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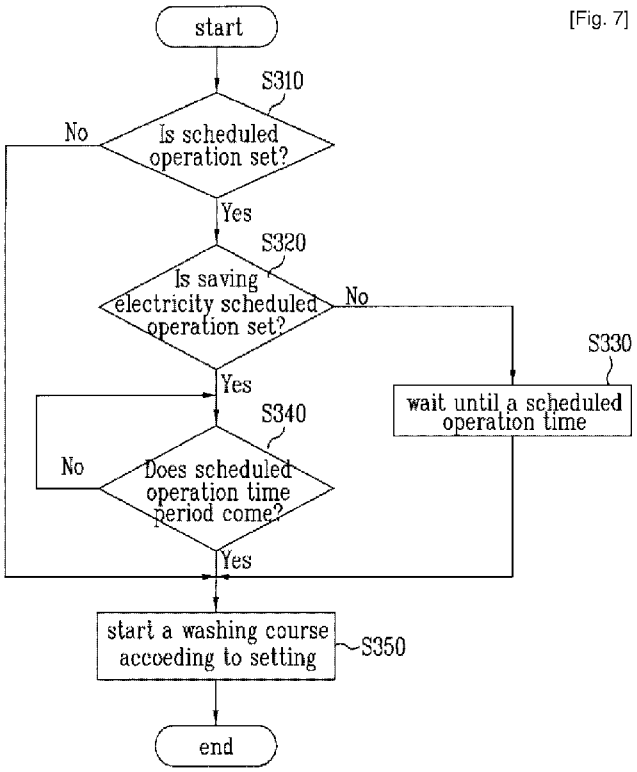
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[Continued on next page]

(54) Title: LAUNDRY MACHINE AND METHOD FOR CONTROLLING THE SAME

[Fig. 7]



(57) Abstract: The present invention relates to a laundry machine (100) including a cabinet (10), a tub (30) mounted in the cabinet (10), a drum (50) rotatably mounted in the tub (30), a driving unit (70) for rotating the drum (50), and a control unit (60) for controlling scheduled operation of the driving unit (70) according to a real time, thereby permitting to display a real time and control the laundry machine (100) by using the real time and the midnight time saving electricity.

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Description

Title of Invention: LAUNDRY MACHINE AND METHOD FOR CONTROLLING THE SAME

Technical Field

[1] The present invention relates to laundry machines, and more particularly, to a laundry machine in which a real time is displayed and of which operation is controlled by using a real time and saved electricity at a midnight, and a method for controlling the same.

Background Art

[2] In general, the laundry machine removes various kinds of contaminants from clothes and beddings by using a softening action of detergent, friction of water flow and impacts applied to laundry caused by rotation of a pulsator or a drum. Current full automatic laundry machine carries out a series of courses of washing, rinsing, spinning, and so on automatically without intermittent handling of a user.

[3] It is a current trend that demands for the drum type laundry machine increase gradually, which, not only enables to reduce a total height, but also does not cause problems of entangling and crumpling of the laundry compared to a pulsator type laundry machine in which a washing tub rotates in an upright state.

[4] A structure of the drum type laundry machine will be described briefly. The drum type laundry machine is provided with a body cabinet which forms an exterior of the drum type washing machine, a tub in the body cabinet supported by dampers and springs for holding washing water, and a cylindrical drum in the tub for placing the laundry therein, wherein the drum has driving power applied thereto by a driving unit for washing the laundry placed therein.

[5] The laundry machine is provided with a scheduling function for operating the laundry machine at a preset time by a user s selection. That is, once the user sets an operation time, the laundry machine performs washing operation as the preset operation time comes.

[6] In a case of the scheduling function of the related art laundry machine, a schedule is set to start washing (or drying) operation after a time period from a time point when the operation is set.

[7] Therefore, the user is required to set a schedule such that an operation starting time is set by subtracting the present time when the user makes the operation schedule from the operation starting time, which requires the user s personal calculation that is inconvenient and cumbersome to the user.

[8] In the meantime, recently, a system is put into practice, in which cheap electricity is

used at a midnight period or a selected time period, avoiding a time period when consumption of the electricity is very high (for an example, midnight electricity, saving electricity, and so on, and hereafter called as saving electricity).

[9] In order to make the scheduled operation in the saving electricity time period, there is inconvenience of producing the scheduled operation time taking both the scheduled operation time and the saving electricity time period into account.

[10] Moreover, since a time period of the saving electricity varies with countries, regions, and so on, the user is required to know each of the saving electricity time periods, and has inconvenience of producing and setting the scheduled operation time.

[11] In the meantime, the saving electricity time period is mostly a midnight time period. Therefore, if the laundry machine is used in the saving electricity time period, operation noise from the laundry machine gives inconvenience to the user as well as neighbors.

Disclosure of Invention

Technical Problem

[12] To solve the problems, an object of the present invention is to provide a laundry machine which can display a real time and a scheduled operation is possible according to the real time, and a method for controlling the same.

[13] Another object of the present invention is to provide a laundry machine which can make automatic setting of a saving electricity time period according to setting of a country or a region in which the laundry machine is used, and a method for controlling the same.

[14] Another object of the present invention is to provide a laundry machine which can perform a scheduled operation of the laundry machine by using inexpensive saving electricity provided in a specific time period, such as a midnight time period, and a method for controlling the same.

[15] Another object of the present invention is to provide a laundry machine in which a course of washing courses of the laundry machine, which generates noise heavily, is omitted or performed after a midnight time period in a case a scheduled operation is performed in the midnight time period.

Solution to Problem

[16] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a laundry machine includes a case, a tub mounted in the case, a drum rotatably mounted in the tub, a driving unit for rotating the drum, and a control unit for controlling scheduled operation of the driving unit according to a real time.

[17] Preferably, the control unit has a saving electricity mode for performing a washing

course in a preset saving electricity supply time period according to setting of the scheduled operation.

[18] Preferably, the control unit includes a real time timer for producing the real time.

[19] Preferably, the control unit has a supplementary power unit for driving the real time timer.

[20] Preferably, the control unit has a data base having a saving electricity time period of each region stored therein for performing the washing course according to the saving electricity time period stored in the data base.

[21] Preferably, the laundry machine further includes an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[22] Preferably, the operation unit includes a saving electricity scheduled operation button for setting the saving electricity scheduled operation in which saving electricity time period is used.

[23] Preferably, the display unit includes a saving electricity scheduled operation display unit for displaying a saving electricity mode scheduled operation in which the saving electricity time period is used.

[24] Preferably, the saving electricity time period is a midnight time period.

[25] Preferably, the control unit has a midnight mode for performing the scheduled operation in the midnight time period in which the saving electricity is supplied.

[26] Preferably, the control unit omits a spinning course from washing courses having the spinning course if the midnight mode scheduled operation is set.

[27] Preferably, the laundry machine further includes an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[28] Preferably, the control unit includes a midnight mode scheduled operation button for setting the midnight mode scheduled operation in which the midnight time period is used.

[29] Preferably, the display unit includes a midnight mode scheduled operation display unit for displaying the midnight mode scheduled operation in which the midnight time period is used.

[30] Preferably, the display unit includes a spinning display unit for displaying omission of the spinning course in the midnight mode scheduled operation.

[31] Preferably, the control unit has a barrel washing mode for performing barrel washing in the midnight time period in which the saving electricity is supplied.

[32] Preferably, the laundry machine further includes an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[33] Preferably, the operation unit includes a barrel washing scheduled operation button for setting barrel washing mode scheduled operation which uses the midnight time period.

[34] Preferably, the display unit includes a barrel washing mode scheduled operation display unit for displaying the barrel washing mode scheduled operation in which the barrel washing is performed in the midnight time period.

[35] In another aspect of the present invention, a method for controlling a laundry machine includes the steps of setting a real time in which a real time is set upon application of power, setting a saving electricity time period in which a saving electricity time period is set according to the real time set thus, and performing scheduled operation in which washing scheduled operation is performed, which is set in the saving electricity time period set thus.

[36] Preferably, the step of performing scheduled operation includes a washing step in which washing operation is performed in the saving electricity time period.

[37] Preferably, the saving electricity time period is a midnight time period, and the step of performing scheduled operation includes a washing step in which washing operation is performed excluding a spinning course in the saving electricity time period.

[38] Preferably, the saving electricity time period is a midnight time period, and the step of performing scheduled operation includes a barrel washing step in which barrel washing operation is performed in the saving electricity time period.

[39] Preferably, the step of setting a saving electricity time period includes the steps of setting a region at which the laundry machine is used, and producing a time for setting the saving electricity time period of the region at which the laundry machine is used.

[40] Preferably, the saving electricity time period is produced from a data base having the saving electricity time period of the region at which the laundry machine is used.

[41] In another aspect of the present invention, a method for controlling a laundry machine includes a scheduled operation determining step for determining whether scheduled operation is set or not, a saving electricity scheduled operation determining step for determining whether the scheduled operation set in the scheduled operation determining step is the saving electricity scheduled operation or not, if the scheduled operation is set in the scheduled operation determining step, a saving electricity time period waiting step for waiting until the saving electricity time period comes, if it is determined that the saving electricity scheduled operation determining step is the saving electricity scheduled operation, and a scheduled operation performing step for performing the scheduled operation set thus, if the saving electricity time period comes in the saving electricity time period waiting step.

[42] Preferably, the scheduled operation and the saving electricity scheduled operation is set by a real time.

[43] Preferably, the saving electricity time period is set according to a region at which the laundry machine is used.

[44] Preferably, the method further includes a washing step for performing a preset washing step, if it is determined that the scheduled operation is not set in the scheduled operation determining step.

[45] Preferably, the method further includes a waiting step for waiting until a preset scheduled operation time comes, and a scheduled operation performing step for performing the preset scheduled operation if the scheduled operation time comes in the waiting step, if it is determined that the scheduled operation is not the saving electricity scheduled operation in the saving electricity scheduled operation determining step.

[46] Preferably, the method further includes a midnight mode determining step for determining whether the scheduled operation set thus is a midnight mode or not if the saving electricity time period comes after the saving electricity waiting step, and a scheduled operation performing step for performing the scheduled operation excluding a spinning course from washing courses, if the scheduled operation set thus is determined to be the midnight mode in the midnight mode determining step.

[47] Preferably, the method further includes a washing step for performing washing courses according to the scheduled operation set thus, if it is determined that the scheduled operation set thus is not the midnight mode in the midnight mode determining step, and a tumbling step for performing tumbling at fixed intervals repeatedly after the washing step for preventing the laundry from crumpling.

[48] Preferably, the scheduled operation determining step includes the step of determining whether the scheduled operation is a barrel washing scheduled operation of not.

[49] Preferably, if it is determined that the scheduled operation is a barrel washing scheduled operation in the scheduled operation determining step, the scheduled operation determining step includes a washing water supply step for supplying washing water and detergent for barrel washing.

[50] Preferably, if it is determined that the scheduled operation is not a barrel washing scheduled operation in the scheduled operation determining step, the washing water and the detergent is supplied and a barrel washing course is performed.

[51] Preferably, the method further includes a waiting step for waiting until a scheduled operation time set thus comes, if it is determined that the scheduled operation is not the saving electricity scheduled operation in the saving electricity scheduled operation determining step, and a step for supplying washing water and detergent and performing a barrel washing course directly if the scheduled operation time period comes in the waiting step.

Advantageous Effects of Invention

[52] The present invention has following advantageous effects.

[53] Since the user can set a scheduled operation time with reference to a real time, the user can set the scheduled operation time readily without calculating the scheduled operation time.

[54] The setting of the saving electricity time period according to country and region where the laundry machine is used, the scheduled operation time can be set readily without calculating the saving electricity time period separately.

[55] By enabling the user to perform the scheduled operation by using the saving electricity in the midnight time period, the present invention permits the user to use inexpensive saving electricity.

[56] By enabling the user to omit or perform a noise generating course if the midnight scheduled operation is performed, the inconvenience of user caused by the noise is resolved.

[57] By enabling the user to perform the barrel washing by using the midnight time period saving electricity, power consumption required for the barrel washing can be reduced.

Brief Description of Drawings

[58] The accompanying drawings, which are included to provide further understanding of the disclosure and are incorporated in and constitute a part of this application, illustrate embodiments of the disclosure and together with the description serve to explain the principle of the disclosure.

[59] In the drawings:

[60] FIG. 1 illustrates a perspective view of a laundry machine in accordance with a preferred embodiment of the present invention.

[61] FIG. 2 illustrates a longitudinal section of a laundry machine in accordance with a preferred embodiment of the present invention.

[62] FIG. 3 illustrates a block diagram of a system of a laundry machine in accordance with a preferred embodiment of the present invention.

[63] FIG. 4 illustrates a plan view of an operation panel of a laundry machine in accordance with a preferred embodiment of the present invention, schematically.

[64] FIG. 5 illustrates a flow chart showing the steps of a method for setting a saving electricity time period to a laundry machine in accordance with a preferred embodiment of the present invention.

[65] FIG. 6 illustrates a flow chart showing the steps of a method for setting a saving electricity time period according to an installation region to a laundry machine in accordance with a preferred embodiment of the present invention.

[66] FIG. 7 illustrates a flow chart showing the steps of a method for making saving electricity scheduled operation of a laundry machine in accordance with a preferred

embodiment of the present invention.

[67] FIG. 8 illustrates a flow chart showing the steps of a method for making midnight mode scheduled operation of a laundry machine in accordance with a preferred embodiment of the present invention.

[68] FIG. 9 illustrates a flow chart showing the steps of a method for making barrel washing scheduled operation of a laundry machine in accordance with a preferred embodiment of the present invention.

Best Mode for Carrying out the Invention

[69] Reference will now be made in detail to the specific embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[70] In describing the present invention, names of elements are defined taking functions thereof into account. Therefore, it is required to understand that the names do not limit the elements technically. Moreover, the names of the elements may be called differently in this field of art.

[71] A laundry machine in accordance with a preferred embodiment of the present invention will be described in detail with reference to the attached drawings.

[72] The present invention will be described taking a laundry machine as an example. However, a control unit and a control method for utilizing a real time and a saving electricity time period that is a main subject matter of the present invention is applicable to laundry dryers, and dishwashers other than the laundry machine.

[73] FIG. 1 illustrates a perspective view of a laundry machine in accordance with a preferred embodiment of the present invention, FIG. 2 illustrates a longitudinal section of a laundry machine in accordance with a preferred embodiment of the present invention, and FIG. 3 illustrates a block diagram of a system of a laundry machine in accordance with a preferred embodiment of the present invention.

[74] As shown, the laundry machine 100 includes a cabinet 10 which forms an exterior of the laundry machine 100, a tub 30 in the cabinet 10 for holding washing water, a drum 50 mounted in the tub 30 to be rotatable in a shaft direction, a driving unit 70 for providing rotating power to the drum 50 to wash, rinse and spin laundry 1 in the drum 50, a control unit 60 for controlling respective units to operate the laundry machine 100, and an operation panel 20 for controlling respective units in association with the control unit 60.

[75] The cabinet 10 forms the exterior of the laundry machine 100, and the respective units to be described later mounted to an outside or inside thereof. The cabinet 10 has a door 12 rotatably mounted to a front of the cabinet 10 for introducing the laundry 1.

[76] The tub 30 is provided to hold the washing water therein, has an enclosure opened toward the door 12 for holding the laundry 1 introduced through the door 12.

[77] The driving unit 70 is mounted to a rear of the tub 30. The driving unit 70 having a motor rotates the drum 50, and a rotation speed of the driving unit 70 is controlled by the control unit 60. Detailed description of the driving unit 70 will be omitted since a structure, kinds of the driving unit 70 are well known to persons in this field of art, and a variety of embodiments are possible.

[78] In the meantime, the tub 30 is elastically supported by springs 31 above the tub 30 and dampers 32 below the tub 30. Accordingly, at the time vibration generated when the drum 50 rotates by the driving unit 70 transmits to the cabinet 10 through the tub 30, the vibration is buffered and dampened by the springs 31 and the dampers 32, thereby reducing transmission of the vibration to the cabinet 10 from the drum 50.

[79] Above the tub 30, there are a water supply hose 33 for supplying water to the tub 30 from an external water source, a water supply valve 34 on the water supply hose 33 for controlling in/out of the water, and a detergent supply unit 35 for holding detergent such that the water being supplied through the water supply hose 33 is introduced to the tub 30 together with the detergent. In addition to this, the detergent supply unit 35 may have detergent provided thereto for washing of the laundry and washing of a barrel.

[80] Below the tub 30, there are a drain hose 36 and a drain pump 37 for draining the washing water used for washing and rinsing to an outside of the laundry machine 100.

[81] In the meantime, a circulating duct 40 is mounted to an outside of the tub 30, for circulating air for drying course of the laundry machine 100. That is, the circulating duct 40 is configured to draw air out of the tub 30, heat the air, and return the air to the tub 30, again.

[82] The circulating duct 40 includes a drying duct 41 and a condensing duct 47. The drying duct 41 has a heater 43 and a fan 45 for blowing hot air into the tub 30.

[83] The drying duct 41 and the condensing duct 47 are mounted to be in communication with each other, as well as with the drum 50, and the tub 30 has an air inlet 38 for introduction of hot air thereto through the drying duct 41, and an air outlet 39 for discharging air to the condensing duct 47.

[84] The condensing duct 47 has a water supplying unit 49 for supplying cooling water to the condensing duct 47 for condensing moisture in the air.

[85] The drum 50 is rotatably mounted in the tub 30, and has the laundry 1 introduced thereto through the door 12 held therein. The drum 50 has a plurality of drain holes 52 for in/out of water therethrough, and a plurality of lifts 54 for lifting and dropping the laundry 1 in the drum 50 when the drum 50 rotates. By the lifting and dropping of the laundry 1 with the lifts 54, washing performance can be improved.

[86] Referring to FIG. 4, the operation panel 20 on an upper side of the door 12 includes an operation unit 22 for controlling operation of the laundry machine 100 and a display unit 26 for displaying an operation state of the laundry machine 100. The operation unit 22 and the display unit 26 controls operation of the laundry machine 100, or displays the operation state of the laundry machine 100 in association with the control unit 60.

[87] The operation unit 22 has a plurality of buttons 23 and a rotary knob 24. The buttons 23 and the rotary knob 24 which is inputting means for operating the laundry machine 100, enables the user to input desired course and time by handling the buttons 23 and the rotary knob 24 when the user selects a washing time, setting of a scheduled operation, method of washing, and rinsing and spinning types.

[88] The plurality of buttons 23 may include a saving electricity scheduled operation button 27a for using saving electricity, a midnight mode scheduled operation button 27b for operating the laundry machine 100 in a midnight period, a barrel washing button 27c for performing barrel washing in the midnight period, additionally. In the meantime, functions to be implemented by the saving electricity scheduled operation button 27a, the midnight mode scheduled operation button 27b, the barrel washing button 27c can be set by the rotary knob.

[89] In the meantime, the control unit 60 controls the laundry machine 100 according to information received through the operation unit 22 to perform courses of washing, rinsing, or spinning or the barrel washing at a set time or a scheduled time.

[90] The display unit 26 which displays information on the laundry machine 100 set at the operation unit 22 includes a plurality of LEDs and LCD arranged side by side for displaying various kinds of washing information for the user, such as a state of progress of washing, a remained time period, and so on with characters or codes by flashing or the LEDs, or on the LCD.

[91] In a case saving electricity scheduled operation is set with the rotary knob 24 at the operation unit 22, the display unit 26 may have a saving electricity scheduled operation display unit 28a additionally for informing the user that scheduled operation for using the saving electricity is set. The display unit 26 has a midnight mode scheduled operation display unit 28b for displaying that a spinning course is omitted, which generates much noise when the scheduled operation is progressed in the midnight. Owing to the spinning display unit 28b, the user can notice that no spinning is progressed in the scheduled operation. The display unit 26 has a barrel washing display unit 28c for user s notice of the setting of the barrel washing in a case the barrel washing by utilizing the midnight mode is set.

[92] The control unit 60 controls general operation of the laundry machine 100, and operates the laundry machine 100 according to setting at the laundry machine 100.

That is, the control unit 60 controls general operation and preset scheduled operation at a specific time.

[93] For this, the control unit 60 has a real time timer 62 for producing a real time according to user s setting, and a data base 66 having saving electricity time periods of stored therein for regions to be set by the user. The control unit 60 displays the saving electricity scheduled operation set by the user at the operation panel 20.

[94] In this instance, the real time timer 62 displays, not an operation time of the laundry machine 100 in the related art, but an actual time of the region where the laundry machine 100 is installed as well as times of respective courses of the laundry machine 100. The real time timer 62 may have a supplementary power source unit 64 (for an example, a disposable dry battery, or a re-chargeable battery) mounted therein, additionally. If real time timer 62 has the supplementary power source unit 64 mounted therein, the real time timer 62 can be operable even if the power source unit which is a main power source of the laundry machine 100 is cut off.

[95] The data base 66 has saving electricity time periods of each region and regions of each country or region stored therein, and the control unit 60 sets an operation time by using the saving electricity time period stored in the data base 66 in the case of saving electricity scheduled operation.

[96] If the midnight mode scheduled operation is set, the control unit 60 can omit the spinning course in the scheduled operation. That is, after the washing and rinsing are finished, which come before the spinning course, the washing process can be stopped excluding the spinning course. The spinning course is omitted thus due to noise generated in the spinning course the most in the washing process of the laundry machine 100.

[97] The control unit 60 displays that the spinning course is omitted at the operation panel 20 if the midnight mode scheduled operation is set. In this instance, the operation panel 20 may display that additional rinsing and spinning courses are required.

[98] In the meantime, if the user s setting is not the midnight mode, the control unit 60 may perform tumbling in which the drum is rotated periodically and repeatedly so that no crumple is formed at the laundry of which spinning is progressed.

[99] If the user sets the barrel washing saving electricity scheduled operation, after filing the washing water and the detergent to the tub 30, the control unit 60 may perform the barrel washing by rotating the drum 50 as the saving electricity time period comes.

[100] The operation of the laundry machine in accordance with a preferred embodiment of the present invention will be described. It is required that respective units described below are understood with reference to the foregoing description and drawings.

[101] The laundry machine 100 of the present invention is required to have a process in which a real time and a saving electricity time period for using saving electricity are

set at an initial operation of the laundry machine 100.

[102] A method for setting the real time and the saving electricity time period at the initial operation of the laundry machine 100 will be described.

[103] The setting of the saving electricity time period can be made by two methods; by personal input of a starting time and an end time of supply of the saving electricity, or by selecting a region at which the laundry machine 100 is installed from the data base in the control unit.

[104] The method for setting a saving electricity time period by personal input of the saving electricity time period will be described. FIG. 5 illustrates a flow chart showing the steps of a method for setting a saving electricity time period to a laundry machine in accordance with a preferred embodiment of the present invention.

[105] Referring to FIG. 5, respective units of the laundry machine 100 are come into operation (S110) as the user supplies power through a main power source of the laundry machine 100. In this instance, the control unit 60 lets the user to set a real time of the laundry machine 100 at the display unit 26 of the operation panel 20 (S120).

[106] According to the real time the user inputs, an operation time of general scheduled operation, saving electricity scheduled operation, or a midnight scheduled operation is set.

[107] Then, if the user finishes setting of an actual time, the control unit 60 displays input of a saving electricity time period at the display unit 26 of the operation panel 20. Alike the actual time setting, the saving electricity time period can be input by handling a button 23 on the operation panel 20 (S130). The input of the saving electricity time period can be set by inputting a starting time and an end time of the saving electricity time period.

[108] A method for setting the saving electricity time period proper to a region where the laundry machine 100 is installed will be described. FIG. 6 illustrates a flow chart showing the steps of a method for setting a saving electricity time period according to an installation region to a laundry machine in accordance with a preferred embodiment of the present invention.

[109] Referring to FIG. 6, respective units of the laundry machine 100 are come into operation (S210) as the user supplies power through a main power source of the laundry machine 100. In this instance, the control unit 60 displays a region where the user of the laundry machine 100 uses the laundry machine 100 at the display unit 26 for the user to select the region (S220).

[110] In this instance, the control unit 60 can display a name of a region or a code of the region on the display unit 26 of the operation panel 20. Or, the user can set a region to be used by handling the button 23 on the operation panel 20. If a code of the region is used, a region and a code for the region which is shown in a manual of the laundry

machine 100 can be used.

[111] If setting of the region is finished by the user, the control unit 60 can apply the saving electricity time period according to the saving electricity time period for each region stored in the data base 66.

[112] Then, the control unit 60 displays an actual time input on the display unit 26 of the operation panel. According to this, the user can input the actual time by handling the button 23 on the operation panel 20. (S230).

[113] Then, if the user finishes setting of the actual time, the control unit displays the saving electricity time period at the display unit 26, and waits for user s input. Then, the user can select the saving electricity time period displayed thus, or input the saving electricity time period by handling the button 23 on the operation panel 20 the same as the actual time setting (S240).

[114] In the meantime, the control unit 60 can make the saving electricity time period setting by using the saving electricity time period for each region stored in the data base. In this instance, in a case the saving electricity time period for each region stored in the data base is used, user s saving electricity time input setting can be omitted.

[115] The scheduled operation in the saving electricity time period of the laundry machine of the present invention will be described in detail with reference to the attached drawings.

[116] The laundry machine of the present invention relates to real time scheduled operation with a real time timer and saving electricity scheduled operation. Detailed description of the operation of the laundry machine related to general washing, rinsing, spinning and drying of the laundry machine will be omitted for clarity of the present invention.

[117] FIG. 7 illustrates a flow chart showing the steps of a method for making saving electricity scheduled operation of a laundry machine in accordance with a preferred embodiment of the present invention.

[118] The control unit 60 determines whether the scheduled operation is set by user s handling of the operation panel 20 or not (S310). If the scheduled operation is not set, the control unit 60 puts the laundry machine 100 into operation directly according to setting of washing the user selected (S350).

[119] In the meantime, if the scheduled operation is set by the user, the control unit 60 determines if the scheduled operation is the saving electricity scheduled operation or not (S320). If the scheduled operation is general scheduled operation (that is, scheduled operation not related to the saving electricity time period), the control unit 60 waits until an operation time set by the user comes (S330). Then, as a time of the scheduled operation comes, the control unit 60 puts the laundry machine 100 into operation according to the setting of washing the user selected (S350).

[120] In this instance, if the scheduled operation set by the user is the saving electricity

scheduled operation, the control unit 60 determines if the preset saving electricity time period is come (S340).

[121] In this instance, if the saving electricity time period does not come yet, a waiting state is maintained, and if the saving electricity time period comes, the laundry machine 100 is put into operation according to the setting of washing the user selects (S350).

[122] In the meantime, the saving electricity scheduled operation can cause a problem of noise since most of the saving electricity is supplied in a midnight time period. According to this, the saving electricity scheduled operation is possible to use the midnight mode scheduled operation.

[123] FIG. 8 illustrates a flow chart showing the steps of a method for making midnight mode scheduled operation of a laundry machine in accordance with a preferred embodiment of the present invention.

[124] The control unit 60 determines whether the scheduled operation is set by user s handling of the operation panel 20 or not (S410). If the scheduled operation is not set, the control unit 60 puts the laundry machine 100 into operation directly according to setting of washing the user selected (S440).

[125] In the meantime, if the scheduled operation is set by the user, the control unit 60 determines if the scheduled operation is the saving electricity scheduled operation or not (S420). If the scheduled operation is general scheduled operation (that is, scheduled operation not related to the saving electricity time period), the control unit 60 waits until an operation time set by the user comes (S430). Then, as a time of the scheduled operation comes, the control unit 60 puts the laundry machine 100 into operation according to the setting of washing the user selected (S440).

[126] In this instance, if the scheduled operation set by the user is the saving electricity scheduled operation, the control unit 60 determines if the preset saving electricity time period is come (S450). In this instance, if the saving electricity time period does not come yet, a waiting state is maintained.

[127] Thereafter, if the saving electricity time period comes, the control unit determines if the user s setting of washing is the midnight mode. If not, the control unit 60 puts the laundry machine 100 into operation according to preset setting of washing mode to perform a washing course. (S470).

[128] In the meantime, if the setting of washing the user selects is the midnight mode, the control unit 60 performs washing prior to the spinning mode in which noise is heavy in a preset washing mode (S490). In this instance, the control unit 60 displays that the spinning course is omitted in the scheduled operation at the midnight mode display unit 28b for the user to notice.

[129] In the meantime, if the user sets that the spinning course is performed in the midnight

scheduled operation, the control unit 60 may perform tumbling in which the drum 50 is rotated at fixed intervals repeatedly until the midnight time period ends (or a time the user sets) after the midnight spinning course performed so that no crumple is formed at the laundry of which spinning is progressed (S480).

[130] Though, the midnight mode scheduled operation is described with the saving electricity scheduled operation, the midnight mode scheduled operation can be performed individually with no relation to the saving electricity scheduled operation. In this case, the control unit determines the midnight mode when the scheduled operation is started, and performs operation of the midnight mode.

[131] In the meantime, the barrel washing of the laundry machine can be performed in the midnight time period by using the saving electricity. In this case, comparatively cheap saving electricity can be used.

[132] FIG. 9 illustrates a flow chart showing the steps of a method for making barrel washing scheduled operation of a laundry machine in accordance with a preferred embodiment of the present invention.

[133] The control unit 60 detects a setting state of the barrel washing as the barrel washing is set by user s handling of the operation panel 20 (S510).

[134] Then, the control unit 60 determines whether the barrel washing the user sets is the scheduled operation or not (S520). If no barrel washing scheduled operation is set individually, the control unit 60 puts the laundry machine 100 into operation directly according to the setting of the barrel washing the user selects, to progress the barrel washing by supplying washing water and detergent (S530). In this instance, if the barrel washing scheduled operation the user sets is general scheduled operation (that is, scheduled operation not related to the saving electricity time period), the control unit 60 waits until an operation time set by the user comes (S550). Then, as a time of the scheduled operation comes, the control unit 60 puts the laundry machine 100 into operation according to the setting of barrel washing the user selected, to perform the barrel washing by supplying washing water and detergent(S560).

[135] In this instance, if the barrel washing scheduled operation the user sets is the saving electricity scheduled operation, at first, the control unit 60 supplies washing water and detergent for the barrel washing (S570).

[136] Then, the control unit 60 determines whether a preset saving electricity time period comes or not. If the saving electricity time period does not come yet, a waiting state is maintained (S580).

[137] In the meantime, if the saving electricity time period comes, the control unit 60 performs the barrel washing by using the washing water, and the detergent supplied in advance, and rotation power of the drum 50 according to barrel washing setting the user selects (S590).

[138] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

[Claim 1] A laundry machine comprising:
a case;
a tub mounted in the case;
a drum rotatably mounted in the tub;
a driving unit for rotating the drum; and
a control unit for controlling scheduled operation of the driving unit according to a real time.

[Claim 2] The laundry machine as claimed in claim 1, wherein the control unit has a saving electricity mode for performing a washing course in a preset saving electricity supply time period according to setting of the scheduled operation.

[Claim 3] The laundry machine as claimed in claim 1, wherein the control unit includes a real time timer for producing the real time.

[Claim 4] The laundry machine as claimed in claim 3, wherein the control unit has a supplementary power unit for driving the real time timer.

[Claim 5] The laundry machine as claimed in claim 2, wherein the control unit has a data base having a saving electricity time period of each region stored therein for performing the washing course according to the saving electricity time period stored in the data base.

[Claim 6] The laundry machine as claimed in claim 1, further comprising an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[Claim 7] The laundry machine as claimed in claim 6, wherein the operation unit includes a saving electricity scheduled operation button for setting the saving electricity scheduled operation in which saving electricity time period is used.

[Claim 8] The laundry machine as claimed in claim 6, wherein the display unit includes a saving electricity scheduled operation display unit for displaying a saving electricity mode scheduled operation in which the saving electricity time period is used.

[Claim 9] The laundry machine as claimed in claim 2, wherein the saving electricity time period is a midnight time period.

[Claim 10] The laundry machine as claimed in claim 9, wherein the control unit has a midnight mode for performing the scheduled operation in the midnight time period in which the saving electricity is supplied.

[Claim 11] The laundry machine as claimed in claim 10, wherein the control unit

omits a spinning course from washing courses having the spinning course if the midnight mode scheduled operation is set.

[Claim 12] The laundry machine as claimed in claim 9, further comprising an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[Claim 13] The laundry machine as claimed in claim 12, wherein the control unit includes a midnight mode scheduled operation button for setting the midnight mode scheduled operation in which the midnight time period is used.

[Claim 14] The laundry machine as claimed in claim 12, wherein the display unit includes a midnight mode scheduled operation display unit for displaying the midnight mode scheduled operation in which the midnight time period is used.

[Claim 15] The laundry machine as claimed in claim 12, wherein the display unit includes a spinning display unit for displaying omission of the spinning course in the midnight mode scheduled operation.

[Claim 16] The laundry machine as claimed in claim 9, wherein the control unit has a barrel washing mode for performing barrel washing in the midnight time period in which the saving electricity is supplied.

[Claim 17] The laundry machine as claimed in claim 16, further comprising an operation unit for inputting the real time period and the saving electricity time period and a display unit for displaying the real time.

[Claim 18] The laundry machine as claimed in claim 17, wherein the operation unit includes a barrel washing scheduled operation button for setting barrel washing mode scheduled operation which uses the midnight time period.

[Claim 19] The laundry machine as claimed in claim 17, wherein the display unit includes a barrel washing mode scheduled operation display unit for displaying the barrel washing mode scheduled operation in which the barrel washing is performed in the midnight time period.

[Claim 20] A method for controlling a laundry machine comprising the steps of:
setting a real time in which a real time is set upon application of power;
setting a saving electricity time period in which a saving electricity time period is set according to the real time set thus; and
performing scheduled operation in which washing scheduled operation is performed, which is set in the saving electricity time period set thus.

[Claim 21] The method as claimed in claim 20, wherein the step of performing scheduled operation includes a washing step in which washing

operation is performed in the saving electricity time period.

[Claim 22] The method as claimed in claim 20, wherein the saving electricity time period is a midnight time period, and the step of performing scheduled operation includes a washing step in which washing operation is performed excluding a spinning course in the saving electricity time period.

[Claim 23] The method as claimed in claim 20, wherein the saving electricity time period is a midnight time period, and the step of performing scheduled operation includes a barrel washing step in which barrel washing operation is performed in the saving electricity time period.

[Claim 24] The method as claimed in claim 20, wherein the step of setting a saving electricity time period includes the steps of;
setting a region at which the laundry machine is used, and
producing a time for setting the saving electricity time period of the region at which the laundry machine is used.

[Claim 25] The method as claimed in claim 24, wherein the saving electricity time period is produced from a data base having the saving electricity time period of the region at which the laundry machine is used.

[Claim 26] A method for controlling a laundry machine comprising:
a scheduled operation determining step for determining whether scheduled operation is set or not;
a saving electricity scheduled operation determining step for determining whether the scheduled operation set in the scheduled operation determining step is the saving electricity scheduled operation or not, if the scheduled operation is set in the scheduled operation determining step;
a saving electricity time period waiting step for waiting until the saving electricity time period comes, if it is determined that the saving electricity scheduled operation determining step is the saving electricity scheduled operation; and
a scheduled operation performing step for performing the scheduled operation set thus, if the saving electricity time period comes in the saving electricity time period waiting step.

[Claim 27] The method as claimed in claim 26, wherein the scheduled operation and the saving electricity scheduled operation is set by a real time.

[Claim 28] The method as claimed in claim 26, wherein the saving electricity time period is set according to a region at which the laundry machine is used.

[Claim 29] The method as claimed in claim 26, further comprising a washing step for performing a preset washing step, if it is determined that the scheduled operation is not set in the scheduled operation determining step.

[Claim 30] The method as claimed in claim 26, further comprising:
a waiting step for waiting until a preset scheduled operation time comes; and
a scheduled operation performing step for performing the preset scheduled operation if the scheduled operation time comes in the waiting step,
if it is determined that the scheduled operation is not the saving electricity scheduled operation in the saving electricity scheduled operation determining step.

[Claim 31] The method as claimed in claim 26, further comprising:
a midnight mode determining step for determining whether the scheduled operation set thus is a midnight mode or not if the saving electricity time period comes after the saving electricity waiting step; and
a scheduled operation performing step for performing the scheduled operation excluding a spinning course from washing courses,
if the scheduled operation set thus is determined to be the midnight mode in the midnight mode determining step.

[Claim 32] The method as claimed in claim 31, further comprising:
a washing step for performing washing courses according to the scheduled operation set thus, if it is determined that the scheduled operation set thus is not the midnight mode in the midnight mode determining step, and
a tumbling step for performing tumbling at fixed intervals repeatedly after the washing step for preventing the laundry from crumpling.

[Claim 33] The method as claimed in claim 26, wherein the scheduled operation determining step includes the step of determining whether the scheduled operation is a barrel washing scheduled operation of not.

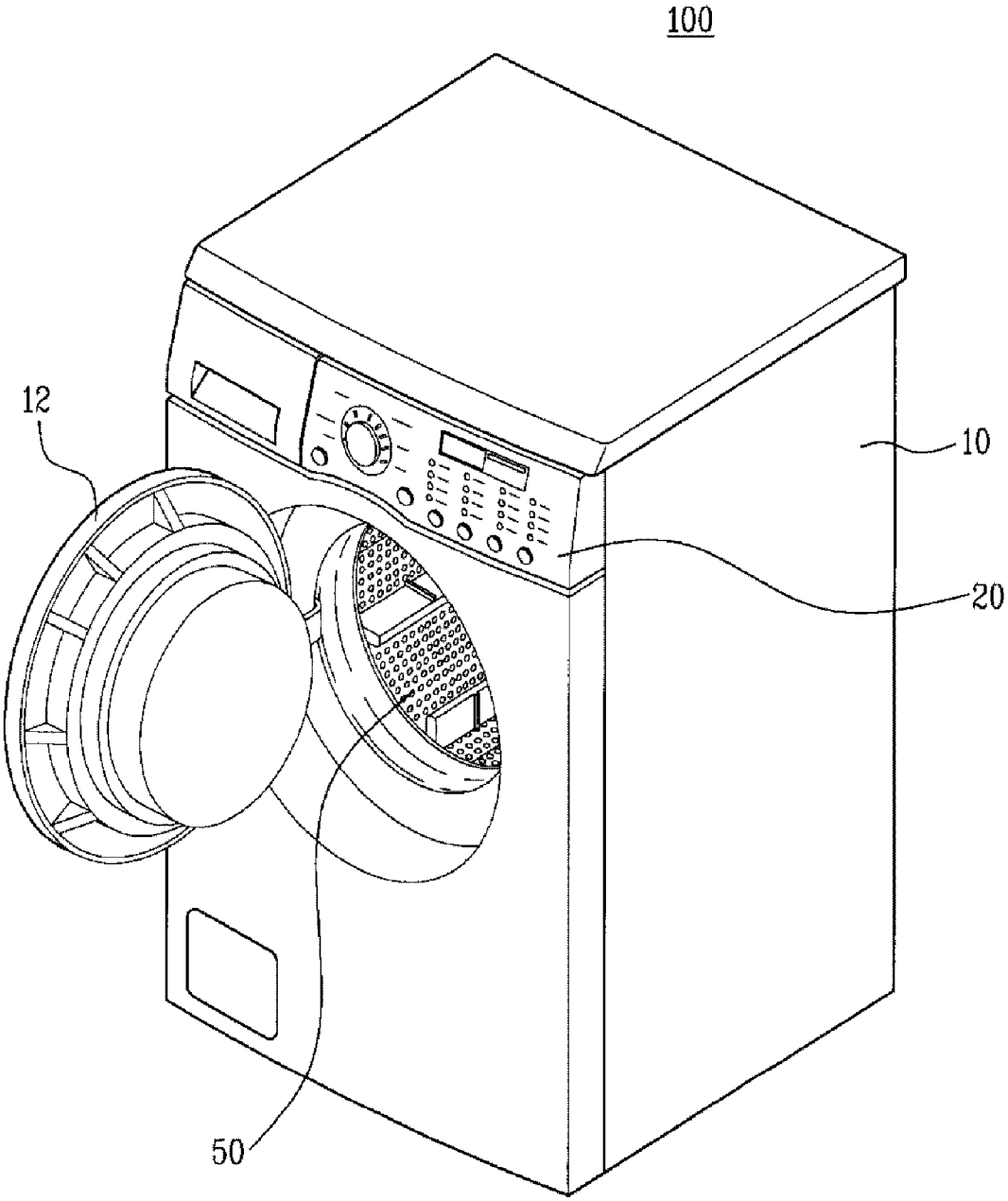
[Claim 34] The method as claimed in claim 33, wherein, if it is determined that the scheduled operation is a barrel washing scheduled operation in the scheduled operation determining step, the scheduled operation determining step includes a washing water supply step for supplying washing water and detergent for barrel washing.

[Claim 35] The method as claimed in claim 26, wherein, if it is determined that the

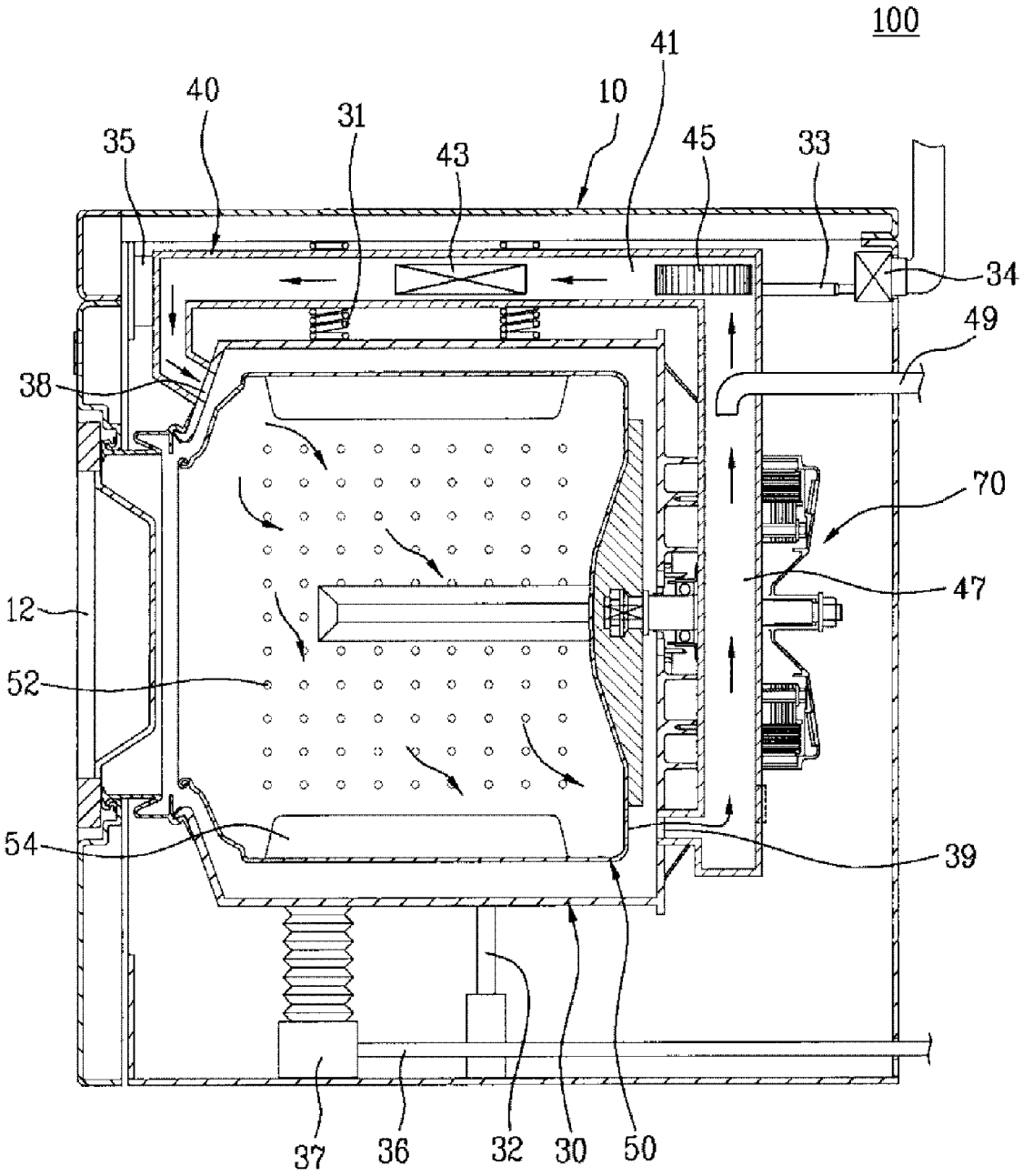
scheduled operation is not a barrel washing scheduled operation in the scheduled operation determining step, the washing water and the detergent is supplied and a barrel washing course is performed.

[Claim 36] The method as claimed in claim 33, further comprising:
a waiting step for waiting until a scheduled operation time set thus comes, if it is determined that the scheduled operation is not the saving electricity scheduled operation in the saving electricity scheduled operation determining step; and
a step for supplying washing water and detergent and performing a barrel washing course directly if the scheduled operation time period comes in the waiting step.

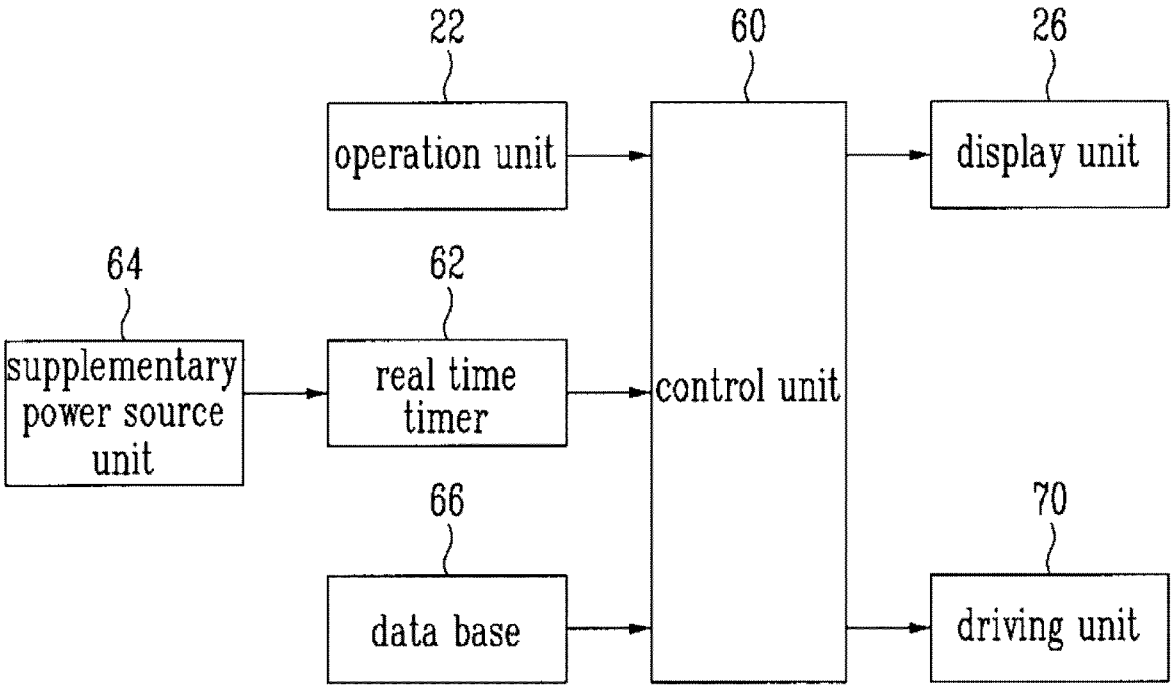
[Fig. 1]



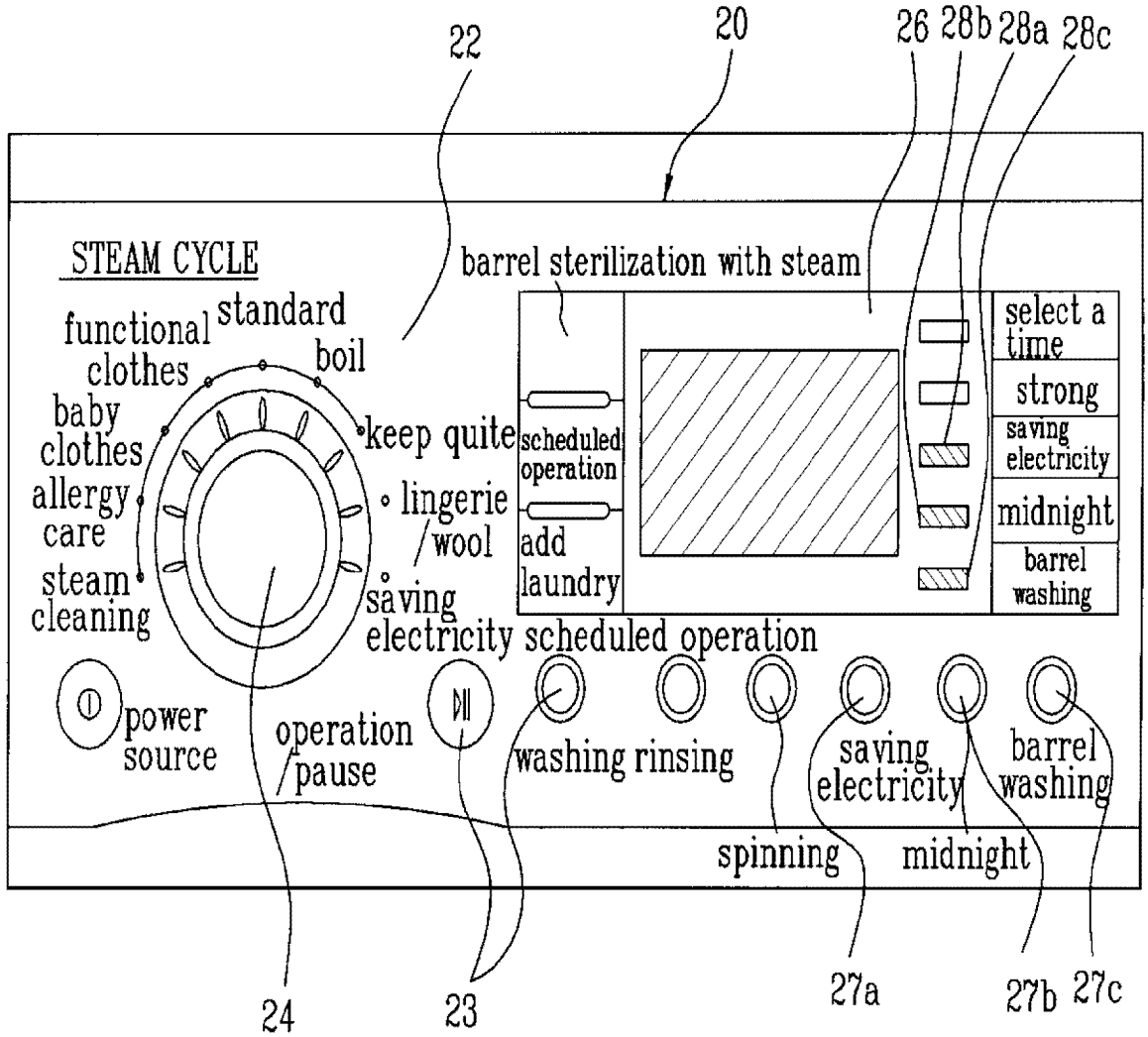
[Fig. 2]



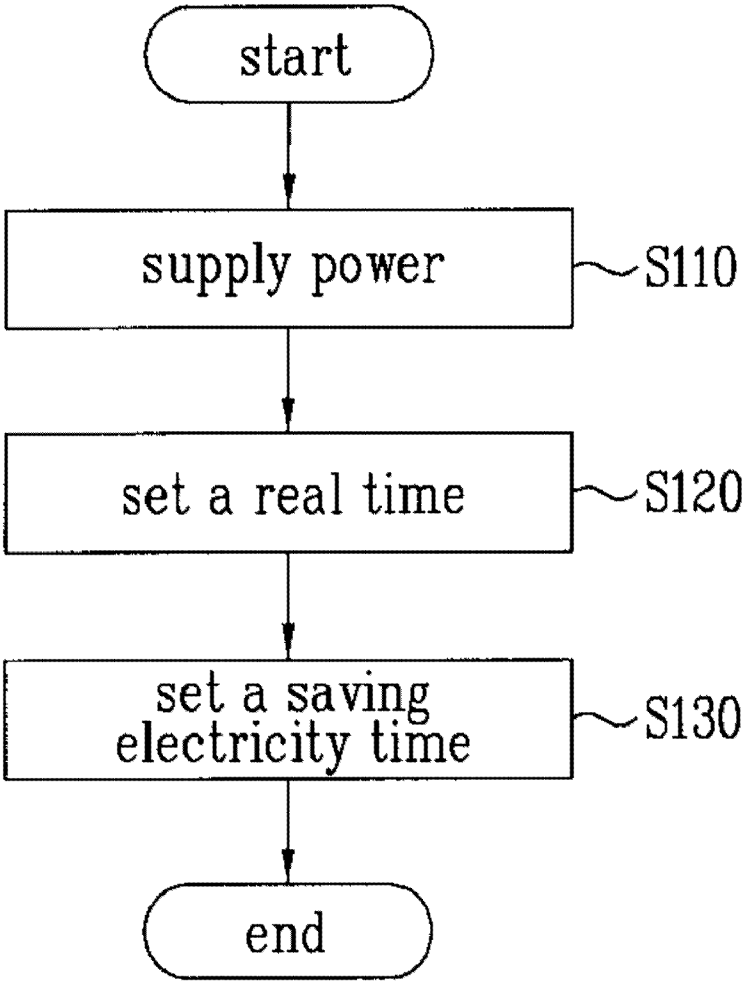
[Fig. 3]


22
60
26
operation unit
display unit
64
62
supplementary power source unit
real time timer
control unit
66
70
data base
driving unit

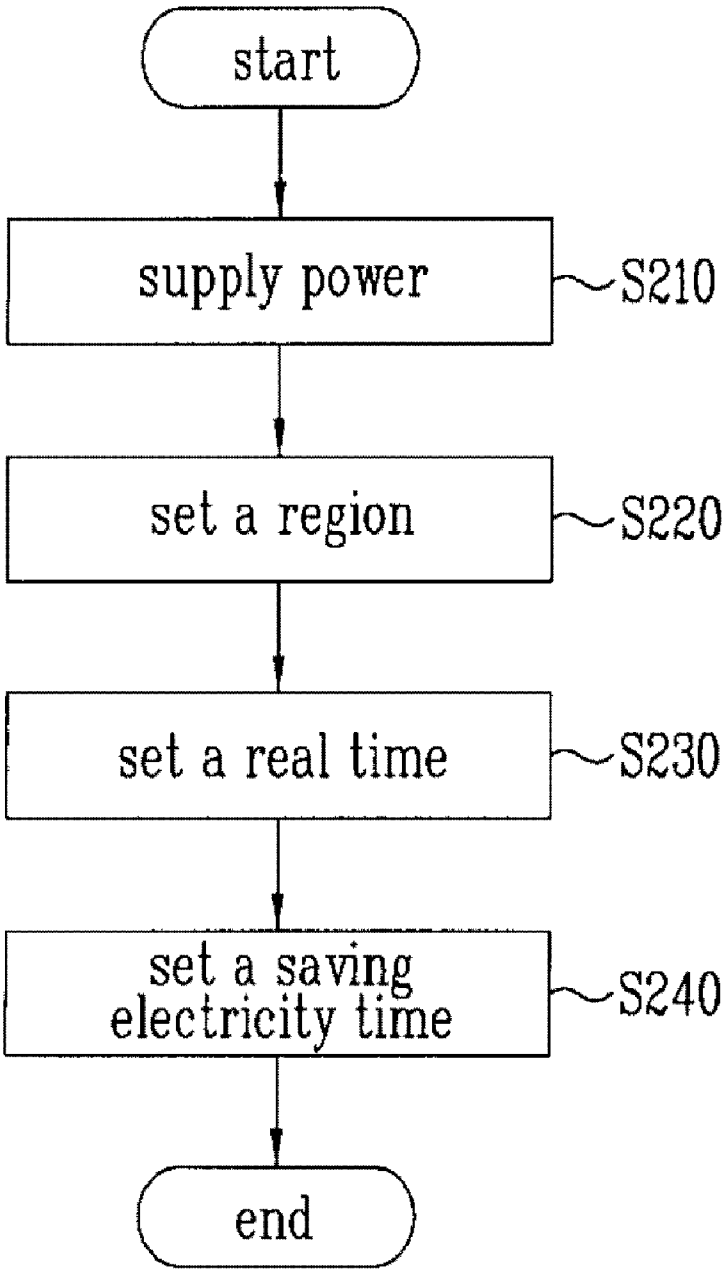
[Fig. 4]


22
20
26
28b
28a
28c
STEAM CYCLE
barrel sterilization with steam
functional clothes
standard
boil
baby clothes
keep quite
allergy care
lingerie
wool
steam cleaning
saving electricity
scheduled operation
add laundry
select a time
strong
saving electricity
midnight
barrel washing
power source
operation /pause
washing
rinsing
spinning
saving electricity
midnight
barrel washing
24
23
27a
27b
27c

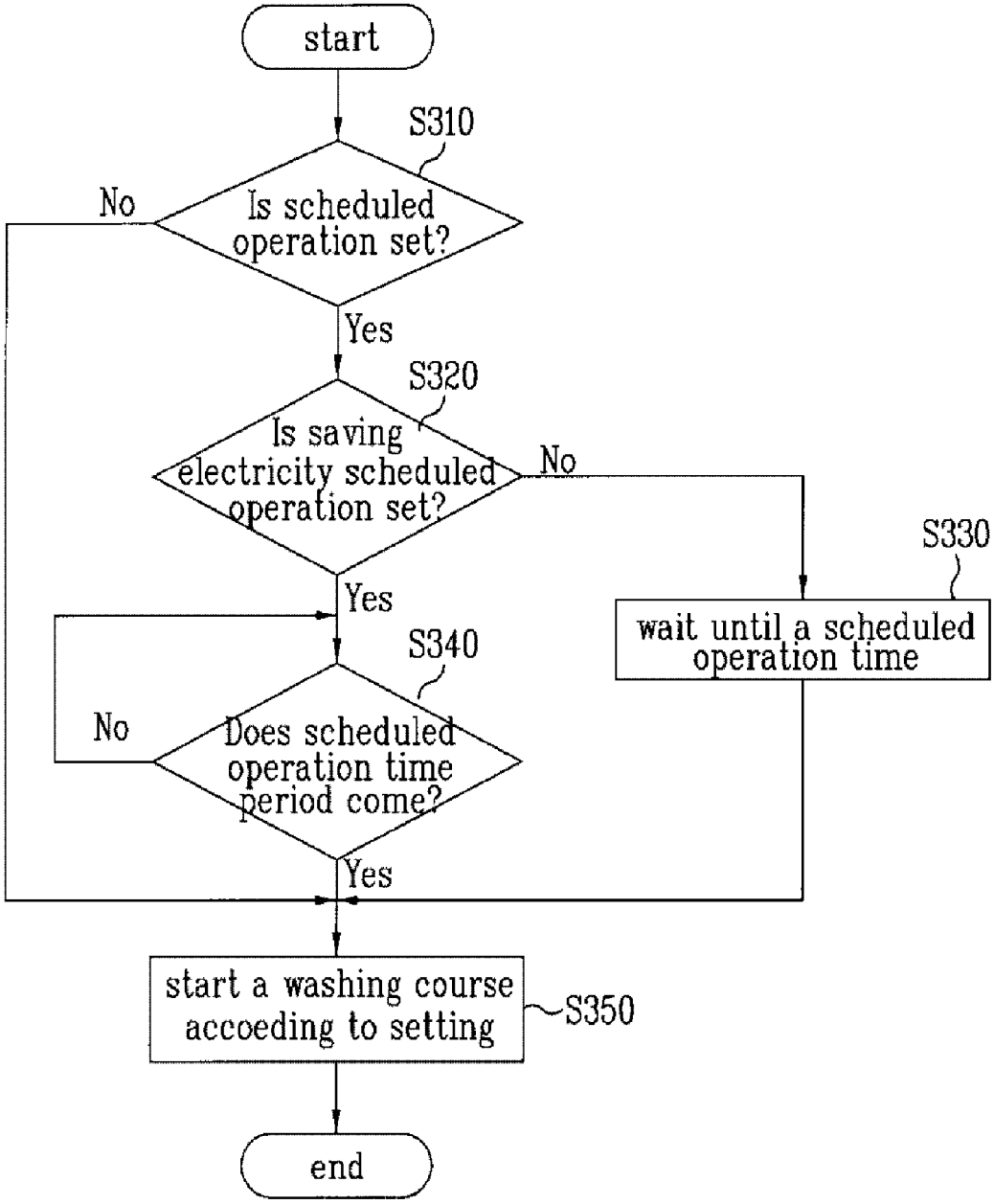
[Fig. 5]


start
supply power
S110
set a real time
S120
set a saving electricity time
S130
end

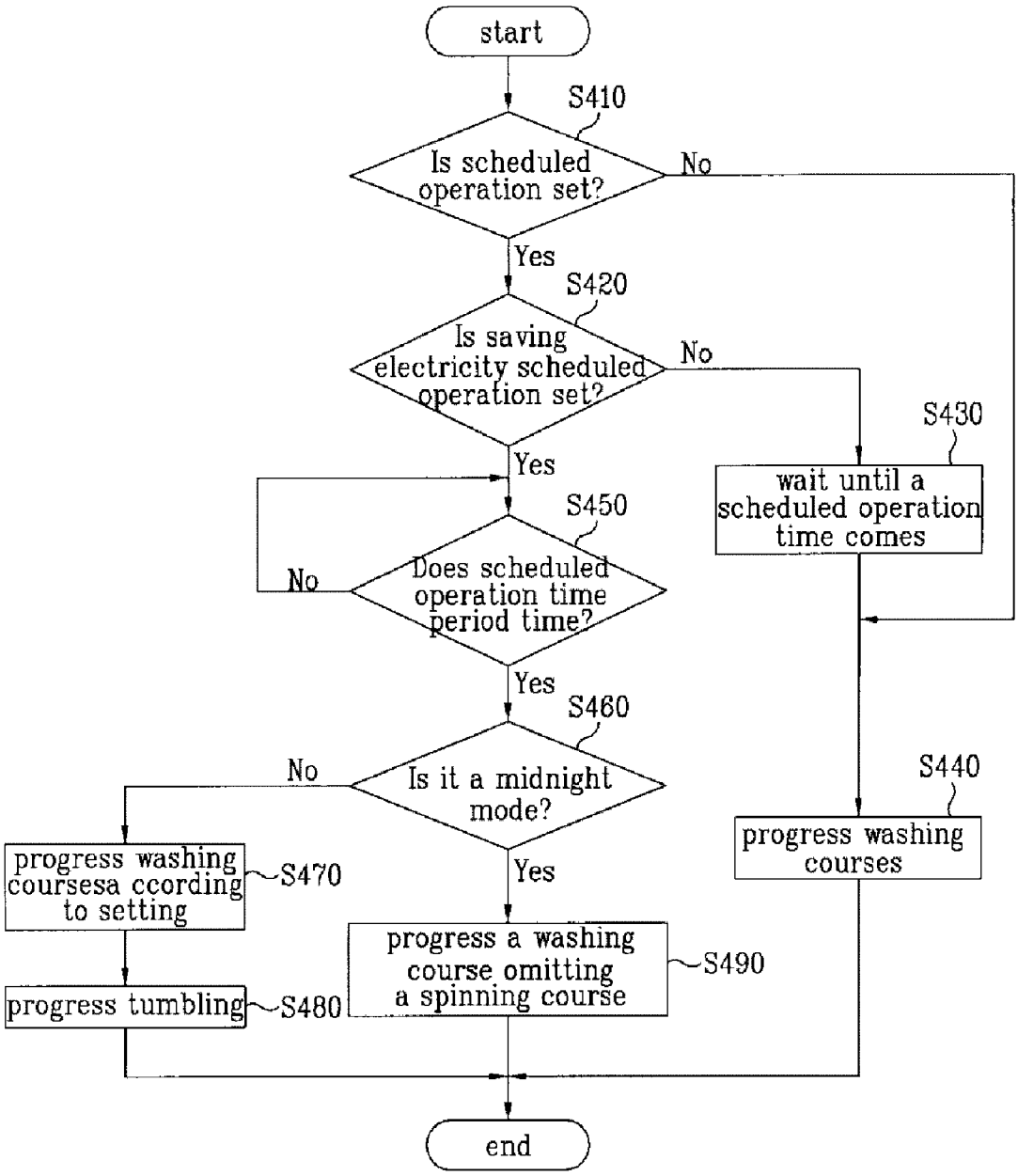
[Fig. 6]


start
supply power
S210
set a region
S220
set a real time
S230
set a saving electricity time
S240
end

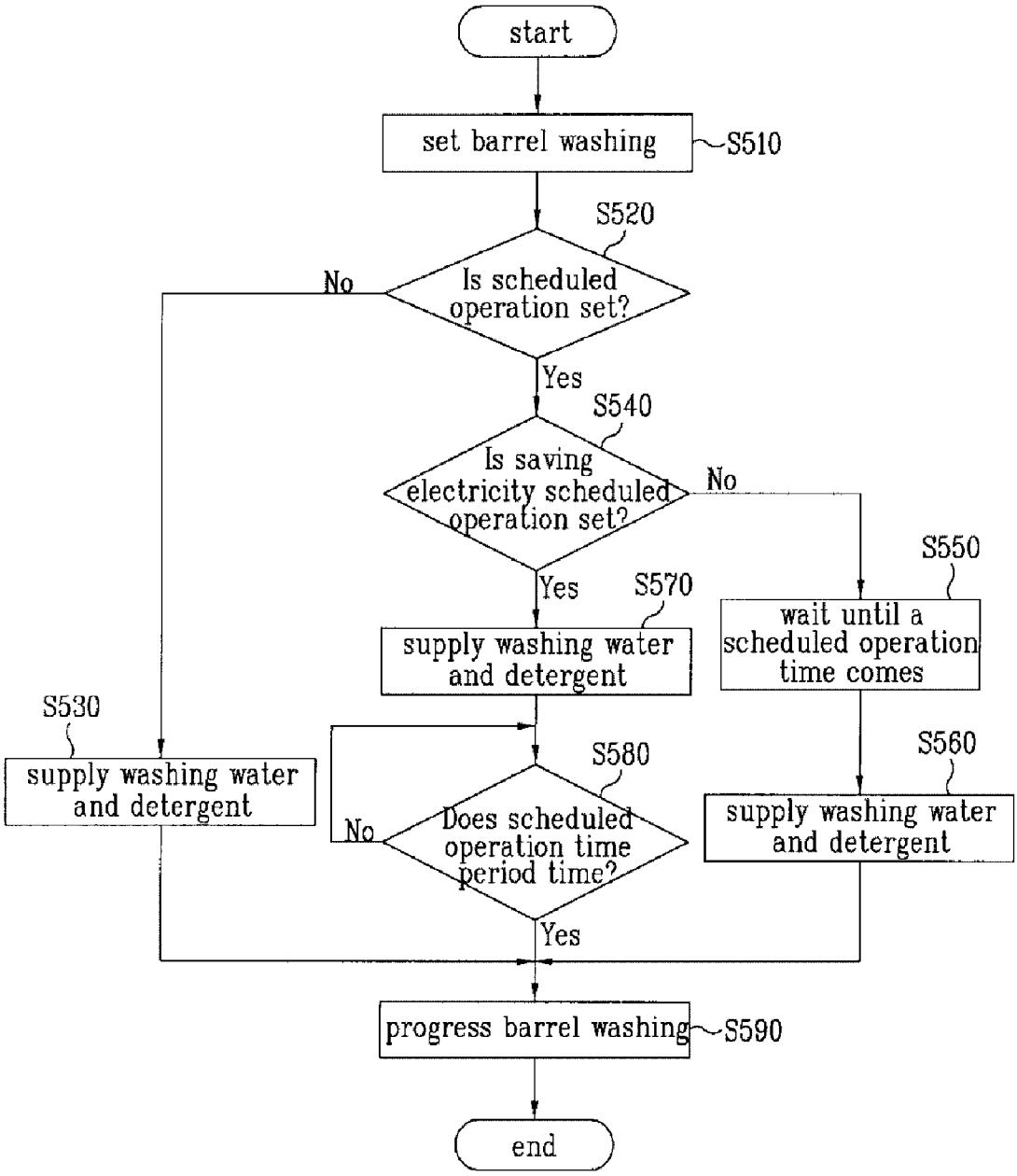
[Fig. 7]


start
S310
Is scheduled operation set?
No
Yes
S320
Is saving electricity scheduled operation set?
No
S330
wait until a scheduled operation time
Yes
S340
Does scheduled operation time period come?
No
Yes
start a washing course accoeding to setting
S350
end

[Fig. 8]


start
S410
Is scheduled operation set?
No
Yes
S420
Is saving electricity scheduled operation set?
No
Yes
S430
wait until a scheduled operation time comes
S450
Does scheduled operation time period time?
No
Yes
S460
Is it a midnight mode?
No
Yes
S440
progress washing courses
progress washing coursesa ccording to setting
S470
progress a washing course omitting a spinning course
S490
progress tumbling
S480
end

[Fig. 9]


start
set barrel washing
S510
S520
Is scheduled operation set?
No
Yes
S540
Is saving electricity scheduled operation set?
No
Yes
S550
wait until a scheduled operation time comes
S560
S570
supply washing water and detergent
S530
supply washing water and detergent
S580
Does scheduled operation time period time?
No
Yes
supply washing water and detergent
progress barrel washing
S590
end

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 1910/000997

A. CLASSIFICATION OF SUBJECT MATTER
IPC[8]: ***D06F 33/02*** (2006.01); ***D06F 39/00*** (2006.01)
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[8]: D06F

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)
EPODOC, WPI, TXTnn

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 887 443 A1 (ELECTROLUX HOME PROD CORP) 13 February 2008 (13.02.2008) *Figure 1; claims 1-40; description paragraphs [0001]-[0003], [0014], [0029], [0032].*	1,2,3,20,21,26,27,29,30
Y		6-15,22,23,31,32
	--	
Y	DE 10 2004 039 435 A1 (BSH BOSCH SIEMENS HAUSGERAETE) 23 February 2006 (23.02.2006) *Figures 1,2; claims 1-4; description paragraphs [0017],[0018],[0022].*	6-15,22,23,31,32
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☒ Further documents are listed in the continuation of Box C. ☒ 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	Date of mailing of the international search report
29 June 2010 (29.06.2010)	27 July 2010 (27.07.2010)

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Facsimile No. +43 / 1 / 534 24 / 535	Telephone No. +43 / 1 / 534 24 / 380

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 882 768 A2 (SAMSUNG ELECTRONICS CO LTD) 30 January 2008 (30.01.2008) *Whole document.* --	1-36
A	JP 2-274288 A (SANYO ELECTRIC CO) 8 November 1990 (08.11.1990) *Abstract.* ----	1-36

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR 2010/000997

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
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DE	A	102004039435		DE	A1	102004039435	2006-02-23
EP	A	1882768		US	A1	2010138055	2010-06-03
				CN	A	101113557	2008-01-30
				US	A1	2008022465	2008-01-31
				EP	A2	1882768	2008-01-30
				KR	A	20080010047	2008-01-30
JP	A	2274288		JP	A	2274288	1990-11-08