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

(11) **EP 4 379 124 A1**

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

(43) Date of publication:
05.06.2024 Bulletin 2024/23

(21) Application number: **22848103.2**

(22) Date of filing: **17.06.2022**

(51) International Patent Classification (IPC):
D06F 39/08 *(2006.01)* ***D06F 37/04*** *(2006.01)*
D06F 23/02 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
D06F 23/02; D06F 37/04; D06F 39/08

(86) International application number:
PCT/CN2022/099386

(87) International publication number:
WO 2023/005496 (02.02.2023 Gazette 2023/05)

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

(30) Priority: **29.07.2021 CN 202110862929**
29.07.2021 CN 202110862936

(71) Applicants:
- **CHONGQING HAIER DRUM WASHING MACHINE CO., LTD.**
  Chongqing, Sichuan 400026 (CN)
- **HAIER SMART HOME CO., LTD.**
  Laoshan District
  Qingdao
  Shandong 266101 (CN)

(72) Inventors:
- **LIU, Xiaochun**
  Qingdao, Shandong 266101 (CN)
- **LIU, Kai**
  Qingdao, Shandong 266101 (CN)
- **LU, Jinbo**
  Qingdao, Shandong 266101 (CN)
- **CHENG, Baozhen**
  Qingdao, Shandong 266101 (CN)
- **HOU, Yongshun**
  Qingdao, Shandong 266101 (CN)

(74) Representative: **Beck & Rössig**
European Patent Attorneys
Denninger Str. 169
81925 München (DE)

(54) WATER INLET STRUCTURE OF DRUM WASHING MACHINE AND DRUM WASHING MACHINE

(57) A water inlet structure for a drum washing machine and the drum washing machine are provided. The water inlet structure comprises a support frame (1), a water inlet pipe (10) and a buffer structure (4), wherein an water outlet of the water inlet pipe (10) is provided with a water passing chamber radially extending, the water passing chamber is installed on the on the support frame (1) by the buffer structure (4). By setting a buffer structure (4) between the support frame (1) and the water passing chamber, the support frame (1) is flexible connected with the water passing chamber by the buffer structure (4), so that the support frame (1) can move relative to the water passing chamber and the deformation force of the outer cylinder (8) is buffered. The deformation force of the outer cylinder (8) is prevented from being transmitted to the water passing chamber formed by the bearing seat (2) and the water outlet adaptor (3), so as to avoid the bearing seat and the oil seal from being deformed. The noise and water leakage of the drum washing machine are further solved.

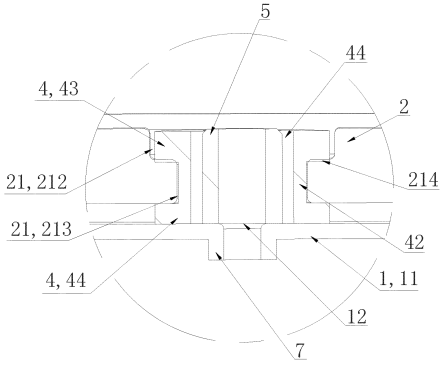


FIG. 4

EP 4 379 124 A1

Description

Field

[0001] The invention belongs to the field of household appliances, and in particular relates to a water inlet structure of a drum washing machine and the drum washing machine.

Background

[0002] In the prior art, a drum washing machine generally includes an inner cylinder for holding laundry, an inner cylinder support and a motor. An inner cylinder shaft is arranged at a rear end of the inner cylinder, and the inner cylinder shaft is extended along the front and back direction of the inner cylinder. The inner cylinder support is arranged outside of the inner cylinder, and the motor is arranged on the inner cylinder support. The inner cylinder shaft passes through the inner cylinder support to connect with the motor. The motor drives the inner cylinder shaft to rotate thereby driving the rotation of the inner cylinder, so that the laundry in the inner cylinder can be beat and washed. The inner cylinder support includes an outer cylinder containing washing water, an inner cylinder is rotatably arranged in the outer cylinder, and dehydration holes are arranged on the inner cylinder, so that the water in the outer cylinder flows into the inner cylinder through the dehydration holes to soak the laundry in the inner cylinder, the water in the cylinder flows out to the outer cylinder through the dehydration holes, and water in the laundry in the inner cylinder is discharged to the outer cylinder through the dehydration holes when the inner cylinder rotates at high speed. Thereby the laundry is washed.

[0003] In the existing drum washing machine, an interior of the inner cylinder shaft is hollow, and a water inlet pipe is connected with the inner cylinder shaft for feeding the water inlet to the inner cylinder. In order to increase the stability of the motor on the inner cylinder support, generally on the inner cylinder support is provided with a motor support frame. The motor is clamped between the water inlet structure and the inner cylinder support, and the motor is fastened on the inner cylinder support by the motor support frame. On the motor support frame is provided with a bearing seat for supporting the inner cylinder shaft, and both the motor support frame and the bearing seat are provided with a shaft hole that allows the inner cylinder shaft to pass through. One end of the inner cylinder shaft in the axial direction is provided with a water inlet, and the water outlet of the water inlet pipe is provided with a water outlet adapter with a hollow inside and being connected with the water inlet of the inner cylinder shaft. The water outlet adapter is provided with an opening to allow the inner cylinder shaft to be inserted, the opening of the water outlet adapter faces the bearing seat, and the water outlet adapter is arranged on the bearing seat. The cylinder shaft passes through the motor support frame and the bearing seat to be inserted into the water outlet adapter through the opening of the water outlet adapter, so as to realize the connection between the water inlet of the inner cylinder shaft and the water outlet adapter. The inner cylinder support includes an outer cylinder, and a motor support frame is arranged on the outer cylinder. The outer cylinder is easily deformed under the action of the external force. When the outer cylinder is deformed, the deformation force of the outer cylinder can be transmitted to the bearing and oil seal of the bearing seat through the motor support frame, and the bearing and oil seal is deformed and damaged, thereby causing noise and water leakage of the drum washing machine..

Summary

[0004] The objective of the present invention is to overcome the deficiencies in the prior art, and a water inlet structure for a drum washing machine is provided. By setting a buffer structure between a motor support frame and a bearing seat, the motor support frame is flexibly connected with the bearing seat by the buffer structure, so that the motor support frame can allow moving with respect to the bearing seat to buffer the deformation force on the outer cylinder. The deformation force of the outer cylinder is prevented from being transmitted to the bearing and the oil seal of the bearing seat, so as to avoid the bearing seat and the oil seal from being deformed and damaged. The noise and water leakage of the drum washing machine are further solved.

[0005] In order to solve the above problems, the present invention adopts the following technical solution.

[0006] The invention provides a water inlet structure of a drum washing machine, which comprises a support frame and a water inlet pipe. A water outlet of the water inlet pipe is provided with a water passing chamber radially extending. The water inlet structure comprises a buffer structure, and the water passing chamber is installed on the on the support frame by the buffer structure.

[0007] Further, the water outlet of the water inlet pipe is provided with a bearing seat and a water outlet adapter. The water outlet adapter has an opening facing the bearing seat, and the water outlet adapter is attached on the bearing seat to form the water passing chamber. The water outlet of the water inlet pipe is connected with the water outlet adapter. A first part of the buffer structure is connected with the support frame, and a second part of the buffer structure is connected with the bearing seat.

[0008] Further, the support frame comprises a support portion horizontally extending, and a top of the support portion is in contact with a bottom of the bearing seat. The first part of the buffer structure is a first buffer ring, and the first buffer ring is located between the upper of the support portion and the bottom of the bearing seat.

[0009] Further, the support portion is axially provided with a first installation hole, the bearing seat is axially provided with a second installation hole assembled with

the first installation hole, and the first buffer ring is located between the first installation hole and the second installation hole.

[0010] Preferably, openings of the first installation hole, the second installation hole and the first buffer ring are arranged coaxially.

[0011] Further, the second part of the buffer structure comprises a second buffer ring being coaxial with the first buffer ring. A radial dimension of the first buffer ring is larger than a radial dimension of the first buffer ring, and the second buffer ring is embedded in the second installation hole.

[0012] Further, the second installation hole is arranged on an outer peripheral edge of the bearing seat, and the outer peripheral edge of the bearing seat is provided with a notch communicating with the second installation hole. The notch is extended from a top to a bottom of the bearing seat.

[0013] Further, the second part of the buffer structure comprises a third buffer ring coaxial with the second buffer ring, and the second buffer ring is arranged between the first buffer ring and the third buffer ring. A radial dimension of the third buffer ring is larger than the radial dimension of the second buffer ring. The second installation hole is a stepped hole, and the third buffer ring abuts on a step in the second installation hole.

[0014] Preferably, the first buffer ring and the third buffer ring are symmetrically arranged with respect to the second buffer ring.

[0015] Further, the opening of the first buffer ring, the opening of the second buffer ring and the opening of the third buffer ring form a through hole. A steel sleeve is provided on an inner wall of the through hole, matched with a screw, and coaxial with the through hole. An outer peripheral wall of the steel sleeve is abutted on the inner wall of the through hole.

[0016] Further, the inner wall of the through hole is provided with grooves, openings of the grooves face an inside of the through hole. The grooves are arranged at intervals in a circumference of the through hole.

[0017] Preferably, the grooves are arranged along the circumference of the through hole to form a circle. Each of the grooves is extended from a top of the through hole to the bottom of the through hole, and the top and the bottom of the grooves are respectively opened.

[0018] Further, the bottom of the supporting part is provided with a protrusion protruding downward, the protrusion is in a shape of cylinder, and an opening of the protrusion is coaxial with the first installation hole.

[0019] After adopting the above solutions of the present invention, there are the following advantages compared with the prior art.

[0020] By setting a buffer structure between the motor support frame and the bearing seat, the motor support frame is flexible connected with the bearing seat by the buffer structure, so that the motor support frame can move relative to the bearing seat. The deformation force of the outer cylinder is prevented from being transmitted to the bearing and the oil seal of the bearing seat, so as to avoid the bearing seat and the oil seal from being deformed and damaged. The noise and water leakage of the drum washing machine are further solved.

[0021] The specific implementation manners of the present invention will be further described in detail below in conjunction with the accompanying drawings.

Description of drawings

[0022] The accompanying drawings, as a part of the present invention, are used to further understand the present invention, and the exemplary embodiments of the present invention and the descriptions are used to explain the present invention, but do not improperly limit to the present invention. Apparently, the drawings in the following description are only some embodiments, and those skilled in the art can also obtain other drawings according to these drawings without creative efforts.

Fig. 1 is a schematic diagram of a water inlet structure of a drum washing machine in an embodiment of the present invention.

Figure 2 is an explosive view of a water inlet structure of a drum washing machine in an embodiment of the present invention.

Fig. 3 is a partial enlarged view of a water inlet structure of a drum washing machine in an embodiment of the present invention.

Fig. 4 is a sectional view of a water inlet structure of a drum washing machine in an embodiment of the present invention.

Fig. 5 is a schematic diagram of a drum washing machine in an embodiment of the present invention.

Fig. 6 is a schematic diagram of a drum washing machine in an embodiment of the present invention.

Fig. 7 is a partial enlarged view of a drum washing machine in an embodiment of the present invention.

Fig. 8 is a schematic diagram of a water inlet structure of a drum washing machine in an embodiment of the present invention.

Fig. 9 is a schematic diagram of a water inlet structure of a drum washing machine in an embodiment of the present invention.

[0023] In the figures: 1. Motor support frame; 11. First support portion; 12. First installation hole; 2. Bearing seat; 21. Second installation hole; 211. Opening; 212. First portion; 213. Second portion ; 214. Step; 3. Water outlet adapter; 4. Buffer structure; 41. First buffer ring; 42. Second buffer ring; 43. Third buffer ring; 44. Through hole; 441. Groove; 5. Steel sleeve; 6. Screw; 7. Protrusion; 8. Outer cylinder; 81. Outer cylinder rear; 82. Recess; 83. First reinforcing rib; 9. Motor; 10. Water inlet pipe; 101. Water inlet section; 102. Second reinforcing rib; 13. Installation structure; 131. Installation portion; 1311. Third installation hole; 132. Second support portion; 1321. First type support portion; 1322. Hole; 1323.

Second type support portion.

[0024] It should be noted that these figures and descriptions are not intended to limit the concept scope of the present invention in any way, but illustrate the concept of the present invention for those skilled in the art by referring to specific embodiments.

Embodiments

[0025] To make the objectives, technical solutions, and advantages of the solutions of the present invention clearer, the technical solutions in the embodiments are clearly and completely described below in conjunction with the accompanying drawings in the embodiments of the present invention. The following embodiments are used to describe the present invention but are not intended to limit the scope of the present invention.

[0026] In the description of the present invention, it should be noted that the orientation or position relationship indicated by the terms such as "upper", "lower", "front", "rear", "left", "right", "vertical", "horizontal", "inner", "outer" and the like is the orientation or position relationship shown in the drawings, only for the convenience of describing the present invention and simplifying the description, rather than indicating or implying that the device or element referred to must have a specific orientation and be constructed and operated in a specific orientation, and therefore cannot be understood as a limitation of the present invention.

[0027] In the description of the present invention, it should be noted that the terms "mounted", "connected" and "connection" should be understood in a broad sense unless otherwise specified and defined. For example, it can be fixed connection, detachable 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 invention can be understood according to specific situations.

[0028] As shown in Figures 1 and 4, the present invention provides a water inlet structure for a drum washing machine, comprises a motor support frame 1, a bearing seat 2 mounted on the motor support frame 1, and a water outlet adapter 3 mounted on the bearing seat 2. Both the motor support frame 1 and the bearing seat 2 are respectively provided with a shaft hole for an inner cylinder shaft to pass through. The water outlet adapter 3 is provided with an opening, and the inner cylinder shaft being pass through is inserted in the opening. The water inlet structure also comprises a buffer structure 4, at least part of the buffer structure 4 is arranged on between the motor support frame 1 and the bearing seat 2.

[0029] In the embodiment of the present invention, the support frame is a motor support frame. By setting the buffer structure 4 between the motor support frame 1 and the bearing seat 2, the motor support frame 1 is flexibly connected with the bearing seat 2 by the buffer structure 4. The relative movement between the motor support frame 1 and the bearing seat 2 can be performed, so the deformation force on the outer cylinder can be buffered. The deformation force on the outer cylinder can be prevented from being transmitted to the bearing and the oil seal of the bearing seat 2, so the deformation and damage of the bearing and the oil seal can be avoided. Thereby the noise and water leakage of the drum washing machine is avoided.

[0030] Specifically, as shown in Figure 5, the drum washing machine comprises an outer cylinder 8 and an inner cylinder, the inner cylinder is rotatably arranged in the outer cylinder 8 through the inner cylinder shaft, and the motor support frame is mounted on a rear of the outer cylinder. The inner cylinder shaft is passed out of the outer cylinder, passed out of the motor support frame 1 through the shaft hole of the motor support frame 1, and then passed out of the bearing seat 2 through the shaft hole of the bearing seat 2, and finally inserted into the water outlet adapter 3 through the opening of the water outlet adapter 3. The water outlet adapter 3 is connected with an external water inlet pipe. The buffer structure 4 can be made of rubber. The bearing seat 2 of the water outlet adapter 3 forms a water passage chamber.

[0031] An outer periphery of the opening of the water outlet adapter 3 is provided with a number of first fixing holes, which are arranged along a circumference of the opening to form a circle. An outer periphery of the shaft hole of the bearing seat 2 is provided with a number of second fixing holes, which are arranged along a circumference of the shaft hole to form a circle. The first fixing holes and the second fixing holes are fixed by screws 6 to install the water outlet adapter 3 on the bearing seat 2.

[0032] As shown in Figures 1-4, in the embodiment of the present invention, the motor support frame 1 has a first support portion 11 extending horizontally, and the first support portion 11 is provided with a shaft hole. The bearing seat 2 is in a shape of ring, and the opening of the bearing seat 2 is as a shaft hole. A bottom of the bearing seat 2 is in contact with a top of the first support portion 11, and at least part of the buffer structure 4 is arranged between the top of the first support part 11 and the bottom of the bearing seat 2.

[0033] In the embodiment of the present invention, the motor support frame 1 has the first support portion 11, the motor is attached on the first support portion 11, and the first support portion 11 supports the motor. The first support portion 11 is extended along a horizontal direction. Further, the first support portion 11 is in a shape of square, so that the top of the first support portion 11 is a plane, the shaft hole is arranged at a center of the first support portion 11. The shaft hole of the first support portion 11 is a circular hole;

[0034] The bearing seat 2 is in a shape of ring. Further, the bearing seat 2 is a circular ring, and the bottom of the bearing seat 2 is a plane. An opening of the bearing seat 2 is as the shaft hole of the bearing seat 2. The shaft hole of the bearing seat 2 is a circular hole, and the shaft

hole of the bearing seat 2 is arranged coaxially with the shaft hole of the first support portion 11. Both the bottom of the bearing seat 2 and the top of the first support portion 11 are respectively flat, so that the bottom of the bearing seat 2 can be completely contact with the top of the first support portion 11, and there is no gap between the bearing seat 2 and the first support portion 11, thereby increasing the stability of assembly between the bearing seat 2 and the first support portion 11. At least part of the buffer structure 4 is arranged between the bottom of the bearing seat 2 and the top of the first support portion 11, that is, at least part of the buffer structure 4 is clamped between the bottom of the bearing seat 2 and the top of the first support portion 11, so the stability of the buffer structure 4 between the bearing seat 2 and the first support portion 11 is enhanced, and further the force on the bearing seat 2 transmitted through the first support portion 11 is buffered.

[0035] As shown in Figures 3 and 4, in the embodiment of the present invention, an outer periphery of the shaft hole of the first support portion 11 is provided with a first installation hole 12, and the outer periphery of the shaft hole of the bearing seat 2 is provided with a second installation hole 21. At least part of the buffer structure 4, that is, a first portion of the buffer structure is a first buffer ring 41. The first buffer ring 41 is arranged between the first installation hole 12 and the second installation hole 21, and assembled with the first installation hole 12 and the second installation hole 21.

[0036] In the embodiment of the present invention, a plurality of first installation holes 12 are provided on the outer periphery of the shaft hole of the first support portion 11, and the first installation holes 12 are arranged along the circumference of the shaft hole of the first support portion 11 to form a circle. A plurality of second installation holes 21 are provided on the outer periphery of the shaft hole of the bearing seat 2, and the second installation holes 21 are arranged along the circumference of the shaft hole of the bearing seat 2 to form a circle. Both the first installation hole 12 and the second installation hole 21 are circular holes, and the first installation hole 12 and the second installation hole 21 are coaxially arranged. The first installation hole 12 is aligned to the second installation hole 21, and the first installation hole 12 is assembled with the installation hole 21. A second fixing hole is located between two adjacent second installation holes 21. A bottom of the water outlet adapter 3 is circular, and an outer circumference of the water outlet adapter 3 is provided with a protrusion which is extended in a radial direction and extended into a space between two second installation holes 21, a first fixing hole is formed on the protrusion, and the first fixing hole is aligned to the second fixing hole.

[0037] The buffer structure 4 includes the first buffer ring 41 being made of rubber, The first buffer ring 41 is arranged between the first installation hole 12 and the second installation hole 21, and the opening of the first buffer ring 41 is aligned to the first installation hole 12 and the second installation hole 21. Further, the first buffer ring 41 is circular, and the opening of the first buffer ring 41 is a circular hole. The opening of first buffer ring 41, the first installation hole 12 and the second installation hole 21 are coaxially arranged; and the opening of the first buffer ring 41, the first installation hole 12 and the second installation hole 21 are fixed by screw 6 to mount the first buffer ring 41 between the motor support frame 1 and the bearing seat 2.

[0038] As shown in Figure 4, the bottom of the first supporting portion 11 is provided with a protrusion protruding downward. The protrusion 7 is in a shape of cylinder, an opening of the protrusion 7 is coaxial with the first installation hole 12, and the screw 6 passes out of the motor support frame 1 through the first installation hole 12 and then penetrates into the protrusion 7. The protrusion 7 can hide the screw 6 to prevent a tip of the screw 6 from damaging other parts or stabbing workers.

[0039] As shown in Figures 3 and 4, in the embodiment of the present invention, the remaining part of the buffer structure 4, that is, a second part of the buffer structure comprises a second buffer ring 42 which is formed by the first buffer ring 41 extending upwards and is coaxial with the first buffer ring 41. The second buffer ring 42 is embedded in the second installation hole 21. A radial dimension of the first buffer ring 41 is larger than a radial dimension of the second buffer ring 42.

[0040] In the embodiment of the present invention, the buffer structure 4 also comprises the second buffer ring 42 being made of rubber. The second buffer ring 42 is formed by the opening at the top of the first buffer ring 41 being extending upwards. The second buffer ring 42 is integrated with the first buffer ring 41, and the second buffer ring 42 is embedded in the second installation hole 21. The second buffer ring 42 can assist the first buffer ring 41 to buffer the deformation force on the outer cylinder to be transmitted to the bearing seat 2. At the same time, the force of the screw 6 on the bearing seat 2 can also be buffered, to avoid damage to the bearing seat 2 by the screw 6.

[0041] The opening of the first buffer ring 41 is aligned with the opening of the second buffer ring 42, and a diameter of the opening of the first buffer ring 41 is equal to that of the opening of the second buffer ring 42. The radial dimension of the first buffer ring 41 is larger than that of the second buffer ring 42, so that the second buffer ring 42 is inserted into the second installation hole 21, and the first buffer ring 41 can be clamped between the bearing seat 2 and the motor support frame.

[0042] As shown in Figure 3, in the embodiment of the present invention, the second installation hole 21 is arranged on the outer peripheral edge of the bearing seat 2, and the outer peripheral edge of the bearing seat 2 is provided with a notch 211 communicating with the second installation hole. The notch 211 is extended from the top to the bottom of the bearing seat 2. The top of the notch 211 is communicated with the top of the opening of the second installation hole 21, and the bottom of the

notch 211 is communicated with the bottom of the opening of the second installation hole 21.

[0043] In the embodiment of the present invention, the outer peripheral edge of the bearing seat 2 is provided with a notch 211 communicating with the second installation hole 21. The second installation hole 21 can be communicated with the outside of the outer peripheral edge by the notch 211. The notch 211 is extended from the top of the bearing seat 2 to the bottom of the bearing seat 2, and the top and the bottom of the notch 211 are respectively communicated to the top and the bottom opening of the second installation hole 21, so that the second buffer ring 42 is allowed to be embedded in the second installation hole 21 through the opening, and the first buffer ring 41 is located outside the opening and at the bottom of the bearing seat 2. The first buffer ring 41 and the second buffer ring 42 are simultaneously installed, thereby reducing the installation time.

[0044] As shown in Figures 3 and 4, in the embodiment of the present invention, the remained part of the buffer structure 4 further comprises a third buffer ring 43 being coaxial with the second buffer ring 42 and formed by the second buffer ring 42 extending upward. The radial dimension of the third buffer ring 43 is greater than the radial dimension of the second buffer ring 42.

[0045] In the embodiment of the present invention, the buffer structure 4 comprises a third buffer ring 43 being made of rubber. The third buffer ring 43 is formed by the second buffer ring 42 extending upwards. The third buffer rings 43 is integrated with the second buffer ring 42, the diameter of the opening of the third buffer ring 43 is equal to the diameter of the opening of the second buffer ring 42, and the opening of the third buffer ring 43 is aligned to the opening of the second buffer ring 42.

[0046] The third buffer ring 43 can assist the first buffer ring 41 to buffer the deformation force on the outer cylinder transmitted to the bearing seat 2, and the third buffer ring 43 can buffer the force of the screw 6 on the bearing seat 2, so it is avoided that the bearing seat 2 is damaged by the screw 6.

[0047] The third buffer ring 43 is a circular ring, and the radial dimension of the first buffer ring 41 is equal to the radial dimension of the third buffer ring 43, which improves the appearance of the buffer structure 4.

[0048] As shown in Figures 3 and 4, in the embodiment of the present invention, the second installation hole 21 is a stepped hole. The second installation hole 21 comprises a first portion 212 and a second portion 213 arranged up and down. The second buffer ring 42 is embedded in the second portion 213, the third buffer ring 43 is embedded in the first portion 212, and the bottom of the third buffer ring 43 abuts on a step 214 between the first portion 212 and the second portion 213.

[0049] In the embodiment of the present invention, the second installation hole 21 is a stepped hole having a first portion 212 and a second portion 213 arranged up and down. The first portion 212 is located on the top of the bearing seat 2. The second buffer ring 42 is embedded in the second portion 213, and the second buffer ring 42 is positioned by the second portion 213, so that the second buffer ring 42 is prevented from being misaligned when the buffer structure 4 is installed. The third buffer ring 43 is embedded in the first portion 212, and the third buffer ring 43 is positioned by the first portion 212 to prevent the third buffer ring 43 from being misaligned when the buffer structure 4 is installed. Because the second buffer ring 42 is embedded in the second portion 213, and the third buffer ring 43 is embedded in the first portion 212, therefore, the diameter of the first portion 212 is greater than the diameter of the second portion 213.

[0050] There is a step 214 between the bottom of the first portion 212 and the top of the second portion 213, the bottom of the third buffer ring 43 is abuts on the step 214, and the third buffer ring 43 is supported by the step 214.

[0051] The second installation hole 21 is provided with an opening, so the first portion 212 is provided with a first sub-opening, and the second portion 213 is provided with a second sub-opening. The radial dimension of the third buffer ring 43 is larger than that of the second buffer ring 42, so the radial dimension of the first sub-opening is greater than the radial dimension of the second sub-opening. It is ensured that the second buffer ring 42 is inserted into the second portion 213 through the second sub-opening, and the third buffer ring 43 is inserted into the first portion 212 through the first sub-opening. Thereby the third buffer ring 43 and the second buffer ring 42 can be simultaneously installed to reduce the installation time.

[0052] As shown in Figures 2 and 4, in the embodiment of the present invention, the opening of the first buffer ring 41, and the opening of the second buffer ring 42 and the opening of the third buffer ring 43 form a through hole 44. A steel sleeve 5 is provided on an inner wall the through hole 44, matched with the screw 6, and coaxial with the through hole 44, and an outer peripheral wall of the steel sleeve 5 is abutted on an inner wall of the through hole 44.

[0053] In the embodiment of the present invention, the radial dimensions of the opening of the first buffer ring 41, the opening of the second buffer ring 42 and the opening of the third buffer ring 43 are the same, so that the radial dimensions of the through holes 44 formed by the three buffer rings are the same. In order to reduce the damage to the buffer structure 4 and strengthen the assembly strength between the bearing seat 2 and the screw 6, the steel sleeve 5 is provided on the inner wall of the through hole 44. The steel sleeve 5 has a certain hardness and can be connected with the screw 6 in a threaded manner. The screw 6 is assembled with the opening of the steel sleeve 5 and the first installation hole 12 to realize to install the bearing seat 2 on the motor support frame 1.

[0054] As shown in Figure 3, the inner wall of the through hole 44 is provided with several grooves 441, openings of the grooves 441 face the inside of the through

hole 44, and the grooves 441 are arranged along a circumferential direction of the through hole 44 at intervals. The grooves 441 are arranged at intervals, so that there is a protrusion protruding toward the inside of the through hole 44 and located between two adjacent grooves 441. The outer wall of the steel sleeve 5 is in contact with the protrusion to realize the outer wall of the steel sleeve 5 to be contact with the partial inner wall of the through hole 44, and it is increased in the tight connection between the outer wall of the steel sleeve 5 and the inner wall of the through hole 44. So it is avoided that the threaded force between the screw 6 and the steel sleeve 5 damages to bearing seat 2 during installation.

[0055] The grooves 441 are arranged along the circumference of the through hole 44 to form in a circle. Each of the grooves 441 is extended from the top of the through hole 44 to the bottom of the through hole 44, and the top and the bottom of the grooves 441 are respectively open. The grooves 441 are arranged along all the inner wall of the through hole 44, to increase the tight connection between the steel sleeve 5 and the inner wall of the through hole 44.

[0056] As shown in Figures 6 to 9, a water inlet structure of a drum washing machine provided by the present invention, comprises an inner drum shaft and a water inlet pipe 10. A water inlet of the inner drum shaft passes through an outer cylinder rear 81 of the drum washing machine, and is connected with a water outlet of the water inlet pipe 10. The water inlet pipe 10 is provided with an installation structure 13 attached on the outer cylinder rear 81.

[0057] In the embodiment of the present invention, the water inlet pipe 10 is installed on the outer cylinder rear 81 of the drum washing machine by the installation structure 13 of the water inlet pipe 10, so that the deformation force on the outer cylinder can be transmitted to the water inlet pipe 10, and the deformation force on the outer cylinder 8 is avoided to be transmitted to the bearing and the oil seal of the bearing seat 2 or is reduced to transmit to the bearing and the oil seal of the bearing seat 2. The deformation of the bearing and the oil seal of the bearing seat 2 is avoided or weakened, thereby avoiding or reducing the noise and the water leakage of the drum washing machine.

[0058] The water inlet structure also comprises an outer cylinder 8, a motor 9, a bearing seat 2, and a water outlet adapter 3 attached on the bearing seat 2. The bearing seat 2 is provided with a bearing and an oil seal. The outer cylinder 8 has an outer cylinder rear 81, and the bearing seat 2 is provided with a shaft hole. The water outlet adapter 3 is provided with an opening and a water inlet. The inner cylinder shaft passes through the outer cylinder rear 81, and the inner cylinder shaft passing out of the outer cylinder rear 81 passes through the bearing seat 2 through the shaft hole of the bearing seat 2. The inner cylinder shaft passing out of the bearing seat 2 is inserted into the water outlet adapter 3 through the opening of the water outlet adapter 3. The water inlet of the water outlet adapter 3 is connected with the water outlet of the water inlet pipe 10. The water outlet adapter 3 is in a shape of hemisphere, and has an opening at diameter being the opening of the water outlet adapter 3. The opening of the water outlet adapter 3 faces the bearing seat 2, and the water outlet adapter 3 is buckled on the bearing seat 2. The bearing seat 2, the outer cylinder rear 81, the inner cylinder shaft are coaxial with the water outlet adapter 3.

[0059] The bearing seat 2 can be arranged on the outer cylinder rear 81 via a support frame of the motor 9, and the water inlet pipe 10 is arranged on the outer cylinder rear 81, so the water inlet pipe 10 can share the deformation force on the outer cylinder with the bearing seat 2, resulting in weakening the deformation of the bearing and the oil seal. Alternatively, the bearing seat 2 is directly connected to the inner cylinder shaft, and the deformation force on the outer cylinder 8 is completely transmitted to the water inlet pipe 10, so the stability of the water inlet structure is ensured, and it is avoided that the deformation force on the outer cylinder 8 is transmitted to the bearing and the oil seal to make the bearing and the oil seal deform. Specifically, the installation structure 13 is attached on the outer cylinder rear 81. A feeding opening of the drum washing machine faces forward, and the outer cylinder rear 81 is opposite to the feeding opening.

[0060] The water inlet pipe 10 has a water inlet section 101 vertically extending, the installation structure 13 is arranged at one end of the water inlet section 101, and the other end of the water inlet section 101 is provided with a water passing chamber radially extending. By the arrangement of the water passing chamber radially extending at one end of the water inlet section 10, the water inlet section 101 is installed and kept a space from the outer cylinder rear, so there is a space for installing the motor on the motor support frame, and the motor is arranged between the water inlet section and the outer cylinder rear. The internal space of the drum washing machine is fully utilized. The bearing seat and the water outlet adapter with a shape of hemisphere are located at other end of the water inlet section, the diameter end of the water outlet adapter facing the bear seat 2 is open, and the water outlet adapter covers the bearing seat 2 to form the water passing chamber.

[0061] As shown in Figures 6 to 9, in the embodiment of the present invention, the water inlet pipe 10 has a water inlet section 101 vertically extending. The installation structure 13 has an installation portion 131 horizontally extending, and the installation portion 131 is spaced from the water inlet section 101 and in contact with the outer tube rear 81. The installation portion 131 is provided with a plurality of third installation holes 1311.

[0062] In the embodiment of the present invention, the water inlet pipe 10 has a water inlet section 101 vertically extending, and the water inlet section 101 is extended upward from the axis of the outer cylinder rear 81. A motor 9 with a shape of disc is attached on and coaxial with the outer wall of the outer cylinder rear 81. The inner cylinder

shaft passes through the outer cylinder rear 81 and the motor 9, and further passes out of the bearing seat 2 through the shaft hole of the bearing seat 2 in turn. A position of the outer cylinder rear 81 corresponding to the periphery of the motor 9 is recessed, so the water inlet section 101 can be fixedly connected with the outer cylinder rear 81. The water inlet section 101 is extended upward and out of the peripheral of the motor 9, and the installation structure 13 is arranged on a position of the water inlet section 101 beyond the peripheral of the motor 9.

[0063] The installation structure 13 has the installation portion 131 fixedly connected with the outer wall of the outer cylinder rear 81, the installation portion 131 is extended horizontally, and the installation portion 131 is spaced from the water inlet section 101. A projection of the water inlet section 101 on the installation portion 131 is vertical to the installation portion 131. In order to increase the assembly strength between the water inlet pipe 10 and the outer cylinder rear 81 and improve the stability of the water inlet pipe 10 on the outer cylinder rear 81, the installation portion 131 is attached to the outer wall of the outer cylinder rear 81. The installation portion 131 is provided with the third installation holes 1311, and the third installation holes 1311 are fixedly connected with the outer wall of the outer cylinder rear 81 through screws and other fasteners.

[0064] The third installation holes 1311 are arranged along the extension direction of the installation portion 131, to increase the installation area between the installation portion 131 and the outer cylinder rear 81, thereby improving the assembly strength between the installation portion 131 and the outer cylinder rear 81.

[0065] As shown in Figure 7, the outer wall of the outer cylinder rear 81 is provided with first reinforcing ribs 83 radially extending, and the reinforcing ribs 83 are distributed along the circumferential direction of the outer cylinder rear 81. The installation portion 131 is in contact with the first reinforcing ribs 83. Each of the third installation holes 1311 is fixedly connected to the outer cylinder rear 81 between two adjacent first reinforcing ribs 83. The first reinforcing ribs 83 can increase the strength of the outer cylinder rear 81. By the arrangement of the installation portion 131 being in contact with the first reinforcing ribs 83, it is increased in the tightness between the installation portion 131 and the outer cylinder rear 81. The outer cylinder rear 81 between adjacent first reinforcing ribs 83 is fixedly connected with one third installation hole 1311.

[0066] As shown in Figures 6 to 9, in the embodiment of the present invention, the installation structure 13 also comprises a support portion 132 being extended from the installation portion 131 toward the water inlet pipe 10. The support portion 132 is extended from the installation portion 131 to the outer peripheral wall of the water inlet pipe 10, and connected together.

[0067] In the embodiment of the present invention, the support portion 132 is arranged between the installation portion 131 and the outer peripheral wall of the water inlet pipe 10, so the installation portion 131 is spaced from the outer peripheral wall of the water inlet pipe 10, and the support portion 132 can simultaneously support the installation portion 131 and the water inlet pipe 10. The connection between the third installation hole 1311 and the outer cylinder rear 81 is prevented from being broken by the gravity of the water or the vibration of the outer cylinder during feeding water.

[0068] Further, the support portion 132 comprises a first type support portion 1321 and a second type support portion 1323. The installation portion 131 is in a shape of square, and two first type support portions 1321 are formed by extension portions extending from the opposite sides of the installation portion 131 and being perpendicular to the installation portion 131. The installation portion 131 is extended along the horizontal direction, and the installation portion 131 is square, so, the two first type support portions 1321 are equivalent to the extensions of the installation portion 131 to increase the support area of the first type support portions 1321 on the installation portion 131.

[0069] The two first type support portions 1321 are perpendicular to the installation portion 131 to reduce the connection stress between the first type support portion 1321 and the installation portion 131. It is avoided that the connection between the first type support portion 1321 and the installation portion 131 is easily broken under the gravity of water or the vibration of the out cylinder.

[0070] The size of the first type support portion 1321 is gradually decreased along the extension direction. That is, the size of a first side of the first type support portion 1321 on the installation portion 131 is larger than that of a second side of the first type support portion 1321 on the water inlet pipe 10. The first type support portion 1321 mainly supports the fragile connection between the third installation hole 1311 and the outer cylinder rear 81, and the weight of the first type support part 1321 is reduced. The first type support part 1321 is integrated with the installation portion 131.

[0071] As shown in Figures 8 and 9, the second side of the first type support portion 1321 opposite to the installation portion 131 is provided with a hole 1322 being coaxial with the water inlet pipe 10, and the hole 1322 of the first type support portion 1321 is sleeved on the outer peripheral wall of the water inlet pipe 10. The first type support portion 1321 is extended to the water inlet pipe 10 and is connected with the outer peripheral wall of the water inlet pipe 10. In order to enhance the connection between the first type support portion 1321 and the water inlet pipe 10, the first type of support portion 1321 is sleeved on the outer peripheral wall of the water inlet pipe 10 through the hole 1322, so the first type support portion 1321 is connected with the entire outer periphery wall of the water inlet pipe 10. The first type support portion 1321, the hole 1322 and the water inlet pipe 10 can be integrated as a whole.

[0072] The size between the two sides of the first type

support portion 1321 in the extension direction is decreased, and two sides are symmetrically set, so that the hole 1322 is in the middle of the extension direction of the first type support portion 1321.

[0073] As shown in Figure 9, a second type support portion 1323 is extended toward the water inlet pipe 10 from a middle of the installation portion 131, the second type support portion 1323 is perpendicular to the installation portion 131. The second type support portion 1323 is respectively connected to the two first type support portions 1321. The second type support portion 1323 is located in the middle of the extension direction of the installation portion 131, and the second type support portion 1323 is between the two first type support portions 1321 and respectively connected to the two second type support portions 1321. The second type support portion 1323 can assist the first type support portions 1321 to support the installation portion 131 and the water inlet pipe 10, to enhance the stability of the water inlet pipe 10 on the outer cylinder rear 81.

[0074] Two third installation holes 1311 are arranged on the installation portion 131, and the two third installation holes 1311 are respectively arranged on the installation portions 131 in both sides of the second type support portion 1323, so that the installation portion 131 on both sides of the second type support portion can be connected with the outer cylinder rear 81. The installation portion 131 is evenly installed on the outer cylinder rear, and prevented from shaking on the outer cylinder rear 81.

[0075] As shown in Figure 7, the outer cylinder rear 81 corresponding to the motor 9 is recessed to form a recess 82. Specifically, the outer cylinder rear 81 where the first reinforcing ribs 83 is located and being outside of the motor 9 is recessed to form a recess 82. The first type of support portions 1321, the second type support portion 1323 and the installation portion 131 are embedded in the recess 82, and the installation portion 131 is in contact with the first reinforcing rib 83 of the outer cylinder rear 81. The first type support portions 1321 and the second type support portion 1323 reduce the installation distance between the water inlet pipe 10 and the outer cylinder rear 81, and the installation strength between the water inlet pipe 10 and the outer cylinder rear 81 is further enhanced.

[0076] As shown in Figures 8 and 9, in the embodiment of the present invention, the outer peripheral wall of the water inlet pipe 10 is provided with a number of second reinforcing ribs 102 extending along an axis direction of the water inlet pipe 10, and the second reinforcing ribs 102 are arranged in the circumferential direction of the water inlet pipe 10 to form in a circle.

[0077] In the embodiment of the present invention, the second reinforcing ribs 102 are provided on the outer peripheral wall of the water inlet pipe 10, and the second reinforcing ribs 102 can enhance the structural strength of the water inlet pipe 10.

[0078] Further, the second reinforcing ribs 102 are extended to the water outlet of the water inlet pipe 10 from the first type support portion 1321 on the outer periphery of the hole 1322. The length of the second reinforcing rib 102 is increased to further enhance the structural strength of the water inlet pipe 10.

[0079] The sizes of the second reinforcing ribs 102 on the side of the water inlet pipe 10 facing the outer cylinder rear 81 are gradually decreased in a direction from the first type support portion 1321 to the water outlet of the water inlet pipe 10. The water outlet of the water inlet pipe 10 is communicated with the water inlet of the water outlet adapter 3. The gap between the water outlet adapter 3 of the water inlet pipe 10 and the bearing seat 2 is relatively small, so, the sizes of the second reinforcing ribs 102 are gradually decreased in a direction extending from the first type support portion 1321 to the water inlet pipe 10 at the outer periphery of the bearing seat 2, and not to disturb other portions. For example, the size of the second reinforcing rib 102 at the first type support portion 1321 is relatively large because of the recess 82 between the motor 9 and the outer cylinder rear 81. The recess 82 provides a certain space for the reinforcing ribs 102.

[0080] The above description is only a preferred embodiment of the present invention, and does not limit the present invention in any form. Although the present invention describes as the above preferred embodiments, it is not intended to limit the present invention. Any skilled person in the art, without departing from the scope of the technical solution of the present invention, can use the content of the above solutions to make some changes or modify them into equivalent embodiments. In essence, any simple modifications, equivalent changes and modifications made to the above embodiments still fall within the scope of the solutions of the present invention.

Claims

1. A water inlet structure for a drum washing machine, comprising a support frame,

   a water inlet pipe, wherein an water outlet of the water inlet pipe is provided with a water passing chamber radially extending, and
   a buffer structure, wherein the water passing chamber is installed on the on the support frame by the buffer structure.

2. The water inlet structure according to claim 1, wherein the water outlet of the water inlet pipe is provided with a bearing seat and a water outlet adapter,

   the water outlet adapter has an opening facing the bearing seat, and the water outlet adapter is attached on the bearing seat to form the water passing chamber,
   the water outlet of the water inlet pipe is connected with the water outlet adapter, and
   a first part of the buffer structure is connected

with the support frame, and a second part of the buffer structure is connected with the bearing seat.

3. The water inlet structure according to claim 2, wherein the support frame comprises a support portion horizontally extending, a top of the support portion is in contact with a bottom of the bearing seat, and
the first part of the buffer structure is a first buffer ring, and the first buffer ring is located between the upper of the support portion and the bottom of the bearing seat.

4. The water inlet structure according to claim 3, wherein, the support portion is axially provided with a first installation hole, the bearing seat is axially provided with a second installation hole assembled with the first installation hole, and

the first buffer ring is located between the first installation hole and the second installation hole;
preferably, openings of the first installation hole, the second installation hole and the first buffer ring are arranged coaxially.

5. The water inlet structure according to any one of claims 1-4, wherein, the second part of the buffer structure comprises a second buffer ring being coaxial with the first buffer ring,

a radial dimension of the first buffer ring is larger than a radial dimension of the first buffer ring, and
the second buffer ring is embedded in the second installation hole.

6. The water inlet structure according to claim 5, wherein, the second installation hole is arranged on an outer peripheral edge of the bearing seat, and the outer peripheral edge of the bearing seat is provided with a notch communicating with the second installation hole, and
the notch is extended from a top to a bottom of the bearing seat.

7. The water inlet structure according to claim 5, wherein, the second part of the buffer structure comprises a third buffer ring coaxial with the second buffer ring, and the second buffer ring is arranged between the first buffer ring and the third buffer ring,

a radial dimension of the third buffer ring is larger than the radial dimension of the second buffer ring, and
the second installation hole is a stepped hole, and the third buffer ring abuts on a step in the second installation hole;
preferably, the first buffer ring and the third buffer ring are symmetrically arranged with respect to the second buffer ring.

8. The water inlet structure according to any one of claims 1-7, wherein, the opening of the first buffer ring, the opening of the second buffer ring and the opening of the third buffer ring form a through hole,

a steel sleeve is provided on an inner wall of the through hole, matched with a screw, and coaxial with the through hole, and
an outer peripheral wall of the steel sleeve is abutted on the inner wall of the through hole.

9. The water inlet structure according to claim 8, wherein, the inner wall of the through hole is provided with grooves, openings of the grooves face an inside of the through hole, and

the grooves are arranged at intervals in a circumference of the through hole;
preferably, the grooves are arranged along the circumference of the through hole to form a circle,
each of the grooves is extended from a top of the through hole to the bottom of the through hole, and
the top and the bottom of the grooves are respectively opened.

10. The water inlet structure according to any one of claims 1-9, wherein, the bottom of the supporting part is provided with a protrusion protruding downward, the protrusion is in a shape of cylinder, and an opening of the protrusion is coaxial with the first installation hole.

11. The water inlet structure according to any one of claims 1-10, wherein, the water inlet pipe comprises a water inlet section vertically extending,
the installation structure is arranged at one end of the water inlet section, and another end of the water inlet section is provided with the water passing chamber radially extending.

12. The water inlet structure according to claim 11, wherein, the installation structure comprises an installation portion horizontally extending, there is a distance between the installation portion and an outer wall of the water inlet section, and installation holes are provided on the installation portion.

13. The water inlet structure according to claim 12, wherein, a support portion is extended from the installation portion toward the water inlet pipe, and the support portion is extended from the installation portion to the outer wall of the water inlet pipe.

14. The water inlet structure according to claim 13, wherein, the installation portion is in a shape of square, and

two first type support portions are formed by extension portions extending from the opposite sides of the installation portion, and perpendicular to the installation portion;
preferably, a size of the first type support portions is gradually decreased in an extension direction.

15. The water inlet structure according to claim 14, wherein, a second type support portion is extended toward the water inlet pipe from a middle of the installation portion,

the second type support portion is perpendicular to the installation portion, and
the second type support portion is respectively connected to the two first type support portions;
preferably, two installation holes are formed on the installation portion, and the two installation holes are respectively arranged on the installation portions in both sides of the second type of support portion.

16. The water inlet structure according to any one of claims 11-15, wherein, the other end of the water inlet section is provided with a bearing seat and a water outlet adapter,

the bearing seat is in a shape of annular and radially extended,
the water outlet adapter is in a shape of hemisphere, and a diameter end of the water outlet adapter is an opening facing the bearing seat, and
the water outlet of the water inlet section is connected with the water outlet adapter.

17. The water inlet structure according to claim 16, wherein, the outer wall of the water inlet section is provided with second reinforcing ribs extending along an axis direction of the water inlet pipe, and the second reinforcing ribs are arranged in a circumferential direction of the water inlet pipe to form a circle;

preferably, the second reinforcing ribs are extended to the outer periphery of the bearing seat from the first type of support portion;
more preferably, the sizes of the second reinforcing ribs on the same side with the first type support portion are gradually decreased in a direction from the first type support portion to the bearing seat.

18. A drum washing machine having the water inlet structure according to any one of claims 1-17, comprising an outer cylinder having an outer cylinder rear, wherein,

the water inlet section is extended upward from an axis of the outer cylinder rear, and the installation structure is set on an upper of the outer cylinder rear,
the water passing chamber is located at the axis of the outer cylinder rear,
the water inlet of the inner cylinder shaft passes through the outer cylinder rear, and is inserted into the water passing chamber, and
the inner cylinder shaft is connected with the water passing chamber.

19. The drum washing machine according to claim 18, wherein, the outer cylinder rear is provided with motor with a shape of disc and being coaxial with the outer cylinder rear,
the outer cylinder rear corresponding to an outer periphery of the motor is recessed to form a depression, a support portion and a installation portion are embedded in the recess.

20. The drum washing machine according to claim 19, wherein, first reinforcing ribs radially extending are arranged on the outer cylinder rear,

the first reinforcing ribs are distributed at intervals in a circumference of the outer cylinder rear,
the installation portion is in contact with the reinforcing ribs, and
the installation hole is fixedly connected with the outer cylinder rear between two adjacent first reinforcing ribs.

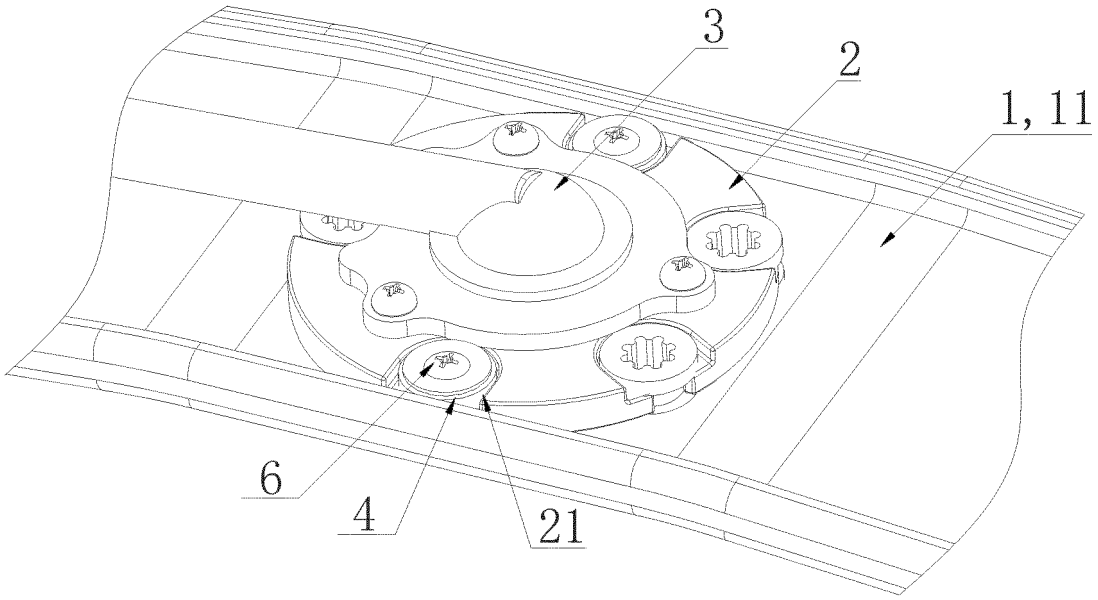


FIG. 1

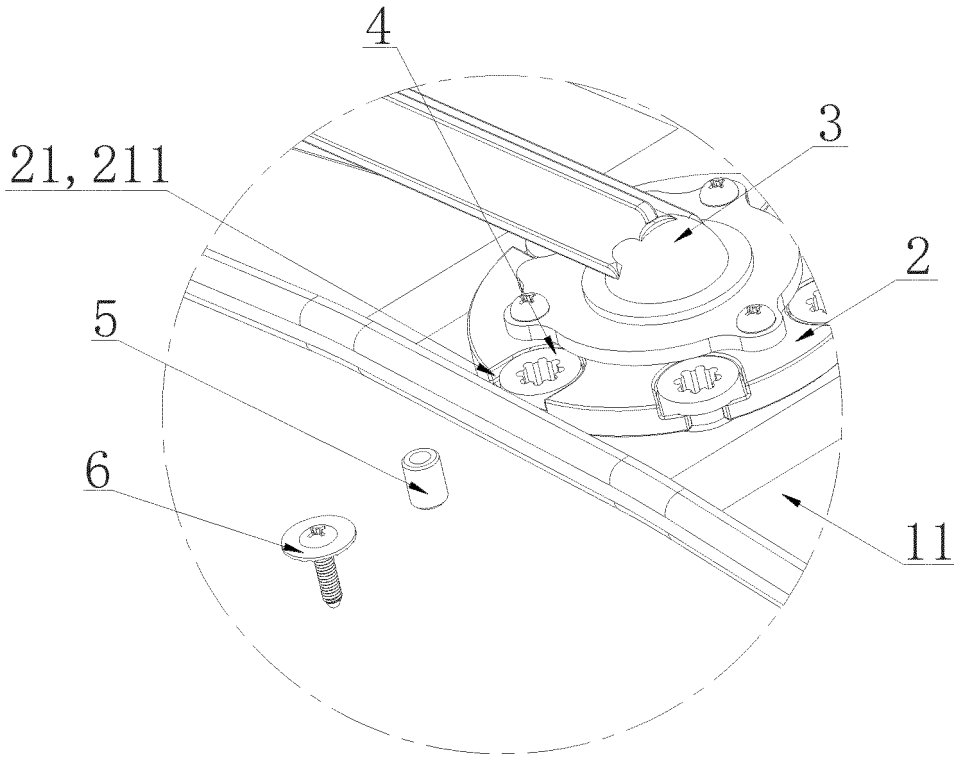


FIG. 2

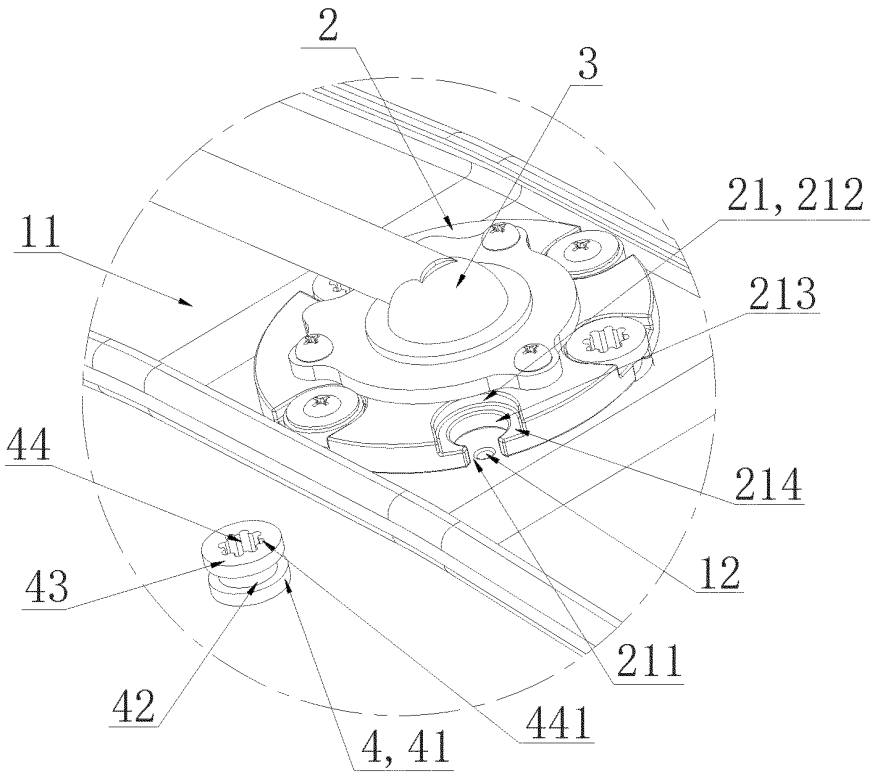

2
3
21, 212
11
213
44
214
12
43
211
42
441
4, 41

FIG. 3

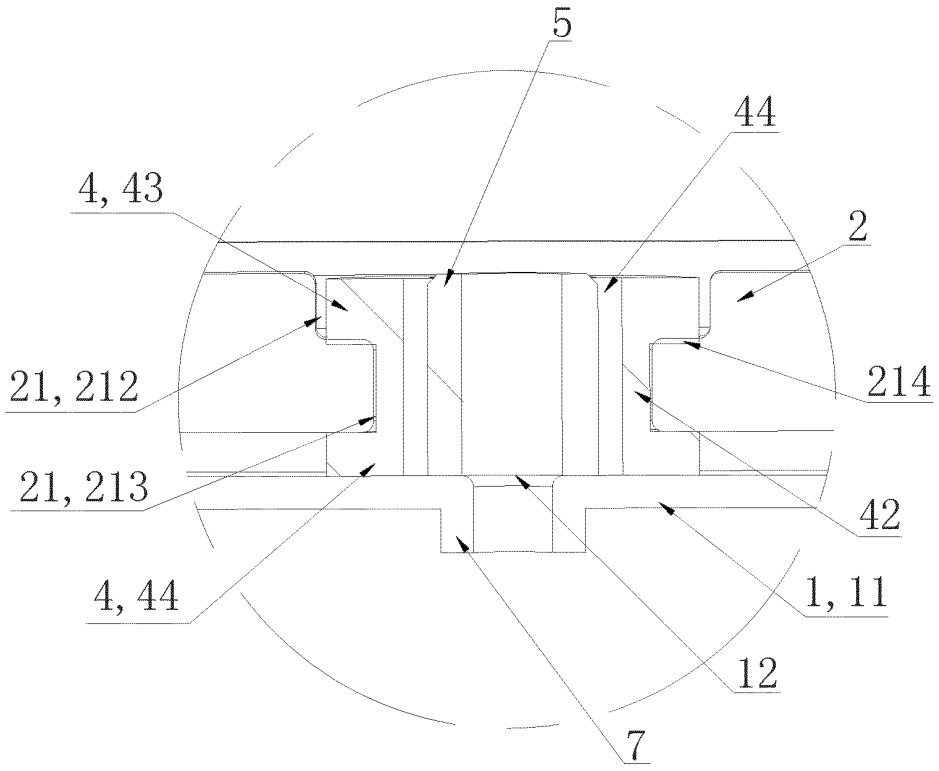

5
44
4, 43
2
214
21, 212
21, 213
42
4, 44
1, 11
12
7

FIG. 4

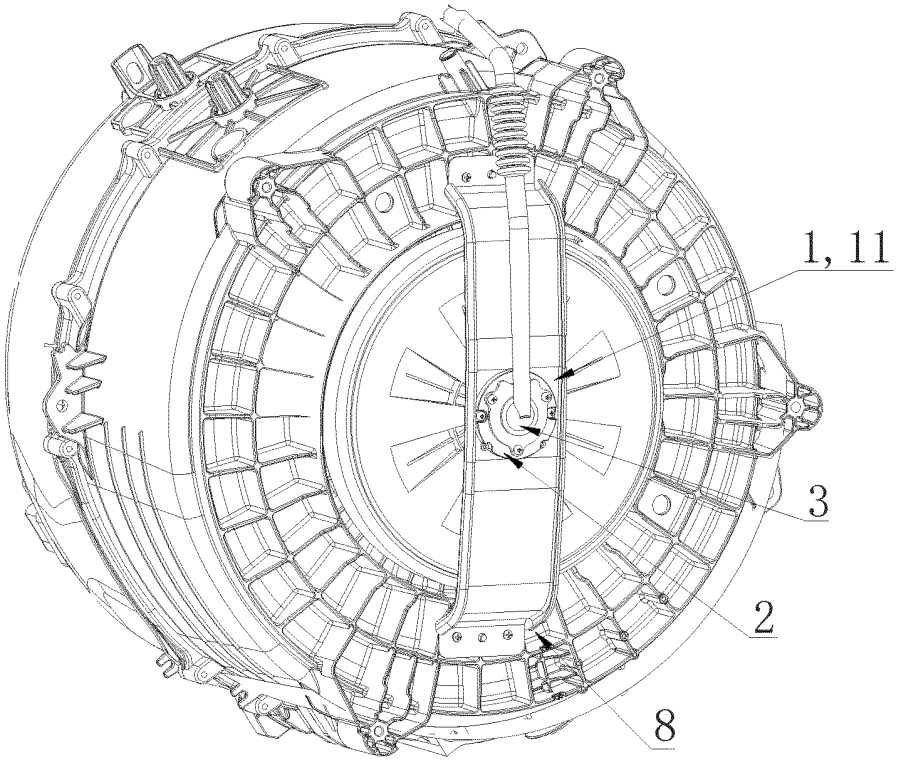


FIG. 5

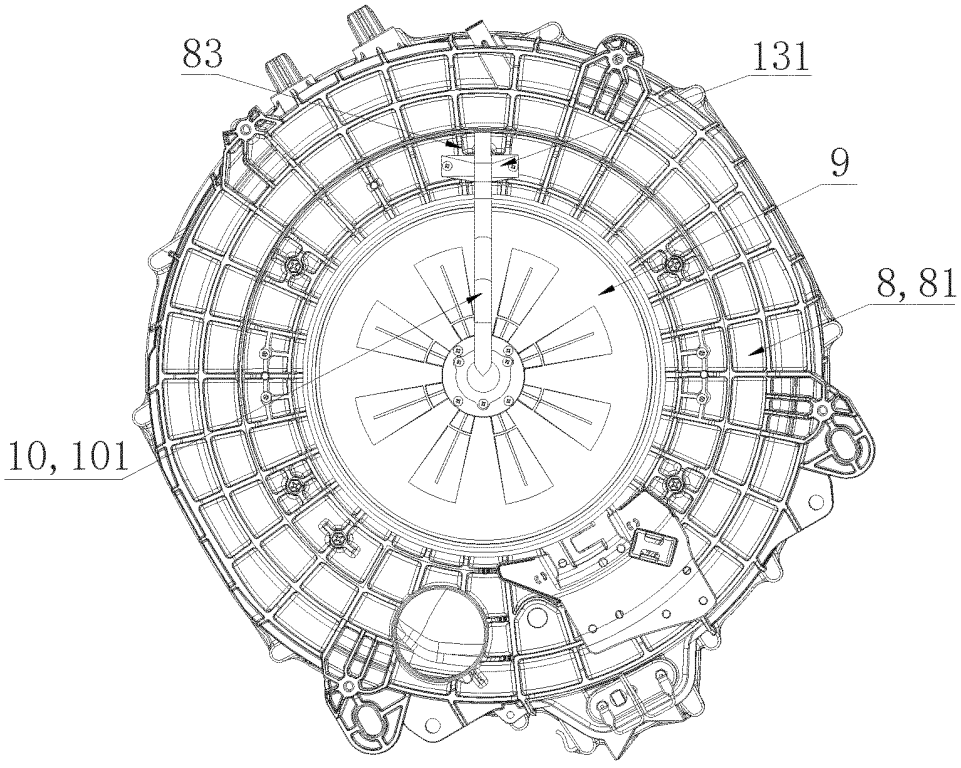


FIG. 6

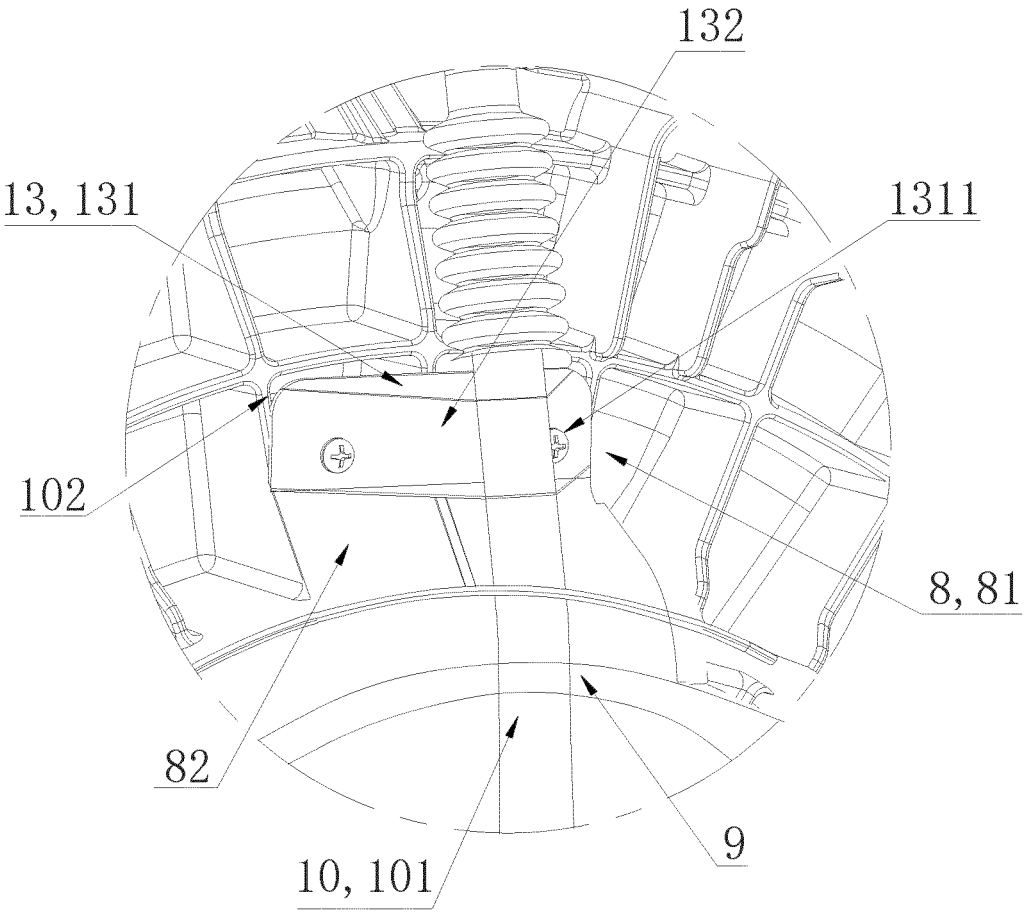


FIG. 7

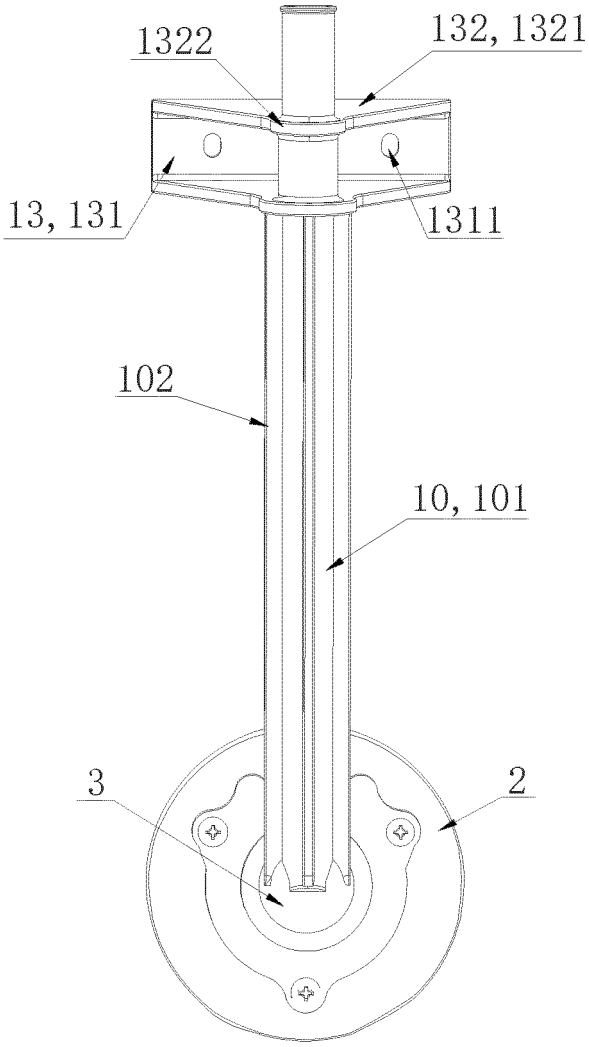


FIG. 8

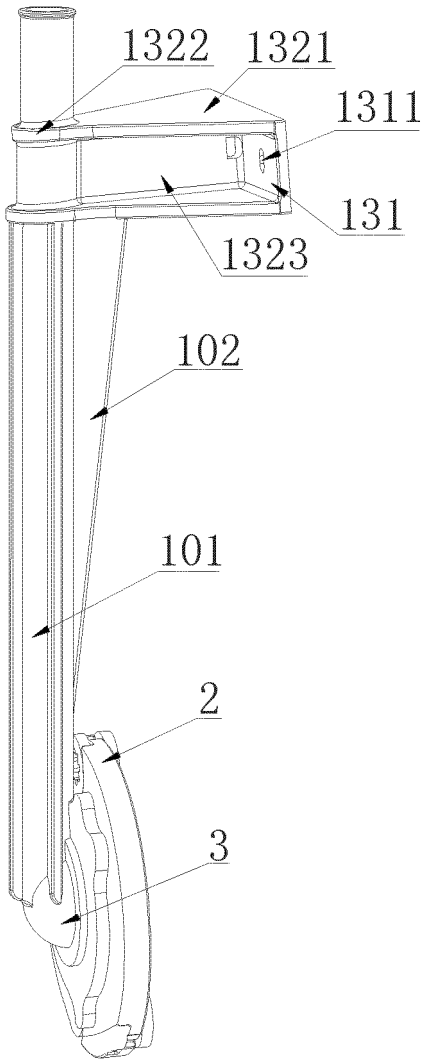


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/099386

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/08(2006.01)i; D06F 37/04(2006.01)i; D06F 23/02(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

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

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

CNTXT; ENTXT; DWPI; WPABS: 洗衣机, 滚筒, 进水, 供水, 给水, 轴承, 接头, 减震, 减振, 缓冲, wash, drum, water, inlet, supply, bearing, joint, damping, cushion

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 102080325 A (REN WENTAO) 01 June 2011 (2011-06-01) description, embodiment 1, and figures 1-2	1, 11
A	CN 108866937 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 23 November 2018 (2018-11-23) entire document	1-20
A	CN 108866920 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 23 November 2018 (2018-11-23) entire document	1-20
A	JP 2004290704 A (SHARP K. K.) 21 October 2004 (2004-10-21) entire document	1-20
A	US 2019112748 A1 (LG ELECTRONICS INC.) 18 April 2019 (2019-04-18) entire document	1-20

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

* Special categories of cited documents:
"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
"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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 August 2022	**07 September 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2022/099386

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 102080325 A	01 June 2011	None	
CN 108866937 A	23 November 2018	None	
CN 108866920 A	23 November 2018	None	
JP 2004290704 A	21 October 2004	None	
US 2019112748 A1	18 April 2019	WO 2017155309 A1	14 September 2017

Form PCT/ISA/210 (patent family annex) (January 2015)