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(54) **DRAINAGE STRUCTURE OF WASHING MACHINE**

(57) The disclosure relates to a draining structure of a washing machine. An inner drum is installed in a washing machine housing, a drain port is arranged on the inner drum, and a drain valve is installed at the drain port; the washing machine is further provided with a positioning and locking mechanism for making the inner drum rotate to a fixed drainage position and be locked; and the washing machine is provided with a valve core opening mechanism for opening the drain valve after the inner drum rotates to the fixed drainage position, so that when the washing machine is in a draining state, the drain valve is opened after the inner drum rotates to the fixed drainage position to discharge the washing water in the inner drum. In this way, the drain valve is in a closed state under the normal state of the washing machine, and is in an open state under the joint action of the positioning and locking mechanism and the valve core opening mechanism when the washing machine is in a draining state, so that the effect that during the rotating process of the inner drum, the inner drum is sealed, and during

drainage, the drain valve is opened to allow water in the inner drum to be discharged normally is realized; besides, the inner drum does not have to be sleeved with an outer drum, thus increasing the volume of the inner drum and improving the washing capacity of the washing machine.

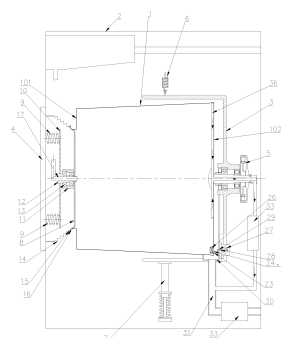


Fig. 1

Description

TECHNICAL FIELD

[0001] The disclosure belongs to the technical field of washing machines, in particular relates to a washing machine provided with only a rotatable inner drum capable of containing water, and more particularly relates to a draining structure of a washing machine.

BACKGROUND

[0002] In the prior art, a drum washing machine generally comprises an inner drum and an outer drum which are sleeved, the outer drum is sealed and used for containing water, and the inner drum is used for containing clothes and can rotate to beat and wash the clothes. Meanwhile, the inner drum is provided with draining holes, so that water in the outer drum flows into the inner drum through the draining holes to soak the clothes in the inner drum, the water in the inner drum flows out to the outer drum through the draining holes, and water in the clothes in the inner drum is discharged to the outer drum through the draining holes when the inner drum rotates at a high speed, so as to realize the purpose of washing clothes.

[0003] However, as the inner drum and the outer drum are mutually sleeved, dirt tends to be accumulated between the inner drum and the outer drum during the use of the washing machine. Besides, because the inner and outer drums are mutually sleeved, users cannot clean the outer wall of the inner drum and the inner wall of the outer drum, thus increasing bacteria in the washing machine and reducing the washing efficiency of the washing machine and the cleanliness of the washed clothes.

[0004] Meanwhile, in the existing washing machines, the inner drum is sleeved with the outer drum, the inner drum rotates to beat and wash clothes in the washing process, so the washing capacity of the washing machine is based on the inner drum, resulting in a low utilization rate of the inner space of the washing machine, and the washing capacity of the washing machine cannot be expanded on the existing basis.

[0005] In view of this, the current research and development hotspot is to provide a washing machine to combine the inner and outer drum and make the inner drum be a sealed container, which can not only contain water and clothes, but also rotate to beat and wash the clothes. Meanwhile, since the washing machine is not provided with an outer drum or the outer drum and washing machine housing are integrally arranged, the inner drum of the washing machine can be expanded to improve the washing capacity of the washing machine.

[0006] However, since the inner drum not only contains washing water, but also rotates to beat and wash clothes in the drum, how to design a draining structure suitable for the washing machine has become an urgent problem to be solved.

[0007] In view of the above technical defects, the present application is hereby submitted.

SUMMARY

[0008] The technical problem to be solved by the present disclosure is to overcome defects in the prior art and provide a draining structure of a washing machine. According to the draining structure of the washing machine, by arranging a drain valve at the bottom most part of an inner drum and disposing a valve core opening mechanism corresponding to the drain valve on the washing machine, the valve core opening mechanism pushes a drain valve core to open after the washing machine inner drum is positioned at a corresponding position, so as to solve the problem of discharging washing water contained in the inner drum, and further realize the purposes of sealing an opening of the rotatable inner drum during the normal working process of the washing machine, and discharging washing water in the inner drum through the drain valve when the washing machine is in a draining state. Meanwhile, the inner drum and outer drum of a drum washing machine are combined to realize the purpose of improving the washing capacity of the washing machine.

[0009] In order to solve the technical problem and achieve the technical effect, the basic design idea of the technical solution adopted by the disclosure is as follows:

A draining structure of a washing machine, an inner drum is installed in washing machine housing, a drain port is arranged on the inner drum, and a drain valve is installed at the drain port;

the washing machine is further provided with a positioning and locking mechanism for making the inner drum rotate to a fixed drainage position and be locked; and the washing machine is provided with a valve core opening mechanism for opening the drain valve after the inner drum rotates to the fixed drainage position, and when the washing machine is in a draining state, the drain valve is opened after the inner drum rotates to the fixed drainage position to discharge the washing water in the inner drum.

[0010] Further, the drain port is arranged at a side wall of the inner drum or an outer periphery of a front end or a rear end of the inner drum; and preferably the inner drum is a tapered drum with a small diameter at one end and a large diameter at another end, and the drain port is arranged at an outer periphery of an end having larger diameter of the inner drum.

[0011] Further, the rear end of the inner drum is composed of an inner drum bottom, an outer peripheral portion of the inner drum bottom is provided with the drain port horizontally penetrating the inner drum bottom, and the drain valve is arranged at the drain port; and the drain valve comprises a valve core covering the drain port, and

the valve core is connected with the inner drum bottom by a limiting spring, to make the valve core block the drain port from inside to outside under the action of the limiting spring.

[0012] Further, the rear end of the inner drum is installed on an inner drum support, the inner drum support is installed in the washing machine housing via a damping suspension spring and/or a damping support rod, and the valve core opening mechanism is installed on the inner drum support.

[0013] Further, the valve core opening mechanism comprises a stepping motor installed on the inner drum support, an output end of the stepping motor is provided with a rotating wheel fixedly connected thereto in a coaxial mode, an outer periphery of the rotating wheel is hinged to one end of a connecting rod, and another end of the connecting rod passes through a limiting hole formed in the inner drum support and moves telescopically in a direction of the drain valve to push the valve core to move towards the inside of the inner drum to open the drain valve for drainage.

[0014] Further, the valve core opening mechanism comprises an electromagnet installed on the inner drum support, and the electromagnet is arranged corresponding to the drain valve, and the drain valve and the electromagnet are in the coaxial direction when the inner drum rotates to the fixed drainage position; and a magnet is mounted on the valve core of the drain valve or the whole valve core is composed of a magnet, to provide an electromagnetic repulsion force to the valve core after the electromagnet is energized, and the valve core is pushed to move towards inside of the inner drum to open the drain valve for drainage.

[0015] Further, a water collecting tank is correspondingly arranged outside the drain port of the inner drum, and a bottom of the water collecting tank communicates with a washing machine drain pipe to collect and discharge the water discharged through the drain port of the inner drum.

[0016] Further, when the inner drum is at the fixed drainage position, the drain port is at a lowest position of the inner drum, and water in the inner drum converges towards the drain port, and flows out through the drain port opened via the drain valve.

[0017] Further, the drain port is disposed at an outer periphery of the inner drum bottom; when the inner drum is at the fixed drainage position, the drain port rotates to a position directly under an axis of the inner drum; and the water collecting tank comprises a groove under the drain port, and a rear side wall of the groove extends vertically upwards to a rear side of the drain port and is spaced from the drain port, to guide the water flowing out of the drain port to fall into the water collecting tank.

[0018] Further, the water collecting tank is installed on or integrally formed with the inner drum support of the washing machine, and the valve core opening mechanism is installed on the water collecting tank.

[0019] Compared with the washing machines in the

prior art, the washing machine of the present disclosure has the following beneficial effects:

Due to the above settings, the drain valve is in a closed state under the normal state of the washing machine, and is in an open state under the joint action of the positioning and locking mechanism and the valve core opening mechanism when the washing machine is in a draining state, so that the water contained in the inner drum does not flow out from the drain port when the inner drum rotates normally. Further, the effect is realized that during the rotating process of the inner drum, the inner drum is sealed, and during drainage, the drain valve is opened to allow water in the inner drum to be discharged normally. And the purpose of normal draining of the washing machine with the inner drum having both a rotating function and a water containing function is realized; besides, the inner drum does not have to be sleeved with an outer drum, thus increasing the volume of the inner drum and improving the washing capacity of the washing machine.

[0020] In order to make the design concept of the technical solution of the present disclosure clearer and facilitate further understanding of its beneficial effects, some specific embodiments of the present disclosure will be described in detail below with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] As part of the present disclosure, the accompanying drawings are used for providing a further understanding of the present disclosure. The exemplary embodiments of the present disclosure and descriptions thereof are used to explain the present disclosure, but do not constitute improper limitations of the present disclosure. Obviously, the drawings in the following description are only some embodiments, and other drawings can be obtained according to these drawings without creative labor for those skilled in the art. In the drawings:

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

Fig. 2 is a structural diagram of an inner drum of the washing machine in an unlocked state according to an embodiment of the present disclosure;

Fig. 3 is a structural diagram of an inner drum of the washing machine in a locked state according to an embodiment of the present disclosure;

Fig. 4 is a structural diagram of a drain valve in a closed state according to an embodiment of the present disclosure; and

Fig. 5 is a structural diagram of a drain valve in an open state according to an embodiment of the present disclosure.

[0022] Reference numerals in the figures: 1. inner drum, 2. housing, 3. inner drum support, 4. door cover,

5. drive motor, 6. damping suspension spring, 7. damping support rod, 23. drain port, 24. drain valve, 25. valve core, 26. limiting spring, 27. rotating wheel, 28. connecting rod, 29. limiting hole, 30. water collecting tank, 31. drain pipe, 44. locking pin, 45. locking groove, 101. inner drum opening, 102. inner drum bottom.

[0023] It should be noted that the drawings and the written description are not intended to limit the conceptual scope of the disclosure in any way, but to explain the inventive concept to those skilled in the art by referring to specific embodiments.

DETAILED DESCRIPTION

[0024] In order to make the purpose, technical solution and advantages of the embodiments of the present disclosure more clear, the following will clearly and completely describe the technical solution in the embodiments with reference to the drawings in the embodiments of the present disclosure. The following embodiments are used to illustrate the present disclosure, but are not used to limit the scope of the present disclosure.

[0025] In the description of the present disclosure, it should be noted that the orientation or positional relationships indicated by the terms "upper", "lower", "front", "rear", "left", "right", "vertical", "inner" and "outer" are based on the orientation or positional relationships shown in the drawings, only for convenience of describing the present disclosure and simplifying the description, and do not indicate or imply that the indicated device or element must have a specific orientation, be constructed and operate in a specific orientation, and therefore cannot be understood as a limitation of the present disclosure.

[0026] In the description of the present disclosure, it should be noted that the terms "install" and "connect" should be understood in a broad sense unless otherwise specified and defined, for example, it can be fixed connection, removable connection or integrated connection, it can be mechanical connection or electrical connection, and it can be direct connection or indirect connection through intermediate media. For those of ordinary skill in the art, the specific meaning of the above terms in the present disclosure can be understood in specific situations.

[0027] As shown in Figs. 1 to 4, the embodiment of the present disclosure provides a washing machine; the washing machine comprises a housing 2, an inner drum 1 is arranged in the housing 2. The axis of the inner drum 1 extends horizontally or is inclined downwards gradually from front to back. The front end of the inner drum 1 is provided with an inner drum opening 101, and the rear end is provided with an inner drum bottom 102 in a sealed mode. And there is no through hole in the drum wall of the inner drum 1, so that a sealed container with only a front opening is formed in the inner drum 1. Meanwhile, the front end of the housing 2 of the washing machine is provided with a door cover 4 which can be opened out-

wards for the purpose of blocking the inner drum opening 101 after the door cover 4 is closed and putting clothes into the inner drum 1 via the inner drum opening 101 after the door cover 4 is opened. The rear end of the inner drum 1 is installed in the housing 2 of the washing machine through an inner drum support 3; the inner drum support 3 and the rear end of the inner drum 1 are coaxially arranged. The upper end and lower end of the inner drum support 3 are both bent to the direction of the drum opening at the front end of the inner drum 1. The bent parts extend to at least the middle of the inner drum 1, and the upper and lower bent parts are respectively connected with the housing 2 of the washing machine through a damping suspension spring 6 and a damping support rod 7, so as to realize the purpose that the inner drum support 3 can be installed in the washing machine housing 2 in a vibrating manner. Meanwhile, the center of the inner drum bottom 102 and a motor shaft of a washing machine drive motor 5 are coaxially arranged to drive the inner drum 1 to rotate, and the inner drum 1 and the drive motor 5 are both fixedly installed on the inner drum support 3. Preferably, the inner drum bottom 102 and the drive motor 5 are respectively arranged on the two sides of the inner drum support 3, the drive motor 5 is fixedly connected to the inner drum support 3. The motor shaft of the drive motor 5 passes through the inner drum support 3 through a bearing and is coaxially and fixedly connected with the inner drum bottom 102, and the shaft of the drive motor 5 can rotate relative to the inner drum support 3, so as to realize the purpose that the inner drum 1 and the drive motor 5 are installed on the inner drum support 3 and the inner drum 1 can rotate alone to wash clothes inside under the action of the drive motor 5.

[0028] In the present embodiment, in order to discharge the water in the inner drum of the washing machine, and to realize sealing the inner drum and containing water and normal washing in the working process of the washing machine, the following settings are made: A draining structure of a washing machine, an inner drum 1 is installed in a washing machine housing 2, a drain port 23 is arranged on the inner drum 1, and a drain valve 24 in a normally closed state is installed at the drain port 23; the washing machine is provided with a positioning and locking mechanism for making the inner drum 1 rotate to a fixed drainage position and be locked; and the washing machine is provided with a valve core opening mechanism for opening the drain valve 24 after the inner drum 1 rotates to the fixed drainage position, so that when the washing machine is in a draining state, the drain valve 24 is opened after the inner drum 1 rotates to the fixed drainage position to discharge the washing water in the inner drum.

[0029] During the normal operation of the washing machine, the drain valve is closed and the drain port is in a closed state, so that water in the inner drum cannot flow out of the drain port. And when the washing machine is in a draining state, the inner drum of the washing machine rotates to the fixed draining position under the action of

the positioning and locking mechanism, the valve core opening mechanism on the washing machine is turned on. A valve core of the drain valve is pushed to open by the valve core opening mechanism; the drain port is in an opening state, and water in the inner drum flows out through the drain port.

[0030] In this way, the drain valve is in a closed state under the normal state of the washing machine, and is in an open state under the joint action of the positioning and locking mechanism and the valve core opening mechanism when the washing machine is in a draining state, so that the water contained in the inner drum does not flow out from the drain port when the inner drum rotates normally, further, the effect is realized that during the rotating process of the inner drum, the inner drum is sealed, and during drainage, the drain valve is opened to allow water in the inner drum to be discharged normally. And the purpose of normal draining of the washing machine with the inner drum having both a rotating function and a water containing function is realized. Besides, the inner drum does not have to be sleeved with an outer drum, thus increasing the volume of the inner drum and improving the washing capacity of the washing machine.

Embodiment 1

[0031] As shown in Figs. 1 to 4, the present embodiment introduces a draining structure of a washing machine. An inner drum 1 is installed in a housing 2 of the washing machine, a drain port 23 is arranged on the inner drum 1, and a drain valve 24 in a normally closed state is installed at the drain port 23. The washing machine is provided with a positioning and locking mechanism for making the inner drum 1 rotate to a fixed drainage position and be fixed; and the washing machine is provided with a valve core opening mechanism for opening the drain valve 24 after the inner drum 1 rotates to the fixed drainage position, and when the washing machine is in a draining state, the drain valve 24 is opened after the inner drum 1 rotates to the fixed drainage position to discharge the washing water in the inner drum 1.

[0032] In the present embodiment, the drain port 23 is arranged at a side wall of the inner drum 1 or an outer periphery of the front end or a rear end of the inner drum 1. And preferably, the inner drum 1 is set into a tapered drum with a small diameter at one end and a large diameter at the other end. The drain port 23 is arranged at an outer periphery of an end having larger diameter of the inner drum 1. By arranging the drain port at the end having larger diameter of the tapered inner drum, the water in the inner drum converges towards the drain port, thus realizing the purpose that the water in the inner drum is completely discharged through the drain port.

[0033] In the present embodiment, the rear end of the inner drum 1 is composed of an inner drum bottom 102 and the front end is composed of an inner drum opening 101, and the two are connected via an inner drum side wall. The inner drum side wall is a tapered surface and

the diameter of which gradually increases from the inner drum opening 101 towards the inner drum bottom 102. An outer peripheral portion of the inner drum bottom 102 is provided with the drain port 23 horizontally penetrating the inner drum bottom, and the drain valve 24 is arranged at the drain port 23. The drain valve 24 comprises a valve core 25 covering the drain port 23, and the valve core 25 is connected to the inner drum bottom 102 via a limiting spring 26 to make the valve core 25 block the drain port 23 from inside to outside under the action of the limiting spring 26. By connecting the valve core to the inner drum bottom through the limiting spring, the limiting spring provides an elastic force to the outside of the inner drum, so that the valve core closely fits the inner drum bottom correspondingly under the action of the elastic force, so that the valve core completely blocks the drain port, and the purpose of sealing the drain port is realized.

[0034] In the present embodiment, the drain port 23 on the inner drum 1 is set into a tapered hole gradually widening from inside to outside, the smaller end of the tapered hole is closed, and a side wall of the tapered hole is provided with a through hole to connect an inside of the inner drum 1 with an outside of the inner drum 1. The valve core 25 is a plate structure covering the larger end of the tapered hole. The limiting spring 26 extending along the axis is arranged in the tapered hole, and one end of the limiting spring 26 is connected with a sealing part of the smaller end of the tapered hole, and the other end of the limiting spring 26 is connected with the valve core 25. And the limiting spring 26 is in a tensioned state to apply a pushing force, towards the outside of the inner drum 1, to the valve core 25, so that the valve core 25 completely blocks the drain port 23.

[0035] In the present embodiment, the rear end of the inner drum 1 is provided with an inner drum support 3, the inner drum support 3 is installed in the housing 2 of the washing machine via a damping suspension spring 6 and/or a damping support rod 7. The valve core opening mechanism is installed on the inner drum support 3.

[0036] In the present embodiment, when the inner drum 1 is at the fixed drainage position, the drain port 23 is at the lowest position of the inner drum 1, and the water in the inner drum 1 converges towards the drain port 23, and flows out through the drain port 23 with the drain valve 24 opened. The valve core opening mechanism is installed on a side, away from the inner drum 1, of the inner drum support 3 and is opposite to the outer periphery of the inner drum 1. When the inner drum 1 is at the fixed drainage position, the drain port 23 and a connecting rod 28 of the valve core opening mechanism are coaxially arranged, and the connecting rod 28 is axially stretched by a stepping motor and a rotating wheel 27, and pushes the valve core 25 of the drain valve 24 to move towards the inside of the inner drum 1 to open the drain port 23.

[0037] As shown in Figs. 4 and 5, in the present embodiment, the valve core opening mechanism comprises the stepping motor installed on the inner drum support

3, an output end of the stepping motor is provided with the rotating wheel 27 fixedly connected thereto in a co-axial mode. The outer periphery of the rotating wheel 27 is hinged to one end of the connecting rod 28, and the other end of the connecting rod 28 passes through a limiting hole formed in the inner drum support 3 and moves telescopically in the direction of the drain valve 23 to push the valve core 25 to move towards the inside of the inner drum 1 to open the drain valve 24 for drainage.

[0038] In the present embodiment, a water collecting tank 30 is correspondingly arranged outside the drain port 23 of the inner drum 1, and the bottom of the water collecting tank 30 communicates with a washing machine drain pipe 31 to collect and discharge the water discharged through the drain port 23 of the inner drum 1.

[0039] In the present embodiment, the drain port 23 is disposed at the outer periphery of the inner drum bottom 102. When the inner drum 1 is at the fixed drainage position, the drain port 23 rotates to a position directly under the axis of the inner drum 1. And the water collecting tank 30 comprises a groove correspondingly arranged under the drain port 23, and a rear side wall of the groove extends vertically upwards to a rear side of the drain port 23 and is spaced from the drain port 23 to guide the water flowing out of the drain port 23 to fall into the water collecting tank 30 and prevent the water flowing out of the horizontally arranged drain port from splashing to the outside of the washing machine. Meanwhile, the front side wall of the water collecting tank 30 is attached to the lower part of the washing machine inner drum 1, or a gap there between is extremely small, so as to ensure that the water in the water collecting tank 30 will not splash out from the front end, thereby avoiding the occurrence of overflow of water discharged from the inner drum.

[0040] In the present embodiment, the water collecting tank 30 is installed on or integrally formed with the inner drum support 3 of the washing machine, and the valve core opening mechanism is installed on the water collecting tank 30.

[0041] In the present embodiment, the positioning and locking mechanism can be any existing mechanism which can control the inner drum of the washing machine to rotate to the fixed drainage position and be fixed. For example, a control program is correspondingly arranged on a drive motor which drives the inner drum to rotate, so as to control the inner drum to rotate to the fixed drainage position and then be locked, so that the inner drum stops rotating. The positioning and locking mechanism can also be arranged as follows: as shown in Figs. 2 and 3, the side wall of the inner drum 1 is provided with a locking groove 34 recessed inwardly, and the washing machine is provided with a locking pin 41 corresponding to the locking groove 34. The locking pin 41 is mounted on the housing 2 of the washing machine or on the inner drum support 3 and can move telescopically in the radial direction of the inner drum. As shown in Fig. 2, when the locking pin 41 contracts inwards under the action of a driving device, the locking pin 41 is separated from the

locking groove 42, and the inner drum 1 rotates freely. And as shown in Fig. 3, when the locking pin 41 is ejected outwards under the action of the driving device, the locking pin 41 extends into the locking groove 42 in the inner drum 1, the inner drum 1 stops rotating, and the inner drum 1 is at the fixed drainage position, so that the drain port 23 is at a position corresponding to the valve core opening mechanism.

[0042] As shown in Fig. 4, in the normal washing process of the washing machine, the drain valve is closed, the inner drum rotates normally, and the water in the inner drum washes clothes normally instead of flowing out from the drain port. And as shown in Fig. 5, during the drainage process of the washing machine, the inner drum rotates to the fixed drainage position, the stepping motor pushes the rotating wheel to rotate, the rotating wheel drives the connecting rod to move towards the inner drum, the end of the connecting rod pushes the valve core of the drain valve at a relative position to move towards the inside of the inner drum, the valve core is pushed to open the drain port against the pulling force of the spring. The water in the inner drum flows out from the open drain port, and the outflow water is collected by the water collecting tank and then discharged out of the washing machine through the drain pipe, thus realizing the purpose of discharging the water in the inner drum.

Embodiment 2

[0043] The difference between the present embodiment and Embodiment 1 is that the valve core opening mechanism comprises an electromagnet installed on the inner drum support 3, and the electromagnet is arranged correspondingly to the drain valve 23, so that the drain valve 23 and the electromagnet are in the coaxial direction when the inner drum 1 rotates to the fixed drainage position. And a magnet is mounted on the valve core 25 of the drain valve 23 or the whole valve core is composed of magnet to provide an electromagnetic repulsion force to the valve core 25 after the electromagnet is energized. The valve core 25 is pushed to move towards the inside of the inner drum 1 to open the drain valve 23 for drainage.

[0044] In the normal washing process of the washing machine, the drain valve is closed, the inner drum rotates normally, and the water in the inner drum washes clothes normally instead of flowing out from the drain port. And during the drainage process of the washing machine, the inner drum rotates to the fixed drainage position, the electromagnet is energized to provide a repulsion force to the valve core, so that the valve core moves towards the inside of the inner drum against the elastic force of the spring under the repulsion force, and the drain port of the inner drum is open. The water in the inner drum flows out from the open drain port, and the outflow water is collected by the water collecting tank and then discharged out of the washing machine through the drain pipe, thus realizing the purpose of discharging the water in the inner drum.

Embodiment 3

[0045] In the present embodiment, in order to realize the sealing at the inner drum opening 101 when the washing machine runs, the following settings are made:

as shown in Fig. 1, a washing machine is provided. A door cover 4 is installed on a housing 2 of the washing machine, and the door cover 4 is rotatably connected with an inner drum cover 8 through an elastic mechanism, and after the door cover 4 is closed, the elastic mechanism provides a locking elastic force to the inner drum cover 8 to make the inner drum cover 8 be in sealing contact with the inner drum opening 101, and make the inner drum cover 8 rotate together with the inner drum 1, so as to realize the purpose of sealing the inner drum 1 after the inner drum cover 8 is fastened to the inner drum opening 101 when the door cover 4 is closed.

[0046] In this way, the inner drum opening is sealed by the inner drum cover tightly pressed by elastic force. The inner drum cover is in sealing contact with the inner drum opening and rotates together with the inner drum opening in the washing process of the washing machine, so that the purpose of dynamic sealing of the drum opening when the inner drum rotates is realized, and the inner drum can both rotate and contain water. Besides, the inner drum does not have to be sleeved with an outer drum, thus increasing the volume of the inner drum and improving the washing capacity of the washing machine.

[0047] In the present embodiment, the door cover 4 and the inner drum cover 8 are coaxially arranged, and the door cover 4 and the inner drum cover 8 are connected through the elastic mechanism, and the inner drum cover 8 is pressed against the inner drum opening 101 under the action of the elastic mechanism in a compressed state after the door cover 4 is closed.

[0048] In the present embodiment, the inner drum cover 8 is fixedly connected with the door cover 4, so that the inner drum cover 8 moves together with the opening and closing of the door cover 4, thereby realizing the purpose that the inner drum cover 8 opens and closes the inner drum opening 101. Meanwhile, the inner drum cover 8 and the door cover 4 can relatively rotate around the central axis, so that the inner drum cover 8 is hermetically and fixedly connected with the inner drum 1 and the inner drum cover 8 can rotate together with the inner drum 1 after the washing machine is closed.

[0049] Preferably, in the present embodiment, in order to increase the sealing performance between the inner drum cover 8 and the inner drum opening 101 after the inner drum cover 8 is closed, the inner drum cover 8 and the inner drum opening 101 can be elastically clamped, so that the inner drum cover and the inner drum opening 101 can be fixedly clamped after the door cover 4 is closed, and the inner drum cover moves together with the door cover 4 and is separated from the inner drum opening 101 after the door cover 4 is opened. And clamping fixation at the position of sealing contact between the inner drum cover 8 and the inner drum opening 101 is

realized, so as to enhance the sealing performance of the inner drum opening 101.

[0050] In the present embodiment, a center of the inner drum cover 8 is connected with a rotating shaft 12 extending to the outside of the inner drum in the axial direction of the inner drum 1. The inner drum cover 8 can rotate around the rotating shaft. One end of the rotating shaft 12 is rotatably connected with the inner drum cover 8, and the other end of the rotating shaft 12 is connected with the door cover 4 through an elastic mechanism; and the elastic mechanism applies an elastic force to the inner drum cover 8 to drive the inner drum cover 8 to move towards the inner drum opening 101, so that the inner drum cover 8 is fastened to the inner drum opening 101 in a sealing mode to realize the sealing of the inner drum opening 101.

[0051] In the present embodiment, a center of an outer side of the inner drum cover 8 is provided with an installation groove 11 extending outwards. The rotating shaft 12 is mounted in the installation groove 11 by a bearing, and the rotating shaft 12 extends in the axial direction of the inner drum 1, so that the inner drum cover 8 can relatively rotate around the rotating shaft 12. And the end of the rotating shaft 12 is fixedly connected with the door cover 4 by springs 9, so that the springs 9 are in a compressed state after the door cover 4 is closed, and the inner drum cover is in sealing contact with the inner drum opening 101, and the inner drum cover 8 rotates around the rotating shaft relative to the door cover 4. Preferably, an insertion end of the rotating shaft 12 inserted into the installation groove 11 of the inner drum cover 8 is provided with a protruding portion protruding outwards in the radial direction for being engaged with the installation groove 11 of the inner drum cover 8, and the rotating shaft 12 and the inner drum cover 8 are fixed in the axial direction.

[0052] In the present embodiment, in order to improve the pressing force of the springs and the stability of the inner drum cover after being fastened, the following settings are made:

as shown in Figs. 1 and 2, the center of the outer side of the inner drum cover 8 is provided with the installation groove 11 extending outwards, the rotating shaft 12 is mounted in the installation groove 11 by the bearing. The rotating shaft 12 extends in the axial direction of the inner drum 1, and the inner drum cover 8 can relatively rotate around the rotating shaft 12. And an end of the rotating shaft 12 is provided with a support plate 10 perpendicular to the axis of the rotating shaft 12, and an outer periphery of the support plate 10 is fixedly connected with the door cover 4 through the plurality of springs 9.

[0053] In the present embodiment, a diameter of the support plate 10 is greater than or equal to a diameter of the inner drum opening 101, the support plate 10 is coaxial with the inner drum 1. The springs 9 are arranged on the outer periphery of the support plate 10 symmetrically relative to the axis of the inner drum 1, and each spring 9 is arranged in a direction parallel to the axis of

the inner drum 1.

[0054] The inner drum cover is subjected to limiting elastic force of different springs in a plurality of directions by adding the support plate connected with the rotating shaft between the door cover and the inner drum cover of the washing machine, and connecting the support plate to the door cover via a plurality of springs uniformly distributed on the outer periphery of the support plate. Thus, the inner drum cover can be stably in sealing contact with the inner drum opening without deflection, thus improving the sealing reliability at the inner drum opening of the washing machine.

[0055] By connecting the inner drum cover with the door cover through the rotating shaft provided with the springs, the inner drum cover contacts with the inner drum opening to compress the springs after the door cover is closed. The springs provide an elastic force for the inner drum cover to move towards the inner drum, and the inner drum cover and the inner drum opening are jointed in a sealed mode, thereby realizing the purposes of limiting the inner drum cover and allowing the inner drum cover and the inner drum opening to be in sealing contact after the door cover is closed. Meanwhile, as the inner drum cover and the rotating shaft can rotate relatively, when the inner drum rotates under the driving of the washing machine drive motor, the inner drum cover can rotate together with the inner drum under the friction force, so as to realize the purpose of sealing the inner drum opening. In addition, as the front end of the inner drum is connected with the door cover through the inner drum cover, the rotating shaft, and the springs, the front end of the inner drum can be elastically installed in the housing in a vibrating manner, so that the front end of the inner drum and the washing machine housing are installed in a mutually supporting mode. Thus, the supporting action point of the inner drum is improved, and the stability of the inner drum in the operation process is enhanced.

[0056] In the present embodiment, a water inlet pipe 17 is coaxially installed at the rotating shaft 12, one end of the water inlet pipe 17 penetrates into the inner drum 1 through the inner drum cover 8, and the other end penetrates the rotating shaft 12 and is bent upwards to extend to communicate with a water inlet structure of the washing machine, so that the inlet water of the washing machine flows into the inner drum 1 through the center of the inner drum opening 101. And the purpose of the water input of the inner drum 1 from the center of the front inner drum cover 8 is realized. Preferably, a water seal is arranged at the position where the inner drum cover 8 and the rotating shaft 12 are hinged together to ensure the tightness of the inner drum 1.

[0057] In the present embodiment, the outer periphery of the inner drum cover 8 is provided with an inclining portion 15 inclined outward, and the inclining portion 15 is a tapered surface, and the diameter of which gradually increases from the outer periphery of the inner drum 1 to the door cover 4. A circular of fixing portion 16 in jointing

contact with the inclining portion 15 is arranged at the inner drum opening 101. Preferably, an outer end of the fixing portion 16 is provided with an outward bent chamfer to guide the inner drum cover 8 to slide into the inner drum opening 101, so that the fixing portion 16 and the inclining portion 15 are correspondingly attached to realize sealing.

[0058] More preferably, the outer periphery of the inner drum cover 8 is provided with two sections of tapered surfaces with different curvatures and gradually increasing diameters towards the door cover 4. And both sides of a first tapered surface are respectively connected with an outer periphery of the door cover 4 and one side of the second tapered surface. The first tapered surface corresponds to a horizontal bending surface of the inner drum opening 101, the horizontal bending surface is a cylindrical surface horizontally bent from the inner drum opening 101 to the outside of the inner drum 1. An inner diameter of the horizontal bending surface is equal to or slightly smaller than a maximum diameter of the first tapered surface. And an end of the horizontal bending surface is gradually inclined outwards to form the fixing portion 16 of tapered, and the second tapered surface forms the inclining portion 15 and is in jointing contact with the fixing portion 16.

[0059] In the present embodiment, a sealing pipe 14 of tubular is also arranged between the inner drum cover 8 and the door cover 4, which can expand and contract in the radial direction. One end of the sealing pipe 14 is hermetically connected with the outer periphery of the inner drum cover 8, and the other end of the sealing pipe 14 is fixedly connected with the door cover 4, so that the elastic mechanism is hermetically installed inside the sealing pipe 14, and the inner drum cover 8 can move relative to the door cover 4 along with the expansion and contraction of the sealing pipe 14. And the sealing pipe 14 is made of bellows made of elastic rubber. Preferably, the end of the sealing pipe 14 and the door cover 4 are in sleeve connection in a manner of rotating relatively around the axis of the inner drum 1, so that the sealing pipe 14 does not rotate along when the door cover 4 rotates together with the inner drum 1.

Embodiment 4

[0060] In the present embodiment, in order to discharge the water in the inner drum of the washing machine after clothes are removed, and to realize sealing the inner drum and containing water and normal washing in the working process of the washing machine, the following settings are made:

as shown in Fig. 1, a draining structure of a washing machine is provided, the inner drum 1 is installed in the housing 2, the inner drum 1 is a tapered drum with a smaller diameter at one end and a larger diameter at the other end, and a draining flow passage 36 is arranged at a larger end of the inner drum 1. One end of the draining flow passage 36 communicates with the larger end of the

inner drum 1, and the other end of the draining flow passage 36 penetrates out of the inner drum 1 through the center of the larger end and communicates with the washing machine drain pipe 31.

[0061] The embodiment of the disclosure also introduces a draining method of the washing machine. The inner drum rotates at a certain rotating speed, so that washing water separated from clothes in the inner drum flows to the larger end against the inner wall of the tapered inner drum under the action of centrifugal force. And when reaching the larger end of the inner drum, water flows out via the center of the larger end of the inner drum along the draining flow passages arranged at the larger end, and flows out of the washing machine along the drain pipe to realize the discharge of washing water in the inner drum.

[0062] During the normal washing process of the drum washing machine, the inner drum 1 generally rotates at a low speed, and water in the inner drum 1 is not subjected to too much centrifugal force, so that clothes and water in the inner drum 1 will experience a beating washing effect along with the low-speed rotation of the inner drum. In this way, the water in the inner drum 1 does not converge towards the larger end and will not be discharged out of the washing machine. However, during the draining process of the drum washing machine, the inner drum 1 rotates at a medium-high speed, and water separated from the clothes in the inner drum 1 is subjected to the rotation centrifugal force of the inner drum, so that the water in the inner drum 1 converges towards the larger end of the inner drum along the inner drum wall, flows into the draining flow passages 36 arranged at the larger end of the inner drum, and flows out of the inner drum 1 through the center of the larger end of the inner drum 1, and is discharged out of the washing machine through the drain pipe 31.

[0063] In this way, water in the inner drum is not subjected to centrifugal force and does not converge towards the larger end of the inner drum in the normal washing state of the washing machine, and water in the inner drum rotating at a high speed is subjected to centrifugal force in the draining state of the washing machine, flows towards the draining flow passages at the larger end of the inner drum and is discharged. Thus, the water contained in the inner drum does not flow out from the drain port when the inner drum rotates normally, further, the effect that during the rotating process of the inner drum, the inner drum is sealed, and during drainage, the drain valve is opened to allow water separated from clothes in the inner drum to be discharged normally is realized, and the purpose of normal draining of the washing machine with the inner drum having both a rotating function and a water containing function is realized. Besides, the inner drum does not have to be sleeved with an outer drum, thus increasing the volume of the inner drum and improving the washing capacity of the washing machine.

[0064] In the present embodiment, the front end of the inner drum 1 is provided with the inner drum opening

101, the rear end is provided with the inner drum bottom 10, and the inner drum opening 101 and the inner drum bottom 102 are connected through the inner drum side wall. The side wall of the inner drum is in a tapered shape, and the diameter of which gradually increases from the inner drum opening 101 towards the inner drum bottom 102, so as to form the tapered inner drum 1, and the center of the inner drum bottom 102 is installed on the inner drum support 3 via the rotating shaft. And the draining flow passage 36 is arranged on the inner side surface of the inner drum bottom 101, one end of the draining flow passage 36 is arranged at an intersection of the inner drum bottom 101 and the side wall of the inner drum, the other end of the draining flow passage penetrates out through the center of the inner drum bottom 101 and passes through a motor shaft along the axis, and the penetrating end of the draining flow passage 36 communicates with the washing machine drain pipe 31.

[0065] In the present embodiment, the inner drum bottom 102 is provided with a plurality of draining flow passages 36, one ends of the draining flow passages 36 are uniformly distributed on the outer periphery of the inner drum bottom 102 at an equal interval angle and communicate with the inside of the inner drum 1, and the other ends meet at the center of the inner drum bottom 102 and penetrate out of the center of the inner drum bottom 102 to communicate with the washing machine drain pipe 31.

[0066] In the present embodiment, one end of at least one draining flow passage 36 is arranged in the middle of the inner drum bottom 102 and communicates with the inside of the inner drum 1, and the other end penetrates out of the center of the inner drum bottom 102 and communicates with the washing machine drain pipe 31. Preferably, the ends of the adjacent draining flow passages 36 are alternately arranged at the middle or outer periphery of the inner drum bottom 102. By arranging the plurality of draining flow passages which are uniformly distributed on the inner drum bottom with the ends respectively arranged at the middle or outer periphery so as to adsorb and discharge the water at each part of the inner drum bottom, the draining efficiency in the inner drum is improved.

[0067] In the present embodiment, each draining flow passage 36 is composed of hollow convex ribs protruding from an inner side surface of the inner drum bottom 102. And during the rotation of the inner drum 1, the hollow convex ribs lift and beat the water and clothes in the inner drum 1 to wash the clothes, so that the inwardly protruding draining flow passages 36 have the auxiliary lifting rib function that is, lifting, beating and washing the clothes in the inner drum 1.

[0068] In the present embodiment, the draining flow passages 36 and/or the drain pipe 31 is provided with a drain pump 33 to apply pressure to the water flowing to the inner drum bottom 102 of the washing machine, so as to discharge the water out of the washing machine along the draining flow passages 36 and the drain pipe

31; and the drain pump 33 does not work when the drum washing machine is in a normal washing state and is opened when the drum washing machine executes a draining program, so as to control the water discharge of the inner drum of the washing machine and provide a water flow driving force.

Embodiment 5

[0069] The present embodiment is based on the draining method of the washing machine described in Embodiment 4, the inner drum rotates at a certain rotating speed, so that washing water in the inner drum flows to the larger end along the inner wall of the tapered inner drum under the action of centrifugal force, and when reaching the larger end of the inner drum, water flows out via the center of the larger end of the inner drum along the draining flow passages arranged at the larger end, and flows out of the washing machine along the drain pipe to realize the discharge of washing water in the inner drum.

[0070] In this way, water in the inner drum is not subjected to centrifugal force and does not converge towards the larger end of the inner drum in the normal washing state of the washing machine, and water in the inner drum rotating at a high speed is subjected to centrifugal force in the draining state of the washing machine, flows towards the draining flow passages at the larger end of the inner drum and is discharged, so that the water contained in the inner drum does not flow out from the drain port when the inner drum rotates normally, further, the effect that during the rotating process of the inner drum, the inner drum is sealed, and during drainage, the drain valve is opened to allow water contained in the inner drum to be discharged normally is realized, and the purpose of normal draining of the washing machine with the inner drum having both a rotating function and a water containing function is realized.

[0071] In the present embodiment, the draining method of the washing machine comprises the following specific steps:

Step 1, the inner drum of the washing machine rotating at a certain speed, and the water in the inner drum flowing to the side wall of the inner drum under the action of centrifugal force;

Step 2, under the action of the tapered inner drum, the water adhering to the side wall of the inner drum being guided by the side wall of the inner drum and being affected by the centrifugal force in the rotating process of the inner drum, so that the water in the inner drum flowing to the inner drum bottom with a larger diameter;

Step 3, the water reaching the inner drum bottom flowing into the draining flow passages arranged on the inner drum bottom, flowing out of the inner drum from the center of the inner drum along the draining flow passages, and then being discharged out of the washing machine along the drain pipe.

[0072] In the present embodiment, in the above-mentioned Step 3, the drain pump on the draining flow passages and/or the drain pipe starts to work to apply pressure to the water flowing to the inner drum bottom, so that the water flows along the draining flow passages and the drain pipe and is discharged out of the washing machine. When the washing machine executes other programs, the drain pump on the draining flow passages and/or the drain pipe does not work, so that the water in the inner drum will not be adsorbed by the drain pump to be discharged, the water in the inner drum is retained and the clothes are normally washed.

[0073] In the present embodiment, during the draining process of the washing machine, the inner drum rotates at a medium-high speed, so that the water in the inner drum adheres to the side wall of the inner drum under the action of centrifugal force and flows to the larger end of the inner drum.

[0074] The above descriptions are merely preferred embodiments of the present disclosure, and are not intended to limit the present disclosure in any form. Although the present disclosure has been disclosed above through the preferred embodiments, the embodiments are not intended to limit the present disclosure. A person skilled in the art can make some equivalent variations, alterations or modifications to the above-disclosed technical content without departing from the scope of the technical solutions of the present disclosure to obtain equivalent embodiments. Any simple alteration, equivalent change or modification made to the above embodiments according to the technical essence of the present disclosure without departing from the content of the technical solutions of the present disclosure shall fall within the scope of the technical solutions of the present disclosure.

Claims

1. A draining structure of a washing machine, **characterized in that** an inner drum is installed in a housing of the washing machine, a drain port is arranged on the inner drum, and a drain valve is installed at the drain port, a positioning and locking mechanism for rotating the inner drum to a fixed drainage position and locking the inner drum is provided on the washing machine, and an opening mechanism of a valve core for opening the drain valve after the inner drum rotating to the fixed drainage position is provided on the washing machine, the drain valve is opened after the inner drum rotating to the fixed drainage position to discharge washing water in the inner drum.
2. The draining structure of the washing machine according to claim 1, **characterized in that** the drain port is arranged at a side wall of the inner drum, or an outer periphery of a front end or a rear end of the

inner drum; and

the inner drum is a tapered drum with a smaller diameter at one end and a larger diameter at another end, and the drain port is arranged at an outer periphery of the end with larger diameter of the inner drum.

3. The draining structure of the washing machine according to claim 2, **characterized in that** the rear end of the inner drum is composed of an inner drum bottom, an outer peripheral portion of the inner drum bottom is provided with the drain port horizontally penetrating the inner drum bottom, and the drain valve is arranged in the drain port; and the drain valve comprises the valve core covering the drain port, and the valve core is connected with the inner drum bottom via a limiting spring, to make the valve core block the drain port from inside to outside under an action of the limiting spring.
4. The draining structure of the washing machine according to claim 3, **characterized in that** the rear end of the inner drum is installed on an inner drum support, the inner drum support is installed in the housing of the washing machine via a damping suspension spring and/or a damping support rod, and the opening mechanism of the valve core is installed on the inner drum support.
5. The draining structure of the washing machine according to claim 4, **characterized in that** the opening mechanism of valve core comprises a stepping motor installed on the inner drum support, an output end of the stepping motor is fixedly and coaxially connected with a rotating wheel, an outer periphery of the rotating wheel is hinged to one end of a connecting rod, and another end of the connecting rod passes through a limiting hole formed in the inner drum support and moves telescopically in a direction of the drain valve to push the valve core to move towards the inside of the inner drum to open the drain valve for drainage.
6. The draining structure of the washing machine according to claim 4, **characterized in that** the opening mechanism of the valve core comprises an electromagnet installed on the inner drum support, and the electromagnet is arranged corresponding to the drain valve; the drain valve and the electromagnet are in a coaxial direction when the inner drum rotates to the fixed drainage position; the valve core of the drain valve is provided with a magnet or the valve core is composed entirely of the magnet, an electromagnetic repulsion force is acted on the valve core after the electromagnet is energized, and the valve core is pushed to move towards inside of the inner drum to open the drain valve for drainage.

7. The draining structure of the washing machine according to any one of claims 1-6, **characterized in that** a water collecting tank is correspondingly arranged outside the drain port of the inner drum, and a bottom of the water collecting tank communicates with a drain pipe of the washing machine, the water collecting tank collects and discharges the water discharged through the drain port of the inner drum.
8. The draining structure of the washing machine according to claim 7, **characterized in that** when the inner drum is at the fixed drainage position, the drain port is at a lowest position of the inner drum, water in the inner drum converges toward the drain port and flows out through the drain port opened by the drain valve.
9. The draining structure of the washing machine according to claim 8, **characterized in that** the drain port is disposed at an outer periphery of the inner drum bottom; when the inner drum is at the fixed drainage position, the drain port rotates to a position directly under an axis of the inner drum; and the water collecting tank comprises a groove under the drain port, and a rear side wall of the groove extends vertically upwards to a rear side of the drain port and is spaced from the drain port to guide the water flowing out of the drain port to fall into the water collecting tank.
10. The draining structure of the washing machine according to claim 9, **characterized in that** the water collecting tank is installed on the inner drum support of the washing machine, or is integrally formed with the inner drum support of the washing machine, and the opening mechanism of the valve core is installed on the water collecting tank.

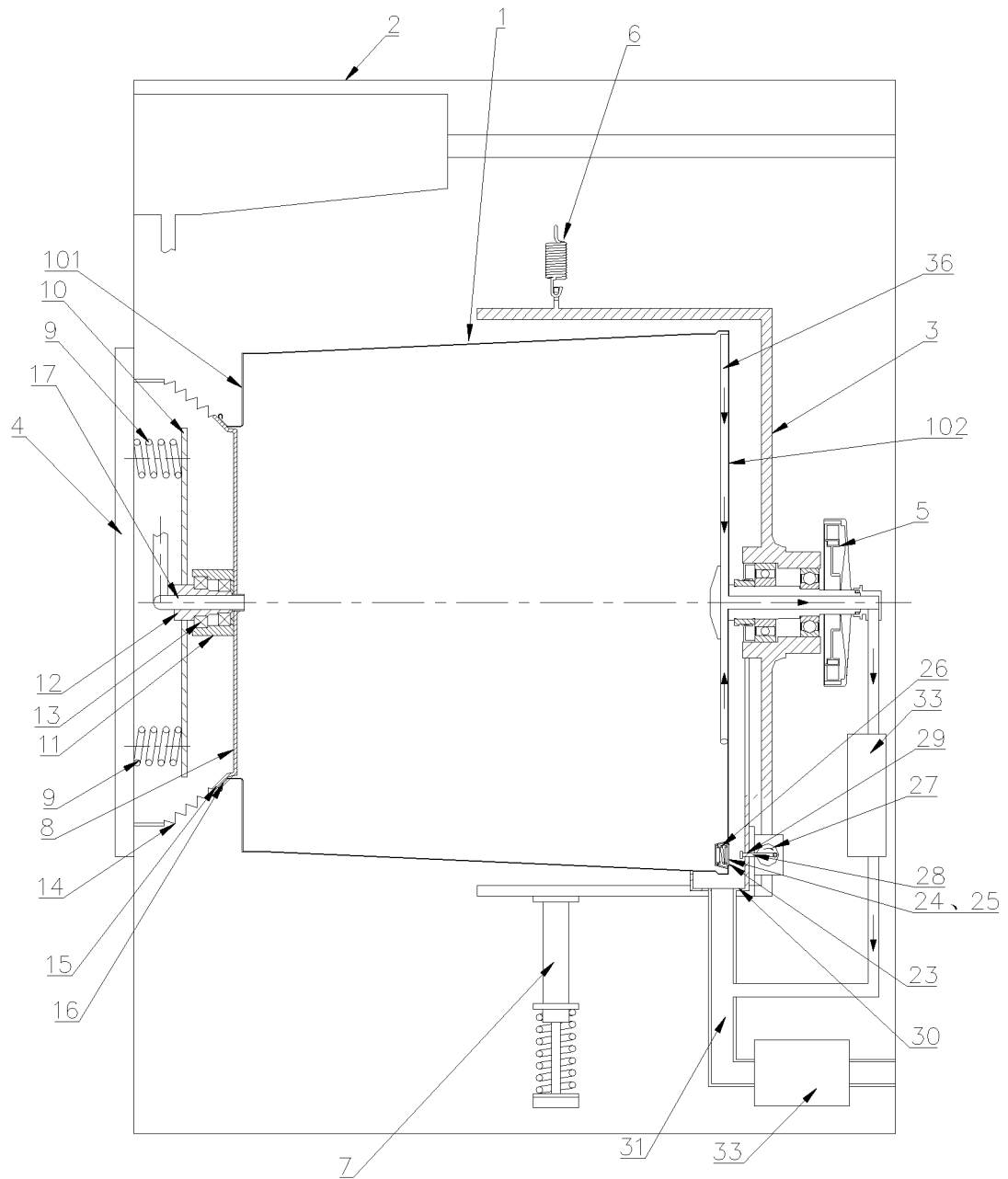


Fig. 1

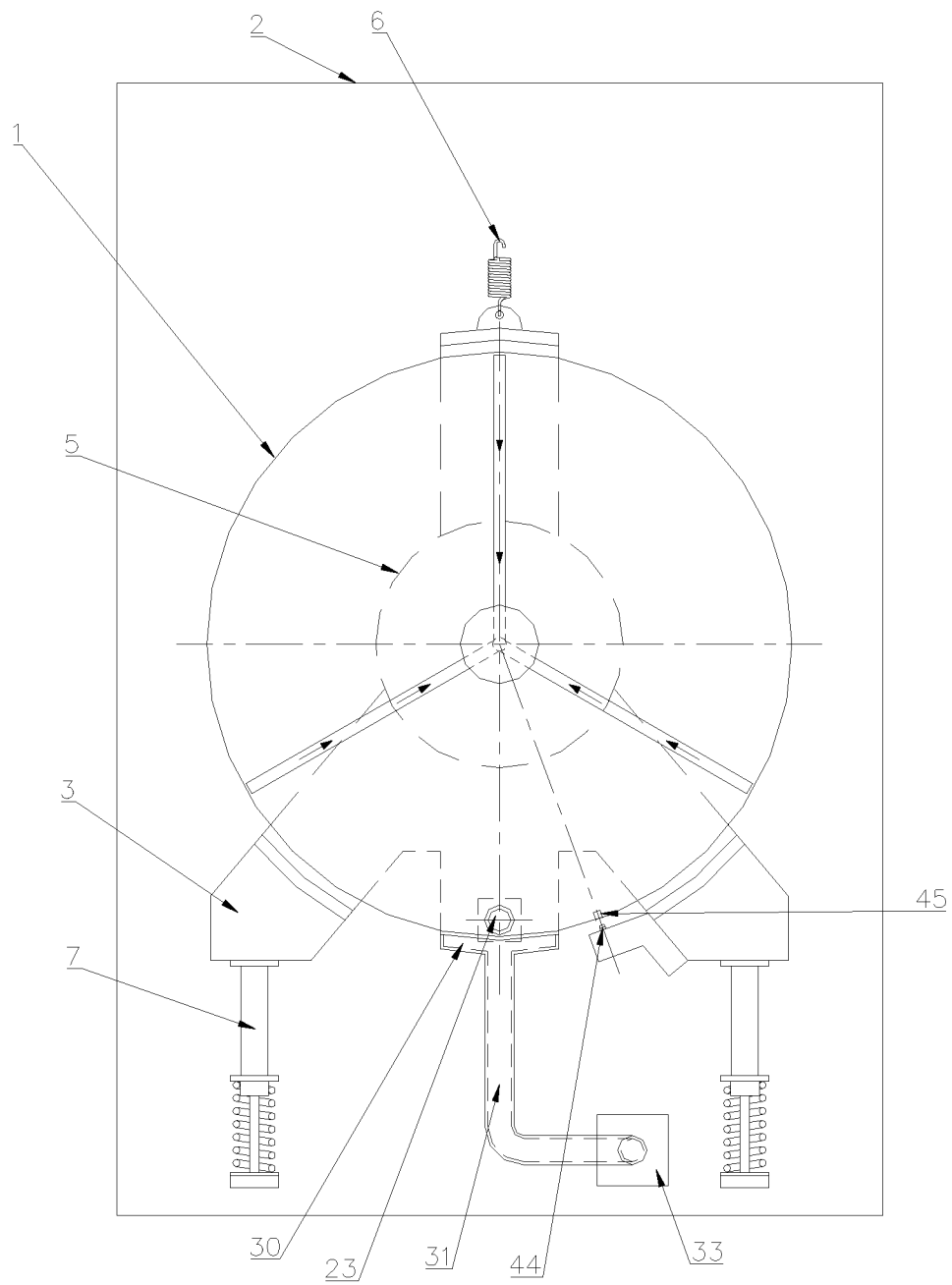


Fig. 2

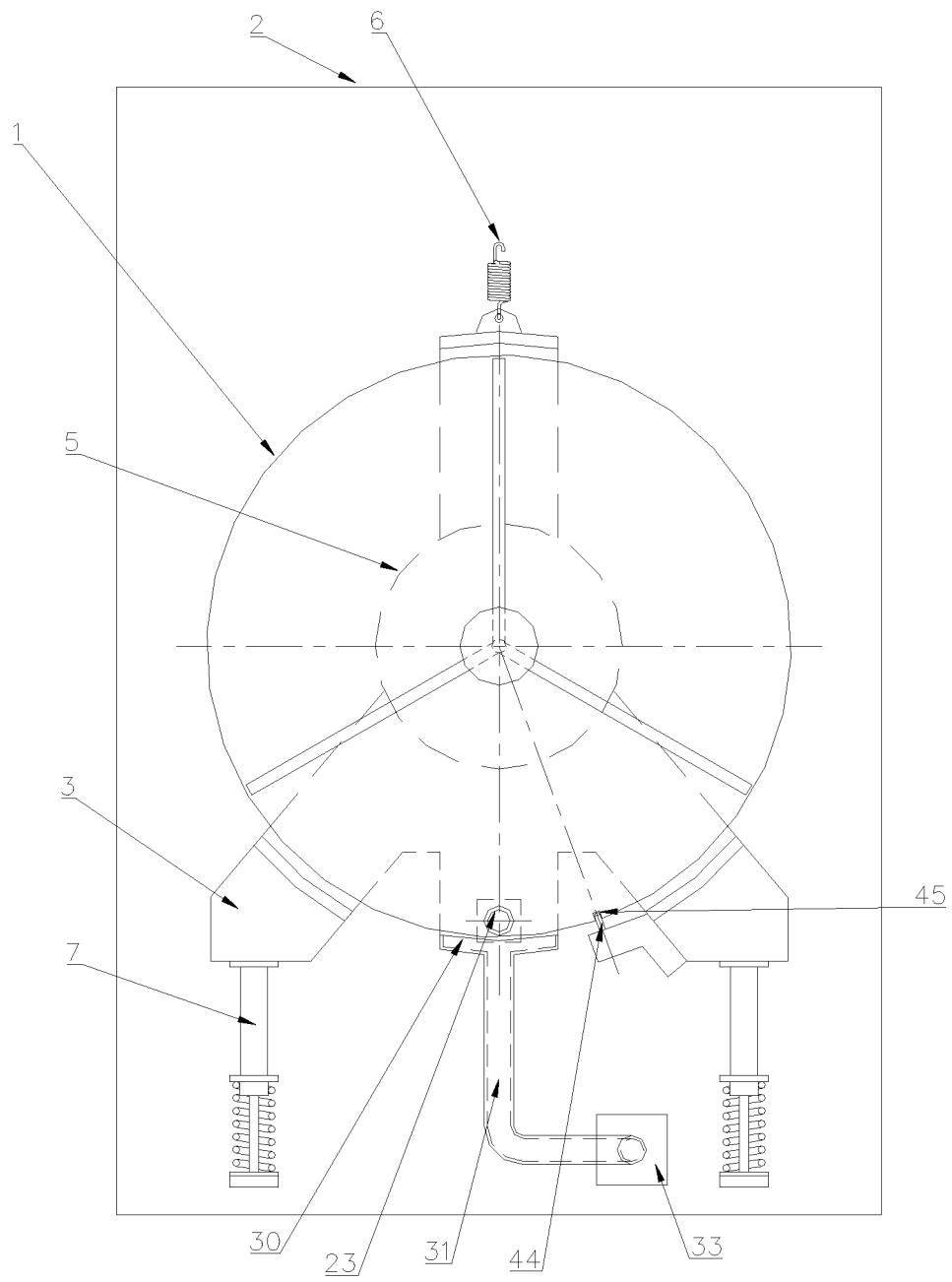


Fig. 3

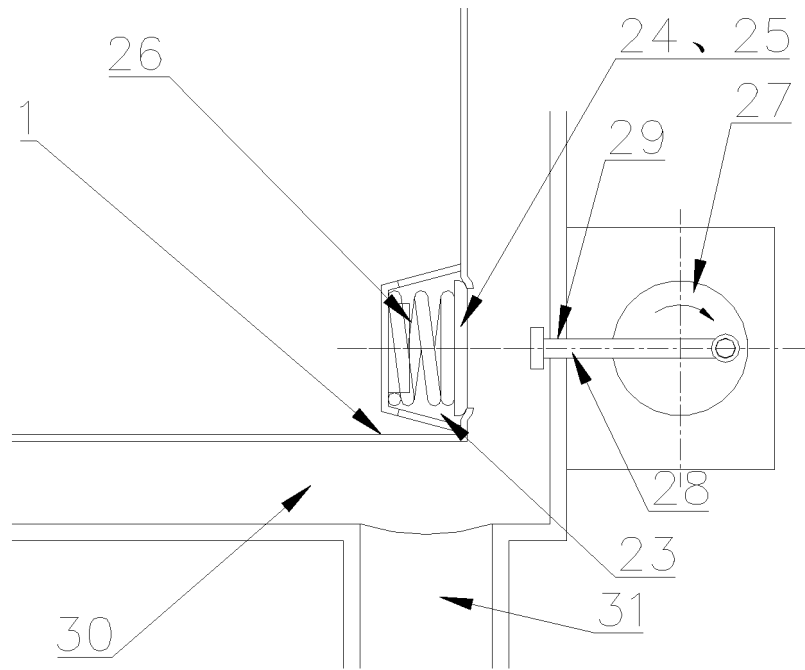


Fig. 4

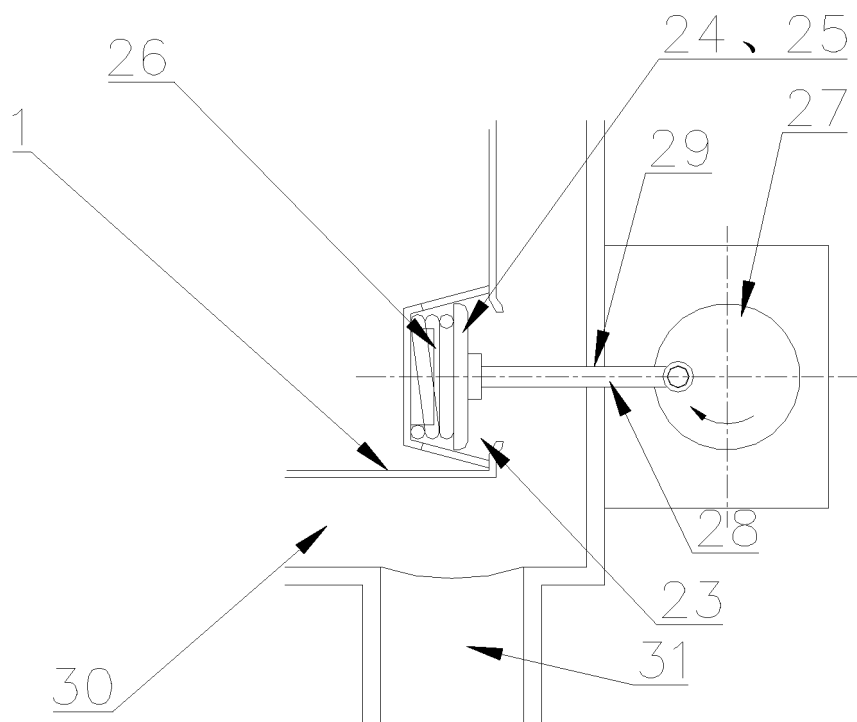


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/084809

A. CLASSIFICATION OF SUBJECT MATTER

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; EPODOC; WPI: 内桶, 洗涤筒, 洗衣筒, 内筒, 甩干筒, 脱水筒, 旋转筒, 洗涤桶, 洗衣桶, 甩干桶, 脱水桶, 旋转桶, 脱水槽, 旋转槽, 甩干槽, 洗涤槽, 排水, 排放, 排泄, 排出, 阀, 开关, 节水, 节约, 省水, 密封, 密闭, 封闭, 无孔, 水, 定位, 锁定, 锁止, drum, basket, cylinder, buffer, tumble, roller, airproof, obturat+, hole+, bore+, aperture+, finestra+, orifice+, water, valve, switch, flex+, telescopic, up+, down+, drain+, discharg+, dewater+, water, watershoot, waterspout, brak+, stop+, lock+, locat+, position+, orientation

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5152159 A (TOSHIBA K.K.) 06 October 1992 (06.10.1992), description, column 6, line 12 to column 15, line 68, and figures 1-18	1-10
X	JP 042398 A (TOSHIBA CORP.) 07 January 1992 (07.01.1992), description, page 3, column 2, line 15 to page 6, column 3, line 4, and figures 1-7	1-10
X	JP 0461896 A (TOSHIBA CORP.) 27 February 1992 (27.02.1992), description, page 3, column 1, line 8 to page 5, column 4, line 2, and figures 1-5	1-10

☒ 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	
“P” document published prior to the international filing date but later than the priority date claimed	“&” document member of the same patent family

Date of the actual completion of the international search
18 July 2018

Date of mailing of the international search report
01 August 2018

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/084809

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CN 104452184 A (HISENSE RONSHEN GUANGDONG REFRIGERATORS CO., LTD.) 25 March 2015 (25.03.2015), entire document	1-10

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

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 Information on patent family members

 International application No.
 PCT/CN2018/084809

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