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- **LI, Wenwei**
Shandong 266101 (CN)
- **XING, Benfu**
Shandong 266101 (CN)
- **YANG, Xuguang**
Shandong 266101 (CN)
- **WANG, Jinkai**
Shandong 266101 (CN)
- **CHANG, Yuanyuan**
Shandong 266101 (CN)

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(71) Applicant: **Qingdao Haier Drum Washing Machine Co., Ltd.**
Shandong 266101 (CN)

(74) Representative: **Høiberg P/S**
Adelgade 12
1304 Copenhagen K (DK)

(72) Inventors:
• **LV, Peishi**
Shandong 266101 (CN)

(54) **INTEGRATED LAUNDRY CARE MACHINE AND OPERATING METHOD THEREOF**

(57) The present invention provides an integrated laundry care machine and an operating method thereof. The integrated laundry care machine comprises a cabinet (1), a washing system (2) and a clothing care system (3) disposed in the cabinet (1). A retractable plate (4) is disposed between the washing system (2) and the clothing care system (3). After being extended out, the plate (4) could ascend or descend along a height direction of the integrated laundry care machine. The plate (4) is provided to contain clothes taken out from the washing system (2), and transfer the laundry towards the clothing care system (3), it is advantageous for improving the work efficiency in moving the laundry from the washing system (2) to the clothing care system (3) and reduce labor intensity; further the plate (4) could contain the items accidentally dropped as being taken out from the washing system (2) or the clothing care system (3) and prevent from falling on the ground.

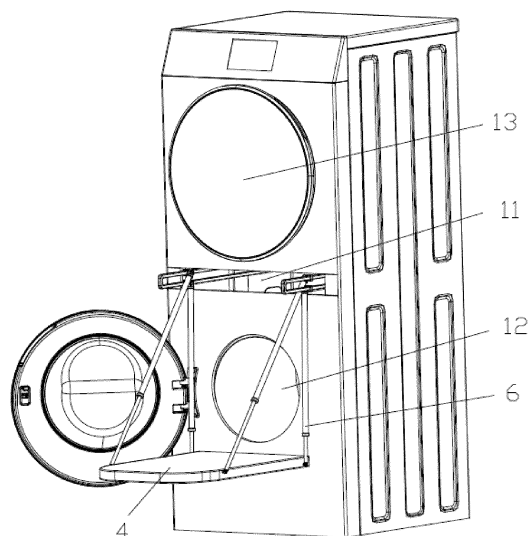


Fig.3

Description

Field of the invention

[0001] The present disclosure relates generally to the technical field of washing machine and, more particularly, to an integrated laundry care machine and a method of operating the same.

Description of the Related Art

[0002] Generally, a washing machine is an important appliance for performing washing to remove contaminants from clothing and the like (hereinafter referred to as "laundry"). The washing machine provides people with more efficient ways to clean dirty clothes. Today, in a sense be viewed as an extension of laundry machine, clothing care system, such as clothes dryer, has been widely used. With the help of such an appliance, people do not need to put clothes in the sun for drying or take extra procedures for taking care of clothing, the space for hanging could be saved.

[0003] The typical front-load washing machine (hereinafter referred to as "drum washing machine") rotates under the driving of a built-in motor, so that clothes in the drum is repeatedly subjected to ascending and descending movements to remove dirt from clothes by water. In this way, the wear degree of clothes could be reduced. Therefore, the drum washing machine becomes more and more popular nowadays.

Technical problem

[0004] However, the washed clothes are slightly entangled and clung to the inner wall of the drum after the spin-drying cycle. People are more likely to have the clothes fall on the ground as opening the washing machine door to take out the washed clothes from the drum and have to wash them repeatedly. Such situation may occur in using an independent clothing care system because it is required to take out clothes first and then place them in the clothing care system. The actions of pick and place require more time and it is not convenient and physically demanding, especially when much clothes needs to be washed,

Summary of the invention

[0005] It is an object of the present invention to provide an integrated laundry care machine with a higher efficiency, and capable of positively reducing workload and preventing clothes from falling on the ground.

[0006] In accordance with the present invention, the above and other objects can be accomplished by providing:

[0007] An integrated laundry care machine comprising: a cabinet; a washing system included in the cabinet; a clothing care system included in the cabinet; and a

retractable plate capable of ascending or descending along the height direction of the integrated laundry care machine as being extended out is disposed between the washing system and the clothing care system.

[0008] Further, the washing system and the clothing care system are arranged vertically, and preferably the washing system is arranged below the clothing care system.

[0009] Further, the cabinet is provided with a washing system access and a clothing care system access; manually or automatically, the plate is extended out or pushed back, and ascends or descends between the lower edge of the washing system access and the lower edge of the clothing care system access.

[0010] Further, the washing system access and the clothing care system access are provided on the front plate of the cabinet.

[0011] Further, the front panel of the cabinet is opened with a plate access allowing the plate to be extended out or pushed back, and the plate access is formed in a position between the washing system access and the clothing care system access.

[0012] Further, the plate is provided with an end surface or a sealing plate which is matched with the plate access. As the plate retracting back in the cabinet, the end surface or the sealing plate of the plate is located inside the plate access and be even with the front panel.

[0013] Further, the plate keeps horizontal or reverses in ascending or descending.

[0014] Further, the plate is flat, or basin-shaped, or box-shaped, or disk-shaped.

[0015] Further, the plate is extended out and descends to the lower edge of the washing system access for containing clothing taken out from the washing system; the plate ascends for facilitating to put clothing into the clothing care system.

[0016] Further, the plate is extended out and descends along the height direction of the integrated laundry care machine for containing clothing taken out from the washing system; the plate with clothing ascends along the height direction of the integrated laundry care machine for transferring clothing towards the clothing care system.

[0017] Further, two rails are provided on the left and right sides of the cabinet which are opposite to each other in parallel, and two or more slide blocks matched with the two rails are connected to the plate and slide on the rails.

[0018] Further, one or more connecting rods are provided between each slide block and the plate, and one end of the connecting rod is hinged to the slide block and the other end of the connecting rod is hinged to the plate.

[0019] Further, two or more connecting rods are disposed on each of the left side or the right side of the plate, and wherein one or more connecting rods is retractable.

[0020] Further, the rail includes a rail body which is fixedly disposed inside the cabinet and a protrusion part which capable of being extended out or retracted from the cabinet and the protrusion part is provided on the

front end of the rail body.

[0021] Further, the clothing care system is a drying system, a washing system, a deodorizing system, a sterilization system, a folding system, or a steam ironing system.

[0022] Further, in accordance with the present invention, the above and other objects can be accomplished by providing a method of operating the integrated laundry care machine, with which the efficiency for transferring laundry could be improved and it demands less physical work.

[0023] An operating method of the integrated laundry care machine, wherein the cabinet is provided with a washing system access and a clothing care system access, includes:

Step A: pulling out the plate from the cabinet and moving it down to the lower edge of the washing system access as the washing system finishes washing, putting clothing taken out from the washing system on the plate;

Step B: moving the plate up to the lower edge of the clothing care system and putting clothing on the plate into the clothing care system;

Step C: pushing back the plate into the cabinet.

[0024] Further, the working method further includes a step D, Step D: pulling out the plate as the clothing care system finishing its work to contain clean clothes accidentally dropped as being taken out from the clothing care system.

Effects of the invention

[0025] The integrated laundry care machine and method of operating the same of the present disclosure have one or more of the following effects: in the integrated laundry care machine, both of the washing system and the clothing care system are included within the cabinet, through which the overall space occupied by the integrated laundry care machine is reduced and the distance for moving washed clothes from the washing system to the clothing care system is shortened, so that it is advantageous for improving the work efficiency for moving the laundry from the washing system to the clothing care system and reducing the labor intensity. A retractable plate is disposed between the washing system and the clothing care system; as being extended out, the plate could ascend or descend along the height direction of the integrated laundry care machine, the plate is used to contain clothes taken out from the washing system and transfer the washed clothes taken out from the washing system to the clothes care system, so it is advantageous to improve the work efficiency for transferring the laundry from the washing system to the clothing care system, and reduce the labor intensity. In addition, the plate is

used for containing clothes accidentally dropped as being taken out from the washing system to prevent clean clothes from falling on the ground and being contaminated.

Brief description of the drawings

[0026]

FIG. 1 is a front view of an integrated laundry care machine according to an embodiment of the present invention.

FIG. 2 is a perspective view of an integrated laundry care machine according to an embodiment of the present invention in which a plate being extended out.

FIG. 3 is a perspective view of an integrated laundry care machine according to an embodiment of the present invention in which a plate is descending.

FIG. 4 is a perspective view of an integrated laundry care machine according to an embodiment of the present invention in which a plate is in a middle position in ascending or descending.

FIG. 5 is an enlarged view of the area **A** of **FIG. 4**.

FIG. 6 is a perspective view of an integrated laundry care machine according to an embodiment of the present invention in which a plate ascends in place.

Detailed description of the embodiments

[0027] Advantages and features of the present disclosure and methods for accomplishing the same will be more clearly understood from exemplary embodiments described below with reference to the accompanying drawings.

[0028] In the description of the present invention, it should be noted that the orientations or positional relationships described by the terms "inner", "outer", "upper", "lower", "left", "right", etc. are merely based on the drawings. The positional relationship is for the convenience of the description of the present invention in a clear way, and is not intended to be an indication or implication that the invention should have specified directions or should be operated in specified directions, and hence it should not be understood as a limitation of the invention.

[0029] Hereinafter, embodiments of the present disclosure will be described in detail with reference to the accompanying drawings **FIG. 1** to **FIG. 5**. An integrated laundry care machine according to an embodiment of the present disclosure includes: a cabinet **1** and the cabinet **1** receives a washing system **2** and a clothing care system **3**. A retractable plate **4** is provided between the washing system **2** and the clothing care system **3** inside the cab-

inet **1**, the plate **4** is capable of ascending and descending along the height direction of the integrated laundry care machine, or to be specific, along the height direction of the cabinet **1**.

[0030] In the present embodiment, both of the washing system **2** and the clothing care system **3** are included within the cabinet **1**, through which the overall space occupied by the integrated laundry care machine is reduced and the distance for moving washed clothes from the washing system **2** to the clothing care system **3** is shortened, so that it is advantageous for improving the work efficiency for moving the laundry from the washing system **2** to the clothing care system **3** and reducing the labor intensity. The plate **4** which could be pulled out from or pushed back to the cabinet **1** is disposed between the washing system **2** and the clothing care system **3**. As the plate **4** being extended out from the cabinet **1**, it could ascend or descend along the height direction of the integrated laundry care machine. The plate **4** is configured to contain washed clothes taken out from the washing system **2**, and then move them to an area in the vicinity of the clothing care system **3** at one time. So it is advantageous to improve the work efficiency for transferring the laundry from the washing system **2** to the clothing care system **3**, and reduce the labor intensity. The plate **4** is also configured to contain clothes accidentally dropped as being taken out from the washing system **2** to prevent clean clothes from falling on the ground and being contaminated.

[0031] In the present embodiment, as shown in **FIG. 1**, the washing system **2** and the clothing care system **3** are arranged vertically, and preferably the washing system **2** is arranged below the clothing care system **3**. In one aspect, the plate **4** is extended out from the cabinet **1** and then descends along the height direction of the integrated laundry care machine to an area corresponding to the washing system **2** to contain the laundry taken out from it. At this position, the plate **4** is also used for containing those items accidentally dropped as being taken out and preventing them from falling on the ground and being contaminated. Then the plate **4** ascends along the height direction of the integrated laundry care machine to the area in vicinity of the clothing care system **3** for transferring the laundry to the clothing care system **3**. Through the movements of the plate **4**, the clothes that needs to be placed in the clothing care system **3** could be moved in place at one time automatically without extra manual work or using other tools such as wash basin for transferring, which is advantageous for improving transfer efficiency of the laundry from the washing system **2** to the clothing care system **3**, which demands less physical work.

[0032] In this embodiment, a front panel of the cabinet is opened with a washing system access **12** and a clothing care system access **13** by which the laundry could be put into or taken out. The front panel of the cabinet is also opened with a plate access **11** allowing the plate **4** to be extended out or pushed back, and the plate access

11 is formed in a position between the washing system access **12** and the clothing care system access **13**. The plate **4** could be extended out from the cabinet or pushed back into it, or move upwardly or downwardly as be extended out. The driving force of the plate **4** is not limited in this embodiment and the plate **4** could be driven manually, semi-automatically, or automatically.

[0033] In this embodiment, the plate **4** could descend to the lower edge of the washing system access **12** and ascend to the lower edge of the clothing care system **13**. It should be noted that in the front panel, the area from the bottom of the washing system access **12** to the bottom of the cabinet **1** could be regarded as the lower edge of the washing system access **12**. It is preferably to allow the plate **4** descend to a position 0 to 2cm lower than the bottom of the washing system access **12**. A comparatively small descend distance is preferably because it could shorten the required time of the ascending or descending movement of the plate **4** so as to improve efficiency, so that the plate **4** could contain the clothes taken out from the washing system **2** in a better way and prevent the laundry from falling on the ground and being contaminated. Similarly, it should be noted that in the front panel, the area from the bottom of the clothing care system access **13** to the area that the plate access **11** located could be defined as the lower edge of the clothing care system access **13**. It is preferably to allow the plate **4** to ascend to the level of the plate access **11** and stop and the clothes on the plate **4** could be easily put into the clothing care system **3** for caring. As an alternative solution shown in **FIG. 6**, the ascend movement of the plate **4** could be terminated as the plate **4** moves up to a position between the plate access **11** and the bottom of the clothing care system access **13** to shorten the distance between the plate **4** and the clothing care system access **13** so as to facilitate the process for putting the clothes on the plate **4** into the clothing care system access **13**, thereby further reducing labor intensity and improving reducing work efficiency.

[0034] The shape of the plate **4** could be varied, such as that it could be designed as a flat plate, or basin-shaped, box-shaped or disk-shaped. Taking consideration of the overall appearance of the integrated laundry care machine, the plate **4** is provided with an end surface or a sealing plate which is matched with the plate access **11**. As the plate **4** retracting back in the cabinet **1**, the end surface or the sealing plate of the plate **4** is located inside the plate access **11** and be even with the front panel.

[0035] In this embodiment, the plate **4** stays horizontal as ascending or descending. To be specific, firstly the plate **4** is extended out from the cabinet **1** and keeps horizontal as moving down for containing clothes taken out from the washing system **2**. The plate **4** with washed clothes further keeps horizontal as ascending and is configured to transfer washed clothes towards the clothing care system **3**.

[0036] The clothing care system **3** could be a drying

system, a washing system, a fresh deodorizing system, a sterilization system, a folding system, or a steam ironing system.

[0037] Referring to FIG. 4 and FIG. 5, the connection structure between the plate 4 and the cabinet 1 includes: two rails 14 respectively provided on the left and right sides of the cabinet 1 which are opposite to each other in parallel and two slide blocks 5 matched with the rails 14 disposed on the plate 4 which could slide on the rails 14 to enable the plate 4 to be extended out or retracted from the cabinet 1.

[0038] Each of the slide blocks 5 is connected to the plate 4 through one or more connecting rod 6. To be specific, one end of each connecting rod 6 is hinged to one of the slide blocks 5 and the other end of the connecting rod 6 is hinged to the plate 4. The swing of the connecting rods 6 enables the plate 4 to ascend or descend. In this embodiment, four connecting rods 6 are provided, which are evenly distributed on both sides of the plate 4 and respectively disposed on the front end and the rear end of the sides of the plate 4 to make the plate 4 more stable in moving.

[0039] In this embodiment, in order to keep the plate 4 horizontal in ascending or descending as being extended out, the four connecting rods 6 are preferably retractable. When the slide blocks 5 move to different positions on the rails 14, the plate 4 is driven to ascend or descend to different levels due to the sliding and retraction movements of the connecting rods 6. Each of the rails 14 includes a rail body which is fixedly disposed inside the cabinet 1 and a protrusion part which capable of being extended out or retracted from the cabinet 1, and the protrusion part is provided on the front end of the rail body.

[0040] Referring to FIG. 1 to FIG. 5, a method of operating the integrated laundry care machine includes the following steps:

Step A: Pulling out the plate 4 from the cabinet 1 and moving it down to the lower edge of the washing system access 12 as the washing system 2 finishes washing.

[0041] In this process, the plate 4 firstly is extended out from the cabinet 1 and descends along the height direction of the integrated laundry care machine to the lower edge of the washing system access 12. At this position, cleaned clothes are taken out from the washing system 2 and stacked up on the plate 4. The descended plate 4 is used for holding washed clothes taken out from the washing system 2 and hence clothing accidentally dropped could be caught by the plate 4 and protected from falling on the ground and being contaminated.

[0042] **Step B:** Enabling the plate 4 to ascend to the lower edge of the clothing care system 13 and putting the clothes on the plate 4 into the clothing care system 3.

[0043] In this process, the plate 4 ascends along the height direction of the integrated laundry care machine to the lower edge of the clothing care system 13. At this position, the clothes on the plate 4 could be put into the clothing care system 3 easily. Hence, the transfer by the plate 4 could improve working efficiency and reduce labor

intensity.

[0044] **Step C:** retracting the plate 4 into the cabinet 1.

[0045] In other embodiments, the operating method may include a Step D. **Step D:** pulling out the plate 4 as the clothing care system 3 finishing its work. The extended plate 4 could contain clean clothes accidentally dropped as being taken out from the clothing care system 3 and protect those items from falling on the ground and being contaminated.

[0046] While the invention has been specifically described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation. Reasonable variation and modification are possible within the scope of the forgoing disclosure and drawings without departing from the spirit of the invention which is defined in the appended claims. This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

Claims

1. An integrated laundry care machine comprising:

a cabinet;
a washing system included in the cabinet;
a clothing care system included in the cabinet;
characterized in that further comprises:
a retractable plate capable of ascending or descending along the height direction of the integrated laundry care machine as being extended out is disposed between the washing system and the clothing care system.

2. The integrated laundry care machine according to claim 1, wherein the cabinet is provided with a washing system access and a clothing care system access; manually or automatically, the plate is extended out or pushed back, and ascend or descend between the lower edge of the washing system access and the lower edge of the clothing care system access.

3. The integrated laundry care machine according to claim 1, wherein the plate keeps horizontal or reverses in ascending or descending.

4. The integrated laundry care machine according to claim 1, wherein the plate is flat, or basin-shaped, or box-shaped, or disk-shaped.

5. The integrated laundry care machine according to claim 2, wherein the plate is extended out and descends to the lower edge of the washing system access for containing clothing taken out from the washing system; the plate ascends for facilitating to put clothing into the clothing care system.

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6. The integrated laundry care machine according to claim 1, wherein the plate is extended out and descends along the height direction of the integrated laundry care machine for containing clothing taken out from the washing system; the plate with clothing ascends along the height direction of the integrated laundry care machine for transferring clothing towards the clothing care system.

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7. The integrated laundry care machine according to any one of claim 1 to claim 6, wherein two rails are provided on the left and right sides of the cabinet which are opposite to each other in parallel, and two or more slide blocks matched with the two rails are connected to the plate and slide on the rails.

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8. The integrated laundry care machine according to claim 6, wherein one or more connecting rods are provided between each slide block and the plate, and one end of the connecting rod is hinged to the slide block and the other end of the connecting rod is hinged to the plate.

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9. The integrated laundry care machine according to any one of claim 1 to claim 6, wherein the clothing care system is a drying system, a washing system, a deodorizing system, a sterilization system, a folding system, or a steam ironing system.

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10. An operating method of the integrated laundry care machine according to any one of claim 1 to claim 9, wherein the cabinet is provided with a washing system access and a clothing care system access, includes:

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Step A: pulling out the plate from the cabinet and moving it down to the lower edge of the washing system access as the washing system finishes washing, putting clothing taken out from the washing system on the plate;

Step B: moving the plate up to the lower edge of the clothing care system and putting clothing on the plate into the clothing care system;

Step C: pushing back the plate into the cabinet.

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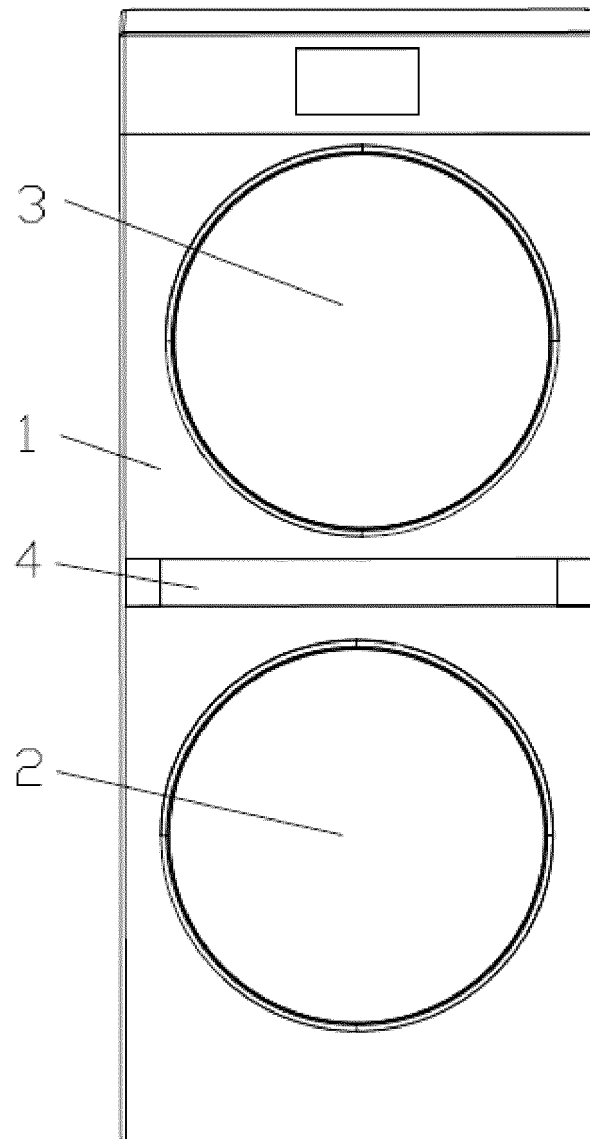


Fig.1

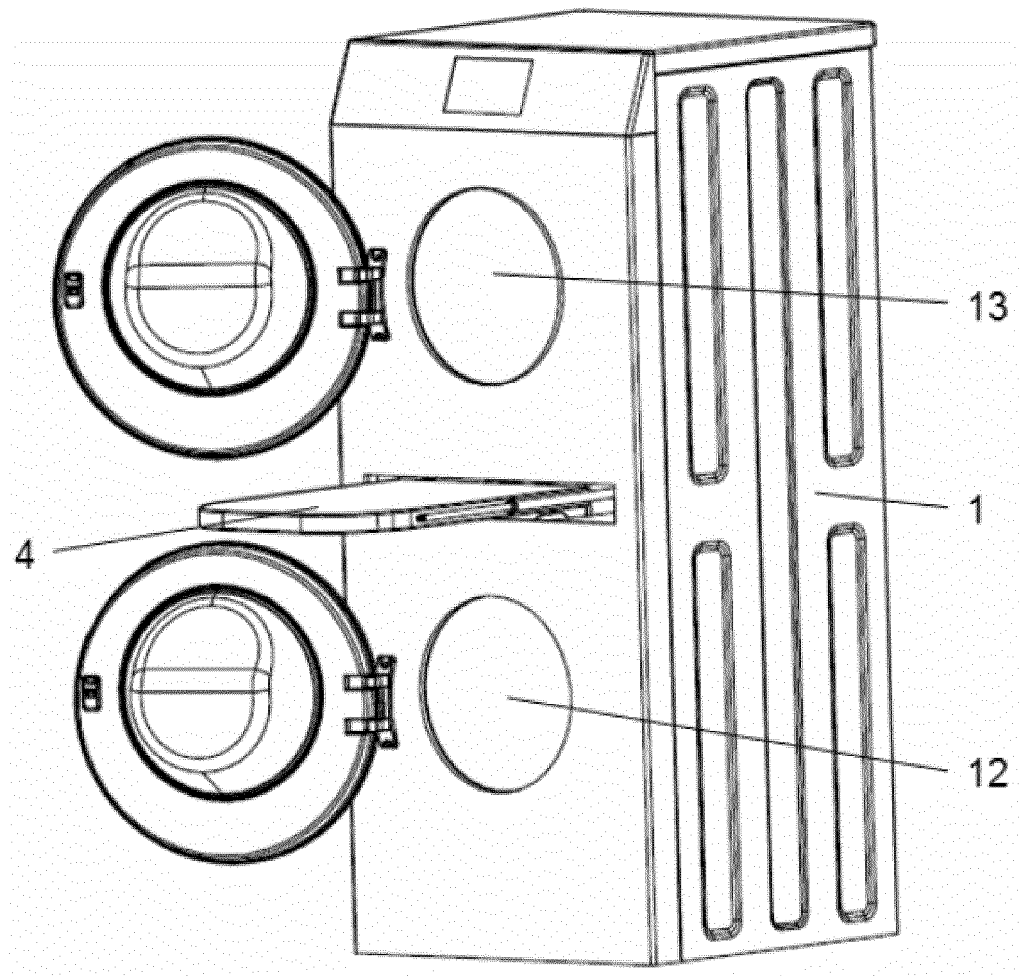


Fig.2

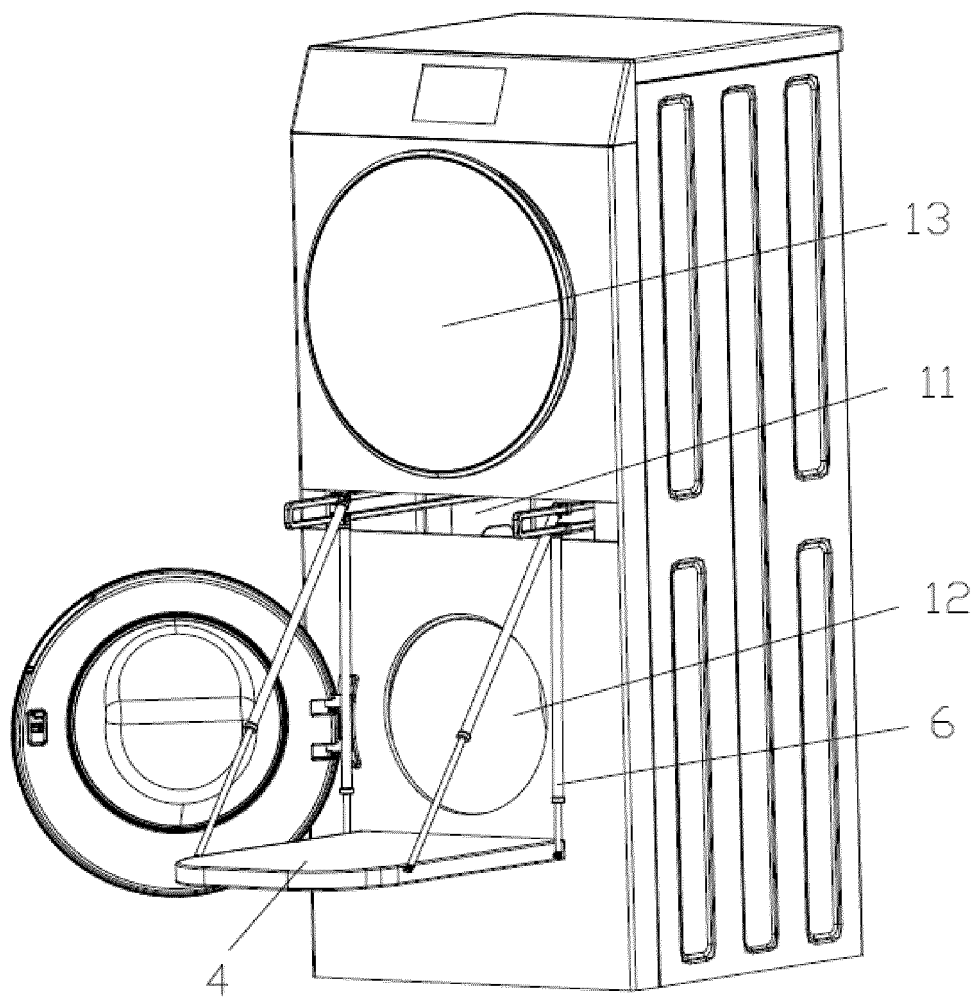


Fig.3

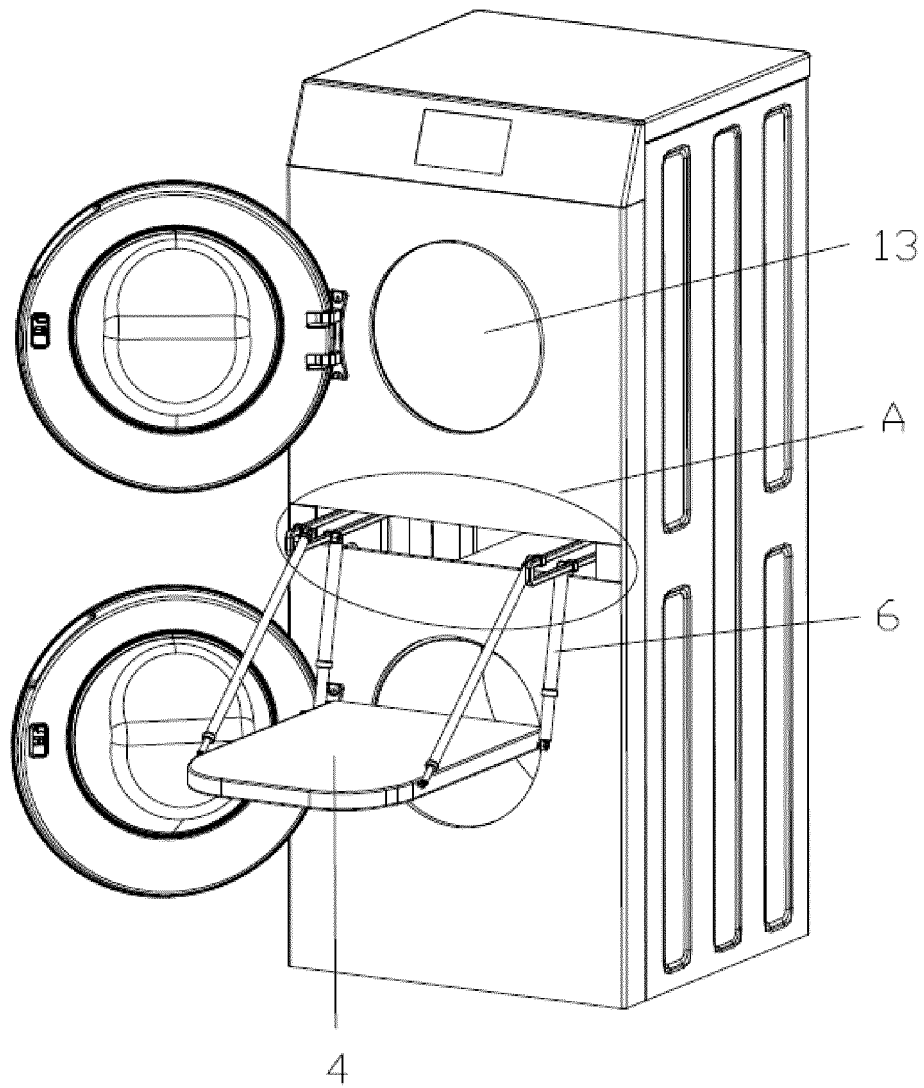


Fig.4

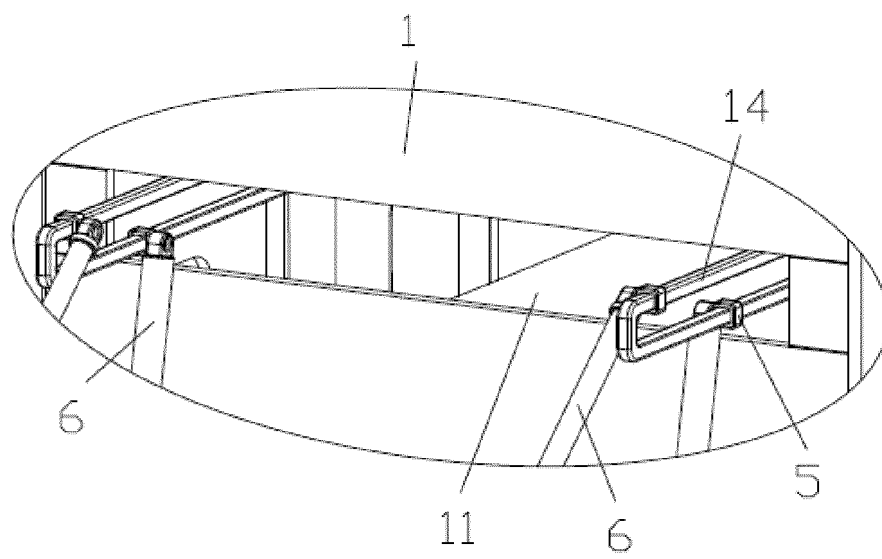


Fig.5

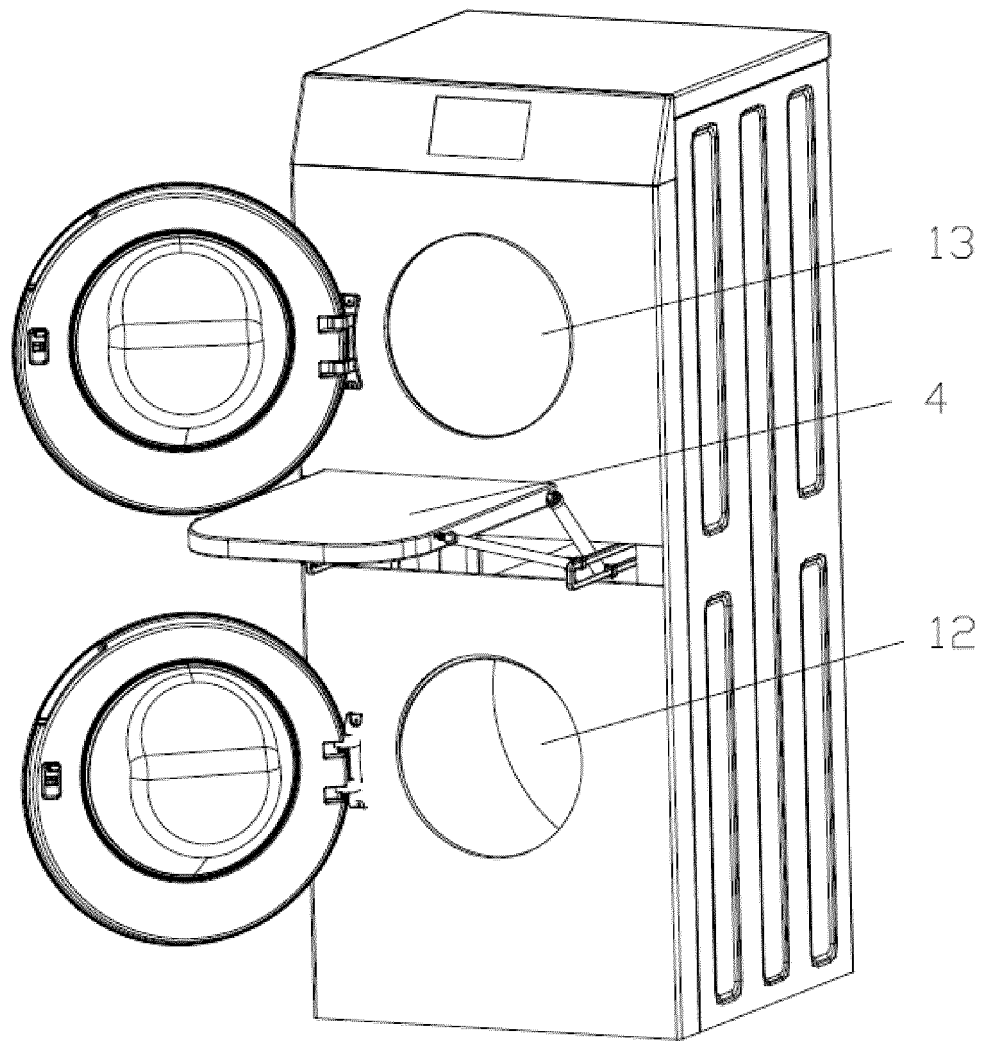


Fig.6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/103854

A. CLASSIFICATION OF SUBJECT MATTER

D06F 29/00 (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, WPI, EPODOC, CNKI: 衣, 洗, 护理, 烘干, 掉落, 盆, 升降, 托, 滚筒, 板, 盆, 伸缩, 升降, 上下, 板, clothes, wash+, dry+, combination, up and down, lift+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 205242103 U (GUANGZHOU ENEJEAN WASHING EQUIPMENT MANUFACTURING CO., LTD.), 18 May 2016 (18.05.2016), description, paragraph 15, and figure 1	1-10
A	CN 105442253 A (HISENSE (SHANDONG) AIR-CONDITIONING CO., LTD.), 30 March 2016 (30.03.2016), entire document	1-10
A	CN 101307552 A (NANJING LG PANDA APPLIANCES CO., LTD.), 19 November 2008 (19.11.2008), entire document	1-10
A	CN 102061590 A (BSH ELECTRICAL APPLIANCES (JIANGSU) CO., LTD.), 18 May 2011 (18.05.2011), entire document	1-10
A	CN 101319457 A (ZHAO, Dayong), 10 December 2008 (10.12.2008), entire document	1-10
A	US 7404303 B1 (BARBOSA, D.D. et al.), 29 July 2008 (29.07.2008), entire document	1-10
A	US 6978556 B1 (CORNELIOUS, E.), 27 December 2005 (27.12.2005), entire document	1-10

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 07 December 2017	Date of mailing of the international search report 08 January 2018
Name and mailing address of the ISA 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 WANG, Hu Telephone No. (86-10) 62413611

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/CN2017/103854

	Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
5	CN 205242103 U	18 May 2016	None	
	CN 105442253 A	30 March 2016	None	
10	CN 101307552 A	19 November 2008	KR 20090102413 A	30 September 2009
	CN 102061590 A	18 May 2011	WO 2011057955 A1	19 May 2011
	CN 101319457 A	10 December 2008	None	
	US 7404303 B1	29 July 2008	None	
15	US 6978556 B1	27 December 2005	None	
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