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(54) **DETERGENT CONTAINER ASSEMBLY FOR WASHING MACHINE, AND WASHING MACHINE HAVING SAME**

(57) A detergent container assembly (200) for a washing machine (1000), and washing machine (1000) having the same. The detergent container assembly (200) comprises: a detergent container (1), a dispenser container (2) and a drive assembly. The dispenser container (2) is provided in the detergent container (1), and is suitable for moving between an open position and a closed position, a front surface (23) of the dispenser container being provided with a button (231) thereon. The drive assembly is provided between the dispenser container (2) and the detergent container (1), and is configured to drive the dispenser container (2) to move from the closed position to the open position when the button (231) is pressed.

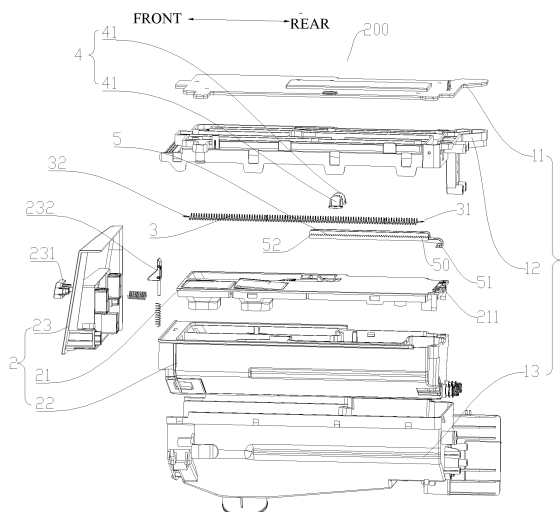


Fig. 2

Description

FIELD

[0001] The present disclosure relates to a field of washing machines, and more particularly to a detergent box assembly for a washing machine and a washing machine having the same.

BACKGROUND

[0002] It is pointed out in the related art that a detergent box of a drum washing machine is generally opened and closed by being drawn manually. That is, the detergent box is generally provided with a hand-clasping groove which is easy to be held by a user. However, the hand-clasping groove will influence an overall appearance of the drum washing machine, and dust tends to accumulate at the hand-clasping groove. Moreover, the opening and closing of the detergent box by drawing belong to a manual operation, so a comfort of use is not high, and thus the user has poor hand feeling and experience feeling.

SUMMARY

[0003] Embodiments of the present disclosure seek to solve at least one of the problems existing in the related art to at least some extent. Accordingly, a detergent box assembly for a washing machine is provided by the present disclosure. A distributor box of the detergent box assembly may pop out automatically or semi-automatically.

[0004] A washing machine having the detergent box assembly is further provided by the present disclosure.

[0005] To achieve the above objectives, the detergent box assembly for the washing machine according to a first aspect of embodiments of the present disclosure is provided. The detergent box assembly includes a detergent box; a distributor box disposed in the detergent box and configured to move between an open position and a closed position, the distributor box being provided with a button in a front surface thereof; and a drive unit disposed between the distributor box and the detergent box, and configured to drive the distributor box to move from the closed position to the open position when the button is pressed.

[0006] In the detergent box assembly for the washing machine according to embodiments of the present disclosure, by the drive unit, the distributor box may pop out of the detergent box assembly automatically or semi-automatically.

[0007] In addition, the detergent box assembly according to the above embodiments of the present disclosure may further have following additional technical features.

[0008] According to an example of the present disclosure, the drive unit includes a gear subassembly mounted to the detergent box; a rack member disposed to the

distributor box and configured to mesh with the gear subassembly, in which along a length direction of the rack member, the rack member has a first end away from the front surface of the distributor box and a second end adjacent to the front surface of the distributor box and opposite to the first end; and a tension spring arranged along the length direction of the rack member and having a movable end and a fixed end opposite to the movable end, in which the movable end is coupled to a side away from the front surface of the distributor box, and the fixed end is mounted to the detergent box adjacent to the front surface of the distributor box.

[0009] According to an example of the present disclosure, the movable end is further fixed to the first end of the rack member.

[0010] According to an example of the present disclosure, the gear subassembly includes a damping gear, and a rotation axis of the damping gear is arranged horizontally.

[0011] According to an example of the present disclosure, the rack member includes two racks opposite to each other, the gear subassembly includes two damping gears, and the two racks are configured to mesh with the two damping gears respectively.

[0012] According to an example of the present disclosure, the two racks are integrally formed as a dual-rack member.

[0013] According to an example of the present disclosure, the two damping gears are disposed at two opposite sides of the dual-rack member respectively.

[0014] According to an example of the present disclosure, the tension spring is disposed in the dual-rack member.

[0015] According to an example of the present disclosure, the distributor box has a top cover, and the rack member is disposed to the top cover of the distributor box.

[0016] According to an example of the present disclosure, one of the dual-rack member and the distributor box is provided with a mounting member, the other one of the dual-rack member and the distributor box is provided with a mounting groove, and the mounting member is configured to be fitted with the mounting groove so as to mount the dual-rack member to the distributor box.

[0017] According to an example of the present disclosure, the mounting member is disposed to a rear end of the dual-rack member and extends downwards and forwards.

[0018] According to an example of the present disclosure, the detergent box assembly further includes a lock catch disposed to the distributor box and coupled to the button, and the lock catch is configured to be locked to the washing machine. When the button is pressed, the lock catch is disengaged from the washing machine. After the lock catch is disengaged from the washing machine, the tension spring drives the distributor box to move from the closed position to the open position.

[0019] The washing machine according to a second aspect of embodiments of the present disclosure in-

cludes: a machine body assembly having a detergent box; a distributor box disposed in the detergent box and configured to move between an open position and a closed position, the distributor box being provided with a button in a front surface thereof; and a drive unit disposed between the distributor box and the detergent box, and configured to drive the distributor box to move from the closed position to the open position when the button is pressed.

[0020] In the washing machine according to embodiments of the present disclosure, by the drive unit, the distributor box may pop out of the detergent box assembly automatically or semi-automatically.

[0021] According to an example of the present disclosure, the drive unit includes a gear subassembly mounted to the detergent box; a rack member disposed to the distributor box and configured to mesh with the gear subassembly, in which along a length direction of the rack member, the rack member has a first end away from the front surface of the distributor box and a second end adjacent to the front surface of the distributor box and opposite to the first end; and a tension spring arranged along the length direction of the rack member and having a movable end and a fixed end opposite to the movable end, in which the movable end is coupled to a side away from the front surface of the distributor box, and the fixed end is mounted to the machine body assembly adjacent to the front surface of the distributor box.

[0022] According to an example of the present disclosure, the movable end is further fixed to the first end of the rack member, and the fixed end is mounted to the detergent box adjacent to the front surface of the distributor box.

[0023] According to an example of the present disclosure, the gear subassembly includes a damping gear, and a rotation axis of the damping gear is arranged horizontally.

[0024] According to an example of the present disclosure, the rack member includes two racks opposite to each other, the gear subassembly includes two damping gears, and the two racks are configured to mesh with the two damping gears respectively.

[0025] According to an example of the present disclosure, the two racks are integrally formed as a dual-rack member.

[0026] According to an example of the present disclosure, the two damping gears are disposed at two opposite sides of the dual-rack member respectively.

[0027] According to an example of the present disclosure, the tension spring is disposed in the dual-rack member.

[0028] According to an example of the present disclosure, the distributor box has a top cover, and the rack member is disposed to the top cover of the distributor box.

[0029] According to an example of the present disclosure, one of the dual-rack member and the distributor box is provided with a mounting member, the other one of the dual-rack member and the distributor box is pro-

vided with a mounting groove, and the mounting member is configured to be fitted with the mounting groove so as to mount the dual-rack member to the distributor box.

[0030] According to an example of the present disclosure, the mounting member is disposed to a rear end of the dual-rack member and extends downwards and forwards.

[0031] According to an example of the present disclosure, the washing machine further includes a lock catch disposed to the distributor box and coupled to the button, and the lock catch is configured to be locked to the washing machine. When the button is pressed, the lock catch is disengaged from the washing machine. After the lock catch is disengaged from the washing machine, the tension spring drives the distributor box to move from the closed position to the open position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032]

Fig. 1 is a schematic view of a washing machine according to an embodiment of the present disclosure;

Fig. 2 is an exploded view of a detergent box assembly for a washing machine according to an embodiment of the present disclosure;

Fig. 3 is a schematic view illustrating a distributor box shown in Fig. 2 located at a closed position;

Fig. 4 is a partially schematic view of the detergent box assembly shown in Fig. 3;

Fig. 5 is a partially schematic view of the detergent box assembly shown in Fig. 3;

Fig. 6 is a schematic view illustrating the distributor box shown in Fig. 2 located at an open position;

Fig. 7 is a partially schematic view of the detergent box assembly shown in Fig. 6;

Fig. 8 is a partially schematic view of the detergent box assembly shown in Fig. 6.

Reference numerals:

[0033]

1000: washing machine; 100: machine body; 200: detergent box assembly;

1: detergent box; 11: detergent-box upper cover; 12: detergent-box lower cover; 13: detergent-box base seat;

2: distributor box; 21: distributor-box top cover; 211: mounting groove;

22: distributor-box seat;

23: front surface of distributor box; 231: button;

232: lock catch;

3: tension spring member; 31: movable end; 32: fixed end;

4: gear subassembly; 41: damping gear;
5: rack member; 50: first end; 51: mounting member;
52: second end.

DETAILED DESCRIPTION

[0034] Reference will be made in detail to embodiments of the present disclosure. The same or similar elements and the elements having same or similar functions are denoted by like reference numerals throughout the descriptions. The embodiments described herein with reference to drawings are explanatory, illustrative, and used to generally understand the present disclosure. The embodiments shall not be construed to limit the present disclosure.

[0035] Various embodiments and examples are provided in the following description to implement different structures of the present disclosure. In order to simplify the present disclosure, certain elements and settings will be described. However, these elements and settings are only by way of example and are not intended to limit the present disclosure. In addition, reference numerals may be repeated in different examples in the present disclosure. This repeating is for the purpose of simplification and clarity and does not refer to relations between different embodiments and/or settings. Furthermore, examples of different processes and materials are provided in the present disclosure. However, it would be appreciated by those skilled in the art that other processes and/or materials may be also applied. Moreover, a structure in which a first feature is "on" a second feature may include an embodiment in which the first feature directly contacts the second feature, and may also include an embodiment in which an additional feature is formed between the first feature and the second feature so that the first feature does not directly contact the second feature.

[0036] A detergent box assembly 200 for a washing machine 1000 according to a first aspect of embodiments of the present disclosure will be described with reference to Figs. 1-8. The washing machine 1000 may be configured as a drum washing machine. In following descriptions of the present application, the drum washing machine is taken as an example of the washing machine 1000 for explanations.

[0037] As shown in Fig. 2, the detergent box assembly 200 for the washing machine 1000 according to the first aspect of embodiments of the present disclosure includes: a detergent box 1, a distributor box 2 and a drive unit. The drive unit is disposed between the distributor box 2 and the detergent box 1. The drive unit is configured to drive the distributor box to move from a closed position to an open position when a button 231 is pressed.

[0038] Specifically, the distributor box 2 is disposed in the detergent box 1, and the distributor box 2 is configured to movable between the open position and the closed position. A front surface of the distributor box 2 is provided with the button 231. Specifically, referring to Figs. 3-8, by pressing the button 231, the distributor box

2 has an open state and a closed state. When located at the open position, the distributor box 2 is at the open state (as shown in Figs. 6-8), in which case at least part of the distributor box 2 extends out of a front surface of the detergent box 1, and detergents (such as washing powder, laundry detergent or softener) may be put in the distributor box 2. When located at the closed position, the distributor box 2 is at the closed state (as shown in Figs. 3-5), in which case the front surface of the distributor box 2 is preferably flush with the front surface of the detergent box 1, so as to ensure the washing machine 1000 (such as the drum washing machine) to have an aesthetic appearance.

[0039] The distributor box 2 may include a plurality of accommodating grooves which are separated from one other to receive different detergents respectively. It could be understood that, the number and a specific arrangement of the accommodating grooves may be changed adaptively according to actual requirements, which is not limited by the present disclosure.

[0040] In embodiments of the present disclosure, the drive unit includes a gear subassembly 4, a rack member 5 and a tension spring 3. The gear subassembly 4 is mounted to the detergent box 1. Referring to Fig. 2, in a preferable embodiment of the present disclosure, the gear subassembly 4 includes a damping gear 41, and a rotation axis of the damping gear 41 is arranged horizontally. The damping gear is configured as a gear member with damping, which preferably is a fluid damping gear.

[0041] The rack member 5 is provided to the distributor box 2 and is configured to mesh with the gear subassembly 4. Along a length direction of the rack member 5, the rack member 5 has a first end 50 away from a front surface 23 of the distributor box and a second end 52 adjacent to the front surface 23 of the distributor box and opposite to the first end 50. It should be noted that, the rack member 5 may be mounted to the distributor box 2 as a separate member, or the rack member 5 may be formed at a wall surface of a top cover of the distributor box 2, or at a wall of a slot channel of the distributor box 2, i.e., the rack member 5 is configured as a part of the distributor box 2, which is not limited herein.

[0042] The tension spring 3 is arranged along the length direction of the rack member 5 and has a movable end 31 and a fixed end 32 opposite to the movable end. The movable end 31 is coupled to a side away from the front surface of the distributor box, and the fixed end 32 is mounted to the detergent box adjacent to the front surface of the distributor box. Referring to Fig. 2, in a preferable embodiment of the present disclosure, the movable end 31 is further fixed to the first end 50 of the rack member 5. Certainly, in some other embodiments of the present disclosure, the movable end 31 of the tension spring 3 may be mounted to the distributor box, which is not limited herein.

[0043] Specifically, two ends (for example a front end and a rear end shown in Fig. 2) of the tension spring 3 in a length direction thereof are connected to the deter-

gent box 1 and the distributor box 2 respectively, so as to drive the distributor box 2 to move from the closed position to the open position. As shown in Fig. 2, a direction in which the tension spring 3 is stretchable and retractable is same with a direction in which the distributor box 2 is movable. For example, both directions are a front and rear direction shown in Fig. 2. One end (for example the front end shown in Fig. 2) of the tension spring 3 in the length direction thereof is connected to the detergent box 1, and the other end (for example the rear end shown in Fig. 2) of the tension spring 3 in the length direction thereof is connected to the distributor box 2. During a working process of the tension spring 3, the tension spring 3 may drive the distributor box 2 and the detergent box 1 to have a relative displacement with respect to each other. The tension spring 3 is configured to drive the distributor box 2 to move from the closed position to the open position. For example, in an example shown in Fig. 2, the distributor box 2 may be driven by the tension spring 3 to move forwards to the open position from the closed position.

[0044] Thus, by providing the tension spring 3, the distributor box 2 may move from the closed position to the open position under an action of a spring force, without being drawn manually, thus improving a comfort of use. In addition, the tension spring 3 may be configured as a cylinder tension spring. Moreover, a structure and an operation principle of the tension spring 3 are known by those skilled in the art, and will not be elaborated herein.

[0045] In the detergent box assembly 200 for the washing machine 1000 according to the present disclosure, since the tension spring 3, the gear subassembly 4 and the rack member 5 cooperate with one another, a pop-out speed and a pop-out force of the distributor box 2 may be controlled, such that the distributor box 2 may pop out freely, thereby improving an operation stability of the distributor box 2 and a service life of the detergent box assembly 200.

[0046] In another embodiment of the present disclosure, referring to Figs. 1-3 and Fig. 6, a washing machine is provided. The washing machine includes a machine body assembly 100, and the machine body assembly 100 includes the detergent box 1. Thus, the detergent box 1 is a stationary member relative to the machine body assembly 100 of the washing machine 1000.

[0047] In some embodiments of the present disclosure, the detergent box 1 may be configured as a separate member and mounted to the machine body assembly 100. For example, an upper portion of the machine body 100 may have a mounting cavity, and the detergent box 1 may be fixed in the mounting cavity. The detergent box 1 may include a detergent-box upper cover 11, a detergent-box lower cover 12 and a detergent-box base seat 13. The detergent-box upper cover 11 may be welded to a top portion of the detergent-box lower cover 12, and the detergent-box lower cover 12 may be connected to a top portion of the detergent-box base seat 13 by a snapping structure. Certainly, the present disclosure is

not limited to this, a configuration of the detergent box 1 is not limited to this, and a manner of connection among the detergent-box upper cover 11, the detergent-box lower cover 12 and the detergent-box base seat 13 is not limited to this. In some other embodiments of the present disclosure, the detergent box 1 may be integrally formed in the washing machine, serving as a part of the machine body assembly 100.

[0048] In addition, it should be noted that, in another embodiment of the present disclosure, as a whole of the washing machine, the fixed end 32 of the tension spring 3 may be mounted to the machine body assembly 100 adjacent to the front surface 23 of the distributor box. That is, it is fine as long as the fixed end 32 of the tension spring 3 is fixed.

[0049] In the present disclosure, unless specified or limited otherwise, the terms "fixed", "connected" and the like should be construed broadly, may be, for example, fixed connections, detachable connections, or adjustable connections, may also be direct connections or indirect connections via intervening structures, and may also be inner communications or interaction relationships of two elements.

[0050] In an embodiment of the present disclosure, referring to Figs. 1 and 2, the distributor box 2 is a movable member relative to the machine body assembly 100 and/or the detergent box 1. Specifically, the distributor box 2 may be disposed in the detergent box 1 and may move forwards and backwards in the detergent box 1. The distributor box 2 may include a distributor-box top cover 21, a distributor-box seat 22 and a distributor-box panel. The distributor-box top cover 21 may be connected to the distributor-box seat 22 by a snapping manner, and the distributor-box panel may be fixed to the front surface 23 of the distributor box and assembled together therewith.

[0051] As shown in Figs. 1 and 3, when the distributor box 2 is fitted in the detergent box 1 completely, the distributor-box top cover 21 and the distributor-box seat 22 are located between the detergent-box lower cover 12 and the detergent-box base seat 13, and the distributor-box panel may be flush with a front surface of the machine body 100 and may seal a front surface of the mounting cavity tightly, thereby allowing the appearance of the washing machine 1000 to be neat and aesthetic. Certainly, the present disclosure is not limited to this, the configuration of the distributor box 2 is not limited to this, and a manner of connection among the distributor-box top cover 21, the distributor-box seat 22 and the distributor-box panel is not limited to this.

[0052] In an embodiment of the present disclosure, as shown in Figs. 1 and 2, the detergent box assembly 200 may further include the button 231 and a lock catch 232. The button 231 is disposed to the front surface 23 of the distributor box 2. For example, the button 231 may be disposed to the distributor-box panel. The lock catch 232 is disposed to the distributor box 2 and is coupled to the button 231. The lock catch 232 is configured to be locked

to the washing machine. When the button 231 is pressed, the lock catch 232 is disengaged from the washing machine. After the lock catch 232 is disengaged from the washing machine, the tension spring 3 drives the distributor box 2 to move from the closed position to the open position.

[0053] Specifically, as shown in Fig. 2, the button 231 is preferably disposed at a center of the front surface 23 of the distributor box, to facilitate operations for the user. When the button 231 is pressed, the distributor box 2 may be driven by the tension spring 3 to move forwards to the open position from the closed position, such that the detergents (such as washing powder, laundry detergent or softener) may be put in the distributor box 2. Thus, by providing the button 231 and the tension spring 3, when the button 231 is pressed, the distributor box 2 may move from the closed position to the open position automatically, without being drawn manually, thereby improving the comfort of use. Moreover, by providing the button 231, the aesthetic and neat properties of the overall detergent box assembly 200 may be improved.

[0054] As shown in Fig. 2, when the button 231 is pressed, the lock catch 232 is disengaged from the detergent box 1, in which case the tension spring 3 starts to operate. Certainly, the structure and position of the button 231 are not limited to this, and a technical solution that allows the distributor box 2 to be locked at the closed position and to be released is not limited to the fit between the button 231 and the lock catch 232 shown in Fig. 2. For example, when moving to the closed position, the distributor box 2 may be locked by a hasp structure, in which case the user may open the hasp structure by himself/herself. Specific embodiments concerned are known by those skilled in the art, and will not be elaborated herein.

[0055] In embodiments of the present disclosure, the gear subassembly 4 is disposed to the detergent box 1, and the rack member 5 (for example a half part of a dual-rack member 42 shown in Fig. 2) is disposed to the distributor box 2 and is meshed with the gear subassembly 41.

[0056] In embodiments of the present disclosure, the rack member 5 includes two racks opposite to each other, the gear subassembly 4 includes two damping gears, and the two racks are meshed with the two damping gears respectively.

[0057] Referring to Fig. 2, in a preferable embodiment of the present disclosure, the two racks are integrally formed as a dual-rack member, and the tension spring 3 is disposed in the dual-rack member. As shown in Figs. 5 or Fig. 8, in a preferable embodiment of the present disclosure, the two damping gears are disposed at two opposite sides of the dual-rack member respectively.

[0058] The gear subassembly 4 is mounted to the detergent-box lower cover 12. In a preferable embodiment of the present disclosure, the rotation axis of the damping gear 41 is arranged horizontally, i.e., the damping gear 41 may rotate in a vertical plane.

[0059] In a preferable embodiment of the present disclosure, the rack member 5 is disposed to the distributor-box top cover 21. That is, the whole drive unit is disposed in an upper space of the detergent box. The rack member 5 has a plurality of meshing teeth, the plurality of meshing teeth are spaced apart from one other in the length direction of the rack member 5, and the gear subassembly 4 is meshed with the rack member 5 mutually. It should be noted that, in a preferable embodiment of the present disclosure, as shown in Fig. 2, the damping gear of the gear subassembly 4 is a gear member with damping, which preferably is a fluid damping gear.

[0060] Thus, when the distributor box 2 drives the rack member 5 to pop out forwards, the forward moving speed of the rack member 5 may be slowed down by the damping gear 41 under a damping action of the damping gear 41, thereby slowing down the forward pop-out speed of the distributor box 2. Thus, by the fit between the damping gear 41 and the rack member 5, the pop-out speed and the pop-out force of the distributor box 2 may be controlled, and thereby an opening process of the distributor box 2 may be buffered, such that the distributor box 2 may pop out freely. In addition, the damping gear 41 and the rack member 5 are simple in structure and easy to process and assemble. Certainly, the structure of the damping subassembly 4 is not limited to what is shown in the drawings.

[0061] In some embodiments of the present disclosure, two rack members 5 and two damping gears 41 are provided, and the two racks are meshed with the two damping gears 41 correspondingly. Referring to Figs. 4 and 5, preferably, the two racks are integrally formed, the two racks each extend along the front and rear direction, and the two racks are spaced apart from each other in a left and right direction. Correspondingly, two damping gears 41 are provided, and the two damping gears 41 are disposed outside of the two racks respectively. That is, one damping gear 41 is provided at a left side of a left rack and is meshed with the left rack, and also, one damping gear 41 is provided at a right side of a right rack and is meshed with the right rack. Preferably, the two racks are bilaterally symmetrical, and the two damping gears 41 are bilaterally symmetrical. Thus, by providing the two racks and the two damping gears 41, an operation effect of the damping gear may be effectively improved, such that the distributor box 2 may be opened smoothly and stably.

[0062] Optionally, the tension spring 3 is disposed between the two racks which are integrally formed. Thus, the structure of the detergent box assembly 200 may be compact. Moreover, since the damping gears are arranged at a left side and a right side of the tension spring 3 respectively, a speed control effect may be effectively achieved, and the pop-out of the distributor box 2 may be effectively buffered and slowed down, such that the distributor box 2 may open and pop out stably or at a constant speed.

[0063] For example, in examples shown in Figs. 5 and

8, the two racks are disposed to a rear half part of the top portion of the distributor box 2, the first ends 50 of the two racks are adjacent to a rear end of the distributor box 2, and the tension spring 3 is mounted between the two racks which are integrally formed.

[0064] When the distributor box 2 is located at the closed position, the tension spring 3 presents a stretched state. When the distributor box 2 is located at the open position, the tension spring 3 presents a contracted state. Thus, when the button 231 in the front surface 23 of the distributor box is pressed, the tension spring 3 contracts to the contracted state, thereby driving the distributor box 2 to open.

[0065] In a preferable embodiment of the present disclosure, as shown in Fig. 2, the two racks are integrally formed as the dual-rack member 42, thus facilitating processing and mounting. In a preferable embodiment of the present disclosure, one of the dual-rack member 42 and the distributor box 2 is provided with a mounting member 51, the other one of the dual-rack member 42 and the distributor box 2 is provided with a mounting groove 211, and the mounting member 51 is configured to be fitted with the mounting groove 211 so as to mount the dual-rack member 42 to the distributor box 2. That is, when the dual-rack member 42 is provided with the mounting member 51, the distributor box 2 is provided with the mounting groove 211, and when the dual-rack member 42 is provided with the mounting groove 211, the distributor box 2 is provided with the mounting member 51. Thus, by the fit between the mounting member 51 and the mounting groove 211, the dual-rack member 42 may be firmly fixed to the distributor box 2. Specifically, the dual-rack member 42 is disposed to the top portion of the distributor box 2. As shown in Fig. 2, the mounting member 51 is disposed to a rear end of the dual-rack member 42 and extends downwards and forwards. Referring to Fig. 2, the mounting member 51 is generally formed as a curved hook, and extends backwards from the rear end of the dual-rack member 42 firstly, then extends downwards, and further extends forwards. The mounting groove 211 is recessed forwards from a center portion of a rear end of the distributor-box top cover 21. During assembling, it is fine as long as a lower portion of the mounting member 51 is embedded into the mounting groove 211 from rear to front. Thus, the assembling difficulty of the dual-rack member 42 is reduced, and the assembling efficiency of the dual-rack member 42 is improved.

[0066] A manner in which the tension spring 3 and the gear subassembly 4 according to an embodiment of the present disclosure are assembled will be described briefly with reference to the drawings in the following.

[0067] Referring to Fig. 2, a front end of the detergent-box lower cover 12 is provided with a first mounting column extending downwards, a middle portion of the detergent-box lower cover 12 is provided with two first connecting holes spaced apart from each other in the left and right direction, the rear end of the dual-rack member

42 is provided with a second mounting column extending upwards, and the two damping gears 41 each are provided with a second connecting hole. During assembling, by the fit between the mounting member 51 and the mounting groove 211, the dual-rack member 42 is fixed to the rear half part of the top portion of the distributor box 2 firstly. Then, two fasteners may be adopted and each fastener runs through the first connecting hole and the second connecting hole corresponding to the first connecting hole, so as to fix the damping gear 41 to the detergent-box lower cover 12. Subsequently, the front end of the tension spring 3 is fitted over the first mounting column, so as to be fixed with the detergent-box lower cover 12. Further, the rear end of the tension spring 3 is fitted over the second mounting column, so as to be fixed with the distributor-box top cover 21.

[0068] The washing machine 1000 according to a second aspect of embodiments of the present disclosure includes the detergent box assembly 200 for the washing machine 1000 according to the first aspect of embodiments of the present disclosure. Other components and operations of the washing machine 1000 according to embodiments of the present disclosure are known to those skilled in the art, and thus will not be elaborated herein.

[0069] In the washing machine 1000 according to embodiments of the present disclosure, by providing the detergent box assembly 200 for the washing machine 1000 according to the first aspect of embodiments of the present disclosure, the overall performance of the washing machine 1000 is improved.

[0070] In the specification, it is to be understood that terms such as "central," "longitudinal," "lateral," "length," "width," "thickness," "upper," "lower," "front," "rear," "left," "right," "vertical," "horizontal," "top," "bottom," "inner," "outer," "clockwise," and "counterclockwise" should be construed to refer to the orientation as then described or as shown in the drawings under discussion. These relative terms are for convenience of description and do not require that the present disclosure be constructed or operated in a particular orientation.

[0071] In the present disclosure, unless specified or limited otherwise, the terms "mounted," "connected," "coupled," "fixed" and the like are used broadly, and may be, for example, fixed connections, detachable connections, or integral connections; may also be mechanical or electrical connections; may also be direct connections or indirect connections via intervening structures; may also be inner communications of two elements, which can be understood by those skilled in the art according to specific situations.

[0072] In the present disclosure, unless specified or limited otherwise, a structure in which a first feature is "on" or "below" a second feature may include an embodiment in which the first feature is in direct contact with the second feature, and may also include an embodiment in which the first feature and the second feature are not in direct contact with each other, but are contacted via

an additional feature formed therebetween. Furthermore, a first feature "on," "above," or "on top of" a second feature may include an embodiment in which the first feature is right or obliquely "on," "above," or "on top of" the second feature, or just means that the first feature is at a height higher than that of the second feature; while a first feature "below," "under," or "on bottom of" a second feature may include an embodiment in which the first feature is right or obliquely "below," "under," or "on bottom of" the second feature, or just means that the first feature is at a height lower than that of the second feature.

[0073] Reference throughout this specification to "an embodiment," "some embodiments," "one embodiment," "another example," "an example," "a specific example," or "some examples," 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. Thus, the appearances of the phrases such as "in some embodiments," "in one embodiment," "in an embodiment," "in another example," "in an example," "in a specific example," or "in some examples," in various places throughout this specification are not necessarily referring to the same embodiment or example of the present disclosure. Furthermore, the particular features, structures, materials, or characteristics may be combined in any suitable manner in one or more embodiments or examples.

[0074] Although explanatory embodiments have been shown and described, it would be appreciated by those skilled in the art that the above embodiments cannot be construed to limit the present disclosure, and changes, alternatives, and modifications can be made in the embodiments without departing from spirit, principles and scope of the present disclosure.

Claims

1. A detergent box assembly for a washing machine, comprising:

a detergent box;
a distributor box disposed in the detergent box and configured to move between an open position and a closed position, the distributor box being provided with a button in a front surface thereof; and
a drive unit disposed between the distributor box and the detergent box, and configured to drive the distributor box to move from the closed position to the open position when the button is pressed.

2. The detergent box assembly according to claim 1, wherein the drive unit comprises:

a gear subassembly mounted to the detergent

box;

a rack member disposed to the distributor box and configured to mesh with the gear subassembly, wherein along a length direction of the rack member, the rack member has a first end away from the front surface of the distributor box and a second end adjacent to the front surface of the distributor box and opposite to the first end; and a tension spring arranged along the length direction of the rack member and having a movable end and a fixed end opposite to the movable end, wherein the movable end is coupled to a side away from the front surface of the distributor box, and the fixed end is mounted to the detergent box adjacent to the front surface of the distributor box.

3. The detergent box assembly according to claim 2, wherein the movable end is further fixed to the first end of the rack member.
4. The detergent box assembly according to claim 2, wherein the gear subassembly comprises a damping gear, and a rotation axis of the damping gear is arranged horizontally.
5. The detergent box assembly according to claim 2 or 4, wherein the rack member comprises two racks opposite to each other, the gear subassembly comprises two damping gears, and the two racks are configured to mesh with the two damping gears respectively.
6. The detergent box assembly according to claim 5, wherein the two racks are integrally formed as a dual-rack member.
7. The detergent box assembly according to claim 6, wherein the two damping gears are disposed at two opposite sides of the dual-rack member respectively.
8. The detergent box assembly according to claim 6, wherein the tension spring is disposed in the dual-rack member.
9. The detergent box assembly according to any one of claims 2-8, wherein the distributor box has a top cover, and the rack member is disposed to the top cover of the distributor box.
10. The detergent box assembly according to claim 6, wherein one of the dual-rack member and the distributor box is provided with a mounting member, the other one of the dual-rack member and the distributor box is provided with a mounting groove, and the mounting member is configured to be fitted with the mounting groove so as to mount the dual-rack member to the distributor box.

11. The detergent box assembly according to claim 10, wherein the mounting member is disposed to a rear end of the dual-rack member and extends downwards and forwards.

12. The detergent box assembly according to any one of claims 2-11, further comprising:

a lock catch disposed to the distributor box and coupled to the button, the lock catch being configured to be locked to the washing machine, wherein when the button is pressed, the lock catch is disengaged from the washing machine, wherein after the lock catch is disengaged from the washing machine, the tension spring drives the distributor box to move from the closed position to the open position.

13. A washing machine, comprising:

a machine body assembly having a detergent box;

a distributor box disposed in the detergent box and configured to move between an open position and a closed position, the distributor box being provided with a button at a front surface thereof; and

a drive unit disposed between the distributor box and the detergent box, and configured to drive the distributor box to move from the closed position to the open position when the button is pressed.

14. The washing machine according to claim 13, wherein the drive unit comprises:

a gear subassembly mounted to the detergent box;

a rack member disposed to the distributor box and configured to mesh with the gear subassembly, wherein along a length direction of the rack member, the rack member has a first end away from the front surface of the distributor box and a second end adjacent to the front surface of the distributor box and opposite to the first end; and a tension spring arranged along the length direction of the rack member and having a movable end and a fixed end opposite to the movable end, wherein the movable end is coupled to a side away from the front surface of the distributor box, and the fixed end is mounted to the machine body assembly adjacent to the front surface of the distributor box.

15. The washing machine according to claim 14, wherein the movable end is further fixed to the first end of the rack member, and the fixed end is mounted to the detergent box adjacent to the front surface of the

distributor box.

16. The washing machine according to claim 14, wherein the gear subassembly comprises a damping gear, and a rotation axis of the damping gear is arranged horizontally.

17. The washing machine according to claim 14 or 16, wherein the rack member comprises two racks opposite to each other, the gear subassembly comprises two damping gears, and the two racks are configured to mesh with the two damping gears respectively.

18. The washing machine according to claim 17, wherein the two racks are integrally formed as a dual-rack member.

19. The washing machine according to claim 18, wherein the two damping gears are disposed at two opposite sides of the dual-rack member respectively.

20. The washing machine according to claim 18, wherein the tension spring is disposed in the dual-rack member.

21. The washing machine according to any one of claims 14-20, wherein the distributor box has a top cover, and the rack member is disposed to the top cover of the distributor box.

22. The washing machine according to claim 18, wherein one of the dual-rack member and the distributor box is provided with a mounting member, the other one of the dual-rack member and the distributor box is provided with a mounting groove, and the mounting member is configured to be fitted with the mounting groove so as to mount the dual-rack member to the distributor box.

23. The washing machine according to claim 22, wherein the mounting member is disposed to a rear end of the dual-rack member and extends downwards and forwards.

24. The washing machine according to any one of claims 14-23, further comprising:

a lock catch disposed to the distributor box and coupled to the button, the lock catch being configured to be locked to the washing machine, wherein when the button is pressed, the lock catch is disengaged from the washing machine, wherein after the lock catch is disengaged from the washing machine, the tension spring drives the distributor box to move from the closed position to the open position.

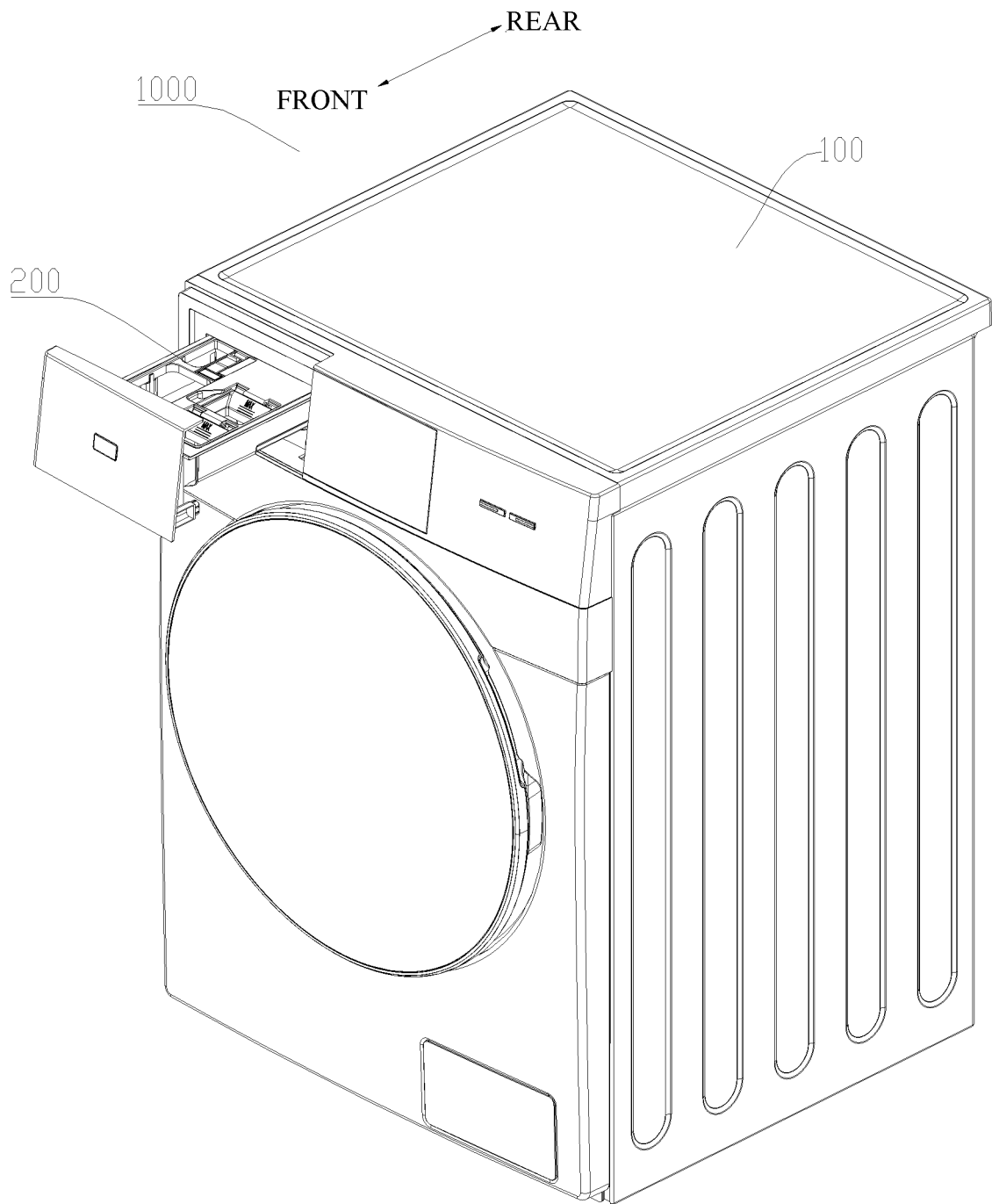


Fig. 1

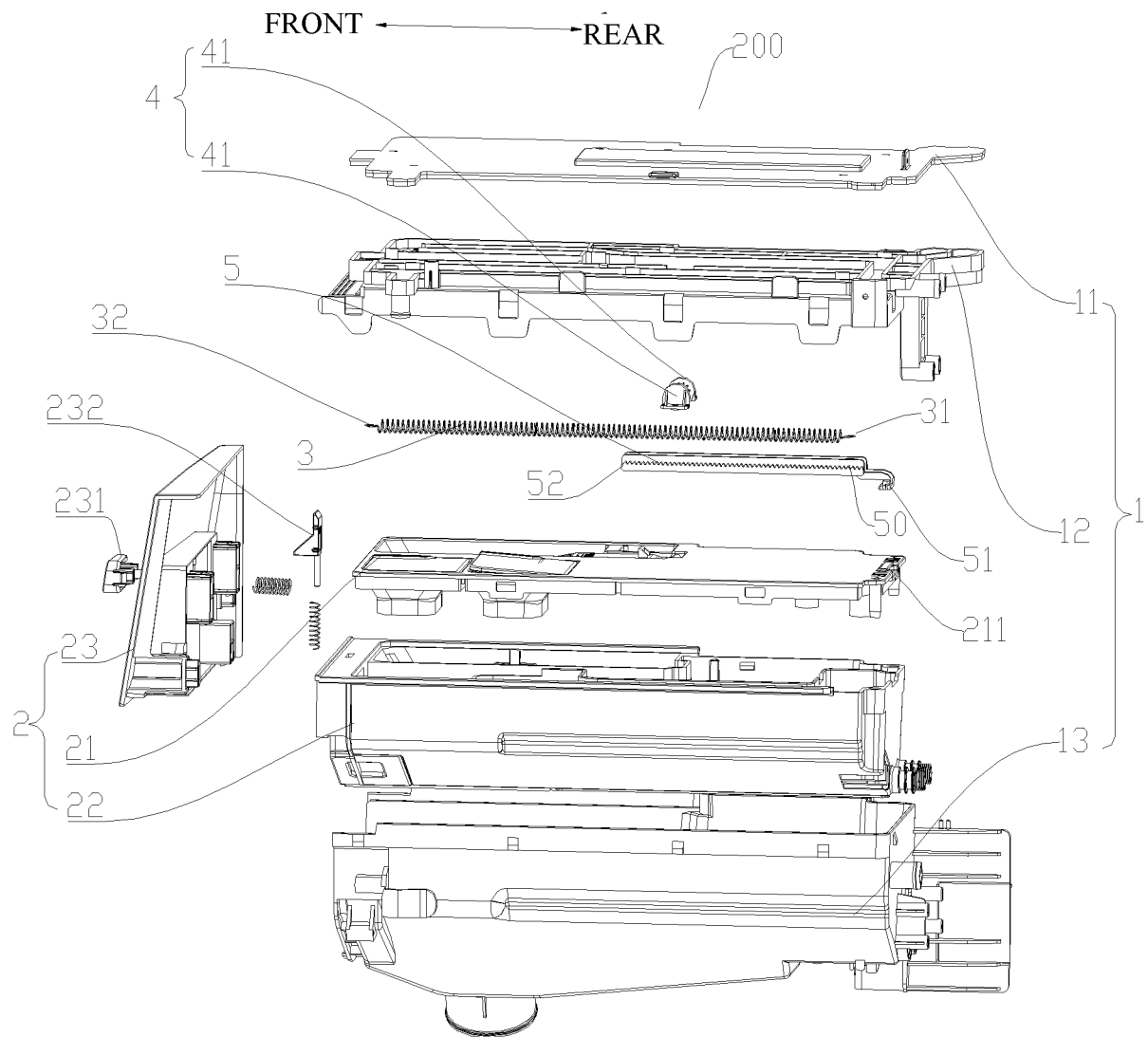


Fig. 2

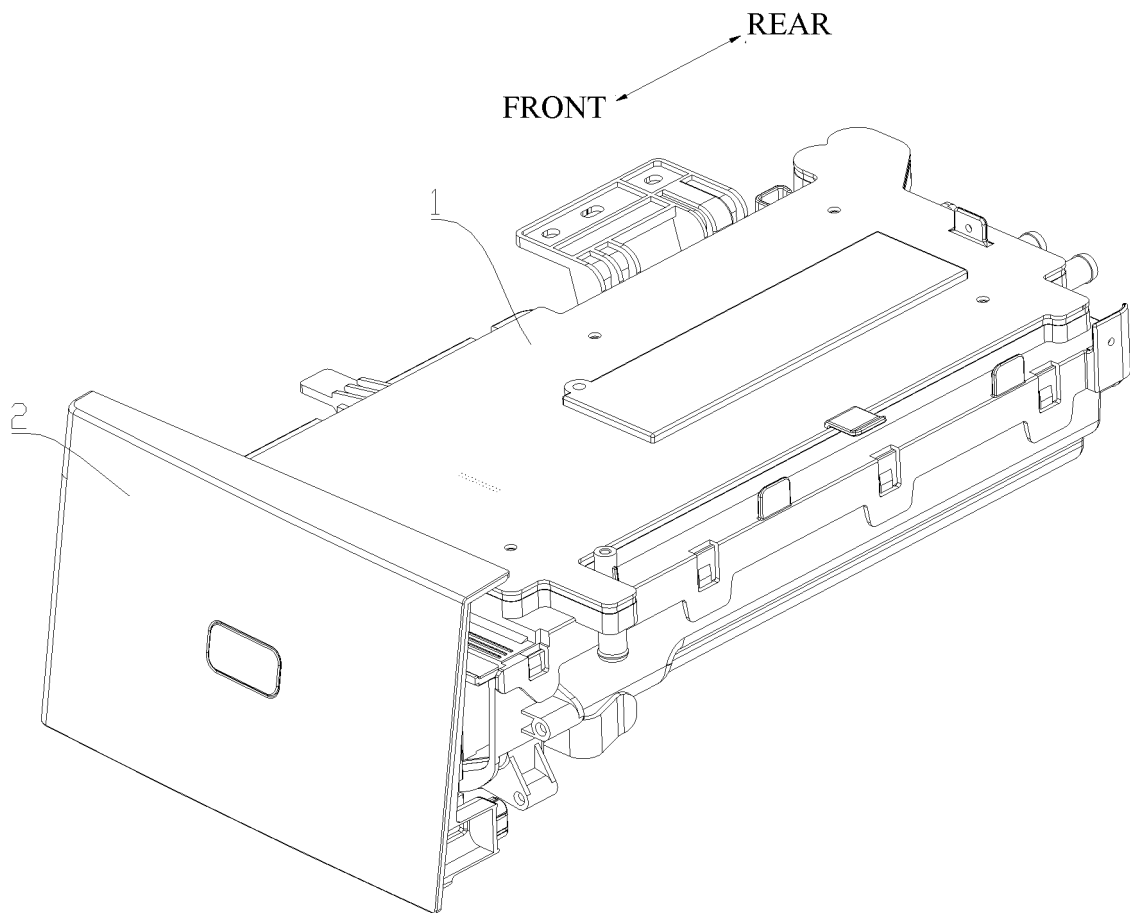


Fig. 3

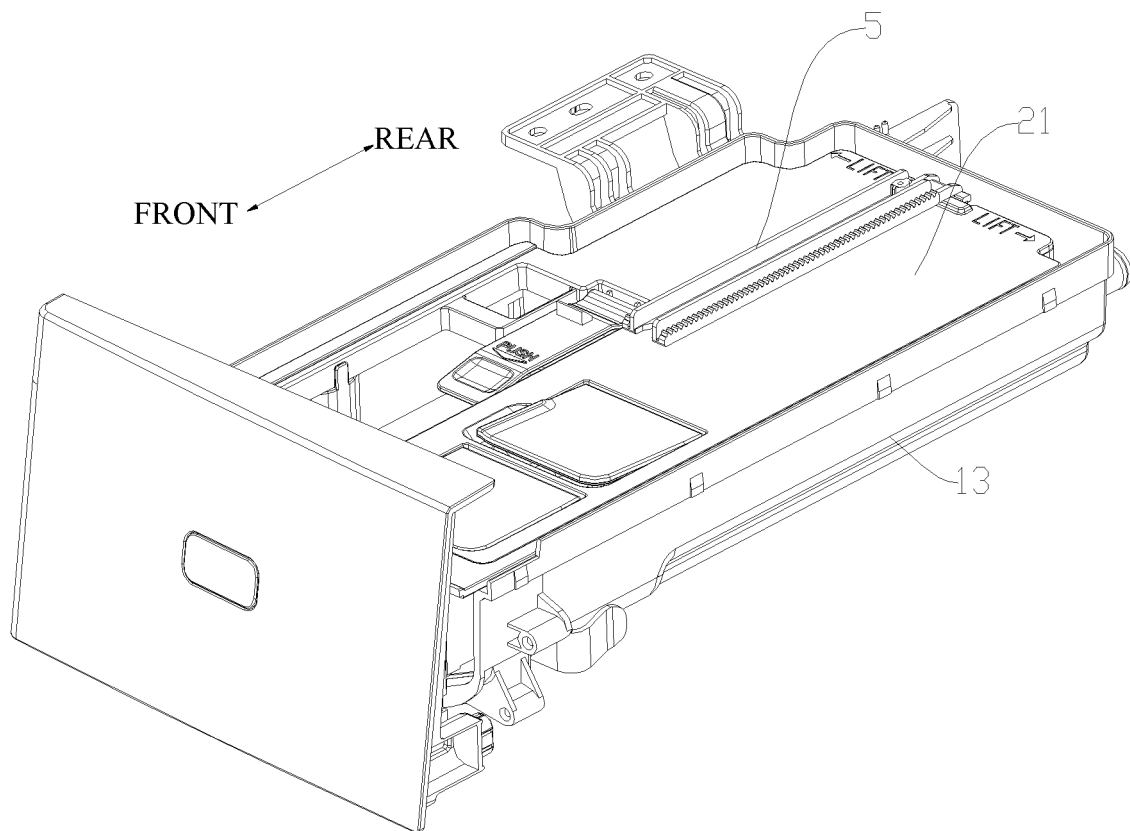


Fig. 4

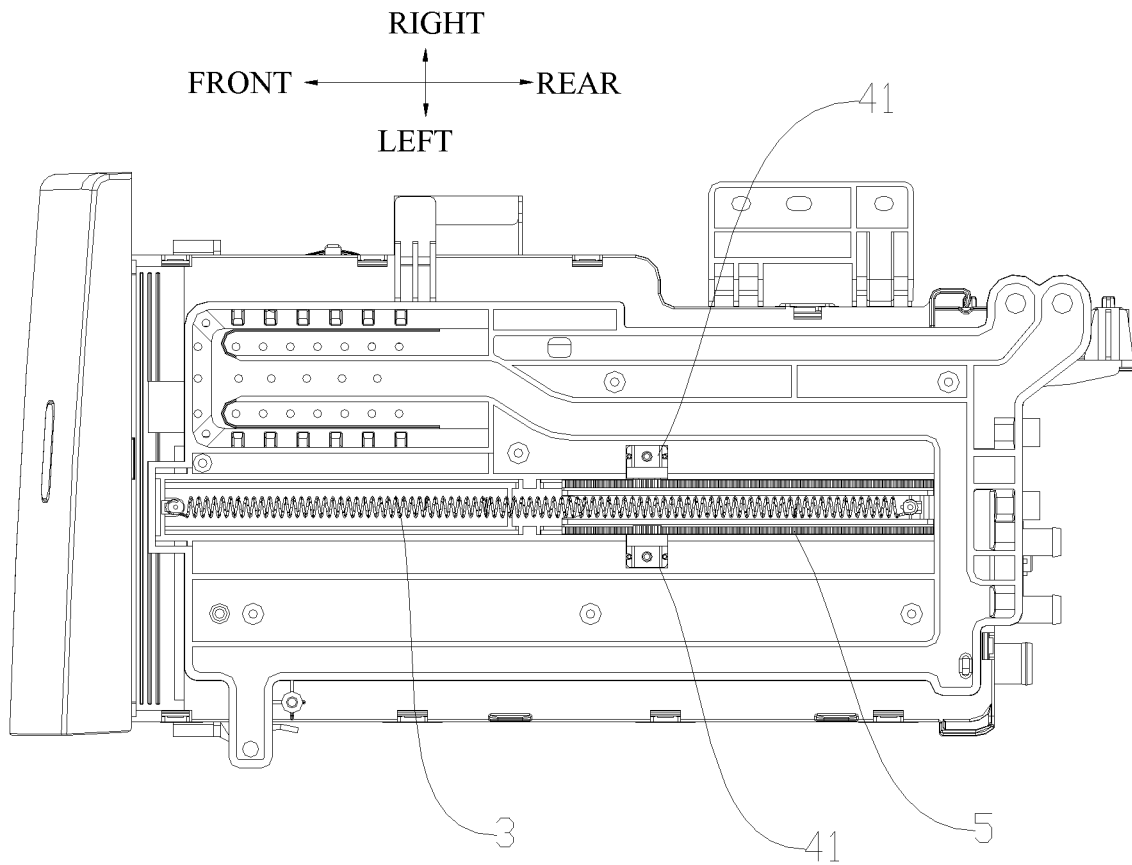


Fig. 5

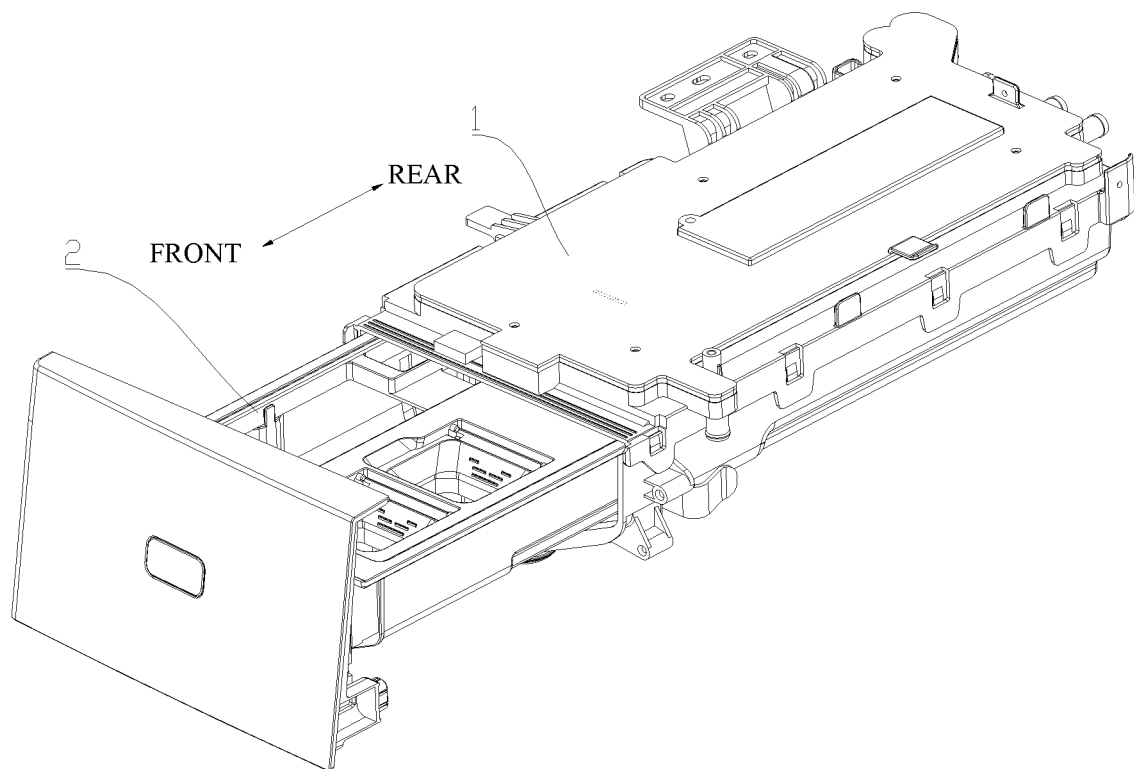


Fig. 6

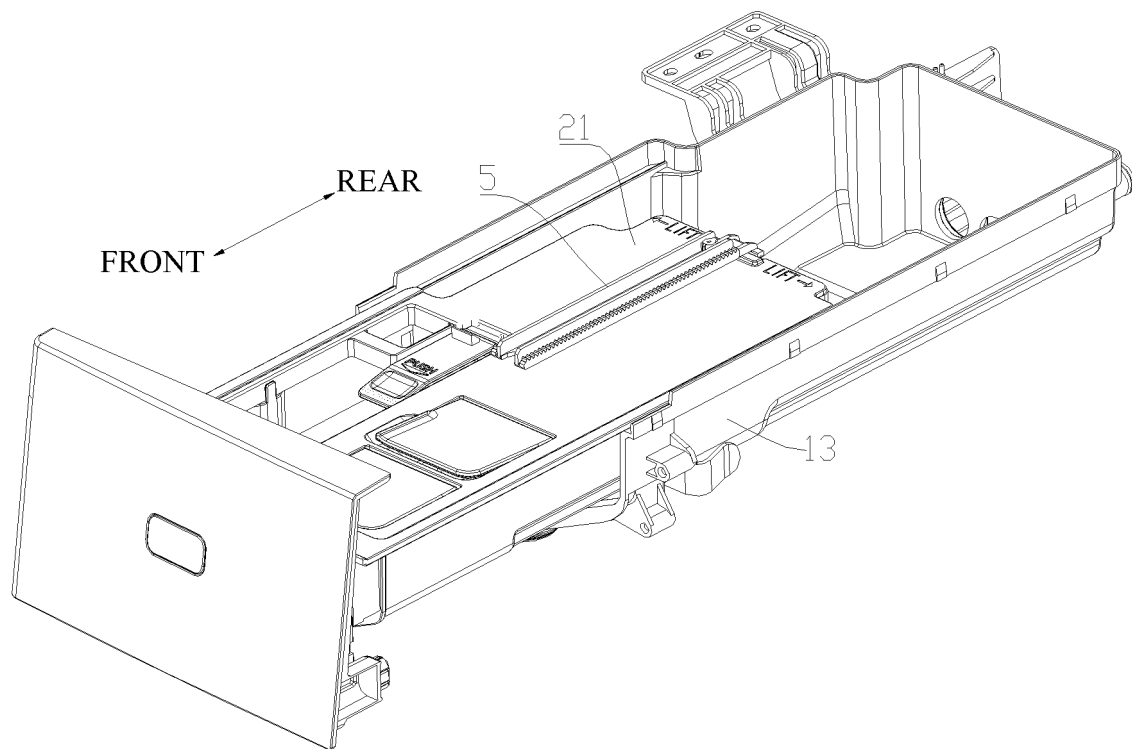


Fig. 7

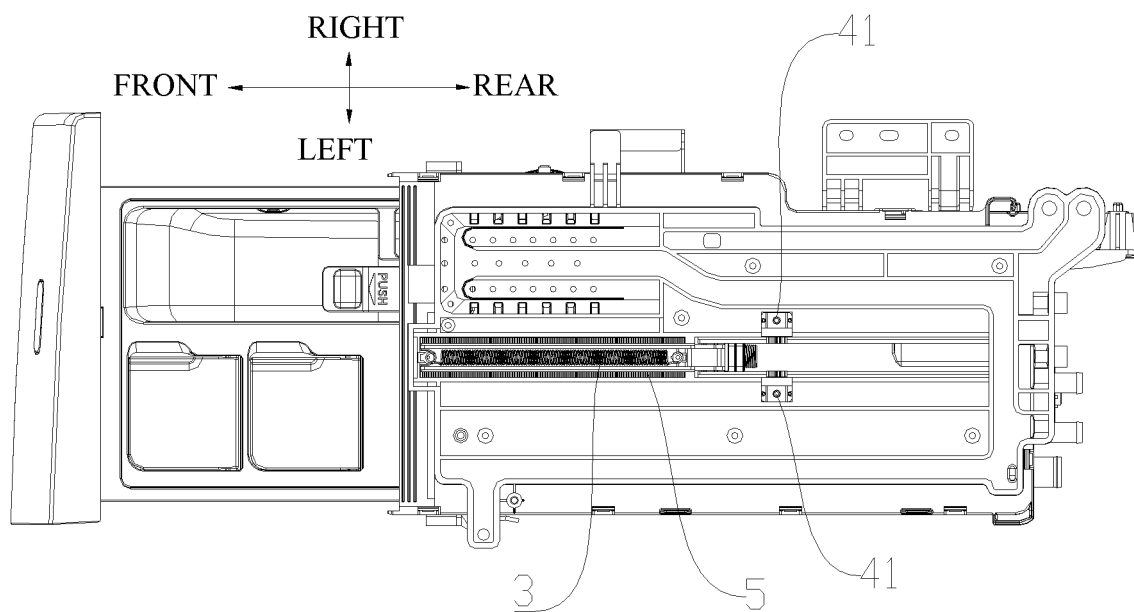


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2015/077597

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/02 (2006.01) i; D06F 39/08 (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)

CNABS, CNTXT, VEN: LITTLE SWAN, liquid soap, treating agent, softener, container, little, swan, detergent, agent, dispens+, deliver+, distribut+, storage, drawer, box, case, driv+, extract+, push+, pull+, eject+, key, button, gear, rack, spring

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2014206481 A1 (ELECTROLUX APPLIANCES AB), 31 December 2014 (31.12.2014), description, page 16, line 28 to page 19, line 16, and figures 1-7	1, 13
Y	WO 2014206481 A1 (ELECTROLUX APPLIANCES AB), 31 December 2014 (31.12.2014), description, page 16, line 28 to page 19, line 16, and figures 1-7	2-12, 14-24
Y	CN 101558196 A (LG ELECTRONICS INC.), 14 October 2009 (14.10.2009), description, page 5, particular embodiment 1 to page 22, paragraph 2, and figures 1-25	2-12, 14-24
A	CN 103835097 A (PAS DEUTSCHLAND GMBH), 04 June 2014 (04.06.2014), the whole document	1-24
A	CN 103741432 A (TCL HOUSEHOLD APPLIANCES (HEFEI) CO., LTD.), 23 April 2014 (23.04.2014), the whole document	1-24

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 11 December 2015 (11.12.2015)	Date of mailing of the international search report 23 December 2015 (23.12.2015)
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer GUO, Xu Telephone No.: (86-10) 62084600

INTERNATIONAL SEARCH REPORT
 Information on patent family members

International application No.

PCT/CN2015/077597

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		US 2014137608 A1	22 May 2014
CN 103741432 A	23 April 2014	None	

Form PCT/ISA/210 (patent family annex) (July 2009)