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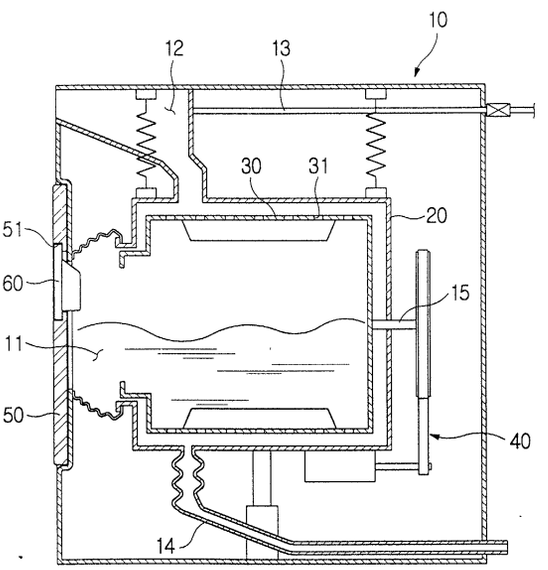
(54) Drum type washing machine

(57) Disclosed herein is a drum type washing machine. The drum type washing machine includes a cabinet (10) defining the appearance of the washing machine and opened at the front to form a main opening (11). A fixed drum (20) is horizontally set in the cabinet (10) and contains wash water therein. A rotary drum (30) is set in the fixed drum (20) in such a way as to be rotatable in alternating directions. A main door (50) selectively closes the main opening (11). A sub-opening (51) is provided at a predetermined portion of the main door (50) such that a user puts laundry into the rotary drum (30) without opening the main door (50), and a sub-door (60) is provided at a predetermined portion of the main door (50) for selectively closing the sub-opening (51).

FIG. 2



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Description

[0001] The present invention relates to drum type washing machines.

[0002] Drum type washing machines are designed to wash laundry by dropping the laundry from the top to the bottom of a rotary drum by rotation of the rotary drum. As shown in Figure 1, a conventional drum type washing machine includes a box-shaped cabinet 1 which defines the appearance of the washing machine. A fixed drum 2 is horizontally set in the cabinet 1, and contains wash water therein. A rotary drum 3 is set in the fixed drum 2 in such a way as to be rotatable in alternating directions.

[0003] The cabinet 1 is opened at the front to form an opening 1a. The opening 1a allows a user to put laundry into the rotary drum 3 or take the laundry out of the rotary drum 3. A front door 4 is hinged to the opening 1a of the cabinet 1 for selectively closing the opening 1a.

[0004] When one desires to wash laundry using such a drum type washing machine, the laundry is first put into the rotary drum 3 through the opening 1a, and the door 4 is closed to close the opening 1a. Next, wash water and detergent are supplied to the fixed drum 2 and the rotary drum 3. After that, the rotary drum 3 is rotated to wash the laundry.

[0005] However, the conventional drum type washing machine is designed such that the level of wash water supplied to the fixed drum 2 and the rotary drum 3 is higher than the lower edge of the opening 1a. Thus, when the door 4 is opened to open the opening 1a before wash water is drained from the fixed drum 2 and the rotary drum 3, wash water may spill out from the opening 1a.

[0006] Therefore, the conventional drum type washing machine is problematic in that a user cannot put additional laundry into the washing machine when the supply of wash water to the fixed drum 2 and the rotary drum 3 has been completed.

[0007] It is an aim of the present invention to enable a user to put additional laundry in a rotary drum even when the supply of wash water has been completed.

[0008] According to a first aspect of the present invention there is provided a drum type washing machine, comprising a cabinet defining an appearance of the washing machine and opened at the front to form a main opening, a fixed drum horizontally set in the cabinet for containing wash water therein, a rotary drum set in the fixed drum in such a way as to be rotatable in alternating directions, and a main door for selectively closing the main opening, wherein a sub-opening is provided at a predetermined portion of the main door to receive laundry into the rotary drum without opening of the main door, and a sub-door is provided at a predetermined portion of the main door for selectively closing the sub-opening.

[0009] Preferably, the sub-opening and sub-door are positioned above a level of wash water contained in the fixed drum.

[0010] Preferably, the sub-door is hinged to a predetermined portion of the main door.

[0011] Preferably, the main opening has a circular profile, and the main door has a rectangular profile and is hinged at its lower edge to the cabinet in such a way as to be rotatable in a vertical direction for selectively closing the main opening, and, the sub-opening has a circular profile, and the sub-door has a circular profile and is hinged at its edge to the main door in such a way as to be rotatable in a horizontal direction for selectively closing the sub-opening.

[0012] For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings in which:

Figure 1 is a schematic sectional view showing a conventional drum type washing machine;

Figure 2 is a schematic sectional view showing a drum type washing machine according to a preferred embodiment of the present invention;

Figure 3 is a perspective view of the drum type washing machine of Figure 2, with a main door open; and

Figure 4 is a perspective view of the drum type washing machine of Figure 2, with the main door closed and a sub-door open.

[0013] Figure 2 shows a drum type washing machine according to a preferred embodiment of the present invention including a cabinet 10 which defines the appearance of the washing machine. A fixed drum 20 is horizontally set in the cabinet 10, and contains wash water therein. A rotary drum 30 is set in the fixed drum 20 in such a way as to be rotatable in alternating directions. The drum type washing machine also has a drive unit 40.

[0014] The cabinet 10 defines the appearance of the drum type washing machine, and has a box-shape. The cabinet 10 is open at the front to form a main opening 11. The main opening 11 allows a user to put laundry in the rotary drum 30 or take the laundry out of the rotary drum 30. A main door 50 is hinged to the main opening 11 of the cabinet 10 for selectively closing the main opening 11.

[0015] In a preferred embodiment of the present invention, the main opening 11 has a circular profile while the main door 50 has a rectangular profile. The main door 50 is hinged, at its lower edge, to the cabinet 10 in such a way as to be rotatable in a vertical direction for selectively closing the main opening 11.

[0016] The cabinet 10 is provided at its upper portion with a detergent container 12 and a water supply hose

13. Water supplied from an external water source passes sequentially through the water supply hose 13 and the detergent container 12 to the fixed drum 20.

[0017] The fixed drum 20 is horizontally suspended in the cabinet 10, and has a cylindrical shape to contain wash water in the fixed drum 20. A drain pipe 14 downwardly extends from the bottom of the fixed drum 20 such that wash water is discharged to the outside through the drain pipe 14.

[0018] The rotary drum 30 contains laundry therein, and washes the laundry by dropping the laundry from the top to the bottom of the rotary drum 30 by its rotation. The rotary drum 30 has a cylindrical shape like the fixed drum 20, and is concentrically set inside the fixed drum 20. The rotary drum 30 is perforated on its sidewall with a great number of spin-drying perforations 31 such that wash water flows into the rotary drum 30 through the spin-drying perforations 31. Further, a rotary shaft 15 is installed on the rear wall of the rotary drum 30 in such a way as to pass through the fixed drum 20, and is rotated by the drive unit 40.

[0019] A circular sub-opening 51 is formed on an upper portion of the main door 50 to allow a user to put laundry into the rotary drum 30 even when the supply of wash water to the fixed drum 20 and the rotary drum 30 is completed. The drum type washing machine of the present invention also has a sub-door 60 for selectively closing the sub-opening 51.

[0020] The sub-door 60 has a circular profile to close the sub-opening 51 which has a circular profile, and is hinged to a predetermined portion of the main door 50 in such a way as to be rotatable in a horizontal direction for selectively closing the sub-opening 51.

[0021] In this case, since the sub-opening 51 and the sub-door 60 are provided at a position which is higher than the wash water level, wash water does not spill from the sub-opening 51 even when the level of wash water contained in the fixed drum 20 is higher than the lower edge of the main door 50.

[0022] That is, although a user makes the rotary drum 30 stop rotating and opens the sub-door 60 to open the sub-opening 51 when wash water is contained in the fixed drum 20 such that the water reaches a level higher than the lower edge of the main door 50, wash water does not spill from the sub-opening 51, thus allowing a user to put additional laundry into the rotary drum 30 through the sub-opening 51.

[0023] The operation and effect of the drum type washing machine will be described in the following with reference to the drawings.

[0024] When a user desires to wash laundry, as shown in Figure 3, the user opens the main door 50 and puts laundry into the rotary drum 30 through the main opening 11. After that, a user closes the main door 50 and manipulates a control panel of the drum type washing machine to perform a washing operation.

[0025] As the washing operation starts, wash water is supplied to the fixed drum 20 and the rotary drum 30 through the water supply hose 13 until it reaches a predetermined water level which is higher than the lower edge of the main door 50. After the supply of wash water is completed, the washing operation is performed by dropping the laundry from the top to the bottom of the rotary drum 30 by its rotation.

[0026] When it is necessary to put additional laundry into the washing machine during the washing operation, the washing machine stops operating for a moment so as to stop the rotation of the rotary drum 30. As shown in Figure 4, a user opens the sub-door 60 which is provided on the upper portion of the main door 50, so as to open the sub-opening 51. After that, additional laundry is put into the rotary drum 30 through the sub-opening 51. At this time, since the sub-opening 51 and the sub-door 60 are arranged at a position which is higher than the level of wash water contained in the fixed drum 20 and the rotary drum 30, wash water does not spill from the sub-door 60.

[0027] As described above, the present invention provides a drum type washing machine, which is provided on an upper portion of a main door with a sub-opening and a sub-door for selectively closing the sub-opening, thus allowing a user to put additional laundry into a rotary drum through the sub-door even when the supply of wash water into the rotary drum has been completed.

[0028] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope of the invention as defined in the accompanying claims.

[0029] The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0030] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0031] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0032] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A drum type washing machine, comprising a cabinet (10) defining an appearance of the washing machine and opened at a front to form a main opening (11) , a fixed drum (20) horizontally set in the cabinet (10) for containing wash water therein, a rotary drum (30) set in the fixed drum (20) in such a way as to be rotatable in alternating directions, and a main door (50) for selectively closing the main opening (11), wherein a sub-opening (51) is provided at a predetermined portion of the main door (11) to receive laundry into the rotary drum (30) without opening of the main door (11), and a sub-door (60) is provided at a predetermined portion of the main door (50) for selectively closing the sub-opening (51) .

2. The drum type washing machine according to claim 1, wherein said sub-opening (51) and sub-door (60) are positioned above a level of wash water contained in the fixed drum (20).

3. The drum type washing machine according to claim 1 or 2, wherein said sub-door (60) is hinged to a predetermined portion of the main door (50).

4. The drum type washing machine according to any of claims 1, 2, or 3 wherein said main opening (11) has a circular profile, and said main door (50) has a rectangular profile and is hinged at a lower edge thereof to the cabinet (10) in such a way as to be rotatable in a vertical direction for selectively closing the main opening (11), said sub-opening (51) has a circular profile, and said sub-door (60) has a circular profile and is hinged at an edge thereof to said main door (50) in such a way as to be rotatable in a horizontal direction for selectively closing the sub-opening (51).

FIG. 1
(PRIOR ART)

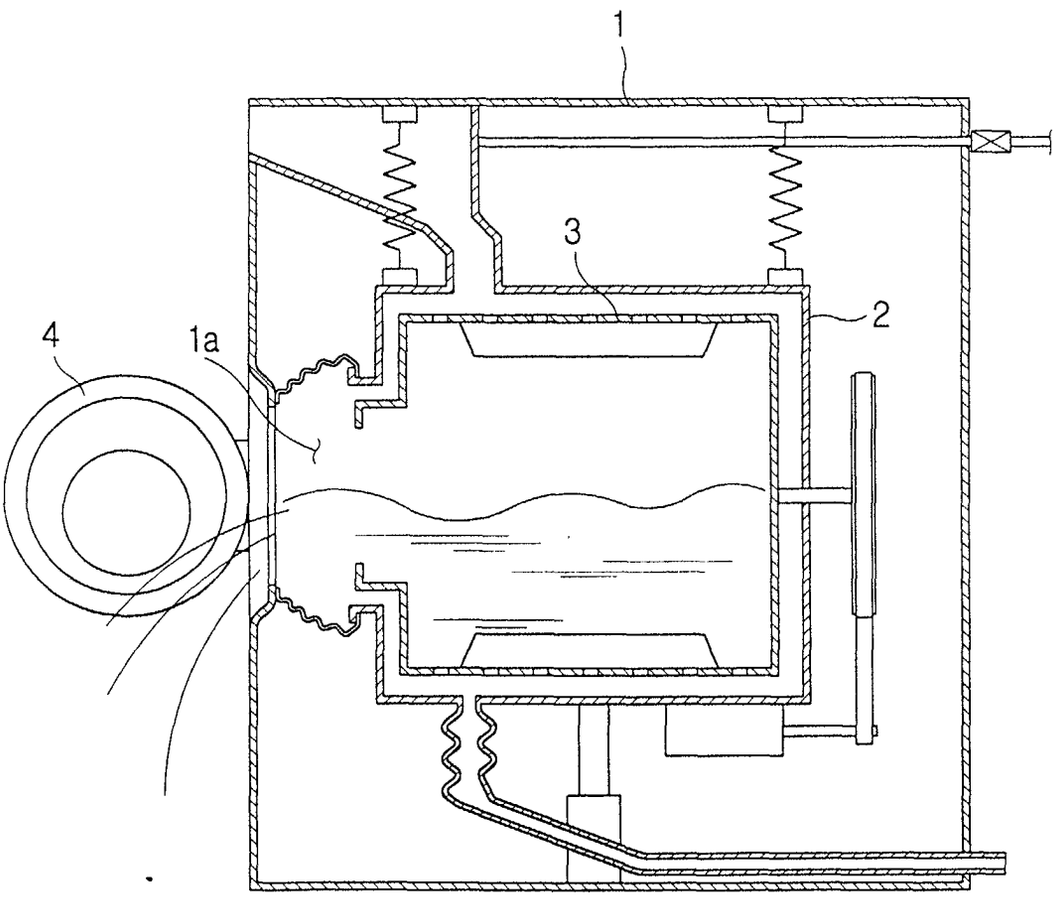

FIG. 2

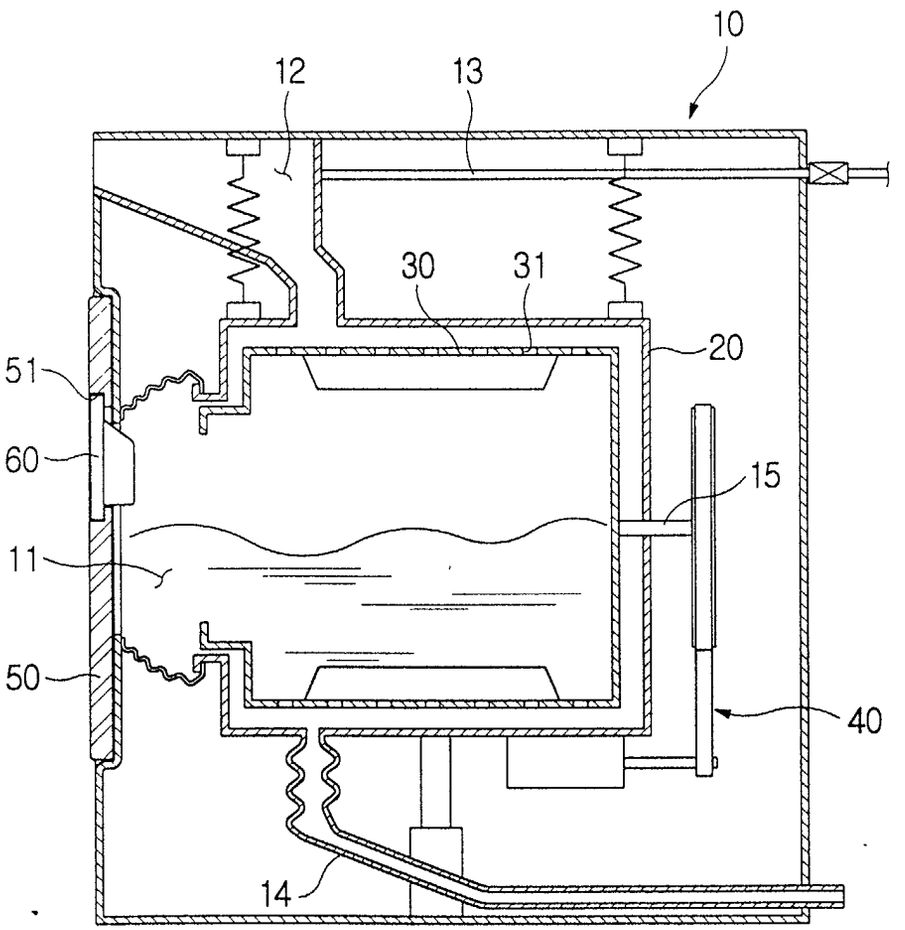

FIG. 3

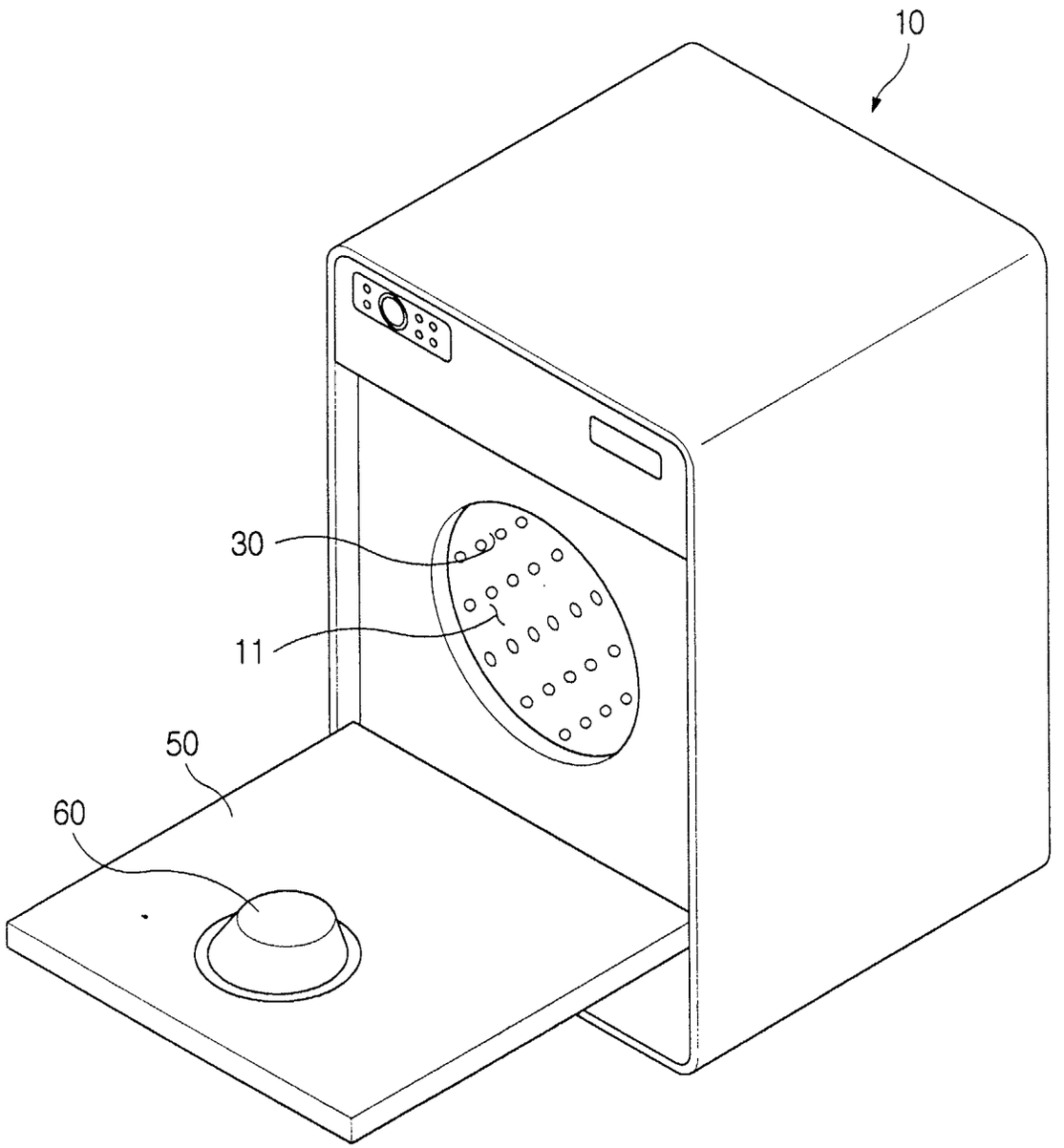

FIG. 4