



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**01.02.2012 Bulletin 2012/05**

(51) Int Cl.:  
**D06F 33/02** <sup>(2006.01)</sup> **D06F 35/00** <sup>(2006.01)</sup>  
**D06F 39/08** <sup>(2006.01)</sup>

(21) Application number: **11382248.0**

(22) Date of filing: **20.07.2011**

(84) Designated Contracting States:  
**AL 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 RS SE SI SK SM TR**  
 Designated Extension States:  
**BA ME**

(72) Inventor: **Ortega Salas, José Ignacio**  
**48910 Sestao (ES)**

(74) Representative: **Igartua, Ismael Fagor, S.Coop.**  
**Industrial Property Department**  
**San Andrés Auzoa, z/g;**  
**Apdo. 213**  
**20500 Arrasate-Mondragon (ES)**

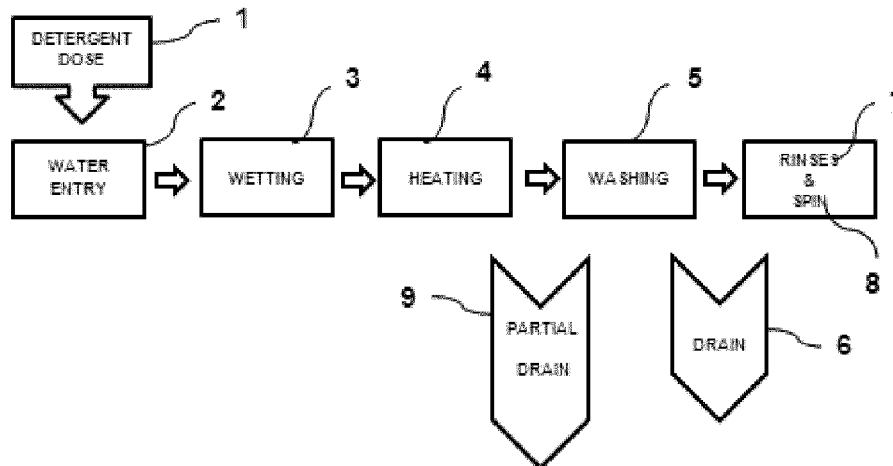
(30) Priority: **29.07.2010 ES 201031181**

(71) Applicant: **Fagor, S. Coop.**  
**20500 Arrasate-Mondragon (ES)**

(54) **Clothes washing method for a washing machine**

(57) Clothes washing method for a washing machine, comprising a wetting phase (3), wherein the clothes absorb water, and a washing phase (5), wherein the clothes are treated mechanically; and there is at least

one partial water drain after the wetting phase (3) and before the end of the washing phase (5), so that a variable amount of water depending on the selected washing program and the clothing load and type inserted in the washing machine is extracted by means of said partial drain.



**Fig. 2**

**Description**

## TECHNICAL FIELD

**[0001]** The invention relates to clothes washing by mechanical means, and more particularly, to a clothes washing method with partial water drain previous to the washing stage.

## PRIOR ART

**[0002]** Methods for washing clothes in a washing machine are well known in the prior art comprising, depending on the washing program selected, a wetting phase, in which clothes absorb water which has entered the washing machine drum previously, and a washing phase where the clothes are mechanically treated.

**[0003]** Korean patent application KR20080040401 discloses a method for controlling a washing machine as described above, in which a drainage valve is activated, water level in the washing machine tub is measured, it is established if the level measured is less than a preset level, and the drainage valve is disconnected after a set period of time. A previous drain is performed before the washing to obtain a preset water level.

**[0004]** Korean patent application KR20070117912 discloses a washing machine, and a washing machine operating method which drains the water if the water level is beyond set limits, all of which occurs before the washing.

**[0005]** Korean patent application KR20050041499 discloses a method for controlling the washing process, in which the drum is supplied with a quantity of water after a set period of time, after which the water is drained, followed by a prewash and a washing. This involves a shorter washing program than normal, in order to remove dirt or sand remains, followed by a normal washing program.

**[0006]** Japanese patent application JP4285592 discloses an automatic washing machine control method, which employs water level detection before the washing process, wherein when the level exceeds a set value, the water is drained to a preset value, and the washing method is initiated when said preset level is obtained.

**[0007]** United States patent application US2008104770 discloses a washing control method, wherein water is intermittently supplied, and the variation in the water level in the tub produced as a result of said supply is detected, and the drum is drained when the water level remains constant or decreases. It constitutes an operation carried out before the washing method which allows the siphon phenomenon to be detected. It therefore constitutes an additional safety to the water supply for the washing method.

**[0008]** United States patent application US3071432 discloses a method for washing machines, wherein, after clothing is loaded, the drum is rotated and water is added continuously and any excess liquid is drained from the

drum, whilst said drum is being continually heated during a first phase, and the water supply is shutoff as soon as a certain temperature is reached. Given that it involves a continuous water supply, it must periodically be partially drained to avoid flooding, whilst the water is heated.

## DISCLOSURE OF THE INVENTION

**[0009]** It is an object of the invention to provide a clothes washing method for a washing machine, comprising a wetting phase wherein clothes absorb the water, and a washing phase wherein the clothes are mechanically treated.

**[0010]** The method of the invention involves a partial water drain following the wetting phase and before the completion of the washing phase, wherein a variable amount of water is drained as a function of the washing program selected and the load and type of clothing inserted in the washing machine. Partial drain is understood to involve continuous and/or intermittent evacuation. The amount of water remaining in the washing machine is reduced and adjusted by means of said partial drain.

**[0011]** These and other advantages and characteristics of the invention will become evident on viewing the drawings and the detailed description of the invention.

## DESCRIPTION OF THE DRAWINGS

**[0012]**

Fig. 1 shows the method normally used for washing clothes in a washing machine.

Fig. 2. shows the clothes washing method for a washing machine, with partial water drain before the end of the washing phase according to a first embodiment.

Fig. 3. shows the clothes washing method for a washing machine, with partial water drain before the end of the washing phase according to a second embodiment.

Fig. 4. shows the clothes washing method for a washing machine, with partial water drain before the end of the washing phase according to a third embodiment.

## DETAILED DISCLOSURE OF THE INVENTION

**[0013]** Fig. 1 shows a clothes washing method for a washing machine normally used. The method comprises, depending on the washing program selected, the phases explained below.

**[0014]** A detergent product dosage phase 1, which can be added all at once at the start of the method, or partially up to the water heating phase 4.

**[0015]** A water intake phase 2, which can be carried out partially until the water heating phase 4 inclusive.

**[0016]** A wetting phase 3, wherein the clothes absorb the water that enters the washing machine drum; during this phase the clothing load is subjected to mechanical agitation via the washing machine motor to obtain correct wetting. The clothes absorb the water and the water level decreases in the drum; the washing machine has at least one water level detection means, normally a pressure sensor, and thereby it can establish how much water there is in the drum. The washing machine has several washing programmes, which respond to an algorithm that defines the phases of the washing method, with their different characteristics; when the water reaches the bottom level detected by the pressure sensor and after a preset period of time during which the clothing has absorbed the water, the selected washing program defines a new intake of water until it reaches the preset water level and depending on the clothing type and load inserted in the washing machine; this process is repeated a number of times as defined in the selected washing program. When this phase is complete, the washing machine is aware of the amount of water that has entered the washing machine, the approximate amount of water absorbed and therefore the approximate amount of water remaining, and with this data and the characteristics of the washing programme selected it is aware of the clothing type and load inserted in the washing machine.

**[0017]** A water heating phase 4, which may or may not exist depending on the selected wash program, wherein the water is heated to a set temperature. As a function of the selected washing program and the clothing type and load defined, and if the wetting phase was not sufficiently long, this phase may involve further water intake.

**[0018]** A washing phase 5, wherein the clothing is mechanically treated by rotating the washing machine drum alternately in one direction and another via a motor, for a set period of time according to the washing program selected.

**[0019]** A drain phase 6, wherein the water is drained from the machine.

**[0020]** A rinse phase 7, during which some water is supplied for rinsing clothes and some short spins are carried out.

**[0021]** And a spin phase 8, wherein the principal and longest spin is carried out to complete the water extraction from the clothing.

**[0022]** Fig. 2. shows a clothes washing method for a washing machine, with partial water drain before the end of the washing phase 5 according to a first embodiment. In said method, following the water heating phase 4 and before the end of the washing phase 5, the washing program selected defines a partial water drain 9, wherein a variable amount of water is drained from the washing machine as a function of clothing load and type inserted in the washing machine. After the wetting phase 3 the selected washing program defines the clothing type and load in the washing machine, and using this information

and a preset level of water required for the washing phase 5, it defines the amount of water to be drained. This partial drain 9 also extracts some of the detergent and water heated previously from the washing container, but there is a reduction and better adjustment of the amount of water remaining in the washing machine after the partial drain 9 and required for the washing phase 5.

**[0023]** Fig. 3. shows a clothes washing method for a washing machine, with partial water drain before the end of the washing phase 5 according to a second embodiment. In said method, following the wetting phase 3 and before the end of the water heating phase 4 or before the start of the water heating phase 4, the selected washing program defines a partial water drain 10, wherein a variable amount of water is drained from the washing machine as a function of clothing load and type inserted in the washing machine. In this embodiment not so much water is heated during the water heating phase 4 and the detergent product dosage phase can be carried out in three different ways: at a phase 1 during the water intake phase 2, at a phase 11 during the wetting phase 3, and at a phase 12 after the partial drain 10 and before the water heating phase 4, thereby avoiding in the latter extracting detergent product from the washing machine during the partial drain 10.

**[0024]** Fig. 4. shows a clothes washing method for a washing machine, with partial water drain before the end of the washing phase 5 according to a third embodiment. In said method the selected washing program defines the carrying out of the water partial water drain in two phases, wherein a variable amount of water is drained from the washing machine as a function of clothing type and load inserted in the washing machine; the first drainage 13 is carried out after the wetting phase 3 and before the end of the water heating phase 4 or before the start of said phase, and the second partial drain 14 is carried out after the water heating phase 4 and before the end of the washing phase 5. In this embodiment not so much water is heated during the water heating phase 4 after the partial drain 13, and on the other hand the amount of water remaining in the washing machine is reduced and better adjusted for the washing phase 5 after the partial drain 14. The detergent product dosage phase can be carried out in three different ways: at a phase 1 during the water intake phase 2, at a phase 11 during the wetting phase 3, and at a phase 12 after the partial drain 13 and before the water heating phase 4, thereby avoiding in the latter extracting detergent product from the washing machine during the partial drain 13.

**[0025]** In any of the invention embodiments, by means of the partial water drain before the end of the washing phase 5 there is less water and therefore less load for the washing machine motor to move. As a result, motor temperature does not increase or smaller motors can be used which will therefore cost less and consume less power. Also, and without changing the motor, washing efficiency can be improved, by extending clothing washing time (motor ON) for the same washing phase duration

5, or reducing clothing washing time for the same efficiency and thereby reducing power consumption.

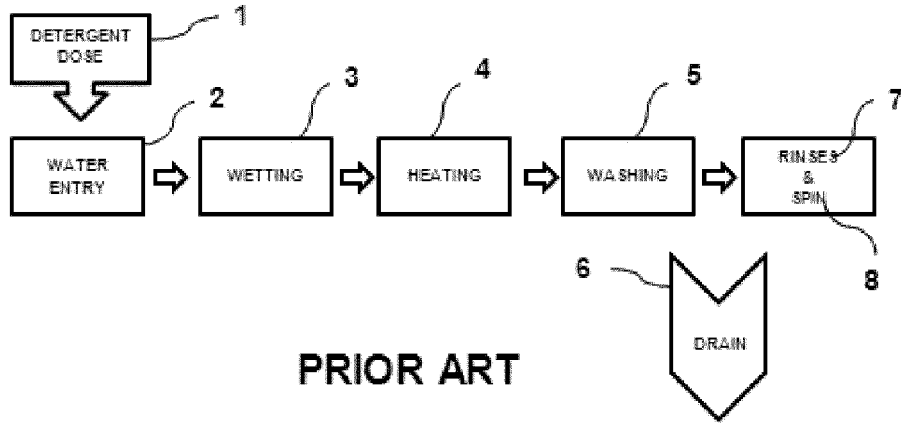
**[0026]** A better adjustment of the amount of water remaining in the washing machine for the washing phase 5 after the several partial drains is also achieved, as after the wetting phase 3 it is aware of how much water has entered in the washing machine, the approximate amount of water absorbed and therefore the approximate amount of water remaining, and with this data and the characteristics of the washing programme selected it is aware of the clothing type and load in the washing machine. To the contrary, without the partial drain there is greater imprecision, as the selected program has to operate during the wetting phase with imprecise water level detection signals due to the drum's movement, with approximate preset times for the volume of clothing in the drum which make water absorption difficult, all of which extends the time needed to precisely obtain the amount of water adjusted to the washing phase 5.

8. Method according to any of claims 4 to 6, wherein the detergent product dosage is performed after the partial drain before the water heating phase (4).
- 5 9. Method according to any of claims 1 to 8, wherein the water extracted via partial drain is discharged outside the washing machine.
- 10 10. Method according to any of claims 1 to 8, wherein the water extracted via partial drain is discharged into an auxiliary container for its later use.
- 15 11. Clothes washing machine **characterised in that** it comprises control means for implementing a method according to any of the previous claims.

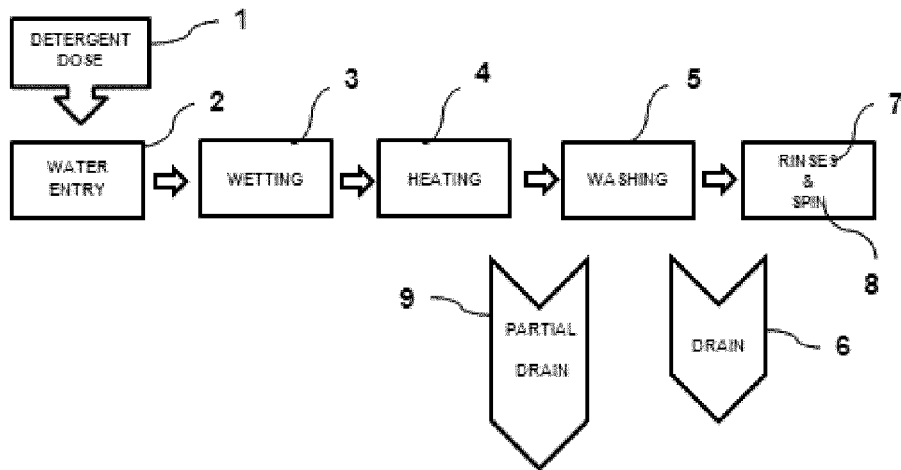
20

### Claims

1. Clothes washing method for a washing machine, comprising a wetting phase (3), wherein the clothes absorb water, and a washing phase (5), wherein the clothes are treated mechanically, **characterised in that** there is at least one partial water drain after the wetting phase (3) and before the end of the washing phase (5), so that a variable amount of water depending on the selected washing program and the clothing load and type inserted in the washing machine is extracted by means of said partial drain.
- 25 2. Method according to claim 1, wherein there is a partial water drain before the washing phase (5).
- 30 3. Method according to claim 1 or 2, comprising a water heating phase (4) before the washing phase (5) wherein there is a partial water drain after the water heating phase (4).
- 35 4. Method according to claim 1 or 2, comprising a water heating phase (4) before the washing phase (5) wherein there is a partial water drain before the end of the water heating phase (4).
- 40 45 5. Method according to claim 4, wherein there is a partial water drain before the start of the water heating phase (4).
- 50 55 6. Method according to claim 4 or 5, wherein there is also a partial water drain after the water heating phase (4).
7. Method according to any of claims 4 to 6, wherein the detergent product dosage is performed during the wetting phase (3).



**Fig. 1**



**Fig. 2**

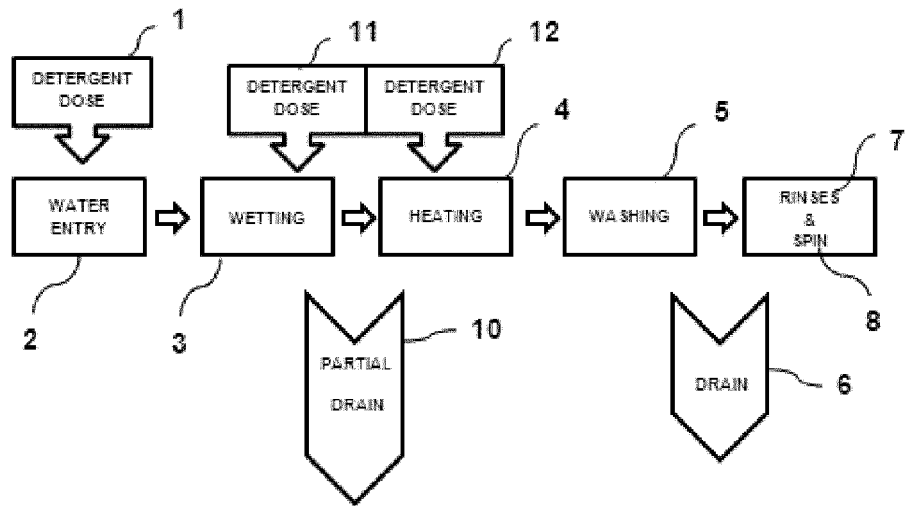


Fig. 3

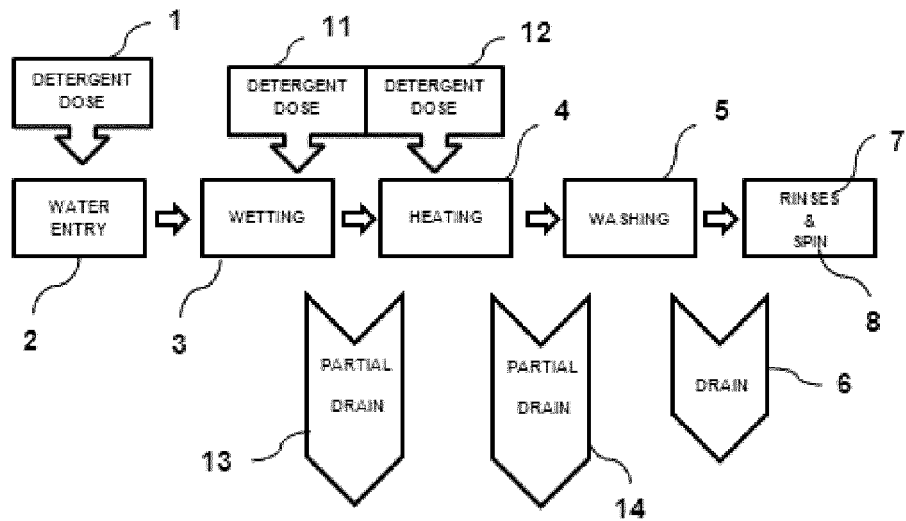


Fig. 4

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- KR 20080040401 **[0003]**
- KR 20070117912 **[0004]**
- KR 20050041499 **[0005]**
- JP 4285592 B **[0006]**
- US 2008104770 A **[0007]**
- US 3071432 A **[0008]**