



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.09.2010 Bulletin 2010/37

(51) Int Cl.:
D06F 39/08 (2006.01)

(21) Application number: **10154507.7**

(22) Date of filing: **24.02.2010**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **09.03.2009 JP 2009054543**

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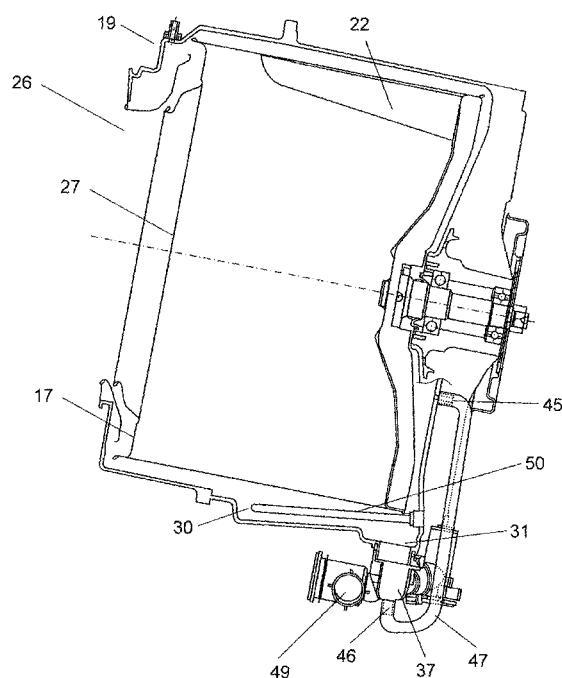
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(54) **Drum-type washer**

(57) A drum-type washer includes a water circulation channel (47), which is extended from an opening in a rear side of the washing tub (19), and communicated with a drain space (37) in the downstream of the drain outlet (31). After water is fed to a predetermined water level,

the rotating drum (17) starts to be rotated unidirectionally at a predetermined speed greater than the speed during washing, and then water is fed into the washing tub together with detergent. This minimizes the occurrence of accumulation of the detergent in the drain space.

FIG. 3



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a drum-type washer for washing laundry in a rotating drum.

2. Background Art

[0002] Conventional drum-type washers have a structure shown in Fig. 7, which will be described as follows.

[0003] As shown in Fig. 7, a drum-type washer includes drum 1 rotatably mounted in washing tub 3. Drum 1 has a large number of water-through-holes 2 in the entire outer peripheral surface. The washer also includes rotating shaft 4 fixed at one end to the rotation center of drum 1 and at the other end to drum pulley 5. The washer also includes motor 6, which is connected to drum pulley 5 via belt 7 so as to rotate drum 1. Drum 1 has an opening with lid 8. Washing tub 3 is suspended inside washer body 9 by spring 10 and vibro-isolatedly supported by vibration free damper 11. Vibration of washing tub 3 during spin cycle is prevented from being transmitted to washer body 9 by vibration free damper 11 and is reduced by weight 12. Washing tub 3 has drain outlet 17a at its bottom. The washer also includes feed valve 13 for feeding water into washing tub 3, drainage pump 14 for draining water from washing tub 3, and heater 15 for heating water in washing tub 3. The washer also includes control device 16, which controls the operations of motor 6, feed valve 13, drainage pump 14, heater 15, and the like so as to perform a series of cycles including wash, rinse, and spin cycles. An example of a conventional technique related to the present invention is shown in Japanese Patent Unexamined Publication No. H10-201988.

[0004] The following is a description of the operation of the above-described drum-type washer.

[0005] First, the user opens lid 8, loads laundry into drum 1, and turns the washer on to start a wash cycle. As a result, feed valve 13 is opened to feed water into washing tub 3. When the water reaches a predetermined level, feed valve 13 is closed to stop feeding water. Then, drum 1 is rotated by motor 6 at low speed, raising the laundry in drum 1 and then dropping it into the water during the wash cycle. When the wash cycle is performed for a predetermined time, the water in washing tub 3 is drawn into drainage pump 14 via drain outlet 17a. Then, drainage pump 14 is operated to drain the water as intermediate spinning so as to start a rinse cycle. The rinse cycle includes the same operation as the wash cycle. In a subsequent spin cycle, drum 1 is rotated at high speed to centrifugally dehydrate the laundry.

[0006] In the wash cycle, the detergent poured into a detergent container (not shown) is supposed to be introduced into washing tub 3 together with the water flowing through feed valve 13 immediately after washing is start-

ed. This operation is done manually or by other means. When the cleaning water comes into contact with laundry stains, the detergent cleans and removes stains, providing a high cleaning effect. In the above-described conventional structure, however, the detergent introduced at the start of washing often drops directly through drain outlet 17a as detergent aggregates before it is completely dissolved in the water in washing tub 3. This causes the detergent to get into the drain space and then to be discharged without fulfilling its function.

SUMMARY OF THE INVENTION

[0007] In view of the above-described problem, the present invention provides a drum-type washer that improves the solubility of detergent, thereby allowing the detergent to provide an excellent cleaning effect in the following manner. In a feed-water cycle, water is first fed into the drain space, then drum 1 starts to be rotated at an increased number of revolutions, and then detergent is introduced into the washing tub. This prevents the detergent from dropping through drain outlet 17a and accumulating in the drain space, and if the detergent drops through drain outlet 17a and accumulates in the drain space, accelerates to return it into washing tub 3.

[0008] The drum-type washer according to the present invention includes a rotating drum rotatable in a washing tub, the rotating drum having a rotation axis horizontal or inclined from a horizontal; a drain outlet in the bottom of the washing tub; a motor for rotating the rotating drum; a feed-water unit for feeding water into the washing tub; a drainage unit for draining water from the washing tub; a water circulation channel extended from an opening in the rear side of the washing tub, the water circulation channel being communicated with a drain space in the downstream of the drain outlet; and a controller for controlling at least the motor, the feed-water unit, and the drainage unit so as to perform at least wash, rinse, and spin cycles. After water is fed to a predetermined water level, the rotating drum starts to be rotated unidirectionally at a predetermined number of revolutions larger than the number of stirring revolutions during washing, and then water is fed into the washing tub together with detergent.

[0009] With this structure, in a feed-water cycle, water is first fed and kept in the drain space, then the rotating drum starts to be rotated at an increased number of revolutions to form a stream of water which runs across the surface of the inlet of the drain space, and then detergent is introduced into the washing tub. The stream of water prevents detergent from dropping into the drain space and the water circulation channel. Even if detergent accumulates in the drain space, it is stirred up by the cleaning water that has rushed into the drain space from the opening in the rear side of the rotating drum through the water circulation channel, and is returned from the drain space into the washing tub. The returned detergent is dissolved in the washing tub or the rotating drum with the

help of the rotation of the rotating drum, and brought into contact with the laundry. This achieves a drum-type washer which allows detergent to have its full cleaning effect, and hence, to provide excellent detergency performance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 is a sectional view of a side of a drum-type washer according to a first embodiment of the present invention.

Fig. 2 is a rear view of a washing tub of the washer according to the first embodiment.

Fig. 3 is a sectional view of a side of the washing tub, including a drain space, of the washer according to the first embodiment.

Fig. 4 is an operation flow of the washer according to the first embodiment.

Fig. 5 is an operation flow of a drum-type washer according to a second embodiment of the present invention.

Fig. 6 is an operation flow of a drum-type washer according to a third embodiment of the present invention.

Fig. 7 is a longitudinal sectional view of a side of a conventional drum-type washer.

DETAILED DESCRIPTION OF THE INVENTION

[0011] First to fourth embodiments of the present invention will be described as follows with reference to drawings. In the drawings, the dimensions of some components are exaggerated for clarity. In the second to fourth embodiments, like components are labeled with like reference numerals with respect to the first embodiment, and the description thereof will be sometimes omitted. Note that the present invention is not limited to these embodiments.

FIRST EMBODIMENT

[0012] Fig. 1 is a sectional view of a side of a drum-type washer according to a first embodiment of the present invention. Fig. 2 is a rear view of a washing tub of the washer. Fig. 3 is a sectional view of a side of the washing tub, including a drain space, of the washer. Fig. 4 is an operation flow of the washer.

[0013] As shown in Fig. 1, the drum-type washer includes rotating drum 17 rotatably mounted in washing tub 19. Rotating drum 17 is formed in a bottomed cylindrical shape and has a large number of water-through-holes 18 in the entire outer periphery. Rotating drum 17 has rotating shaft 20 as its rotation axis, which is either horizontal or slightly inclined from the horizontal. More specifically, the rotation axis is inclined downward from the front side to the rear side of rotating drum 17. Rotating

shaft 20 is connected via belt 44 to motor 21, which is fixed on the bottom of washing tub 19 so that rotating drum 17 can be rotated by motor 21 in the forward and reverse directions. Rotating drum 17 is provided on its inner circumference wall with several projection boards 22.

[0014] The washer also includes body 23 having opening 24, which is formed on the front side of washing tub 19 and in the direction perpendicular to an upwardly inclined surface of body 23. Opening 24 is covered with openable lid 25. When washing laundry, the user opens lid 25 and loads the laundry into rotating drum 17 through opening 24, laundry loading-unloading opening 26 of washing tub 19, and laundry loading-unloading opening 27 of drum 17. When washing is over, the user unloads the laundry from rotating drum 17 through these openings. Providing lid 25 in the direction perpendicular to the upwardly inclined surface of body 23 allows the user to load and unload laundry without bending over too much.

[0015] Washing tub 19 is swingably suspended from body 23 by spring 28 and damper 29. Washing tub 19 is provided on its inside bottom with long U-shaped drainage ditch 30 along the direction of rotating shaft 20. Drainage ditch 30 is equipped with heater 50, and has drain outlet 31 at a position to its bottom rear side. Drain outlet 31 is connected to drain space 37, which is connected at its outlet with drainage channel 32 via drain valve 49 as a component of drainage unit 60. Drainage channel 32 is connected at the other end thereof with drainage pump 33 as another component of drainage unit 60, so that drainage pump 33 drains water from washing tub 19. The washer also includes feed-water unit 65, which has first feed valve 34a and second feed valve 34b. First feed valve 34a feeds water directly into washing tub 19 through feed-water channel 36, and second feed valve 34b feeds water into washing tub 19 via detergent container 35 and feed-water channel 36a. The washer also includes water level detector 48 for detecting the water level in washing tub 19.

[0016] The washer also includes control device 39, which has controller 38 composed of a microcomputer. Controller 38 controls the operations of motor 21, drainage pump 33, feed valves 34a and 34b, drain valve 49, and other components via a power switching unit (not shown) so as to control wash, rinse, spin, and dry cycles.

[0017] Control device 39 receives information from an input setting unit (not shown) for setting an operation course and other conditions, and displays the information on a display unit (not shown) provided therein. The display unit is on the front side of body 23, so that the user can see it easily. Control device 39 also has storage unit 75, which stores data required for controller 38 to control. Storage unit 75 and the display unit can be provided in control device 39 together with controller 38.

[0018] As shown in Fig. 2, washing tub 19 of the washer is provided on its rear side with rear-side opening 45. Rear-side opening 45 and opening 46 of drain space 37 shown in Fig. 3 are connected to water circulation chan-

nel 47 so that water or air in washing tub 19 can circulate there.

[0019] The operation of the washer having the structure shown in Figs. 2 and 3 will be described as follows based on the flow of Fig. 4.

[0020] In Step 100, the user opens lid 25, loads laundry into rotating drum 17, and closes lid 25 so that the drum-type washer can be started. In Step 101, the user turns on the power switch (not shown). In Step 102, the user selects a course and cycles. In Step 103, the selected program is displayed on the operation panel. In Step 104, the user presses the start button (not shown) to start the program. In Step 105, lid 25 of the washer is locked.

[0021] Next, a feed-water cycle is performed in Steps 106 to 119 as follows.

[0022] In Step 106, first feed valve 34a is turned on to feed water. In Step 107, the water is fed into washing tub 19 through first feed-water channel 36. In Step 108, it is determined whether the water in washing tub 19 has reached a predetermined water level S1 which is, for example, 0 mm or the reset water level. When it is affirmatively determined, the process proceeds to Step 109 where first feed valve 34a is turned off to stop feeding water; otherwise, the process returns to Step 107 to continue to feed water.

[0023] In Step 110, rotating drum 17 starts to be rotated by motor 21. In Step 111, it is determined whether rotating drum 17 has reached a predetermined number of revolutions R2 which is, for example, 85 r/min. When it is affirmatively determined, the process proceeds to Step 112; otherwise, the process returns to Step 110 to continue to rotate drum 17 so as to increase the number of revolutions. In Step 112, second feed valve 34b is turned on to feed water. In Step 113, the water is made to pass through detergent container 35. In Step 114, the water is made to pass through feed-water channel 36a. In Step 115, the water is fed into washing tub 19 together with detergent. As a result, the detergent is introduced into washing tub 19.

[0024] In Step 116, it is determined whether the water has reached a predetermined water level S2 which is, for example, 60 mm. When it is affirmatively determined, the process proceeds to Step 117 where second feed valve 34b is turned off to stop feeding water; otherwise, the process returns to Step 112 to continue to feed water. In Step 118, it is determined whether a predetermined rotation time T1 has been reached. When it is affirmatively determined, the rotation of rotating drum 17 is stopped in Step 119 so that the process proceeds to the next cycle; otherwise, the process returns to Step 117 to continue the rotation.

[0025] During the rotation of rotating drum 17, the detergent-containing water is stirred, allowing the detergent to be dissolved in the water. At the same time, the water hits the sidewalls (not shown) of drainage ditch 30. When the water hits the sidewalls, this produces foam containing highly concentrated detergent, which grows and fills the space between rotating drum 17 and washing tub 19.

The foam then expands to the front side of rotating drum 17 and washing tub 19, gets into rotating drum 17 through laundry loading-unloading opening 27, and finally permeates the laundry. At this moment, most of the detergent that has reached drainage ditch 30 is dissolved by stirring. However, when the amount of detergent is large, some of the detergent that remains without being dissolved in the water sometimes drops through drain outlet 31 and accumulates in drain space 37.

[0026] The accumulation of the detergent, however, can be minimized as follows. As described above, detergent is introduced into washing tub 19 after rotating drum 17 is rotated unidirectionally at the predetermined number of revolutions R2 while water is being continuously fed. The number of revolutions R2 is larger than the number of stirring revolutions during washing. In other words, in the feed-water cycle, water is first fed and kept in drain space 37, then rotating drum 17 starts to be rotated at an increased number of revolutions, and then detergent is introduced into washing tub 3. This can prevent the detergent from dropping into drain space 37 and water circulation channel 47. Even if detergent accumulates in drain space 37, it is returned into washing tub 19 and dissolved easily in tub 19 or rotating drum 17 with the help of the rotation of drum 17, thereby providing an excellent cleaning effect.

[0027] As described above, the drum-type washer of the present invention includes rotating drum 17, drain outlet 31, motor 21, feed-water unit 65, drainage unit 60, water circulation channel 47, and controller 38. Rotating drum 17 is rotatably mounted in washing tub 19, and has rotating shaft 20 as its rotation axis, which is either horizontal or inclined from a horizontal. Drain outlet 31 is in the bottom of washing tub 19. Motor 21 rotates rotating drum 17. Feed-water unit 65 feeds water into washing tub 19. Drainage unit 60 drains water from washing tub 19. Water circulation channel 47 is extended from rear-side opening 45 in the rear side of washing tub 19 in such a manner as to be communicated with drain space 37 in the downstream of drain outlet 31. Controller 38 controls at least motor 21, feed-water unit 65, and drainage unit 60 so as to perform at least wash, rinse, and spin cycles.

[0028] In the drum-type washer according to the present embodiment, after water is fed to a predetermined water level, rotating drum 17 starts to be rotated unidirectionally at the predetermined number of revolutions larger than the number of stirring revolutions during washing, and then water is fed into washing tub 19 together with detergent.

[0029] With this structure, in a feed-water cycle, water is first fed and kept in drain space 37, then rotating drum 17 starts to be rotated at an increased number of revolutions, and then detergent is introduced into washing tub 19. This prevents the detergent from dropping into drain space 37 and water circulation channel 47. Even if detergent accumulates in drain space 37, it is returned into washing tub 19 and dissolved easily in tub 19 or rotating drum 17 with the help of the rotation of drum 17,

thereby providing an excellent cleaning effect.

SECOND EMBODIMENT

[0030] Fig. 5 is an operation flow of a drum-type washer according to a second embodiment of the present invention. A sectional view of a side of the washer, a rear view of washing tub 19, and a sectional view of a side of washing tub 19, including drain space 37, according to the second embodiment are identical to those in the first embodiment, and hence, will be described with reference to Figs. 1, 2, and 3, respectively.

[0031] The drum-type washer of the present second embodiment is identical to that of the first embodiment except that controller 38 controls the following operations. Water is fed for a predetermined time while rotating drum 17 is being rotated unidirectionally at a predetermined number of revolutions. When the predetermined time passes, drum 17 is rotated at an increased number of revolutions, and then water is fed into washing tub 19 together with detergent.

[0032] The following is a description of the main part of the operation flow shown in Fig. 5 of the washer having the above-described structure. The same steps as those in the first embodiment will not be described in the present embodiment.

[0033] In the feed-water cycle, in Step 206, rotating drum 17 starts to be rotated by motor 21. In Step 207, it is determined whether drum 17 has reached a predetermined number of revolutions R1 which is, for example, 45 r/min. When it is affirmatively determined, the process proceeds to Step 208; otherwise, the process returns to Step 206 where drum 17 is continued to rotate so as to increase the number of revolutions. When first feed valve 34a is turned on in Step 208, water starts to be fed. In Step 209, the water is fed into washing tub 19 through feed-water channel 36. In Step 210, it is determined whether the water has reached a predetermined water level S1 which is, for example, 0 mm or the reset water level. When it is affirmatively determined, the process proceeds to Step 211 where first feed valve 34a is turned off to stop feeding water; otherwise, the process returns to Step 209 to continue feeding water.

[0034] After the water feeding is stopped, in Step 212, the number of revolutions of rotating drum 17 is increased. In Step 111, it is determined whether drum 17 has reached a predetermined number of revolutions R2 which is, for example, 85 r/min. When it is affirmatively determined, the process proceeds to Step 112; otherwise, the process returns to Step 212 where drum 17 is continued to rotate so as to increase the number of revolutions.

[0035] In Step 112, second feed valve 34b is turned on to feed water. In Step 113, the water is made to pass through detergent container 35. In Step 114, the water is made to pass through feed-water channel 36a. In Step 115, the water is fed into washing tub 19 together with detergent. As a result, the detergent is introduced into

washing tub 19.

[0036] In Step 116, it is determined whether the water has reached a predetermined water level S2 which is, for example, 60 mm. When it is affirmatively determined, the process proceeds to Step 117 where second feed valve 34b is turned off to stop feeding water; otherwise, the process returns to Step 115 to continue to feed water into washing tub 19. In Step 118, it is determined whether a predetermined rotation time T1 has been reached. When it is affirmatively determined, the rotation of rotating drum 17 is stopped in Step 119 so that the process proceeds to the next cycle: a laundry stirring cycle.

[0037] As described hereinbefore, after water is fed for the predetermined time while rotating drum 17 is being rotated unidirectionally at the predetermined number of revolutions R1, drum 17 is rotated at an increased number of revolutions while continuing to feed water. Then, detergent is introduced into washing tub 19 together with water. This prevents laundry in drum 17 from being unevenly wet when water is first fed, allowing a smooth increase in the number of revolutions of drum 17. As a result, detergent can be introduced into washing tub 19 after the number of revolutions is thus increased efficiently, thereby improving its solubility in drum 17 and providing an excellent cleaning effect.

[0038] As described above, controller 38 of the washer according to the present invention controls the following operations. In the feed-water cycle, water is fed for a predetermined time while rotating drum 17 is being rotated unidirectionally at a predetermined number of revolutions. When the predetermined time passes, drum 17 is rotated at an increased number of revolutions while continuing to feed water, and then detergent is introduced into washing tub 19.

[0039] With this structure, the laundry in rotating drum 17 is prevented from being unevenly wet when water is fed first, allowing a smooth increase in the number of revolutions of drum 17. As a result, detergent can be introduced into washing tub 19 after the number of revolutions is thus increased efficiently, thereby securely improving its solubility in drum 17 and providing an excellent cleaning effect.

THIRD EMBODIMENT

[0040] Fig. 6 is an operation flow of a drum-type washer according to a third embodiment of the present invention. A sectional view of a side of the washer, a rear view of washing tub 19, and a sectional view of a side of washing tub 19, including drain space 37, according to the third embodiment are identical to those in the first embodiment, and hence, will be described with reference to Figs. 1, 2, and 3, respectively.

[0041] The drum-type washer of the present third embodiment is identical to those of the first and second embodiments except that controller 38 controls the following operation. In a feed-water cycle, when a predetermined time has passed after the pouring of detergent, rotating

drum 17 is rotated at a further increased number of revolutions.

[0042] The operation of the washer will be described with reference to Fig. 6. The same steps as those in the first and second embodiments will not be described in the present embodiment.

[0043] In the feed-water cycle, detergent is introduced into washing tub. In Step 301, the number of revolutions of rotating drum 17 is increased. In Step 302, it is determined whether rotating drum 17 has reached a predetermined number of revolutions R3 which is, for example, 120 r/min. When it is affirmatively determined, the process proceeds to Step 118; otherwise, the process returns to Step 301 so as to increase the number of revolutions.

[0044] In Step 118, it is determined whether rotating drum 17 has reached a predetermined rotation time T1. When it is affirmatively determined, the rotating of drum 17 is stopped in Step 119, and the process proceeds to the next cycle; otherwise, the process returns to Step 118 where drum 17 is continued to rotate. The predetermined number of revolutions R2 is larger than the number of stirring revolutions during washing, and smaller than the predetermined number of revolutions R3.

[0045] As described above, controller 38 controls drum 17 to be rotated at the further increased number of revolutions when the predetermined time has passed since the pouring of the detergent.

[0046] With this structure, the detergent is prevented from dropping into drain space 37 and water circulation channel 47. Even if, the detergent accumulates in drain space 37, it is returned into washing tub 19 and dissolved easily in tub 19 or drum 17 with the help of the rotation of drum 17. At the same time, stirring the cleaning water in washing tub 19 at high speed produces foam containing highly concentrated detergent, which is applied to the laundry in drum 17. The foam containing highly concentrated detergent easily permeates the laundry, providing an excellent cleaning effect.

FOURTH EMBODIMENT

[0047] A drum-type washer according to a fourth embodiment of the present invention will be described as follows. A sectional view of a side of the washer, a rear view of washing tub 19, and a sectional view of a side of washing tub 19, including drain space 37, according to the fourth embodiment are identical to those in the first to third embodiments, and hence, will be described with reference to Figs. 1, 2, and 3, respectively.

[0048] The drum-type washer of the present fourth embodiment is identical to that of one of the first to third embodiments except that controller 38 controls the following operation. Water is fed while rotating drum 17 is being rotated in the direction opposite to the direction in which the water is fed to drain outlet 31 through feed-water channels 36 and 36a.

[0049] The following is a description of the operation of the washer having the above-described structure. The

same steps as those in the first to third embodiments will not be described in the present embodiment.

[0050] Assume a case where, in a feed-water cycle, as shown in Figs. 1 to 3, feed valve 34a or 34b is turned on to feed water through feed-water channels 36 and 36a while rotating drum 17 is being rotated. In this case, water is fed while rotating drum 17 is being rotated in the direction opposite to the direction in which the water is fed to drain outlet 31 through feed-water channels 36 and 36a. The water returning into washing tub 19 prevents detergent from dropping directly through drain outlet 31 into drain space 37 and water circulation channel 47. Even if the detergent accumulates in drain space 37, the returning water stirs up the detergent, thereby improving its solubility in rotating drum 17 and providing an excellent cleaning effect.

[0051] As described hereinbefore, according to the drum-type washer of the present invention, detergent is introduced into washing tub 19 in such a manner as to minimize itself from dropping into the drain space and the water circulation channel in a feed-water cycle, thereby improving its solubility. As a result, the drum-type washer provides excellent washing performance.

Claims

1. A drum-type washer comprising:

a rotating drum rotatable in a washing tub, the rotating drum having a rotation axis horizontal or inclined from a horizontal;
a drain outlet in a bottom of the washing tub;
a motor for rotating the rotating drum;
a feed-water unit for feeding water into the washing tub;
a drainage unit for draining water from the washing tub;
a water circulation channel extended from an opening in a rear side of the washing tub, the water circulation channel being communicated with a drain space in a downstream of the drain outlet; and
a controller for controlling at least the motor, the feed-water unit, and the drainage unit so as to perform at least wash, rinse, and spin cycles, wherein
the controller controls so that after water is fed for a predetermined water level, the rotating drum starts to be rotated unidirectionally at a predetermined number of revolutions larger than the number of stirring revolutions during washing, and then water is fed into the washing tub together with detergent.

2. The drum-type washer of claim 1, wherein
the controller controls so that after the water is fed for the predetermined time while the rotating drum

is being rotated unidirectionally at the predetermined number of revolutions, the rotating drum is rotated at an increased number of revolutions, and then water is fed into the washing tub together with detergent.

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3. The drum-type washer of claim 1 or 2, wherein the controller controls so that when a predetermined time has passed after pouring of the detergent, the rotating drum is rotated at a further increased number of revolutions.

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4. The drum-type washer of claim 1 or 2, wherein the controller controls so that the water is fed while the rotating drum is being rotated in a direction opposite to a direction in which the water is fed to the drain outlet through the feed-water channel.

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5. The drum-type washer of claim 3, wherein the controller controls so that the water is fed while the rotating drum is being rotated in a direction opposite to a direction in which the water is fed to the drain outlet through the feed-water channel.

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FIG. 1

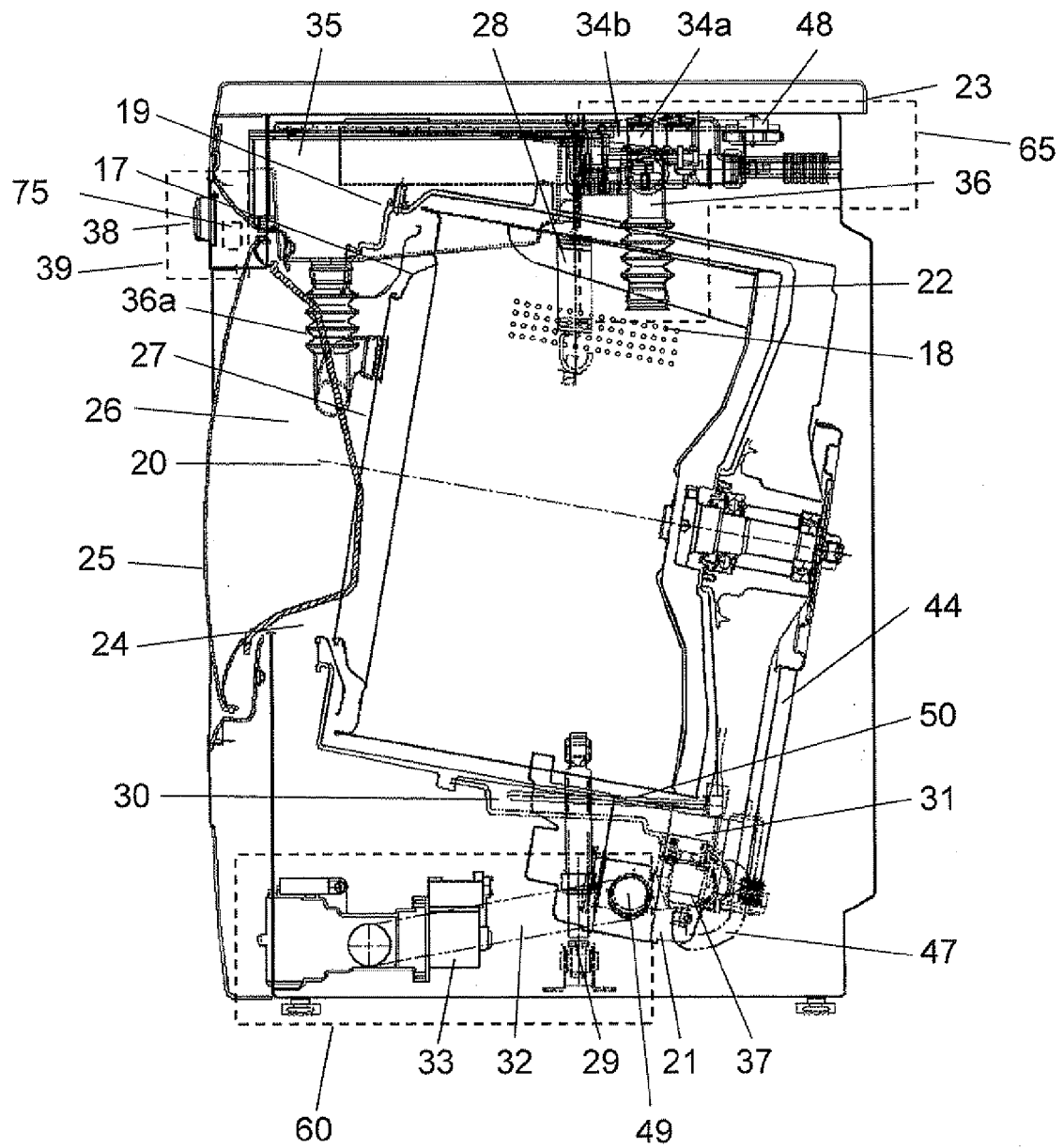


FIG. 2

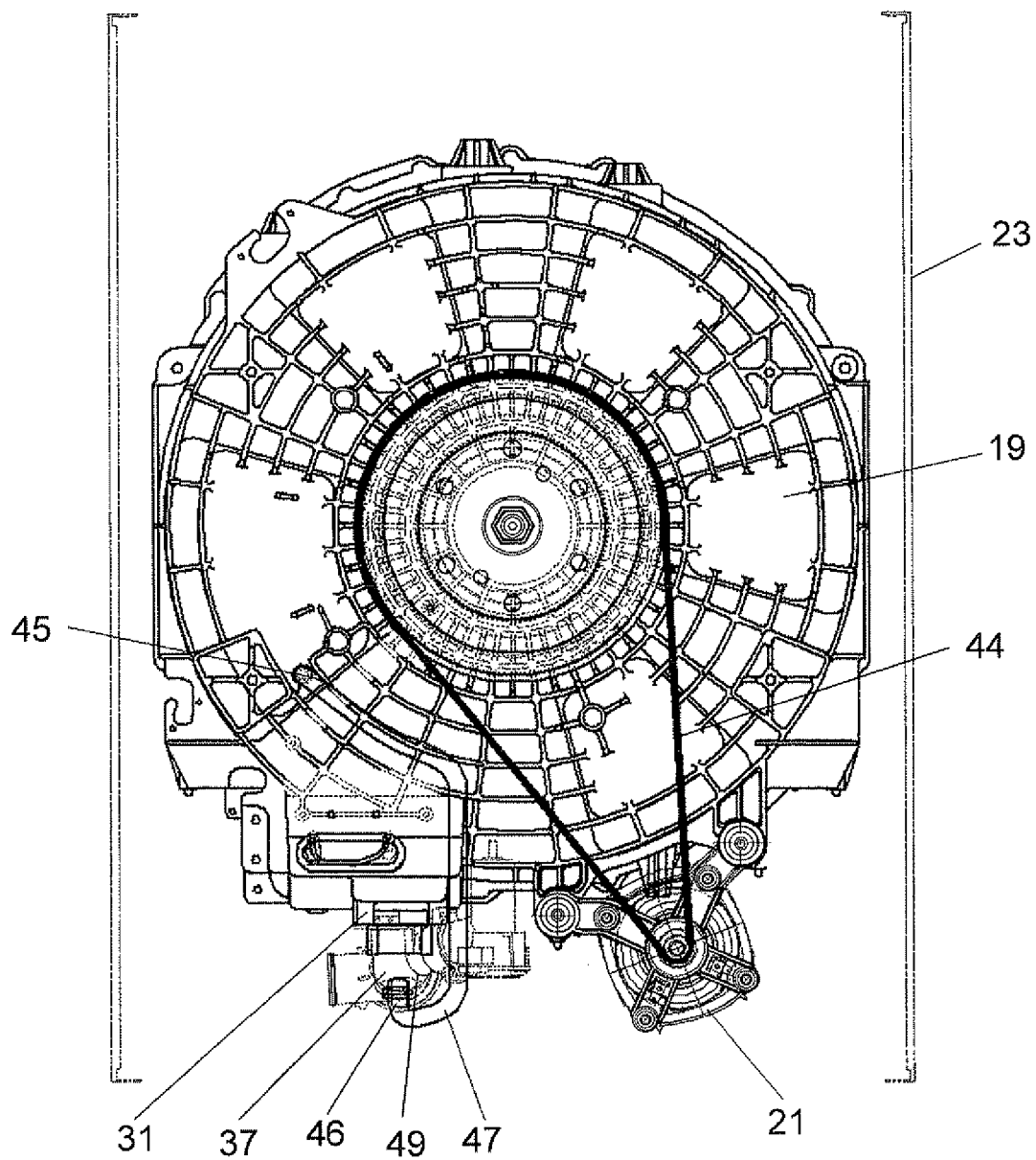


FIG. 3

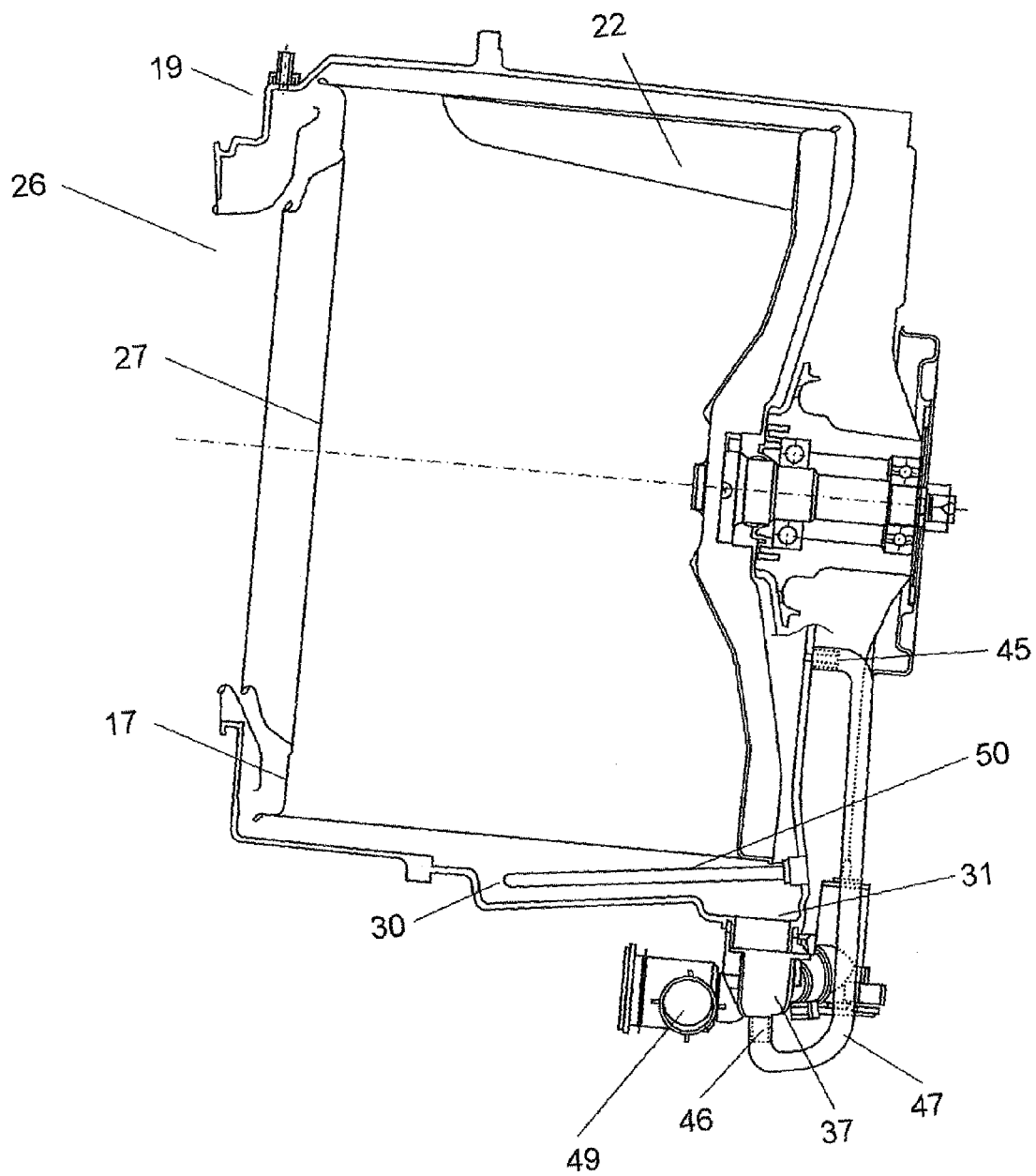


FIG. 4

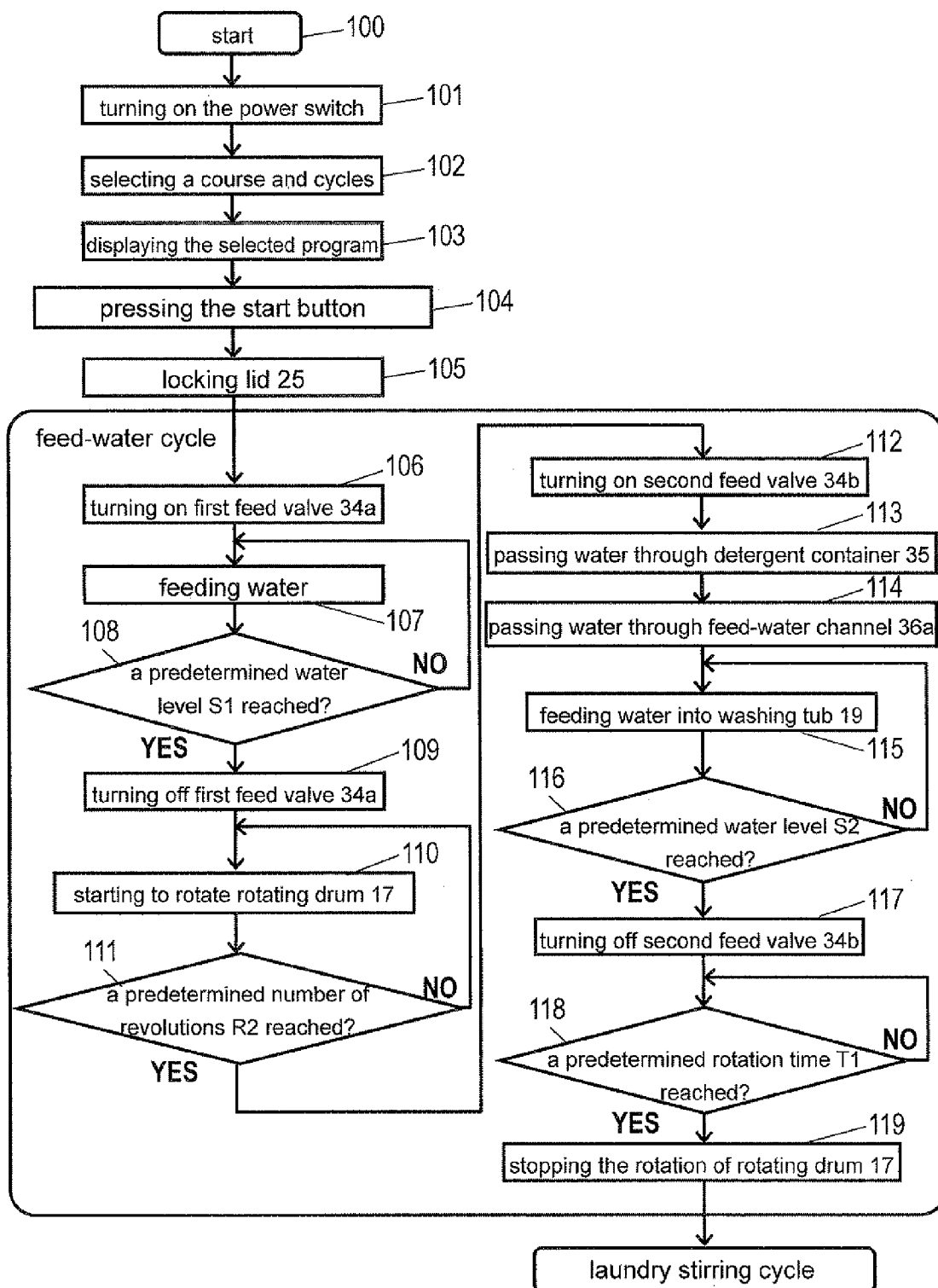


FIG. 5

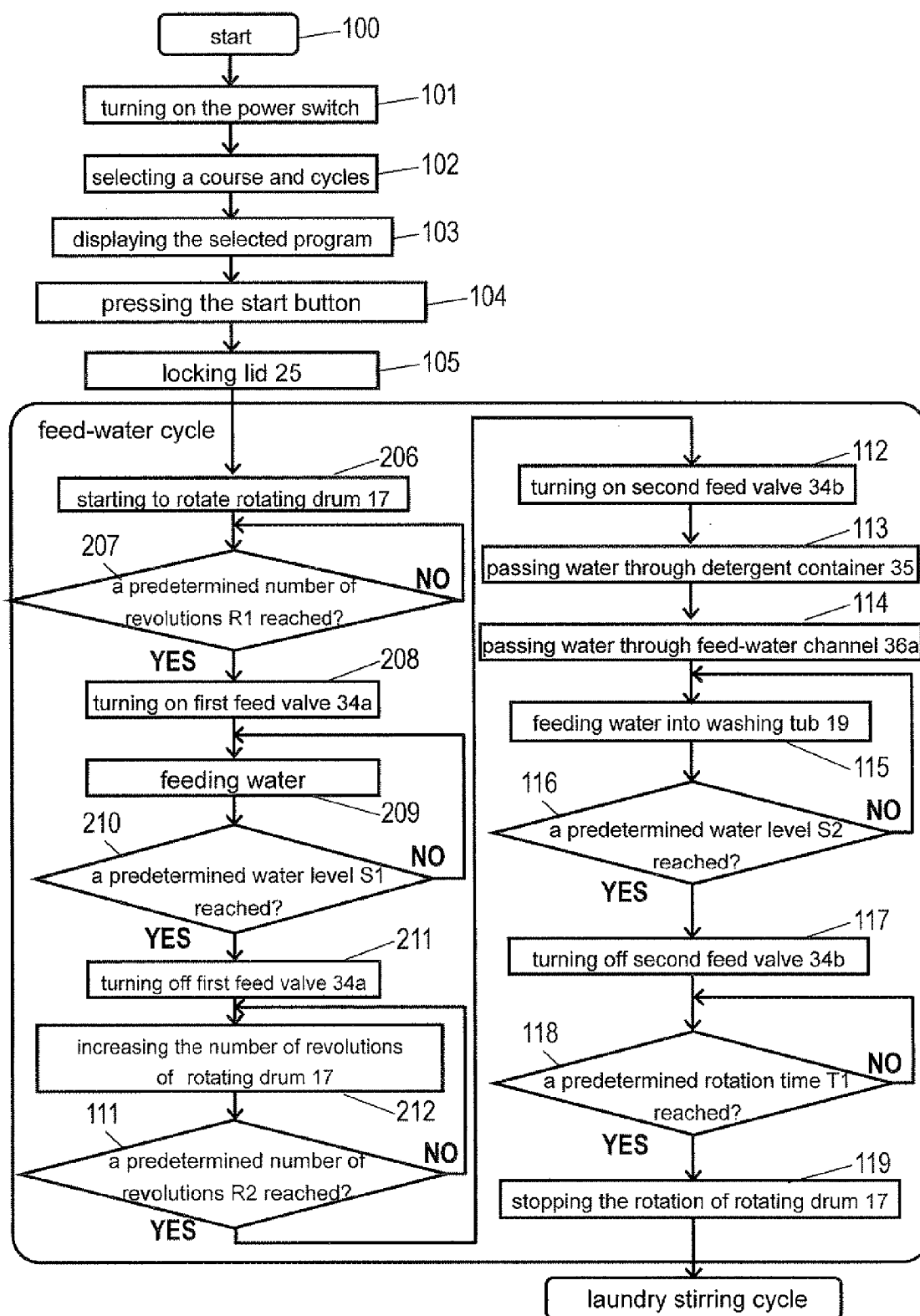


FIG. 6

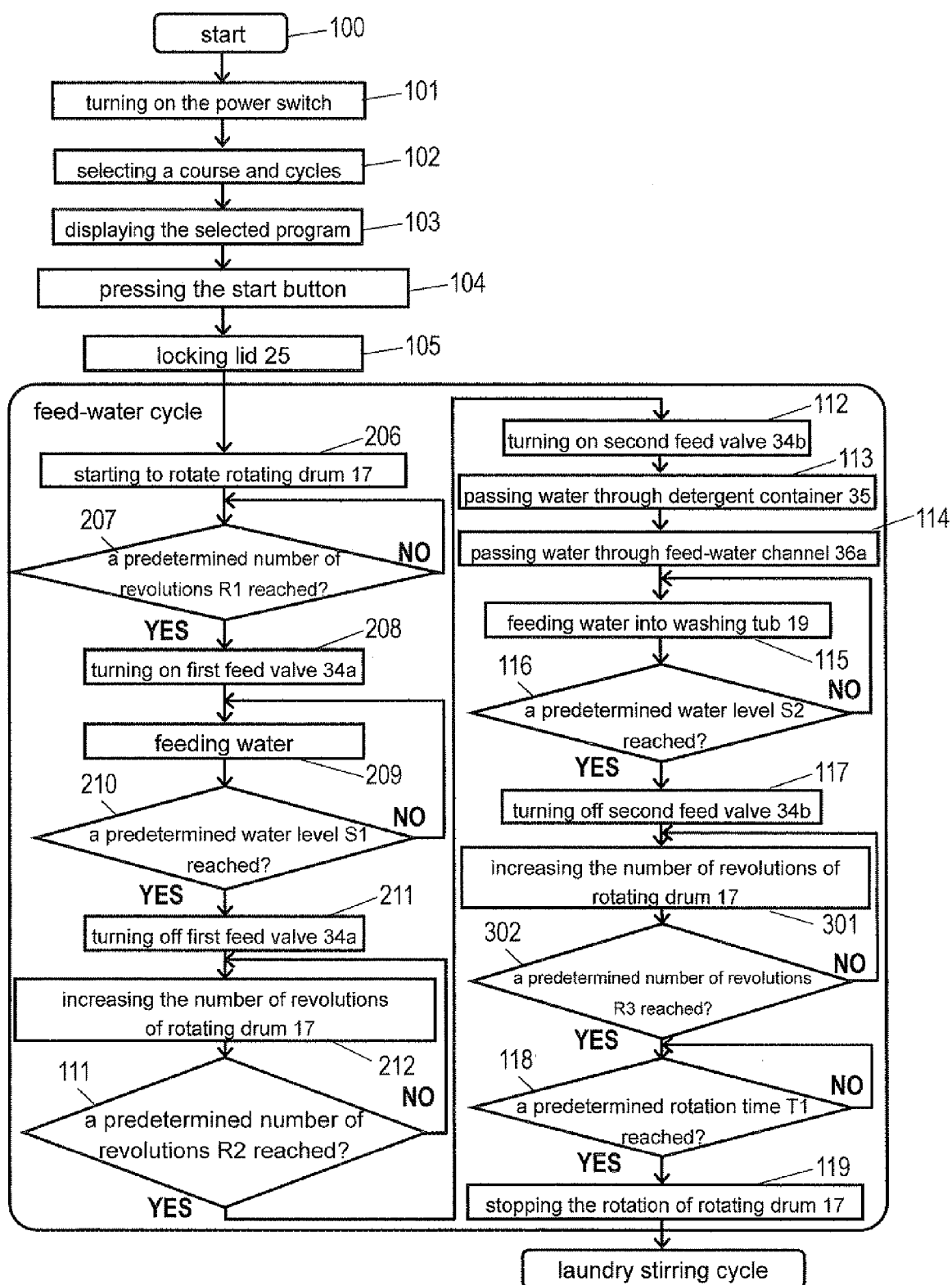
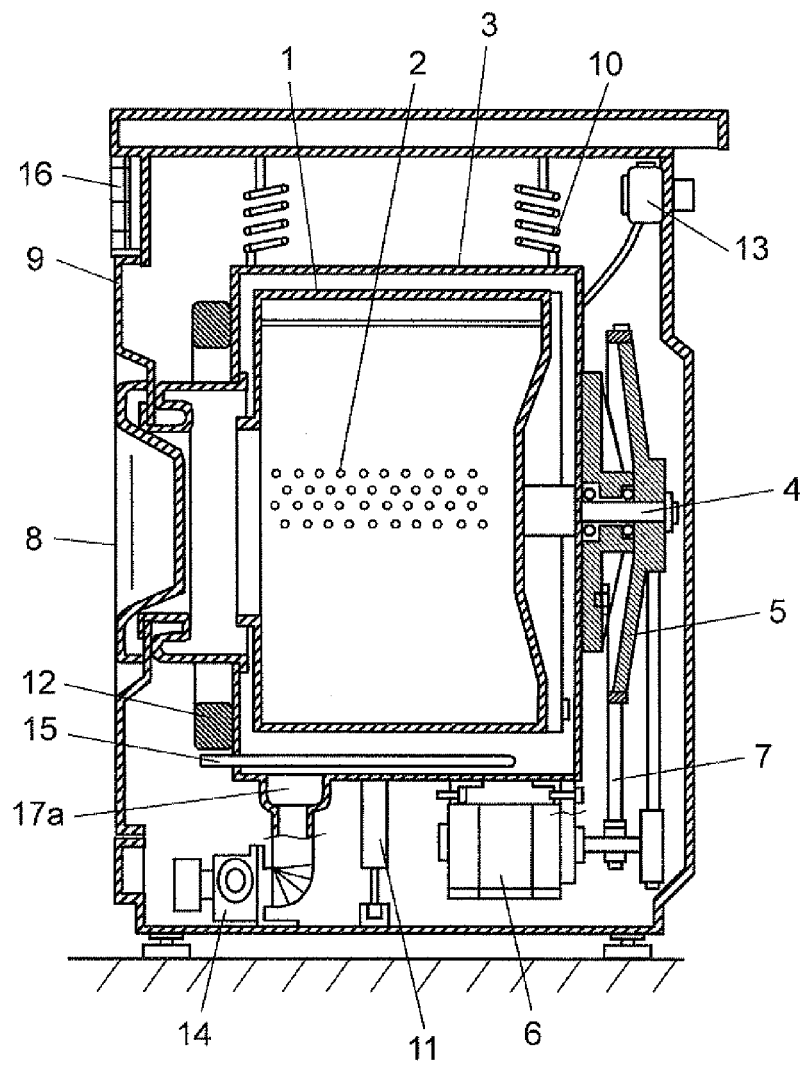


FIG. 7





EUROPEAN SEARCH REPORT

Application Number
EP 10 15 4507

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	GB 2 127 045 A (BOSCH SIEMENS HAUSGERAETE) 4 April 1984 (1984-04-04) * page 1, line 66 - line 96; figure 1 *	1-5	INV. D06F39/08
Y	EP 0 821 095 A2 (PHILCO ITALIANA [IT]) 28 January 1998 (1998-01-28) * column 1, line 33 - line 56; figures 1-2 *	1-5	
Y	EP 0 677 609 A2 (MERLONI ELETTRODOMESTICI SPA [IT]) 18 October 1995 (1995-10-18) * column 4, line 48 - column 5, line 21; figures 1-4 *	1-5	
A	DE 37 04 079 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 18 August 1988 (1988-08-18) * column 4, line 2 - line 30; figure 3 *	1-5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
Place of search		Date of completion of the search	Examiner
Munich		31 May 2010	Hannam, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 15 4507

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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