes operations easy.

[00186] In the embodiments of the present disclosure, the detergent should be understood in a broad sense. The detergent may be a washing agent added to the laundry treatment chamber during washing, including but not limited to the detergent. In an embodiment, the detergent may be a common detergent, a softener, a laundry detergent, a disinfectant, etc. For those of ordinary skill in the art, specific meanings of the above terms in the present disclosure may be understood depending on specific cases.

[00187] Other compositions and operations of the laundry treatment device according to the embodiments of the present disclosure are known to those of ordinary skill in the art and will not be repeated in detail.

[00188] In the description of the present disclosure, unless expressly specified and defined otherwise, the first feature being “on” or “under” the second feature may indicate that the first feature is in direct contact with the second feature, or the first and second features, instead of being in direct contact with each other, are in contact with each other by another feature therebetween. Moreover, the first feature being “above” the second feature may indicate that the first feature is directly above or obliquely above the second feature, or simply indicate that a level of the first feature is higher than that of the second feature.

[00189] 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.

- 5 **[00190]** Although embodiments of the present disclosure have been illustrated and described, it is conceivable for those of ordinary skill 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 connection crossbeam, comprising:

5 a connection crossbeam body adapted to be fixed on a support structure of a laundry treatment device and having an inclined support surface; and

a support base disposed on the inclined support surface, wherein a vibration damping rod connected to the laundry treatment device is to be mounted on the support base.

2. The connection crossbeam according to claim 1, wherein the inclined support surface is located on an inner side of the connection crossbeam body, and gradually extends obliquely and
10 inwardly in a direction from top to bottom.

3. The connection crossbeam according to claim 1 or 2, wherein the connection crossbeam body is at least partially recessed towards an inner side of the connection crossbeam body to form a crossbeam protrusion on an inner side surface of the connection crossbeam body and a crossbeam recess on an outer side surface of the connection crossbeam body.

15 4. The connection crossbeam according to claim 3, wherein the crossbeam protrusion extends in a length direction of the connection crossbeam body.

5. The connection crossbeam according to claim 3, wherein the crossbeam protrusion is at least partially recessed towards an outer side of the connection crossbeam body to form at least one reinforcing recess on an inner side surface of the connection crossbeam and at least one
20 reinforcing protrusion on an outer side surface of the connection crossbeam.

6. The connection crossbeam according to claim 5, wherein the at least one reinforcing recess comprises a plurality of reinforcing recesses arranged at intervals in a length direction of the connection crossbeam body.

7. The connection crossbeam according to claim 3, wherein the support base is located
25 above the at least one reinforcing recess.

8. The connection crossbeam according to any one of claims 3 to 7, wherein the crossbeam protrusion has a top wall and at least one side wall, each of the top wall and the at least one side wall extending in a length direction of the connection crossbeam body, wherein one of the at

least one side wall of the crossbeam protrusion is located above the top wall of the crossbeam protrusion crossbeam and has a surface formed as the inclined support surface.

9. A support frame of a laundry treatment device, the support frame comprising:

a base in a square shape;

5 a first vertical beam and a second vertical beam that are arranged on two corners, at a front side, of the base, each of the first vertical beam and the second vertical beam extending upwardly from the base;

a third vertical beam and a fourth vertical beam that are arranged on two corners, at a rear side, of the base, each of the third vertical beam and the fourth vertical beam extending
10 upwardly from the base, wherein the first vertical beam and the fourth vertical beam are located at a left side of the base, and wherein the second vertical beam and the third vertical beam are located at a right side of the base; and

a first connection crossbeam and a second connection crossbeam, the first connection crossbeam having two ends connected to a middle part of the first vertical beam and a middle
15 part of the fourth vertical beam, and the second connection crossbeam having two ends connected to a middle part of the second vertical beam and a middle part of the fourth vertical beam, wherein each of the first connection crossbeam and the second connection crossbeam is the connection crossbeam according to any one of claims 1 to 8.

10. A laundry treatment device, comprising the support frame of the laundry treatment
20 device according to claim 9.