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

(11) **EP 4 328 372 A1**

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

(43) Date of publication:
28.02.2024 Bulletin 2024/09

(21) Application number: **21943740.7**

(22) Date of filing: **30.07.2021**

(51) International Patent Classification (IPC):
D06F 39/02 *(2006.01)*

(86) International application number:
PCT/CN2021/109812

(87) International publication number:
WO 2022/252384 (08.12.2022 Gazette 2022/49)

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

(30) Priority: **31.05.2021 CN 202110604761**

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(54) LIQUID STORAGE CASE ASSEMBLY AND LAUNDRY TREATMENT DEVICE

(57) A liquid storage case assembly (1) and a laundry treatment device having same. The liquid storage case assembly (1) comprises: a detergent case (100), provided with an accommodating cavity having an opening on one side; and a dispenser case (200), openably/closably provided within the accommodating cavity in a drawable mating manner. At least one of the detergent case (100) and the dispenser case (200) is provided with a rolling member and the other one is provided with an inclined guide surface mated with the rolling member. The inclined guide surface extends obliquely downward in an opening direction of the dispenser case (200).

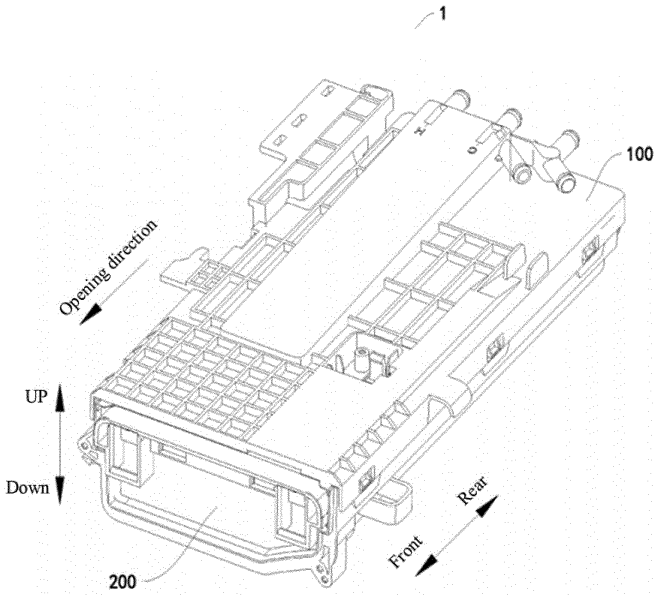

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority to Chinese Patent Application No. 202110604761.8 filed on May 31, 2021, the entire disclosure of which is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to the technical field of washing appliance manufacturing, and more particularly, to a liquid storage box assembly and a laundry treatment device having the liquid storage box assembly.

BACKGROUND

[0003] In the related art, a laundry treatment device such as a washing machine is generally provided with a detergent box assembly. The detergent box assembly includes a detergent box and a dispenser box movably disposed in the detergent box, thereby facilitating detergent storage. However, frictional resistance between the dispenser box and the detergent box during opening and closing of the dispenser box increases, resulting in unsmooth movement of the dispenser box. In addition, it is inconvenient to realize full opening of the dispenser box, leading to poor user experience.

SUMMARY

[0004] The present disclosure aims to at least solve one of the technical problems existing in the related art. To this end, embodiments of the present disclosure provide a liquid storage box assembly. The liquid storage box assembly has advantages such as ease of fully opening the dispenser box, user-friendly operation, and a comfortable user experience.

[0005] Embodiments of the present disclosure also provide a laundry treatment device having the liquid storage box assembly.

[0006] In order to achieve the above objects, embodiments of a first aspect of the present disclosure provide a liquid storage box assembly. The liquid storage box assembly includes a detergent box and a dispenser box. The detergent box has an accommodation cavity with an opening at a side of the accommodation cavity. The dispenser box is engaged in the accommodation cavity in a drawable manner in such a manner that the dispenser box is openable or closable. At least one of the detergent box and the dispenser box is provided with a rolling member, and another one of the detergent box and the dispenser box has an inclined guide surface engaged with the rolling member. The inclined guide surface obliquely extends downwards in an opening direction of the dispenser box.

[0007] The liquid storage box assembly according to the embodiments of the present disclosure has advantages such as ease of fully opening the dispenser box, user-friendly operation, and a comfortable user experience.

[0008] In addition, the liquid storage box assembly according to the above embodiments of the present disclosure may further have the following additional technical features.

[0009] According to some embodiments of the present disclosure, the other one of the detergent box and the dispenser box is provided with a guide portion. The inclined guide surface is formed at the guide portion.

[0010] According to some embodiments of the present disclosure, in the opening direction of the dispenser box, a length of the inclined guide surface is 1, and a length of the guide portion is L, where $l \geq 0.5$ L.

[0011] According to some embodiments of the present disclosure, the other one of the detergent box and the dispenser box further has a limiting surface. The limiting surface is connected to the inclined guide surface and obliquely extends upwards in the opening direction of the dispenser box.

[0012] According to some embodiments of the present disclosure, the inclined guide surface has an extending length greater than an extending length of the limiting surface.

[0013] According to some embodiments of the present disclosure, the other one of the detergent box and the dispenser box further has an engagement guide surface. The engagement guide surface has an end connected to the limiting surface and another end extending horizontally.

[0014] According to some embodiments of the present disclosure, the rolling member includes at least one first roller disposed at the detergent box, and the inclined guide surface includes a first guide surface located at the dispenser box. The first roller is in contact and engaged with the first guide surface.

[0015] According to some embodiments of the present disclosure, the at least one first roller includes at least two first rollers arranged at intervals in the opening direction of the dispenser box. Some of the at least two first rollers are disposed at a side of the detergent box close to the opening, and the rest of the at least two first rollers are disposed at a side of the detergent box facing away from the opening.

[0016] According to some embodiments of the present disclosure, the rolling member further includes at least one second roller disposed at the dispenser box, and the inclined guide surface further includes a second guide surface located at the detergent box. The at least one second roller is in contact and engaged with the second guide surface, and the second guide surface and the first guide surface are parallel to each other and arranged side by side.

[0017] According to some embodiments of the present disclosure, the at least one second roller includes at least two second rollers arranged at intervals in the opening

direction of the dispenser box. Some of the at least two second rollers are disposed at a side of the dispenser box facing away from the opening, and the rest of the at least two second rollers are disposed at a side of the dispenser box close to the opening.

[0018] According to some embodiments of the present disclosure, the detergent box includes a base and an upper cover removably disposed at the base. The accommodation cavity is defined by the upper cover and the base.

[0019] According to embodiments of a second aspect of the present disclosure, a laundry treatment device is provided. The laundry treatment device includes a body having a washing cavity and a mounting groove and the liquid storage box assembly according to the embodiments of the first aspect of the present disclosure. The liquid storage box assembly is mounted in the mounting groove.

[0020] With the laundry treatment device according to the embodiments of the present disclosure, by using the liquid storage box assembly according to the embodiment of the first aspect of the present disclosure, the liquid storage box assembly has advantages such as ease of fully opening the dispenser box, user-friendly operation, and the comfortable user experience.

[0021] Additional aspects and advantages of the present disclosure will be provided at least in part in the following description, or will become apparent in part from the following description, or will be learned from the practice of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The above and/or additional aspects and advantages of the present disclosure will become apparent and readily appreciated from the following description of the embodiments in conjunction with the accompanying drawings, in which:

FIG. 1 is a schematic structural view of a liquid storage box assembly according to an embodiment of the present disclosure.

FIG. 2 is a schematic structural view of a liquid storage box assembly according to an embodiment of the present disclosure.

FIG. 3 is a schematic structural view of a liquid storage box assembly according to an embodiment of the present disclosure.

FIG. 4 is a partially enlarged view of FIG. 3.

FIG. 5 is a schematic structural view of a liquid storage box assembly according to some other embodiments of the present disclosure.

FIG. 6 is a cross-sectional view at part A in FIG. 5.

FIG. 7 is an enlarged view at part D in FIG. 6.

FIG. 8 is a cross-sectional view at part B in FIG. 6.

FIG. 9 is a schematic structural view of a liquid storage box assembly according to some other embodiments of the present disclosure.

FIG. 10 is a cross-sectional view at part C in FIG. 9.

FIG. 11 is an exploded view of a liquid storage box assembly according to some other embodiments of the present disclosure.

FIG. 12 is a schematic structural view of a base of a liquid storage box assembly according to some other embodiments of the present disclosure.

FIG. 13 is a schematic structural view of a base of a liquid storage box assembly according to some other embodiments of the present disclosure.

FIG. 14 is an enlarged view at part E in FIG. 13.

FIG. 15 is a cross-sectional view at part G in FIG. 14.

FIG. 16 is a schematic structural view of a base of a liquid storage box assembly according to some other embodiments of the present disclosure.

[0023] Reference Numerals: liquid storage box assembly 1, box body 10, liquid inlet 11, water inlet 12, discharge cavity 13, guide rib 14, guide channel 141, step portion 15, baffle 151, detection groove 152, mounting through hole 16, detergent box 100, first roller 110, base 120, upper cover 130, dispenser box 200, first guide surface 210, limiting surface 220, engagement guide surface 230, second roller 240, detection device 300, first probe 310, second probe 320, drive device 400.

DETAILED DESCRIPTION

[0024] 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 limiting, the present disclosure.

[0025] A liquid storage box assembly 1 according to the embodiments of the present disclosure will be described below with reference to the accompanying drawings.

[0026] As illustrated in FIG. 1 to FIG. 4, the liquid storage box assembly 1 according to the embodiments of the present disclosure may include a detergent box 100 and a dispenser box 200.

[0027] In some examples, the liquid storage box assembly 1 may be disposed in a laundry treatment device and configured to store a laundry treatment agent. For example, the liquid storage box assembly 1 is disposed in a washing machine. The liquid storage box assembly 1 is formed as a detergent box assembly of the washing machine. The liquid storage box assembly 1 includes the detergent box 100 and the dispenser box 200. The dispenser box 200 is movably engaged in the detergent box 100 in a drawable manner. The dispenser box 200 is configured to store a detergent and is openable or closable by drawing the dispenser box 200, thereby achieving filling of the detergent. In this way, it is convenient to

quantitively dispense the detergent into a washing tub of the washing machine in batches by means of the liquid storage box assembly 1.

[0028] For example, the liquid storage box assembly 1 is applied in a clothes dryer. The liquid storage box assembly 1 is formed as a water box of the clothes dryer. The water box of the clothes dryer is used for collecting condensed water generated by condensation during drying and requires regular cleaning by a user. That is, the liquid storage box assembly 1 includes the detergent box 100 and the dispenser box 200. The dispenser box 200 is movably engaged in the detergent box 100 in a drawable manner. The dispenser box 200 is configured to store the condensed water and is openable or closable by drawing the dispenser box 200, thereby realizing the regular cleaning of the collected condensed water.

[0029] In some embodiments, the detergent box 100 may have an accommodation cavity with an opening at a side of the accommodation cavity. The dispenser box 200 is movably engaged in the accommodation cavity in a drawable manner, to achieve opening or closing of the dispenser box 200. In this way, the dispensing of the detergent to the dispenser box 200 is facilitated. At least one of the detergent box 100 and the dispenser box 200 may be provided with a rolling member. For example, the rolling member may be a roller. Further, the other one of the detergent box 100 and the dispenser box 200 may have an inclined guide surface. The inclined guide surface is in contact and engaged with the rolling member. That is, the rolling member and the inclined guide surface may roll relative to each other. Specifically, the inclined guide surface obliquely extends downwards in an opening direction of the dispenser box 200 (the opening direction is illustrated in FIG. 1). For example, when the dispenser box 200 may move in a front-rear direction in a horizontal plane, the inclined guide surface gradually and obliquely extends downwards in the front-rear direction. In other words, the dispenser box 200 has a trend of moving forwards and downwards during its opening.

[0030] It should be understood herein that in some examples the detergent box 100 may be provided with the rolling member, and the dispenser box 200 may have the inclined guide surface corresponding to the rolling member. In other examples, the dispenser box 200 may be provided with the rolling member, and the detergent box 100 may have the inclined guide surface corresponding to the rolling member. In yet other examples, the detergent box 100 and the dispenser box 200 may be provided with a first rolling member and a second rolling member, respectively. The dispenser box 200 may have a first inclined guide surface corresponding to the first rolling member, and the detergent box 100 may have a second inclined guide surface corresponding to the second rolling member.

[0031] With the liquid storage box assembly 1 according to the embodiments of the present disclosure, by providing the detergent box 100 and the dispenser box 200, pre-storage of the detergent can be realized. During each laundry, the detergent may be quantitatively poured into the washing tub in batches based on washing requirements, eliminating a hassle that users have to fetch a detergent bag (or a detergent container), open the detergent bag (or the detergent container), and dispense the detergent every time they do the laundry. The arrangement of the liquid storage box assembly 1 makes laundry more convenient and simplifies user's operation.

[0032] Moreover, by providing the dispenser box 200 and/or the detergent box 100 with the rolling member, a drawing action of the dispenser box 200 can be implemented through rolling of the rolling member. As a result, it is possible to reduce frictional resistance between the dispenser box 200 during opening and closing of the detergent box 100, allowing the dispenser box 200 to move smoothly and flexibly. Further, since the dispenser box 200 and/or the detergent box 100 also has the inclined guide surface corresponding to the rolling member, during opening of the dispenser box 200, the dispenser box 200 may have a tendency to open downwards and forwards under the action of gravity, thereby achieving its automatic opening along the inclined guide surface. Moreover, it is convenient to open the dispenser box 200 smoothly and fully. That is, the dispenser box 200 can be fully opened. In particular, when the dispenser box 200 is full of the detergent, quick and automatic opening of the dispenser box 200 can be realized. Therefore, convenience and comfortableness of use is improved, and user's experience is facilitated.

[0033] It should be understood that the phase "fully opening the dispenser box 200" refers to opening the dispenser box 200 to its outermost position. At this time, a pick-and-place opening of the dispenser box 200 is completely exposed. Certainly, in some other specific examples, the pick-and-place opening of the dispenser box 200 may also be completely exposed before the dispenser box 200 reaches the outermost position.

[0034] Therefore, the liquid storage box assembly 1 according to the embodiments of the present disclosure has advantages such as ease of fully opening the dispenser box 200, user-friendly operation, and a comfortable user experience.

[0035] A liquid storage box assembly 1 according to a specific embodiment of the present disclosure will be described below with reference to the accompanying drawings.

[0036] In some specific embodiments of the present disclosure, as illustrated in FIG. 1 to FIG. 4, the liquid storage box assembly 1 according to the embodiment of the present disclosure may include a detergent box 100 and a dispenser box 200.

[0037] In some embodiments, one of the detergent box 100 and the dispenser box 200 is provided with a rolling member, and the other one of the detergent box 100 and the dispenser box 200 is provided with a guide portion. An inclined guide surface is formed at the guide portion. In this way, a movement trajectory of the dispenser box 200 can be positioned and guided by using the guide

portion to improve accuracy and reliability of operations of the dispenser box 200. Further, processing of the inclined guide surface is also facilitated. In addition, it is convenient to form a support engagement between the inclined guide surface and the rolling member, thereby ensuring that the rolling member is movable in an extending direction of the inclined guide surface.

[0038] Optionally, a side of the detergent box 100 facing towards the dispenser box 200 is provided with a rolling member. The rolling member is a roller. A bottom of the dispenser box 200 is provided with a guide portion. The roller is engaged with the guide portion. The roller and the guide portion may roll relative to each other to achieve drawing of the dispenser box 200. The guide portion may be formed as a planar structure or a groove structure. In some specific examples, the guide portion is formed as a guide groove, and the inclined guide surface is located at a bottom of the guide groove. Specifically, the detergent box 100 has an opening defined at a front side surface thereof. The dispenser box 200 is movable in a drawable manner in the front-rear direction. In this way, the inclined guide surface gradually and obliquely extends downwards from back to front. An angle of the inclined guide surface relative to the front-rear direction may be set to be smaller than or equal to 10 degrees. For example, the angle of the inclined guide surface relative to the front-rear direction may be 2 degrees, 3 degrees, or 5 degrees. In this way, during forward drawing of the dispenser box 200, it is convenient to allow for an automatically forward movement of the dispenser box 200 under the action of gravity. As a result, the automatic opening of the dispenser box 200 is realized. Further, the smooth and full opening of the dispenser box 200 is facilitated.

[0039] Specifically, in the opening direction of the dispenser box 200, a length of the inclined guide surface is 1, and a length of the guide portion is L, where $l \geq 0.5$ L. that is, the length of the inclined guide surface is at least greater than or equal to half of the length of the guide portion.

[0040] Optionally, the dispenser box 200 may move in the front-rear direction. The guide portion extends in the front-rear direction. In the front-rear direction, the length of the inclined guide surface is 1, and the length of the guide portion is L, i.e., a length of a contactable engagement region between the dispenser box 200 and the roller, where $l \geq 0.6L$, $l \geq 0.7L$, or $l \geq 0.8L$.

[0041] In some embodiments, as illustrated in FIG. 4, one of the detergent box 100 and the dispenser box 200 is provided with the rolling member, and the other one of the detergent box 100 and the dispenser box 200 has a limiting surface 220. The limiting surface 220 has an end connected to the inclined guide surface and obliquely extending upwards in the opening direction of the dispenser box 200. In this way, the limiting surface 220 can not only be used to provide the movement of the dispenser box 200 with a buffering effect, but can also supply a reaction force to prevent the dispenser box 200 from title downwards.

[0042] Optionally, as illustrated in FIG. 4, the side of the detergent box 100 facing towards the dispenser box 200 is provided with a first roller 110. The bottom of the dispenser box 200 has the guide groove. The roller is engaged in the guide groove. The roller and the guide groove is movable relative to each other to achieve the drawing movement of the dispenser box 200. The inclined guide surface and the limiting surface 220 are located at the bottom of the guide groove. Specifically, the detergent box 100 has the opening defined at the front side surface thereof (the front-rear direction is illustrated in FIG. 1). The dispenser box 200 is movable in a drawable manner in the front-rear direction. Therefore, the inclined guide surface gradually and obliquely extends downwards from back to front (an up-down direction is illustrated in FIG. 1). The limiting surface 220 is located behind the inclined guide surface and gradually and obliquely extends upwards from back to front.

[0043] Specifically, as illustrated in FIG. 4, the inclined guide surface has an extending length greater than an extending length of the limiting surface 220. A lower end of the inclined guide surface is flush with a lower end of the limiting surface 220. In this way, it is convenient to achieve the full opening of the dispenser box 200 automatically and smoothly. Moreover, overall stability of the opened dispenser box 200 can be ensured.

[0044] In some optional examples, as illustrated in FIG. 4, one of the detergent box 100 and the dispenser box 200 is provided with the rolling member, and the other one of the detergent box 100 and the dispenser box 200 has an engagement guide surface 230. The engagement guide surface 230 has an end connected to the limiting surface 220 and another end extending horizontally. In this way, it is possible to further ensure the overall stability of the opened dispenser box 200.

[0045] Specifically, as illustrated in FIG. 4, the side of the detergent box 100 facing towards the dispenser box 200 is provided with the first roller 110. The bottom of the dispenser box 200 is provided with a first guide portion. The first roller 110 is engaged in the first guide portion. The first roller 110 and the first guide portion may roll relative to each other to achieve the drawing movement of the dispenser box 200. The inclined guide surface, the limiting surface 220, and the engagement guide surface 230 are sequentially located at the guide portion. Specifically, the opening of the detergent box 100 is formed at the front side surface thereof. The dispenser box 200 is movable in a drawable manner in the front-rear direction. The engagement guide surface 230 is located behind the limiting surface 220.

[0046] In some embodiments, as illustrated in FIG. 4, the rolling member may include a first roller 110. The first roller 110 is disposed at the detergent box 100. The inclined guide surface may include a first guide surface 210. The first guide surface 210 is located at the dispenser box 200. The first roller 110 is in contact and engaged with the first guide surface 210. That is, a support en-

gagement between the first roller 110 and the first guide surface 210 can be realized, and relative rolling between the first roller 110 and the first guide surface 210 can be carried out. In this way, a reduction in relative friction between the dispenser box 200 and the detergent box 100 can be facilitated, thereby achieving a smooth movement and automatic opening of the dispenser box 200.

[0047] Specifically, as illustrated in FIG. 4, the rolling member 110 includes at least two first rollers 110. The at least two first rollers 110 are arranged at intervals in the opening direction of the dispenser box 200. Some of the at least two first rollers 110 are arranged at a side of the detergent box 100 close to the opening, and the rest of the at least two first rollers 110 are arranged at a side of the detergent box 100 facing away from the opening. In this way, it is convenient to support the dispenser box 200 and improve structural stability and reliability of the dispenser box 200. Moreover, a steady movement of the dispenser box 200 without shaking during its movement is facilitated.

[0048] For example, the opening of the detergent box 100 is formed at the front side surface thereof. The rolling member includes two first rollers 110. One of the two first rollers 110 is disposed close to a front side of the detergent box 100, and another one of the two first rollers 110 is disposed close to a rear side of the detergent box 100. More specifically, as illustrated in FIG. 2 and FIG. 3, the rolling member may also include a second roller 240. The second roller 240 is disposed at the dispenser box 200. The inclined guide surface may also include a second guide surface. The second guide surface is located at the detergent box 100. The second roller 240 is in contact and engaged with the second guide surface. That is, a support engagement between the second roller 240 and the second guide surface can be realized, and relative rolling movement between the second roller 240 and the second guide surface can be carried out. In this way, a reduction in the relative friction between the dispenser box 200 and the detergent box 100 is facilitated, thereby realizing the smooth movement and automatic opening of the dispenser box 200. Further, the second guide surface and the first guide surface 210 are parallel to each other and arranged side by side. In this way, it is possible to ensure that the dispenser box 200 can be drawn smoothly.

[0049] Further, the rolling member includes at least two second rollers 240. The at least two second rollers 240 are arranged at intervals in the opening direction of the dispenser box 200. Some of the second rollers 240 are disposed at a side of the dispenser box 200 facing away from the opening, and the rest of the second rollers 240 are disposed at a side of the dispenser box 200 close to the opening. In this way, support for the dispenser box 200 is further facilitated, thereby enhancing the structural stability and reliability of the dispenser box 200. Therefore, the dispenser box 200 can smoothly move and is prevented from shaking during its movement.

[0050] For example, the opening of the detergent box 100 is formed at the front side surface thereof. The rolling member includes two second rollers 240. One of the two second rollers 240 is disposed close to the rear side of the detergent box 100, and another one of the two second rollers 240 is disposed close to the front side of the detergent box 100. For example, the rolling member includes a first roller 110 and a second roller 240. The first roller 110 includes two first rollers 110 spaced apart from each other in the opening direction of the dispenser box 200. 图 that is, the two first rollers 110 are located at a front end and a rear end of the detergent box 100, respectively. The second roller 240 includes two second rollers 240 spaced apart from each other in the opening direction of the dispenser box 200. That is, the two second rollers 240 are located at a front end and a rear end of the dispenser box 200, respectively. Optionally, the two first rollers 110 of the detergent box 100 are mounted by screws or snaps. The two second rollers 240 of the dispenser box 200 are mounted by screws or snaps.

[0051] In some embodiments, the detergent box 100 may include a base and an upper cover. The upper cover is removably disposed at the base. The accommodation cavity is defined by the upper cover and the base. In this way, manufacturing of the detergent box 100 is facilitated. Moreover, it is convenient to maintain and replace components disposed in the detergent box 100.

[0052] Optionally, the upper cover is located at a top of the detergent box 100, and the base is located at a bottom of the detergent box 100. The upper cover and the base are assembled together to form the detergent box 100. The upper cover and the base may be mounted by snaps or screws. The dispenser box 200 is adapted to be pushed into the accommodation cavity of the detergent box 100 from the front side.

[0053] According to a specific embodiment of the present disclosure, the liquid storage box assembly 1 may include the detergent box 100 and the dispenser box 200. The liquid storage box assembly 1 may be disposed in the laundry treatment device and configured to store the laundry treatment agent. For example, the liquid storage box assembly 1 is disposed in the washing machine. The liquid storage box assembly 1 includes the detergent box 100 and the dispenser box 200. The detergent may be stored in the dispenser. The dispenser box 200 is moved in the drawable manner to open or close the dispenser box 200, thereby realizing the filling of the detergent. In this way, it is convenient to quantitively disperse the detergent to the washing tub of the washing machine in batches by using the liquid storage box assembly 1.

[0054] The detergent box 100 may have the accommodation cavity with the opening at the side of the accommodation cavity. The opening of the detergent box 100 is formed at the front side surface of the detergent box 100. The dispenser box 200 is movably engaged in the accommodation cavity in a drawable manner, to open or close the dispenser box 200. In this way, the dispens-

ing of the detergent to the dispenser box 200 is facilitated. At least one of the detergent box 100 and the dispenser box 200 may be provided with the rolling member, and the rolling member may be the roller. Further, the other one of the detergent box 100 and the dispenser box 200 may have the inclined guide surface. The inclined guide surface is in contact and engaged with the rolling member. That is, the rolling element may roll on the inclined guide surface. Specifically, the inclined guide surface obliquely extends downwards in the opening direction of the dispenser box 200. For example, when the dispenser box 200 is movable in a first horizontal direction within the horizontal plane, the inclined guide surface gradually and obliquely extends downwards in the first horizontal direction.

[0055] The rolling member may include the first roller 110. The first roller 110 is disposed on the detergent box 100. The inclined guide surface may include the first guide surface 210. The first guide surface 210 is located at the dispenser box 200. The first roller 110 is in contact and engaged with the first guide surface 210. That is, the support engagement between the first roller 110 and the first guide surface 210 can be realized, and the first roller 110 and the first guide surface 210 can move relative to each other. In this way, a reduction in the relative friction between the dispenser box 200 and the detergent box 100 can be facilitated, thereby realizing the smooth movement and automatic opening of the dispenser box 200.

[0056] A plurality of first rollers 110 may be provided. The plurality of first rollers 110 is arranged at intervals in the opening direction of the dispenser box 200. The plurality of first rollers 110 is arranged close to the front side and the rear end of the detergent box 100, respectively.

[0057] The rolling member may also include the second roller 240. The second roller 240 is disposed on the dispenser box 200. The inclined guide surface may further include the second guide surface. The second guide surface is located at the detergent box 100. The second roller 240 is in contact and engaged with the second guide surface. That is, the support engagement between the second roller 240 and the second guide surface can be realized, and the second roller 240 and the second guide surface are movable relative to each other. In this way, a reduction in the relative friction between the dispenser box 200 and the detergent box 100 is facilitated, allowing for the smooth movement and automatic opening of the dispenser box 200.

[0058] Further, a plurality of second rollers 240 is provided. The plurality of second rollers 240 is arranged at intervals in the opening direction of the dispenser box 200. The plurality of second rollers 240 is disposed close to the front end and the rear side of the detergent box 100. The two first rollers 110 of the detergent box 100 are mounted by screws or snaps. The two second rollers 240 of the dispenser box 200 are mounted by screws or snaps.

[0059] Each of the detergent box 100 and the dispenser box 200 has the guide groove. Specifically, the dispenser box 200 has a first guide groove. The first guide surface is located at a bottom of the first guide groove. The detergent box 100 has a second guide groove. The second guide surface is located at a bottom of the second guide groove. In this way, not only the movement trajectory of the dispenser box 200 can be positioned and guided by using the guide groove, thereby improving the operation accuracy and reliability of the dispenser box 200, but also the manufacturing and arrangement of the inclined guide surface can be facilitated. In addition, the support engagement between the inclined guide surface and the rolling member can be easily formed.

[0060] When the dispenser box 200 is movable in the drawable manner in the front-rear direction, the first guide surface and the second guide surface each gradually and obliquely extend downwards from back to front. An angle of the first guide surface relative to the front-rear direction may be set to be smaller than or equal to 10 degrees. For example, the angle of the first guide surface relative to the front-rear direction may be 2 degrees, 3 degrees, or 5 degrees. Similarly, an angle of the second guide surface relative to the front-rear direction may be set to be smaller than or equal to 10 degrees. For example, the angle of the second guide surface relative to the front-rear direction may be 2 degrees, 3 degrees, or 5 degrees. In this way, during the drawing of the dispenser box 200 to open the dispenser box 200, it is possible to allow the dispenser box 200 to automatically move forwards under the gravity, thereby achieving the automatic opening of the dispenser box 200. Moreover, the smooth and full opening of the dispenser box 200 is facilitated.

[0061] In the opening direction of the dispenser box 200, the length of the inclined guide surface is 1, and the length of the guide portion is L, where $l \geq 0.5\ L$. That is, the length of the inclined guide surface is at least greater than or equal to half of the length of the guide groove. Specifically, the dispenser box 200 is movable in the front-rear direction. The first guide groove extends in the front-rear direction. In the front-rear direction, the length of the first guide groove is 11, and the length of the first guide groove is L1, i.e., the length of the first guide groove is a length of the contactable engagement region between the dispenser box 200 and the roller, where $l1 \geq 0.6L1$, $l1 \geq 0.7L1$, or $l1 \geq 0.8L1$. Similarly, the second guide groove extends in the front-rear direction. In the front-rear direction, a length of the second guide surface is l2, and a length of the second guide groove is L2, i.e., the length of the second guide groove is a length of a contactable engagement region between the dispenser box 200 and the roller, where $l2 \geq 0.6L2$, $l2 \geq 0.7L2$, or $l2 \geq 0.8L2$.

[0062] The first guide groove has a first limiting surface 220. The first limiting surface 220 has a front end connected to the first guide surface 210 and a rear end extending in an inclination direction opposite to the first guide surface 210. Similarly, the second guide groove has a second limiting surface 220. The second limiting

surface 220 has a rear end connected to the second guide surface and a front end extending in an inclination direction opposite to the second guide surface. In this way, not only the movement of the dispenser box 200 can be buffered by using the limiting surface 220, but also the limiting surface 220 can also provide a reaction force to prevent the dispenser box 200 from titling downwards as a whole.

[0063] That is, the first guide surface 210 gradually and obliquely extends downwards from back to front. The first limiting surface 220 is located behind the inclined guide surface. Further, the first limiting surface 220 gradually and obliquely extends upwards from back to front. The second guide surface gradually and obliquely extends downwards from back to front. The second limiting surface 220 is located in front of the inclined guide surface. Further, the second limiting surface 220 gradually and obliquely extends upwards from back to front.

[0064] The first guide surface 210 has an extending length greater than an extending length of the first limiting surface 220. A lower end of the first guide surface 210 is flush with the lower end of the first limiting surface 220. Similarly, the second guide surface has an extending length greater than an extending length of the second limiting surface 220. A lower end of the second guide surface is flush with a lower end of the second limiting surface 220. In this way, it is possible not only to fully open the dispenser box 200 automatically and smoothly, but also to ensure the overall stability of the opened dispenser box 200.

[0065] The detergent box 100 may include the base and the upper cover. The upper cover is detachably disposed at the base. The accommodation cavity is defined between the upper cover and the base. In this way, the manufacturing of the detergent box 100 is facilitated. Moreover, it is convenient to maintain and replace the components disposed in the detergent box 100. The upper cover is located at the top of the detergent box 100, and the base is located at the bottom of the detergent box 100. The upper cover and the base are assembled together to form the detergent box 100. The upper cover and the base may be mounted by snaps or screws. The dispenser box 200 is adapted to be pushed into the accommodation cavity of the detergent box 100 from the front side.

[0066] In some other optional embodiments, the dispenser box 200 is disposed in the detergent box 100 in such a manner that the dispenser box 200 is movable in the front-rear direction. The dispenser box 200 is movable between an open position and a closed position. A button may be provided at a front surface of the dispenser box 200 to facilitate the user's operation. For example, the dispenser box 200 has an open state and a closed state. When the dispenser box 200 is located at the open position, the dispenser box 200 is in the open position. At this time, the dispenser box 200 at least partially extends from the front surface of the detergent box 100, allowing the detergent such as washing powder, laundry detergent, or softener to be poured into the dispenser box 200. When the dispenser box 200 is in the closed position, the dispenser box 200 is in the closed state. At this time, the front surface of the dispenser box 200 is preferably and substantially flush with a front surface of the detergent box 100, thereby ensuring an aesthetically pleasing appearance of the laundry treatment device such as a front load washing machine.

[0067] The dispenser box 200 may include a plurality of containing grooves for containing different detergents. The plurality of containing grooves is arranged at intervals. It can be understood that the number, a specific arrangement, and the like of the containing groove may be changed as desired, and the present disclosure is not limited in this regard.

[0068] A locking member is disposed at the dispenser box 200. For example, the locking member may be provided at the front end of the dispenser box 200. The locking member is configured to be locked onto the detergent box 100. The locking member and the detergent box 100 are separated from each other when the button is pressed.

[0069] The detergent box 100 is a stationary member relative to a body of the laundry treatment device. Specifically, the detergent box 100 may be fixed on a body of the washing machine. For example, a mounting groove may be formed at an upper part of the body. The detergent box 100 may be fixed in the mounting groove.

[0070] The dispenser box 200 is a movable member relative to the body or the detergent box 100. Specifically, the dispenser box 200 may be disposed in the detergent box 100 and is movable back and forth in the detergent box 100. The dispenser box 200 may include a dispenser box body and a dispenser box cover located at a top of the dispenser box body. In addition, the dispenser box 200 may also include a dispenser box panel. The dispenser box panel may be fixed to a front surface when the dispenser box body and dispenser box cover are assembled together. The button and the locking member may be disposed at the dispenser box panel. For example, the button is disposed at a front surface of the dispenser box panel, and the locking member is disposed at a rear surface of the dispenser box panel. Therefore, the washing machine has a more aesthetically pleasing appearance.

[0071] When the dispenser box 200 is fully engaged in the detergent box 100, the dispenser box cover and the dispenser box body are located between the detergent box cover and the detergent box body. Moreover, the dispenser box panel may be flush with a front surface of the body and tightly seal a front surface of a mounting cavity, thereby providing a washing machine with neat and attractive appearance.

[0072] During operating of the liquid storage box assembly 1 according to the above embodiments of the present disclosure, when the detergent needs to be dispensed into the dispenser box 200, the dispenser box 200 is in the closed position. At this time, the dispenser

box 200 needs to be switched from the closed position to the open position. After the button is pressed, the locking member is unlocked. As a result, the dispenser box 200 moves from the closed position to the open position. When the dispenser box 200 moves to the open position, the user may pour the detergent and the like into the dispenser box 200. After pouring of the detergent into the dispenser box 200 is completed, when it is necessary to close the dispenser box 200, the dispenser box 200 is pushed from front to back to move backwards. As the dispenser box 200 moves to the closed position, the locking member is locked. As a result, the dispenser box 200 is in the closed state.

[0073] According to some other embodiments of the present disclosure, the liquid storage box assembly 1 may include a box body 10 and a detection device 300. The detection device 300 is configured to detect the presence or absence of the detergent. The liquid storage box assembly 1 is disposed in the washing machine. The liquid storage box assembly 1 includes the detergent box 100 and the dispenser box 200. The dispenser box 200 is movably engaged in the detergent box 100 in a drawable manner. The detergent may be stored in a dispenser. The dispenser box 200 may be opened or closed by drawing the dispenser box 200, thereby realizing the filling of the detergent. In this way, it is convenient to quantitatively dispense the detergent into the washing tub of the washing machine in batches by using the liquid storage box assembly 1. Certainly, the clothing treatment agent may also be other agents such as a softener or a disinfectant.

[0074] A liquid inlet 11, a water inlet 12, and a discharge cavity 13 may be defined in an interior of the box body 10. The liquid inlet 11 and the water inlet 12 are in communication with the discharge cavity 13, respectively. That is, the detergent may be delivered into the discharge cavity 13 through the liquid inlet 11, and clean water may be delivered into the discharge cavity 13 through the water inlet 12. In this way, the detergent and clean water can be discharged into the washing tub of the washing machine through the discharge cavity 13. Further, a liquid mixing device may be provided downstream of the discharge cavity 13, to facilitate sufficient mixing of the detergent and clean water.

[0075] The detection device 300 is at least partially disposed in the discharge cavity 13. The detection device 300 is configured to sense the presence or absence of the laundry treatment agent. The laundry treatment agent herein may be a detergent or a softener. For example, the detection device 300 may include two probes. The detection device 300 can detect whether there is the detergent in the discharge cavity 13 by detecting conductivity of each of the two probes in the discharge cavity 13. When the detergent does not submerge the two probes simultaneously, a warning is issued to remind the user that the detergent needs to be dispensed. The probes used herein are probe sensors, and the detailed structures thereof are omitted herein.

[0076] By arranging the detection device 300 at least partially in the discharge cavity 13, for example, positioning a detection end of the detection device 300 in the discharge cavity 13, when the detergent is delivered into the discharge cavity 13, the detection device 300 can sense the presence or absence of the detergent, thereby determining whether there is the detergent in the discharge cavity 13. When no detergent is detected, a warning would be issued to remind the user that the detergent needs to be dispensed, thereby ensuring a washing effect of the washing machine on the laundry and normal operation of the washing machine.

[0077] Further, when clean water is delivered into the discharge cavity 13, clean water may flush the detection device 300 to remove a detergent left on a surface of the detection device 300. In this way, the detergent on the surface of the detection device 300 can be completely cleaned, thus reducing corrosion of the detergent on the detection device 300. Therefore, sensing performance of the detection device 300 can be prevented from being reduced due to deterioration of the surface of the detection device 300 or foreign matter adhering to the surface of the detection device 300, thus facilitating prolonging service life and improving operation reliability of the detection device 300.

[0078] Meanwhile, the detection device 300 is in contact with the detergent only when the detergent is delivered into the discharge cavity 13. In fact, the detection device 300 is not in contact with the detergent for a long time. Therefore, a power supply isolation module does not need to be independently provided. As a result, it is convenient to simplify the structure of the liquid storage box assembly 1 and improve use safety of the liquid storage box assembly 1. In addition, the risk of electric leakage and electric shock can be avoided.

[0079] Optionally, after each delivering of the detergent into the discharge cavity 13, it is necessary to deliver clean water into the discharge cavity 13 once, to clean away the detergent on the detection device 300. Certainly, in other examples, the detergent may also be consecutively delivered several times, and then the delivering of clean water is performed.

[0080] The discharge cavity 13 has a first end and a second end in a length direction of the discharge cavity 13. The first end is located at an upper part of the discharge cavity 13. The second end is located at a lower part of the discharge cavity 13. The liquid inlet 11 and the water inlet 12 are each located at the first end. The liquid inlet 11 and the water inlet 12 are located adjacent to each other. The liquid inlet 11 is in communication with a liquid storage cavity of the liquid storage box assembly 1 through a liquid inlet pipeline. The water inlet 12 is in communication with a tap water source through a water inlet pipeline. A discharge outlet is formed at the second end of the discharge cavity 13. The discharge outlet is in communication with the washing tub of the washing machine. The detection device 300 is disposed between the first end and the second end.

[0081] An upper end of the discharge cavity 13 has a guide channel 141. The liquid inlet 11 and the water inlet 12 are in communication with the guide channel 141, respectively. A middle part of the discharge cavity 13 is provided with a step portion 15. The detection end of the detection device 300 is located at the step portion 15. The guide channel 141 extends vertically. An opening at a lower end of the guide channel 141 and the step portion 15 directly face towards each other. In this way, the detergent and the clean water can be accurately and smoothly guided to the detection device 300, thereby facilitating the detection of the detection device 300 on the detergent, thereby flushing and cleaning the detection device 300 with the clean water.

[0082] The guide channel 141 is located at the upper end of the discharge cavity 13. A guide rib 14 is provided in the discharge cavity 13. The guide rib 14 has an upper end connected to a cavity wall of the discharge cavity 13 and a lower end extending in an up-down direction. The guide channel 141 is defined between the guide rib 14 and the cavity wall of the discharge cavity 13 and extends vertically, which facilitates the formation of the guide channel 141.

[0083] An upper surface of the step portion 15 is provided with a baffle 151. The baffle 151 extends vertically. A detection groove 152 may be defined by the baffle 151 and a side wall of the discharge cavity 13. The detection end of the detection device 300 is located in the detection groove 152. In this way, it is possible to gather the detergent by using the detection groove 152. Therefore, accurate detection of the detergent by the detection device 300 is facilitated.

[0084] The cavity wall of the discharge cavity 13 has a mounting through hole 16. The detection device 300 extends into the discharge cavity 13 through the mounting through hole 16. In this way, not only the detection of the detergent can be achieved by the detection device 300 in the discharge cavity 13, but also the installation and arrangement of the detection device 300 can be facilitated.

[0085] The liquid storage box assembly 1 further includes a drive device 400. The drive device 400 is configured to drive the laundry treatment agent to flow to deliver the laundry treatment agent into the washing tub. The drive device 400 is disposed at the box body 10. The liquid inlet 11 is adapted to be in communication with an outlet of the drive device 400. In this way, the drive device 400 can be used to provide a driving force for delivering the detergent. Therefore, it is possible to ensure that the detergent can be smoothly delivered to the discharge cavity 13. Moreover, an improvement in a detection effect of the detection device 300 is facilitated. The box body 10 may have a liquid storage cavity. The liquid storage cavity is adapted to be in communication with an inlet of the drive device 400. In this way, the detergent can be stored in the liquid storage cavity, thereby allowing the detergent to be quantitatively dispensed into the washing tub of the washing machine in batches.

[0086] The drive device 400 may be a driving pump. The driving pump has an inlet in communication with the liquid storage cavity and an outlet in communication with the discharging cavity 13. The driving pump is removably disposed at the box body 10. In this way, the driving pump can better provide the detergent with a driving force to reliably deliver the detergent into the discharging cavity 13, thereby ensuring the detection effect of the detection device 300. Further, the detection device 300 is located at a rear part of an inner side of the detergent box 100. The driving pump is located at a rear part of the detergent box 100. The detection device 300 is provided with a probe. The probe is installed behind the detergent box 100 through screws, press-fit, or other manners. The driving pump is assembled behind the detergent box 100 through snaps and screws.

[0087] The detection device 300 may include a first probe 310 and a second probe 320. The first probe 310 penetrates the box body 10. An outer end of the first probe 310 is located outside the box body 10. Moreover, a detection end of the first probe 310 extends into the discharge cavity 13. The second probe 320 penetrates the box body 10. An outer end of the second probe 320 is located outside the box body 10. Moreover, a detection end of the second probe 320 extends into the discharge cavity 13. The first probe 310 and the second probe 320 are parallel to each other and spaced apart from each other. For example, the first probe 310 and the second probe 320 are arranged side by side horizontally. In this way, it is possible to determine whether there is the detergent in the discharge cavity 13 by detecting conductivity of each of the first probe 310 and the second probe 320. When the detergent does not submerge the two probes simultaneously, a warning is issued to remind the user that the detergent needs to be dispensed. An installation height of the probe needs to consider a concentration of the detergent to be maintained at a predetermined height and distance. Certainly, in other examples, the first probe 310 and the second probe 320 may also be arranged side by side vertically.

[0088] The box body 10 includes a detergent box 100 and a dispenser box 200. The detergent box 100 is configured as an accommodation cavity with an opening at a side of the accommodation cavity. The dispenser box 200 is movably engaged in the accommodation cavity in a drawable manner. A liquid inlet 11, a water inlet 12, and a discharge cavity 13 may be defined by the detergent box 100 and the dispenser box 200. The dispenser box 200 has a liquid storage cavity, thereby realizing the pre-storage of the detergent. During each laundry, it is possible to quantitatively dispense the detergent into the washing tub in batches based on the washing requirements. Therefore, the hassle that users have to fetch and open the detergent bag (or the detergent container) and dispense the detergent each laundry is eliminated. The arrangement of the liquid storage box assembly 1 allows for more convenient clothes washing and the simplification of user's operation.

[0089] The opening of the detergent box 100 is defined at the front side surface of the detergent box 100. The dispenser box 200 is movably engaged in the accommodation cavity in the front-rear direction in a drawable manner. The detergent box 100 may include a base 120 and an upper cover 130. The upper cover 130 is removably disposed at the base 120. An accommodation cavity is defined by the upper cover 130 and the base 120. In this way, the manufacturing of the detergent box 100 and the maintenance and replacement of the components disposed in the detergent box 100 are facilitated. The upper cover 130 is located at the top of the detergent box 100, and the base 120 is located at the bottom of the detergent box 100. The upper cover 130 and the base 120 are assembled together to form the detergent box 100. The upper cover 130 and the base 120 may be mounted through snaps or screws. The dispenser box 200 is pushed into the accommodation cavity of the detergent box 100 from the front side.

[0090] A laundry treatment device according to an embodiment of the present disclosure will be described below. The laundry treatment device according to the embodiments of the present disclosure includes a body and a liquid storage box assembly 1. The body has a washing cavity and a mounting groove. The liquid storage box assembly 1 is disposed in the mounting groove. The liquid storage box assembly 1 is the liquid storage box assembly 1 according to the above embodiments of the present disclosure.

[0091] Optionally, the laundry treatment device is a washing machine. A washing tub is provided in the washing machine and defines a washing cavity.

[0092] With the laundry treatment device according to the embodiments of the present disclosure, by using the liquid storage box assembly 1 according to the above embodiments of the present disclosure, the liquid storage box assembly 1 has the advantages such as ease of fully opening the dispenser box 200, user-friendly operation, and the comfortable user experience.

[0093] Other configurations and operations of the laundry treatment device according to the embodiments of the present disclosure are known to those of ordinary skill in the art, and the description thereof in detail will be omitted herein.

[0094] In the description of the present disclosure, it is to be understood that, terms such as "center", "longitudinal", "lateral", "length", "width", "thickness", "over", "below", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom", "in", "out", "clockwise", "counterclockwise", "axial", "radial", "circumferential", etc., is based on the orientation or position relationship shown in the drawings, and is only for the convenience of describing the present disclosure and simplifying the description, rather than indicating or implying that the associated 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 to the present disclosure. In addition, features defined with "first" and "second" may explicitly or implicitly include one or more of these features. In the description of the present disclosure, "a plurality of' means two or more, unless otherwise specifically defined. In the description of the present disclosure, the first feature being "on" or "under" the second feature may include the scenarios that the first feature is in direct contact with the second feature, or the first and second features, instead of being in direct contact with each other, are in contact with each other through another feature therebetween.

[0095] In the description of the present disclosure, the first feature being "above" the second feature may indicate that the first feature is directly above or obliquely above the second feature, or simply indicate that the level of the first feature is higher than that of the second feature.

[0096] In the present disclosure, it should be noted that, unless otherwise clearly specified and limited, terms such as "installed", "mounted", "connected", 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; and internal communication between two components. For those of ordinary skill in the art, the specific meaning of the above-mentioned terms in the present disclosure can be understood according to specific circumstances.

[0097] In the description of this specification, descriptions with reference to the terms "an embodiment", "some embodiments", "schematic embodiments", "examples", "specific examples", or "some examples", etc. mean that specific features, structure, materials, or characteristics described in conjunction with the embodiment or example are included in at least one embodiment or example of the present disclosure. In this specification, the schematic representations of the above terms do not necessarily refer to the same embodiment or example. Moreover, the described specific features, structures, materials, or characteristics may be combined in any one or more embodiments or examples in a suitable manner.

[0098] Although the embodiments of the present disclosure are illustrated and described above, it can be understood by those of ordinary skill in the art that various changes, modifications, substitutions, and alterations may be made to these embodiments without departing from the principles and purpose of the present disclosure. The scope of the present disclosure is defined by the claims and their equivalents.

Claims

1. A liquid storage box assembly, comprising: a detergent box having an accommodation cavity with an opening at a side of the accommodation cavity; and a dispenser box engaged in the accommodation cavity in a drawable manner in such a manner that the dispenser box is openable or closeable, at least one

of the detergent box and the dispenser box being provided with a rolling member, and another one of the detergent box and the dispenser box having an inclined guide surface engaged with the rolling member, the inclined guide surface obliquely extending downwards in an opening direction of the dispenser box.

2. The liquid storage box assembly according to claim 1, wherein the other one of the detergent box and the dispenser box is provided with a guide portion, the inclined guide surface being formed at the guide portion.

3. The liquid storage box assembly according to claim 2, wherein in the opening direction of the dispenser box, a length of the inclined guide surface is 1 and a length of the guide portion is L, where $l \geq 0.5$ L.

4. The liquid storage box assembly according to claim 1, wherein the other one of the detergent box and the dispenser box further has a limiting surface, the limiting surface being connected to the inclined guide surface and obliquely extending upwards in the opening direction of the dispenser box.

5. The liquid storage box assembly according to claim 4, wherein the inclined guide surface has an extending length greater than an extending length of the limiting surface.

6. The liquid storage box assembly according to claim 4, wherein the other one of the detergent box and the dispenser box further has an engagement guide surface, the engagement guide surface having an end connected to the limiting surface and another end extending horizontally.

7. The liquid storage box assembly according to claim 1, wherein: the rolling member comprises at least one first roller disposed at the detergent box; and the inclined guide surface comprises a first guide surface located at the dispenser box, the first roller being in contact with and engaged with the first guide surface.

8. The liquid storage box assembly according to claim 7, wherein the at least one first roller comprises at least two first rollers arranged at intervals in the opening direction of the dispenser box, some of the at least two first rollers being disposed at a side of the detergent box close to the opening, and the rest of the at least two first rollers being disposed at a side of the detergent box facing away from the opening.

9. The liquid storage box assembly according to claim 7, wherein: the rolling member further comprises at least one second roller disposed at the dispenser box; and the inclined guide surface further comprises a second guide surface located at the detergent box, the at least one second roller being in contact with and engaged with the second guide surface, and the second guide surface and the first guide surface being parallel to each other and arranged side by side.

10. The liquid storage box assembly according to claim 9, wherein the at least one second roller member comprises at least two second rollers arranged at intervals in the opening direction of the dispenser box, some of the at least two second rollers being disposed at a side of the dispenser box facing away from the opening, and the rest of the at least two second rollers being disposed at a side of the dispenser box close to the opening.

11. The liquid storage box assembly according to claim 1, wherein the detergent box comprises: a base; and an upper cover removably disposed at the base, the accommodation cavity being defined by the upper cover and the base.

12. A laundry treatment device, comprising: a body having a washing cavity and a mounting groove; and the liquid storage box assembly according to any one of claims 1 to 11, the liquid storage box assembly being mounted in the mounting groove.

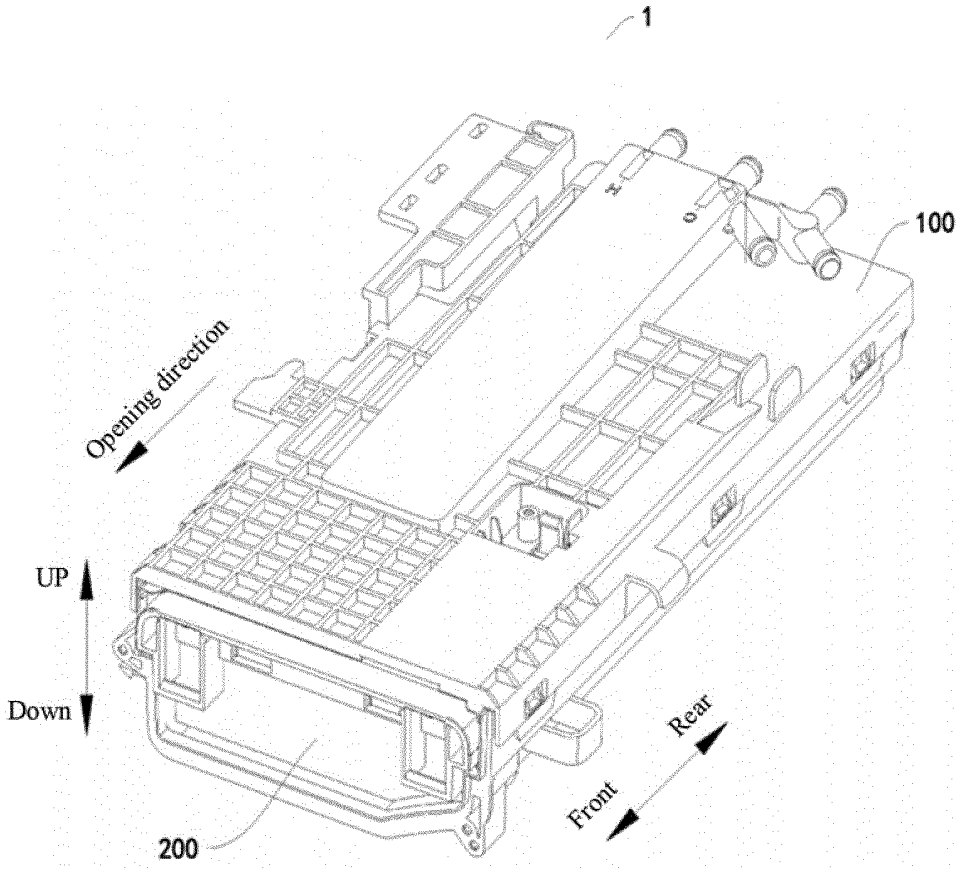
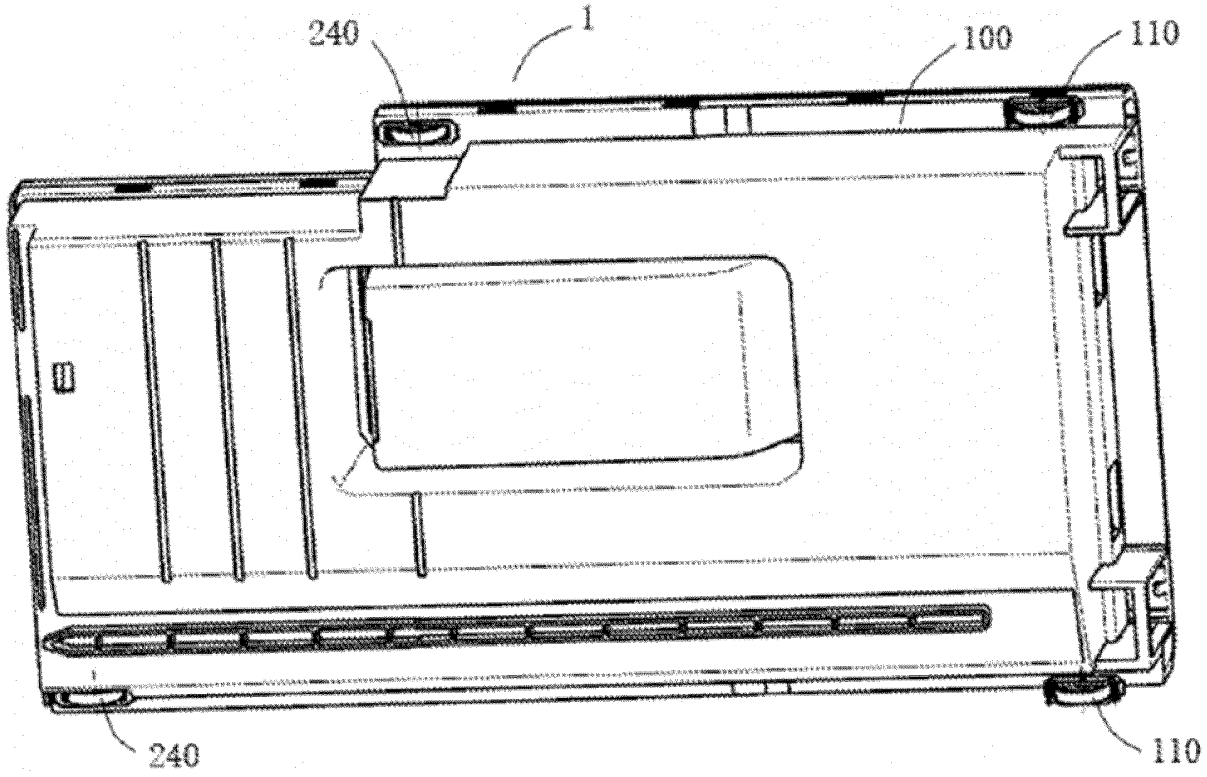

1
100
Opening direction
UP
Down
Rear
Front
200

FIG. 1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1
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110
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FIG. 2

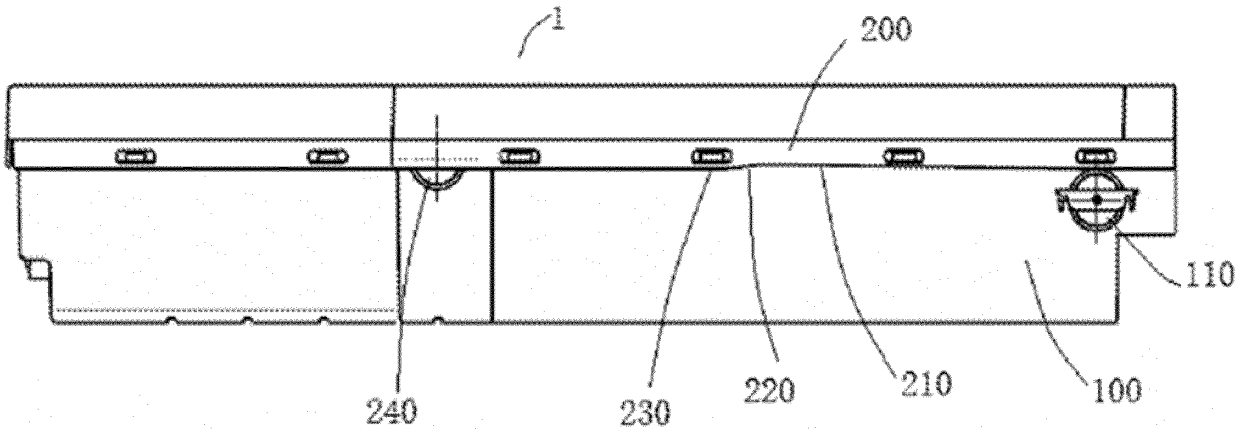

FIG. 3

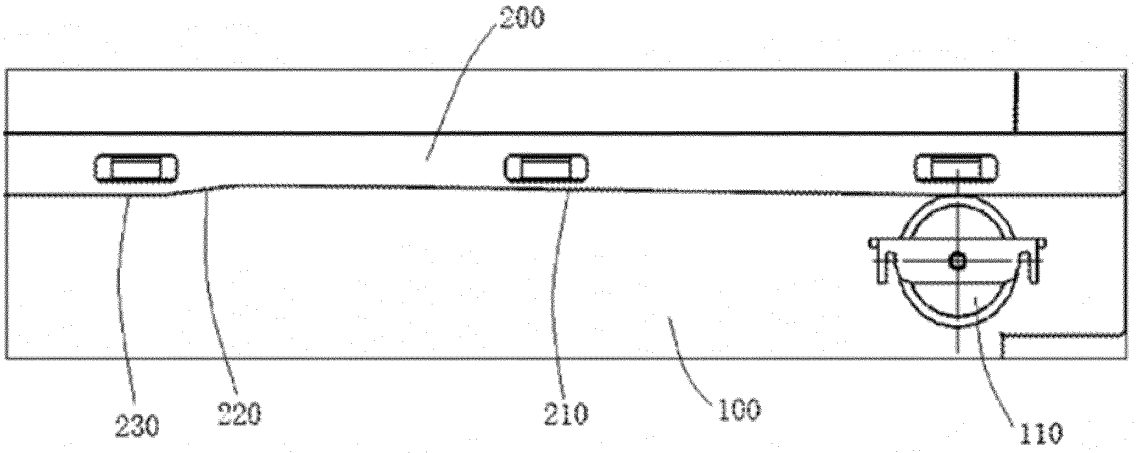

FIG. 4

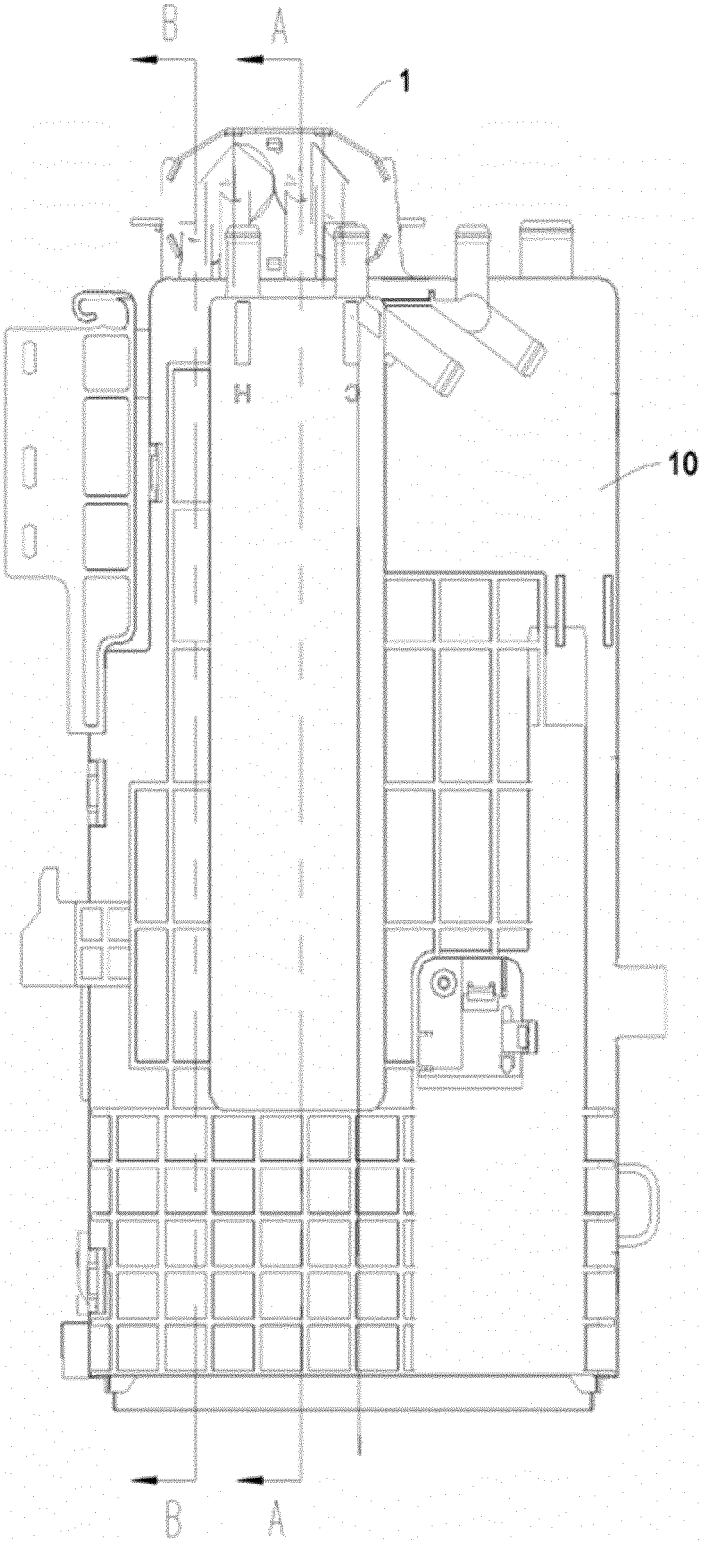

FIG. 5

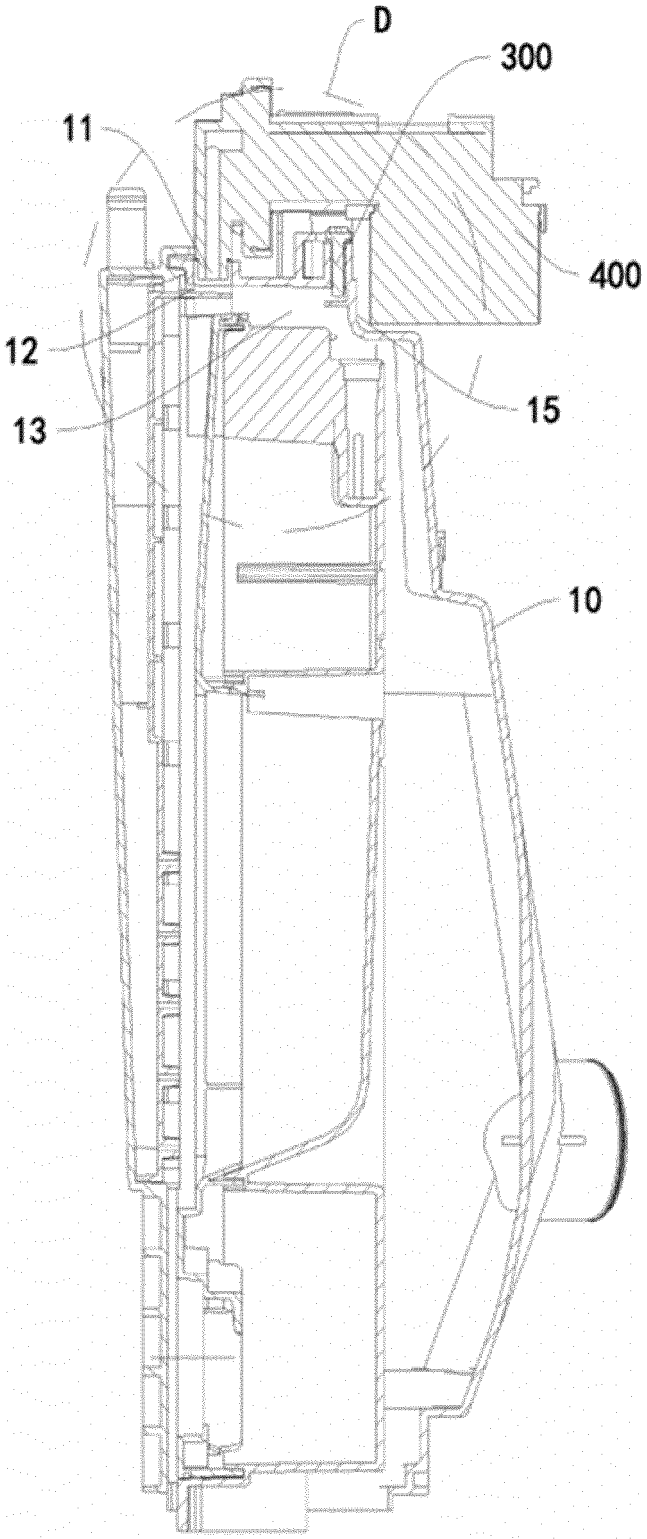

FIG. 6

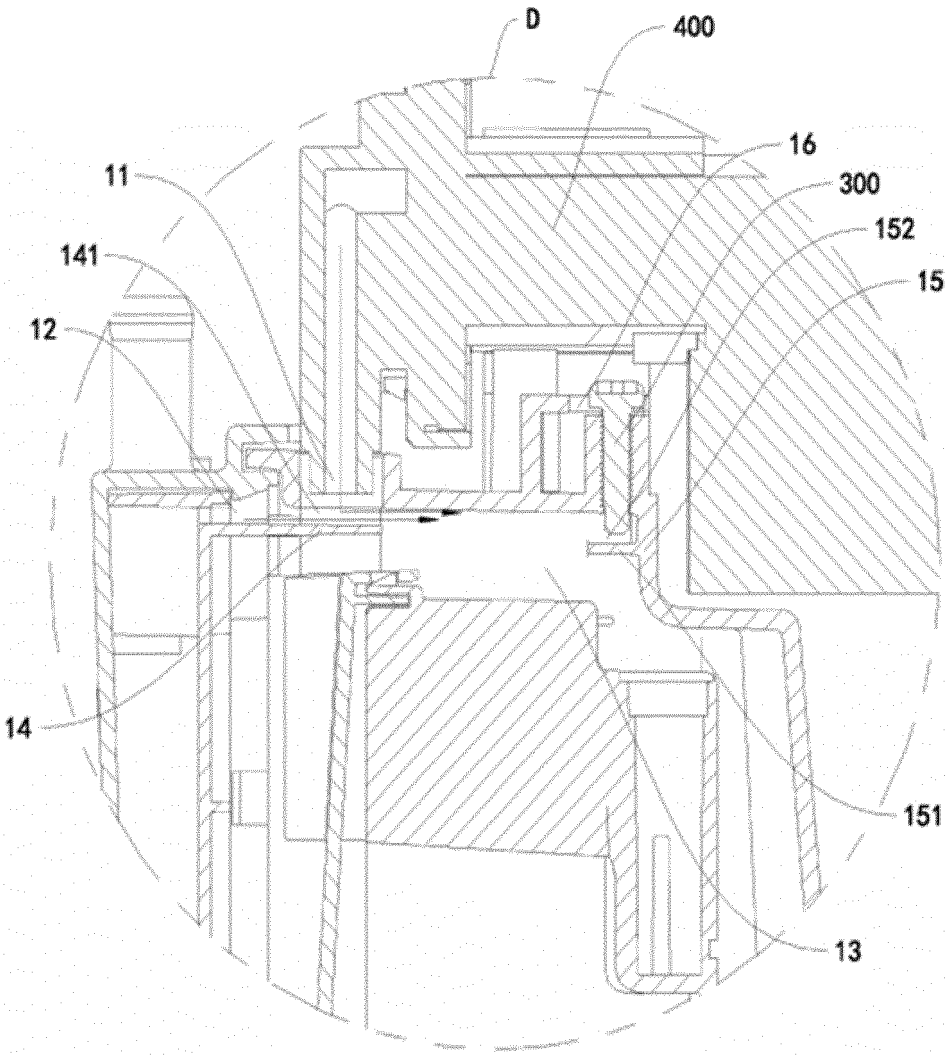

FIG. 7

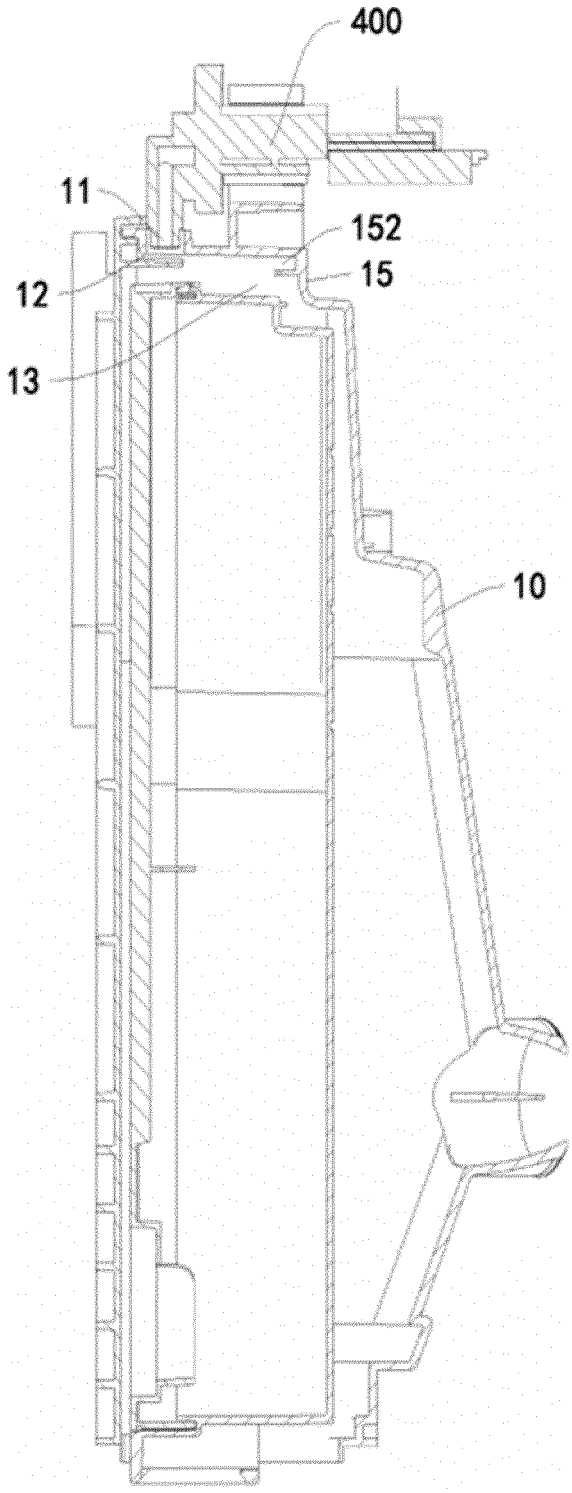

FIG. 8

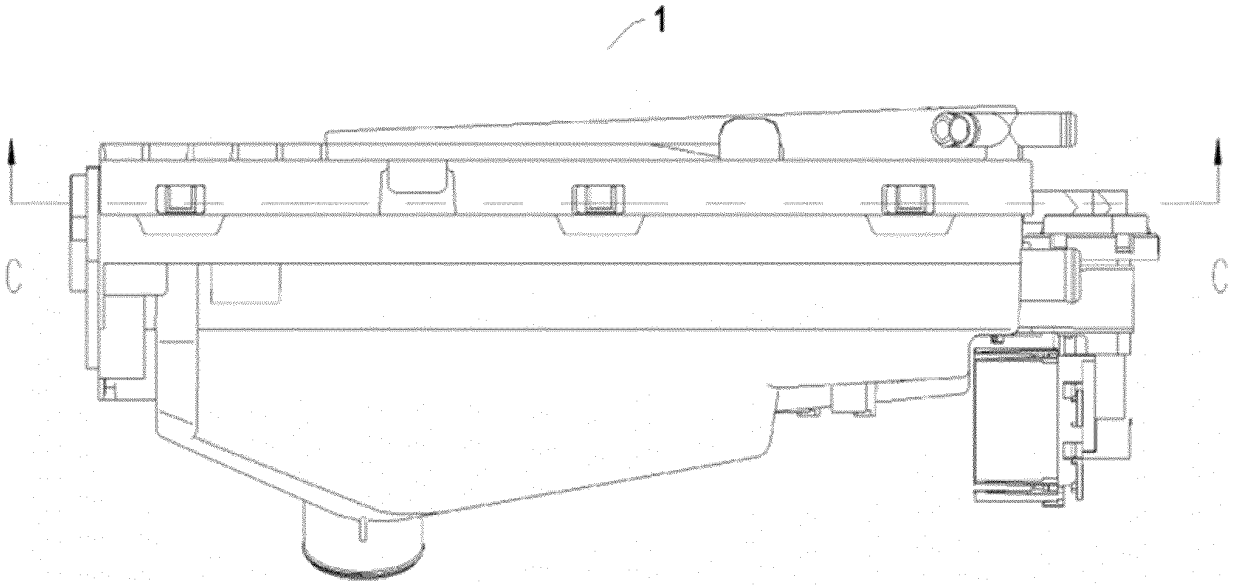

FIG. 9

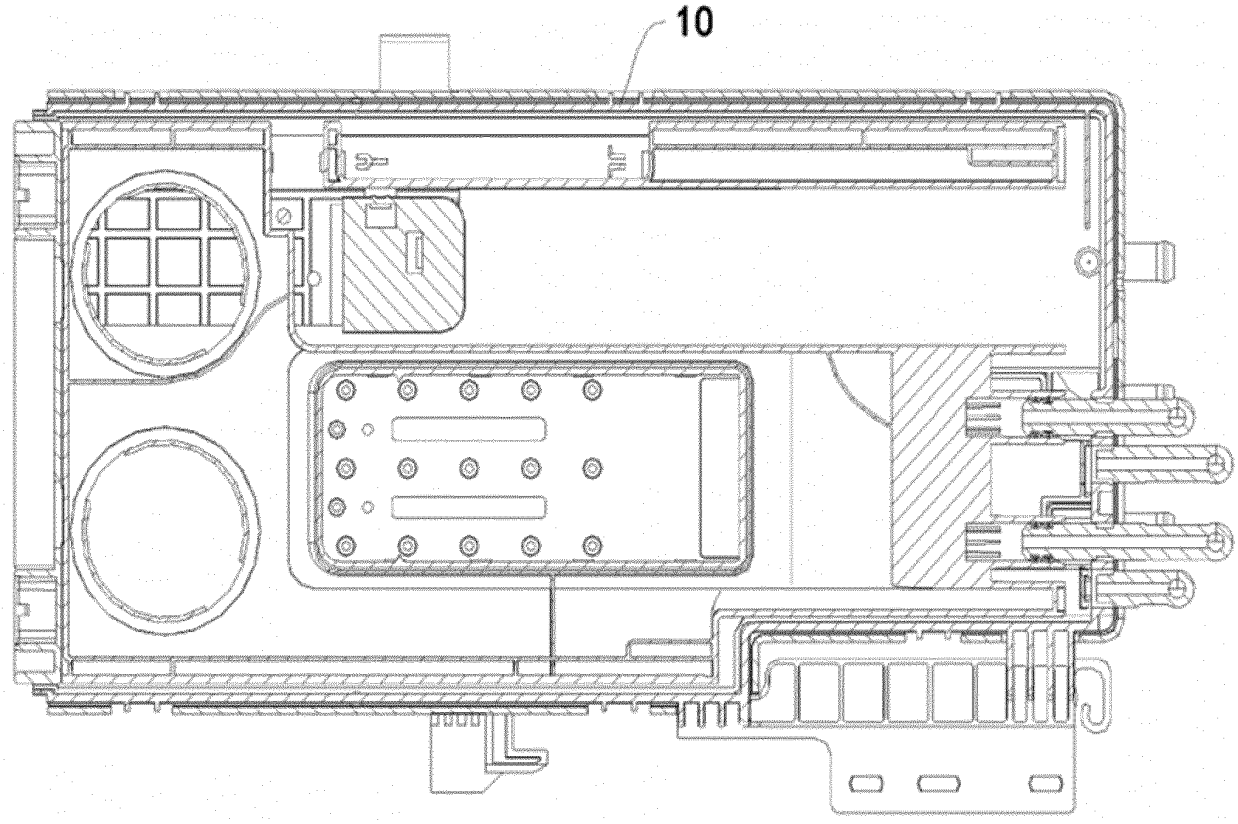

FIG. 10

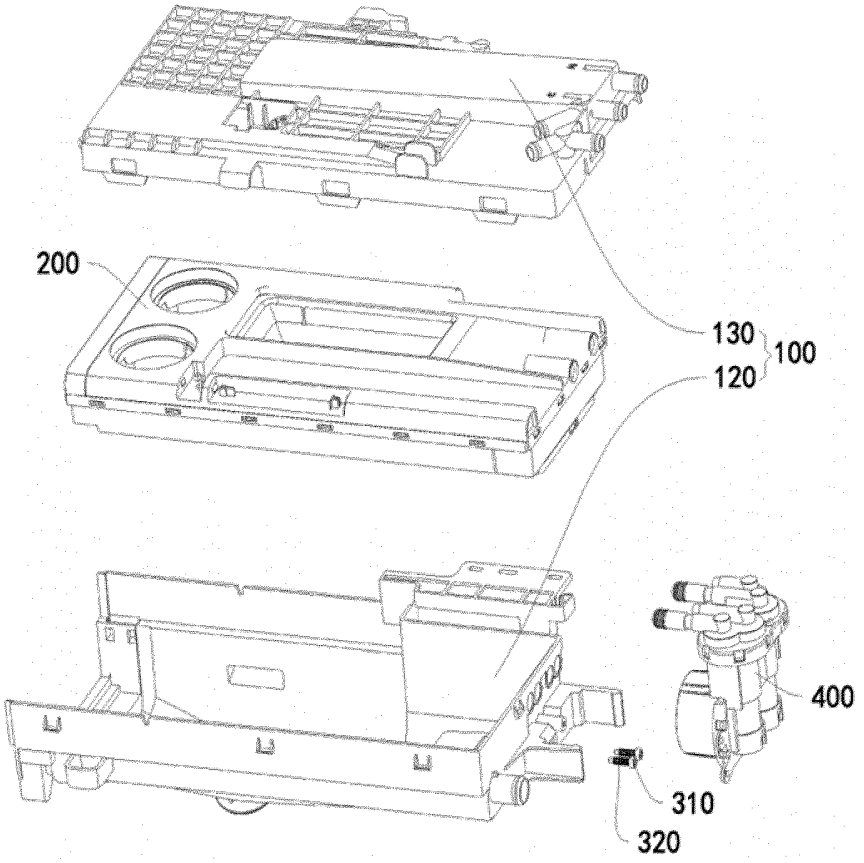

FIG. 11

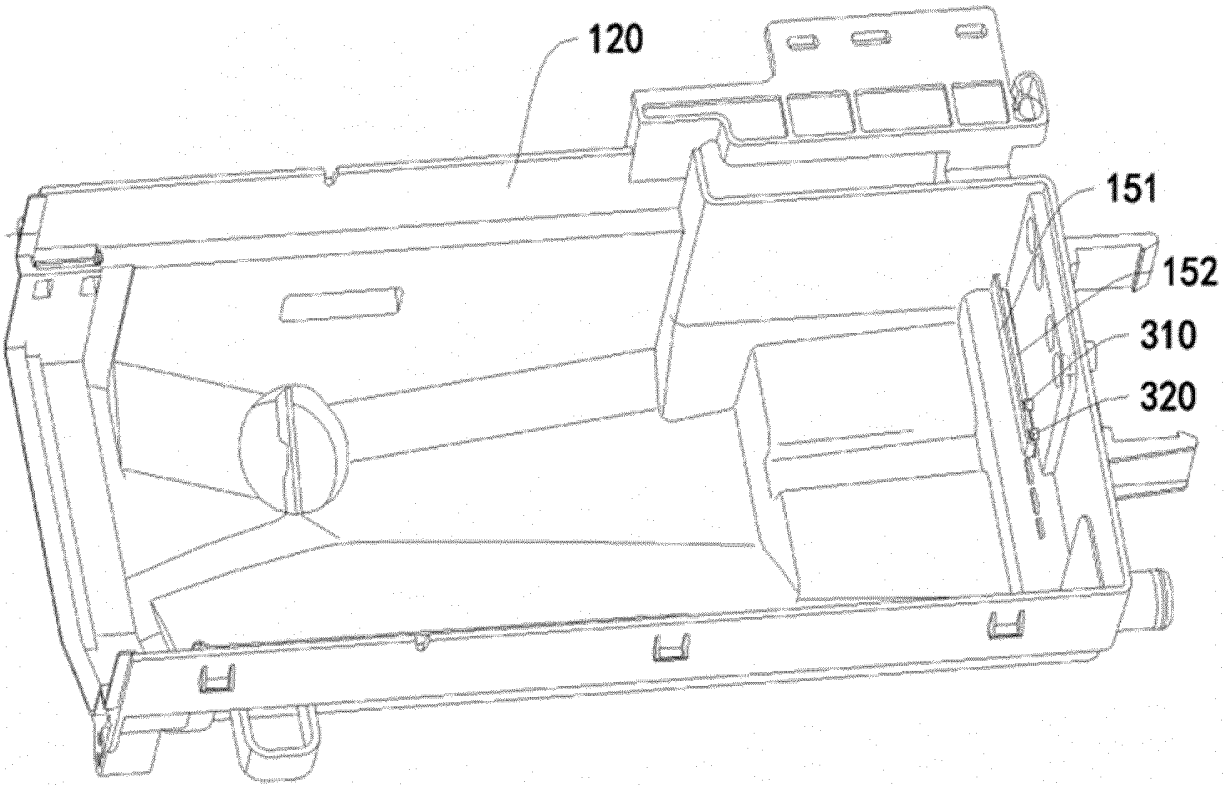

FIG. 12

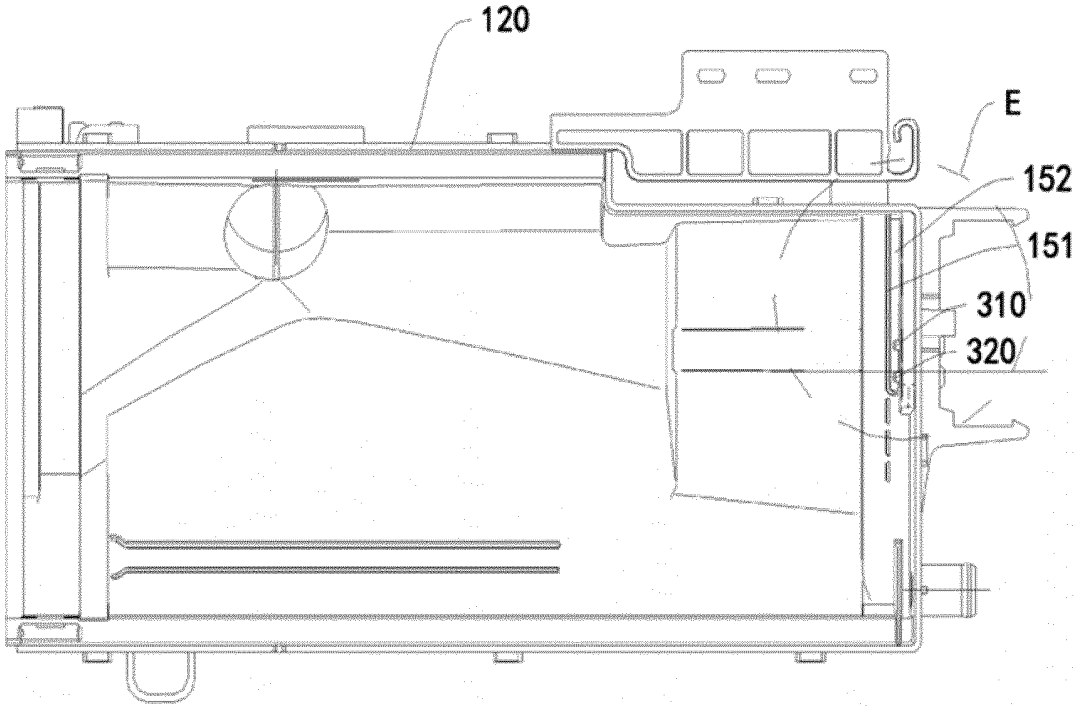

FIG. 13

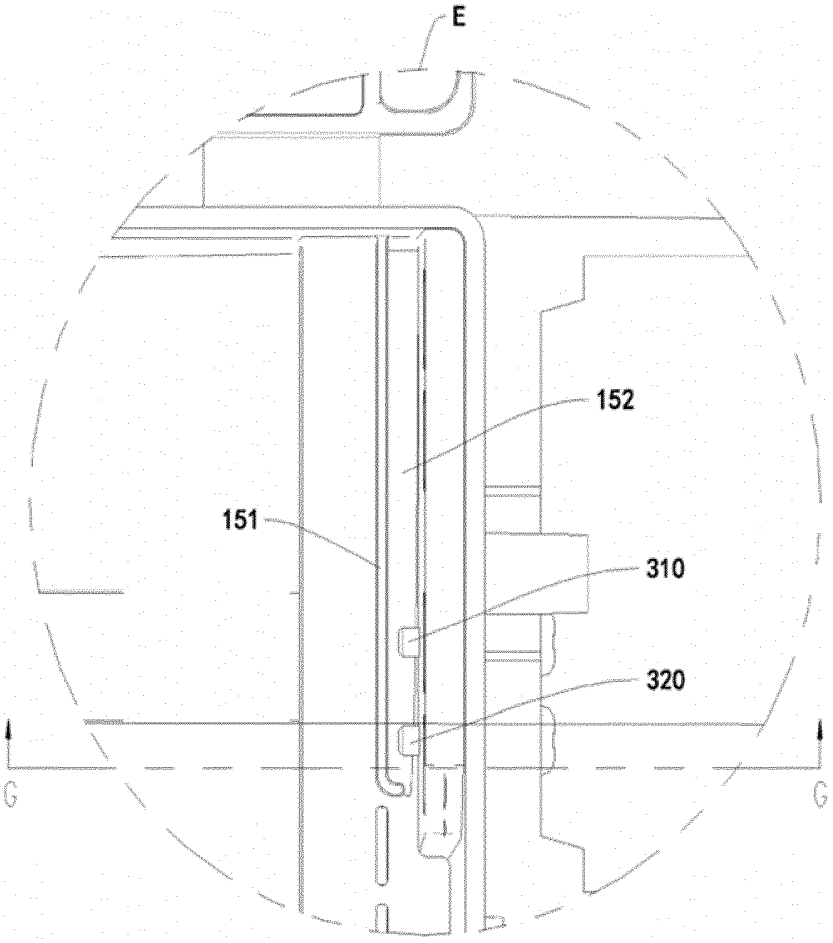

FIG. 14

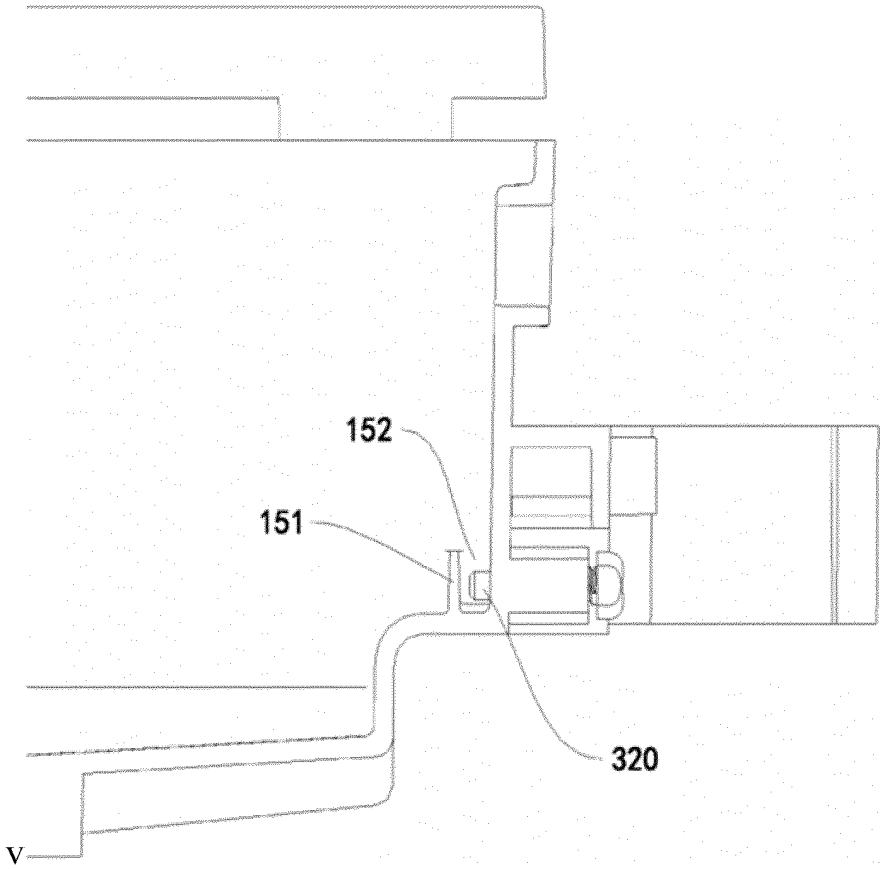

FIG. 15

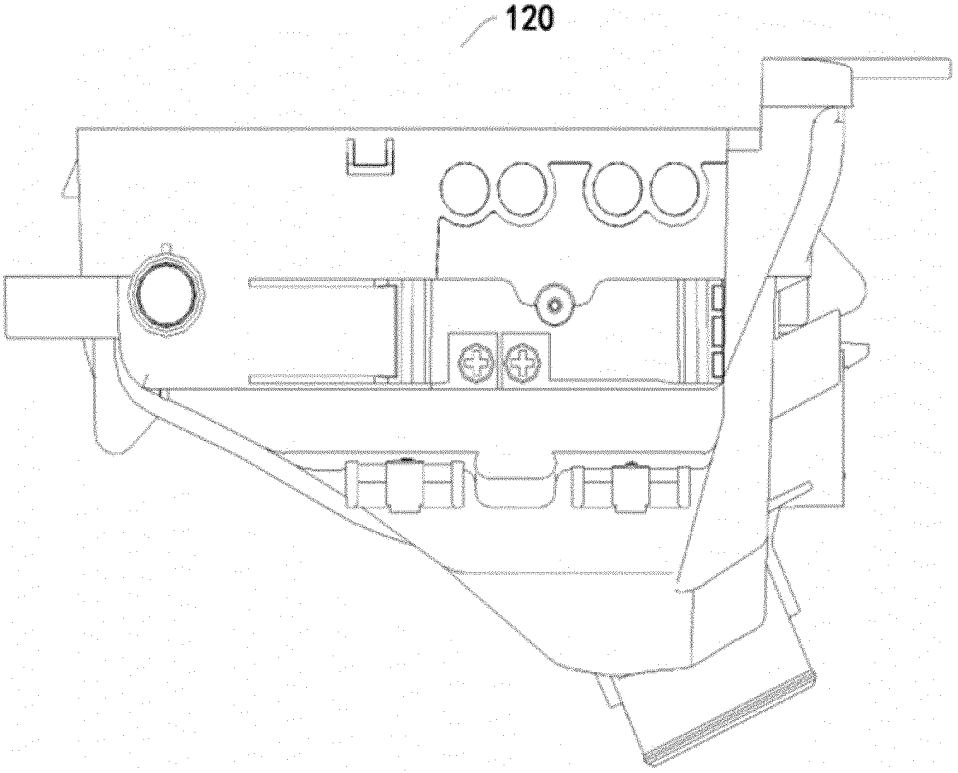

FIG. 16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/109812

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/02(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)

CNPAT, CNKI, WPI, EPODOC: 滚子, 辊, 球, 轮, 导槽, 导轨, 滑槽, 倾, 斜, 盒, 分配器, 洗涤, 柔软, 柔顺, 皂, wheel?, roller?, box?, incline, slant, guid+, lead+.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	CN 113201915 A (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 03 August 2021 (2021-08-03) description, paragraphs 87-111, and figures 13-16	1-8, 11-12
Y	CN 109898287 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 18 June 2019 (2019-06-18) description, paragraphs 19-23, and figures 1-2	1-12
Y	CN 202709630 U (HAIER GROUP CORP., et al.) 30 January 2013 (2013-01-30) description, paragraphs [0021]-[0029] and figures 1-3	1-12
Y	CN 109387023 A (LG ELECTRONICS INC.) 26 February 2019 (2019-02-26) description, paragraphs [0071]-[0077], and figures 4A-5B	9-10
A	CN 107142685 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 08 September 2017 (2017-09-08) entire document	1-12
A	FR 2568280 A1 (AMIENS CONST ELECTRO MECA) 31 January 1986 (1986-01-31) entire document	1-12

☑ 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
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 February 2022	**25 February 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/109812

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 206502997 U (WUXI FEILING ELECTRONIC CO., LTD.) 19 September 2017 (2017-09-19) entire document	1-12
A	CN 107142684 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 08 September 2017 (2017-09-08) entire document	1-12

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/109812

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 113201915 A	03 August 2021	None	
CN 109898287 A	18 June 2019	CN 109898285 A	18 June 2019
		WO 2019114656 A1	20 June 2019
		CN 109898285 B	27 August 2021
		CN 109898287 B	07 September 2021
CN 202709630 U	30 January 2013	None	
CN 109387023 A	26 February 2019	KR 20190014916 A	13 February 2019
		EP 3438581 A1	06 February 2019
		EP 3438581 B1	01 September 2021
		US 2019041123 A1	07 February 2019
		US 10571186 B2	25 February 2020
CN 107142685 A	08 September 2017	CN 107142685 B	02 July 2021
FR 2568280 A1	31 January 1986	EP 0170323 A1	05 February 1986
		FR 2568280 B1	05 September 1986
		ES 295999 U	01 November 1987
		ES 295999 Y	16 May 1988
CN 206502997 U	19 September 2017	None	
CN 107142684 A	08 September 2017	CN 107142684 B	05 February 2021

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202110604761 **[0001]**