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(54) **LAUNDRY TREATMENT APPARATUS**

(57) A laundry treating apparatus comprises a laundry treating drum assembly and a front panel (1) located in front of the laundry treating drum assembly; the front panel (1) is provided with an opening for feeding laundry; an outer peripheral surface of the opening of the front panel (1) is concaved to form a installation space, and a door of the laundry treating apparatus is installed in the installation spaces; a washing additive feeding inlet (2) is arranged in the installation space; and by forming the washing additive feeding inlet (2) at the opening, the washing additive feeding inlet (2) can be opened/closed by the doors of the laundry treating apparatus, a user can feed washing additives conveniently, meanwhile, the washing additive feeding inlet (2) is formed in the installation space, thus, the integrated structure of the front panel (1) of the whole machine is retained, the front panel (1) is integrated and attractive favorably, and the structural strength of the front panel (1) is advantageously improved.

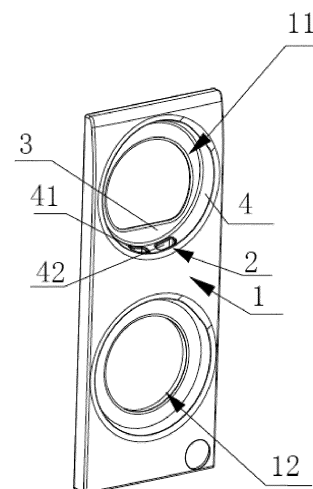


Fig. 2

Description

TECHNICAL FIELD

[0001] The disclosure relates to the field of household appliances, in particular to laundry treating apparatus.

BACKGROUND

[0002] With the development of the society, people have higher requirements on the appearance of household appliances. In highly competitive sales of household appliances, people choose the household appliance appearances they like. The structural design of household appliances affects whether the household appliances are salable. For existing laundry treating apparatus, front panels of existing washing machines are provided with openings used for allowing users to pull out a detergent drawer to put a detergent in, but in terms of appearance, the overall appearance of the laundry treating apparatus is affected, people cannot be satisfied with the appearance of household appliances easily, meanwhile, openings formed in the front panels of the laundry treating apparatus are not conducive to the structural stability of the front panels.

[0003] With the improvement of life quality, people are increasingly pursuing high-quality and exquisite life. Clothes dryers have been chosen by more and more ordinary households and have become one of the essential appliances for high-quality life. In ordinary households, the clothes dryers are usually stacked on drum washing machines, thus a simply stacked whole is formed, but since control panels of the clothes dryers are high, users cannot operate the clothes dryers conveniently, and the drum washing machines and the clothes dryers are provided with independent control systems and are inconvenient for users to operate and control.

[0004] For the convenience of users, twin laundry treating apparatus is born at the right moment, but much twin laundry treating apparatus is formed by stacking clothes dryers on washing machines, consequently, the appearance surface of the twin laundry treating apparatus is of a spliced structure, the consumer's requirement on the appearance of home appliances is difficult to meet, and washing drums and drying drums are inconvenient to control.

[0005] In the prior art, several openings are usually formed in front panels of laundry treating apparatus and comprise condenser picking and placing opening, a condenser air cooling duct air inlet, a washing additive storage box drawing opening and the like, which destroys the integrated exterior structure of the laundry treating apparatus, moreover, the strength of the front panels is reduced, and the problem that the front panels are liable to be deformed is caused.

[0006] Meanwhile, the twin laundry treating apparatus is high, if a washing additive feeding inlet is formed in the front panel surface, the design of an internal feeding

structure is not facilitated, if the washing additive feeding inlet is formed in the upper portion of the front panel, short users cannot feed a washing additive conveniently, if the washing additive feeding inlet is formed in the middle of the front panel, when the front panel is of an integrated structure, the structure of the front panel is severely affected, and the problem that the front panels are liable to be deformed is caused.

[0007] In view of this, the present disclosure is proposed.

SUMMARY

[0008] The technical problem to be solved by the present disclosure is to overcome the defects of the prior art, and the disclosure provides a laundry treating apparatus. Washing additive feeding inlet are arranged at one of openings so that the washing additive feeding inlet can be opened/closed by one of doors of the laundry treating apparatus, users can feed a washing additive conveniently, meanwhile, the washing additive feeding inlet are formed in one of the installation spaces, the integrated structure of a front panel of the whole machine is retained, thus, the front panel is integrated and attractive favorably, and the structural strength of the front panel is advantageously improved.

[0009] In order to solve the above technical problems, the basic conception of the technical solutions adopted by the present disclosure is as follows:

A laundry treating apparatus, comprising a laundry treating drum assembly and a front panel located in front of the laundry treating drum assembly, wherein the front panel is provided with an opening for feeding laundry, an outer peripheral surface of the opening of the front panel is concaved to form a installation space, a door of the laundry treating apparatus is installed in the installation space, and a washing additive feeding inlet is arranged in the installation space.

[0010] In the above solutions, by forming the washing additive feeding inlet at the opening, the washing additive feeding inlet can be opened/closed by the door of the laundry treating apparatus, users can feed a washing additive conveniently, meanwhile, the washing additive feeding inlet are formed in the installation space, a integrated structure of the front panel of the whole machine is retained, thus, the front panel is integrated and attractive favorably, and the structural strength of the front panel is advantageously improved.

[0011] Preferably, the washing additive feeding inlet is arranged in a bottom wall of the installation space, or the washing additive feeding inlet is arranged in a peripheral wall of the installation space.

[0012] In the above solutions, the opening is formed in the center of the bottom wall of the installation space, the

washing additive feeding inlet can also be formed in the bottom wall of the installation space and be located at the edge of the opening. In this way, when the door is closed, the door can close the opening and the washing additive feeding inlet simultaneously. On the other hand, the washing additive feeding inlet can also be formed in the peripheral wall of the installation space. When the door is closed, a circumferential end surface of the door closes the washing additive feeding inlet.

[0013] Preferably, the laundry treating apparatus comprises an automatic feeding device, the washing additive feeding inlet is communicated with a washing additive storage box of the automatic feeding device.

[0014] In the above solutions, the washing additive feeding inlet is communicated with the washing additive storage box in the laundry treating apparatus. Preferably, users can add washing additive into the washing additive storage box through the washing additive feeding inlet, and in the washing process, the automatic feeding device sucks an appropriate amount of washing additive from the washing additive storage box into the laundry treating drum.

[0015] On the other hand, the washing additive feeding inlet can also be used by a user to install a washing additive box into the automatic feeding device. The washing additive box is a box body for storing the washing additive. The washing additive storage box is designed as a limiting device capable of fixing the washing additive box. At least one storage space for holding the washing additive box is defined in the washing additive storage box, and a limiting structure is further arranged on the washing additive storage box for limiting movement of the washing additive box when the washing additive box is installed in the washing additive storage box.

[0016] In the above solution, the washing additive box is of a cuboid or cubic structure and comprises a liquid outlet, the liquid outlet is formed in a bottom of the cuboid/cubic structure, and a bottom wall of the washing additive storage box is vertically provided with a communication structures for enabling the liquid outlet to communicate with a feeding pipe of the laundry treating apparatus.

[0017] Preferably, the laundry treating drum assembly comprises a first laundry treating drum and a second laundry treating drum, and the front panel is provided with a first installation space and a second installation space corresponding to the first laundry treating drum and the second laundry treating drum in up-down direction respectively, and at least the first installation space is provided with the washing additive feeding inlet.

[0018] Preferably, the washing additive feeding inlet in the first installation space is configured to allow washing additive to be fed into the first laundry treating drum and/or the second laundry treating drum.

[0019] In the above solution, the washing additive feeding inlet is formed in the first installation space, and the

washing additive feeding inlet is used for allowing the washing additives to be fed into the first laundry treating drum only, or can also be used for allowing the washing additives to be fed into the second laundry treating drum only, or can also be used for allowing the washing additives to be fed into both the first laundry treating drum and the second laundry treating drum.

[0020] Preferably, the first laundry treating drum is a drying drum, the second laundry treating drum is a washing drum, the washing additive feeding inlet in the first installation space is configured to allow washing additive to be fed into the second laundry treating drum, and no washing additive feeding inlet is formed in the second installation space.

[0021] Preferably, the installation space comprises a circular groove matched with the door, and a groove bottom or a groove wall of the circular groove is provided with the washing additive feeding inlet, and the door is rotationally connected with the front panel in the installation space.

[0022] In the above solution, the door of the laundry treating apparatus is embedded in the circular groove, and a surface of the door and a surface of the front panel form a smooth front surface of the laundry treating apparatus.

[0023] Preferably, the opening is arranged in a center of the circular groove,

the groove bottom of the circular groove is located on a peripheral side of the opening, the washing additive feeding inlet is arranged in the groove bottom, and the washing additive feeding inlet is opened or closed by an inner side surface of the door when the door is opened or closed.

[0024] In the above solutions, the washing additive feeding inlet is arranged in a manner of facing the door, and the inner side surface of the door closes the washing additive feeding inlet.

[0025] Alternatively, the washing additive feeding inlet is arranged in the groove wall of the circular groove, and the washing additive feeding inlet is opened or closed by an outer peripheral end surface of the door when the door is opened or closed.

[0026] Preferably, the washing additive feeding inlet comprise at least two feeding holes, and the feeding holes are distributed in a circumferential direction of the groove wall of the circular groove;

preferably, the washing additive feeding inlet comprise a first feeding hole and a second feeding hole, and the first feeding hole and the second feeding hole are symmetrically arranged in the groove wall of the circular groove;

preferably, the first feeding hole and the second feeding hole are arranged in a bottom of the groove wall of the circular groove; and

preferably, the first feeding hole is communicated with a detergent storage box of the washing additive storage box of the automatic feeding device, and the second feeding hole is communicated with a softener

storage box of the washing additive storage box of the automatic feeding device.

[0027] In the above solution, the automatic feeding device comprises the detergent storage box and the softener storage box. One structure is formed as follows: the first feeding hole communicates with the detergent storage box and the second feeding hole communicates with the softener storage box, a user can directly feed corresponding washing additives into the detergent storage box and the softener storage box through the first feeding hole and the second feeding hole. Another structure is formed as follows: the detergent storage box and the softener storage box of the automatic feeding device are only used for holding a box body storing a detergent and a box body storing a softener; liquid outlets are formed in a bottoms of the box body storing the detergent and the box body storing the softener; the detergent storage box and the softener storage box are internally provided with communication structures correspondingly; and the communication structures are used for enabling the liquid outlets to communicate with the feeding pipes of the laundry treating apparatus.

[0028] Preferably, a distance between a lower edge, in the groove bottom of the circular groove, of the opening and the groove wall of the circular groove is greater than a distance between edges of other positions of the opening and the groove wall of the circular groove; preferably, the lower edge, in the groove bottom of the circular groove, of the opening is horizontally arranged, and the edges of other positions of the opening are arranged in an arc shape.

[0029] Preferably, a mounting table is arranged between the first laundry treating drum and the second laundry treating drum, and the washing additive storage box is mounted on the mounting table.

[0030] After adopting the above technical solutions, the laundry treating apparatus has the following beneficial effects compared with the prior art:

1. According to the laundry treating apparatus of the present disclosure, the washing additive feeding inlet is formed at the position of the opening so that the washing additive feeding inlet can be opened or closed by the door of the laundry treating apparatus, a user can feed a washing additive conveniently, and meanwhile, the washing additive feeding inlet is formed in the installation space, so that the integrated structure of the front panel of the whole machine is retained, thus, the front panel is integrated and attractive favorably, and the structural strength of the front panel is advantageously improved.

2. According to the laundry treating apparatus of the present disclosure, the opening is formed in the center of the bottom wall of one of the installation spaces, the washing additive feeding inlet can be formed in the bottom wall of the installation space and be located at the edge of the opening, and thus, when the door is closed, the door can close the opening and

the washing additive feeding inlet simultaneously. On the other hand, the washing additive feeding inlet can also be formed in the peripheral wall of the installation space, and thus, when the door is closed, the circumferential end surface of the door closes the washing additive feeding inlet.

3. According to the laundry treating apparatus of the present disclosure, the washing additive feeding inlet can also be used by a user to install the washing additive box into the automatic feeding device, the washing additive box is a box body for storing washing additives, the washing additive storage box is designed as a limiting device capable of fixing the washing additive box, at least one storage space for holding the washing additive box is defined in the washing additive storage box, and a limiting structure is further arranged on the washing additive storage box for limiting movement of the washing additive box when the washing additive box is installed in the washing additive storage box. Preferably, the washing additive box is of a cuboid or cubic structure and comprises the liquid outlets, the liquid outlets are formed in the bottom of the cuboid or cubic structure, and the bottom wall of the washing additive storage box is vertically provided with communication structures for enabling the liquid outlets to communicate with feeding pipes of the laundry treating apparatus.

[0031] The embodiments of the present disclosure will be described in further detail below in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] As a part of the application, the drawings are used to provide a further understanding of the disclosure. The schematic embodiments and descriptions of the disclosure are used to explain the disclosure, but do not constitute an improper limitation of the disclosure. Obviously, the drawings in the following description are only some embodiments. For those of ordinary skill in the art, other drawings can be obtained according to these drawings without any creative work. In the figures:

Fig. 1 is a schematic diagram of the laundry treating apparatus according to the present disclosure;
Fig. 2 is a schematic structural diagram of the front panel in Fig. 1;
Fig. 3 is another perspective view of Fig. 2.

[0033] Wherein: 1. Front panel; 11. First installation space; 12. Second installation space; 13. First door; 14. Second door; 2. Washing additive feeding inlet; 3. Groove bottom of circular groove; 4. Groove wall of circular groove; 41. First feeding hole; 42. Second feeding hole.

[0034] It should be noted that these drawings and text descriptions are not intended to limit the scope of the

concept of the present disclosure in any way, but rather to explain the concept of the present disclosure to those skilled in the art by referring to specific embodiments.

DETAILED DESCRIPTION

[0035] In order to make the objectives, technical solutions and advantages of the embodiments of the present disclosure clearer, the technical solutions in the embodiments will be described clearly and completely in combination with the drawings in the embodiments of the present disclosure. The following embodiments are used to illustrate the present disclosure, but not to limit the scope of the present disclosure.

[0036] In the description of the present disclosure, it should be noted that the orientations or positional relationships indicated by the terms "upper", "lower", "inner", "outer" and the like are based on the orientations or positional relationships shown in the drawings, and are only for the purpose of describing the present disclosure and simplifying the description, rather than indicating or implying that referred devices or elements must have a particular orientation, be constructed and operated in a particular orientation, and therefore the orientations or positional relationships cannot be understood as a limitation on the present disclosure.

[0037] In the description of the present disclosure, it should be noted that the terms "installation" and "connection" should be understood in a broad sense unless otherwise specified and limited, for example, connection may be fixed connection, detachable connections or integrated connection, may be mechanical connection or electrical connection, and may be direct connection or indirect connection through an intermediate medium. For those of ordinary skill in the art, the specific meanings of the above terms in the present disclosure can be understood on a case-by-case basis.

Embodiment 1

[0038] Referring to Figs. 1 to Figs. 3, the embodiment provides a laundry treating apparatus, comprising a laundry treating drum assembly and a front panel 1 located in front of the laundry treating drum assembly, wherein the front panel 1 is provided with an opening for feeding laundry, an outer peripheral surface of the opening of the front panel 1 is concaved to form a installation space, a door of the laundry treating apparatus is installed in the installation space, and a washing additive feeding inlet is arranged in the installation space 2.

[0039] In the above solutions, by forming the washing additive feeding inlet 2 at the opening, the washing additive feeding inlet 2 can be opened/closed by the door of the laundry treating apparatus, users can feed a washing additive conveniently, meanwhile, the washing additive feeding inlet 2 are formed in the installation space, a integrated structure of the front panel 1 of the whole machine is retained, thus, the front panel 1 is integrated

and attractive favorably, and the structural strength of the front panel 1 is advantageously improved.

[0040] Preferably, the washing additive feeding inlet 2 is arranged in a bottom wall of the installation space, or the washing additive feeding inlet 2 is arranged in a peripheral wall of the installation space.

[0041] In the above solutions, the opening is formed in the center of the bottom wall of the installation space, the washing additive feeding inlet 2 can also be formed in the bottom wall of the installation space and be located at the edge of the opening. In this way, when the door is closed, the door can close the opening and the washing additive feeding inlet 2 simultaneously. On the other hand, the washing additive feeding inlet 2 can also be formed in the peripheral wall of the installation space. When the door is closed, a circumferential end surface of the door closes the washing additive feeding inlet 2.

[0042] In an embodiment of the present disclosure, a washing additive storage box communicating with the laundry treating drum assembly of the laundry treating apparatus is arranged in the laundry treating apparatus, the laundry additive feeding inlet 2 communicates with the washing additive storage box for a user to feed washing additives into the washing additive storage box, a water inlet pipe of the laundry treating apparatus communicates with the washing additive storage box, in the washing process, water of the water inlet pipe flows into the washing additive storage box and washes the washing additives in the washing additive storage box into the laundry treating apparatus for laundry washing.

[0043] In another embodiment of the present disclosure, the laundry treating apparatus comprises an automatic feeding device, and the washing additive feeding inlet 2 communicates with a washing additive storage box of the automatic feeding device. The automatic feeding device further comprises the washing additive storage box, but the structure is different from that in the above embodiment, the washing additive feeding inlet 2 communicates with the washing additive storage box in the laundry treating apparatus, a user can add the washing additives into the washing additive storage box through the washing additive feeding inlet 2, wherein the washing additives that the user feeds into the washing additive storage box of the automatic feeding device is not only used for one-time washing, but the user can feed many washing additives. During the washing process, an appropriate amount of washing additives are sucked by the automatic feeding device from the washing additive storage box into the laundry treating drum assembly, through the structure design, the user can wash clothes conveniently without adding the washing additives each time.

[0044] In another embodiment of the present disclosure, the washing additive feeding inlet can also be used for a user to install a washing additive box into the automatic feeding device. The washing additive box is a box body for storing washing additives. The washing additive storage box is designed as a storage limiting device for

fixing the washing additive box, at least one storage space for holding the washing additive box is defined in the washing additive storage box, a limiting structure is further arranged on the washing additive storage box for limiting movement of the washing additive box when the washing additive box is installed in the washing additive storage box. Preferably, the washing additive box is of a cuboid or cubic structure and comprises liquid outlets, the liquid outlets are formed in the bottom of the cuboid or cubic structure, and the bottom wall of the washing additive storage box is vertically provided with communication structures for enabling the liquid outlets to communicate with feeding pipes of the laundry treating apparatus, so that when the washing additive box is stored and limited on the washing additive storage box through the washing additive feeding inlet 2, the communication structures on the washing additive storage box just enables the liquid outlets in the bottom of the washing additive box to communicate with the feeding pipes, then in the washing process, the automatic feeding device sucks the washing additives in the washing additive box through the feeding pipes and feeds the washing additives into the washing drum, preferably, the top of the washing additive box is further provided with a one-way ventilation valve for enabling the internal space to communicate with the outside atmosphere, and therefore the effect that the automatic feeding device sucks the washing additives from the washing additive box is ensured.

[0045] Preferably, the laundry treating drum assembly comprises a first laundry treating drum and a second laundry treating drum which are arranged in the up-down direction, a first installation space 11 and a second installation space which correspond to the first laundry treating drum and the second laundry treating drum respectively are arranged on the front panel 1 in the up-down direction, and at least the first installation space 11 is provided with the washing additive feeding inlet 2. The first installation space 11 is provided with a first door 13, and the second installation space 12 is provided with a second door 14.

[0046] Preferably, the washing additive feeding inlet 2 in the first installation space 11 is configured to allow the washing additives to be fed into the first laundry treating drum and/or the second laundry treating drum.

[0047] In the above solution, the washing additive feeding inlet 2 is formed in the first installation space 11, and the washing additive feeding inlet 2 is configured to allow the washing additives to be fed only into the first laundry treating drum, or can also be used for allowing the washing additives to be fed only into the second laundry treating drum, or can also be used for allowing the washing additives to be fed into both the first laundry treating drum and the second laundry treating drum.

[0048] Preferably, the first laundry treating drum is a drying drum, the second laundry treating drum is a washing drum, the washing additive feeding inlet 2 in the first installation space 11 is configured to allow the washing additives to be fed into the second laundry treating drum,

and no washing additive feeding inlet 2 is formed in the second installation space 12. The washing additive feeding inlet 2 of the second laundry treating drum at a lower position is formed in the first installation space 11 at a higher position, and the height position just matches the height of ordinary users, which can easily be used by users, the user experience is good, after the first door 13 is closed, the washing additive feeding inlet 2 is hidden by the first door 13, so that the appearance of the laundry treating apparatus is integrated, and the texture is improved.

[0049] Preferably, the installation space comprises a circular groove matched with the door of the laundry treating apparatus, the groove bottom 3 or the groove wall 4 of the circular groove is provided with the washing additive feeding inlet 2, and the door is rotationally connected with the front panel 1 in the installation space.

[0050] In the above solution, the door of the laundry treating apparatus is embedded in the circular groove, and the surface of the door and the surface of the front panel 1 form a smooth front surface of the laundry treating apparatus.

[0051] Preferably, the opening is formed in the center of the circular groove, the washing additive feeding inlet 2 is arranged at the groove bottom 3 of the circular groove and located on the peripheral side of the opening, and when the door is opened or closed, the inner side surface of the door opens or closes the washing additive feeding inlet 2.

[0052] In the above solution, the washing additive feeding inlet 2 is arranged in a manner of facing the door, and the inner side surface of the door closes the washing additive feeding inlet 2.

[0053] Alternatively, the groove wall 4 of the circular groove is provided with the washing additive feeding inlet 2, and when the door is opened or closed, the outer peripheral end surface of the door opens or closes the washing additive feeding inlet 2.

[0054] Preferably, the washing additive feeding inlet 2 comprise at least two feeding holes, and the feeding holes are distributed in the circumferential direction of the groove wall 4 of the circular groove.

[0055] Preferably, the washing additive feeding inlet 2 comprise a first feeding hole 41 and a second feeding hole 42, and the first feeding hole 41 and the second feeding hole 42 are symmetrically formed in the groove wall 4 of the circular groove.

[0056] Preferably, the first feeding hole 41 and the second feeding hole 42 are formed in the bottom position of the groove wall 4 of the circular groove; and by forming the feeding holes in the bottom position of the groove wall 4 of the circular groove, a user can feed the washing additives conveniently.

[0057] Preferably, the first feeding hole 41 communicates with a detergent storage box of the washing additive storage box of the automatic feeding device, and the second feeding hole 42 communicates with a softener storage box of the washing additive storage box of the

automatic feeding device.

[0058] In the above solution, the automatic feeding device comprises a detergent storage box and a softener storage box. One structure is formed as follows: the first feeding hole 41 communicates with the detergent compartment and the second feeding hole 42 communicates with the softener compartment, a user can directly feed corresponding washing additives into the detergent storage box and the softener storage box through the first feeding hole 41 and the second feeding hole 42. Both the detergent storage box and the softener storage box communicate with an outer drum of the laundry treating drum assembly. The laundry treating drum assembly comprises the outer drum and an inner drum rotationally arranged in the outer drum. Another structure is formed as follows: the detergent storage box and the softener storage box of the automatic feeding device are only used for holding a box body storing a detergent and a box body storing a softener; liquid outlets are formed in the bottoms of the box body storing the detergent and the box body storing the softener; the detergent storage box and the softener storage box are internally provided with communication structures correspondingly; and the communication structures are used for enabling the liquid outlets to communicate with feeding pipes of the laundry treating apparatus.

[0059] Preferably, the distance between the lower edge, in the groove bottom 3 of the circular groove, of the opening and the groove wall of the circular groove is greater than the distance between the edges of other positions of the opening and the groove wall of the circular groove.

[0060] Preferably, the lower edge, in the groove bottom 3 of the circular groove, of the opening is horizontally arranged, and the edges of other positions of the opening are arranged in an arc shape.

[0061] Preferably, a mounting table is further arranged between the first laundry treating drum and the second laundry treating drum, and the washing additive storage box is mounted on the mounting table. The washing additive storage box is installed on the mounting table and located above the second laundry treating drum, and the washing additives can be fed into the second laundry treating drum conveniently.

Embodiment 2

[0062] The second embodiment further discloses the laundry treating apparatus based on the first embodiment. The laundry treating apparatus comprises the first laundry treating drum, the second laundry treating drum, and the front panel which is located in front of the first laundry treating drum and the second laundry treating drum and covers the first laundry treating drum and the second laundry treating drum, wherein the first laundry treating drum and the second laundry treating drum are arranged in the up-down direction. The front panel is provided with the first door and the second door which are

arranged in the up-down direction, and at least one door is provided with a control panel assembly.

[0063] In the above solution, according to the characteristics of the twin-tub laundry treating apparatus, the control panel assembly is arranged on the higher door, the user can view a screen of the control panel assembly conveniently, and the user can input control instructions through the control panel assembly conveniently. The structure design is more suitable for the twin-tub laundry treating apparatus, and the user experience is good.

[0064] Preferably, the first door or the second door comprises a door body and an observation window installed in a hollow position on the door body, an installation space is arranged above the observation window on the door body, and the control panel assembly is installed in the installation space at a position higher than the observation window.

[0065] In the above solution, the installation position of the control panel assembly is higher than that of the observation window, and thus the effect that the user views the internal condition of the laundry treating apparatus is not affected.

[0066] Preferably, the door body comprises an outer frame and an inner frame, and the outer frame and the inner frame are installed integrally to form a main frame of the door. The centers of the outer frame and the inner frame are provided with avoiding ports for installation and avoiding the observation window, and the portions, above the avoiding ports, of the outer frame and the inner frame are correspondingly provided with slots for forming an installation space used for installing the control panel assembly.

[0067] Preferably, the door body further comprises a window screen covering the surface of the outer frame and shielding the whole outer surface of the door. The upper portion of the window screen is provided with an opening corresponding to the slot in the outer frame. The control panel assembly comprises a control panel. The control panel is mounted on the opening.

[0068] In the above solution, the control panel of the control panel assembly is installed on the opening and fixed to the window screen, the appearance is exquisite, the height is moderate, and the user can view conditions and operate the equipment conveniently.

[0069] Preferably, the control panel assembly comprises a shell with one side open, a control panel arranged at the open end of the shell, and a computer board installed in the shell, and the control panel extends into the installation space through the slot in the inner frame and is mounted and fixed on the opening in the window screen.

[0070] Preferably, the surface of the end, opposite to the control panel, of the shell protrudes towards the periphery to form a fixing portion, a peripheral surface of the slot in the surface of the inner frame is recessed to form a mounting portion for accommodating and fixing the fixing portion, and the fixing portion is attached into the mounting portion and fixed on the mounting portion

through a fastener.

[0071] Preferably, the fixing portion is of a sheet structure, and a thickness of the fixing portion matches with a recessed depth of the mounting portion, so that when the fixing portion is mounted on the mounting portion, a surface, exposed out of the outer frame, of the control panel assembly is in smooth transition with the surface of the outer frame. Preferably, the front panel is a whole piece of platy structure covering the first laundry treating drum and the second laundry treating drum, the installation space is arranged on the first door, the control panel assembly is embedded in the installation space and fixed to the first door, and the surface, exposed out of the first door, of the control panel assembly is in smooth transition with the surface of the first door.

[0072] In the above solution, the outer side surface, exposed out of the first door, of the control panel assembly is in smooth transition with the outer side surface of the first door, the inner side surface, exposed out of the first door, of the control panel assembly is in smooth transition with the inner side surface of the first door, through the structural design, whether the first door is closed or opened, the control panel assembly is integrated with the first door visually, the appearance is exquisite, and the texture is good.

[0073] Preferably, the openings are formed in the front panel, and the peripheral surfaces of the openings are recessed to form door installation spaces, and the doors of the laundry treating apparatus are embedded in the door installation spaces and connected to the front panel so as to open or close the openings; and the doors, the control panel and the front panel of the laundry treating apparatus form a smooth front surface of the laundry treating apparatus.

[0074] In the above solution, the front panel is provided with a first door installation space and a second door installation space which correspond to the first laundry treating drum and the second laundry treating drum respectively, wherein the control panel assembly is installed on the first door.

[0075] Preferably, the cross-sectional profile of the front panel from top to bottom is a smooth line that gradually transits from a curve to a straight line segment, the door surfaces are in smooth transition with the front panel on the peripheral sides of the doors, and a control panel of the control panel assembly is in smooth transition with the surface of the first door.

[0076] In the above aspect, the control panel is a touch display and comprises a touch display body and a touch film covering a surface of the touch display body, and the touch film is in smooth transition with the surface of the first door.

[0077] Preferably, at least the first door is partially configured as a curved structure which is curved toward the back side of the laundry treating apparatus or a planar structure which is inclined toward the back side of the laundry treating apparatus; and the first laundry treating drum and the second laundry treating drum share the

control panel assembly, and the control panel assembly is arranged on the curved structure or the planar structure.

[0078] Preferably, the curved structure on the first door is located on the upper portion of the door, the first door is provided with a planar structure or curved structure below the curved structure, and the control panel assembly is arranged on the curved structure on the upper portion of the first door, and the surface of the control panel assembly has the same curvature or the same inclination angle as the surface of the first door on the peripheral side of the control panel assembly.

Embodiment 3

[0079] Based on the above embodiments, the other structures of the laundry treating apparatus are further designed to achieve the technical effect of the integral front panel in the embodiment 3, specifically:

In the embodiment 3, the laundry treating apparatus comprises the first laundry treating drum and the second laundry treating drum which are arranged in the up-down direction. The laundry treating apparatus is further internally provided with a drying module for supplying drying air to the laundry treating apparatus to dry laundries.

[0080] Further, the drying module is a condenser drying module comprising a base, a condenser arranged on the base, and a cooling path arranged on the base for cooling the condenser, and the condenser is connected with a drying path of the laundry treating apparatus. A side plate or a rear cover plate of a shell of the laundry treating apparatus is provided with an air inlet for introducing air into the cooling path; and by forming the air inlet for the cooling path in the side plate or the rear cover plate of the laundry treating apparatus, an integrated structure of the front panel of the whole machine is retained, so that the front panel is integrated, the aesthetics of the front panel is facilitated, the aesthetics of the laundry treating apparatus is significantly improved, and the structural strength of the front panel is advantageously improved by forming the air inlet in the side plate or the rear cover plate.

[0081] Preferably, the cooling path comprises a volute, the volute is installed on the base and is close to the side plate, provided with the air inlet, of the shell, and an air inlet port of the volute is opposite to the air inlet. Wherein, the air inlet can be circular or square, and the air inlet port of the volute is coaxial with the air inlet, so that the air intake efficiency of the air inlet is improved.

[0082] Preferably, the cooling path further comprises an air duct upper shell, and the air duct upper shell is installed on the base, and an air duct for enabling an air outlet port of the volute to communicate with the condenser is formed between the air duct upper shell and the base.

[0083] Preferably, the base is provided with a condenser mounting groove and a groove gradually extending from the air outlet port of the volute to the condenser

mounting groove, and the air duct upper shell is installed at the tops of the groove and the condenser mounting groove to form the cooling path.

[0084] In the above solution, by forming the groove in the base, the installation height of the condenser is advantageously reduced, and an internal space occupied by the base and the condenser in the laundry treating apparatus is reduced.

[0085] Preferably, the air duct upper shell comprises a first shell covering the condenser, and a second shell which is connected to the first shell, covers the top of the groove and is used for enabling the air outlet port of the volute to communicate with the condenser.

[0086] In the above solution, by arranging the air duct upper shell as the first shell and the second shell which are connected to each other, so that the structure of the air duct is simple, the first shell is designed as a flared structure for facilitating spreading cooling air to the whole condenser, the second shell is designed as a box structure arranged in the length direction of the condenser, one end, connected to the volute, of the first shell is a small end, and another end, connected to the second shell is a flared wild-mouth end, so that cooling air cools the condenser comprehensively and favorably, and the drying effect on hot and humid air is improved.

[0087] The structure of the first shell matches with the structure of the condenser, and the structure of the second shell matches with the structure of the groove.

[0088] In the above solution, the first shell is designed as a box structure arranged in the length direction of the condenser, the groove is designed as a trapezoidal structure with an air duct being gradually expanded, and the second shell is designed as a shell structure matched with the groove in shape and mounted at the top of the groove.

[0089] Preferably, the volute further comprises an air outlet port, the air outlet port of the volute is opposite to the air inlet port of the volute, and the second shell extends in the direction of the air outlet port of the volute.

[0090] In the above solution, the volute is designed as a side plate of which the air inlet port facing the laundry treating apparatus, and the air outlet port is opposite to the air inlet port, that is, the air outlet port of the volute faces another side plate of the laundry treating apparatus. An air inlet end of the second shell is connected with the air outlet port of the volute, and extends in the direction of the air outlet port of the volute, thus, the cooling air flow resistance is reduced, and the cooling efficiency of the condenser is improved.

[0091] Preferably, an air outlet used for discharging air subjected to heat exchange with the condenser out of the cooling path is formed in the side plate or the rear cover plate and directly faces the condenser, or the air outlet for the cooling path is formed in the shell and used for directly discharging air subjected to heat exchange into a space between the shell and the laundry treating drum.

[0092] In the above solution, the air outlet corresponds

to the condenser in position, so that the cooling air flow resistance is reduced, the cooling efficiency of the condenser is improved, meanwhile, the energy consumption of a volute fan is advantageously reduced, preferably, no air outlet for the cooling path is formed in the shell, and the structural strength of the shell is favorably improved.

[0093] Preferably, the air inlet is formed in a side plate on one side of the shell, and the air outlet is formed in a side plate on the other side of the shell.

[0094] Preferably, the air inlet and/or air outlet are/is provided with an air direction adjustment filtering device.

[0095] Preferably, the inlet air adjustment filtering device is a shutter structure.

[0096] Preferably, the base is installed between the first laundry treating drum and the second laundry treating drum.

[0097] In the above solution, the base is arranged between the first laundry treating drum and the second laundry treating drum according to the characteristics of the twin-tub washing machine, so that the internal space of the laundry treating apparatus is saved. Compared with the mode that the base is arranged at the bottom of the drying drum in the prior art, by arranging the base between the first laundry treating drum and the second laundry treating drum, the installation height of the condenser is increased, and the condenser is convenient to install and dismount.

[0098] Furthermore, the laundry treating apparatus comprises a rear support, a rear end of the laundry treating apparatus is mounted on the rear support, and the laundry treating apparatus communicates with a condensation drying module; the rear support is provided with an opening allowing the condenser to be inserted and installed in the base. In the embodiment, by forming the opening in a back side of the laundry treating apparatus, the integrated structure of the front panel of the whole machine is retained, so that the front panel is integrated, the aesthetics of the front panel is facilitated, the aesthetics of the laundry treating apparatus is significantly improved, and the structural strength of the front panel is advantageously improved by forming the opening in the rear support.

[0099] Preferably, a condenser fixing base is arranged on the opening, and the condenser fixing base fixes the condenser when the condenser is inserted and installed on the base.

[0100] In the above solution, the condenser fixing base is matched with a corresponding end of the condenser in shape. When the condenser is installed on the base, the condenser fixing base and the corresponding end of the condenser are in hermetical connection, so that drying air is prevented from leaking therefrom.

[0101] Preferably, the condenser fixing base is an independent piece and is fixed at the opening of the rear support through a fastener.

[0102] Preferably, the condenser is provided with clamping members, and the condenser fixing base is provided with clamping slots. When the condenser is insert-

ed and installed on the base, the clamping members are fixedly clamped and connected with the clamping slots.

[0103] Preferably, the condenser fixing base comprises a body, a mounting port is formed in a center of the body, screw bases are arranged on a periphery of the body and fixed to the rear support through screws, one end of the condenser is inserted and installed on the base through the mounting port, and another end of the condenser is provided with a plurality of rotatable clamping members. A side wall of the mounting port is provided with clamping slots corresponding to the clamping members, and the clamping members and the clamping slots are clamped and fixed by adjusting the position of the clamping members.

[0104] Preferably, the condenser is of a cuboid structure, four corners of an end face of one end of the cuboid structure are provided with the clamping members correspondingly, the side wall of the mounting port are provided with clamping grooves corresponding to the clamping members in position, each clamping slot is provided with at least one slot opening facing the center of the mounting port, and the slot openings are used for clamping and fixing the condenser when the clamping members are rotated into the clamping slots.

[0105] In the above solution, the clamping portions of the clamping members can be rotationally clamped into the clamping slots or can be separated from the clamping slots rotationally, and the condenser can be stably fixed by arranging the clamping members at the four corners of the end face of one end of the cuboid structure.

[0106] Preferably, a rear cover plate is detachably installed on the rear support, and the rear cover plate covers an outer surface of the rear support.

[0107] In the above solution, since the opening is formed in the rear support, the appearance of the rear portion of the laundry treating apparatus is affected, the rear cover plate is further detachably arranged on the rear support, and the rear cover plate covers the opening, so that the appearance of the whole machine is integrated, and comprehensive integral design of the laundry treating apparatus is facilitated.

[0108] The base is arranged between the first laundry treating drum and the second laundry treating drum according to the characteristics of the twin-tub washing machine, the internal space of the laundry treating apparatus is saved. Compared with the mode that the base is arranged at the bottom of the drying drum in the prior art, by arranging the base between the first laundry treating drum and the second laundry treating drum, the installation height of the condenser is increased, and the condenser is convenient to install and dismount.

[0109] Preferably, a back of the laundry treating apparatus is provided with a first rear support corresponding to the first laundry treating drum, and the back of the laundry treating apparatus is provided with a second rear support corresponding to the second laundry treating drum, wherein the opening is formed in the first rear support.

[0110] In the above solution, the opening is formed in the first rear support, the height of the opening is increased, and a user can install and dismount the condenser conveniently.

[0111] Preferably, the laundry treating apparatus is provided with a first rear cover plate and a second rear cover plate corresponding to the first rear support and the second rear support respectively, and the first rear cover plate covers an outer surface of the first rear support, and the second rear cover plate covers an outer surface of the second rear support.

[0112] In the above solution, the first rear cover plate covers the first rear support and also covers the opening in the first rear support, the second rear cover plate covers the second rear support, and thus the first rear cover plate and the second rear cover plate can cooperate with each other to cover the entire back of the laundry treating apparatus. The back side of the laundry treating apparatus generally faces the wall, so that the appearance requirement on the back is low.

[0113] On the other hand, compared with the mode that only one cover plate is arranged, the user can install and dismount the condenser more favorably by arranging the first rear cover plate and the second rear cover plate. In the actual dismounting process, the user can replace the condenser by dismounting the first rear cover plate only, while the second rear cover plate does not need to be dismounted, and therefore the difficulty of replacing the condenser is greatly reduced.

[0114] Preferably, the opening is formed in an edge of one side of the rear support, a condenser installation cavity is formed in the base corresponding to the opening, and an installation opening of the condenser installation cavity is formed in the rear side of the base and is directly opposite to the opening.

[0115] In the above solution, by forming the opening in the edge of one side of the rear support, the condenser is installed at the position, close to the edge of the left side or right side of the laundry treating apparatus, between the first laundry treating drum and the second laundry treating drum, according to the structure of the first laundry treating drum and the second laundry treating drum, the gap, close to the edges of the left side and the right edge, between the first laundry treating drum and the second laundry treating drum is the largest, the opening is formed in the edge of one side of the rear support, and the condenser is just installed at the position, therefore, the structural characteristics of the twin-tub laundry treating apparatus are fully utilized, and the internal space of the twin laundry treating apparatus is saved.

[0116] Preferably, the condenser is of a cuboid structure, and is parallel to the axes of the two laundry treating drums.

[0117] In the above solution, the condenser is designed as a cuboid structure, and is parallel to the axes of the two laundry treating drums, so that the internal space of the laundry treating apparatus is saved.

[0118] Preferably, the base is further provided with a

condenser cooling path, and the air inlet port of the condenser cooling path is arranged on a side surface or a back of the laundry treating apparatus.

[0119] In the above solution, the air inlet port of the cooling path is arranged on the side surface or the back of the laundry treating apparatus, and the integrated structure of the front panel of the whole machine is also retained, so that the front panel is integrated, the aesthetics of the front panel is improved, the aesthetic aspect of the laundry treating apparatus is significantly improved, and the structural strength of the front panel is advantageously improved.

[0120] The embodiments described above are only preferred embodiments of the present disclosure, and are not intended to limit the present disclosure in any form. Although the present disclosure has been disclosed as above with the preferred embodiments, it is not intended to limit the present disclosure. Any person skilled in the patent can make use of the above-mentioned technical content to make minor changes or modifications to equivalent embodiments without departing from the technical solutions of the present disclosure. Any simple changes, equivalent changes and modifications made to the above embodiments according to the technical essence of the present disclosure still fall within the scope of the solutions of the present disclosure.

Claims

1. A laundry treating apparatus, comprising a laundry treating drum assembly and a front panel located in front of the laundry treating drum assembly, wherein the front panel is provided with an opening for feeding laundry, an outer peripheral surface of the opening of the front panel is concaved to form an installation space, a door of the laundry treating apparatus is installed in the installation space, and a washing additive feeding inlet is arranged in the installation space.
2. The laundry treating apparatus according to claim 1, wherein the washing additive feeding inlet is arranged in a bottom wall of the installation space, or the washing additive feeding inlet is arranged in a peripheral wall of the installation space.
3. The laundry treating apparatus according to claim 1 or 2, wherein the laundry treating apparatus comprising an automatic feeding device, the washing additive feeding inlet is communicated with a washing additive storage box of the automatic feeding device.
4. The laundry treating apparatus according to any one of claims 1-3, wherein the laundry treating drum assembly comprise a first laundry treating drum and a second laundry treating drum, and the front panel is provided with a first installation space and a second installation space corresponding to the first laundry treating drum and the second laundry treating drum in up-down direction respectively, and at least the first installation space is provided with the washing additive feeding inlet.
5. The laundry treating apparatus according to claim 4, wherein the washing additive feeding inlet in the first installation space is configured to allow washing additive to be fed into the first laundry treating drum and/or the second laundry treating drum; preferably, the first laundry treating drum is as a drying drum, the second laundry treating drum is as a washing drum, and the washing additive feeding inlet in the first installation space is configured to allow washing additive to be fed into the second laundry treating drum.
6. The laundry treating apparatus according to any one of claims 1-5, wherein the installation space comprises a circular groove matched with the door, and a groove bottom or a groove wall of the circular groove is provided with the washing additive feeding inlet, and the door is rotationally connected with the front panel in the installation space.
7. The laundry treating apparatus according to claim 6, wherein the opening for feeding laundry is arranged in a center of the circular groove, the groove bottom of the circular groove is located on a peripheral side of the opening for feeding laundry, the washing additive feeding inlet is arranged in the groove bottom, and the washing additive feeding inlet is opened or closed by an inner side surface of the door when the door is opened or closed; or, the washing additive feeding inlet is arranged in the groove wall of the circular groove, and the washing additive feeding inlet is opened or closed by an outer peripheral end surface of the door when the door is opened or closed.
8. The laundry treating apparatus according to claim 6 or 7, wherein the washing additive feeding inlet comprise at least two feeding holes, and the feeding holes are distributed in a circumferential direction of the groove wall of the circular groove; preferably, the washing additive feeding inlet comprise a first feeding hole and a second feeding hole, and the first feeding hole and the second feeding hole are symmetrically arranged in the groove wall of the circular groove; preferably, the first feeding hole and the second feeding hole are arranged in a bottom of the groove

wall of the circular groove; and preferably, the first feeding hole is communicated with a detergent storage box of the washing additive storage box of the automatic feeding device, and the second feeding hole is communicated with a softener storage box of the washing additive storage box of the automatic feeding device. 5

9. The laundry treating apparatus according to any one of claims 6 to 8, wherein a distance between a lower edge, in the groove bottom of the circular groove, of the opening and the groove wall of the circular groove is greater than a distance between edges of other positions of the opening and the groove wall of the circular groove; 10 15 preferably, the lower edge, in the groove bottom of the circular groove, of the opening is horizontally arranged, and the edges of other positions of the opening are arranged in an arc shape. 20

10. The laundry treating apparatus according to any one of claims 1 to 9, wherein a mounting table is arranged between the first laundry treating drum and the second laundry treating drum, and the washing additive storage box is mounted on the mounting table. 25

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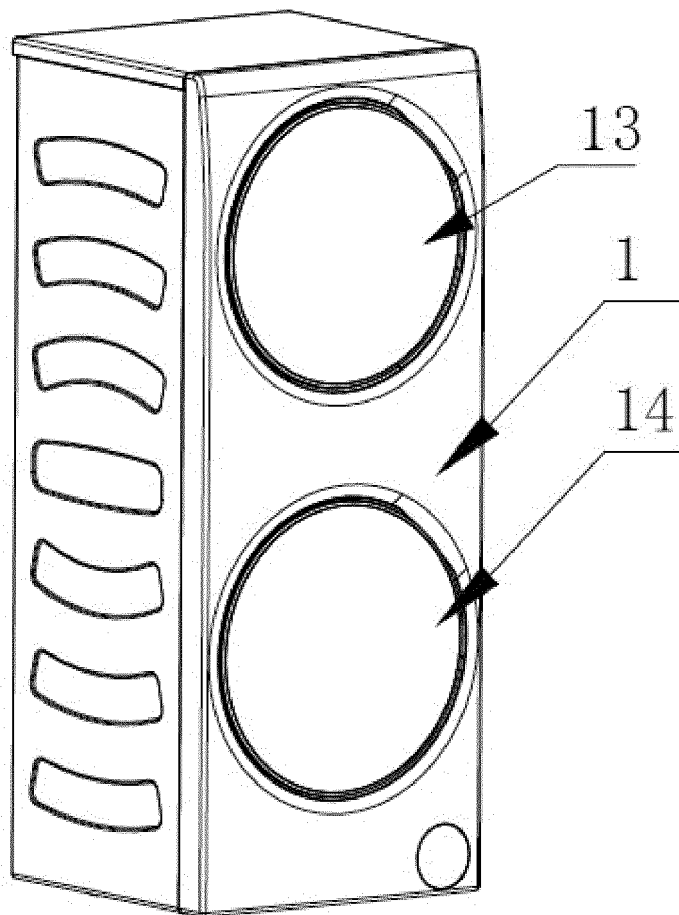


Fig. 1

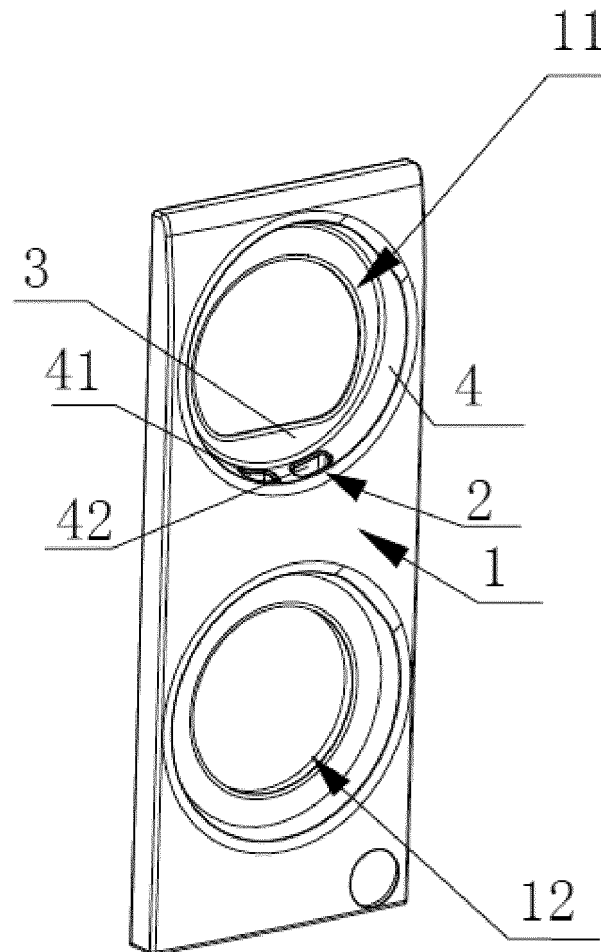


Fig. 2

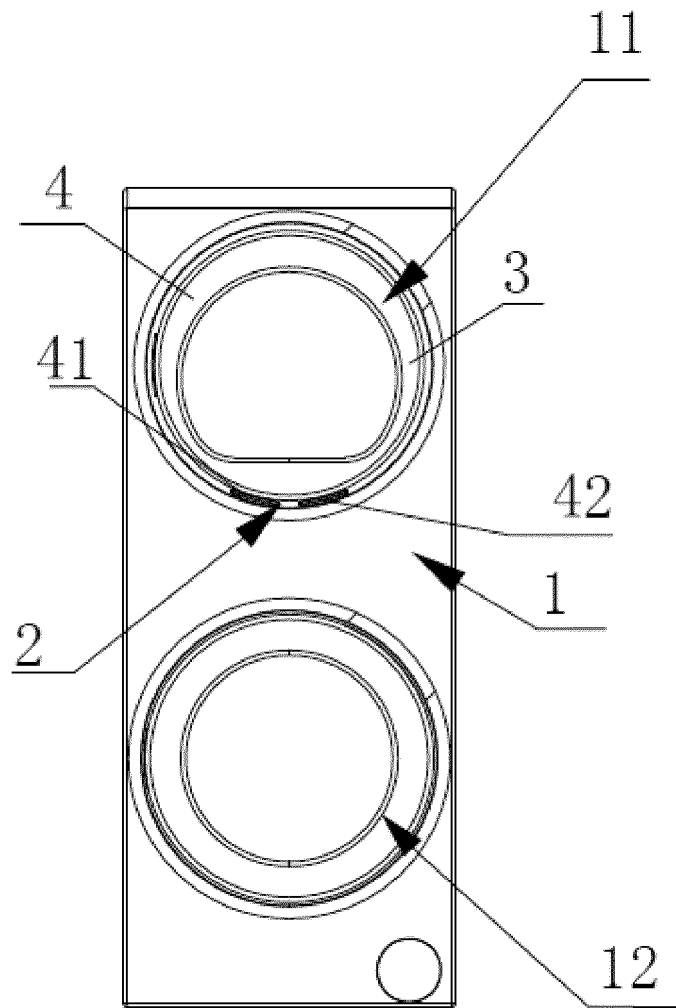


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/103877

5	A. CLASSIFICATION OF SUBJECT MATTER D06F 39/02(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC		
10	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		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNKI, CNPAT, WPI, EPODOC: 海尔, 李文伟, 前面板, 洗衣机, 洗涤剂, 投放口, 添加, 盒体, 存放盒, washer, washing, clothing, front, panel, inward, plate, structure, cover, automatic, bucket, detergent		
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Y	CN 103850085 A (HEFEI RONGSHIDA SANYO ELECTRIC CO., LTD.) 11 June 2014 (2014-06-11) description, paragraphs 15-19, and figures 1-2	1-10
25	Y	CN 106149305 A (WUXI LITTLE SWAN COMPANY LIMITED) 23 November 2016 (2016-11-23) description, paragraphs 23-37, and figures 1-4	1-10
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35	A	KR 20150006264 A (SAMSUNG ELECTRONICS CO., LTD.) 16 January 2015 (2015-01-16) entire document	1-10
40	☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
45	* 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		
50	Date of the actual completion of the international search 21 November 2018		Date of mailing of the international search report 06 December 2018
55	Name and mailing address of the ISA/CN State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451		Authorized officer Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2018/103877

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				KR	20100018855	A	18 February 2010
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KR	20150006264	A	16 January 2015	None			

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