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(54) **LAUNDRY PROCESSING APPARATUS**

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## Description

[Technical Field]

**[0001]** The present invention relates to a laundry treatment apparatus.

[Background Art]

**[0002]** In general, a laundry treatment apparatus is understood to include an apparatus adapted to wash laundry (objects to be washed or objects to be dried), an apparatus adapted to dry laundry, and an apparatus adapted to perform both washing and drying of laundry.

**[0003]** A laundry treatment apparatus of the related art includes a cabinet, a drawer retractably provided in the cabinet, and an accommodation unit disposed in the drawer to provide a laundry accommodation unit (a laundry treatment space) for washing or drying laundry.

**[0004]** In the laundry treatment apparatus including a laundry accommodation unit that is disposed in a drawer retractably provided in a cabinet, in order to improve the washing performance of the laundry treatment apparatus, the volume of the laundry accommodation unit needs to be increased so that the laundry accommodation unit can contain a larger amount of water and laundry.

**[0005]** Therefore, when designing a laundry treatment apparatus including a laundry accommodation unit disposed in a drawer, it is very important to improve washing performance while minimizing the volume of the laundry accommodation unit. US 2009/0211035 A1 discloses a laundry treatment apparatus according to the preamble of claim 1. Related technology is shown in DE 10 2008 027 977 A1.

**[0006]** An object of the present invention devised to solve the problem lies in a laundry treatment apparatus that is capable of improving washing performance while minimizing the volume thereof.

**[0007]** Another object of the present invention devised to solve the problem lies in a laundry treatment apparatus in which a drum containing laundry and an agitator rotatably provided in the drum are rotated by a single driving unit.

**[0008]** A further object of the present invention devised to solve the problem lies in a laundry treatment apparatus in which an agitator and a drum are rotated together in the same direction after the agitator has rotated a predetermined number of times within the drum.

[Technical Solution]

**[0009]** The objects of the present invention can be achieved by providing a laundry treatment apparatus according to claim 1.

**[0010]** The power transmission unit may include a first stopper and a second stopper secured to the body through-hole, the first stopper and the second stopper being spaced apart from each other by a predetermined

distance, an operating unit located in the body through-hole, the operating unit being configured to move reciprocatingly between the first stopper and the second stopper, a through-hole formed through the operating unit so as to allow the rotating shaft to be inserted therein, a first thread provided in the through-hole, and a second thread provided at the rotating shaft so as to mesh with the first thread, the second thread moving the operating unit toward the first stopper or the second stopper when the rotating shaft rotates.

**[0011]** The present invention may further include a receiving portion formed in the connecting body, the receiving portion having a diameter that is greater than the diameter of the body through-hole and defining a moving path of the operating unit.

**[0012]** The present invention may further include an escape-preventing unit for preventing the operating unit from escaping from the receiving portion, the escape-preventing unit being rotatably supported by the connecting body and being configured to allow the rotating shaft to pass therethrough.

**[0013]** The first stopper may be an oilless bearing that is supported by the escape-preventing unit and is configured to allow the rotating shaft to pass therethrough, and the second stopper may be an oilless bearing that is supported by the stepped portion and is configured to allow the rotating shaft to pass therethrough.

**[0014]** The first stopper may be a spring located between the escape-preventing unit and the operating unit so as to provide force to the operating unit so that the operating unit moves away from the escape-preventing unit, and the second stopper may be a spring located between the stepped portion and the operating unit so as to provide force to the operating unit so that the operating unit moves away from the stepped portion.

**[0015]** The first stopper may be an escape-preventing unit for preventing the operating unit from escaping from the receiving portion, the escape-preventing unit being rotatably supported by the connecting body and being configured to allow the rotating shaft to pass therethrough.

**[0016]** The second stopper may be a stepped portion formed between the receiving portion and the body through-hole.

**[0017]** The present invention may further include a cabinet including an entrance formed therein and a drawer to which the tub is secured, the drawer being retractable from the cabinet through the entrance.

**[0018]** The rotating shaft may penetrate the lower surface of the tub and the lower surface of the drum, and may be secured to the agitator.

**[0019]** The rotating shaft may be arranged perpendicular to the ground on which the cabinet is seated.

**[0020]** The driving unit may include a stator secured to the lower surface of the tub while being located outside the tub, the stator being configured to generate a rotating magnetic field, and a rotor configured to be rotated by the rotating magnetic field generated by the stator,

wherein the rotating shaft may be secured to the rotor.

**[0021]** The agitator may include a body disposed in the drum so as to be secured to the rotating shaft, the body being formed in the shape of a circular plate, arranged parallel to the lower surface of the drum, and an arm protruding from the body toward the introduction port.

**[0022]** The present invention may further include a communication hole formed through the lower surface of the drum so that the inside of the drum communicates with the inside of the tub therethrough, and an agitator through-hole formed through the body.

#### [Advantageous Effects]

**[0023]** The present invention may provide a laundry treatment apparatus that is capable of improving washing performance while minimizing the volume thereof.

**[0024]** In addition, the present invention may provide a laundry treatment apparatus in which a drum containing laundry and an agitator rotatably provided in the drum are rotated by a single driving unit.

**[0025]** In addition, the present invention may provide a laundry treatment apparatus in which an agitator and a drum are rotated together in the same direction after the agitator has rotated a predetermined number of times within the drum.

#### [Description of Drawings]

#### **[0026]**

FIGS. 1 and 2 are views illustrating an example of a laundry treatment apparatus according to the present invention.

FIG. 3 is a view illustrating an example of an agitator included in the laundry treatment apparatus according to the present invention.

FIGS. 4 and 5 are views illustrating an example of a power transmission unit included in the laundry treatment apparatus according to the present invention.

FIG. 6 is a view illustrating another example of the power transmission unit included in the laundry treatment apparatus according to the present invention.

#### [Best Mode]

**[0027]** Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the accompanying drawings. Meanwhile, the configuration of an apparatus or a control method thereof, which will be described below, is merely given to describe the embodiments of the present invention, and is not intended to limit the scope of the present invention. The same reference numerals used throughout the specification refer to the same constituent elements.

**[0028]** As shown in FIG. 1, a laundry treatment apparatus 100 according to the present invention includes a cabinet 1, a drawer 2, which is retractably provided in the

cabinet 1, and a laundry accommodation unit 3 and 4, which is disposed in the drawer so as to provide a space required to treat laundry.

**[0029]** The cabinet 1 is provided with an entrance 11, through which the drawer 2 may be drawn out of the cabinet 1 or may be inserted into the cabinet 1. The cabinet 1 may be configured such that the length in the width direction (in the Y-axis direction) is greater than the length in the height direction (in the Z-axis direction) (the drawer may be configured such that the length in the width direction is greater than the length in the height direction).

**[0030]** As shown in FIG. 2, the drawer 2 includes a drawer body 21 having an opening formed in the upper surface thereof, and a drawer cover 25 provided at the opening in the drawer body. That is, the drawer body 21 may be configured to have a hollow hexahedral form, and the drawer cover 25 may be secured to the drawer body 21 so as to define the upper surface of the drawer body 21.

**[0031]** The drawer body 21 may be drawn out of the cabinet 1 or may be inserted into the cabinet 1 using a slider. The slider may include a slider body 271, which is secured to any one of the cabinet 1 and the drawer body 21, and a slider housing 273, which is secured to the remaining one of the cabinet and the drawer body in order to define a moving path of the slider body 271.

**[0032]** The drawer body 21 is provided at the front surface thereof with a drawer panel 23, which serves as means for opening and closing the entrance 11 of the cabinet.

**[0033]** The drawer panel 23 may be provided with a control panel 231 (refer to FIG. 1) for controlling the operation of the laundry treatment apparatus 100. The control panel 231 is provided with a unit (a controller of the laundry treatment apparatus) for controlling units for supplying water to the laundry accommodation unit 3 and 4 and discharging water from the laundry accommodation unit 3 and 4 (a water supply unit and a water discharge unit), a unit for rotating laundry (a driving unit), units for supplying steam or hot air to laundry (a hot air supply unit and a moisture supply unit), and the like.

**[0034]** In addition, the control panel 231 may be provided with an input unit, for enabling a user to input control commands into the laundry treatment apparatus 100, and a display unit (a unit for displaying operational information of the laundry treatment apparatus), for enabling a user to check control commands input through the input unit or notifying a user of the state of execution of the control commands input by the user.

**[0035]** The drawer cover 25 may be provided with a first cover through-hole 251 and a second cover through-hole 253, which are formed through the drawer cover 25 so that the inside of the drawer body 21 communicates with the outside.

**[0036]** The laundry accommodation unit 3 and 4, which is provided in the drawer 2, may include a tub 3, which is provided in the drawer body 21 so as to define a space for containing water, and a drum 4, which is rotatably

provided in the tub so as to contain laundry.

**[0037]** The tub 3 may include a tub body 31, which is secured to the inside of the drawer 2 by a tub support unit 311, and a tub cover 32, which defines the upper surface of the tub body.

**[0038]** The tub cover 32 is provided with an introduction port 33, through which the inside of the tub body 31 communicates with the outside of the tub. The introduction port 33 is opened and closed by a door 35.

**[0039]** The door 35 may be hinged to the tub cover 32 (so as to open and close a portion of the tub cover). The door 35 may be rotated toward the outside of the drawer 2 through the first cover through-hole 251 formed in the drawer cover 25. That is, the door 35 is located within a region of the tub cover 32 that corresponds to the first through-hole 251. Accordingly, a user may put laundry into the introduction port 33 by opening the door 35 after drawing the drawer 2 out of the cabinet 1.

**[0040]** The tub cover 32 is provided with a water supply hole 37, through which water is introduced into the tub body 31. The water supply hole 37 is connected with one end of a water supply pipe 511, which will be described later.

**[0041]** The drum 4 includes a cylindrical-shaped drum body 41 and communication holes 411, through which the inside of the drum body communicates with the tub. The communication holes 411 may be formed in the circumferential surface and the lower surface 43 of the drum body 41. Accordingly, water contained in the tub body 31 may move into the drum body 41 through the communication holes 411, and water in the drum body 41 may move to the tub body 31 through the communication holes 411.

**[0042]** The drum body 41 is provided at the upper surface thereof with a drum introduction port 42, through which laundry supplied through the introduction port 33 is introduced into the drum body 41.

**[0043]** The reason why the laundry accommodation unit 3 and 4 is composed of the tub 3 and the drum 4 is to enable the laundry treatment apparatus 100 according to the present invention to perform a washing function. Accordingly, in order to enable the laundry treatment apparatus 100 to also perform a function of drying laundry in addition to the washing function, a hot air supply unit (not shown) for supplying hot air to the tub 3 may be further provided in the cabinet 1.

**[0044]** The hot air supply unit (not shown), which is provided in the laundry treatment apparatus 100, may include a circulation duct, for circulating the air in the tub 3, and a heat exchanger, which is provided in the circulation duct in order to dehumidify and heat the air discharged from the tub.

**[0045]** Alternatively, the hot air supply unit (not shown) provided in the laundry treatment apparatus may include a discharge duct for discharging the air in the tub to the outside of the cabinet 1, a supply duct for supplying the air outside the tub 3 to the tub 3, and a heat exchanger for heating the air introduced into the supply duct.

**[0046]** When the laundry treatment apparatus 100 according to the present invention is constructed so as to perform a function of washing laundry, the laundry treatment apparatus 100 needs to further include a water supply unit and a water discharge unit.

**[0047]** The water supply unit may include the water supply pipe 511, which connects a water supply source located outside the cabinet 1 to the water supply hole 37, and a valve 513 for opening and closing the water supply pipe 511 under the control of the controller (not shown).

**[0048]** The water supply pipe 511 penetrates the drawer cover 25 through the second cover through-hole 253. The water supply pipe 511 may be configured to have an extendable structure, or may be made of a flexible material in consideration of the moving range of the drawer.

**[0049]** The water discharge unit serves to discharge the water contained in the tub 3 to the outside of the cabinet 1. The water discharge unit may include a water discharge pipe 541 for guiding the water in the tub 3 to the outside of the cabinet 1, and a pump 543, which is disposed in the water discharge pipe 541 in order to discharge the water in the tub 3. The water discharge pipe may also be configured to have an extendable structure, or may be made of a flexible material.

**[0050]** In order to minimize the volume of the laundry treatment apparatus 100 having the above-described configuration, the volume of the laundry accommodation unit 3 and 4 needs to be minimized. However, a reduction in the volume of the laundry accommodation unit 3 and 4 may reduce the amount of water that the tub 3 can contain, and thus may degrade washing performance.

**[0051]** In order to solve this problem, the laundry treatment apparatus 100 according to the present invention may further include an agitator 6, which is rotatably provided in the drum 4.

**[0052]** As shown in FIG. 3, the agitator 6 serves to agitate laundry supplied to the drum body 41. The agitator 6 may include a body 61 disposed in the drum and arms 63 protruding toward the drum introduction port 42 from the body 61.

**[0053]** The body 61 may be formed in the shape of a circular plate that is parallel to the lower surface 43 of the drum, and the arms 63 may be arranged radially about the rotation center of the body 61.

**[0054]** The body 61 is configured to rotate about a rotating shaft 67. As shown in FIG. 2, the rotating shaft 67 may penetrate the lower surface of the tub and the lower surface 43 of the drum, and may be secured to the body 61. The rotating shaft 67 may be arranged perpendicular to the ground (perpendicular to the lower surface of the cabinet).

**[0055]** In this case, a rotating shaft bearing 39 may also be provided at the lower surface of the tub in order to rotatably support the circumferential surface of the rotating shaft 67, and a drum through-hole 431, through which the rotating shaft is inserted, may also be formed in the lower surface 43 of the drum.

**[0056]** As shown in FIG. 3, the agitator 6 may further include agitator through-holes 65, which are formed through the body 61. When the body 61 of the agitator is configured as a plate that is parallel to the lower surface 43 of the drum, the body 61 may interrupt the movement of water that is discharged to the tub 3 through the lower surface 43 of the drum or the movement of water that is introduced through the lower surface 43 of the drum from the tub. This problem may be prevented by the agitator through-holes 65.

**[0057]** The drum 4 and the agitator 6 having the above-described configurations may be rotated simultaneously in the same direction, or only the agitator 6 may be rotated by a driving unit 7, a connecting unit 8 and a power transmission unit 9.

**[0058]** In more detail, the driving unit 7, the connecting unit 8 and the power transmission unit 9 are configured so that the agitator 6 and the drum 4 are rotated simultaneously in the same direction after the agitator has rotated a predetermined number of times.

**[0059]** As shown in FIG. 2, the driving unit 7 may include a stator 71, which is secured to the tub in order to generate a rotating magnetic field, and a rotor 73, which is configured to be rotated by the rotating magnetic field generated by the stator.

**[0060]** The stator 71 is secured to the lower surface of the tub body 31 and is located outside the tub body 31, and the rotating shaft 67 is secured to the rotor 73.

**[0061]** Unlike the configuration illustrated in FIG. 2, the driving unit 7 may include a driven pulley, which is secured to the rotating shaft 67 and is located outside the tub 3, a motor, which is secured to a location outside the tub 3, a driving pulley, which is configured to be rotated by a rotating shaft of the motor, and a belt, which connects the driving pulley to the driven pulley.

**[0062]** When the driving unit 7 is formed to have the configuration illustrated in FIG. 2, it may be possible to minimize power loss (improve washing performance), which may occur during the power transmission process, in comparison with the mechanism in which the power from the motor is transmitted via the driving pulley, the driven pulley and the belt.

**[0063]** As shown in FIG. 4, the connecting unit 8 includes a connecting body 81, which is secured to the lower surface 43 of the drum, and a body through-hole 85, which is formed through the connecting body 81 so as to define a space into which the power transmission unit 9 is inserted.

**[0064]** The connecting body 81 serves to form the rotating shaft of the drum 4. The connecting body 81 may be provided at the circumferential surface thereof with a coupling portion 83, which is secured to the lower surface 43 of the drum.

**[0065]** The power transmission unit 9 is configured so as to move reciprocally within the body through-hole 85 when the rotating shaft 67 rotates. The power transmission unit 9 is characterized in that it transmits the power provided by the rotating shaft 67 to the connecting

body 81 after the rotating shaft 67 has rotated a predetermined number of times.

**[0066]** The power transmission unit 9 may include an operating unit 91, which moves reciprocally within the body through-hole 85, a through-hole 92, which is formed through the operating unit 91 and through which the rotating shaft 67 is inserted, a first stopper 95 and a second stopper 96 for setting a moving range of the operating unit 91, and a transfer unit 93, which moves the operating unit 91 toward the first stopper or the second stopper when the rotating shaft 67 rotates.

**[0067]** As shown in FIG. 5, the operating unit 91, which is formed in the shape of a ring that is provided in the center thereof with the through-hole 92, may be disposed in a receiving portion 87, which is formed in the connecting body 81. The receiving portion 87 serves to define the moving path of the operating unit 91. The receiving portion 87 may be formed so as to be concentric with the body through-hole 85 and to have a diameter larger than that of the body through-hole 85.

**[0068]** The transfer unit 93 may include a first thread 931, which is provided in the through-hole 92, and a second thread 933, which is provided on the circumferential surface of the rotating shaft 67 and meshes with the first thread 931 so as to move the operating unit 91 toward the first stopper 95 or the second stopper 96 when the rotating shaft 67 rotates.

**[0069]** In order to prevent the operating unit 91 from escaping from the receiving portion 87, the connecting unit 8 may further include an escape-preventing unit 88, which is rotatably secured to the connecting body 81 so as to prevent the operating unit 91 from escaping from the receiving portion 87.

**[0070]** As shown in FIG. 4, the escape-preventing unit 88 has therein an escape-preventing through-hole 881 so as to allow the rotating shaft 67 to penetrate the escape-preventing unit 88.

**[0071]** The escape-preventing unit 88 is rotatably supported by the connecting body 81 via a bearing 89 disposed between the lower side of the escape-preventing unit 88 and the upper side of the connecting body 81. In this case, the escape-preventing unit 88 is kept in contact with the bearing 89 by a fastening member 883.

**[0072]** The fastening member 883 may be a nut, which is engaged with the circumferential surface of the rotating shaft 67 and presses the escape-preventing unit 88 toward the bearing 89.

**[0073]** As shown in FIG. 5, when the operating unit 91 reaches the upper end of the receiving portion 87, the first stopper 95 serves to block the movement of the operating unit 91, thereby allowing the rotational force of the rotating shaft 67 to be transmitted to the connecting body 81.

**[0074]** The first stopper 95 may be an oilless bearing, which is supported by the escape-preventing unit 88. The oilless bearing is a device capable of minimizing frictional force between a moving object and a fixed object without supplying a lubricant to a friction surface. The oilless

bearing may be formed in the shape of a ring.

**[0075]** In the case in which the first stopper 95 is a ring-shaped oilless bearing and in which the rotating shaft 67 penetrates the center of the oilless bearing, the first stopper 95 may serve to transmit the rotational force of the rotating shaft 67 to the connecting body 81, and may also serve as a bearing to support the rotating shaft 67 so that the rotating shaft 67 is rotatable within the connecting body 81.

**[0076]** When the operating unit 91 reaches the lower end of the receiving portion 87, the second stopper 96 serves to block the movement of the operating unit 91, thereby allowing the rotational force of the rotating shaft 67 to be transmitted to the connecting body 81. The second stopper 96 may be a ring-shaped oilless bearing, which is supported by a stepped portion 871.

**[0077]** Alternatively, the first stopper 95 and the second stopper 96 may be formed to have the configurations illustrated in FIG. 6.

**[0078]** The first stopper 95 illustrated in FIG. 6 may be a spring that is disposed between the escape-preventing unit 88 and the operating unit 91, and the second stopper 96 may be a spring that is disposed between the stepped portion 871 and the operating unit 91.

**[0079]** In this case, the first stopper 95 may be configured to provide force to the operating unit 91 so that the operating unit 91 moves away from the escape-preventing unit 88, and the second stopper 96 may be configured to provide force to the operating unit 91 so that the operating unit 91 moves away from the stepped portion 871.

**[0080]** The above embodiments have been described as including the first stopper 95 and the second stopper 96 in addition to the escape-preventing unit 88 and the stepped portion 871, which may perform the function of restricting the movement of the operating unit 91. However, in the case in which the escape-preventing unit 88 and the stepped portion 871 are provided, at least one of the first stopper or the second stopper may be omitted.

**[0081]** Hereinafter, the operation of the laundry treatment apparatus 100 having the above configuration will be described. Although, for convenience of explanation, FIG. 5 illustrates the state in which the operating unit 91 is located in the middle of the receiving portion 87, a description will be made hereinbelow of the state in which the initial position of the operating unit 91 is a position at which the operating unit 91 is in contact with the second stopper 96.

**[0082]** When electric current forming a magnetic field for realizing clockwise rotation is supplied to the stator 71, the rotor 73 and the rotating shaft 67 may be rotated in the clockwise direction.

**[0083]** When the rotating shaft 67 is rotated in the clockwise direction, the agitator 6, which is secured to the free end of the rotating shaft, may be rotated in the clockwise direction within the drum 4.

**[0084]** When the rotating shaft 67 is rotated, the escape-preventing unit 88 may also be rotated therewith. However, since the escape-preventing unit 88 is rotatably

supported by the connecting body 81 via the bearing 89, the drum 4, which is secured to the connecting body 81, is prevented from being rotated.

**[0085]** When the agitator 6 is rotated within the drum by the rotation of the rotating shaft 67, the operating unit 91 is moved toward the first stopper 95 by the transfer unit 93. Accordingly, after the rotating shaft 67 has rotated a predetermined number of times (a reference number of times) (after the agitator has rotated a predetermined number of times), the operating unit 91 may come into contact with the first stopper 95.

**[0086]** When the operating unit 91 comes into contact with the first stopper 95, the rotating shaft 67 and the connecting body 81 are connected to each other via the operating unit 91 and the first stopper 95, and thus the connecting body 81 is rotated together with the rotating shaft 67. Accordingly, the drum 4 may be rotated together with the agitator 6 in the same direction.

**[0087]** The reference number of times that only the agitator 6 rotates may be variously set by appropriately configuring the transfer unit 93. In consideration of improvement of washing performance using the agitator, the reference number of times may be set such that the drum 4 is rotated after the agitator 6 has completely rotated at least once.

**[0088]** When electric current forming a magnetic field for realizing counterclockwise rotation is supplied to the stator 71, both the rotor and the rotating shaft 67 may be rotated in the counterclockwise direction.

**[0089]** In this case, the agitator 6 is rotated in the counterclockwise direction within the drum by the counterclockwise rotation of the rotating shaft 67, whereas the drum 4 is not rotated but remains stationary until the operating unit 91 comes into contact with the second stopper 96.

**[0090]** Subsequently, when the operating unit 91 comes into contact with the second stopper 96 after the rotating shaft 67 has rotated a predetermined number of times, the drum 4 may be rotated together with the agitator 6 in the counterclockwise direction.

**[0091]** Although the configurations or functions of the driving unit 7, the connecting unit 8 and the power transmission unit 9 have been described above with reference to the configuration in which the tub is disposed in the drawer retractably provided in the cabinet, the driving unit, the connecting unit and the power transmission unit may also be applied to a laundry treatment apparatus not including the drawer.

**[0092]** That is, the driving unit 7, the connecting unit 8 and the power transmission unit 9 may also be applied to a laundry treatment apparatus including a cabinet, a tub secured to the inside of the cabinet, and a drum rotatably provided in the tub.

## Claims

1. A laundry treatment apparatus comprising:

- a tub (3) for containing water, the tub (3) comprising an introduction port (33) through which laundry is introduced into or taken out of the tub (3);
- a drum (4) provided in the tub (3), the drum (4) containing the laundry supplied thereto through the introduction port (33);
- an agitator (6) rotatably provided in the drum (4);
- a rotating shaft (67) penetrating the tub (3) and the drum (4) so as to be connected to the agitator (6);
- a driving unit (7) for rotating the rotating shaft (67);
- a connecting unit (8) comprising a connecting body (81) secured to the drum (4) and a body through-hole (85) formed through the connecting body (81) so as to allow the rotating shaft (67) to be inserted therein; and
- a power transmission unit (9);
- characterized by**
- said power transmission unit (9) being configured so as to move reciprocatingly up and down within the body through-hole (85) based on the rotation direction of the rotary shaft (67), wherein the power transmission unit (9) is provided to couple to the outer circumferential surface of the rotating shaft (67), and is provided to selectively contact the connecting body (81) to transmit power after the rotating shaft (67) has rotated a predetermined number of times.
2. The laundry treatment apparatus according to claim 1, wherein the power transmission unit (9) comprises:
    - a first stopper (95) and a second stopper (96) secured to the body through-hole (85), the first stopper (95) and the second stopper (96) being spaced apart from each other by a predetermined distance;
    - an operating unit (91) located in the body through-hole (85), the operating unit (91) being configured to move reciprocatingly between the first stopper (95) and the second stopper (96);
    - a through-hole (92) formed through the operating unit (91) so as to allow the rotating shaft (67) to be inserted therein;
    - a first thread (931) provided in the through-hole (92); and
    - a second thread (933) provided at the rotating shaft (67) so as to mesh with the first thread (931), the second thread (933) moving the operating unit (91) toward the first stopper (95) or the second stopper (96) when the rotating shaft (67) rotates.
  3. The laundry treatment apparatus according to claim 2, further comprising:
    - a receiving portion (87) formed in the connecting body (81), the receiving portion (87) having a diameter that is greater than a diameter of the body through-hole (85) and defining a moving path of the operating unit (91).
  4. The laundry treatment apparatus according to claim 3, further comprising:
    - an escape-preventing unit (88) for preventing the operating unit (91) from escaping from the receiving portion (87), the escape-preventing unit (88) being rotatably supported by the connecting body (81) and being configured to allow the rotating shaft (67) to pass therethrough.
  5. The laundry treatment apparatus according to claim 4, wherein the first stopper (95) is an oilless bearing that is supported by the escape-preventing unit (88) and is configured to allow the rotating shaft (67) to pass therethrough, and wherein the second stopper (96) is an oilless bearing that is supported by a stepped portion (871) and is configured to allow the rotating shaft (67) to pass therethrough.
  6. The laundry treatment apparatus according to claim 4, wherein the first stopper (95) is a spring located between the escape-preventing unit (88) and the operating unit (91) so as to provide force to the operating unit (91) so that the operating unit (91) moves away from the escape-preventing unit (88), and wherein the second stopper (96) is a spring located between the stepped portion (871) and the operating unit (91) so as to provide force to the operating unit (91) so that the operating unit (91) moves away from the stepped portion (871).
  7. The laundry treatment apparatus according to claim 3, wherein the first stopper (95) is an escape-preventing unit (88) for preventing the operating unit (91) from escaping from the receiving portion (87), the escape-preventing unit (88) being rotatably supported by the connecting body (81) and being configured to allow the rotating shaft (67) to pass therethrough.
  8. The laundry treatment apparatus according to claim 3, wherein the second stopper (96) is a stepped portion (871) formed between the receiving portion (87) and the body through-hole (85).
  9. The laundry treatment apparatus according to any one of claims 1 to 8, further comprising:
    - a cabinet (1) comprising an entrance (11) formed therein; and
    - a drawer (2) to which the tub (3) is secured, the drawer (2) being retractable from the cabinet (1) through the entrance (11).

10. The laundry treatment apparatus according to claim 9, wherein the rotating shaft (67) penetrates a lower surface of the tub (3) and a lower surface of the drum (4) and is secured to the agitator (6). 5
11. The laundry treatment apparatus according to claim 10, wherein the rotating shaft (67) is arranged perpendicular to a ground on which the cabinet (1) is seated. 10
12. The laundry treatment apparatus according to claim 10, wherein the driving unit (7) comprises:
- a stator (71) secured to the lower surface of the tub (3) while being located outside the tub (3), the stator (71) being configured to generate a rotating magnetic field; and 15
  - a rotor (73) configured to be rotated by the rotating magnetic field generated by the stator (71), and 20
  - wherein the rotating shaft (67) is secured to the rotor (73).
13. The laundry treatment apparatus according to claim 10, wherein the agitator (6) comprises: a body 25
- a body (61) disposed in the drum (4) so as to be secured to the rotating shaft (67), the body (61) being formed in a shape of a circular plate arranged parallel to the lower surface of the drum (4); and 30
  - an arm (63) protruding from the body (61) toward the introduction port (33).
14. The laundry treatment apparatus according to claim 13, further comprising: 35
- a communication hole (411) formed through the lower surface of the drum (4) so that an inside of the drum (4) communicates with an inside of the tub (3) therethrough; and 40
  - an agitator through-hole (65) formed through the body (61). 45

## Patentansprüche

1. Wäschebehandlungsvorrichtung, die aufweist:
- einen Laugenbehälter (3) zum Aufnehmen von Wasser, wobei der Laugenbehälter (3) eine Einleitungsöffnung (33) aufweist, durch die Wäsche in den Laugenbehälter (3) eingeführt oder aus ihr herausgenommen wird; 50
  - eine in dem Laugenbehälter (3) bereitgestellte Trommel (4), wobei die Trommel (4) die Wäsche enthält, die durch die Einführungsöffnung (33) in sie zugeführt wird; 55

einen Rührer (6), der drehbar in der Trommel (4) bereitgestellt ist;  
 eine Drehwelle (67), welche den Laugenbehälter (3) und die Trommel (4) durchdringt, so dass sie mit dem Rührer (6) verbunden ist;  
 eine Antriebseinheit (7) zum Drehen der Drehwelle (67);  
 eine Verbindungseinheit (8), die einen an der Trommel (4) befestigten Verbindungskörper (81) und ein durch den Verbindungskörper (81) ausgebildetes Körperdurchgangsloch (85) aufweist, um zu ermöglichen, dass die Drehwelle (67) in es eingeführt wird; und  
 eine Leistungsübertragungseinheit (9);  
**dadurch gekennzeichnet, dass**  
 die Leistungsübertragungseinheit (9) derart konfiguriert ist, dass sie sich basierend auf der Drehrichtung der Drehwelle (67) innerhalb des Körperdurchgangslochs (85) nach oben und unten hin und her bewegt,  
 wobei die Leistungsübertragungseinheit (9) derart bereitgestellt ist, dass sie mit der Außenumfangsoberfläche der Drehwelle (67) koppelt, und  
 derart bereitgestellt ist, dass sie den Verbindungskörper (81) wahlweise kontaktiert, um Leistung zu übertragen, nachdem sich die Drehwelle (67) eine vorgegebene Anzahl von Malen gedreht hat.

2. Wäschebehandlungsvorrichtung nach Anspruch 1, wobei die Leistungsübertragungseinheit (9) aufweist:

einen ersten Anschlag (95) und einen zweiten Anschlag (96), die an dem Körperdurchgangsloch (85) befestigt sind, wobei der erste Anschlag (95) und der zweite Anschlag (96) um einen vorgegebenen Abstand voneinander beabstandet sind;  
 eine Betriebseinheit (91), die in dem Körperdurchgangsloch (85) angeordnet ist, wobei die Betriebseinheit (91) konfiguriert ist, um sich zwischen dem ersten Anschlag (95) und dem zweiten Anschlag (96) hin und her zu bewegen;  
 ein Durchgangsloch (92), das durch die Betriebseinheit (91) ausgebildet ist, um zu ermöglichen, dass die Drehwelle (67) in es eingesetzt wird;  
 ein erstes Gewinde (931), das in dem Durchgangsloch (92) bereitgestellt ist; und  
 ein zweites Gewinde (933), das an der Drehwelle (67) bereitgestellt ist, um mit dem ersten Gewinde (931) ineinander zu greifen, wobei das zweite Gewinde (933) die Betriebseinheit (91) in Richtung des ersten Anschlags (95) oder des zweiten Anschlags (96) bewegt, wenn sich die Drehwelle (67) dreht.



3. Wäschebehandlungsvorrichtung nach Anspruch 2, die ferner aufweist:  
einen Aufnahmeabschnitt (87), der in dem Verbindungskörper (81) ausgebildet ist, wobei der Aufnahmeabschnitt (87) einen Durchmesser hat, der größer als ein Durchmesser des Körperdurchgangslochs (85) ist und einen Bewegungsweg der Betriebseinheit (91) definiert. 5
4. Wäschebehandlungsvorrichtung nach Anspruch 3, die ferner aufweist:  
eine Entweichungsschutzseinheit (88), um zu verhindern, dass die Betriebseinheit (91) aus dem Aufnahmeabschnitt (87) entweicht, wobei die Entweichungsschutzseinheit (88) von dem Verbindungskörper (81) drehbar gehalten wird und konfiguriert ist, um zu ermöglichen, dass die Drehwelle (67) durch sie hindurchgeht. 10
5. Wäschebehandlungsvorrichtung nach Anspruch 4, wobei der erste Anschlag (95) ein ölfreies Lager ist, das von der Entweichungsschutzseinheit (88) gehalten wird und konfiguriert ist, um zu ermöglichen, dass die Drehwelle (67) durch es hindurchgeht, und wobei der zweite Anschlag (96) ein ölfreies Lager ist, das von einem gestuften Abschnitt (871) gehalten wird und konfiguriert ist, um zu ermöglichen, dass die Drehwelle (67) durch es hindurchgeht. 20 25
6. Wäschebehandlungsvorrichtung nach Anspruch 4, wobei der erste Anschlag (95) eine Feder ist, die zwischen der Entweichungsschutzseinheit (88) und der Betriebseinheit (91) angeordnet ist, um eine Kraft auf die Betriebseinheit (91) anzuwenden, so dass die Betriebseinheit (91) sich von der Entweichungsschutzseinheit (88) weg bewegt, und wobei der zweite Anschlag (96) eine Feder ist, die zwischen dem gestuften Abschnitt (871) und der Betriebseinheit (91) angeordnet ist, um eine Kraft auf die Betriebseinheit (91) anzuwenden, so dass die Betriebseinheit (91) sich von dem gestuften Abschnitt (871) weg bewegt. 30 40
7. Wäschebehandlungsvorrichtung nach Anspruch 3, wobei der erste Anschlag (95) eine Entweichungsschutzseinheit (88) ist, um zu verhindern, dass die Betriebseinheit (91) aus dem Aufnahmeabschnitt (87) entweicht, wobei die Entweichungsschutzseinheit (88) von dem Verbindungskörper (81) drehbar gehalten wird und konfiguriert ist, um zu ermöglichen, dass die Drehwelle (67) durch sie hindurchgeht. 45 50
8. Wäschebehandlungsvorrichtung nach Anspruch 3, wobei der zweite Anschlag (96) ein gestufter Abschnitt (871) ist, der zwischen dem Aufnahmeabschnitt (87) und dem Körperdurchgangsloch (85) ausgebildet ist. 55
9. Wäschebehandlungsvorrichtung nach einem der Ansprüche 1 bis 8, die ferner aufweist:  
einen Schrank (1), der einen darin ausgebildeten Eingang (11) aufweist; und  
eine Schublade (2), an der der Laugenbehälter (3) befestigt ist, wobei die Schublade (2) durch den Eingang (11) aus dem Schrank (1) zurückziehbar ist.
10. Wäschebehandlungsvorrichtung nach Anspruch 9, wobei die Drehwelle (67) eine untere Oberfläche der Wanne (3) und eine untere Oberfläche der Trommel (4) durchdringt und an dem Rührer (6) befestigt ist.
11. Wäschebehandlungsvorrichtung nach Anspruch 10, wobei die Drehwelle (67) senkrecht zu einem Boden, auf dem der Schrank (1) sitzt, eingerichtet ist.
12. Wäschebehandlungsvorrichtung nach Anspruch 10, wobei die Antriebseinheit (7) aufweist:  
einen Stator (71), der an der unteren Oberfläche der Wanne (3) befestigt ist, während er außerhalb der Wanne (3) angeordnet ist, wobei der Stator (71) derart konfiguriert ist, dass er ein sich drehendes Magnetfeld erzeugt; und  
einen Rotor (73), der derart konfiguriert ist, dass er durch das von dem Stator (71) erzeugte sich drehende Magnetfeld gedreht wird, und  
wobei die Drehwelle (67) an dem Rotor (73) befestigt ist.
13. Wäschebehandlungsvorrichtung nach Anspruch 10, wobei der Rührer (6) aufweist:  
einen Körper (61), der in der Trommel (4) angeordnet ist, so dass er an der Drehwelle (67) befestigt ist, wobei der Körper (61) in einer Form einer kreisförmigen Platte ausgebildet ist, die parallel zu der unteren Oberfläche der Trommel (4) eingerichtet ist; und  
einen Arm (63), der von dem Körper (61) in Richtung der Einführungsöffnung (33) vorsteht.
14. Wäschebehandlungsvorrichtung nach Anspruch 13, die ferner aufweist:  
ein Verbindungsloch (411), das durch die untere Oberfläche der Trommel (4) ausgebildet ist, so dass ein Inneres der Trommel (4) durch es hindurch mit einem Inneren der Wanne (3) in Verbindung steht; und  
ein Rührer-Durchgangsloch (65), das durch den Körper (61) ausgebildet ist.

## Revendications

### 1. Appareil de traitement du linge comprenant :

une cuve (3) destinée à contenir de l'eau, la cuve (3) comprenant un orifice d'introduction (33) à travers lequel du linge est introduit dans la cuve (3) ou retiré de celle-ci ;  
 un tambour (4) prévu dans la cuve (3), le tambour (4) contenant le linge fourni à celle-ci à travers l'orifice d'introduction (33) ;  
 un agitateur (6) prévu de manière rotative dans le tambour (4) ;  
 un arbre rotatif (67) pénétrant dans la cuve (3) et le tambour (4) de sorte à être relié à l'agitateur (6) ;  
 une unité d'entraînement (7) pour la rotation de l'arbre rotatif (67) ;  
 une unité de liaison (8) comprenant un corps de liaison (81) fixé au tambour (4) et un trou débouchant de corps (85) formé à travers le corps de liaison (81) de sorte à permettre à l'arbre rotatif (67) d'être inséré dans celui-ci ; et  
 une unité de transmission de puissance (9) ;  
**caractérisé par**  
 ladite unité de transmission de puissance (9) étant configurée de sorte à se déplacer alternativement en haut et en bas dans le trou débouchant de corps (85) sur la base de la direction de rotation de l'arbre rotatif (67),  
 dans lequel l'unité de transmission de puissance (9) est prévue pour le couplage avec la surface circonférentielle extérieure de l'arbre rotatif (67), et est prévue pour le contact sélectif avec le corps de liaison (81) pour transmettre de la puissance après que l'arbre rotatif (67) a tourné un nombre prédéterminé de fois.

### 2. Appareil de traitement du linge selon la revendication 1, dans lequel l'unité de transmission de puissance (9) comprend :

une première butée (95) et une seconde butée (96) fixées au trou débouchant de corps (85), la première butée (95) et la seconde butée (96) étant espacées l'une de l'autre d'une distance prédéterminée ;  
 une unité opérationnelle (91) située dans le trou débouchant de corps (85), l'unité opérationnelle (91) étant configurée pour se déplacer alternativement entre la première butée (95) et la seconde butée (96) ;  
 un trou débouchant (92) formé à travers l'unité opérationnelle (91) de sorte à permettre à l'arbre rotatif (67) d'être inséré dedans ;  
 un premier filet (931) prévu dans le trou débouchant (92) ; et  
 un second filet (933) prévu au niveau de l'arbre

rotatif (67) de sorte à s'engrener avec le premier filet (931), le second filet (933) déplaçant l'unité opérationnelle (91) vers la première butée (95) ou la seconde butée (96) lorsque l'arbre rotatif (67) tourne.

### 3. Appareil de traitement du linge selon la revendication 2, comprenant en outre :

une portion de réception (87) formée dans le corps de liaison (81), la portion de réception (87) ayant un diamètre qui est supérieur à un diamètre du trou débouchant de corps (85) et définissant une voie mobile de l'unité opérationnelle (91).

### 4. Appareil de traitement du linge selon la revendication 3, comprenant en outre :

une unité d'empêchement de fuite (88) pour empêcher l'unité opérationnelle (91) de s'échapper de la portion de réception (87), l'unité d'empêchement de fuite (88) étant supportée de manière rotative par le corps de liaison (81) et étant configurée pour permettre à l'arbre rotatif (67) de passer à travers celle-ci.

### 5. Appareil de traitement du linge selon la revendication 4, dans lequel la première butée (95) est un palier sans huile qui est supporté par l'unité d'empêchement de fuite (88) et est configuré pour permettre à l'arbre rotatif (67) de passer à travers celui-ci, et dans lequel la seconde butée (96) est un palier sans huile qui est supporté par une portion étagée (871) et est configuré pour permettre à l'arbre rotatif (67) de passer à travers celui-ci.

### 6. Appareil de traitement du linge selon la revendication 4, dans lequel la première butée (95) est un ressort situé entre l'unité d'empêchement de fuite (88) et l'unité opérationnelle (91) de sorte à fournir de la force à l'unité opérationnelle (91) de sorte que l'unité opérationnelle (91) s'éloigne de l'unité d'empêchement de fuite (88), et dans lequel la seconde butée (96) est un ressort situé entre la portion étagée (871) et l'unité opérationnelle (91) de sorte à fournir de la force à l'unité opérationnelle (91) de sorte que l'unité opérationnelle (91) s'éloigne de la portion étagée (871).

### 7. Appareil de traitement du linge selon la revendication 3, dans lequel la première butée (95) est une unité d'empêchement de fuite (88) pour empêcher l'unité opérationnelle (91) de fuir de la portion de réception (87), l'unité d'empêchement de fuite (88) étant supportée de manière rotative par le corps de liaison (81) et étant configurée pour permettre à l'arbre rotatif (67) de passer à travers celle-ci.

### 8. Appareil de traitement du linge selon la revendication 3, dans lequel la seconde butée (96) est une portion

étagée (871) formée entre la portion de réception (87) et le trou débouchant de corps (85).

9. Appareil de traitement du linge selon l'une quelconque des revendications 1 à 8, comprenant en outre : 5

une armoire (1) comprenant une entrée (11) formée dans celle-ci ; et  
un tiroir (2) auquel la cuve (3) est fixée, le tiroir (2) étant rétractable de l'armoire (1) à travers l'entrée (11). 10

10. Appareil de traitement du linge selon la revendication 9, dans lequel l'arbre rotatif (67) pénètre dans une surface inférieure de la cuve (3) et une surface inférieure du tambour (4) et est fixé à l'agitateur (6). 15

11. Appareil de traitement du linge selon la revendication 10, dans lequel l'arbre rotatif (67) est agencé perpendiculairement à un sol, sur lequel l'armoire (1) est placée. 20

12. Appareil de traitement du linge selon la revendication 10, dans lequel l'unité de d'entraînement (7) comprend : 25

un stator (71) fixé à la surface inférieure de la cuve (3) tout en étant situé en dehors de la cuve (3), le stator (71) étant configuré pour générer un champ magnétique rotatif ; et 30  
un rotor (73) configuré pour être tourné par le champ magnétique rotatif généré par le stator (71), et  
dans lequel l'arbre rotatif (67) est fixé au rotor (73). 35

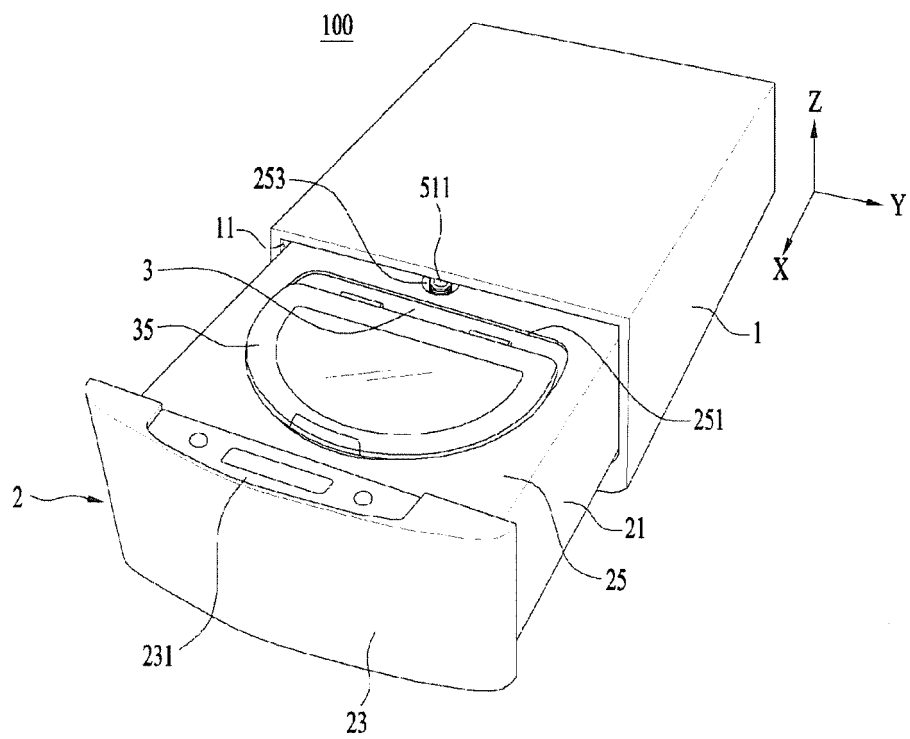
13. Appareil de traitement du linge selon la revendication 10, dans lequel l'agitateur (6) comprend :

un corps (61) disposé dans le tambour (4) de sorte à être fixé à l'arbre rotatif (67), le corps (61) étant réalisé dans une forme de plaque circulaire agencée parallèlement à la surface inférieure du tambour (4) ; et 40  
un bras (63) faisant saillie du corps (61) vers l'orifice d'introduction (33). 45

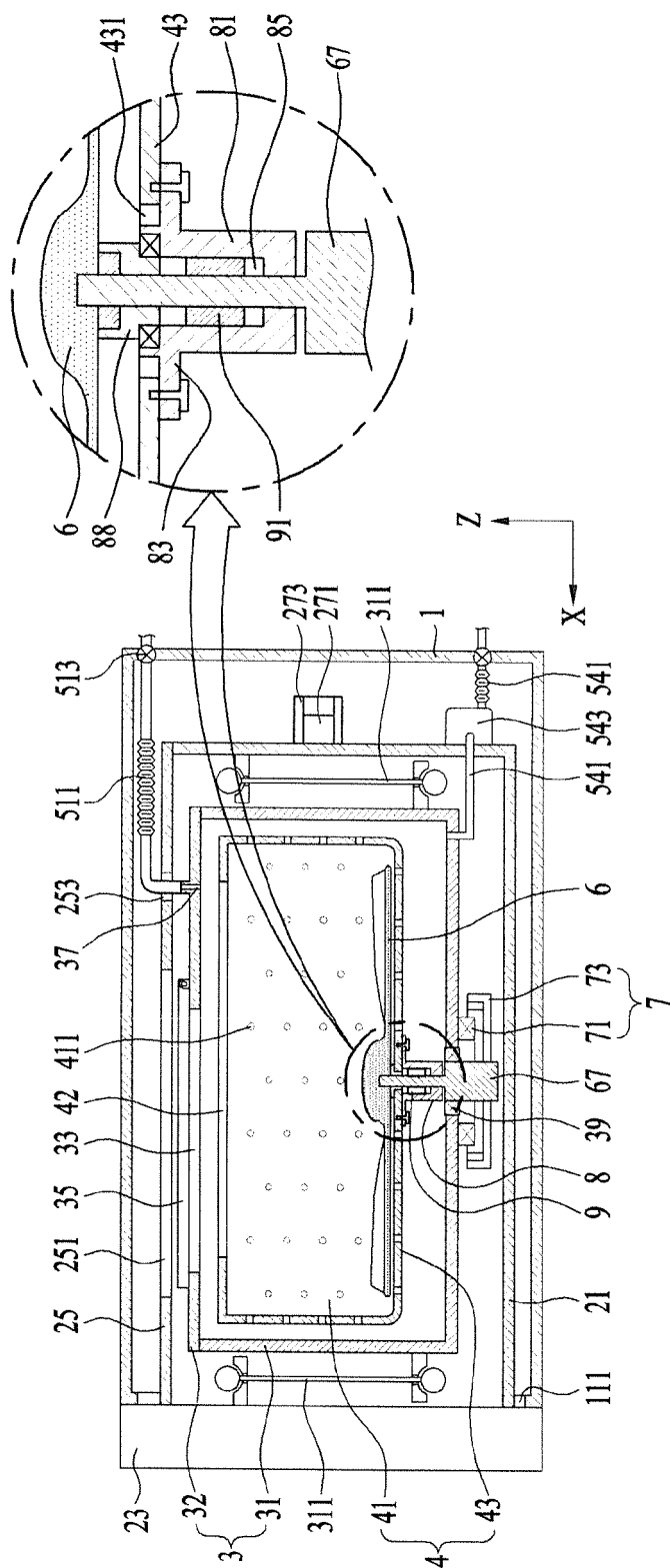
14. Appareil de traitement du linge selon la revendication 13, comprenant en outre : 50

un trou de communication (411) formé à travers la surface inférieure du tambour (4) de sorte qu'un intérieur du tambour (4) communique avec un intérieur de la cuve (3) à travers celui-ci ; et 55  
un trou débouchant d'agitateur (65) formé à travers le corps (61).

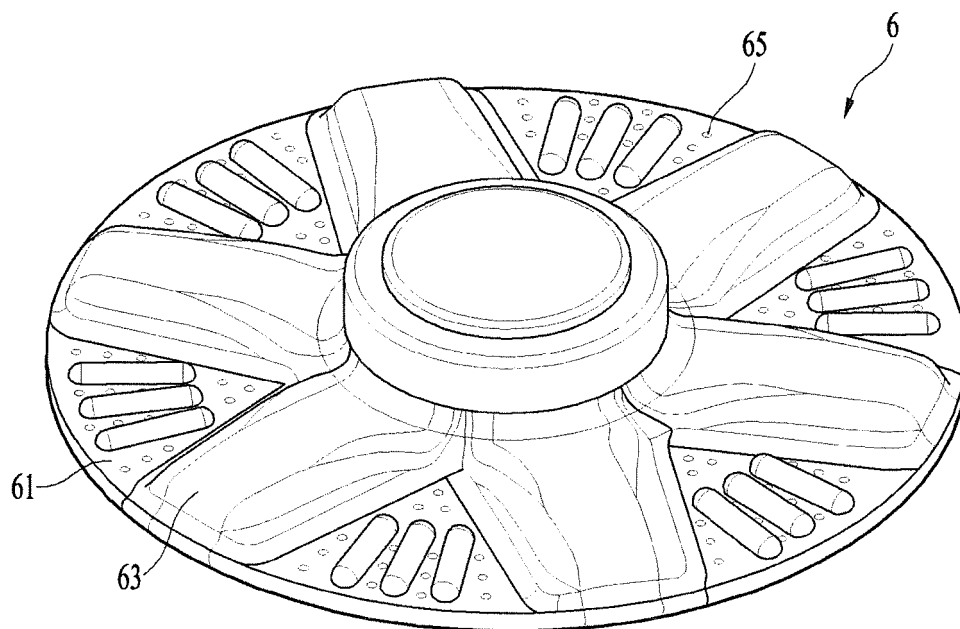
【Fig. 1】



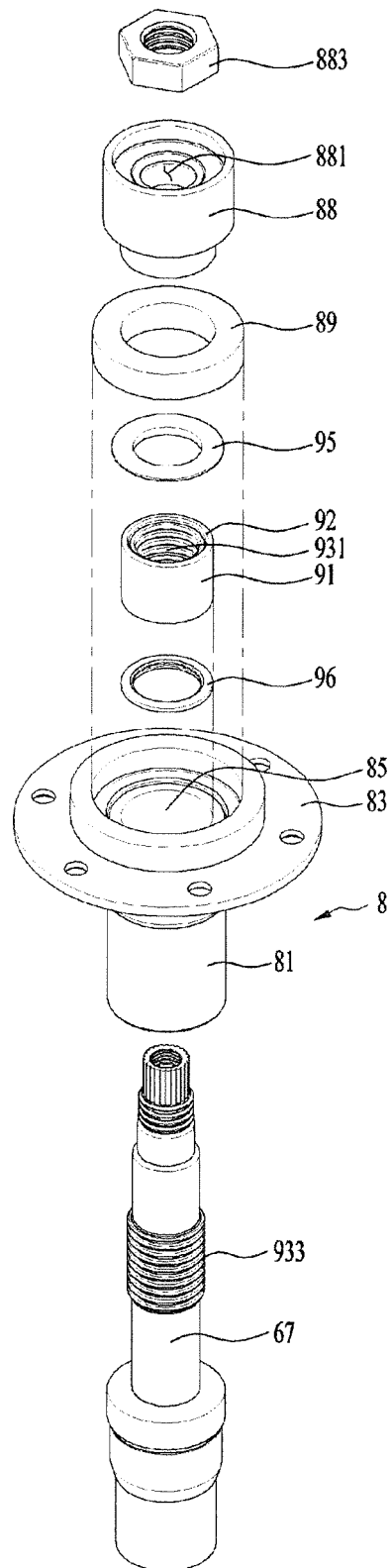
【Fig. 2】



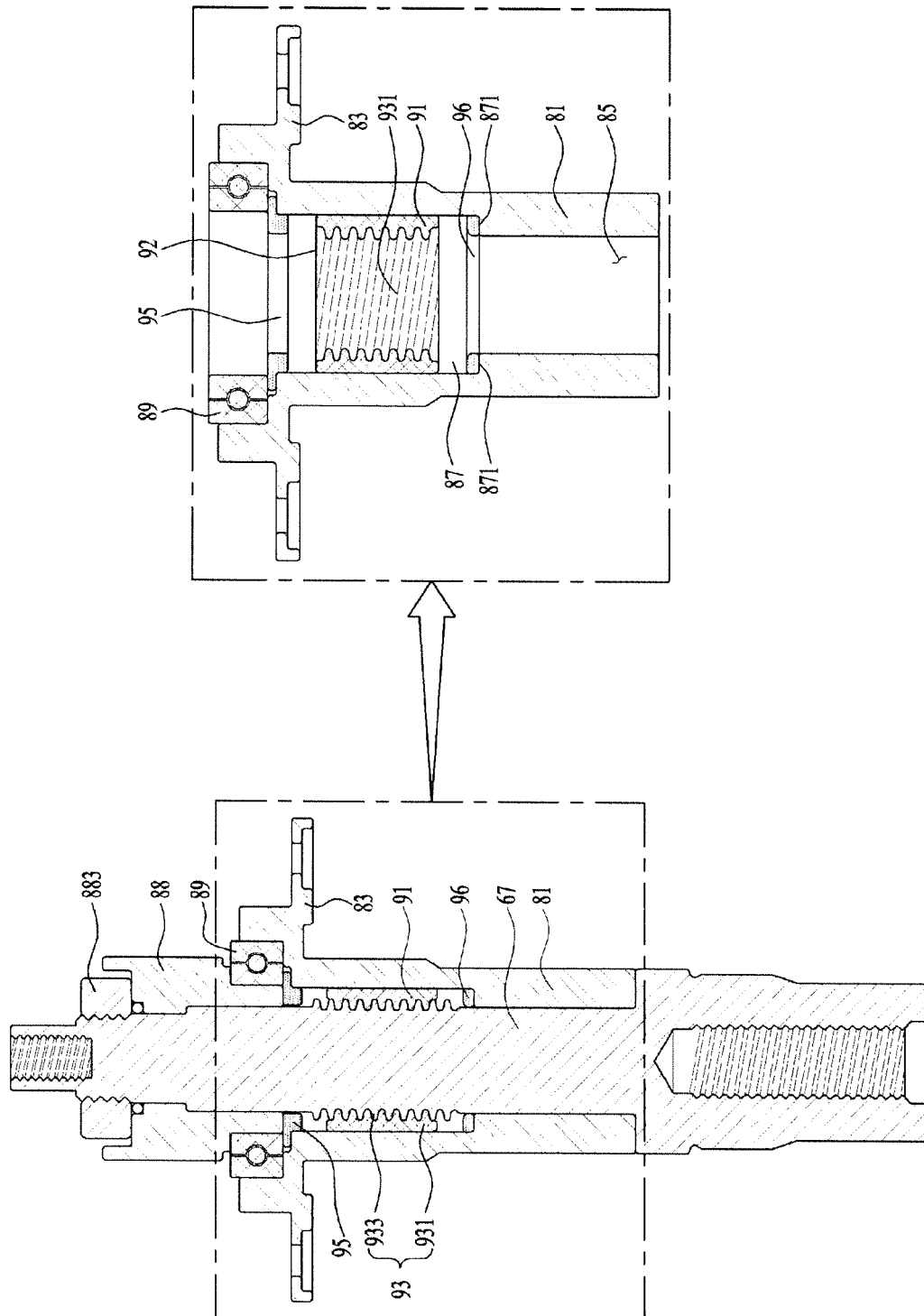
【Fig. 3】



【Fig. 4】

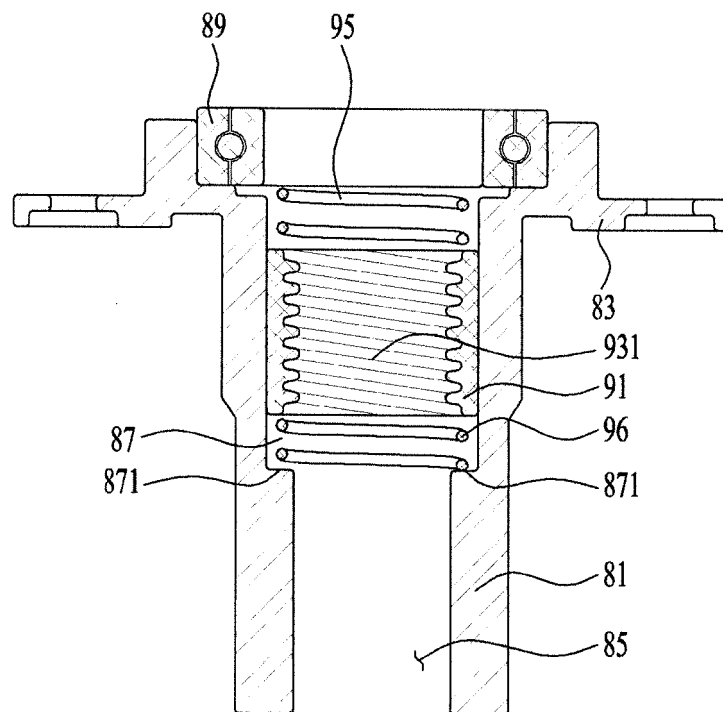


【Fig. 5】





【Fig. 6】



**REFERENCES CITED IN THE DESCRIPTION**

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