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(54) **Control method of a laundry washing machine for execution of a general purpose cycle**

(57) A method for controlling a washing machine, comprising: the execution of a first wash step, wherein the wash water is gradually warmed up and the drum is moved in rotation at a first speed, in order to facilitate the action of one or more cleansing substances present in the water; the execution of a second wash step, following said first wash step, wherein the water temperature is kept above a predetermined threshold and the drum is moved in rotation at a second speed, in order to exert a mechanical cleaning action on the laundry in the drum.

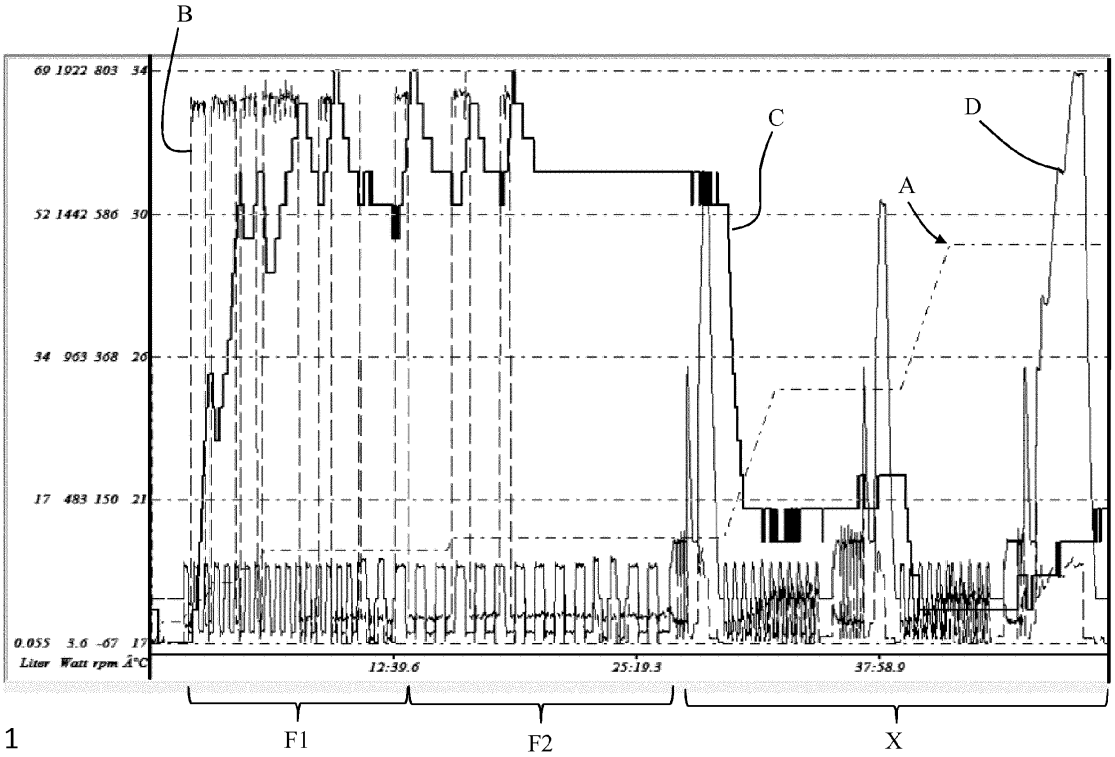

FIG. 1

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Description

[TECHNICAL FIELD]

[0001] The present invention relates to a method for controlling a washing machine for the execution of a general purpose cycle.

[PRIOR ART]

[0002] As is known, washing machines can be set to different wash programs depending on the characteristics of the laundry to be washed.

[0003] By way of example, specific wash cycles can be set for cotton, wool, white, coloured, etc. garments.

[0004] In contrast to the increasingly specialized trend of currently available wash cycles, the Applicant has perceived the need for providing a washing machine equipped with a "general purpose" operating mode, i.e. a wash cycle capable of ensuring satisfactory results with substantially all types of garments.

[OBJECTS AND SUMMARY OF THE INVENTION]

[0005] It is therefore one object of the present invention to provide a method for controlling a washing machine which allows executing a wash cycle that is suitable for a wide range of items.

[0006] This and other objects are achieved through a method for controlling a washing machine as set out in the appended claims.

[0007] In particular, the present invention relates to a method for controlling a washing machine, which comprises:

- the execution of a first wash step, wherein the wash water is gradually warmed up and the drum is moved in rotation at a first speed, in order to facilitate the action of one or more cleansing substances present in the water;
- the execution of a second wash step, following said first wash step, wherein the water temperature is kept above a predetermined threshold and the drum is moved in rotation at a second speed, in order to exert a mechanical cleaning action on the laundry in the drum.

[0008] Preferably, said first speed is comprised between 40 and 50 rpm.

[0009] In said first wash step, preferably, the movement duty cycle is comprised between 80% and 90%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation. Preferably, said second speed is comprised between 40 and 50 rpm.

[0010] In said second wash step, preferably, the movement duty cycle is comprised between 93% and 99%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation. Preferably, said predetermined threshold is comprised between 30°C and 35°C. Preferably, said second wash step is followed by a spin operation, preferably associated with one or more topping-up operations.

[0011] Preferably, the duration of said first step is comprised between 10 and 15 minutes. Preferably, the duration of said second step is comprised between 10 and 15 minutes. Preferably, the execution of said wash steps is activated upon reception of a command by means of a dedicated button.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0012] Some preferred and advantageous examples of embodiment will now be described by way of non-limiting example with reference to the annexed Figure 1, which shows a diagram representative of some characteristic parameters of the method according to the invention.

[DETAILED DESCRIPTION OF THE INVENTION]

[0013] As aforesaid, the method of the invention aims at executing a wash cycle that can suit different types of garments or textiles in general.

[0014] First of all, the method comprises a first wash step, wherein the wash water is gradually warmed up and the drum is moved in rotation at a first speed.

[0015] Preferably, the water is heated to a temperature comprised between 28°C and 32 °C. Preferably, the first speed is comprised between 40 and 50 rpm.

[0016] Preferably, the time duration of the first wash step is comprised between 10 and 15 minutes.

[0017] The purpose of the first wash step is to facilitate the action of one or more cleansing substances present in the water. In fact, the mechanical and thermal action to which the laundry is subjected during this first step is rather mild, and is substantially aimed at promoting the chemical action exerted by the detergent.

[0018] The method of the invention also provides for the execution of a second wash step, following said first wash step.

[0019] In the second wash step, the water temperature is kept above a predetermined threshold and the drum is moved in rotation at a second speed.

[0020] Preferably, the minimum water temperature threshold is set to a value comprised between 30°C to 35°C.

[0021] Preferably, the second speed is comprised between 40 and 50 rpm.

[0022] Preferably, the duration of the second wash step is comprised between 10 and 15 minutes.

[0023] The purpose of the second wash step is to exert a stronger mechanical cleaning action on the laundry, so that the dirt, which was subjected to chemical etching in

the first wash step, can be completely removed.

[0024] Preferably, the second wash step is followed by a spin operation, which may be preferably and advantageously associated with one or more water topping-up operations in the drum.

[0025] In one embodiment, the spin may comprise one or more pulses at a first speed, e.g. comprised between 500 rpm and 700 rpm, followed by one or more pulses at a faster speed, e.g. comprised between 700 rpm and 900 rpm.

[0026] As a whole, the cycle thus executed may have a total duration of 45 to 50 minutes, e.g. substantially equal to 50 minutes.

[0027] In said first wash step, preferably, the movement duty cycle is comprised between 80% and 90%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation. For example, said duty cycle may consist of a series of steps wherein the drum is moved in rotation for approx. 13 seconds and is then kept substantially still for approx. 2 seconds. In this case, the duty cycle is substantially equal to approx. 86.7%.

[0028] Preferably, the direction of rotation of the drum is reversed at each deactivation of the rotation.

[0029] In said second wash step, preferably, the movement duty cycle is comprised between 93% and 99%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation. For example, said duty cycle may consist of a series of steps wherein the drum is moved in rotation for approx. 28 seconds and is then kept substantially still for approx. 1 second. In this case, the duty cycle is substantially equal to approx. 96%.

[0030] Preferably, the direction of rotation of the drum is reversed at each deactivation of the rotation.

[0031] In the preferred embodiment, the cycle implemented through the method according to the invention can be activated by pressing a dedicated button advantageously fitted to the washing machine.

[0032] In other words, in addition to the usual controls through which the user can set a traditional cycle, the washing machine may include an additional button specifically dedicated to the activation of the above-described cycle.

[0033] Preferably, said dedicated button may be configured for:

- turning on the machine first, in the event that it is pressed when the machine is off, and then
- activating the above-described cycle.

[0034] Such a button is described in Italian patent application TO2012A000147 by the present Applicant, which has been wholly incorporated herein for reference.

[0035] In a different embodiment, the cycle executed through the method of the invention may be included among the various cycles selectable by the user through traditional controls.

[0036] Figure 1 shows, by way of example, a number of graphs representative of the execution of the method according to the invention.

[0037] The axis of abscissas represents time, whereas the axis of ordinates represents the water consumption of the machine (A), the electric power drawn by the machine (B), the temperature of the wash water (C) and the revolution speed of the drum (D).

[0038] The first wash step is designated F1, and the second wash step is designated F2.

[0039] As can be seen, in the first wash step the temperature rises gradually, and the revolution speed is slow. In the second wash step, the temperature is kept above the predetermined minimum value, and the revolution speed is considerably increased.

Claims

1. A method for controlling a washing machine, comprising:

   - the execution of a first wash step, wherein the wash water is gradually warmed up and the drum is moved in rotation at a first speed, in order to facilitate the action of one or more cleansing substances present in the water;
   - the execution of a second wash step, following said first wash step, wherein the water temperature is kept above a predetermined threshold and the drum is moved in rotation at a second speed, in order to exert a mechanical cleaning action on the laundry in the drum.

2. A method according to claim 1, wherein in said first wash step the movement duty cycle is comprised between 80% and 90%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation.

3. A method according to claim 1 or 2, wherein in said second wash step the movement duty cycle is comprised between 93% and 99%, said duty cycle being defined by a series of activations/deactivations of said movement, the direction of rotation of the drum being reversed at each deactivation.

4. A method according to any one of the preceding claims, wherein said predetermined threshold is comprised between 30°C and 35°C.

5. A method according to any one of the preceding claims, wherein said second wash step is followed by a spin operation, preferably associated with one or more water topping-up operations.

6. A method according to any one of the preceding claims, wherein the duration of said first step is comprised between 10 and 15 minutes.

7. A method according to any one of the preceding claims, wherein the duration of said second step is comprised between 10 and 15 minutes.

8. A method according to any one of the preceding claims, wherein the execution of said wash steps is activated upon reception of a command by means of a dedicated button.

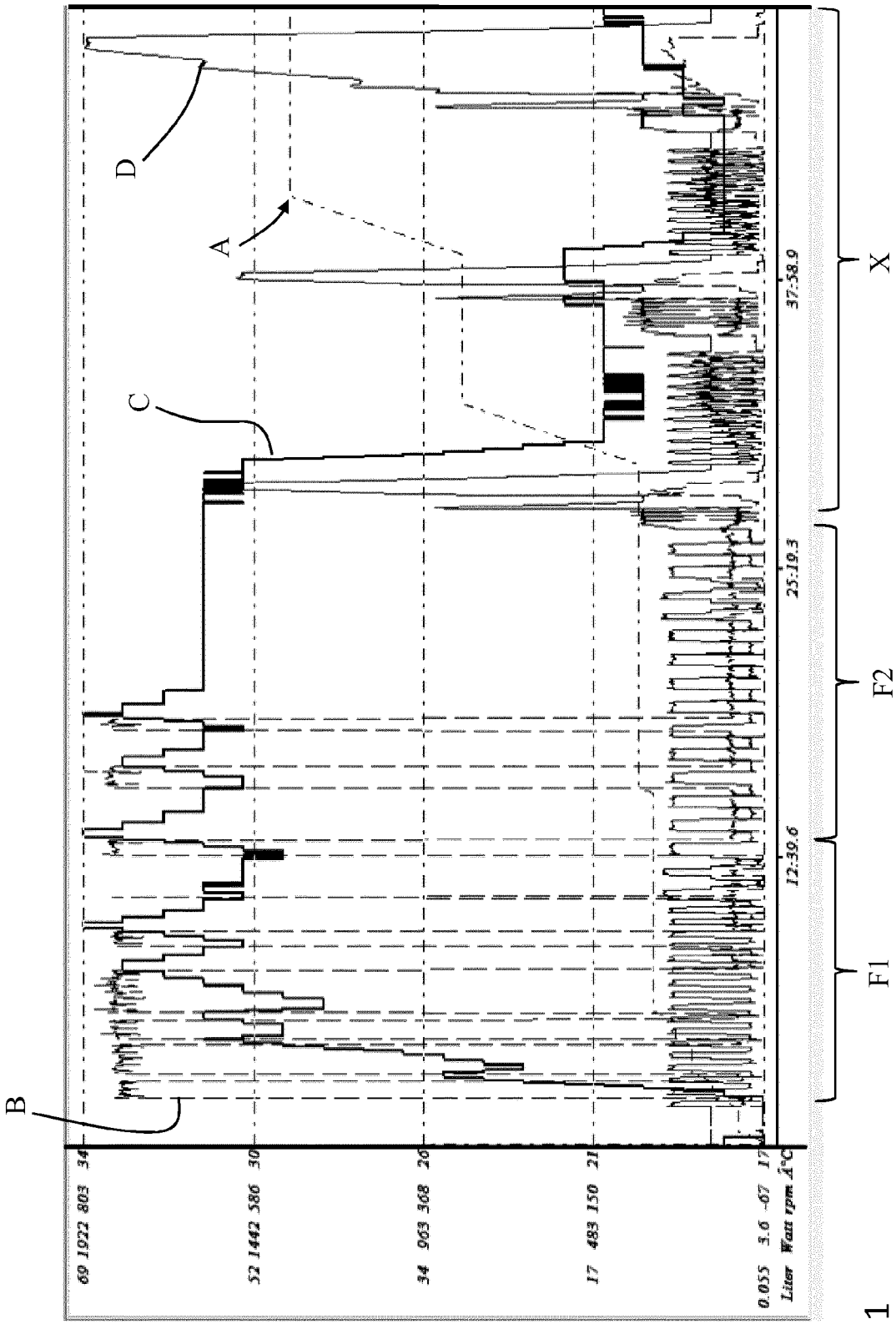
A
B
C
D
X
F1
F2
12:39.6
25:19.3
37:58.9
69 1922 803 34
52 1442 586 30
34 963 368 26
17 483 150 21
0.055 3.6 -67 17
Liter Watt rpm °C

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 9027

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2011/099732 A1 (IM MYONG HUN [KR] ET AL) 5 May 2011 (2011-05-05) * paragraph [0095] - paragraph [0105] * * paragraph [0149] - paragraph [0154] * * paragraph [0213] * * paragraph [0293] - paragraph [0299]; figure 14 *	1	INV. D06F33/02
A	US 2012/180534 A1 (CHO IN HO [KR] ET AL) 19 July 2012 (2012-07-19) * paragraph [0093] - paragraph [0105] * * paragraph [0123] - paragraph [0128] * * paragraph [0171] - paragraph [0192] * * paragraph [0215] - paragraph [0235] * * paragraph [0242] - paragraph [0273] *	1	
A	EP 2 423 368 A1 (PANASONIC CORP [JP]) 29 February 2012 (2012-02-29) * paragraph [0008] - paragraph [0009] * * paragraph [0032] - paragraph [0044] *	1	
A	EP 1 477 606 A1 (TOSHIBA KK [JP] TOSHIBA KK [JP]; TOSHIBA HA PRODUCTS CO LTD [JP]; TOSH) 17 November 2004 (2004-11-17) * paragraph [0005] * * paragraph [0023] - paragraph [0026] *	1	TECHNICAL FIELDS SEARCHED (IPC) D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 March 2014	Fachin, Fabiano

CATEGORY OF CITED DOCUMENTS

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Y : particularly relevant if combined with another document of the same category
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 19 9027

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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04-03-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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