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(54) DRUM WASHING MACHINE

(57) The present disclosure relates to a drum washing machine, which includes a body (1), a first drum assembly (2) and a counterweight (3); the body (1) comprises a first plate (11); the first drum assembly (2) is connected to the first plate (11); and the counterweight (3) is connected to the first plate (11). With the present disclosure, the first drum assembly no longer uses a

damping shock absorber to achieve vibration reduction, which can avoid eccentric vibration of the first drum assembly. At the same time, the counterweight is connected to the first plate, which can reduce the natural frequency of the first plate, thereby reducing the overall vibration amplitude and noise of the washing machine.

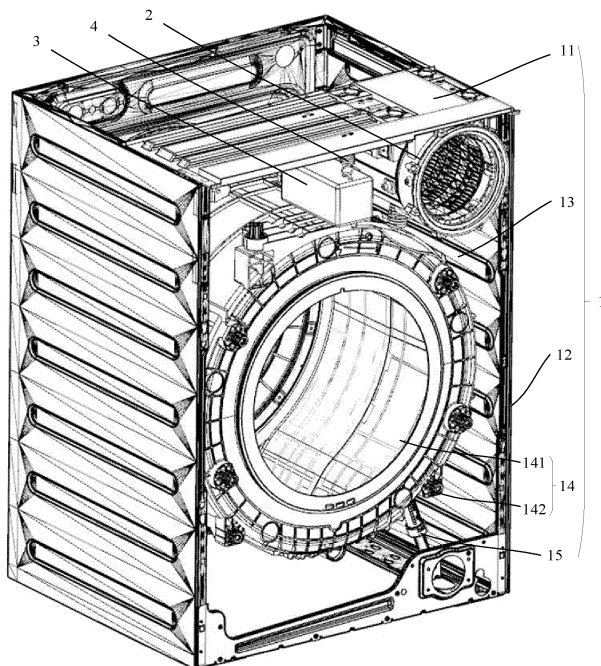


FIG. 1

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of electrical appliances, and in particular to a drum washing machine.

BACKGROUND

[0002] Nowadays, more and more users choose to wash different types of clothes separately (for example, underwear and outerwear are washed separately). Based on this demand, partitioned drum washing machines have gradually become the mainstream choice. Partitioned drum washing machines include a cabinet, a main drum and a secondary drum.

[0003] At present, the main drum and the auxiliary drum are both located inside the casing. In order to reduce the overall height of the washing machine, the main drum and the auxiliary drum are usually eccentrically arranged in the casing, wherein the distances from the axis of the main drum to the inner walls on both sides of the casing are equal, and the distances from the axis of the auxiliary drum to the inner walls on both sides of the casing are unequal.

[0004] In the related art, the auxiliary drum is connected to the inner walls on both sides of the casing through damping shock absorbers to achieve vibration reduction. However, since the distances from the axis of the auxiliary drum to the inner walls on two sides of the casing are not equal, the damping shock absorbers on the two sides of the axis exert unequal forces on the auxiliary drum, and the auxiliary drum vibrates eccentrically, resulting in a relatively larger overall vibration amplitude and noise in the washing machine.

[0005] It should be noted that, information disclosed in the above background portion is provided only for better understanding of the background of the present disclosure, and thus it may contain information that does not form the prior art known by those ordinary skilled in the art.

SUMMARY

[0006] The embodiment of the present disclosure provides a drum washing machine, which can solve the technical problems existing in the related art. The technical solution is as follows:

[0007] The embodiment of the present disclosure provides a drum washing machine, which includes a body, a first drum assembly and a counterweight;

the body includes a first plate;
the first drum assembly is connected to the first plate;
and
the counterweight is connected to the first plate.

[0008] In a possible implementation, the body further includes a casing;

the first plate and the casing are arranged to enclose a receiving space, and the first drum assembly and the counterweight are both located in the receiving space.

[0009] In a possible implementation, the drum washing machine further includes a first elastic connecting member; and

the first elastic connecting member is located in the receiving space, and two ends of the first elastic connecting member are respectively connected to the first plate and the counterweight member.

[0010] In a possible implementation, the first elastic connecting member is a hook spring.

[0011] In a possible implementation, the counterweight has a cubic structure, a hook ring structure is provided on a wall surface of the counterweight close to the first plate, the first plate has a hook spring mounting hole, and two ends of the hook spring are respectively engaged with the hook spring mounting hole and the hook ring structure.

[0012] In a possible implementation, a side of the first plate close to the first drum assembly has a connecting seat; and

[0013] the first drum assembly includes a drum body, a second elastic connecting member and a connecting rod; two ends of the second elastic connecting member are respectively connected to the first plate and the drum body; one end of the connecting rod is connected to the connecting seat, and the other end is connected to the drum body.

[0014] In a possible implementation, the connecting seat includes a seat body and a connecting head, the connecting head is rotatably connected to the seat body, the connecting head has a mounting through hole, and the mounting through hole is used to accommodate the connecting rod;

[0015] one end of the connecting rod is located in the mounting through hole and is slidably connected to the connecting head, and the other end of the connecting rod is rotationally connected to the drum body.

[0016] In a possible implementation, a center of mass of the counterweight is aligned with a center of mass of the first plate in a vertical direction.

[0017] In a possible implementation, a length L1 of the counterweight in an axial direction of the first drum assembly is smaller than an axial length L2 of the first drum assembly.

[0018] In a possible implementation, the counterweight and the first plate are integrally formed.

[0019] In a possible implementation, the counterweight and the first plate are connected by a bolt.

[0020] The technical solution provided by the embodiments of the present disclosure includes at least the following beneficial effects:

[0021] The disclosed embodiment provides a drum washing machine, which includes a body, a first drum assembly and a counterweight. The body includes a first plate, the first drum assembly is connected to the first

plate, and the counterweight is connected to the first plate. In this way, when the drum washing machine is a partitioned drum washing machine, the first drum assembly serves as a secondary drum in the drum washing machine, the first drum assembly is connected to the first plate, and the damping vibration is no longer used to reduce the vibration of the first drum assembly, and the first drum assembly will not have eccentric vibration. At the same time, the counterweight is connected to the first plate, which can reduce the natural frequency of the first plate, thereby reducing the overall vibration amplitude and noise of the washing machine.

[0022] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] In order to more clearly illustrate the technical solutions in the embodiments of the present disclosure, the drawings required for use in the description of the embodiments will be briefly introduced below. Obviously, the drawings described below are only some embodiments of the present disclosure. For ordinary technicians in this field, other drawings can be obtained based on these drawings without paying any creative effort.

FIG. 1 is a schematic structural diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 2 is a partial schematic diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 3 is a partial schematic diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 4 is a partial schematic diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 5 is a partial schematic diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 6 is a partial schematic diagram of a drum washing machine illustrated in an embodiment of the present disclosure;

FIG. 7 is a schematic diagram illustrating a connection between a counterweight and a first plate according to an embodiment of the present disclosure;

FIG. 8 is a schematic diagram illustrating a connection between a counterweight and a first plate according to an embodiment of the present disclosure;

FIG. 9 is a schematic diagram illustrating a connection between a counterweight and a first plate shown in an embodiment of the present disclosure.

Description of the legends

[0024]

- 5 1, body;
- 11, first plate; 12, casing; 13, receiving space; 14, second drum assembly; 15, vibration reduction assembly;
- 10 141, outer cylinder; 142, inner cylinder;
- 110, hook spring installation hole; 111, connecting seat;
- 1111, seat body; 1112, connecting head;
- 1112a, mounting through hole;
- 2, first drum assembly; 2a, first end of the first drum assembly; 2b, second end of the first drum assembly;
- 15 21, drum body; 22, second elastic connecting member; 23, connecting rod;
- 3, counterweight;
- 301, threaded hole; 302, connecting through hole;
- 20 31, hook ring structure; 32, first wall surface; 33, second wall surface;
- 4, first elastic connecting member.

DETAILED DESCRIPTION

[0025] In order to make the objectives, technical solutions and advantages of the present disclosure more clear, the embodiments of the present disclosure will be further described in detail below with reference to the accompanying drawings.

[0026] Unless otherwise defined, the technical terms or scientific terms used herein shall have the usual meanings understood by persons with ordinary skills in the field to which the present disclosure belongs. The words "first", "second", "third" and similar words used in the patent disclosure specification and claims of the present disclosure do not indicate any order, quantity or importance, but are only used to distinguish different components. Similarly, words such as "a" or "one" do not indicate a quantity limitation, but indicate the existence of at least one. Words such as "include" or "comprise" and similar words mean that the elements or objects appearing before "include" or "comprise" include the elements or objects listed after "include" or "comprise" and their equivalents, and do not exclude other elements or objects. Words such as "connect" or "connected" and similar words are not limited to physical or mechanical connections, but may include electrical connections, whether direct or indirect. "Up", "down", "left", "right" and the like are only used to indicate relative positional relationships. When the absolute position of the described object changes, the relative positional relationship may also change accordingly.

[0027] Nowadays, with the improvement of living standards, more and more users choose to wash different types of clothes separately when doing laundry at home. For example, in order to prevent light-colored clothes from being stained by dark-colored clothes, light-colored

clothes and dark-colored clothes are washed separately. Or, for health reasons, underwear and outerwear are washed separately, socks and underwear are washed separately, and socks and underwear are washed separately. Based on the above-mentioned demand for partitioned washing of clothes, partitioned drum washing machines have gradually become the mainstream choice for users when purchasing washing machines.

[0028] The partitioned drum washing machine includes a housing, a main drum and an auxiliary drum, wherein the main drum is arranged in the housing, and the distance between the axis of the main drum and the inner walls on both sides of the housing is equal. The main drum adopts the same vibration reduction measures as the drum in the conventional drum washing machine, that is, the drum and the housing are connected together using springs and damping shock absorbers to achieve damping vibration reduction. However, when designing a partitioned drum washing machine, in order to reduce the overall height of the washing machine and adapt to installation standards, the auxiliary drum is often eccentrically arranged with the main drum, that is, the distance between the axis of the auxiliary drum and the inner walls on both sides of the housing is not equal, accordingly, when damping vibration reduction is adopted for the auxiliary drum, if damping shock absorbers are respectively arranged on both sides of the axis of the auxiliary drum, the damping shock absorbers on the two sides of the axis of the auxiliary drum exert unequal forces on the auxiliary drum, and the auxiliary drum vibrates eccentrically, resulting in a large overall vibration amplitude of the washing machine and a large noise.

[0029] The present disclosure provides a drum washing machine, which includes a body 1, a first drum assembly 2 and a counterweight 3. The body 1 includes a first plate 11, the first drum assembly 2 is connected to the first plate 11, and the counterweight 3 is connected to the first plate 11.

[0030] In this way, when the drum washing machine is a partitioned drum washing machine, the first drum assembly 2 serves as an auxiliary drum in the drum washing machine. The first drum assembly 2 is connected to the first plate 11, and the damping vibration is no longer used to reduce the vibration of the first drum assembly 2. The first drum assembly 2 will not vibrate eccentrically. At the same time, the counterweight 3 is connected to the first plate 11, which can reduce the natural frequency of the first plate 11, thereby reducing the overall vibration amplitude and noise of the washing machine.

[0031] Hereinafter, various parts of the drum washing machine are introduced separately:

1. Body 1

[0032] The body 1 is the main component of the drum washing machine.

[0033] In some possible embodiments, the body 1 includes a first plate 11, a casing 12, a second drum

assembly 14 and a vibration reduction assembly 15. The various components of the body 1 are described in detail below.

5 Casing 12

[0034] The casing 12 is a component in the main body 1 for accommodating the second drum assembly 14 and the vibration reduction assembly 15.

10 **[0035]** As shown in FIG. 1, the casing 12 has a cubic structure, and the interior of the casing is used to dispose the second drum assembly 14 and the vibration reduction assembly 15.

15 **[0036]** The casing 12 can be formed by riveting a plurality of rectangular wall plates, or by welding a plurality of rectangular wall plates, or by a stamping process. The embodiment of the present disclosure does not limit the manufacturing method of the casing 12.

20 Second drum assembly 14

[0037] In the case where the drum washing machine is a partitioned drum washing machine, the second drum assembly 14 serves as the main drum in the drum washing machine.

25 **[0038]** Referring to FIG. 1, the second drum assembly 14 is located inside the housing 12 and is connected to the housing 12.

30 **[0039]** In practice, the distances from the axis of the second drum assembly 14 to the two opposite inner walls of the casing 12 are equal.

[0040] In this way, the connection stability between the second drum assembly 14 and the casing 12 can be improved.

35 **[0041]** In one example, the second drum assembly 14 includes an outer cylinder 141 and an inner cylinder 142, the outer cylinder 141 and the inner cylinder 142 are coaxially arranged, and the outer cylinder 141 is sleeved on the outer ring of the inner cylinder 142.

40 **[0042]** In practice, the outer cylinder 141 is connected to two opposite inner walls, and the inner cylinder 142 is rigidly connected to the output shaft of the motor. When the motor is in operating state, the output shaft rotates to drive the inner cylinder 142 to rotate, thereby completing the washing work for the clothes in the inner cylinder 142.

Vibration reduction components 15

[0043] The vibration reduction assembly 15 is a component in the body 1 for reducing the vibration of the second drum assembly 14.

50 **[0044]** Referring to FIG. 1, the vibration reduction assembly 15 includes a plurality of damping shock absorbers, and two ends of the plurality of damping shock absorbers are connected to the outer cylinder 141 and the casing 12 respectively.

55 **[0045]** In implementation, the same number of damping shock absorbers are distributed on both sides of the

axis of the second drum assembly 14, that is, when two damping shock absorbers are provided on the left side of the axis of the second drum assembly 14, two damping shock absorbers are also provided on the right side of the axis of the second drum assembly 14, and when three damping shock absorbers are provided on the left side of the axis of the second drum assembly 14, three damping shock absorbers are also provided on the right side of the axis of the second drum assembly 14, and the damping shock absorbers located on both sides of the axis of the second drum assembly 14 are symmetrically distributed with respect to the vertical plane where the axis of the second drum assembly 14 is located.

[0046] In this way, the vibration reduction effect of the vibration reduction assembly 15 can be improved.

First plate 11

[0047] The first plate 11 is a component in the body 1 for connecting the first drum assembly 2.

[0048] As shown in FIG. 1, the first plate 11 is connected to two opposite wall plates in the casing 12.

[0049] The connection between the first plate 11 and the casing 12 can be welding, riveting, or detachable connection through bolts. The embodiment of the present disclosure does not limit the connection means between the first plate 11 and the casing 12.

[0050] The first plate 11 may be an upper cover of the casing 12 or a plate other than the casing 12.

[0051] When the first plate 11 is a plate other than the casing 12, the first plate 11 can be assembled with two opposite wall plates in the casing 12 first, and then the upper cover of the casing 12 is installed on the first plate 11 to complete the assembly of the casing 12.

[0052] In an example, as shown in FIG. 1, the first plate 11 is located at the upper side of the casing 12, the lower surface of the first plate 11 is in contact with two opposite wall plates in the casing 12, and the first plate 11 and the casing 12 are riveted together.

[0053] Optionally, the two opposite wall plates in the casing 12 may be perpendicular to the bottom plate of the casing 12, and the two opposite wall plates in the casing 12 have the same height.

[0054] In this way, the first plate 11 can be parallel to the bottom plate of the casing 12, thereby improving the connection stability between the first drum assembly 2 and the first plate 11.

[0055] In one example, as shown in FIG. 1, the first plate 11 and the casing 12 are arranged to enclose a receiving space 13, and the first drum assembly 2 and the counterweight 3 are both located in the receiving space 13 and are both connected to the first plate 11.

[0056] In this way, the space utilization rate in the housing 12 can be improved and the overall height of the drum washing machine can be reduced.

[0057] In one example, the first drum assembly 2 can be arranged in the receiving space 13 and connected to the first plate 11, and the counterweight 3 can be ar-

ranged outside the receiving space 13, for example, arranged above the first plate 11 and connected to the first plate 11.

[0058] In this way, the connection difficulty between the counterweight 3 and the first plate 11 can be reduced.

2. First drum assembly 2

[0059] In some embodiments, the first drum assembly 2 includes a drum body 21, a second elastic connecting member 22 and a connecting rod 23.

[0060] As shown in FIG. 1, the first drum assembly 2 is disposed in the receiving space 13. Referring to FIG. 4, a connecting seat 111 is provided on one side of the first plate close to the first drum assembly 2. Both ends of the second elastic connecting member 22 are respectively connected to the first plate 11 and the drum body 21. One end of the connecting rod is connected to the connecting seat 111, and the other end is connected to the drum body 21.

[0061] The detailed structure of the drum body 21 can refer to the above description of the second drum assembly 14, which will not be repeated here.

[0062] Optionally, the second elastic connecting member 22 may be a spring, the connecting rod 23 may have a cylindrical structure, one end of the connecting rod 23 may be slidably connected to the connecting seat 111, and the other end of the connecting rod 23 may be rotatably connected to the drum body 21.

[0063] In this way, with the second connecting member 22, the first drum assembly 2 can be flexibly connected to the first plate 11. Furthermore, when the drum body 21 vibrates during operation, the second elastic connecting member 22 can absorb part of the energy, thereby reducing the vibration amplitude of the drum body 21, and further reducing the overall vibration amplitude and noise of the drum washing machine.

[0064] In one example, as shown in FIG. 5, the connecting seat 111 includes a seat body 1111 and a connecting head 1112, the connecting head 1112 is rotatably connected to the seat body 1111, the connecting head 1112 has a mounting through hole 1112a, the mounting through hole 1112a is used to accommodate one end of the connecting rod 23. One end of the connecting rod 23 is located in the mounting through hole 1112a, and is slidably connected to the connecting head 1112, and the other end of the connecting rod 23 is rotatably connected to the drum body 21.

[0065] Optionally, the connector 1112 may be rotatably connected to the base body 1111 via a hinge.

[0066] In this way, if there is a coaxiality deviation between the drum body 21 and the output shaft of the motor during assembling, when the drum body 21 undergoes eccentric vibration during operation, the engagement between the connecting seat 111 and the connecting rod 23 can limit the position of the drum body 21, avoiding large stretching of the second elastic connecting member 22, thereby improving the service life of the first

drum assembly 2.

[0067] Optionally, the outer ring of one end of the connecting rod 23 at the mounting through hole 1112a may be provided with a wear-resistant layer.

[0068] Exemplarily, the material of the wear-resistant layer may be tungsten-molybdenum alloy, nickel-chromium alloy, etc. The embodiment of the present disclosure does not limit the material of the wear-resistant layer.

[0069] In this way, the service life of the connecting rod 23 can be increased.

3. Counterweight 3

[0070] The counterweight 3 is a component in the drum washing machine that is connected to the first plate 11 so as to reduce the natural frequency of the first plate 11.

[0071] In some embodiments, the counterweight 3 can be connected to the first plate 11 by a bolt.

[0072] In an example, the counterweight 3 may be provided with a threaded hole 301, and an internal thread is provided in the threaded hole 301.

[0073] Exemplarily, the internal thread may be a fine pitch thread, the thread profile may be an equilateral triangle, and may have a relatively larger fillet at the thread root.

[0074] In this way, stress concentration at the thread root can be reduced. In addition, due to the vibration of the first drum assembly 2, there is a load between the counterweight 3 and the first plate 11. Configuring the internal thread as a fine thread can make the counterweight 3 and the first plate 11 have better self-locking performance under the action of load, preventing the external counterweight 3 from shaking relative to the first plate 11 and generating noise.

[0075] As shown in FIG. 8, the number of threaded holes 31 can be multiple, and the threaded holes 31 are located on the wall surface of the counterweight 3 close to the first plate 11. The first plate 11 has multiple through holes, and the positions of the multiple through holes correspond to the positions of the threaded holes 31. The bolt head of the bolt is located on the side of the first plate 11 away from the counterweight 3, and is attached to the first plate 11.

[0076] In practice, the depth of the threaded hole 301 may be less than the thickness of the counterweight 3. The bolt may pass through the through hole and insert into the threaded hole 301, and the external thread on the outer wall of the bolt engages with the internal thread on the inner wall of the threaded hole 301 to achieve a fixed connection between the counterweight 3 and the first plate 11.

[0077] In this way, the difficulty of assembling the counterweight 3 and the first plate 11 can be reduced.

[0078] In one example, as shown in Fig. 9, the counterweight 3 may be provided with a connecting through hole 302. The number of the connecting through holes 32 may be multiple, and the first plate 11 has multiple through holes, and the positions of the multiple through holes

correspond to the positions of the connecting through holes 32.

[0079] In practice, one end of the bolt can pass through the through hole on the first plate 11 and the connecting through hole 302 in sequence, so that the bolt head abuts against the side wall of the first plate 11 away from the counterweight 3, and the nut and one end of the bolt are assembled together to achieve a fixed connection between the counterweight 3 and the first plate 11.

[0080] In this way, the processing cost of the counterweight 3 is reduced.

[0081] In some embodiments, the counterweight 3 can be integrally formed with the first plate 11.

[0082] In this way, the difficulty of assembling the counterweight 3 and the first plate 11 can be reduced.

[0083] In practice, the counterweight 3 and the first plate 11 can be integrally formed by a casting process or a cutting process. The embodiment of the present disclosure does not limit the forming method of the counterweight 3 and the first plate 11.

[0084] In an example, the counterweight 3 may have a cubic structure, and the center of mass of the counterweight 3 and the center of mass of the first plate 11 are aligned in the vertical direction.

[0085] Optionally, the length of the counterweight 3 in the direction perpendicular to the first drum assembly 2 is smaller than the length of the first plate 11 in the direction perpendicular to the first drum assembly 2.

[0086] Exemplarily, the length of the counterweight 3 in the direction perpendicular to the first drum assembly 2 may be L_3 , the length of the first plate 11 in the direction perpendicular to the first drum assembly 2 may be L_4 , and L_3 and L_4 satisfy $L_3 = 0.2L_4$.

[0087] In practice, the natural frequency of the first plate 11 is inversely proportional to the mass of the first plate 11 and directly proportional to the stiffness of the first plate 11. In this way, when the counterweight 3 and the first plate 11 are integrally formed, the stiffness of the first plate 11 can be reduced as much as possible, so that the natural frequency increment of the first plate 11 due to the integral formation with the counterweight 3 is relatively small, thereby reducing the natural frequency of the first plate 11 and reducing the overall vibration amplitude and noise of the washing machine.

[0088] Optionally, the density of the counterweight 3 is greater than the density of the first plate 11.

[0089] Exemplarily, the material of the first plate 11 may be super-hard aluminum, and the material of the counterweight 3 may be industrial pure iron.

[0090] In this way, the rigidity of the first plate 11 can be made smaller, and the mass of the counterweight 3 can be made larger, thereby reducing the natural frequency of the first plate 11 and reducing the overall vibration amplitude and noise of the washing machine.

[0091] Hereinafter, some optional structural features of drum washing machines are introduced.

Structural feature 1: The drum washing machine also includes a first elastic connecting member 4.

[0092] As shown in FIG. 1 and FIG. 2, the first elastic connecting member 4 is located in the receiving space 13, and two ends of the first elastic connecting member 4 are connected to the first plate 11 and the counterweight 3 respectively.

[0093] In one example, the first elastic connecting member 4 may be a hook spring.

[0094] In this way, the difficulty of assembling the first elastic connecting member 4 with the first plate 11 and the counterweight 3 can be reduced.

[0095] In one example, as shown in FIG. 3, the counterweight 3 has a cubic structure, and a hook ring structure 31 is provided on the wall surface of the counterweight 3 close to the first plate 11, and the first plate 11 has a hook spring mounting hole 110, and the two ends of the hook spring are respectively engaged with the hook ring structure 31 and the hook spring mounting hole 110.

[0096] Optionally, the center of mass of the hook structure 31 and the counterweight 3 may be aligned in the vertical direction.

[0097] In this way, the connection stability between the first elastic connecting member 4 and the counterweight member 3 can be improved.

[0098] Exemplarily, the hook spring mounting hole 110 may include two through holes.

[0099] The above two through holes may both be circular through holes or rectangular through holes. The embodiment of the present disclosure does not limit the shape of the through holes constituting the hook spring mounting hole 110.

[0100] In implementation, one end of the hook spring has an arc-shaped hook structure, which passes through the above-mentioned two through holes in sequence. After passing through the above-mentioned two through holes in sequence, the two through holes limit the arc-shaped hook structure so that one end of the hook spring is clamped with the hook spring mounting hole 110, and one end of the hook spring is abutted against the connecting part between the two through holes, and the connecting part applies a vertical upward supporting force to one end of the hook spring. The other end of the hook spring passes through the hook ring structure 31, and applies a vertical upward pulling force to the hook ring structure 31.

[0101] Optionally, there may be multiple first elastic connectors 4, and accordingly, the first plate 11 may be provided with multiple hook spring mounting holes 110, and the wall surface of the counterweight 3 close to the first plate 11 may be provided with multiple hook ring structures 31.

[0102] In one example, as shown in FIG. 7, the number of the first elastic connectors 4 is 2, and the first plate 11 is correspondingly provided with 2 hook spring mounting holes 110, and the wall surface of the counterweight 3 close to the first plate 11 is provided with 2 hook ring

structures 31. The hook spring mounting holes 110 and the hook ring structures 31 are all located in the same vertical cross section, and a first angle α is formed between a line connecting one hook spring mounting hole 110 and one hook ring structure 31 and the horizontal plane, and a second angle β is formed between a line connecting another hook spring mounting hole 110 and another hook ring structure 31 and the horizontal plane.

[0103] Exemplarily, the first angle α is equal to the second angle β , and both are 45° .

[0104] In this way, when the counterweight 3 moves in the axial direction of the first drum assembly 2, the first elastic connecting member 4 can apply a force to the counterweight 3 in the opposite direction of the moving direction, preventing the counterweight 3 from moving too far in the axial direction of the first drum assembly 2 and colliding with other components in the main body 1, thereby reducing noise.

Structural feature 2: The length of the counterweight 3 is smaller than the axial length of the first drum assembly 2.

[0105] The length of the counterweight 3 is the length of the counterweight 3 in the axial direction of the first drum assembly 2.

[0106] In one example, as shown in FIG. 6, the length of the counterweight 3 in the axial direction of the first drum assembly 2 is L_1 , and the axial length of the first drum assembly 2 is L_2 , that is, $L_1 < L_2$ is satisfied.

[0107] Optionally, as shown in FIG. 6, there is a first reference gap between the first wall 32 of the counterweight 3 and the plane where the first end 2a of the first drum assembly 2 is located, and there is a second reference gap between the second wall 33 of the counterweight and the plane where the second end 2b of the first drum assembly 2 is located.

[0108] The first wall surface 32 and the second wall surface 33 are two opposite wall surfaces of the counterweight 3 in the axial direction of the first drum assembly 2.

[0109] The distance of the first reference gap and the distance of the second reference gap may be equal or unequal, and the embodiment of the present disclosure does not limit the specific values of the first reference gap and the second reference gap.

[0110] In this way, when the counterweight 3 moves in the axial direction of the first drum assembly 2, the existence of the first reference gap and the second reference gap can prevent the counterweight 3 from colliding with the casing 12 when moving in the axial direction of the first drum assembly 2, thereby reducing noise.

[0111] The technical solution provided by the embodiments of the present disclosure includes at least the following beneficial effects:

[0112] The embodiment of the present disclosure provides a drum washing machine, which includes a body 1, a first drum assembly 2 and a counterweight 3. The body

1 includes a first plate 11, the first drum assembly 2 is connected to the first plate 11, and the counterweight 3 is connected to the first plate 11. In this way, when the drum washing machine is a partitioned drum washing machine, the first drum assembly 2 serves as a secondary drum in the drum washing machine, the first drum assembly 2 is connected to the first plate 11, and the damping shock absorber is no longer used to reduce the vibration of the first drum assembly 2, and the first drum assembly 2 will not have eccentric vibration. At the same time, the counterweight 3 is connected to the first plate 11, which can reduce the natural frequency of the first plate 11, thereby reducing the overall vibration amplitude and noise of the washing machine.

[0113] The above description is only an optional embodiment of the present disclosure and is not intended to limit the present disclosure. Any modifications, equivalent substitutions, improvements, etc. made within the spirit and principles of the present disclosure shall be included in the protection scope of the present disclosure.

Claims

1. A drum washing machine, comprising a body (1), a first drum assembly (2) and a counterweight (3);
 - the body (1) comprises a first plate (11);
 - the first drum assembly (2) is connected to the first plate (11); and
 - the counterweight (3) is connected to the first plate (11).
2. The drum washing machine according to claim 1, wherein the main body (1) further comprises a casing (12); and the first plate (11) and the casing (12) are arranged to enclose a receiving space (13), and the first drum assembly (2) and the counterweight (3) are both located in the receiving space (13).
3. The drum washing machine according to claim 2, wherein the drum washing machine further comprises a first elastic connecting member (4); and the first elastic connecting member (4) is located in the receiving space (13), and two ends of the first elastic connecting member (4) are respectively connected to the first plate (11) and the counterweight member (3).
4. The drum washing machine according to claim 3, wherein the first elastic connecting member (4) is a hook spring.
5. The drum washing machine according to claim 4, wherein the counterweight (3) has a cubic structure, a hook ring structure (31) is provided on a wall sur-

face of the counterweight (3) close to the first plate (11), the first plate (11) has a hook spring mounting hole (110), and two ends of the hook spring are respectively engaged with the hook spring mounting hole (110) and the hook ring structure (31).

6. The drum washing machine according to any one of the preceding claims, wherein a side of the first plate (11) close to the first drum assembly (2) has a connecting seat (111); and the first drum assembly (2) comprises a drum body (21), a second elastic connecting member (22) and a connecting rod (23); two ends of the second elastic connecting member (22) are respectively connected to the first plate (11) and the drum body (21); one end of the connecting rod (23) is connected to the connecting seat (111), and the other end is connected to the drum body (21).
7. The drum washing machine according to claim 6, wherein the connecting seat (111) comprises a seat body (1111) and a connecting head (1112), the connecting head (1112) is rotatably connected to the seat body (1111), the connecting head (1112) has a mounting through hole (1112a), and the mounting through hole (1112a) is used to accommodate the connecting rod (23); one end of the connecting rod (23) is located in the mounting through hole (1112a) and is slidably connected to the connecting head (1112), and the other end of the connecting rod (23) is rotationally connected to the drum body (21).
8. The drum washing machine according to any one of the preceding claims, wherein a center of mass of the counterweight (3) is aligned with a center of mass of the first plate (11) in a vertical direction.
9. The drum washing machine according to any one of the preceding claims, wherein a length L1 of the counterweight (3) in an axial direction of the first drum assembly (2) is smaller than an axial length L2 of the first drum assembly (2).
10. The drum washing machine according to any one of the preceding claims, wherein the counterweight (3) and the first plate (11) are integrally formed.
11. The drum washing machine according to any one of the preceding claims, wherein the counterweight (3) and the first plate (11) are connected by a bolt.
12. The drum washing machine according to any one of the preceding claims 2 to 11, wherein two opposite wall plates in the casing (12) are perpendicular to a bottom plate of the casing (12), and the two opposite wall plates in the casing (12) are equal in height.

13. The drum washing machine according to any one of the preceding claims, the main body (1) further comprises a casing (12); and wherein the first plate (11) and the casing (12) are arranged to enclose a receiving space (13), the first drum assembly (2) is located in the receiving space (13), and the counterweight (3) is disposed on the first plate (11) outside the receiving space (13). 5
14. The drum washing machine according to any one of the preceding claims 7 to 13, wherein the connector (1112) is rotatably connected to the base body (1111) via a hinge. 10
15. The drum washing machine according to any one of the preceding claims 7 to 14, wherein an outer ring of the end of the connecting rod (23) at the mounting through hole (1112a) is provided with a wear-resistant layer. 15

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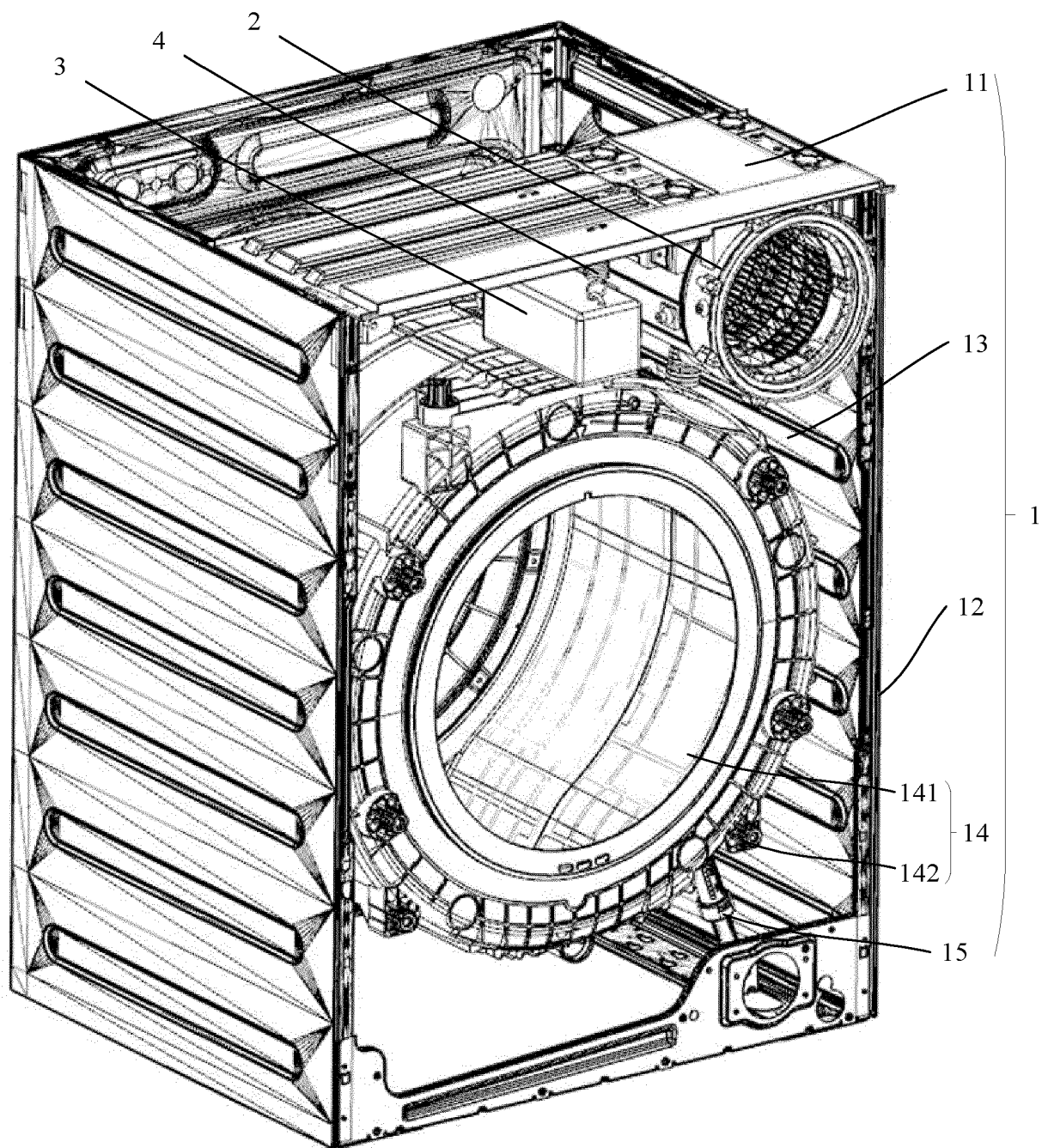


FIG. 1

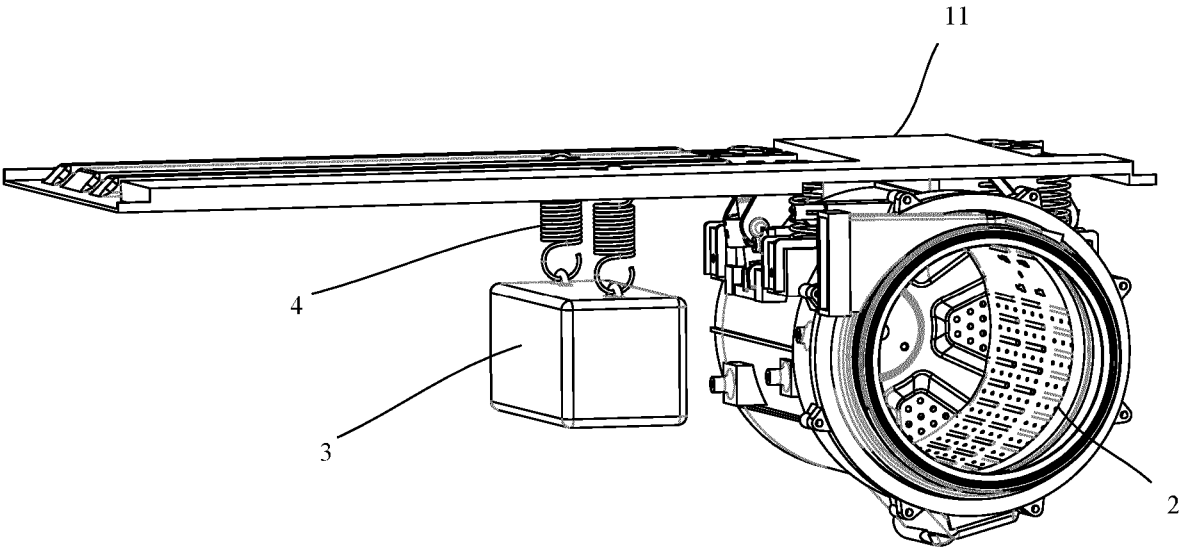


FIG. 2

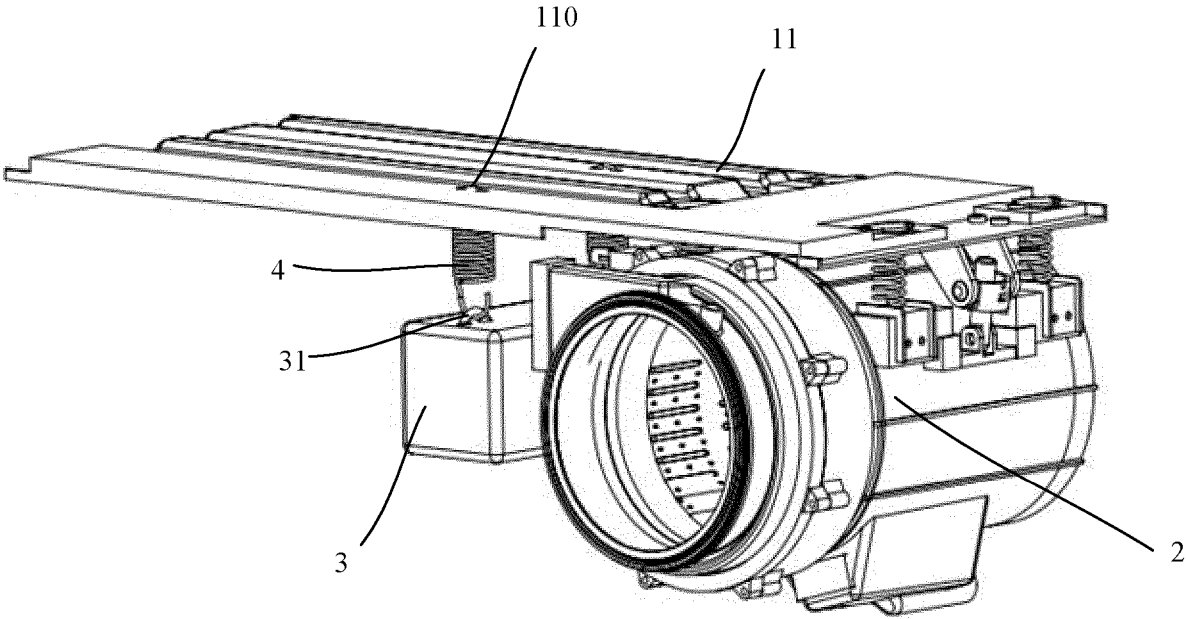


FIG. 3

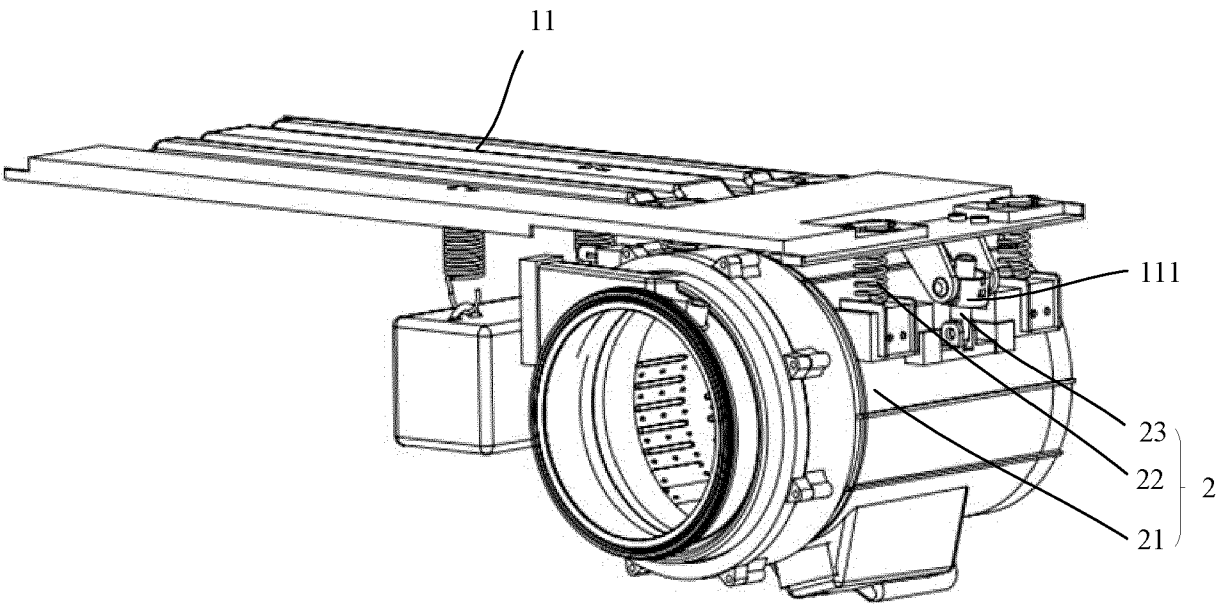


FIG. 4

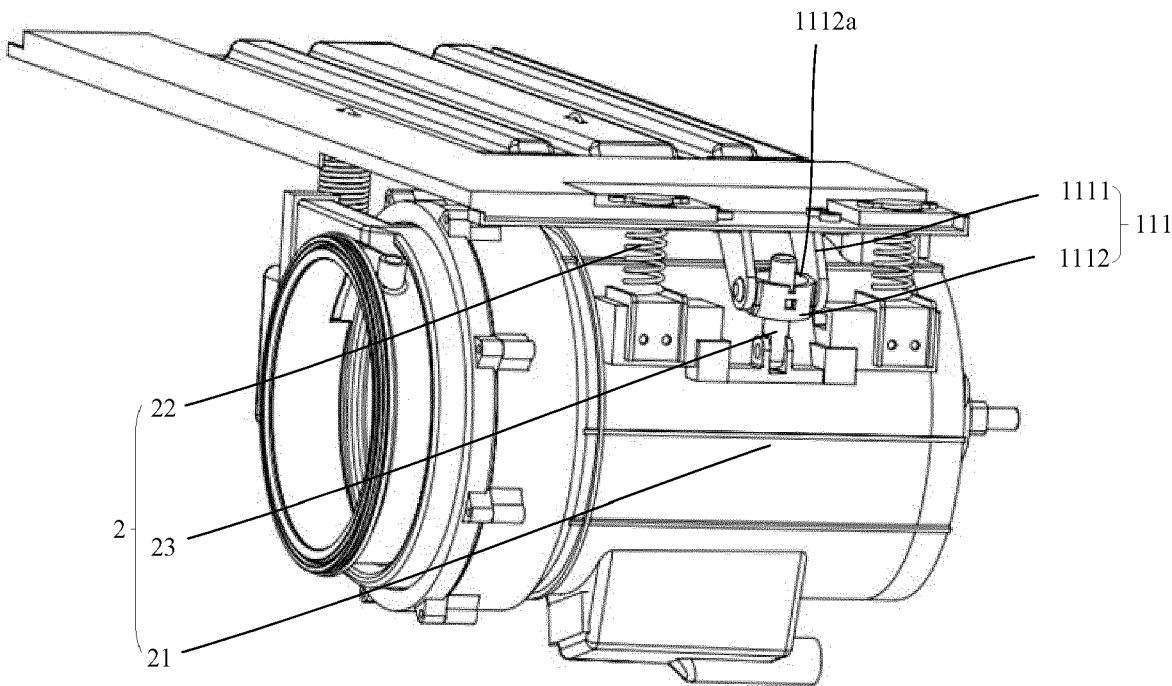


FIG. 5

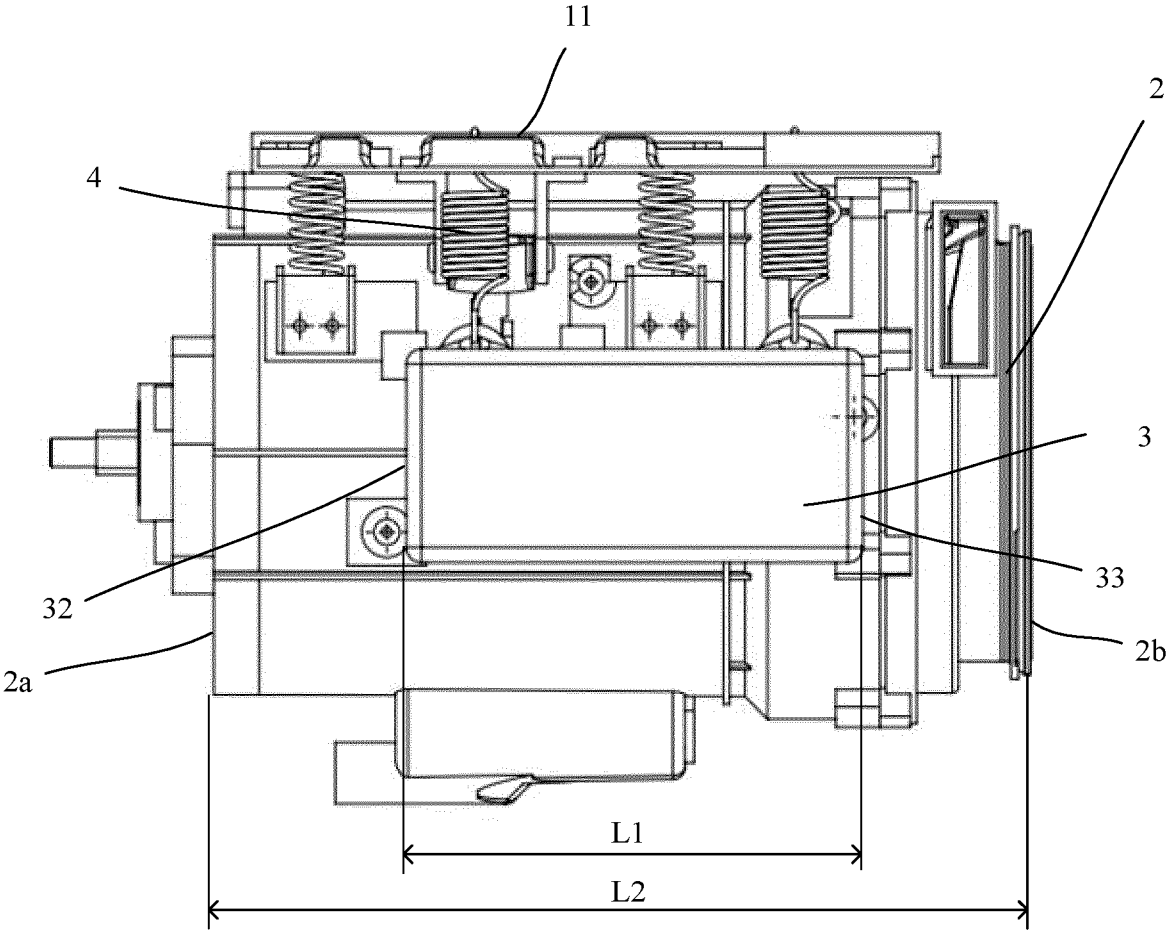


FIG. 6

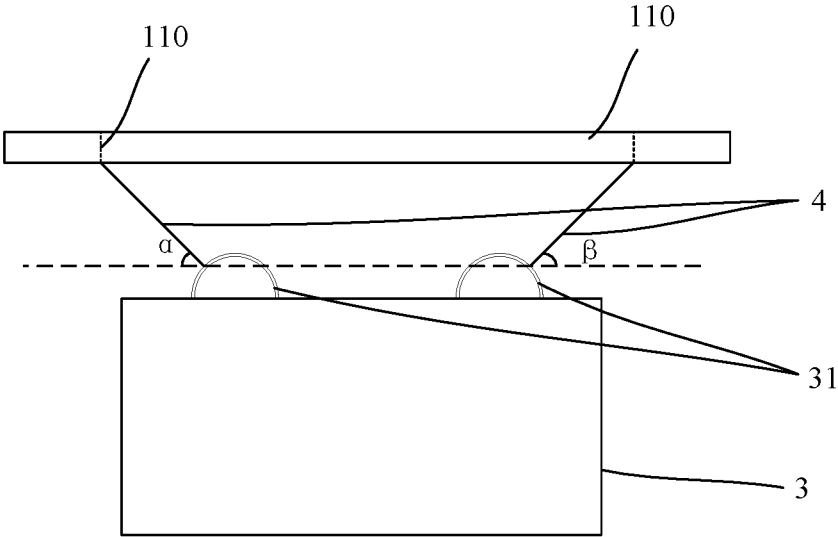


FIG. 7

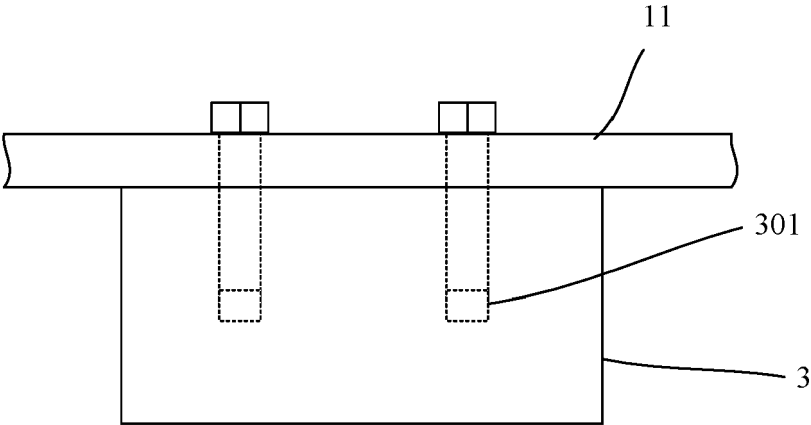


FIG. 8

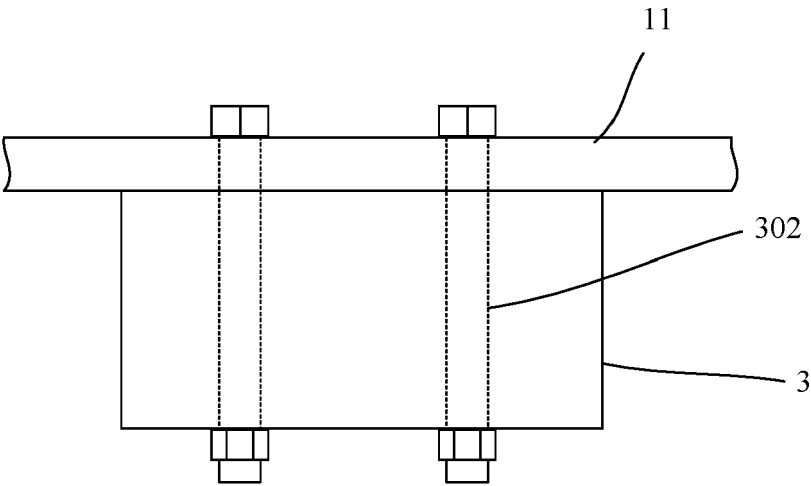


FIG. 9



EUROPEAN SEARCH REPORT

Application Number

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X	ES 2 463 487 A1 (BSH ELECTRODOMÉSTICOS ESPAÑA S A [ES]) 28 May 2014 (2014-05-28) * page 6, line 24 - page 7, line 44 * * figures 1-11 *	1,8,9, 11,12	
A	US 2010/037660 A1 (HONG KYUNG SEOP [KR]) 18 February 2010 (2010-02-18) * column 1, line 65 - column 4, line 17 * * figures 1, 2 *	1	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) D06F
Place of search Munich		Date of completion of the search 22 January 2025	Examiner Weidner, Maximilian
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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