



(11) **EP 4 261 339 A1**

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

(43) Date of publication:
18.10.2023 Bulletin 2023/42

(51) International Patent Classification (IPC):
D06F 39/08 ^(2006.01) **D06F 39/02** ^(2006.01)

(21) Application number: **21902302.5**

(52) Cooperative Patent Classification (CPC):
D06F 39/088; D06F 37/04; D06F 39/02;
D06F 39/08

(22) Date of filing: **08.11.2021**

(86) International application number:
PCT/CN2021/129310

(87) International publication number:
WO 2022/121595 (16.06.2022 Gazette 2022/24)

(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

(72) Inventors:
• **LIU, Kai**
Qingdao, Shandong 266101 (CN)
• **LIU, Xiaochun**
Qingdao, Shandong 266101 (CN)
• **HOU, Yongshun**
Qingdao, Shandong 266101 (CN)
• **ZHAO, Xinyu**
qingdao, Shandong 266101 (CN)

(30) Priority: **09.12.2020 CN 202011449253**

(71) Applicants:
• **Qingdao Haier Drum Washing Machine Co., Ltd.**
Qingdao, Shandong 266101 (CN)
• **HAIER SMART HOME CO., LTD.**
Laoshan District
Qingdao
Shandong 266101 (CN)

(74) Representative: **Beck & Rössig**
European Patent Attorneys
Cuvilliesstraße 14
81679 München (DE)

(54) **WATER INLET STRUCTURE OF DRUM, AND FRONT LOAD WASHING MACHINE**

(57) A water inlet structure of a drum and a drum washing machine are provided. The water inlet structure of the drum includes a drum shaft (1) which is hollow inside and forms a water inlet channel and a water inlet pipe (2), a water outlet end of the water inlet pipe (2) is provided with a water outlet adapter (23), a transfer chamber (231) is provided inside the water outlet adapter (23) and communicates with the water inlet channel, and a stirring structure (19) is provided inside the transfer chamber (231) to stir the water inlet flow. By arranging the stirring structure (19) inside the transfer chamber (231), it is possible to stir the water inlet flow, to break up the water inlet flow, to increase the turbulence degree of the water inlet flow, to achieve sufficient mixing of the

water inlet flow with a detergent, and to improve the washing effect; a drum washing machine is also provided, including a drum, a drum support (8) and a motor (7), the drum support (8) being provided outside the drum, and the motor (7) being provided on the drum support (8), and further including a water inlet structure of the drum, a drum shaft (1) being installed on a bottom of the drum, a water outlet end of the drum shaft (1) communicating with the drum, a water inlet end of the drum shaft (1) passing out of the drum support (8) and being inserted into the transfer chamber (231) with the motor (7), and the water outlet adapter (23) being fixed to the drum support (8).

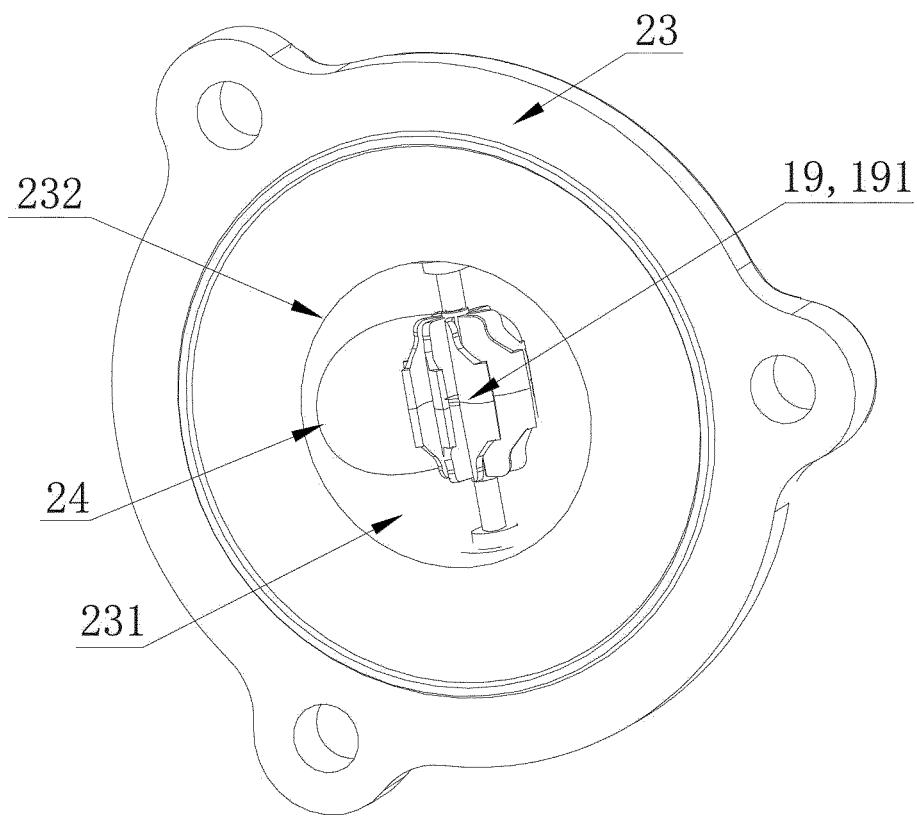


Fig. 2

Description

TECHNICAL FIELD

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

BACKGROUND

[0002] In the prior art, the drum washing machine generally includes a drum in which laundry is contained, a drum support supporting for installing the drum, and a motor. A drum shaft is provided at a bottom of the drum and extended in a left-right direction of the drum. The motor is arranged on the drum support, the drum shaft passes through the drum support and is connected to the motor, and the motor drives the drum shaft to rotate to further drive the drum to rotate. Thereby laundry is beat for washing in the drum. The drum support includes an outer drum containing washing water, and the drum is rotatably assembled inside the outer drum. Dewatering holes are provided on the drum, so that water in the outer drum flows into the drum through the dewatering holes to soak the laundry in the drum. Water in the drum flows out to the outer drum through the dewatering holes. Moisture in the laundry in the drum is discharged out to the outer drum through the dewatering holes when the drum is rotated at a high speed, to achieve washing of the laundry.

[0003] In the existing drum washing machine, the inside of the drum shaft is hollow to form a water inlet channel. A water outlet end of the water inlet channel is communicated with the inside of the drum, and a water inlet end of the water inlet channel is communicated with a water outlet end of the water inlet pipe, thereby water is supplied in the drum through the water inlet pipe and the water inlet channel. A water outlet end of the water inlet pipe is provided with a water outlet adapter, and a transfer chamber being communicated with the water inlet channel is provided inside the water outlet adapter. Water in the water inlet pipe flows into the transfer chamber, and water in the transfer chamber flows into the water inlet channel, and then water in the water inlet channel flows into the drum. Due to the absence of a stirring structure for stirring the water inlet flow inside the transfer chamber, the water inlet flow has less turbulence and is not easily mixed well with the detergent, and the washing effect is reduced.

SUMMARY

[0004] The technical problem to be solved by the present invention is to overcome the shortcomings in the prior art. A water inlet structure of a drum and a drum washing machine are provided. By arranging a stirring structure for stirring the water inlet flow in a transfer chamber, the water inlet flow is stirred by the stirring structure,

the turbulence degree of the water inlet flow is increased, and further the water inlet flow and detergent are fully mixed to improve the washing effect.

[0005] In order to solve the above technical problem, the technical solution of the present disclosure is as follows.

[0006] A water inlet structure of a drum provided by the present invention includes, a drum shaft inside which is hollow to form a water inlet channel and a water inlet pipe. A water outlet end of the water inlet pipe is provided with a water outlet adapter, a transfer chamber is provided inside the water outlet adapter and communicated with the water inlet channel, and a stirring structure is arranged inside the transfer chamber to stir the water inlet flow.

[0007] In an embodiment of the present invention, the water outlet adapter has a hemispherical shape. A water outlet is provided at a center of a diameter end surface of the water outlet adapter. A water outlet end of the water inlet pipe is embedded into the water outlet adapter along a direction perpendicular to a axis of the water outlet adapter, and the stirring structure directly faces the water outlet of the water outlet adapter and the water outlet of the water inlet pipe.

[0008] In an embodiment of the present invention, the stirring structure is a water wheel structure. A rotating shaft of the water wheel structure is rotatably disposed on an inner wall of the water outlet adapter. The rotating shaft is horizontally extended across the water outlet of the water outlet adapter from one side of the inner wall of the water outlet adapter to an opposite side of the inner wall of the water outlet adapter.

[0009] Preferably, both the water outlet of the water outlet adapter and the water outlet of the water inlet pipe are circular. A central line of the water outlet of the water outlet adapter and a central line of the water outlet of the water inlet pipe are both perpendicular to a shaft axis of the rotating shaft.

[0010] In an embodiment of the present invention, a plurality of stirring blades are distributed at intervals along a circumferential direction of the rotating shaft on an outer circumferential wall of the rotating shaft.

[0011] In an embodiment of the present invention, the stirring blade has a plate-like structure and is gradually bent outwardly from the outer circumferential wall of the rotating shaft, and the bending directions of all the stirring blades are uniform.

[0012] In an embodiment of the present invention, the stirring blade is divided into a first section blade, a second section blade and a third section blade along the bending direction of the stirring blade. The first section blade and the third section blade are different in size along the bending direction of the stirring blade, and the second section blade is gradually decreased in size along the bending direction of the stirring blade.

[0013] In an embodiment of the present invention, a stirring chamber is formed between two adjacent stirring blades, and the size of the stirring chamber is gradually

increased along the bending direction of the stirring blade.

[0014] In an embodiment of the invention, a reinforcing rib is provided between two adjacent stirring blades.

[0015] In an embodiment of the present invention, the reinforcing rib is in a plate-like structure, and the reinforcing rib is extended in a bending direction of the stirring blade inside the stirring chamber. The reinforcing rib is respectively fitted with the outer circumferential wall of the rotating shaft and two adjacent stirring blades.

[0016] The present invention also provides a drum washing machine, including a drum, a drum support and a motor, wherein the drum support is provided outside the drum, and the motor is provided on the drum support. The drum washing machine further includes a water inlet structure of the drum. A drum shaft is installed on a bottom of the drum, a water outlet end of the drum shaft is communicated with the drum, and a water inlet end of the drum shaft passes out of the drum support and is inserted into the transfer chamber with the motor. The water outlet adapter is fixed to the drum support.

[0017] With the above technical solution, the present invention has the following advantageous effects over the prior art.

[0018] By providing the stirring structure inside the transfer chamber, the stirring structure is capable of stirring the water inlet flow, breaking up the water inlet flow, increasing the turbulence degree of the water inlet flow, thus achieving sufficient mixing of the water inlet flow with a detergent, and improving the washing effect.

[0019] Specific embodiments of the present disclosure will be further described below in detail in combination with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The drawings as one part of the present disclosure are intended to provide a further understanding for the present disclosure. Schematic embodiments of the present disclosure and the descriptions thereof are intended to explain the present disclosure, rather than to constitute an improper limitation of the present disclosure. Obviously, the drawings described below are merely some embodiments. Under the precondition of not paying any inventive labor, those of ordinary skill in the art can further obtain other drawings according to these drawings.

FIG. 1 is a structural schematic diagram of a water inlet structure of a drum in an embodiment of the present invention.

FIG. 2 is a structural schematic diagram of a water outlet adapter according to an embodiment of the present invention from a view.

FIG. 3 is a structural schematic diagram of a water outlet adapter according to an embodiment of the present invention from another view.

FIG. 4 is a sectional diagram of FIG. 3 at position A.

FIG. 5 is a structural schematic diagram of a water wheel structure in an embodiment of the present invention.

FIG. 6 is a structural schematic diagram of stirring blades according to an embodiment of the present invention.

[0021] In the drawings: 1-drum shaft; 2-water inlet pipe; 23-water outlet adapter; 231-transfer chamber; 232-water outlet of water outlet adapter; 24-water outlet of water inlet pipe; 7-motor; 8-drum support; 9-motor support structure; 19-stirring structure; 191-water wheel structure; 1911-rotating shaft; 1912-stirring blade; 1912a-first section blade; 1912b-second section blade; 1912c-third section blade; 20-stirring chamber; 30-reinforcing rib.

[0022] It should be noted that these drawings and descriptions are not intended to limit the scope of the present disclosure in any way, but rather to illustrate the concept of the present disclosure by reference to specific embodiments for those skilled in the art.

DETAILED DESCRIPTION

[0023] In order to make objects, technical solutions and advantages of the embodiments of the present invention clearer, the solutions in the embodiments are clearly and completely described as follows in combination with accompanying drawings in the embodiments of the present invention. The following embodiments are used for illustrating the present invention, rather than limiting the scope of the present invention.

[0024] In the description of the present invention, it should be noted that, the orientation or positional relationship indicated by such terms as "up", "down", "front", "rear", "left", "right", "vertical", "inner" and "outer" is the orientation or positional relationship based on the accompanying drawings. Such terms are merely used for conveniently and simplified describing the present invention, rather than indicating or implying that the device or element referred to must be located in a certain orientation or must be constructed or operated in a certain orientation. Therefore, the terms cannot be understood as a limitation to the present invention.

[0025] In the description of the present invention, it should be noted that, unless otherwise stipulated and defined definitely, such terms as "installed", "connected" and "in connection" should be understood in their broad sense, e.g., the connection can be a fixed connection, a detachable connection or an integral connection; can be mechanical connection or electrical connection; and can be direct connection or can be indirect connection through an intermediate. For those skilled in the art, specific meanings of the above terms in the present invention can be understood according to specific conditions.

[0026] As shown in FIG. 1 and FIG. 2, the present invention provides a water inlet structure of a drum. The water inlet structure includes a drum shaft 1 in which there is a hollow to form a water inlet channel, and a

water inlet pipe 2. A water outlet end of the water inlet pipe 2 is provided with a water outlet adapter 23. A transfer chamber 231 is provided inside the water outlet adapter 23 and is communicated with the water inlet channel. A stirring structure 19 is provided inside the transfer chamber 231 to stir the water inlet flow.

[0027] In the embodiment of the present invention, by arranging the stirring structure 19 inside the transfer chamber 231, the water inlet flow is stirred by the stirring structure 19. The water inlet flow is broken up to increase the turbulence degree of the water inlet flow, thereby the water inlet flow is sufficiently mixed with the detergent, and improving the washing effect.

[0028] The water outlet adapter 23 is integrally formed with the water inlet pipe 2, thereby the resistance at a transition between the water outlet adapter 23 and the water inlet is reduced, and the sealing property between the water outlet adapter 23 and the water inlet pipe 2 can be increased, and the water inlet flow is prevented from leaking out. The water outlet adapter 23 is provided at the outlet end of the inlet pipe, and the water outlet adapter 23 can change the flow direction of the water inlet flow, so that the water flow from the water inlet pipe 2 can enter into the water inlet channel in the drum shaft 1 relatively smoothly.

[0029] It should be noted that, the water inlet pipe 2 includes a first section water inlet pipe and a second section water inlet pipe. The first section water inlet pipe is a plastic pipe, and the second section water inlet pipe is a rubber pipe. The water outlet of the first section water inlet pipe has the water outlet adapter 23, and the water inlet of the first section water inlet pipe has a rubber joint. The rubber joint of the first section water inlet pipe is integrally formed with the second section water inlet pipe. The second section water inlet pipe of the water inlet pipe 2 is a rubber pipe which makes part of the water inlet pipe bending, so the position of the water inlet pipe 2 is changed more flexibly.

[0030] As shown in FIGS. 2, 3 and 4, in an embodiment of the invention, the water outlet adapter 23 is in the shape of a hemisphere. The diameter end surface of the water outlet adapter 23 is provided with a water outlet being communicated with the water inlet channel. The water outlet 232 of the water outlet adapter is located at the center of the diameter end surface. The water outlet end of the water inlet pipe is embedded into the water outlet adapter 23 along the direction perpendicular to the axis of the water outlet adapter, and the stirring structure 19 directly faces the water outlet 232 of the water outlet adapter and the water outlet 24 of the water inlet pipe.

[0031] In the embodiment of the present invention, the water outlet adapter 23 is in the shape of a hemisphere. The inner wall of the water outlet adapter 23 is in the shape of a circular arc, and the inner wall in the shape of a circular arc can reduce the frictional resistance to the water inlet flow.

[0032] The water outlet adapter 23 is in the shape of a hemisphere, so that the water outlet adapter 23 has an

end face where the diameter is located, and the end face where the diameter is located is referred to as the diametric end surface. The diametric end surface is an end face where the water outlet adapter 23 is the largest in size. The diametric end surface has a circular shape, and an inner circumference of the diametric end surface forms a water outlet 232 of the water outlet adapter having a circular shape.

[0033] The stirring structure 19 is provided at the water outlet 232 of the water outlet adapter. The water inlet flow enters the transfer chamber 231 and is stirred by the stirring structure 19 at the water outlet 232 of the water outlet adapter, so that the water inlet flow into the water inlet channel from the transfer chamber 231 has a large turbulence degree.

[0034] As an embodiment, the water outlet of the water outlet adapter and the water outlet of the water inlet pipe are both circular. A central line of the water outlet of the water outlet adapter and a central line of the water outlet of the water inlet pipe are both perpendicular to the shaft axis of the rotating shaft.

[0035] As shown in FIG. 2 and FIG. 5, in the embodiment of the present invention, the water wheel structure 191 includes a rotating shaft 1911 rotatably provided at an inner wall of the water outlet adapter 23 and a plurality of stirring blades 1912. The rotating shaft 1911 is extended radially within the transfer chamber 231 and extended from an inner wall at one end of the water outlet adapter 23 to an inner wall at an opposite end of the water outlet adapter 23. The plurality of stirring blades 1912 are spaced on the outer circumferential wall of the rotating shaft 1911 along the circumferential direction of the rotating shaft 1911.

[0036] In an embodiment of the invention, specifically, the water wheel structure 191 includes a rotation shaft 1911 being rotatable within the transfer chamber 231 and stirring blades 1912 being capable of rotating to stir the water inlet flow along with the rotation shaft 1911. The rotating shaft 1911 is extended radially inside the transfer chamber 231. One end of the rotating shaft 1911 is rotationally connected with an inner wall of one end of the water outlet adapter 23, and the other end of the rotating shaft 1911 is rotationally connected with an inner wall of an opposite end of the water outlet adapter 23, so that the rotating shaft 1911 directly faces the water outlet. The water inlet flow needs to pass through the water flow structure before reaching the water outlet 232 of the water outlet adapter.

[0037] As shown in FIGS. 2 and 4, the water wheel structure has a rotating shaft rotatably disposed on an inner wall of the water outlet adapter. The rotating shaft is horizontally extended across the water outlet of the water outlet adapter from the inner wall of one side of the water outlet adapter to the inner wall of the opposite side of the water outlet adapter.

[0038] The stirring blades 1912 are provided on an outer circumferential wall of the rotating shaft 1911. The stirring blades 1912 are integrally formed with the rotating

shaft 1911 to reduce resistance to the water inlet flow at a transition between the stirring blades 1912 and the rotating shaft 1911.

[0039] The stirring blades 1912 are provided on the outer circumferential wall of the rotating shaft 1911 by one circle, so the maximum area of stirring of the water inlet flow can be got. The stirring blades 1912 are evenly distributed on the outer circumferential wall of the rotating shaft 1911, so that the stirring force for stirring the water inlet flow is relatively uniform.

[0040] Each of both ends of the rotating shaft 1911 is provided with a mounting block. The mounting block includes a first mounting block and a second mounting block which are disposed coaxially. Both the first mounting block and the second mounting block are disc-shaped. A disc surface of the first mounting block is provided with the second mounting block axially protruded with respect to the first mounting block, and an insertion hole is arranged on the second mounting block in an axial direction. One end of the rotating shaft 1911 is inserted into the insertion hole. The first mounting block is embedded on an inner wall of the water outlet adapter 23, and can be driven to rotate inside the water outlet adapter 23 by the motor to drive the rotating shaft 1911 to rotate. Furthermore, the first mounting block is provided with a through hole being coaxial with and communicated with the insertion hole. One end of the rotating shaft 1911 is rotatably inserted into the insertion hole, and the motor shaft of the motor is connected to the rotating shaft through the through hole, thereby driving the rotating shaft to rotate.

[0041] Preferably, the water inlet end of the drum shaft 1 is inserted into the transfer chamber 231 through the water outlet 232 of the water outlet adapter. The water outlet end of the water inlet pipe is inserted into the transfer chamber 231 in a tangential direction. The water from the water outlet of the water inlet pipe is supplied into the water outlet adapter 23 in the tangential direction of the water outlet adapter, thereby the resistance caused by feeding water is reduced at the transition between the water outlet of the water inlet pipe and the water outlet adapter 23, and the feeding efficiency of the water inlet pipe is improved.

[0042] Since the water-outlet end of the water inlet pipe is inserted into the transfer chamber 231 in a tangential direction, so that the water inlet flow entering into the transfer chamber 231 from the water outlet end of the water inlet pipe can directly flow toward the water outlet 232 of the water outlet adapter. Thus it is avoided that the water inlet flow flows out of the water outlet 232 of the water outlet adapter through multiple turns.

[0043] In addition, the water inlet end of the drum shaft 1 is inserted into the transfer chamber 231 through the water outlet of the water outlet adapter 23, so that the sealing property between the drum shaft 1 and the transfer chamber 231 is increased, and the leakage of the water inlet flow is reduced.

[0044] In order that the stirring structure 19 stirs the

water inlet flow of the transfer chamber 231 to increase the turbulence degree of the water inlet flow, the rotation direction of the water wheel structure 191 is set to be opposite to the flow direction of the water inlet flow. Thereby the rotation of the water wheel structure 191 blocks and fluctuates the water inlet flow.

[0045] As shown in FIGS. 2 and 5, in the embodiment of the present invention, each of the stirring blades 1912 is a plate-like structure and are gradually bent outwardly from the outer circumferential wall of the rotating shaft 1911, and the bending directions of all the stirring blades 1912 are uniform.

[0046] In the embodiment of the present invention, specifically, the stirring blade 1912 is a plate-like structure, and the stirring blade 1912 is protruded outward with respect to the outer circumferential wall of the rotating shaft 1911. The length of the stirring arm is increased, and the turbulence degree of the water inlet flow is increased due to the increase in the stirring area for stirring the water inlet flow.

[0047] The stirring blades 1912 are gradually bent outward from the outer circumferential wall of the rotating shaft 1911, and the bending direction is opposite to the direction of the water inlet flow of the rotating chamber 231. The bent stirring blades 1912 are capable of not only collecting and blocking the water inlet flow, but also increasing the frictional blocking with the water inlet flow, and further increasing the turbulence degree of the water inlet flow.

[0048] As shown in FIG. 5, in an embodiment of the present invention, the stirring blade 1912 is divided into a first section blade 1912a, a second section blade 1912b and a third section blade 1912c in a bending direction of the stirring blade 1912. The first section blade 1912a and the third section blade 1912c are different in size in the bending direction of the stirring blade 1912, and the second section blade 1912b is gradually decreased in size in the bending direction of the stirring blade 1912.

[0049] In an embodiment of the invention, the stirring blade 1912 is divided into three sections along the bending direction of the stirring blade 1912. Wherein the first section blade 1912a and the third section blade 1912c are kept constant in size along the bending direction of the stirring blade 1912, and the second section blade 1912b is gradually reduced in size along the bending direction of the stirring blade 1912. The bending degree of the second section blade 1912b is the greatest to reduce the weight of the stirring blade 1912 on the one hand.

[0050] As shown in FIG. 6, in an embodiment of the present invention, the stirring chamber 20 is formed between two adjacent stirring blades 1912, and the sizes of the stirring chambers 20 along the bending direction of the stirring blade 1912 are gradually increased.

[0051] In the embodiment of the present invention, the stirring blades 1912 are spaced on the outer circumferential wall of the rotating shaft 1911, so that two adjacent stirring blades 1912 form the stirring chamber 20 be-

tween them. The stirring chamber 20 is a space for allowing the water inlet flow to reside, so that the water inlet flow can stay briefly in being stirred, and the stirring blades 1912 can stir the water inlet flow sufficiently. Due to the different bending degrees of the first section blades 1912a, the second section blades 1912b and the third section blades 1912c, the size of the stirring chamber 20 in the bending direction of the stirring blades 1912 gradually increases. So the water inlet flow in the stirring chamber 20 is stirred by the two adjacent stirring blades 1912.

[0052] In an embodiment of the present invention, a reinforcing rib 30 is provided between two adjacent stirring blades 1912.

[0053] In the embodiment of the present invention, the impact of the water inlet flow on the stirring blades 1912 is greater during the stirring of the water inlet flow by the stirring blades 1912. Therefore, in order to increase the structural strength of the stirring blades 1912 and to reduce the cost, the reinforcing rib 30 is provided between two adjacent stirring blades 1912. The reinforcing rib 30 can enhance the strength of the two stirring blades 1912 at the same time.

[0054] As shown in FIG. 6, in the embodiment of the present invention, the reinforcing rib 30 is of a plate-like structure, and the reinforcing rib 30 is extended in the bending direction of the stirring blade 1912 inside the stirring chamber 20. The reinforcing rib 30 is respectively fitted with the outer circumferential wall of the rotating shaft 1911 and the two adjacent stirring blades 1912.

[0055] In an embodiment of the invention, in particular, the reinforcing rib 30 is of a plate-like structure. To maximize the strength of the stirring blade 1912, the arrangement of the reinforcing rib 30 is that the side walls of the reinforcing rib 30 corresponding to the outer circumferential wall of the rotating shaft 1911, and the two adjacent stirring blades 1912 is fitted with the outer circumferential wall of the rotating shaft 1911, and the two adjacent stirring blades 1912. Since the size of the stirring chamber 20 along the bending direction of the stirring blade 1912 is gradually reduced, thus, the size of the reinforcing rib 30 along the bending direction of the stirring blade 1912 is gradually reduced.

[0056] As shown in FIG. 1, the present invention also provides a drum washing machine. The drum washing machine includes a drum, a drum support 8 and a motor 7. The drum support 8 is provided outside the drum, and the motor 7 is provided on the drum support 8. The drum washing machine further includes a water inlet structure of the drum. The drum shaft 1 is installed at the bottom of the drum, the water outlet end of the drum shaft 1 is communicated with the drum, and a water inlet end of the drum shaft 1 passes out of the drum support 8 and is inserted into the transfer chamber 231 with the motor 7. The water outlet adapter 23 is fixed to the drum support 8.

[0057] In an embodiment of the present invention, the drum is a hole-free drum. The drum shaft is coaxially

arranged at the drum bottom. The motor 7 is arranged on the drum support by a motor support structure 9 which is wrapped outside the motor 7. The water outlet adapter 23 is fixed on the drum support 8 by the motor support structure 9, and the water outlet adapter 23 is provided outside the motor support structure 9. The drum support 8 includes an outer drum.

[0058] In feeding the water, the water inlet flow enters into the water inlet pipe 2, the transfer chamber 231, and the drum shaft 1, and finally into the interior of the drum.

[0059] The embodiments merely describe preferred embodiments of the present invention, rather than limiting the concept and scope of the present invention. The preferred embodiments are disclosed above, and not used for limiting the present invention. Under the premise of not departing from the design idea of the present invention, various changes and improvements made to the technical solution of the present invention by those skilled in the art, such as simple amendment, equal change and modify according concept of the present invention, shall all fall within the protection scope of the present invention. The implementing solutions in the above embodiments can be further combined or substituted.

Claims

1. A water inlet structure of a drum, comprising, a drum shaft inside which there is hollow to form a water inlet channel, and a water inlet pipe, wherein, a water outlet end of the water inlet pipe is provided with a water outlet adapter, a transfer chamber is provided inside the water outlet adapter and communicated with the water inlet channel, and a stirring structure is arranged inside the transfer chamber to stir the water inlet flow.
2. The water inlet structure of a drum according to claim 1, wherein, the water outlet adapter has a hemispherical shape,
 - a water outlet is provided at a center of a diameter end surface of the water outlet adapter,
 - a water outlet end of the water inlet pipe is embedded into the water outlet adapter along a direction perpendicular to a axis of the water outlet adapter, and the stirring structure faces directly to the water outlet of the water outlet adapter and the water outlet of the water inlet pipe.
3. The water inlet structure of a drum according to claim 2, wherein, the stirring structure is a water wheel structure,
 - a rotating shaft of the water wheel structure is rotatably disposed on an inner wall of the water outlet adapter,
 - the rotating shaft is horizontally extended across

the water outlet of the water outlet adapter from one side of the inner wall of the water outlet adapter to an opposite side of the inner wall of the water outlet adapter,
preferably, both the water outlet of the water outlet adapter and the water outlet of the water inlet pipe are circular, 5
a central line of the water outlet of the water outlet adapter and a central line of the water outlet of the water inlet pipe are both perpendicular to a shaft axis of the rotating shaft. 10

4. The water inlet structure of a drum according to any one of claims 1-3, wherein, stirring blades are distributed at intervals along a circumferential direction of the rotating shaft on an outer circumferential wall of the rotating shaft. 15
5. The water inlet structure of a drum according to claim 4, wherein, the stirring blade has a plate-like structure and is gradually bent outwardly from the outer circumferential wall of the rotating shaft, and the bending directions of all the stirring blades are uniform. 20
6. The water inlet structure of a drum according to claim 5, wherein, the stirring blade is divided into a first section blade, a second section blade and a third section blade along the bending direction of the stirring blade, 25
the first section blade and the third section blade are different in size along the bending direction of the stirring blade, and the second section blade is gradually decreased in size along the bending direction of the stirring blade. 30 35
7. The water inlet structure of a drum according to claim 5, wherein, a stirring chamber is formed between two adjacent stirring blades, and the size of the stirring chamber gradually increases along the bending direction of the stirring blade. 40
8. The water inlet structure of a drum according to any one of claims 1-7, wherein,, a reinforcing rib is provided between two adjacent stirring blades. 45
9. The water inlet structure of a drum according to claim 8, wherein, the reinforcing rib is in a plate-like structure, and the reinforcing rib is extended in a bending direction of the stirring blade inside the stirring chamber, and the reinforcing rib is respectively fitted with the outer circumferential wall of the rotating shaft and two adjacent stirring blades. 50
10. A drum washing machine, including a drum, a drum support and a motor, the drum support being provided outside the drum, and the motor being provided on the drum support, and 55

further including a water inlet structure of the drum of any one of claims 1-9, wherein, a drum shaft is installed on a bottom of the drum, a water outlet end of the drum shaft is communicated with the drum, a water inlet end of the drum shaft passes out of the drum support and is inserted into the transfer chamber with the motor, and the water outlet adapter is fixed to the drum support.

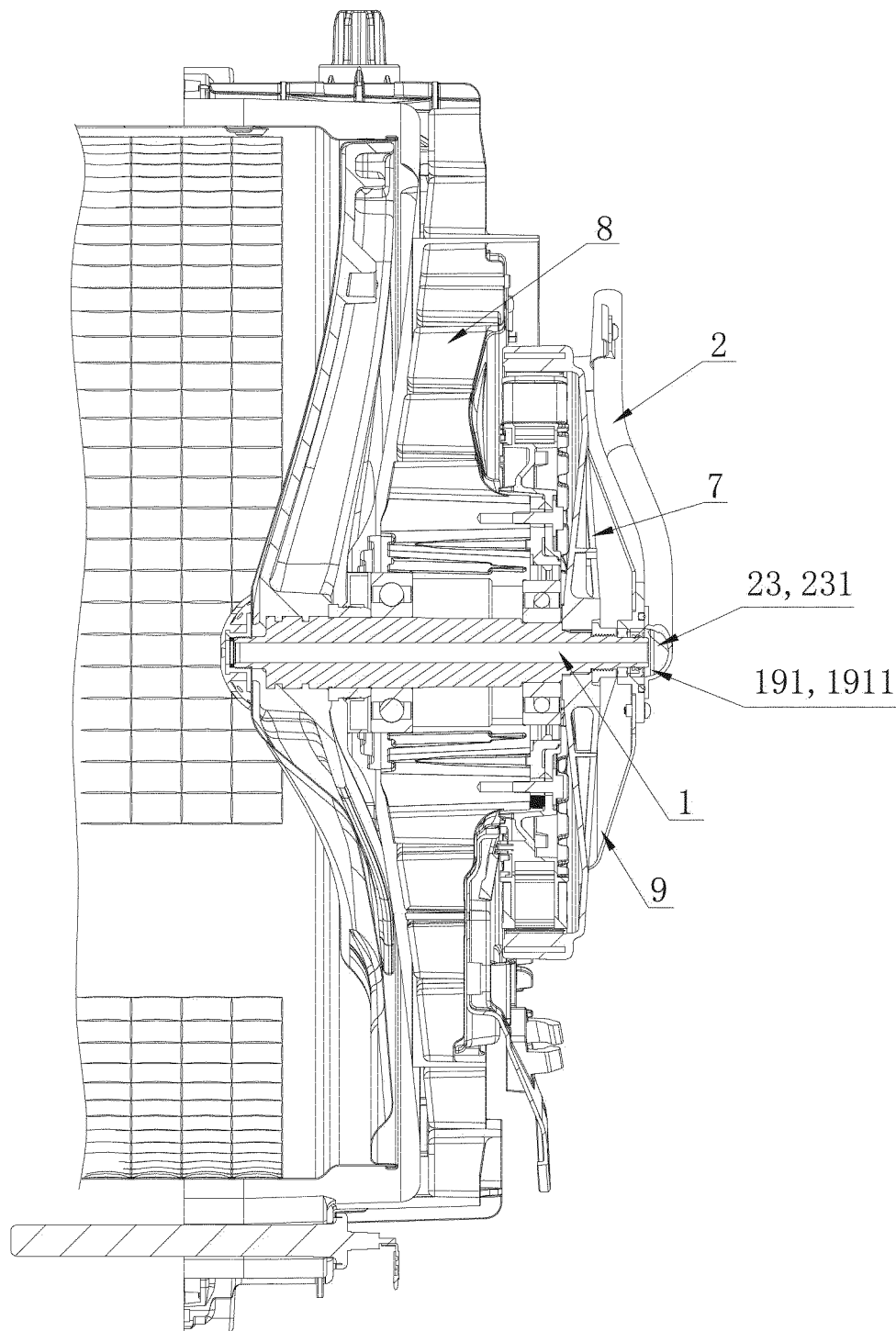


Fig. 1

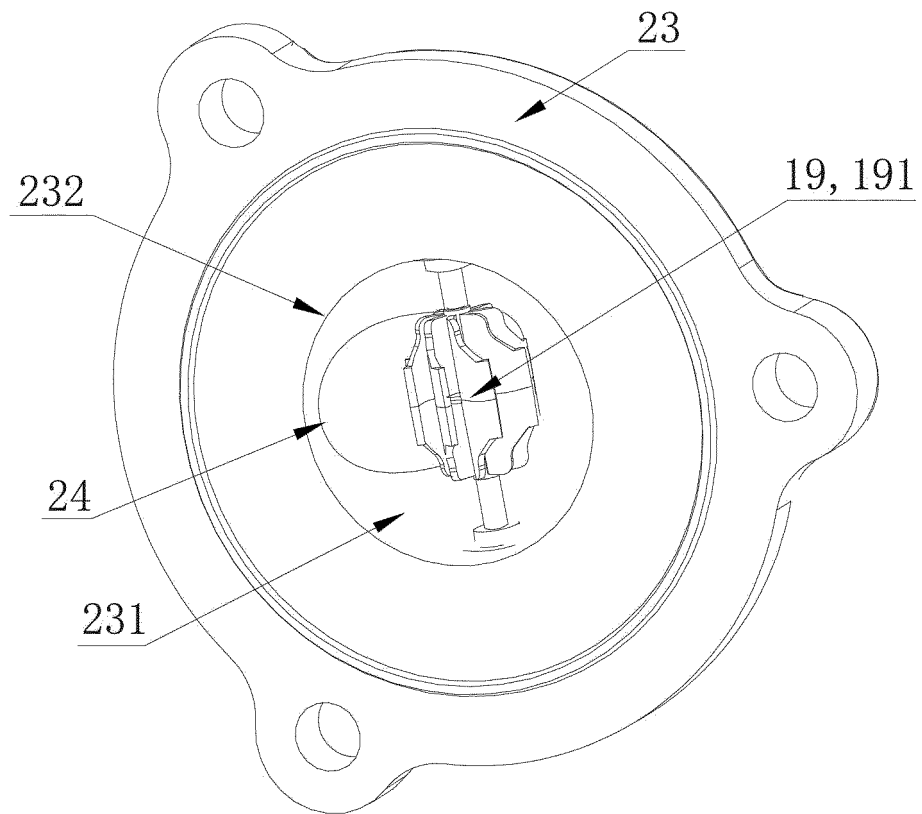


Fig. 2

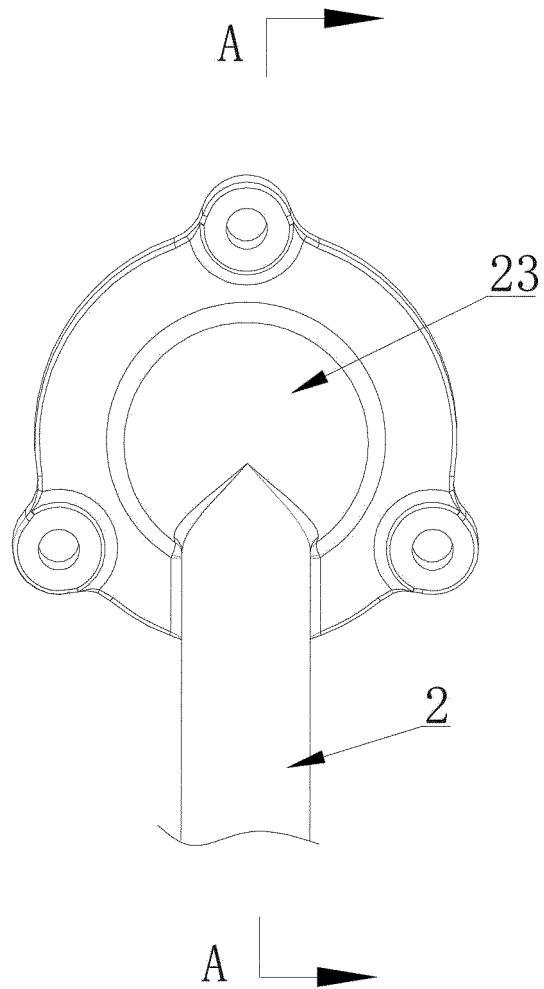


Fig. 3

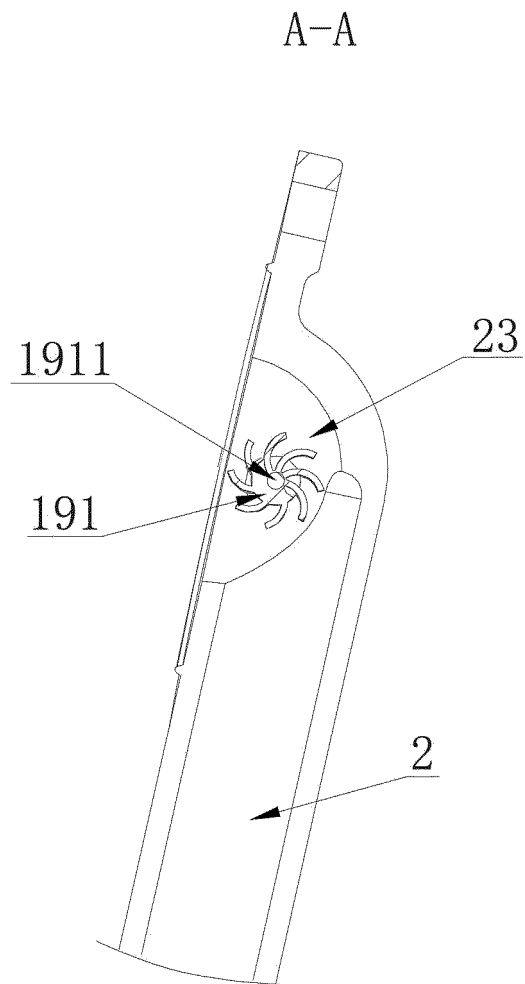


Fig. 4

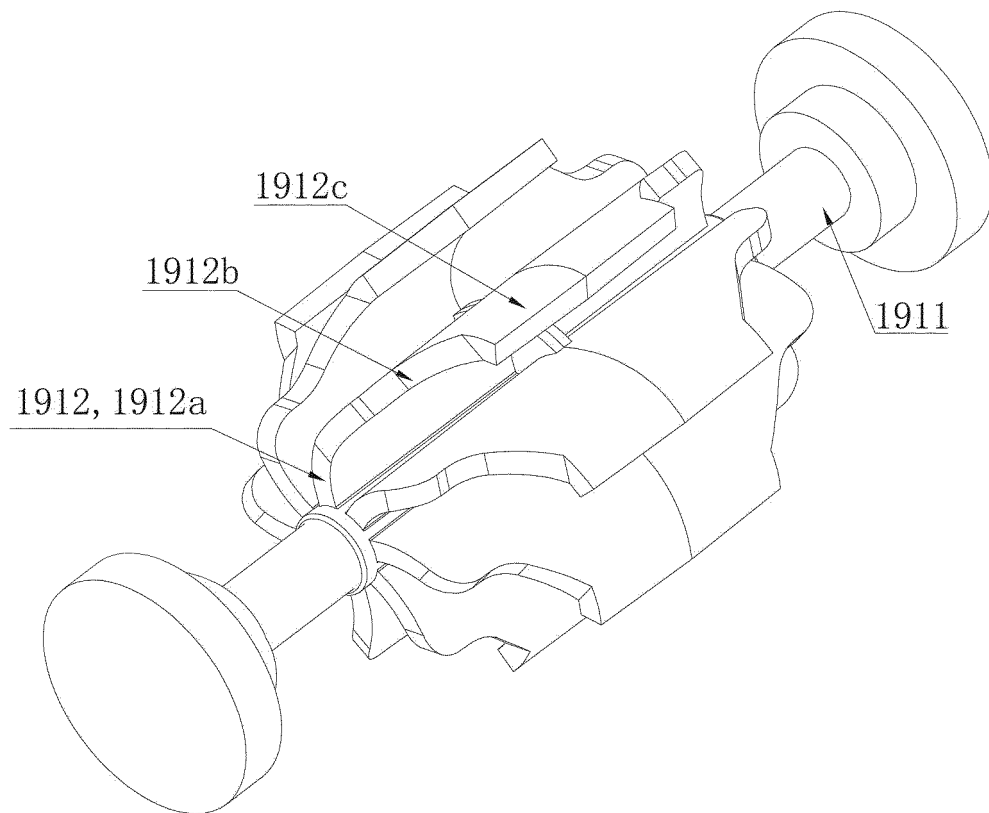


Fig. 5

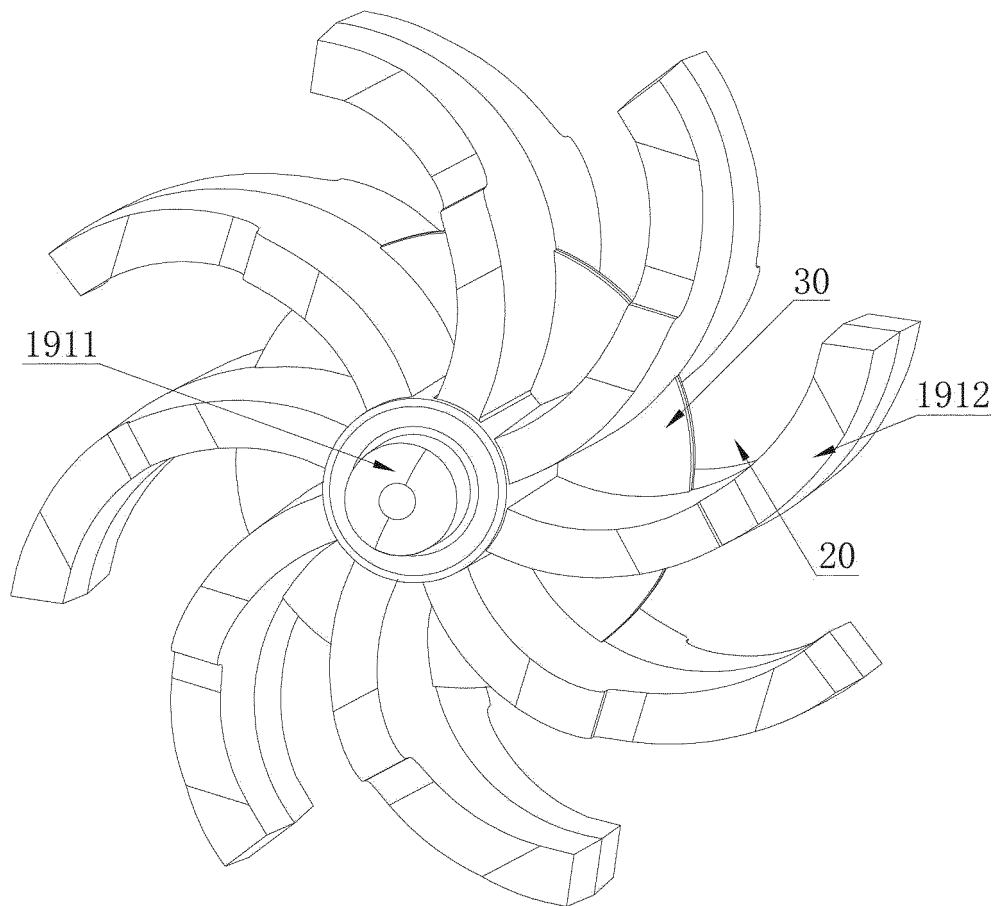


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/129310

A. CLASSIFICATION OF SUBJECT MATTER D06F 39/08(2006.01)i; D06F 39/02(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) CNPAT, EPODOC, WPI, CNKI: 海尔, 滚筒, 洗衣剂, 转接头, 腔, 搅动, 水轮, 洗涤剂, 洗衣液, 洗衣剂, 融合, 混合, 溶解, drum, washer, washing machine, antrum, cavity, agitate, chrun, water wheel, wash, scour, dissolve, melt.																								
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>CN 103911818 A (江苏神农灭菌设备有限公司) 09 July 2014 (2014-07-09) description, paragraphs 13-16, and figures 1-2</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 2320636 Y (WUXI LITTLE SWAN COMPANY LIMITED) 26 May 1999 (1999-05-26) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 105200723 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 105986432 A (HISENSE (SHANDONG) REFRIGERATOR CO., LTD.) 05 October 2016 (2016-10-05) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>JP 025997 A (TOSHIBA CORP.) 10 January 1990 (1990-01-10) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 105200725 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 203360855 U (李守林) 25 December 2013 (2013-12-25) entire document</td> <td>1-10</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	CN 103911818 A (江苏神农灭菌设备有限公司) 09 July 2014 (2014-07-09) description, paragraphs 13-16, and figures 1-2	1-10	A	CN 2320636 Y (WUXI LITTLE SWAN COMPANY LIMITED) 26 May 1999 (1999-05-26) entire document	1-10	A	CN 105200723 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document	1-10	A	CN 105986432 A (HISENSE (SHANDONG) REFRIGERATOR CO., LTD.) 05 October 2016 (2016-10-05) entire document	1-10	A	JP 025997 A (TOSHIBA CORP.) 10 January 1990 (1990-01-10) entire document	1-10	A	CN 105200725 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document	1-10	A	CN 203360855 U (李守林) 25 December 2013 (2013-12-25) entire document	1-10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																						
A	CN 103911818 A (江苏神农灭菌设备有限公司) 09 July 2014 (2014-07-09) description, paragraphs 13-16, and figures 1-2	1-10																						
A	CN 2320636 Y (WUXI LITTLE SWAN COMPANY LIMITED) 26 May 1999 (1999-05-26) entire document	1-10																						
A	CN 105200723 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document	1-10																						
A	CN 105986432 A (HISENSE (SHANDONG) REFRIGERATOR CO., LTD.) 05 October 2016 (2016-10-05) entire document	1-10																						
A	JP 025997 A (TOSHIBA CORP.) 10 January 1990 (1990-01-10) entire document	1-10																						
A	CN 105200725 A (WUXI LITTLE SWAN COMPANY LIMITED) 30 December 2015 (2015-12-30) entire document	1-10																						
A	CN 203360855 U (李守林) 25 December 2013 (2013-12-25) entire document	1-10																						
☐ 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 17 January 2022	Date of mailing of the international search report 27 January 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/CN2021/129310

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 103911818 A	09 July 2014	CN 103911818 B	27 January 2016
CN 2320636 Y	26 May 1999	None	
CN 105200723 A	30 December 2015	None	
CN 105986432 A	05 October 2016	None	
JP 025997 A	10 January 1990	SG 129192 G	12 March 1993
		JP H025997 A	10 January 1990
		KR 900000532 A	30 January 1990
		KR 920003334 B1	27 April 1992
		GB 8914297 D0	09 August 1989
		GB 2220007 A	28 December 1989
		GB 2220007 B	12 August 1992
		HK 18593 A	19 March 1993
CN 105200725 A	30 December 2015	None	
CN 203360855 U	25 December 2013	CN 102995348 A	27 March 2013
		CN 102995348 B	28 August 2013
		CN 202989557 U	12 June 2013
		CN 103276561 A	04 September 2013
		CN 103276561 B	28 October 2015

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