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(54) **MULTIFUNCTIONAL INTEGRATED CLEANER UNIT MACHINE**

(57) The present invention relates to a compound multifunctional cleaning machine, which has an improvement on basis of a case body, a washing basin and a washing machine body in the case body and the like in the prior art. Specifically, a frame is provided on the upper part of the case body, a cover covering the washing machine body is hinged to the frame, a control switch and a water inlet connector of the washing machine body are deployed on the frame, a drum type cloth dryer body located at one side of the washing machine body is disposed within the case body, a front openable door corresponding to the drum type cloth dryer body is disposed at the front side of the case body, and the washing basin is located at the frame above the drum type cloth dryer body. Compared with the prior art, the washing machine, the washing basin and the cloth dryer are inventively combined to form one integral piece in accordance with the national safety standards, the present invention has the following advantages of less occupied space, low manufacturing cost, full functions, a suitable height, convenient installation, lower noise and vibration, low transporting cost and uniform overall style. Also, the compound machine is advantageous in saving time and energy in use. The machine provides more flexibility and convenience for usage, and has product competitiveness in the market.

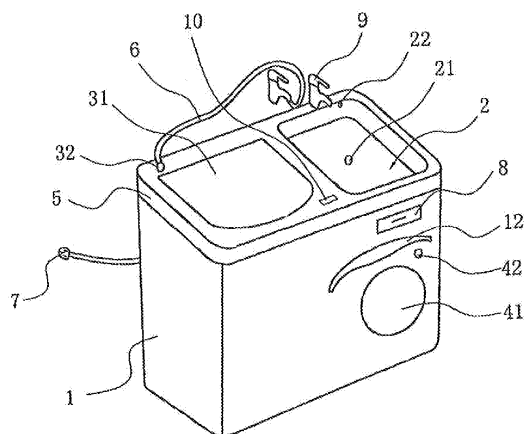


Fig. 1

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a cleaning appliance for washing and drying clothes, and particularly to a compound cleaning machine with a washing basin.

2. Description of the Related Art

[0002] People put on and put off his/her clothes depending on transformation of the seasons. Generally, people will wear more clothes in autumn or winter, and thus more clothes will be washed by a full-automatic washing machine and dried by a drum type cloth dryer in these seasons. In contrast, in spring and summer the people's clothes will be thinner, thus people simply wash the small and thin clothes in the washing basin, and then dry the clothes by hanging them in open air. This will be energy-saving and convenient. Due to this, the urban households are typically equipped with appliances such as a washing machine, a cloth dryer and a washing basin to use in daily cleaning.

[0003] However, the washing machine, the drum type cloth dryer as well as the washing basin currently sold in market are independent from each other, and thus are deployed in different areas in the housing. Therefore, they occupy a relatively large space. In the meantime, water inlet and outlet pipes of the washing machine and the washing basin will be also independently deployed, thus entailing the piping arrangement be complex. As for those residents having smaller space, such defects become more outstanding and obvious.

[0004] The same situation happens at some student hostels where the washing machine, the drum type cloth dryer and the washing basin are similarly deployed independently each other. The students are in their young age, and they do not have too many laundries to be washed. In the case the clothes are rained or sweated due to outdoor sports, it is desirable to change and wash the wet clothes immediately, and wear it after drying. Under the circumstance where a dormitory or an apartment is shared by several students, even if they want to buy the conventional washing machines, they will have a big problem since the washing machine, the drum type cloth dryer and the washing basin occupy too much space in the relatively narrow dorm.

[0005] It can be seen from the above that the home appliance currently available from the market generally has only one single-function. It is difficult for the consumer to find one household electrical appliance which meets the needs of the whole family or all the people in the dorm or apartment as mentioned above. Therefore, it is desirable to reasonably and appropriately recombine the individual household electrical appliances to a compound multifunctional electrical appliance. The mentality or con-

cept behind this trend also relates to saving energy and resources by recombining, integrating and harmonizing the products which are commercially available.

[0006] For this end, one washing machine with a washing basin has been proposed out, which is described in Patent issued number CN 2832876Y, titled "washing machine with washing disc mounting structure". This patent discloses a washing basin hinged at an opening of an upper part of the washing machine body. In order to put into or take out the clothes, the washing basin is uncovered to expose the inlet of the washing machine. Another type of this washing machine is described in Patent issued number CN 2464758Y, titled "washing machine with washing table basin", which mainly employs a drum type washing machine with a front openable door. A washing table basin is provided on the top of the drum type washing machine, and both of them share one common sewer. Compared with the conventional home appliances, the compound machine integrated with the washing basin saves space in some degree and increases capacity of the habitable space in a dorm or an apartment.

[0007] However, the above compound machine incorporating two units still has the following defects: as for the former one, the usage of the washing basin and the washing machine is restricted and adversely affected by each other in some degree, and the bottom of the washing basin is attached to the water outlet pipe. If the washing basin is repeatedly rotated, on one hand, it will hinder the free rotation of the washing basin; on the other hand, it may damage the water outlet pipe.

[0008] As for the latter one, for one thing, there exists a drawback that the surface of the washing table is too high and the usage of the compound machine is restricted. The reason partially resides in the following: during the spin-drying process, the drum type washing machine is rotating at a high speed, in order to reduce the vibration generated by this high-speed rotation, a column-like shock absorption post is provided below the rotating drum, and a weight mass having a certain thickness is attached to the upper side of the outer drum. Thus, the overall height of the drum type washing machine is defined taking into consideration of the above described structure, and will increase as the operation capacity increases.

[0009] A survey shows that the minimum drum type washing machine sold by Haier Company at 2007 (washing machine Model XQG50-E700 without drying function, Model XQG50-HDB1000 with drying function, and the operation capacities of both are 5.0 Kg) has a height of 850mm. A depth of the washing basin commonly used in daily life is 130-180mm, a height of the outlet connector at the bottom of the washing basin is about 60mm. The overall height of the structure combined by the above three utensils is between 930-1030mm, which highly exceeds the common height "800-850mm" of the washing table used by an ordinary adult. Needless to say, this combination is not suitable for usage of the student.

[0010] Secondly, for purpose of alleviating the above defects, the primary task is to reduce the overall height of the drum type washing machine, i.e., to reduce the diameter of the rotating drum. Typically, the drum type washing machine performs cleaning of the clothes by means of dropping the clothes from a height and pulsating it to the water during a rolling process. If the rotating drum is too small in diameter, it is difficult for the clothes to roll in the drum so that the cleaning efficiency is significantly affected, thus the benefit of the drum type washing machine is lost. Thirdly, the cost of the drum type washing machine is high, the cleanness ratio of the drum type washing machine is lower than that of the pulsator type washing machine in terms of time and energy consumption. With the above reasons, a compound washing machine with a desirable washing basin as described above is still not available on the market

[0011] For meeting the demand of the people's life, an advanced model of the drum type washing machine having drying function has been sold on the market. Although this kind washing machine has the advantage of occupying smaller area and convenient usage, it only has one common storage drum. Due to such structure, on one hand, it is impossible to wash and dry the clothes at the same time, so that people have to spend more time on washing and drying under the same condition; on the other hand, as for the drum type washing machine with drying function, when the clothes is washed, dehydrated and to be dried in the rotating drum, the hot air therefrom dries the clothes while additionally drying the water droplet remained on the clothes storage drum after dehydrating, the water droplets not being discharged away within the water storage drum as well as the accumulated water being not drained. Therefore, more time and more energy are needed during the drying process, and thus resulting in that the cost of usage of the washing machine is very high. Moreover, due to the fact that the structure of the drum type washing machine is complex itself, if the drying function is to be recombined, the manufacturing cost will be high and price of the machine goes unattainable. As such, this product will be catered only for the high-end consumers which are less sensitive to the high price.

SUMMARY OF THE INVENTION

[0012] Bearing in minds the disadvantages in the prior art, the technical problem to be solved by the present invention is to provide a compound multifunctional cleaning machine which occupies less space, has low manufacturing cost, has a suitable height for use and the multifunction of the compound machine can be utilized at the same time while the compound machine is energy saving.

[0013] According to an aspect of the invention, there is provided a compound multifunctional cleaning machine, comprising: a case body; a washing basin; and a washing machine body disposed within the case body, wherein a water outlet manifold is disposed within the

case body, and communicates with a drain hole and an overflow hole of the washing basin and a water outlet port of a water outlet pipe of the washing machine body; wherein a frame is provided on an upper part of the case body, a cover covering the washing machine body is hinged to the frame, a control switch and a water inlet connector of the washing machine body are deployed on the frame, a drum type cloth-dryer body located at one side of the washing machine body, is disposed within the case body, a front openable door corresponding to the drum type cloth dryer body is disposed at the front side of the case body, and the washing basin is located at the frame above the drum type cloth dryer body.

[0014] As an improvement to the present invention, a drawer type storage box is disposed in the case body between the washing basin and the drum type cloth dryer body. The storage box is used to store some toiletry articles. Alternatively, a storage sheif is secured on the frame uprightly located at the back upper position of the washing basin. This storage shelf can also be used for storage of some toiletries or the clothes to be washed. These enable the compound machine of the present invention to have more compact structure and more full functions.

[0015] Preferably, a water baffler is fixed on the surface of the case body above the front openable door. It is preferable to arrange the control switch panel of the drum type cloth dryer body at the case body below the water baffler. In this way, it is effective to prevent water from flowing into the drum type cloth dryer body or the control switch panel. Likewise, a watertight flange is disposed at an upper edge of the washing basin or the frame around the washing basin. Obviously, the watertight flange can be disposed at least at one side of the upper edge or the frame. Alternatively, several watertight flanges can be disposed on the upper edge or the frame from inside to outside. With such arrangement, it can prevent water from flowing out so that the structure and the use property can satisfy the safety requirements.

[0016] It is noted that the control switch panel of the drum type cloth dryer body can be individually or independently disposed on the frame. Alternatively, the control switch panel and the control switch of the washing machine body can be unitarily and integrally disposed on the same control panel.

[0017] In practice, a water pipe is configured to be in the case body and connect the water inlet pipe of the washing basin and the water inlet pipe of the washing machine body. The water inlet connector of the washing machine body is connected to the exterior water supply, so as to supply water to the washing basin and the washing machine at the same time. It is apparent that this not only saves the cost for connection, but also facilitates usage of the compound machine.

[0018] In all the above technical solutions, the washing basin is made from stainless steel plate by stamping forming or from engineering plastic material by injection molding. Thus, such washing basin is simple in structure

and is easy to be manufactured. The washing basin can also be formed by combining an inner layer and an outer layer, wherein the outer layer is made from plastic material by injection molding or from metal by sheet metal forming (for example, sheet metal stamping forming), the inner layer is made from stainless steel plate or ceramic or glass to obtain a water-contact layer, the inner layer is embedded into the outer layer, and is sealed and secured by a seal ring/seal rings and a bolt/bolts to form a unitary piece. With the above variations, the compound machine meets the different requirements of different users. In addition, the washing basin and the frame are made from the same stainless steel plate by stamping forming or from the same plastic material by injection molding to form a unitary piece. By adopting the unitary piece, it is more convenient to assemble the compound machine, and can prevent water from leaking out.

[0019] It is more desirable to include an instant water heating device within the case body to supply hot water to the washing basin and the washing machine body (i.e., full-automatic washing machine body). A cold water inlet hole of the instant water heating device is communicated to the water inlet connector by a water pipe. The control panel of the instant water heating device can be individually or independently disposed on the frame. Alternatively, the control panel and the control switch of the washing machine body can be unitarily and integrally disposed on the same control panel. In the present embodiment, the instant water heating device is configured to heat object by electrical heating. That is, cold water which flows through the housing of the instant water heating device, is instantly or rapidly heated to obtain hot water at a desirable temperature, by operating the corresponding switches on the control panel. This hot water can be simultaneously or respectively supplied to the washing basin and the washing machine body for use.

[0020] All power cords of the washing machine body, the drum type cloth dryer body and the instant water heating device can be connected to the same power source plug to reduce the number of the plug for the home appliance. This enables to conveniently operate the compound machine and also reduces the arrangement of the exterior power source plug.

[0021] Compared with the prior art, the washing machine, the washing basin and the cloth dryer of the present invention are inventively combined to form one integral piece in accordance with the national safety standards, the present invention has the following advantages: (1) this not only meets the demands of occupying less space, having low manufacturing cost and full functions as required by the consumers, but also achieves a desirable height by which people may wash their faces or hands etc, by well adjusting and matching the heights of the cloth dryer and the washing basin; (2) the washing and drying functions can be implemented simultaneously as the units for them are separately or independently arranged, thus fulfilling the objectives of timesaving, being quick and energy saving; and (3) with

an integral structure, it is not only convenient to be installed, but also has a larger area to seat on the ground as a whole. Accordingly, the vibration and noise generated when operating the washing machine and the drum type cloth dryer will be reduced, and likewise, the transporting cost is reduced; and (4) the overall style of the compound machine is unified to improve the indoor decoration of the house.

10 BRIEF DESCRIPTION OF THE DRAWINGS

[0022]

Fig. 1 is a perspective view of a compound multifunctional cleaning machine in accordance with a first embodiment of the present invention;

Fig.2 is a rear view of the compound multifunctional cleaning machine in accordance with the first embodiment of the present invention;

Fig. 3 is a side view of the compound multifunctional cleaning machine in accordance with the first embodiment of the present invention; and

Fig. 4 is a rear view of a compound multifunctional cleaning machine in accordance with a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0023] Embodiments of the present invention will be described hereinafter in detail with reference to the drawings. The present invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein; rather, these embodiments are provided so that the present disclosure will be thorough and complete, and will fully convey the concept of the invention to those skilled in the art.

Embodiment 1

[0024] Referring to Figs. 1-3, a compound multifunctional cleaning machine in accordance with a first embodiment of the present invention includes a case body 1, a washing basin 2, a washing machine body 3, such as a full-automatic washing machine body, and a drum type cloth dryer body 4 which are disposed in the case body 1 side by side. The full-automatic washing machine body 3 utilizes a pulsator or stirring type full-automatic washing machine inner tub; and the drum type cloth dryer body 4 employs the drum type cloth dryer inner tub with a front door being openable. Since these components are known techniques in the art, detailed description thereof is omitted for purpose of brevity. A frame 5 is provided on the upper part of the case body 1, and the bottom of the case body 1 is fixed on a seat 11. In other words, the case body 1, the frame 5 and the seat 11 in the present embodiment form a housing of the compound machine. It should be noted that, the case body 1 and the seat 11 can be integrally formed. The frame 5 is

hinged with a cover 31 which can cover the full-automatic washing machine body 3, and is provided with a control switch and a water inlet connector 32 of the full-automatic washing machine body 3. The front side of the case body 1 is disposed with a front openable door 41 which corresponds to the drum type cloth dryer body 4, and a control switch panel 42. The washing basin 2 is provided with a drain hole 21 and an overflow hole 22, which can be located within the frame 5 above the drum type cloth dryer body 4. A water tap 9 is provided on the frame 5 to supply water to the washing basin 2. Meanwhile, in order to facilitate the water entering in and discharging out of the compound machine as well as the connection to the external power source, the compound machine is equipped with a water inlet manifold 6, a water outlet manifold 20 and a power source plug 7. The water inlet manifold 6 is a hose attached to the water inlet connector 32, while a water inlet port of the water tap 9 for the washing basin 2 is attached to the water inlet connector 32 by a water pipe in the case body 1. In this way, it is possible to supply water to the washing basin 2 and the drum for washing at the same time. The above water outlet manifold 20 communicates with the drain hole 21 and the overflow hole 22 of the washing basin 2 as well as the water outlet port of the water outlet pipe of the full-automatic washing machine body 3, so that the water from the washing basin 2 and the full-automatic washing machine body 3 is discharged into the common sewer hole by the water outlet manifold 20. It is possible to miniaturize the arrangement of the power cord plug by connecting both the full-automatic washing machine body 3 and the drum type cloth dryer body 4 by the same one power cord attached with the power source plug 7.

[0025] In the present embodiment, a storage shelf 30 is fixed on the frame 5 upwardly at the back upper position of the washing basin 2, as shown in Figs. 2 and 3. A drawer type storage box 8 is also disposed at the case body 1 between the washing basin 2 and the drum type cloth dryer body 4. Some toiletry articles and the clothes to be washed can be put into the storage shelf 30 and the storage box 8, thereby adding a storage function to the compound machine.

[0026] During the use of the washing basin 2, a water baffle 12 is secured on the surface of the case body 1 above the front openable door 41, in order to prevent water from flowing downward into the drum type cloth dryer body 4 and the control switch panel 42. The control switch panel 42 is disposed on the case body 1 below the water baffle 12, and a watertight flange 51 is provided on the frame 5 around the washing basin 2, to protect the electrical appliance.

[0027] In order to have an overall integral shape, the above described frame 5 and the washing basin 2 can be made from the same stainless steel plate by stamping forming or from the same plastic material by injection molding, to form an integral piece. As such, this integral structure is more effective to prevent water from leaking out than normal condition, so as to ensure the use safety

of the electrical appliance.

Embodiment 2

[0028] As shown in Fig. 4, the differences of the compound machine in accordance with a second embodiment of the present invention from that in accordance with the first embodiment of the present invention lie in that: an instant water heating device 50 is disposed within the case body 1 to supply hot water to the washing basin 2 and the full-automatic washing machine body 3. The instant water heating device 50 is commercially available in the art. A cold water inlet hole of the instant water heating device 50 is communicated to the water inlet connector 32 by a water pipe 60, while a hot water outlet port thereof is communicated to the hot water inlet port of the water tap 9 by a first hot water pipe 40, and the hot water generated by the instant water heating device 50 is supplied to the rotating drum of the full-automatic washing machine body 3 by a second hot water pipe 70. The cold water entered from the water inlet connector 32 is supplied into the rotating drum of the full-automatic washing machine body 3 through a cold water pipe 80, and a cold water control valve 90 is installed on the cold water pipe 80. Referring to Fig.1, the control panel of the instant water heating device 50 and the control switch of the full-automatic washing machine body 3 are unitarily and integrally disposed on the same control panel 10, and are installed on the frame 5. The power cord of the instant water heating device 50 is also connected to the power source plug 7.

Embodiment 3

[0029] As shown, the differences of the compound machine in accordance with the third embodiment of the present invention from that in accordance with the second embodiment of the present invention lie in that: the control panel of the instant water heating device 50, the control switch of the full-automatic washing machine body 3, - the control switch panel 42 of the drum cloth dryer body 4 are all together disposed on the same control panel which is installed on the frame 5, as shown in Fig.1. In this way, the operations will be more conveniently carried out and this will be also beneficial to design the overall shape thereof.

[0030] With the above compound machine, people can use the washing basin to wash their faces, hands, etc, use the full-automatic washing machine to wash clothes at the same time, and dry clothes by means of the drum type cloth dryer. The washing up operation and the washing clothes operation do not interfere with each other and the machine is convenient and quick for usage. Furthermore, the hot water can be obtained by using the instant water heating device. In addition, the compound machine having different heights can be made as the height of the cloth dryer is normally lower than that of the washing machine, to meet the demands of the student groups in

different ages or the consumers in different areas. Accordingly, the compound machine having multi-functions provides more flexibility and convenience for usage, and has product competitiveness in the market.

[0031] Although the embodiments of the present invention have been described and shown, it would be appreciated by those skilled in the art that many modifications, alterations and substitutions may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

Claims

1. A compound multifunctional cleaning machine comprising:

a case body (1);
a washing basin (2); and
a washing machine body (3) disposed within the case body (1),
wherein a water outlet manifold (20) is disposed within the case body (1), and communicates with a drain hole (21) and an overflow hole (22) of the washing basin (2) and a water outlet port of a water outlet pipe of the washing machine body (3),

characterized in that:

a frame (5) is provided on an upper part of the case body (1), a cover (31) covering the washing machine body (3) is hinged to the frame (5), a control switch and a water inlet connector (32) of the washing machine body (3) are deployed on the frame (5), a drum type cloth dryer body (4) located at one side of the washing machine body (3) is disposed within the case body (1), a front openable door (41) corresponding to the drum type cloth dryer body (4) is disposed at the front side of the case body (1), and the washing basin (2) is located within the frame (5) above the drum type cloth dryer body (4).

2. The compound multifunctional cleaning machine according to claim 1, **characterized in that:** a drawer type storage box (8) is disposed in the case body (1) between the washing basin (2) and the drum type cloth dryer body (4).
3. The compound multifunctional cleaning machine according to claim 1, **characterized in that:** a storage shelf (30) is secured on the frame (5) uprightly located at the back upper position of the washing basin (2).
4. The compound multifunctional cleaning machine ac-

cording to claim 1, **characterized in that:** a water baffle (12) is fixed on the surface of the case body (1) above the front openable door (41).

5. The compound multifunctional cleaning machine according to claim 4, **characterized in that:** a control switch panel (42) of the drum type cloth dryer body (4) is provided on the case body (1) below the water baffle (12).
6. The compound multifunctional cleaning machine according to claim 1, **characterized in that:** a water-tight flange (51) is disposed at an upper edge of the washing basin (2) or the frame (5) around the washing basin (2).
7. The compound multifunctional cleaning machine according to any one of claims 1 to 6, **characterized in that:** a water pipe is configured to be in the case body (1) and connect a water inlet pipe of the washing basin (2) and a water inlet pipe of the washing machine body (3).
8. The compound multifunctional cleaning machine according to any one of claims 1 to 6, **characterized in that:** the washing basin (2) is made from stainless steel plate by stamping forming or from engineering plastic material by injection molding, or the washing basin (2) is formed by an inner layer and an outer layer, wherein the outer layer is made from plastic material by injection molding or from metal by sheet metal stamping forming, the inner layer is made from stainless steel plate or ceramic or glass to obtain a water-contact layer, the inner layer is embedded into the outer layer, and is sealed and secured by a seal ring/seal rings and a bolt/bolts to form an integral piece; or the washing basin (2) and the frame (5) are made from the same stainless steel plate by stamping forming or from the same plastic material by injection molding to form an integral piece.
9. The compound multifunctional cleaning machine according to any one of claims 1 to 6, **characterized in that:** an instant water heating device (50) is disposed within the case body (1) to supply hot water to the washing basin (2) and the washing machine body (3), and a cold water inlet hole of the instant water heating device (50) is communicated to the water inlet connector (32) by a water pipe (60),
10. The compound multifunctional cleaning machine according to claim 9, **characterized in that:** power cords of the washing machine body (3), the drum type cloth dryer body (4) and the instant water heating device (50) are all connected to one power source plug (7).

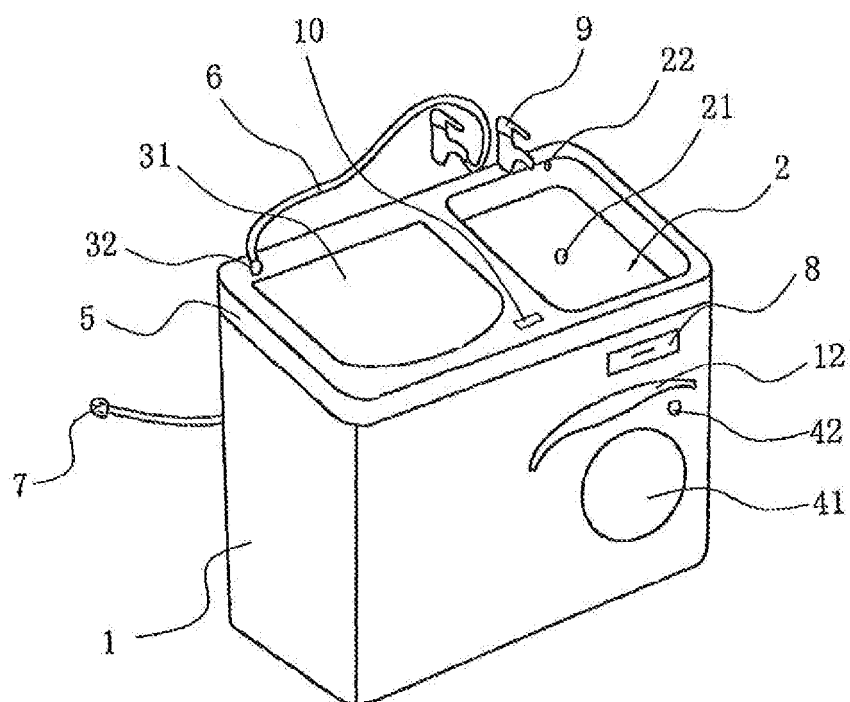


Fig. 1

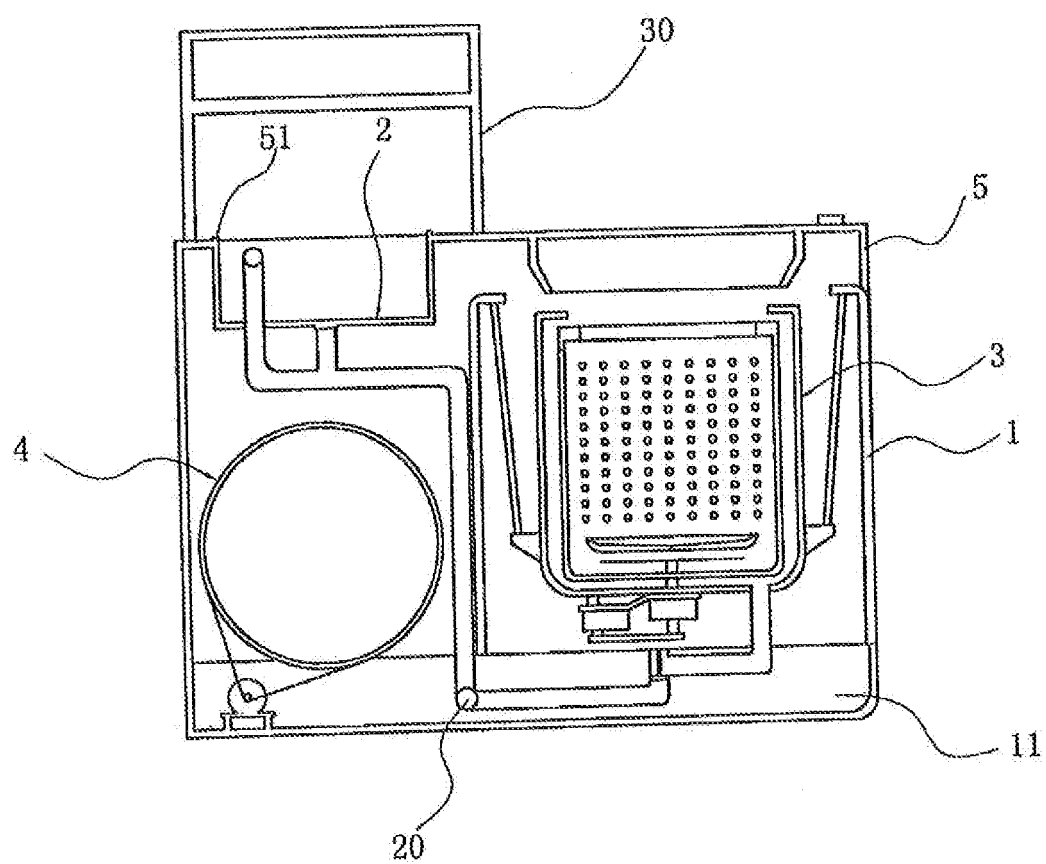


Fig. 2

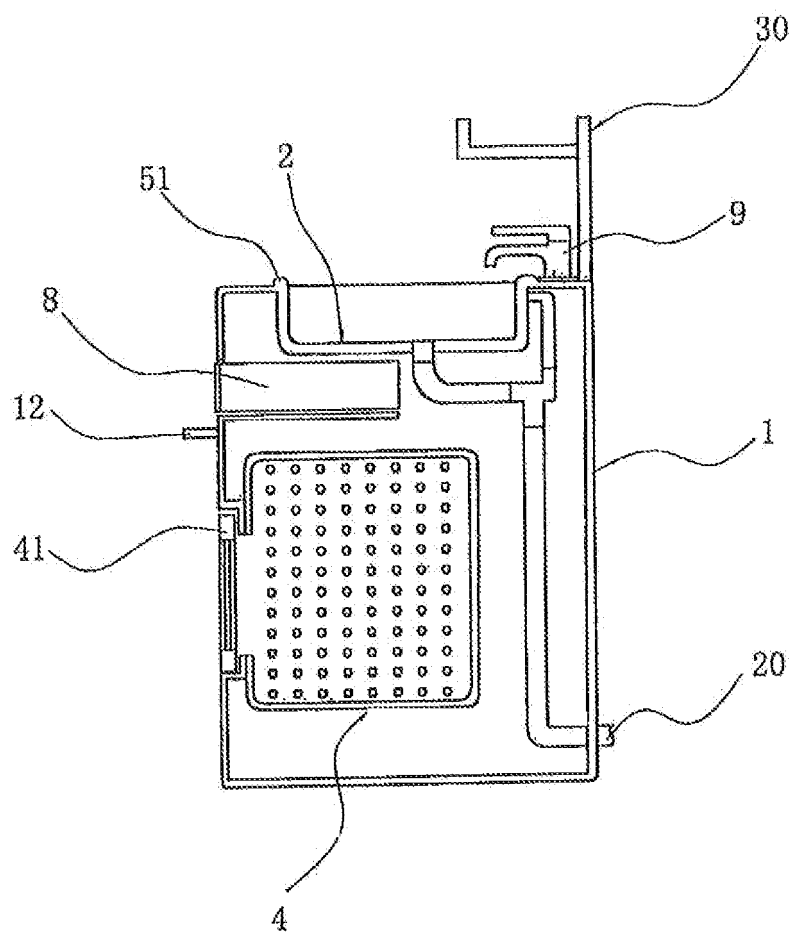


Fig. 3

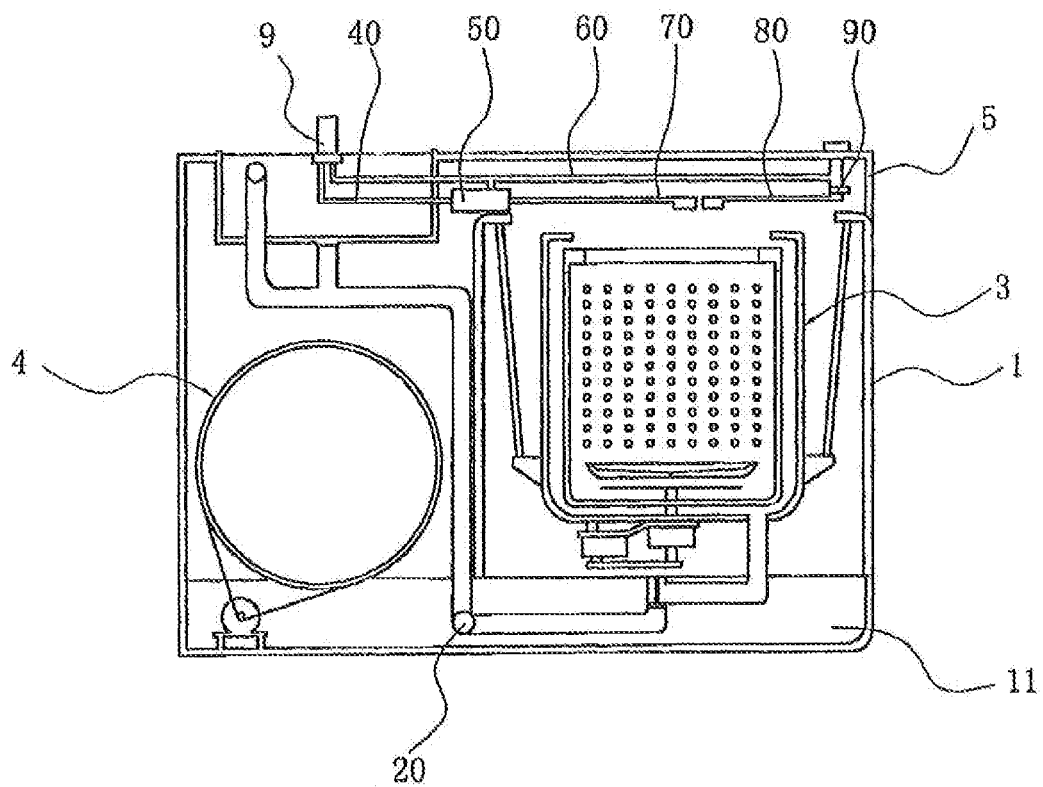


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2009/000042

A. CLASSIFICATION OF SUBJECT MATTER		
See extra sheet		
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)		
IPC: D06F/-, A47K1/-		
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)		
WPI,EPODOC,PAJ: (WASH W STAND+), WASHSTAND, DRYER, (WASHING W MACHINE), (WASH W BASIN) , WASHBASIN, SINK, MODUL+ ,LAUNDRY		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2007151309A1(KENDALL J W et al.), 5 Jul. 2007 (05.07.2007) , See paragraphs 0012-0014, 0140-0145, 0162, 0180-0185, 0189, 0202-0203, abstract, figures 8A,8B,23,30B	1-10
X	US2007151300A1 (SUNSHINE R A) , 5 Jul. 2007 (05.07.2007) , See paragraphs 0008-0032, figures 8A,8B,23,30B	1-10
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 16 Mar. 2009 (16.03.2009)		Date of mailing of the international search report 23 Apr. 2009 (23.04.2009)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451		Authorized officer Xu Yan Telephone No. (86-10)62084564

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2009/000042

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2007256457A1 (KENDALL J W et al.) , 8 Nov. 2007 (08.11.2007) , See paragraphs 0009-0021, figures 8A,8B,23,30B	1-10
X	US2007151305 A1 (KENDALL J W et al.) , 5 Jul. 2007 (05.07.2007) , See paragraphs 0009-0025, 0184-0193, figures 8A,8B,23,30B	1-10
X	US2006156765 A1 (SUNSHINE R A et al.) , 20 Jul. 2006 (20.07.2006) , See paragraphs 00010-0028, figures 8A,8B,23,30B	1-10
PX	CN101215770A(HU Jiebo), 9 Jul. 2008 (09.07.2008) , See claims 1-10	1-10
PX	CN201151824Y(HU Jiebo), 19 Nov. 2008 (19.11.2008) , See claims 1-10	1-10
A	CN2504301Y(XIANG Jianzhong), 7 Aug. 2002 (07.08.2002) , See the whole document	1-10
A	CN1586380A(ZHOU Hongfu), 2 Mar. 2005 (02.03.2005) , See the whole document	1-10
A	JP2002209775A(SUN WAVE IND CO LTD),30 Jul. 2002 (30.07.2002) , See the whole document	1-10

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2009/000042

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US2007151309A1	05.07.2007	BRPI0606219A	06.11.2007
US2007151300A1	05.07.2007	None	
US2007256457A1	08.11.2007	None	
US2007151305 A1	05.07.2007	None	
US2006156765 A1	20.07.2006	US2002017117A1	14.02.2002
		US2004134237A1	15.07.2004
		US2005155393A1	21.07.2005
		US2005198061 A1	08.09.2005
		US2006112737A1	01.06.2006
		US2007283724 A9	13.12.2007
		US2006117810A1	08.06.2006
		US2006130535 A1	22.06.2006
		US2007283723A9	13.12.2007
		US2007266743 A9	22.11.2007
		US2007151302 A1	05.07.2007
		US2007266740A9	22.11.2007
CN101215770A	09.07.2008	None	
CN201151824Y	19.11.2008	None	
CN2504301Y	07.08.2002	None	
CN1586380A	02.03.2005	None	
JP2002209775A	30.07.2002	None	

Form PCT/ISA/210 (patent family annex) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2009/000042

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D06F39/08(2006.01)n

D06F39/14(2006.01)n

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 2832876 Y [0006]
- CN 2464758 Y [0006]