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(54) INNER TUB OF CLOTHES TREATMENT DEVICE, AND CLOTHES TREATMENT DEVICE

(57) Provided are an inner tub (1000) of a clothes treatment device (2000) and a clothes treatment device. The inner tub includes a tub (100) and a lifting rib (200). The tub includes a tub body (120) having a first drainage region (121). The lifting rib covers the first drainage region. The position covered by the lifting rib has a plurality of first drainage holes (1231). The plurality of first drainage holes close to a tub bottom has a distribution density greater than a distribution density of the plurality of first drainage holes close to a tub opening (140).

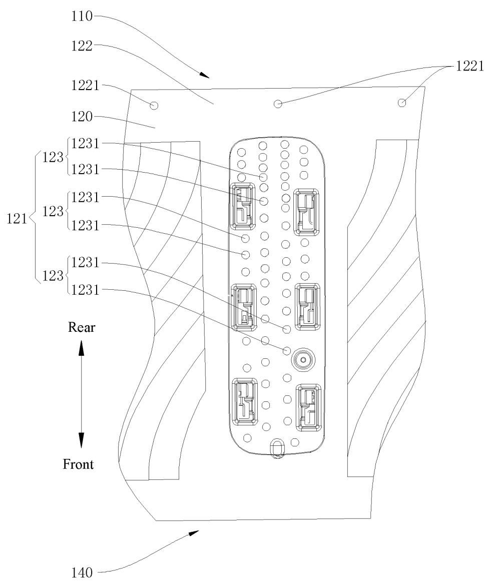

FIG. 2

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to Chinese Patent Applications Nos. 202210346383.2 and 202220765352.6, both titled "INNER TUB OF CLOTHES TREATMENT DEVICE, AND CLOTHES TREATMENT DEVICE" and filed on March 31, 2022, the entire contents of which are incorporated herein by reference.

FIELD

[0002] The present disclosure relates to the field of clothes treatment technologies, and more particularly, to an inner tub of a clothes treatment device, and a clothes treatment device.

BACKGROUND

[0003] To ensure that water in an inner tub of a conventional clothes treatment device can be discharged smoothly, a plurality of drainage holes are usually defined at a tub body of the inner tub of the conventional clothes treatment device. However, in existing technical schemes, although the water in the inner tub can be discharged by the plurality of drainage holes, a drainage efficiency is relatively low. Meanwhile, during clothes treatment in the clothes treatment device, edges of the drainage holes cause scratches on clothes, which results in wear on the clothes, degrading user experience.

SUMMARY

[0004] To this end, the present disclosure provides an inner tub of a clothes treatment device. The inner tub facilitates drainage, provides a high drainage efficiency, and can avoid wear on clothes caused by direct contact of drainage holes with the clothes, improving user experience.

[0005] The present disclosure also aims to provide a clothes treatment device having the above inner tub.

[0006] According to embodiments of the present disclosure, an inner tub of a clothes treatment device comprises: a tub comprising a tub body and a tub bottom, the tub body having a first drainage region; and a lifting rib disposed at an inner side of the tub body and covering the first drainage region, wherein the first drainage region covered by the lifting rib has a plurality of first drainage holes arranged at intervals. In the first drainage region, first drainage holes of the plurality of first drainage holes close to the tub bottom have an arrangement density greater than an arrangement density of first drainage holes of the plurality of first drainage holes close to a tub opening.

[0007] With the inner tub of the clothes treatment device according to the embodiments of the present disclosure, by disposing the lifting rib at the inner side of the tub body to cover the first drainage region, a purpose of covering the plurality of first drainage holes is achieved. Such an arrangement can allow the lifting rib to improve clothes treatment performance and shield the first drainage holes. In this way, the first drainage holes can be prevented from being in direct contact with clothes to avoid wear on the clothes during clothes treatment by the clothes treatment device, improving the user experience. In addition, in the first drainage region, the arrangement density of first drainage holes of the plurality of first drainage holes close to the tub bottom is set to be greater than the arrangement density of first drainage holes of the plurality of first drainage holes close to the tub opening, to increase a quantity of first drainage holes of the plurality of first drainage holes close to the tub bottom. Therefore, water in the tub close to the tub bottom can be quickly discharged through the larger quantity of first drainage holes, improving the drainage efficiency.

[0008] Optionally, the plurality of first drainage holes have an arrangement density that gradually increases in a direction from the tub opening to the tub bottom.

[0009] Optionally, among the plurality of first drainage holes, at least part of the plurality of first drainage holes are arranged at intervals in an axial direction of the tub body. A spacing between two adjacent first drainage holes of at least part of the plurality of first drainage holes gradually decreases in a direction from the tub opening to the tub bottom.

[0010] Optionally, the first drainage region has a plurality of drainage hole groups arranged at intervals in a circumferential direction of the tub body. Each of the plurality of drainage hole groups has a plurality of first drainage holes arranged at intervals in an axial direction of the tub body.

[0011] Optionally, the plurality of first drainage holes in two adjacent drainage hole groups of the plurality of drainage hole groups are staggered in the axial direction of the tub body.

[0012] Optionally, the tub body has a radial size that gradually increases in a direction from the tub opening to the tub bottom.

[0013] Optionally, the lifting rib has a water flow channel, or a water flow channel is defined between the lifting rib and the tub body. The plurality of first drainage holes are in communication with an inner cavity of the tub through the water flow channel.

[0014] Optionally, the lifting rib has a plurality of water passage openings formed at a bottom of at least one side wall of the lifting rib. The plurality of water passage openings cooperate with the tub body to form the water flow channel. Each of the plurality of water passage openings is positioned to correspond with at least one of the plurality of first drainage holes.

[0015] Optionally, a plurality of first drainage regions arranged at intervals in a circumferential direction of the tub body are provided.

[0016] Optionally, the tub body has a plurality of lifting ribs. Each of the plurality of lifting ribs extends in an axial direction of the tub and is capable of covering one of the plurality of first drainage regions at the tub body.

[0017] Optionally, the tub body has a rubbing region at an inner circumferential wall of the tub body. The rubbing region and the first drainage region are arranged in a circumferential direction of the tub body. The rubbing region has a plurality of rubbing protrusions arranged at intervals in the circumferential direction of the tub body. Each of the plurality of rubbing protrusions is formed into a curved shape.

[0018] Optionally, the rubbing region is a non-perforated region.

[0019] Optionally, a flow guide channel is formed between two adjacent rubbing protrusions of the plurality of rubbing protrusions. An end of at least some of the flow guide channels directly faces towards the first drainage region.

[0020] Optionally, the tub body further has a second drainage region. The second drainage region and the rubbing region are arranged in an axial direction of the tub body. The second drainage region is arranged close to the tub bottom. The second drainage region has a plurality of second drainage holes in a normally open state. The plurality of second drainage holes are arranged at intervals in the circumferential direction of the tub body.

[0021] According to the embodiments of the present disclosure, a clothes treatment device comprises: an outer tub; and the above-mentioned inner tub of the clothes treatment device. The inner tub is rotatably disposed in the outer tub.

[0022] With the clothes treatment device according to the embodiments of the present disclosure, the above-mentioned inner tub of the clothes treatment device is adopted. In this way, in a process of clothes treatment, stains at the clothes and a water flow in the inner tub can be discharged through the plurality of first drainage holes, and stains and water close to the tub bottom can be ensured to be quickly and accurately discharged, achieving a purpose of clothes treatment. Further, the drainage efficiency of the clothes treatment device can be effectively improved, and the wear on the clothes caused by the clothes treatment device during the clothes treatment can be effectively reduced, improving the user experience.

[0023] Additional aspects and advantages of the present disclosure will become apparent from the following description or can be learned from practicing of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 1 is a schematic perspective view of a structure of an inner tub according to some embodiments of the present disclosure.

FIG. 2 is a schematic view of a partial structure of an inner tub according to some embodiments of the present disclosure.

FIG. 3 is a schematic view of a partial structure of an inner tub according to some other embodiments of the present disclosure.

FIG. 4 is a schematic perspective view of a structure of a lifting rib according to some embodiments of the present disclosure.

FIG. 5 is a sectional view of an inner tub according to some embodiments of the present disclosure.

FIG. 6 is an enlarged partial view of region I in FIG. 5.

FIG. 7 is a front view of a lifting rib according to some embodiments of the present disclosure.

FIG. 8 is a sectional view of a lifting rib according to some embodiments of the present disclosure.

FIG. 9 is a schematic block view of a clothes treatment device according to some embodiments of the present disclosure.

[0025] Reference numerals of the accompanying drawings:

1000, inner tub;

100, tub; 110, tub bottom; 120, tub body;

121, first drainage region; 123, drainage hole group; 1231, first drainage hole;
122, second drainage region; 1221, second drainage hole;
140, tub opening; 150, water passage channel;

200, lifting rib;

210, first side wall; 211, first water passage opening; 212, first water blocking portion;
220, second side wall; 221, second water passage opening; 222, second water blocking portion;
230, snap hook; 240, water passage opening; 260, shielding member;

300, rubbing region; 310, rubbing protrusion; 320, flow guide channel;

321, first flow guide channel; 3211, first flow guide segment; 3212, second flow guide segment;
322, second flow guide channel;

2000, clothes treatment device.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0026] Embodiments of the present disclosure will be described in detail below with reference to examples thereof as illustrated in the accompanying drawings, throughout which same or similar elements, or elements having same or similar functions, are denoted by same or similar reference numerals. The embodiments described below with reference to the drawings are illustrative only, and are intended to explain, rather than limit, the present disclosure.

[0027] In the description of the present disclosure, it should be understood that the orientation or the position indicated by terms such as "over", "below", "front", "rear", "left", "right", "horizontal", "top", "bottom", "inner", "outer", "axial", "radial", and "circumferential" should be construed to refer to the orientation or the position as shown in the drawings, and is only for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the pointed device or element must have a specific orientation, or be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation of the present disclosure.

[0028] An inner tub 1000 of a clothes treatment device according to embodiments of the present disclosure will be described below with reference to the accompanying drawings.

[0029] As illustrated in FIG. 1, the inner tub 1000 of the clothes treatment device according to the embodiments of the present disclosure includes a tub 100 and a lifting rib 200.

[0030] The tub 100 includes a tub body 120 and a tub bottom 110. The tub body 120 has a first drainage region 121. The first drainage region 121 is mainly configured to facilitate an arrangement of first drainage holes 1231 to facilitate drainage during subsequent clothes treatment of the inner tub 1000.

[0031] The lifting rib 200 is disposed at an inner side of the tub body 120 and covers the first drainage region 121. The first drainage region 121 covered by the lifting rib 200 has a plurality of first drainage holes 1231 arranged at intervals.

[0032] The first drainage hole 1231 is mainly configured to realize communication between the inner tub 1000 and an external flow path, which ensures that water in the inner tub 1000 can be smoothly discharged through the first drainage holes 1231, achieving a purpose of clothes treatment. In addition, the plurality of first drainage holes 1231 arranged at intervals are provided in the present disclosure. The plurality of first drainage holes 1231 arranged at intervals cooperate with each other for drainage to improve a drainage efficiency, and achieve a purpose of thoroughly draining washing water and dirt, enhancing a clothes treatment capacity of the inner tub 1000.

[0033] In addition, through forming the first drainage holes 1231 in the region covered by the lifting rib 200, the first drainage holes 1231 are shielded by the lifting rib 200. On the one hand, the first drainage holes 1231 in the first drainage regions 121 are prevented from being directly observed by the user, which improves aesthetics of the inner tub 1000. On the other hand, the first drainage holes 1231 can be ensured not to come into direct contact with the clothes in a process of clothes treatment. Therefore, edges of the first drainage holes 1231 are prevented from wearing the clothes to effectively solve a problem of wear of the clothes, which greatly reduces a wear rate of the clothes, improving user experience.

[0034] It should be noted that, through disposing the lifting rib 200 at the inner side of the tub body 120, the lifting rib 200 can drive the clothes to rotate along with a rotation of the tub 100 in a washing process of the clothes treatment device. On the one hand, a height of the clothes can be raised by the lifting rib 200. The clothes at a certain height fall down under an action of gravity, which realizes up-and-down tumbling and agitation of the clothes, achieving the purpose of clothes treatment. On the other hand, a contact area between the clothes and the inner tub 1000 can be increased by the lifting rib 200, in such a manner that the clothes close to the lifting rib 200 can rub against the lifting rib 200 to generate a rubbing effect, which enhances the clothes treatment capacity of the inner tub 1000, improving the user experience.

[0035] That is, the lifting rib 200 of the present disclosure can not only enhance the clothes treatment capacity of the inner tub 1000, but also improve the aesthetics of the inner tub 1000. Further, the lifting rib 200 can also prevent the edges of the first drainage holes 1231 from wearing the clothes. In this way, a need to arrange other structural members for shielding the first drainage holes 1231 is eliminated, which can simplify a structure of the inner tub 1000 and reduce production costs of the inner tub 1000.

[0036] As illustrated in FIG. 2, in the first drainage region 121, first drainage holes of the first drainage holes 1231 close to the tub bottom 110 have an arrangement density greater than an arrangement density of first drainage holes of the first drainage holes 1231 close to a tub opening 140. That is, in the present disclosure, the first drainage holes 1231 are disposed at each of a position close to the tub bottom 110 and a position close to the tub opening 140, and the first drainage holes 1231 close to the tub bottom 110 have a distribution quantity greater than a distribution quantity of the first drainage holes 1231 close to the tub opening 140. Therefore, the arrangement density of the first drainage holes 1231 close to the tub bottom 110 is greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140, which allows a larger quantity of first drainage holes 1231 to be formed at the position close to the tub bottom 110 per unit area and a smaller quantity of first drainage holes 1231 to be formed at the position close to the tub opening 140 per unit area.

[0037] With the inner tub 1000 of the clothes treatment device according to the embodiments of the present disclosure, the larger quantity of first drainage holes 1231 may be formed at the position close to the tub bottom 110 through the above arrangement, in such a manner that the water close to the tub bottom 110 in the tub 100 can be quickly discharged, making drainage of the inner tub 1000 more convenient and improving the drainage efficiency. In this way, the washing water and the dirt in the inner tub 1000 can be smoothly and thoroughly discharged, which improves drainage performance. In particular, when the inner tub 1000 is used for dehydration, the plurality of first drainage holes 1231 having the larger quantity and cooperating with each other can greatly enhance a dehydration quality to reduce a moisture content of the clothes, improving the user experience.

[0038] Since the smaller quantity of first drainage holes 1231 are formed at the position close to the tub opening 140, the quantity of the first drainage holes 1231 decreases. Accordingly, structural strength of a part corresponding to the smaller quantity of first drainage holes 1231 is increased. That is, in the present disclosure, a part of the tub body 120 close to the tub opening 140 has higher structural strength.

[0039] That is, through the above arrangement, the structural strength of the tub body 120 can also be guaranteed while ensuring that the washing water and the dirt in the inner tub 1000 can be quickly and smoothly discharged. Therefore, the structural strength of the inner tub 1000 can be ensured to prolong a service life of the inner tub 1000.

[0040] It should be understood that, compared with the related art, the inner tub 1000 of the clothes treatment device in the present disclosure is configured such that the arrangement density of the first drainage holes 1231 close to the tub bottom 110 is greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140. In this way, while ensuring that the first drainage holes 1231 are formed at each of the position close to the tub bottom 110 and the position close to the tub opening 140, the larger quantity of first drainage holes 1231 can be formed at the position close to the tub bottom 110 to improve the drainage efficiency and the drainage performance of the inner tub 1000. Further, in the present disclosure, the plurality of first drainage holes 1231 are also formed at the position covered by the lifting rib 200 to ensure that the first drainage holes 1231 are kept from coming into direct contact with the clothes during the clothes treatment of the clothes treatment device, which avoids snagging or tearing of the clothes by the first drainage holes 1231, improving the user experience.

[0041] It should be noted that, with the above arrangement (in the first drainage region 121, the arrangement density of the first drainage holes 1231 close to the tub bottom 110 is set to be greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140) in the present disclosure, an optimal effect is produced, especially when the inner tub 1000 is arranged obliquely with respect to a horizontal direction to enable a lowest part of the tub bottom 110 to be lower than a lowest part of the tub opening 140, or when the inner tub 1000 is formed as a tapered tub to enable the lowest part of the tub bottom 110 to be lower than the lowest part of the tub opening 140.

[0042] In the description of the present disclosure, "plurality" means at least two, unless otherwise specified.

[0043] Optionally, as illustrated in FIG. 8, the tub body 120 has a plurality of snap holes. The lifting rib 200 has a plurality of snap hooks 230 at each of two sides of the lifting rib 200. The plurality of snap hooks 230 are snap-fitted and engaged with the plurality of snap holes in one-to-one correspondence. The lifting rib 200 can be fixedly arranged at the tub body 120 by connecting the plurality of snap hooks 230 and the plurality of snap holes through a snap-fit engagement. Therefore, while ensuring that a position of the lifting rib 200 relative to the tub body 120 is stable, an engagement between the lifting rib 200 and the tub body 120 can be convenient, reducing assembly difficulty of the inner tub 1000, and simplifying the structure of the inner tub 1000. In addition, an engagement between the snap hooks 230 and the snap holes enables the lifting rib 200 to be detachably connected to the tub body 120. That is, the lifting rib 200 and the tub body 120 can be completely detached, which facilitates replacement or disassembly of the lifting rib 200.

[0044] Of course, in some other examples, a connection method of the lifting rib 200 and the tub body 120 is not limited to the above snap-fit engagement between the snap hooks 230 and the snap holes, and may also include other connection methods. For example, the lifting rib 200 has a plurality of first connection holes at each of two sides of the lifting rib 200. The tub body 120 has a plurality of second connection holes engaged with the plurality of first connection holes. The second connection hole is formed as an internal threaded hole. A bolt passes through the first connection hole to be fixedly connected in the second connection hole, for realizing a detachable connection between the lifting rib 200 and the tub body 120. Alternatively, the tub body 120 has a plurality of slots. The lifting rib 200 has a plurality of catches at each of two sides of the lifting rib 200. The plurality of catches are inserted into and engaged with the plurality of slots in one-to-one correspondence, in such a manner that the detachable connection between the lifting rib 200 and the tub body 120 can also be realized.

[0045] In some embodiments of the present application, as illustrated in FIG. 2 and FIG. 3, the plurality of first drainage holes 1231 have an arrangement density that gradually increases in a direction from the tub opening 140 to the tub bottom 110. That is, the first drainage holes 1231 have a distribution quantity that gradually increases in the direction from the tub opening 140 to the tub bottom 110. In this way, while ensuring that the arrangement density of the first drainage holes 1231 close to the tub bottom 110 can be greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140, the larger quantity of first drainage holes 1231 can be formed in the direction from the tub opening 140 to the tub bottom 110. That is, the larger quantity of first drainage holes 1231 can be formed in the first drainage region 121. The larger quantity of first drainage holes 1231 cooperate with each other for drainage to improve a drainage capacity of the inner tub 1000, improving the drainage efficiency.

[0046] In some embodiments of the present disclosure, as illustrated in FIG. 2 and FIG. 3, among the plurality of first drainage holes 1231, at least part of the plurality of first drainage holes 1231 are arranged at intervals in an axial direction of the tub body 120. Such an arrangement ensures that the first drainage holes 1231 are formed in the direction from the tub opening 140 to the tub bottom 110. Also, the plurality of first drainage holes 1231 cooperate with each other to discharge water at different parts of the tub body 120 in the axial direction of the tub body 120, improving the drainage efficiency.

[0047] Optionally, as illustrated in FIG. 2 and FIG. 3, a spacing between two adjacent first drainage holes 1231 gradually decreases in the direction from the tub opening 140 to the tub bottom 110. In a region of a same area, the spacing between two adjacent first drainage holes 1231 is small. Accordingly, the quantity of the first drainage holes 1231 increases. That is, the arrangement density of the first drainage holes 1231 increases. Therefore, it is ensured that the first drainage holes 1231 have the arrangement density that gradually increases in the direction from the tub opening 140 to the tub bottom 110. That is, the arrangement density of the first drainage holes 1231 close to the tub bottom 110 is ensured to greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140, to improve the drainage efficiency of the inner tub 1000.

[0048] In some embodiments of the present disclosure, as illustrated in FIG. 1 and FIG. 2, the first drainage region 121 has a plurality of drainage hole groups 123. Each of the plurality of drainage hole groups 123 has a plurality of first drainage holes 1231 arranged at intervals in the axial direction of the tub body 120. Cooperation between the plurality of drainage hole groups 123 can make the plurality of first drainage holes 1231 in the first drainage region 121 evenly distributed, improving aesthetics of the first drainage region 121 and reducing manufacturing difficulty of the first drainage hole 1231. In addition, the cooperation between the plurality of drainage hole groups 123 can also increase the quantity of first drainage holes 1231 at the tub body 120, which further improves the drainage capacity of the inner tub 1000, improving the drainage efficiency.

[0049] Optionally, as illustrated in FIG. 1 and FIG. 2, the plurality of drainage hole groups 123 are arranged at intervals in a circumferential direction of the tub body 120. In this way, water flows at different parts of the inner tub 1000 can be simultaneously discharged through the first drainage holes 1231, especially enabling water flows at different parts of the tub body 120 in the circumferential direction of the tub body 120 to be simultaneously discharged, to further improve the drainage efficiency. Particularly, in a dehydration process using the inner tub 1000, the cooperation between the plurality of drainage hole groups 123 can greatly enhance the dehydration quality to reduce the moisture content of the clothes.

[0050] Optionally, as illustrated in FIG. 2, the plurality of first drainage holes 1231 in two adjacent drainage hole groups 123 of the plurality of drainage hole groups 123 are staggered in the axial direction of the tub body 120. That "staggered in the axial direction" should be understood as that, in the axial direction of the tub body 120, two adjacent first drainage holes 1231 in the two adjacent drainage hole groups 123 have a different spacing from the tub bottom 110. In this way, the plurality of first drainage holes 1231 in the first drainage region 121 can be located at different parts of the tub body 120 in both the axial direction of the tub body 120 and the circumferential direction of the tub body 120. In such an arrangement, the plurality of first drainage holes 1231 can cooperate with each other to simultaneously discharge water at different parts of the tub body 120, making the drainage of the inner tub 1000 more convenient and improving the drainage efficiency.

[0051] In some specific examples, in two adjacent drainage hole groups 123, when a spacing between the first drainage hole 1231 at a rearmost side of one of the two adjacent drainage hole groups 123 and the tub bottom 110 is H, a spacing between the first drainage hole 1231 at a rearmost side of another one of the two adjacent drainage hole groups 123 and the tub bottom 110 may be set to 2H. In this way, when spacings between the plurality of first drainage holes 1231 in each drainage hole group 123 are gradually increased by a certain value, the plurality of first drainage holes 1231 in the two adjacent drainage hole groups 123 can be staggered to improve the drainage efficiency.

[0052] That is, in the present disclosure, by forming the larger quantity of first drainage holes 1231 at the position close to the tub bottom 110 and arranging the plurality of first drainage holes 1231 in two adjacent drainage hole groups 123 alternately in the axial direction of the tub body 120, the drainage efficiency and the drainage performance of the inner tub 1000 can be maximized, improving clothes treatment performance of the inner tub 1000.

[0053] Optionally, as illustrated in FIG. 3, the plurality of first drainage holes 1231 in two adjacent drainage hole groups 123 are arranged directly opposite to each other in the axial direction of the tub body 120. That "arranged directly opposite to each other in the axial direction" should be understood as that, in the axial direction of the tub body 120, two adjacent first drainage holes 1231 in the two adjacent drainage hole groups 123 have a same spacing from the tub bottom 110. Such an arrangement can reduce difficulty of arranging the plurality of first drainage holes 1231, improving an efficiency of arranging the plurality of first drainage holes 1231. Also, the plurality of first drainage holes 1231 that are arranged directly opposite to each other in the axial direction of the tub body 120 can make the plurality of first drainage holes 1231 in the first drainage region 121 evenly arranged, to improve the aesthetics of the first drainage region 121, improving the aesthetics of the inner tub 1000.

[0054] In some embodiments of the present disclosure, as illustrated in FIG. 5, the tub body 120 has a radial size that gradually increases in the direction from the tub opening 140 to the tub bottom 110. That is, the radial size of the tub opening 140 is smaller than the radial size of the tub bottom 110. The tub body 120 is connected between the tub opening 140 and the tub bottom 110, in such a manner that when the tub body 120 is arranged parallel to a horizontal plane, an overall structure of the tub body 120 can be arranged obliquely with respect to the horizontal plane and a lowermost end of the tub bottom 110 is lower than a lowermost end of the tub opening 140.

[0055] Through the above arrangement, in a process of drainage, the water flow in the inner tub 1000 flows towards the tub bottom 110 due to gravity. Since the larger quantity of first drainage holes 1231 are formed at the position close to the tub bottom 110 in the present disclosure, the water in the inner tub 1000 can be guided to the first drainage holes 1231 and discharged through the first drainage holes 1231, which improves the drainage efficiency of the inner tub 1000 and ensures that the water in the inner tub 1000 can be quickly discharged to improve the drainage effect.

[0056] That is, in the present disclosure, by inventively setting the radial size of the tub body 120 and setting the quantity and the positions of the first drainage holes 1231, cooperation between the first drainage holes 1231 and the radial size of the tub body 120 can achieve optimal quick drainage and ensure that the water in the inner tub 1000 can be discharged quickly, improving the drainage efficiency and the drainage quality. Therefore, the inner tub 1000 of the present disclosure can provide the satisfactory drainage quality, improving the user experience.

[0057] In addition, by setting the radial size of the tub body 120 in a manner described above, a volume of the inner tub 1000 can also be increased, in such a manner that the inner tub 1000 can treat a large amount of clothes at one time, improving the user experience.

[0058] Optionally, the first drainage hole 1231 is in a normally open state to enable communication between an inner side of the tub 100 and an outer side of the tub 100. Therefore, the inner side of the tub 100 can be kept in communication with the outer side of the tub 100 through the first drainage hole 1231, which can not only improve the drainage efficiency, but also thoroughly discharge the washing water and the dirt in the inner tub 1000, improving the drainage performance, and further improving the clothes treatment capacity of the inner tub 1000.

[0059] In addition, with the first drainage hole 1231 in the normally open state, a need to dispose a seal for sealing the first drainage hole 1231 at the first drainage hole 1231 is eliminated, which reduces the production costs and manufacturing difficulty of the inner tub 1000 of the present disclosure and simplifies the structure of the inner tub 1000, facilitating control.

[0060] In some embodiments of the present disclosure, the lifting rib 200 has a water flow channel. The plurality of first drainage holes 1231 are in communication with an inner cavity of the tub 100 through the water flow channel. The water flow channel is configured to divert the water flow flowing towards the first drainage holes 1231 and guide flowing of the water flow, which ensures that the water in the inner cavity of the tub 100 can be smoothly discharged through the first drainage holes 1231, achieving a purpose of dehydration.

[0061] In some examples, the lifting rib 200 has a plurality of water flow inlets. The plurality of water flow inlets are formed as inlets of the water flow channels to bring the water flow channel into communication with the inner cavity of the tub 100, which realizes communication between the first drainage holes 1231 and the inner cavity of the tub 100. Therefore, the water in the inner cavity of the tub 100 can be smoothly discharged through the first drainage holes 1231.

[0062] Optionally, the water flow inlet formed at the lifting rib 200 may be set with a small diameter, in such a manner that the lifting rib 200 can have the plurality of water flow inlets. In addition, the plurality of water flow inlets with small diameters can enhance a dehydration capacity of the inner tub 1000 of the clothes treatment device, and prevent edges of the water flow inlets from scratching the clothes.

[0063] It should be noted that, the lifting rib 200 has the water flow channel, in such a manner that no water flow channel needs to be formed between the lifting rib 200 and the tub body 120. Therefore, the lifting rib 200 can be closely attached to the tub body 120, to improve position stability of the lifting rib 200, effectively improving cleaning effectiveness of the clothes treatment.

[0064] In addition, by forming the water flow channel at the lifting rib 200, a distance between the water flow channel and the tub body 120 can be increased. In this way, the water flow in the inner tub 1000 can flow out slowly in the process of washing clothes, in such a manner that the water in the inner tub 1000 can be maintained at a high water level, which can save water consumption of the inner tub 1000, achieving water conservation. Further, the above arrangement can also avoid water mixing between the inner tub 1000 and an outer tub, which prevents dirt and bacteria between the inner tub 1000 and the outer tub from flowing into the inner tub 1000 along the water flow channel, achieving healthy washing.

[0065] In other examples, the water flow channel is not limited to being formed at the lifting rib 200. Further, the water flow channel may be formed between the lifting rib 200 and the tub body 120. The first drainage hole 1231 is in communication with the inner cavity of the tub 100 through the water flow channel. In this way, the water flow in the inner cavity of the tub 100 can flow into the first drainage hole 1231 through the water flow channel between the lifting rib 200 and the tub body 120, and then be discharged through the first drainage hole 1231 to achieve the purpose of dehydration. In addition, the water flow channel can also guide flowing of the water flow to further improve the drainage efficiency.

[0066] In some examples, a part of the lifting rib 200 may be spaced apart from the tub body 120 to define the water flow channel between the lifting rib 200 and the tub body 120, facilitating the communication between the first drainage hole 1231 and the inner cavity of the tub 100.

[0067] Specifically, as illustrated in FIG. 4, the lifting rib 200 has a plurality of water passage openings 240 at a bottom of at least one side wall of the lifting rib 200. When the lifting rib 200 is disposed at the inner side of the tub body 120, the water passage opening 240 is located between the side wall of the lifting rib 200 and the tub body 120 to form the water flow channel between the lifting rib 200 and the tub body 120. That is, the water passage opening 240 cooperates with the tub body 120 to form the water flow channel, achieving the communication between the first drainage hole 1231 and the inner cavity of the tub 100.

[0068] It should be noted that, by forming the plurality of water passage openings 240 at the bottom of the at least one side wall of the lifting rib 200, the plurality of water passage openings 240 may be arranged at intervals at the bottom of the at least one side wall of the lifting rib 200. Cooperation between the plurality of water passage openings 240 can increase a water passage area of the water flow channel, which ensures that the water in the inner cavity of the tub 100 can quickly flow into the water flow channel and be quickly discharged through the first drainage hole 1231 to improve the drainage efficiency. In addition, by arranging the plurality of water passage openings 240 at intervals, the lifting rib 200 can be connected to the inner side of the tub body 120 by the side wall of the lifting rib 200 between two adjacent water passage openings 240, realizing a fixed connection between the lifting rib 200 and the tub 100.

[0069] In a specific example, as illustrated in FIG. 4 and FIG. 8, the plurality of water passage openings 240 are arranged at intervals in a length direction of the lifting rib 200. The lifting rib 200 has the plurality of water passage openings 240 at each of two opposite sides of the lifting rib 200 in a width direction of the lifting rib 200. By forming the plurality of water passage openings 240 at the lifting rib 200 in the length direction of the lifting rib 200, the plurality of water passage openings 240 can cooperate with each other to guide water at different parts of the tub body 120 in a length direction of the tub body 120 to the first drainage holes 1231. That is, water at the different parts of the tub body 120 in the length direction of the tub body 120 can be ensured to be simultaneously guided to the first drainage holes 1231 and discharged through the first drainage holes 1231, to further improve the drainage efficiency.

[0070] In addition, by forming the plurality of water passage openings 240 at each of two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200, the plurality of water passage openings 240 can cooperate with each other to guide the water in the inner cavity of the tub body 120 located at two sides of the lifting rib 200 in the width direction of the lifting rib 200 to the first drainage holes 1231. It should also be understood that, by forming the plurality of water passage openings 240 at each of the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200, the plurality of water passage openings 240 cooperate with each other to guide the water at different parts of the tub body 120 in the circumferential direction of the tub body 120 to the first drainage holes 1231 simultaneously and discharge the water through the first drainage holes 1231. That is, the water at the different parts of the tub body 120 in the circumferential direction of the tub body 120 can be ensured to be discharged simultaneously, to further improve the drainage efficiency.

[0071] In summary, in the present disclosure, by arranging the plurality of water passage openings 240 at intervals in the length direction of the lifting rib 200, the water at different parts of the tub body 120 in the axial direction of the tub body 120 is simultaneously discharged. By forming the plurality of water passage openings 240 at each of the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200, the water at the different parts of the tub body 120 in the circumferential direction of the tub body 120 is simultaneously discharged. In this way, the water at various parts of the tub body 120 in the axial direction and the circumferential direction of the tub body 120 can be simultaneously discharged, to maximize the drainage efficiency of the inner tub 1000, and to minimize the moisture content of the clothes especially when the inner tub 1000 performs a dehydration procedure, improving the user experience.

[0072] Optionally, each of the plurality of water passage openings 240 is positioned to correspond with at least one of the plurality of first drainage holes 1231. That is, the water flow channel between the lifting rib 200 and the tub body 120 can be positioned to correspond with at least one of the plurality of first drainage holes 1231. That "positioned to correspond" should be understood as that, in the axial direction of the tub body 120, the water flow channel is at least arranged directly opposite to one of the plurality of first drainage holes 1231. In this way, the water flow channel can directly guide the water in the inner cavity of the tub body 120 to the first drainage hole 1231, and then discharge the water through the first drainage hole 1231, improving the drainage efficiency of the inner tub 1000.

[0073] Optionally, the water passage openings 240 located at the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200 are staggered to prevent the water entering, from a side of the lifting rib 200 in the width direction of the lifting rib 200, the region covered by the lifting rib 200 from being discharged from another side of the lifting rib 200 in the width direction of the lifting rib 200. That is, the water entering the region covered by the lifting rib 200 from the water passage openings 240 can be ensured to be smoothly discharged through the first drainage hole 1231.

[0074] In a specific example, as illustrated in FIG. 4, the lifting rib 200 has a first side wall 210 and a second side wall 220 that are oppositely arranged in the width direction of the lifting rib 200. The first side wall 210 has a plurality of first water passage openings 211. The second side wall 220 has a plurality of second water passage openings 221. The plurality of first water passage openings 211 and the plurality of second water passage openings 221 are staggered. That "the plurality of first water passage openings 211 and the plurality of second water passage openings 221 are staggered" should be understood as that a projection of one of the plurality of first water passage openings 211 at the first side wall 210 onto the second side wall 220 is located between two adjacent second water passage openings 221, and accordingly, a projection of one of the plurality of second water passage openings 221 at the second side wall 220 onto the first side wall 210 is located between two adjacent first water passage openings 211. In this way, the plurality of first water passage openings 211 and the plurality of second water passage openings 221 are staggered. With the above arrangement, the plurality of water passage openings 240 are formed at each of the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200. The plurality of first water passage openings 211 at the first side wall 210 cooperate with each other to guide the water at one side of the lifting rib 200 in the width direction of the lifting rib 200 to the first drainage hole 1231. The plurality of second water passage openings 221 at the second side wall 220 cooperate with each other to guide the water at another side of the lifting rib 200 in the width direction of the lifting rib 200 to the first drainage hole 1231. That is, the water at the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200 can be ensured to be guided to the first drainage holes 1231 through the water passage openings 240, and then discharged by the first drainage holes 1231, to achieve the purpose of drainage.

[0075] Optionally, as illustrated in FIG. 4, the first side wall 210 further includes a first water blocking portion 212 located between two adjacent first water passage openings 211. The second water passage opening 221 is arranged directly opposite to the first water blocking portion 212. That is, the first side wall 210 not only has the first water passage openings 211 but also includes the first water blocking portion 212. In this way, part of the water flowing from the second water passage opening 221 to the region covered by the lifting rib 200 directly acts on the first water blocking portion 212 under an action of inertia. The first water blocking portion 212 is configured to block the flowing of the water, to prevent the water from flowing back into the tub body 120 through the lifting rib 200. Therefore, all the water flowing into the region covered by the lifting rib 200 can flow out through the first drainage holes 1231, to achieve the purpose of drainage and improve the drainage efficiency of the inner tub 1000.

[0076] Optionally, as illustrated in FIG. 4, the second side wall 220 further includes a second water blocking portion 222 located between two adjacent second water passage openings 221. The first water passage opening 211 is arranged directly opposite to the second water blocking portion 222. The first water passage opening 211 and the second water blocking portion 222 are arranged to cooperate with each other, in such a manner that part of the water flowing from the first water passage opening 211 to the region covered by the lifting rib 200 directly acts on the second water blocking portion 222 under the action of inertia. The second water blocking portion 222 is configured to block the flowing of the water, to prevent the water from flowing back into the tub body 120 through the lifting rib 200. Therefore, all the water flowing into the region covered by the lifting rib 200 can flow out through the first drainage holes 1231, to achieve the purpose of drainage and improve the drainage efficiency of the inner tub 1000.

[0077] That is, in the present disclosure, the first water blocking portion 212 is disposed at the first side wall 212, and the second water blocking portion 222 is disposed at the second side wall 220. Also, the first water passage opening 211 is arranged directly opposite to the second water blocking portion 222, and the second water passage opening 221 is arranged directly opposite to the first water blocking portion 212. In this way, the plurality of first water passage openings 211 and the plurality of second water passage openings 221 are staggered. That is, the water passage openings 240 at the two opposite sides of the lifting rib 200 in the width direction of the lifting rib 200 are staggered. Therefore, the water entering the region covered by the lifting rib 200 through the first water passage openings 211 and the second water passage openings 221 is ensured to be discharged through the first drainage holes 1231 to improve the drainage efficiency.

[0078] Dotted lines in FIG. 4 show flow paths of part of the water entering the region covered by the lifting rib 200 under the action of inertia. These dotted lines clearly reveal that part of the water entering the region covered by the lifting rib 200 from the first water passage openings 211 acts on the second water blocking portion 222, and part of the water entering the region covered by the lifting rib 200 from the second water passage openings 221 acts on the first water blocking portion 212, preventing part of the water entering the region covered by the lifting rib 200 from flowing towards the inner cavity of the tub 100.

[0079] Optionally, as illustrated in FIG. 7 and FIG. 8, the lifting rib 200 has a shielding member 260 at an outer surface of a side wall of the lifting rib 200. The shielding member 260 is configured to shield the water passage opening 240. On the one hand, during the clothes treatment of the inner tub 1000, the edge of the water passage opening 240 is prevented from scratching the clothes, reducing the wear on the clothes caused by the inner tub 1000. On the other hand, the water passage opening 240 is prevented from being directly observed by the user, to enhance visual aesthetics of the inner tub 1000, i.e., to improve the aesthetics of the inner tub 1000.

[0080] Optionally, at least part of the shielding member 260 is disposed at a side of the water passage opening 240 away from the tub body 120. With the above arrangement, when the lifting rib 200 is disposed at the inner side of the tub body 120, the shielding member 260 can be arranged away from the tub body 120, and the water passage opening 240 can be positioned between the tub body 120 and the shielding member 260. In this way, the shielding member 260 can effectively shield the water passage opening 240, which prevents the water passage opening 240 of the lifting rib 200 from being directly observed by the user, improving the aesthetics of the inner tub 1000.

[0081] Optionally, a gap is formed between the shielding member 260 and the tub body 120 to enable communication between the water passage opening 240 and the inner cavity of the tub 100. The gap is mainly configured to avoid the water passage opening 240, which prevents the shielding member 260 or the tub body 120 from directly blocking the water passage opening 240 to avoid a situation where the water passage opening 240 fails to bring the first drainage hole 1231 into communication with the inner cavity of the tub 100. That is, forming the gap between the shielding member 260 and the tub body 120 can ensure that the first drainage hole 1231 can be in normal communication with the inner cavity of the tub 100 through the water passage opening 240, which further ensures that the water in the inner cavity of the tub 100 can smoothly flow to the first drainage hole 1231. In addition, the gap can also provide guidance for the flowing of the water in the inner cavity of the tub 100 to ensure that the water in the inner cavity of the tub 100 can smoothly flow to the water passage opening 240, and then flow to the first drainage hole 1231 through the water passage opening 240, facilitating drainage through the first drainage hole 1231.

[0082] Optionally, as illustrated in FIG. 8, the shielding member 260 has an end connected to the side wall of the lifting rib 200 and another end extending in a direction away from the side wall of the lifting rib 200. By connecting the end of the shielding member 260 to the side wall of the lifting rib 200, the lifting rib 200 provides support for the shielding member 260 to improve structural stability of the shielding member 260. Also, by enabling the other end of the shielding member 260 to extend in the direction away from the side wall of the lifting rib 200, it can be ensured that the shielding member 260 effectively shields the water passage opening 240, improving the aesthetics of the inner tub 1000.

[0083] Optionally, the shielding member 260 is formed as an annular shielding rib arranged around an outer circumferential wall of the lifting rib 200, to enable the shielding member 260 to be engaged with and connected to the lifting rib 200. In this case, shielding the water passage opening 240 by the annular shielding rib can also effectively prevent the user from directly observing the water passage opening 240, to improve the aesthetics of the inner tub 1000.

[0084] Optionally, after the annular shielding rib is arranged around the outer circumferential wall of the lifting rib 200, an end portion of the annular shielding rib may be connected to the outer circumferential wall of the lifting rib 200 through bonding or a snap-fit engagement to realize a fixed connection between the annular shielding rib and the lifting rib 200, improving positional stability of the annular shielding rib to ensure that the annular shielding rib can effectively shield the water passage opening 240.

[0085] Of course, in other examples, the annular shielding rib and the lifting rib 200 may also be integrally formed, to reduce difficulty of assembling the annular shielding rib with the lifting rib 200. Also, connection strength between the annular shielding rib and the lifting rib 200 is guaranteed, which ensures that the annular shielding rib can be stably connected to the lifting rib 200.

[0086] Optionally, an end portion of the annular shielding rib away from the lifting rib 200 is made smooth to avoid scratching the clothes by the end portion of the annular shielding rib, reducing the wear on the clothes caused by the inner tub 1000.

[0087] It should be noted that, in the present disclosure, the water flow channel is defined between the lifting rib 200 and the tub body 120, in such a manner that a surface of the lifting rib 200 can have a non-perforated structure, which not only simplifies processing procedures of the lifting rib 200 and reduces manufacturing difficulty, but also further reduces the wear on the clothes caused by the inner tub 1000.

[0088] In some embodiments of the present disclosure, a plurality of first drainage regions 121 are provided, and the plurality of first drainage regions 121 are arranged at intervals in the circumferential direction of the tub body 120. Since each of the plurality of first drainage regions 121 has the plurality of drainage hole groups 123, and each of the plurality of drainage hole groups 123 has the plurality of first drainage holes 1231, the quantity of the first drainage holes 1231 at the tub body 120 can be increased, improving the drainage capacity of the inner tub 1000 and the drainage efficiency.

[0089] In the present disclosure, arranging the plurality of first drainage regions 121 at intervals in the circumferential direction of the tub body 120 enables the water flows at different parts of the inner tub 1000 to be simultaneously discharged through the first drainage holes 1231, to further improve the drainage efficiency. Particularly, in the process of dehydration using the inner tub 1000, the cooperation between the plurality of first drainage holes 1231 can greatly improve the dehydration quality, which reduces the moisture content of the clothes.

[0090] Optionally, the tub body 120 has three first drainage regions 121, and the three first drainage regions 121 are evenly distributed at the tub body 120. The three first drainage regions 121 cooperate with each other to discharge the water flow in the inner tub 1000 to achieve the purpose of dehydration and improve the dehydration efficiency.

[0091] Of course, in some other examples, the tub body 120 is not limited to having only the above three first drainage regions 121. Those of ordinary skill in the art may also arrange more first drainage regions 121 based on an actual drainage demand and a volume of the inner tub 1000, such as four first drainage regions 121, five first drainage regions 121, and so on.

[0092] It should be noted that, the structural strength of the tub body 120 decreases with an increase of the quantity of the first drainage regions 121. Therefore, arranging the three first drainage regions 121 can effectively improve the structural strength of the tub body 120 while improving the drainage efficiency, further prolonging the service life of the inner tub 1000.

[0093] Optionally, the tub body 120 has a plurality of lifting ribs 200. On the one hand, the plurality of lifting ribs 200 are configured to cooperate with the plurality of first drainage regions 121 at the tub body 120. Each of the plurality of lifting ribs 200 covers one of the plurality of first drainage regions 121 at the tub body 120. Therefore, the lifting rib 200 is ensured to be disposed at each of the plurality of first drainage regions 121, preventing the edges of the first drainage holes 1231 from wearing the clothes to further effectively solve the problem of wear of the clothes.

[0094] In addition, with the plurality of lifting ribs 200, the plurality of lifting ribs 200 cooperate with each other to further increase a contact area between the inner tub 1000 and the clothes, improving the cleaning effectiveness of the clothes treatment.

[0095] In some specific examples, the tub body 120 has three lifting ribs 200, and the three lifting ribs 200 are evenly distributed at an inner wall of the inner tub 1000 to shield the three first drainage regions 121, respectively. When the clothes treatment device is in operation, the lifting rib 200 rotates with the inner tub 1000. During a rotation of the lifting rib 200 from a lower position to a higher position, the lifting rib 200 may lift up the clothes. With a continuous rotation of the lifting rib 200, the clothes are separated from the lifting rib 200 under the action of gravity, fall freely, and hit tumbling water or other clothes. Therefore, a purpose of cleaning clothes is achieved, and washing performance of the clothes treatment device is improved.

[0096] Of course, in some other examples, the tub body 120 is not limited to having only the above three lifting ribs 200. Four, five, or more lifting ribs 200 may be provided, as long as the quantity of the lifting ribs 200 corresponds to the quantity of the first drainage regions 121 and the lifting ribs 200 can effectively shield the first drainage holes 1231.

[0097] Optionally, as illustrated in FIG. 1 and FIG. 5, each of the plurality of lifting ribs 200 extends in the axial direction of the tub 100, to increase an area of the lifting rib 200. On the one hand, each of the plurality of lifting ribs 200 can be ensured to completely cover one first drainage region 121, which avoids an exposure of the first drainage holes 1231 arranged at intervals in the axial direction of the tub body 120, to solve the problem of wear of the clothes. On the other hand, the lifting ribs 200 can be ensured to effectively drive the clothes to turn over and increase the contact area between the inner tub 1000 and the clothes, which achieves the clothes treatment and improves the cleaning effectiveness of the clothes treatment.

[0098] In some embodiments of the present disclosure, as illustrated in FIG. 1 and FIG. 5, the tub body 120 has a rubbing region 300 at an inner circumferential wall of the tub body 120. The rubbing region 300 can impart a greater frictional resistance to the clothes during the clothes treatment of the inner tub 1000, which enables the tub body 120 to have the rubbing effect, making the clothes treated cleaner and improving the user experience.

[0099] Optionally, as illustrated in FIG. 1, the rubbing region 300 and the first drainage region 121 are arranged in the circumferential direction of the tub body 120. Since the tub body 120 has a larger area in the circumferential direction, an area of the rubbing region 300 and an area of the first drainage region 121 can be maximized, which improves cleaning performance of the inner tub 1000 on the one hand, and improves the drainage efficiency on the other hand.

[0100] Optionally, as illustrated in FIG. 1, the rubbing region 300 and the first drainage region 121 are staggered in the circumferential direction of the tub body 120. That is, when the tub body 120 has the rubbing region 300 at a certain location, no first drainage region 121 is provided at that location. Correspondingly, when the tub body 120 has the first drainage region 121 at a certain location, no rubbing region 300 is provided at that location. Since the lifting rib 200 of the present disclosure needs to cover the first drainage region 121, the rubbing region 300 and the lifting rib 200 can be staggered in the circumferential direction of the tub body 120 (as illustrated in FIG. 5) through the above arrangement, which prevents the lifting rib 200 from shielding the rubbing region 300, further enabling the rubbing region 300 to maximize the frictional resistance to the clothes to improve a cleaning quality for the clothes. In addition, the above arrangement can also avoid a formation of the first drainage hole 1231 in the rubbing region 300, making a layout of the first drainage hole 1231 simpler and more convenient.

[0101] Also, by staggering the rubbing region 300 and the lifting rib 200 in the circumferential direction of the tub body 120, the rubbing region 300 and the lifting rib 200 cooperate with each other to rub the clothes, which further improves the clothes treatment capability of the inner tub 1000.

[0102] Optionally, as illustrated in FIG. 1, the rubbing region 300 has a plurality of rubbing protrusions 310, and the plurality of rubbing protrusions 310 are arranged at intervals in the circumferential direction of the tub body 120. Each of the plurality of rubbing protrusions 310 is formed into a curved shape. During the clothes treatment, the rubbing protrusion 310 may be in contact with and rub against the clothes to generate the rubbing effect, improving the clothes treatment capability of the inner tub 1000. In addition, cooperation between the plurality of rubbing protrusions 310 can increase a contact area between the plurality of rubbing regions 300 and the clothes, further improving the clothes treatment capacity of the inner tub 1000.

[0103] Moreover, in the present disclosure, the rubbing protrusion 310 is set in the curved shape. On the one hand, the clothes are ensured to be capable of rotating normally in the tub 100, which achieves the purpose of cleaning the clothes. On the other hand, aesthetics of the rubbing protrusion 310 can also be improved, further improving the aesthetics of an interior of the inner tub 1000.

[0104] Optionally, the rubbing region 300 is a non-perforated region. Since the rubbing region 300 is in direct contact with the clothes in during the clothes treatment of the inner tub 1000, forming the rubbing region 300 as the non-perforated region can prevent the rubbing region 300 from wearing and scratching the clothes. That is, the wear of the clothes caused by the inner tub 1000 during the clothes treatment can be avoided, improving the user experience.

[0105] Optionally, as illustrated in FIG. 1, a flow guide channel 320 is defined between two adjacent rubbing protrusions 310 of the plurality of rubbing protrusions 310. An end of each of at least some of the flow guide channels 320 directly faces towards the first drainage region 121. In the process of drainage, the flow guide channel 320 can guide the flowing of the water in the tub body 120 to ensure that the water can flow in a predetermined direction. In addition, since the end of each of the portion of the flow guide channels 320 directly faces towards the first drainage region 121, the flow guide channel 320 can guide the water to the first drainage region 121. In this case, the water is discharged through the first drainage hole 1231 in the first drainage region 121, achieving the purpose of dehydration and improving the drainage efficiency.

[0106] Optionally, an end of each of a portion of the flow guide channels 320 directly faces towards the first drainage hole 1231, and the flow guide channel 320 is configured to directly guide the water flow to the first drainage hole 1231 to further improve the drainage efficiency.

[0107] Therefore, in the present disclosure, the flow guide channel 320 is formed by a structure (the rubbing protrusion 310) on the tub body 120. In this way, no other flow guide members need to be arranged, which further simplifies the structure of the inner tub 1000.

[0108] Optionally, as illustrated in FIG. 1, the tub body 120 further has a second drainage region 122. The second drainage region 122 and the rubbing region 300 are arranged in the axial direction of the tub body 120. The second drainage region 122 is arranged close to the tub bottom 110. In this way, a space of the tub body 120 is rationally utilized, ensuring that all of the first drainage region 121, the second drainage region 122, and the rubbing region can be disposed at the tub body 120.

[0109] Optionally, as illustrated in FIG. 1 and FIG. 2, the second drainage region 122 has a plurality of second drainage holes 1221 in a normally open state. It should also be understood that, the plurality of second drainage holes 1221 in the normally open state are arranged close to the tub bottom 110. During a setting of the lifting rib 200, to prevent the clothes from getting stuck due to a close spacing between the lifting rib 200 and the tub bottom 110, the lifting rib 200 and the tub bottom 110 are usually spaced apart from each other by a long distance. For example, a spacing between a rear end of the lifting rib 200 and the tub bottom 110 is set to be greater than 10 mm, which ensures that the clothes are not stuck between the lifting rib 200 and the tub bottom 110. That is, the clothes can be ensured to normally move in the inner tub 1000 during the rotation of the inner tub 1000, to achieve the purpose of cleaning the clothes. However, the above arrangement causes the first drainage hole 1231 in the first drainage region 121 to be spaced apart from the tub bottom 110, in such a manner that the water between the first drainage hole 1231 and the tub bottom 110 cannot be discharged normally. Therefore, the second drainage hole 1221 is formed close to the tub bottom 110 in the present disclosure and is configured to discharge the water that cannot be discharged from the first drainage hole 1231, improving the drainage performance of the inner tub 1000.

[0110] In addition, since the tub body 120 of the present disclosure has the radial size that gradually increases in the direction from the tub opening 140 to the tub bottom 110, the second drainage hole 1221 is formed and fits with a structural shape of the tub body 120, which can achieve the optimal quick drainage, improving the drainage efficiency and enhancing the drainage quality.

[0111] That is, in the present disclosure, the first drainage hole 1231 in the first drainage region 121 cooperates with the second drainage hole 1221 in the second drainage region 122 to discharge the water, which greatly improves the dehydration quality, reducing the moisture content of the clothes.

[0112] Optionally, as illustrated in FIG. 1 and FIG. 2, the plurality of second drainage holes 1221 are arranged at intervals in the circumferential direction of the tub body 120. The plurality of second drainage holes 1221 cooperate with each other to discharge the water in the inner tub 1000 close to the tub bottom 110, achieving the purpose of clothes treatment. Also, discharging the water through the plurality of second drainage holes 1221 cooperating with each other can improve the drainage efficiency.

[0113] Optionally, the second drainage holes 1221 are in the normally open state to enable communication between the inner side of the tub 100 and the outer side of the tub 100. In this way, a need to dispose a seal at the second drainage hole 1221 is eliminated, to further reduce the production costs of the inner tub 1000, and make the structure of the inner tub 1000 simple, facilitating control.

[0114] Optionally, as illustrated in FIG. 1 and FIG. 2, an end of each of at least some of the flow guide channels 320 directly faces towards the first drainage region 122. In the process of drainage, the flow guide channel 320 may guide part of the water in the tub body 100 to the second drainage region 122. In this case, the water is discharged through the second drainage hole 1221 in the second drainage region 122, achieving the purpose of dehydration and improving the drainage efficiency.

[0115] Optionally, as illustrated in FIG. 1 and FIG. 2, an end of each of a portion of the flow guide channels 320 directly faces towards the second drainage hole 1221. In this way, the flow guide channel 320 can guide the water flow directly to the second drainage hole 1221 and discharge the water flow directly through the second drainage hole 1221, further improving the drainage efficiency.

[0116] In a specific example, as illustrated in FIG. 5, a part of the plurality of flow guide channels 320 are first flow guide channels 321. The first flow guide channel 321 has an end extending towards the second drainage region 122 and another end extending towards the tub opening 140. In this way, the first flow guide channel 321 can guide the water at the tub opening 140 to the second drainage region 122, and then discharge the water through the second drainage holes 1221 in the second drainage region 122 to achieve the purpose of drainage.

[0117] Optionally, as illustrated in FIG. 5, the first flow guide channel 321 includes a first flow guide segment 3211 and a second flow guide segment 3212. The first flow guide segment 3211 has an end extending towards the second drainage region 122. The second flow guide segment 3212 has an end extending towards the tub opening 140. The first flow guide segment 3211 has another end in communication with another end of the second flow guide segment 3212. In this way, the water at the tub opening 140 can enter the second flow guide segment 3212, and flow in an extension direction of the second flow guide segment 3212. In a process of flowing, since the another end of the second flow guide segment 3212 is in communication with the another end of the first guide segment 3211, the water in the second flow guide segment 3212 can smoothly flow to the first flow guide segment 3211. Then, the water flows in the extension direction of the first flow guide segment 3211 to the second drainage region 122, and is discharged through the second drainage holes 1221 in the second drainage region 122. Therefore, a purpose of discharging the water through the second drainage holes 1221 is achieved.

[0118] Optionally, as illustrated in FIG. 5, the first flow guide segment 3211 has a bending direction opposite to a bending direction of the second flow guide segment 3212, which ensures that two opposite ends of the first flow guide segment 3211 and the second flow guide segment 3212 connected to each other can extend towards the second drainage region 122 and the tub opening 140, respectively, achieving guiding the water flow at the tub opening 140 to the second drainage region 122 using the first flow guide segment 3211 and the second flow guide segment 3212. In addition, aesthetics of the first flow guide channel 321 can be improved through the above arrangement, which further improves aesthetics of the rubbing region 300 in the inner tub 1000.

[0119] Optionally, a part of the plurality of flow guide channels 320 are second flow guide channels 322. The second flow guide channel 322 has an end extending towards the tub opening 140 and another end extending towards the first drainage region 121. In this way, in the process of drainage, the second flow guide channel 322 can guide part of the water at the tub opening 140 to the first drainage region 121, and then discharge water through the first drainage holes 1231 in the first drainage region 121 to achieve the purpose of dehydration and improving the drainage efficiency.

[0120] In some examples, as illustrated in FIG. 5, a part of the plurality of flow guide channels 320 are second flow guide channels 322. The second flow guide channel 322 has an end extending towards the tub bottom 110 and another end extending towards the first drainage region 121. In this way, in the process of drainage, the second flow guide channel 322 can guide part of the water at the first drainage region 121 to the tub bottom 110, and then discharge the water through the second drainage region 122 at the tub bottom 110. Therefore, the first drainage region 122 cooperates with the second drainage region 121 to discharge the water, achieving the purpose of dehydration and improve the drainage efficiency.

[0121] That is, in the present disclosure, by disposing the rubbing region 300 at the inner circumferential wall of the tub body 120, the plurality of flow guide channels 320 are defined at the rubbing region 300. A part of the plurality of flow guide channels 320 may guide the water in the tub 100 to the first drainage region 121, while another part of the plurality of flow guide channels 320 may guide the water in the tub 100 to the second drainage region 122, realizing guiding the water at different parts of the tub 100 to be discharged to improve the drainage efficiency of the inner tub 1000.

[0122] Optionally, as illustrated in FIG. 5 and FIG. 6, a partial structure of the tub bottom 110 extends towards the inner cavity of the tub body 120 to cover the second drainage region 122. That "cover" mentioned above should be understood as that, the tub bottom 110 has the second drainage region 122 within a projection range of a circumferential surface on which the tub body 120 is located, in such a manner that the tub bottom 110 can cover the second drainage region 122, i.e., the second drainage holes 1221. In this way, the second drainage holes 1221 are prevented from being in direct contact with the clothes during the clothes treatment, which avoids wear of the clothes caused by the edges of the second drainage holes 1221. Further, the problem of wear of the clothes is effectively solved, which greatly reduces the wear rate of the clothes, improving the user experience.

[0123] Optionally, as illustrated in FIG. 6, a water passage channel 150 is formed between an outer circumferential wall of the tub bottom 110 and the tub body 120. The second drainage hole 1221 is in communication with the inner cavity of the tub body 120 through the water passage channel 150. The water passage channel 150 is mainly configured to divert the water flow flowing towards the first drainage hole 1221 and guide flowing of the water flow, which ensures that the water in the inner cavity of the tub 100 can be smoothly discharged through the second drainage hole 1221, achieving the purpose of dehydration. Arrows in FIG. 6 show a direction in which the water in the inner cavity of the tub 100 flows towards the second drainage hole 1221 through the water passage channel 150.

[0124] In summary, both the first drainage hole 1231 and the second drainage hole 1221 of the present disclosure are covered by structural members (the lifting rib 200 and the tub bottom 110) and the rubbing region 300 is configured to have the non-perforated structure. In this way, the inner tub 1000 resembles the non-perforated structure, which improves the aesthetics of the inner tub 1000. Also, the inner tub 1000 can be prevented from scratching the clothes to improve the user experience.

[0125] Of course, in some other examples, third drainage holes (not illustrated) may also be formed at parts not covered by the lifting rib 200 and tub bottom 110. For example, the rubbing region 300 has the third drainage holes, to further increase a quantity of drainage holes at the inner tub 1000, increasing the drainage efficiency of the inner tub 1000.

[0126] In the description of the present disclosure, features associated with "first", "second", and "third" may explicitly or implicitly include one or more of the features to distinguish the described features, rather than indicating any order or importance.

[0127] In specific embodiments of the present disclosure, the inner tub 1000 may be a stainless steel tub. The stainless steel tub can enhance strength and rigidity of the inner tub 1000, prolonging the service life of the inner tub 1000 of the clothes treatment device. Also, the stainless steel tub has a metallic texture, which enhances the visual aesthetics of the inner tub 1000 along with the rubbing protrusion 310 at the inner tub 1000.

[0128] A specific embodiment of the inner tub 1000 of the clothes treatment device of the present disclosure is described below with reference to the accompanying drawings.

[0129] As illustrated in FIG. 1 and FIG. 5, the inner tub 1000 of the clothes treatment device includes the tub 100 and the lifting rib 200. The tub 100 includes the tub body 120 and the tub bottom 110. The tub body 120 has the radial size that gradually increases in the direction from the tub opening 140 to the tub bottom 110. The tub body 120 has three first drainage regions 121, the second drainage region 122, and three rubbing regions 300. The rubbing region 300 and the first drainage region 121 are arranged in the circumferential direction of the tub body 120. The second drainage region 122 and the rubbing region 300 are arranged in the axial direction of the tub body 120. The second drainage region 122 is arranged close to the tub bottom 110.

[0130] The lifting rib 200 is disposed at the inner side of the tub body 120 and covers the first drainage region 121. The first drainage region covered by the lifting rib 200 has four drainage hole groups 123. Each of the four drainage hole groups 123 includes the plurality of first drainage holes 1231 arranged at intervals in the axial direction of the tub body 120. The plurality of drainage hole groups 123 are arranged at intervals in the circumferential direction of the tub body 120. The first drainage holes 1231 close to the tub bottom 110 have the arrangement density greater than the arrangement density of the first drainage holes 1231 close to the tub opening 140 in the direction from the tub opening 140 to the tub bottom 110.

[0131] The water flow channel is defined between the lifting rib 200 and the tub body 120. The plurality of first drainage holes 1231 are in communication with the inner cavity of the tub 100 through the water flow channel.

[0132] The rubbing region 300 has the plurality of rubbing protrusions 310, and the plurality of rubbing protrusions 310 are arranged at intervals in the circumferential direction of the tub body 120. Each of the plurality of rubbing protrusions 310 is formed into the curved shape. The flow guide channel 320 is defined between the two adjacent rubbing protrusions 310 of the plurality of rubbing protrusions 310. The end of each of at least some of the flow guide channels 320 directly faces towards the first drainage region 121. An end of each of at least another portion of the flow guide channels 320 directly faces towards the second drainage region 122.

[0133] The second drainage region 122 has the plurality of second drainage holes 1221 each in the normally open state. The plurality of second drainage holes 1221 are arranged at intervals in the circumferential direction of the tub body 120.

[0134] The clothes treatment device according to the embodiments of the present disclosure is described below with reference to the accompanying drawings.

[0135] The clothes treatment device according to the embodiments of the present disclosure includes an outer tub and the inner tub 1000.

[0136] The inner tub 1000 is the above-mentioned inner tub 1000 of the clothes treatment device, and thus a structure of the inner tub 1000 will be omitted here. The inner tub 1000 is rotatably disposed in the outer tub.

[0137] With the clothes treatment device according to the embodiments of the present disclosure, the above inner tub 1000 is adopted. The inner tub 1000 can drive the clothes to rotate in a process of rotating relative to the outer tub, to achieve the purpose of clothes treatment. Also, the first drainage holes 1231 and the second drainage holes 1221 are ensured to come into no contact with the clothes during a rotation, which avoids scratching, wear, or the like of the clothes. In addition, the above inner tub 1000 has the large quantity of first drainage holes 1231 at a part of the above inner tub 1000 close to the tub bottom 110. The plurality of first drainage holes 1231 can cooperate with each other to ensure that the water in the clothes treatment device can be quickly discharged. Therefore, the drainage performance of the clothes treatment device is improved, which achieves the purpose of dehydration and reduces the moisture content of the clothes, enhancing the user experience.

[0138] It should be noted that, although each of the first drainage holes 1231 and the second drainage holes 1221 of the present disclosure is set to be in the normally open state, the outer tub is further disposed at an outer side of the inner tub 1000. Therefore, in a process of washing the clothes by the clothes treatment device, the water in the inner tub 1000 is kept from being discharged through the first drainage holes 1231 and the second drainage holes 1221 when a space between the inner tub 1000 and the outer tub is filled with the water. In this case, the clothes can be washed using the water in the inner tub 1000. When the clothes need to be dehydrated after being washed, a water outlet of the outer tub is opened, in such a manner that the water between the inner tub 1000 and the outer tub can be discharged. Further, the water in the inner tub 1000 is ensured to be discharged through the first drainage holes 1231 and the second drainage holes 1221, to achieve the purpose of dehydration.

[0139] The clothes treatment device of the present disclosure may be a drum washing machine. That is, the inner tub 1000 of the present disclosure may be applied in the drum washing machine. Of course, the inner tub 1000 may also be applied in a dryer or a pulsator washing machine currently on the market. When the inner tub 1000 is applied in the dryer, a dehydration efficiency of the dryer can be improved. When the inner tub 1000 is applied in the pulsator washing machine or the drum washing machine, a washing efficiency and a dehydration efficiency of the pulsator washing machine or the drum washing machine can be improved.

[0140] In the description of the present disclosure, it should be noted that, unless otherwise clearly specified and limited, terms such as "install", "connect with", "connect to", and the like should be understood in a broad sense. For example, it may be a fixed connection or a detachable connection or connection as one piece; mechanical connection or electrical connection; direct connection or indirect connection through an intermediate; internal communication of 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.

[0141] FIG. 2 and FIG. 3 each display four rows of drainage hole groups 123 for illustrative purpose. However, it is conceivable for those of ordinary skill that the above technical solutions can be applied in a technical solution of two, three, five, or more rows of drainage hole groups 123 after they read the above technical solutions. The technical solution also falls within the scope of protection of the present disclosure.

[0142] Other components of the inner tub 1000 of the clothes treatment device and the clothes treatment device according to the embodiments of the present disclosure, such as a rotation process and a control process of the inner tub 1000, are known to those of ordinary skill in the art and will not be described in detail here.

[0143] Reference throughout this specification to terms such as "an embodiment" and "an example" means that a particular feature, structure, material, or characteristic described in connection with the embodiment or example is included in at least one embodiment or example of the present disclosure. The appearances of the above phrases in various places throughout this specification are not necessarily referring to the same embodiment or example. Further, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0144] 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

1. An inner tub of a clothes treatment device, the inner tub comprising:

a tub comprising a tub body and a tub bottom, the tub body having a first drainage region; and
a lifting rib disposed at an inner side of the tub body and covering the first drainage region, wherein the first drainage region covered by the lifting rib has a plurality of first drainage holes arranged at intervals,
wherein in the first drainage region, first drainage holes of the plurality of first drainage holes close to the tub bottom have an arrangement density greater than an arrangement density of first drainage holes of the plurality of first drainage holes close to a tub opening.

2. The inner tub according to claim 1, wherein the plurality of first drainage holes has an arrangement density that gradually increases in a direction from the tub opening to the tub bottom.

3. The inner tub according to claim 1 or 2, wherein among the plurality of first drainage holes, at least part of the plurality of first drainage holes are arranged at intervals in an axial direction of the tub body, a spacing between two adjacent first drainage holes of the at least part of the plurality of first drainage holes gradually decreasing in the direction from the tub opening to the tub bottom.

4. The inner tub according to any one of claims 1 to 3, wherein the first drainage region has a plurality of drainage hole groups arranged at intervals in a circumferential direction of the tub body, and wherein each of the plurality of drainage hole groups comprises a plurality of first drainage holes arranged at intervals in the axial direction of the tub body.

5. The inner tub according to claim 4, wherein the plurality of first drainage holes in two adjacent drainage hole groups of the plurality of drainage hole groups are staggered in the axial direction of the tub body.

6. The inner tub according to any one of claims 1 to 5, wherein the tub body has a radial size that gradually increases in the direction from the tub opening to the tub bottom.

7. The inner tub according to any one of claims 1 to 6, wherein the lifting rib has a water flow channel, or a water flow channel is defined between the lifting rib and the tub body, the plurality of first drainage holes being in communication with an inner cavity of the tub through the water flow channel.

8. The inner tub according to claim 7, wherein the lifting rib has a plurality of water passage openings formed at a bottom of at least one side wall of the lifting rib, the plurality of water passage openings cooperating with the tub body to form the water flow channel, and each of the plurality of water passage openings being positioned to correspond with at least one of the plurality of first drainage holes.

9. The inner tub according to any one of claims 1 to 8, wherein a plurality of first drainage regions are provided, the plurality of first drainage regions being arranged at intervals in the circumferential direction of the tub body.

10. The inner tub according to any one of claims 1 to 9, wherein the tub body is provided with a plurality of lifting ribs, each of the plurality of lifting ribs extending in an axial direction of the tub and being capable of covering one of the plurality of first drainage regions at the tub body.

11. The inner tub according to any one of claims 1 to 10, wherein the tub body has a rubbing region at an inner circumferential wall of the tub body, the rubbing region and the first drainage region being arranged in the circumferential direction of the tub body, wherein the rubbing region has a plurality of rubbing protrusions arranged at intervals in the circumferential direction of the tub body, each of the plurality of rubbing protrusions being formed into a curved shape.

12. The inner tub according to claim 11, wherein the rubbing region is a non-perforated region.

13. The inner tub according to claim 11 or 12, wherein a flow guide channel is formed between two adjacent rubbing protrusions of the plurality of rubbing protrusions, an end of at least some of the flow guide channels directly facing towards the first drainage region.

14. The inner tub according to any one of claims 11 to 13, wherein the tub body further has a second drainage region, the second drainage region and the rubbing region being arranged in the axial direction of the tub body, and the second drainage region being arranged close to the tub bottom,
wherein the second drainage region has a plurality of second drainage holes in a normally open state, the plurality of second drainage holes being arranged at intervals in the circumferential direction of the tub body.

15. A clothes treatment device, comprising:

an outer tub; and
an inner tub according to any one of claims 1 to 14, the inner tub being rotatably disposed in the outer tub.

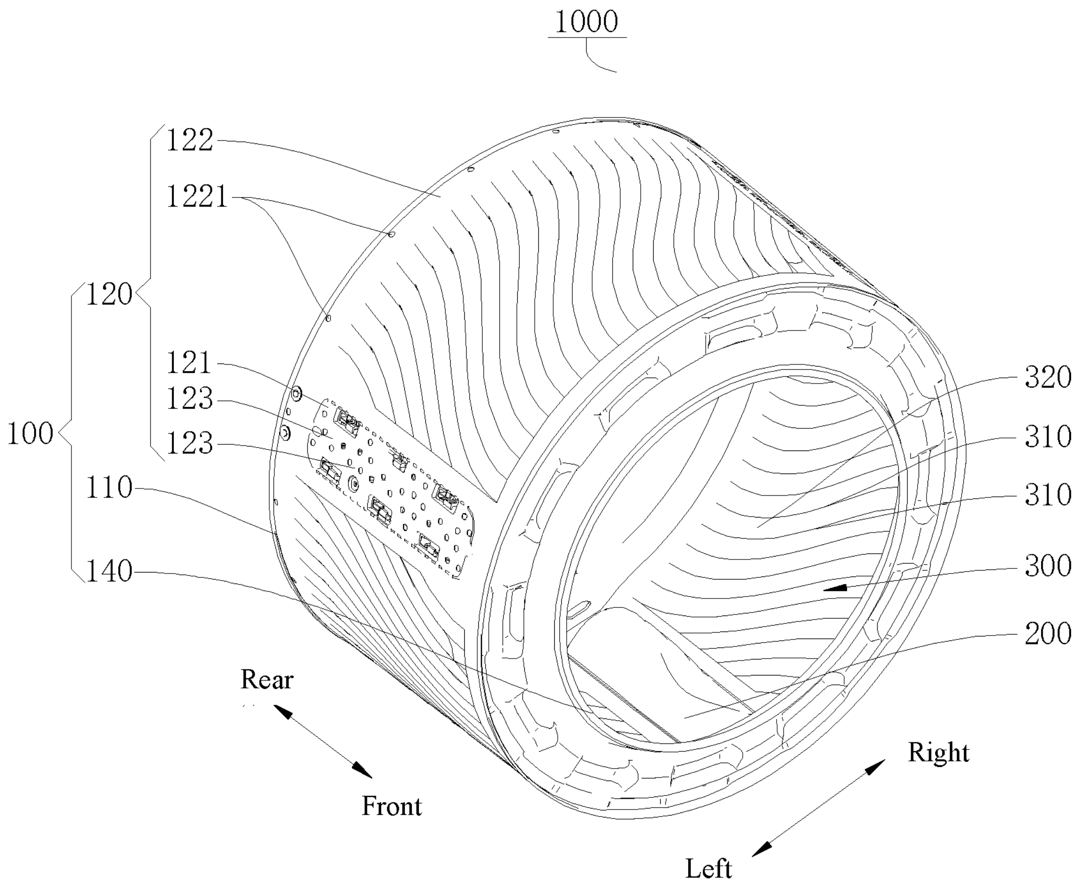
1000
122
1221
120
121
123
100
123
110
140
320
310
310
300
200
Rear
Front
Right
Left

FIG. 1

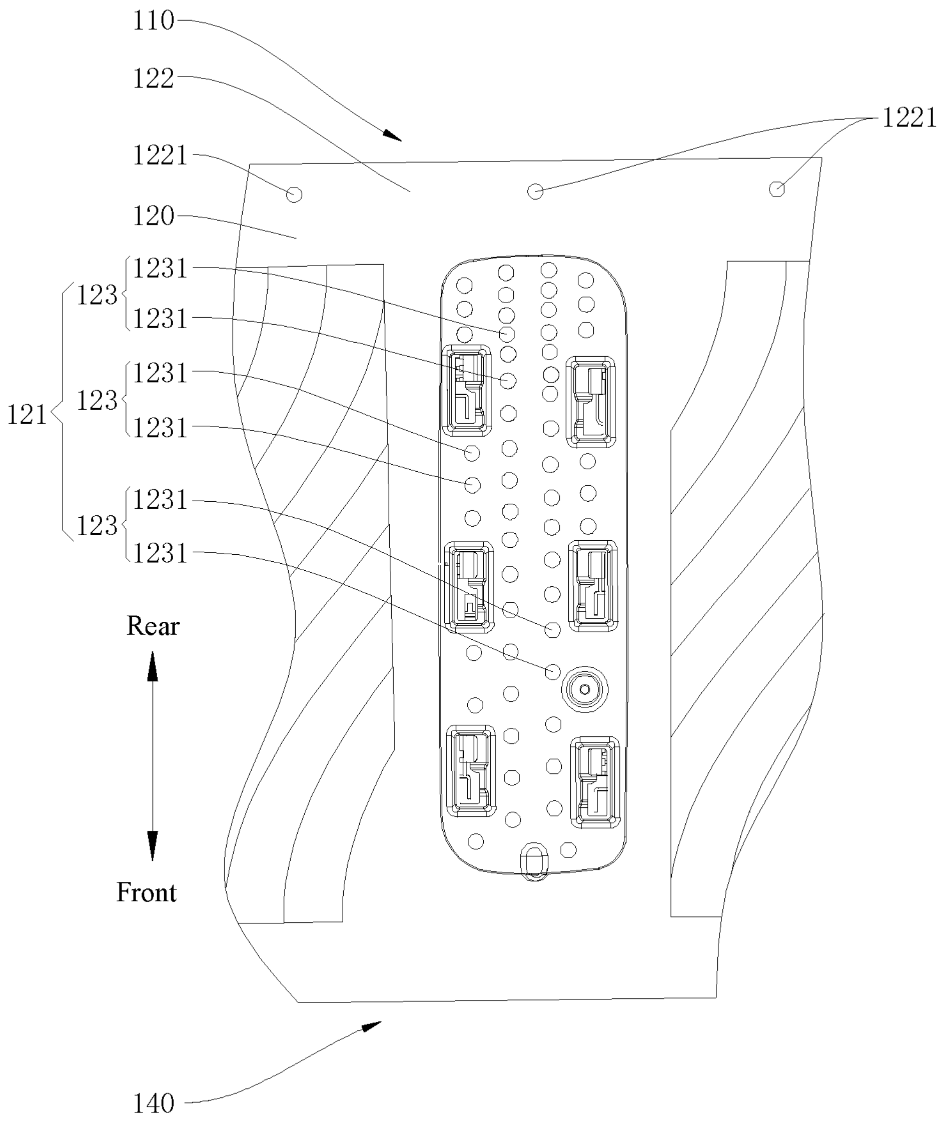
110
122
1221
1221
120
1231
123
1231
1231
121
123
1231
1231
123
1231
Rear
Front
140

FIG. 2

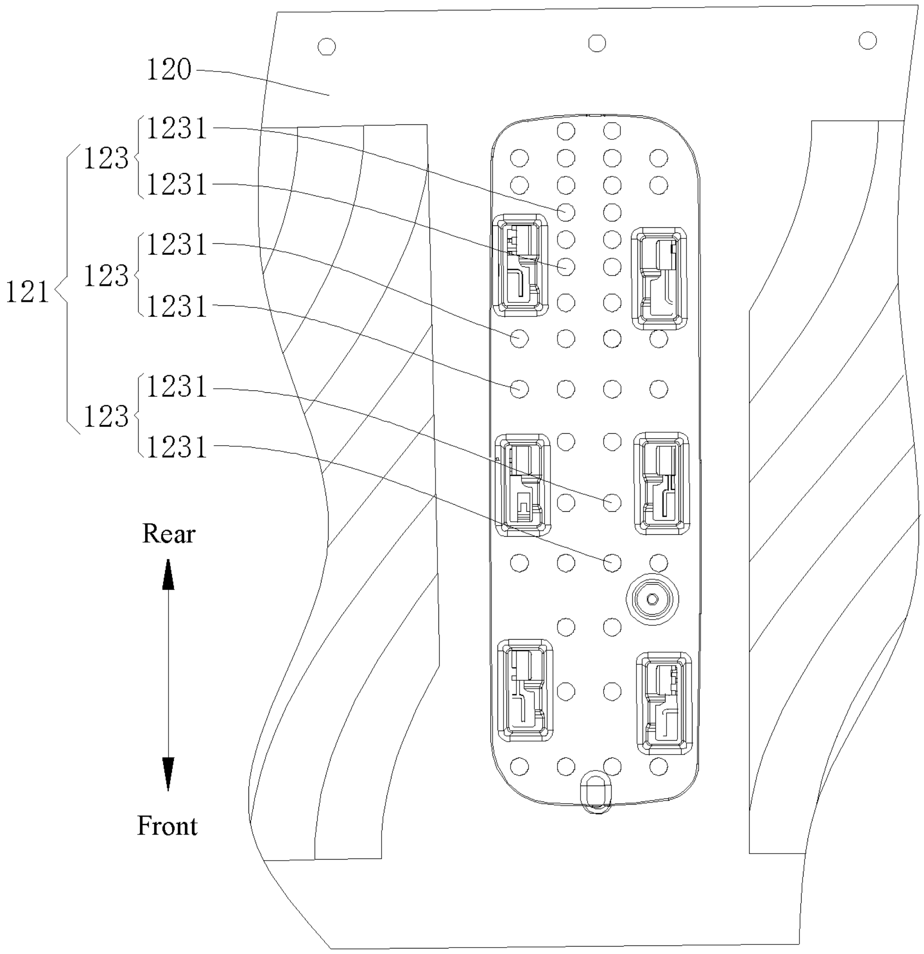
120
1231
1231
1231
1231
1231
1231
123
123
123
121
Rear
Front

FIG. 3

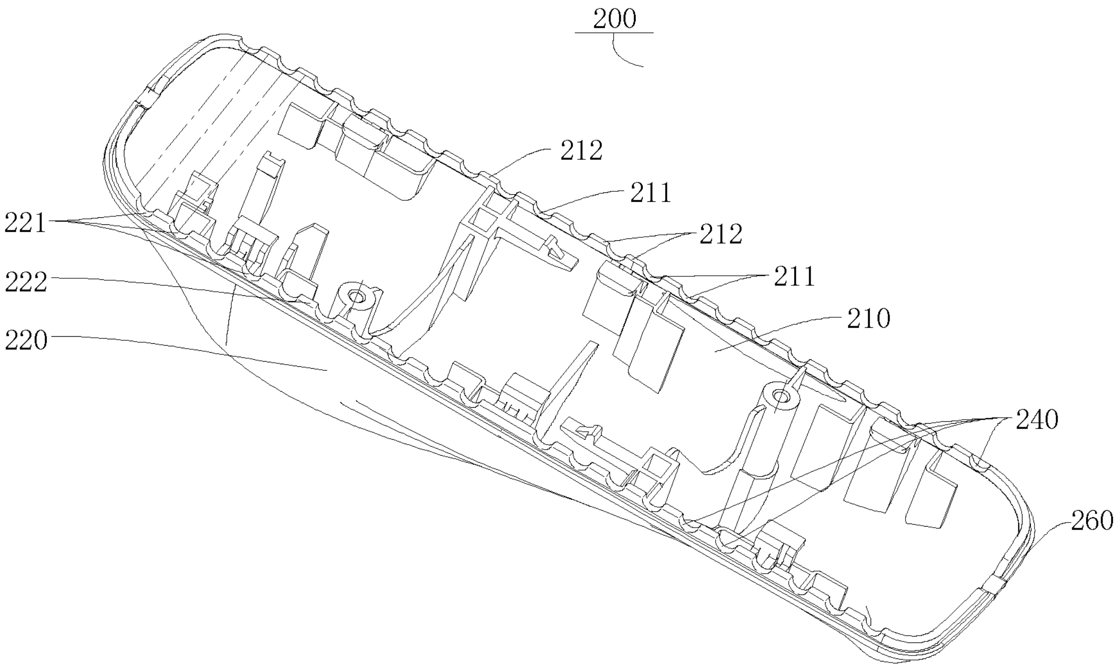
200
212
211
212
211
210
221
222
220
240
260

FIG. 4

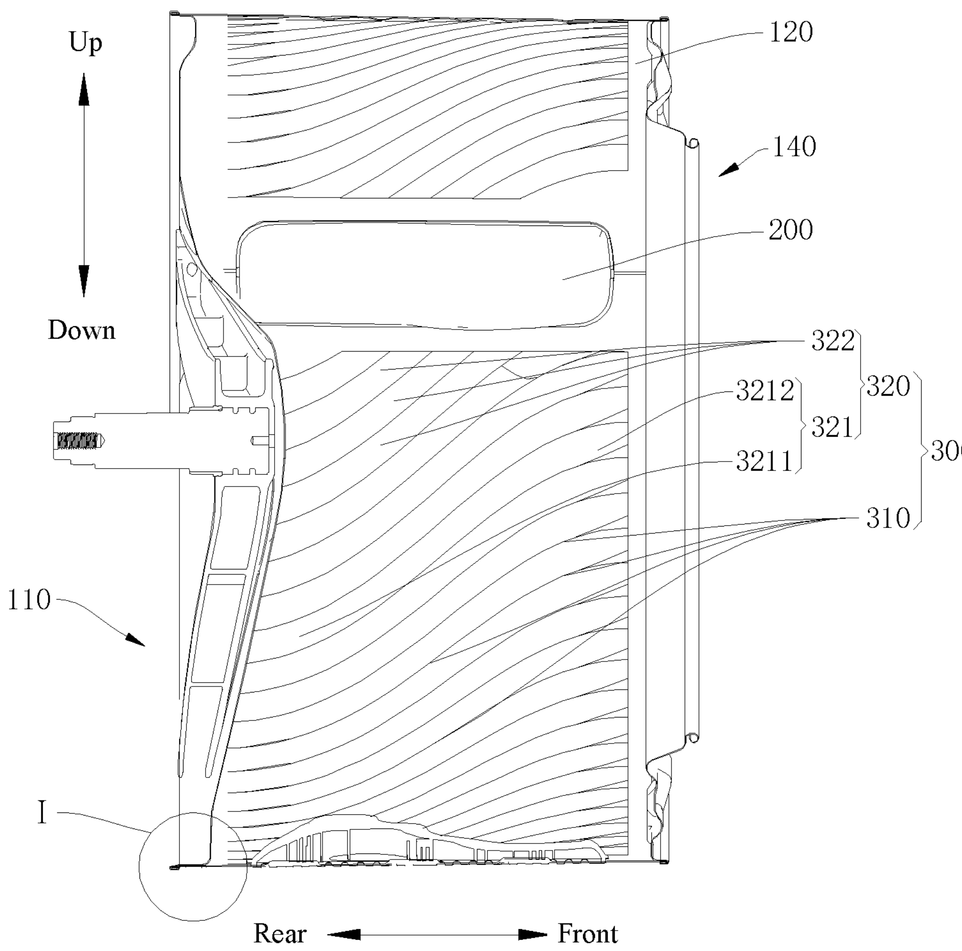
Up
Down
120
140
200
322
320
3212
321
300
3211
310
110
I
Rear
Front

FIG. 5

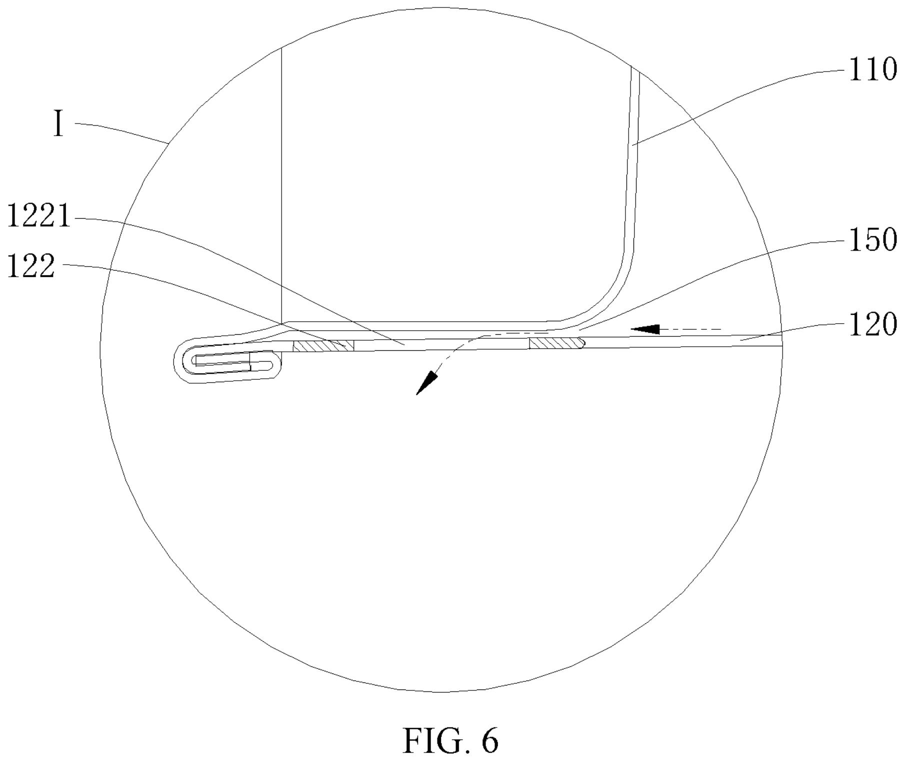
I
110
1221
122
150
120

FIG. 6

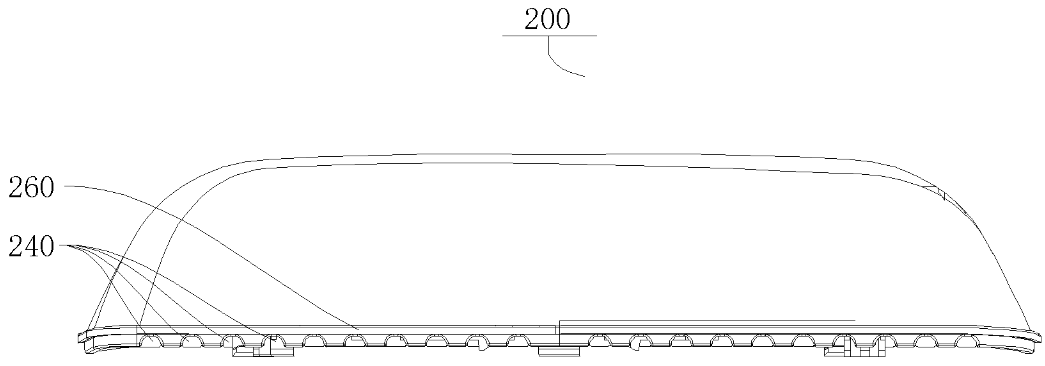

FIG. 7

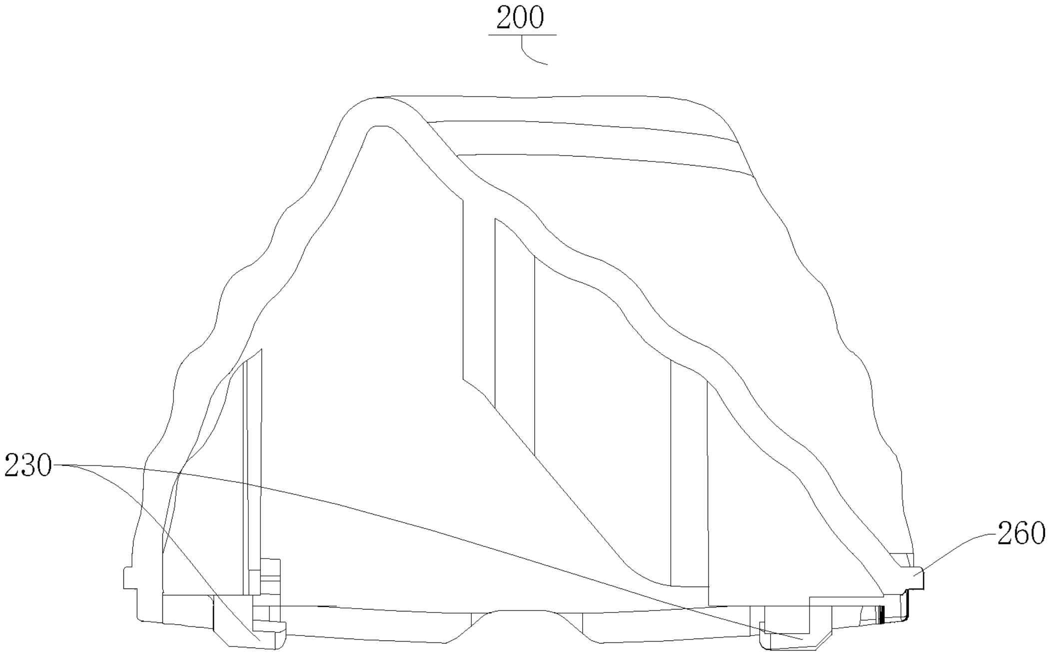

FIG. 8

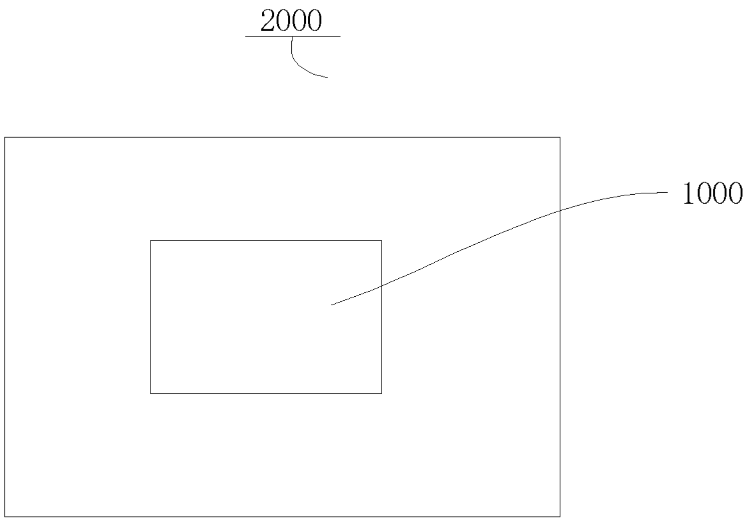

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/090707

A. CLASSIFICATION OF SUBJECT MATTER

D06F 58/20(2006.01)i; D06F 39/08(2006.01)i; D06F 39/12(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

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

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

CNTXT; ENTXT; DWPI; WPABS; CNKI: 内筒, 内桶, 提升筋, 升降器, 排水孔, 排水口, 密度, 间距, inner, trum, tank, cylinder, lifter, drain, hole, open, density, space

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 109423800 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 05 March 2019 (2019-03-05) description, embodiment 3, and figures 8-10	1-15
A	CN 108625119 A (ANHUI JULONG TRANSMISSION TECHNOLOGY CO., LTD.) 09 October 2018 (2018-10-09) entire document	1-15
A	CN 113529351 A (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 22 October 2021 (2021-10-22) entire document	1-15
A	CN 106498658 A (LG ELECTRONICS INC.) 15 March 2017 (2017-03-15) entire document	1-15
A	CN 113355858 A (LG ELECTRONICS INC.) 07 September 2021 (2021-09-07) entire document	1-15
A	CN 108866941 A (HISENSE (SHANDONG) REFRIGERATOR CO., LTD.) 23 November 2018 (2018-11-23) entire document	1-15

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

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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 December 2022	**29 December 2022**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China**	
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/090707

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002095891 A (SANYO ELECTRIC CO., LTD.) 02 April 2002 (2002-04-02) entire document	1-15
A	JP 2013074964 A (HITACHI APPLIANCES INC.) 25 April 2013 (2013-04-25) entire document	1-15
A	US 2020248366 A1 (LG ELECTRONICS INC.) 06 August 2020 (2020-08-06) entire document	1-15

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/090707

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
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CN	113529351	A	22 October 2021	None			
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				EP	3138946	A1	08 March 2017
				KR	20170028740	A	14 March 2017
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				KR	20210112749	A	15 September 2021
				US	2021277571	A1	09 September 2021
				AU	2021201440	A1	23 September 2021
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JP	2013074964	A	25 April 2013	None			
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				JP	2020124473	A	20 August 2020
				RU	2728631	C1	30 July 2020

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REFERENCES CITED IN THE DESCRIPTION

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- CN 202220765352 **[0001]**