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(54) METHOD FOR DISPLAYING INFORMATION ABOUT OPERATING PROGRAMS, OR CYCLES, OF A HOUSEHOLD APPLIANCE, AND HOUSEHOLD APPLIANCE THEREOF

(57) A method is described for displaying information about operating programs, or cycles, of a household appliance (3), said method comprising the steps of storing at least one piece of identification information about said programs/cycles of said household appliance (3) into second memory means (19) of an interface module (9), said identification information being univocal for each one of said programs/cycles, said interface module (9) being adapted to control a display (5) of said household appliance (3) and to make said at least one piece of identification information about said programs/cycles displayable on said display (5), through said interface module (9), every time a program selector (7) is actuated. Further, a household appliance (3) is disclosed, configured to carry out the described method.

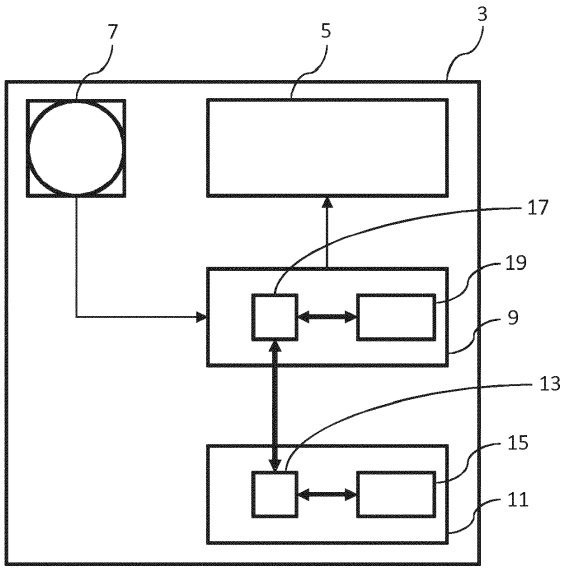


Fig. 2

EP 3 037 578 A1

Description

[0001] The present invention relates to a method for displaying information about operating programs, or cycles, of a household appliance, and to a household appliance thereof.

[0002] It is known that many household appliances, such as washing machines or dishwashers, allow the user to set an operating program, or cycle. Also, most of the household appliances currently available on the market includes a display whereon some information about the operation of the appliance is displayed.

[0003] In particular, considering by way of example a washing machine, a person can set a wash program by means of a program selector (e.g. a knob, wherein each fraction of a revolution corresponds to a specific program), and display information about the selected wash program on a display of the washing machine.

[0004] However, in the household appliances known in the art, quite a long time passes between the selection of the program (via the program selector) and the visualization of the program information on the display. Generally, in fact, said time is approximately one second, and depends on both the time needed for reading the information from the memory of the main board that controls the operation of the household appliance and the time needed for transferring said information to the interface board that manages and controls the display.

[0005] One second may seem a very short time, but when a user has to choose the desired program by means of a rotary selector, much time may be required for completing the selection.

[0006] With reference to Fig. 1, let us assume that a washing machine has nine wash programs/cycles and that the program is selected by means of a rotary selector 1 that can be turned both clockwise (arrow O) and counterclockwise (arrow A). The rotary selector 1 can thus be set to nine different positions, in particular one position every forty degrees of rotation of the knob, wherein each position corresponds to a specific program/cycle. It is therefore apparent that the longest wait time will occur when the user selects the fifth program (because the knob can be turned both clockwise and counterclockwise). In fact, assuming that at each movement of the knob it will be necessary to wait a second for the information about the selected program to be shown on the display, then at least five seconds will be required for the user to select the fifth program, because at each movement of the knob he/she will have to wait for the program information to be displayed on the display and then decide whether that program is of interest or not.

[0007] The worst case occurs when the program selector is a single push-button, and the display shows information about a program every time the push-button is pressed. Considering also in this case a one-second delay between the actuation of the push-button and the visualization of the corresponding program information on the display, then a maximum delay of nine seconds (still assuming that there are nine wash programs/cycles available) will occur when a user decides to choose the last program/cycle available.

[0008] Such delays are really excessive and may be annoying for the user of the household appliance; therefore, a solution to this problem needs to be found.

[0009] It is therefore the main object of the present invention to overcome the above-mentioned problems by providing a method for displaying information about programs, or cycles, of a household appliance, and a household appliance thereof, which can improve the usability of the household appliance for a user.

[0010] It is another object of the invention to provide a method for displaying information about programs, or cycles, of a household appliance, and a household appliance thereof, which can provide information about a certain program/ cycle in real time. Said objects are achieved by the present invention through a method for displaying information about programs, or cycles, of a household appliance, and a household appliance thereof, incorporating the features set out in the appended claims, which are an integral part of the present description.

[0011] Further objects, features and advantages of the present invention will become apparent from the following detailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

- Fig. 1 shows a program selector according to the prior art;
- Fig. 2 is a schematic view of a household appliance according to the present invention;
- Fig. 3A shows a first example of information about operating programs/cycles of the household appliance of Fig. 2 according to the present invention;
- Fig. 3B shows a first screen of the information of Fig. 3A according to the invention;
- Fig. 3C shows another example of information about operating programs/cycles of the household appliance of Fig. 2 according to the present invention;
- Fig. 3D shows a second screen including at least a part of the program/cycle information of Fig. 3C.

[0012] In the present description, the terms "program" and "cycle" have the same meaning, i.e. they identify a specific operating configuration of a household appliance.

[0013] With reference to Fig. 2, there is schematically shown as a whole a household appliance 3 according to the present invention. In particular, said household appliance 3 may be a washing machine (laundry washing machine, clothes dryer, washing/drying machine, dishwasher, etc.) or a cooking machine (e.g. an oven), or any other household device making use of operating programs/cycles.

[0014] The household appliance (3) comprises:

- a display 5, e.g. a grayscale matrix LCD ("Liquid

Crystal Display"), adapted to display information about the operation of the household appliance 3,

- a program selector 7,
- an interface module 9, in particular an electronic graphic interface board, connected to said display 5 for controlling it,
- a main module 11, in particular an electronic main board, configured for governing and controlling the entire operation of the household appliance 3.

[0015] The program selector 7 may be a rotary-knob selector (see for example Fig. 1), a key/push-button, a sliding selector, and so on.

[0016] More in detail, the main module 11 comprises first processing means 13 and first memory means 15. The first processing means 13 are connected to the first memory means 15 and can read the information stored therein. Such information concerns the operation of the household appliance 3, and in particular comprises detailed information about the operating programs/cycles of the household appliance 3.

[0017] The interface module 9 comprises second processing means 17 adapted to control the operation of the display 5.

[0018] One peculiarity of the present invention is that the interface module 9 comprises second memory means 19 adapted to store at least one piece of identification information about the programs/cycles of the household appliance 3.

[0019] In particular, said at least one piece of identification information may comprise the program/cycle name and/or an image (e.g. an icon) associated with a program/cycle and/or a number associated with the program/cycle.

[0020] Said at least one piece of program/cycle identification information comprises data that univocally identify one operating program/cycle of the household appliance 3.

[0021] A further peculiarity of the invention is that the program selector 7 is directly connected to the interface module 9.

[0022] The interface module 9 and the main module 11 are connected to each other, e.g. via a bus connection; they can therefore transfer data to each other.

[0023] More in detail, when a user operates the program selector 7, the interface module 9 will receive from it an electric signal corresponding to the position taken by the selector 7; said electric signal can be seen as a trigger signal that enables a certain event. Upon receiving said trigger signal, the second processing means 17 will gain read access to the second memory means 19 to obtain the corresponding program/cycle identification information. The second processing means 17 will then control the display 5 accordingly to display said program/cycle identification information.

[0024] With reference to Figures 3A and 3B, let us assume by way of example that the household appliance 3 is a laundry washing machine. Fig. 3A shows a first table 21 that contains the identification information about the operating programs/cycles, in particular, the names of the programs/cycles (column with reference numeral 211) and the icons associated with such programs/cycles (column with reference numeral 213), stored in the second memory means 19 (the first table 21 should be regarded as an example representative of the memory locations of the second memory means 19).

[0025] When a user first operates the program selector 7, the second processing means 17 will receive the trigger signal from the program selector 7 and will gain read access to the second memory means 19. Since this is the first actuation of the program selector 7, the second processing means 17 will read the first program available in the first table 21; in other words, they will obtain the name of the program/cycle and the icon associated with that program, and will control the display 5 to display such information. In this case, the display 5 will display the name of the first program "7-day laundry" and the associated icon (see Fig. 3B).

[0026] After the above-described first actuation of the program selector 7, if the user does not execute any further operation (inactivity) within a predefined time (e.g. approx. 1.5 seconds), then the second processing means 17 will transmit the program/cycle identification information currently displayed on the display 5 to the first processing means 13 of the main module 11, which will gain read access to the first memory means 15 to obtain the detailed information associated with the displayed, i.e. selected, program/cycle.

[0027] With reference to Fig. 3C, there is shown, by means of a second table 23, the detailed information about the programs/cycles that may be stored in the first memory means 15. Still assuming that the household appliance 3 is a laundry washing machine, such detailed information about the programs/cycles may comprise, for example, the name of the wash program, the associated icon, water temperature, spin speed, program duration, etc. It is clear that the detailed information about the programs/cycles may vary according to the type of household appliance 3 and may include further data; for example, said further data may comprise additional images associated with the various steps of a given program/cycle (see Fig. 3D).

[0028] Therefore, still considering the above-described example, if the program selected and displayed on the display 5 is "7-day laundry", the processing means 17 will transmit said program name to the first processing means 13, which will gain read access to the first memory means 15 to obtain detailed information about the "7-day laundry" program. In this case, the detailed information will be "90°" for temperature, "1200" rpm for spin speed, and "2:55" for program duration in hours and minutes. This detailed information will then be transmitted from the first processing means 13 to the second processing means 17, which will afterwards make it available for visualization on the display 5 (see Fig. 3D).

[0029] It is apparent from the above-described exam-

ple that the solution of the present invention advantageously allows making the time that elapses between the actuation of the program selector 7 and the visualization of the program/cycle shorter than the time needed for accessing the main module 11 (typically approx. 1 second), due to the very fact that the second memory means 19 comprise information identifying the program/cycle.

[0030] Furthermore, the program selector 7 is directly connected to the interface module 9, so that it is not necessary to gain access also the first memory means 15 to display on the display 5 said program/ cycle identification information.

[0031] In practice, for the purpose of just displaying the program/cycle identification information, this excludes the time needed for communication between the interface module 9 and the main module 11; as a result, the user will not have to wait for said communication time between the interface module 9 and the main module 11 to take place for having the program/cycle identification information immediately available on the display 5. In fact, in the present invention it is envisaged to gain access to the main module 11 only for displaying detailed information about the selected program/cycle, which detailed information resides in the first memory means 15.

[0032] If the user quickly operates the program selector 7, i.e. rapidly selects a plurality of operating programs/cycles, the display 5 will in turn quickly display the program identification information because at each selection of the selector 7 the program/cycle identification information will be directly extracted from the interface module 9 (i.e. from the second memory means 19).

[0033] In the household appliance 3 according to the invention, a fading effect is also applied to the display 5 during the transition between a first screen containing only the program/cycle identification information (like the one shown in Fig. 3B) and a second screen containing detailed information about the program/cycle (like the one shown in Fig. 3D). The fading effect may also be applied when the display 5 is turned on and off, in particular showing a logo of the manufacturer of the household appliance 3.

[0034] The following will describe a method for displaying information about operating programs/cycles of a household appliance 3 comprising:

- a display 5 adapted to display information about operating programs, or cycles, of said household appliance 3,
- a program selector 7,
- an interface module 9 connected to said display 5 and comprising second processing means 17 adapted to control the operation of said display 5,
- a main module 11 configured for governing and controlling the entire operation of said household appliance 3.

[0035] According to the present invention, said method comprises the steps of:

- storing at least one piece of identification information about said programs/cycles of said household appliance 3 into second memory means 19 of an interface module 9, said identification information being univocal for each one of said programs/cycles, said interface module 9 being adapted to control a display 5 of said household appliance 3; and
- making said at least one piece of identification information about said programs/cycles displayable on said display 5, through said interface module 9, every time a program selector 7 is actuated.

[0036] The identification information about said programs/cycles comprises a program/cycle name and/or an image, in particular an icon, associated with said program/cycle and/or a program/cycle number.

[0037] Said step of displaying provides to read, by means of second processing means 17 included in said interface module 9, the at least one piece of identification information about said programs/cycles from the second memory means 19.

[0038] The method according to the present invention further provides to display detailed information about said programs/cycles on said display 5 after a predetermined inactivity time has elapsed since the actuation of the program selector 7. To this end, it is provided to transmit, by means of said processing means 17, the at least one piece of identification information about the program/ cycle which is currently displayed on the display 5 to first processing means 13 of a main module 11, which have read access to first memory means 15 for obtaining the detailed information about the displayed, i.e. selected, program/cycle. Subsequently, it is provided to display on said display 5 the detailed information about the displayed, i.e. selected, program/ cycle.

[0039] Another peculiarity of the method according to the invention is that it is provided to connect the program selector 7 directly to said interface module 9, so that at every actuation the latter will receive a trigger signal that will enable the second processing means 17 to read the program/cycle identification information from the second memory means 19.

[0040] The following will describe further features of the method according to the invention.

[0041] According to a first feature, the images, or icons, displayable on the display 5 can take different brightness levels. For example, if a certain program of the household appliance is being executed, only those icons associated with the functions of that program will be enabled, i.e. they will be lit on the display 5, while the icons associated with functions not involved in that program will be disabled, i.e. they will have a low brightness level on the display 5.

[0042] According to a second feature, it is provided to display on the display 5 a program/cycle progress bar providing information about the progress of the program being executed.

[0043] According to a third feature it is provided to dis-

play, during the execution of a program/cycle of said household appliance 3, icons identifying the steps of said program/cycle by means of the display 5. More in detail, the step icon is an animated one, i.e. it will change its appearance over time according to the step in execution. For example, assuming that a cycle has four steps, during step one a first fraction of four fractions of the whole icon will be shown, during step two a first and a second fractions of four will be shown, and so on until the fourth and last step of the cycle will be executed and the icon will be displayed in full. As an alternative, different images/icons may be displayed for each step of the cycle. According to a fourth feature it is provided to activate, during the normal operation of the household appliance 3, a "screen saver" on the display 5 after a predefined time (e.g. one minute) of inactivity of a user. In particular, the screen saver may consist of a reduction in the brightness of the display 5 and/or the visualization of the relevant program information alone, e.g. the program progress bar and the program step icon.

[0044] According to a fifth feature it is provided to equip the household appliance 3 with a user menu that allows setting a menu language and a country (typically the one where the household appliance 3 is located). In addition, once a user has set the language and the country, the household appliance 3 is configured to, when a fault occurs, show on the display 5 information about the manufacturer's service center in that specific country. Such service center information may include a telephone number, a fax number, an address, a technician's name, and so on. In addition, when a fault occurs, a code associated with that fault may also be displayed.

[0045] The present invention also relates to a computer program product which can be loaded into a memory 15,19 of the household appliance 3, and which is adapted to implement the method of the invention.

[0046] The characteristics and advantages of the method for displaying information about operating programs/cycles of a household appliance, and of the household appliance thereof, according to the present invention are apparent in the light of the above description.

[0047] In particular, a first advantage of the present invention is that it allows improving the usability of a household appliance for a user.

[0048] A further advantage of the present invention is that it allows providing a user with information about a specific operating program/cycle in real time.

[0049] It is however clear that many changes may be made to the method for displaying information about operating programs/cycles of a household appliance, and the household appliance thereof, according to the present invention, and that in its practical implementation the various components may have different shapes and arrangements or be replaced with other technically equivalent elements without departing from the novelty spirit of the inventive idea.

[0050] In particular, although a method for displaying information about operating programs/cycles of a washing machine has been described in detail herein, the present invention can however be conveniently applied to household appliances intended for different applications, e.g. food cooking.

[0051] It can therefore be easily understood that the present invention is not limited to the above-described method for displaying information about operating programs/cycles of a household appliance, and household appliance thereof, but may be subject to many modifications, improvements or replacements of equivalent parts and elements without departing from the inventive idea, as clearly specified in the following claims.

Claims

1. Method for displaying information about operating programs, or cycles, of a household appliance (3), said method comprising the steps of:

   - storing at least one piece of identification information about said programs/cycles of said household appliance (3) into second memory means (19) of an interface module (9), said identification information being univocal for each one of said programs/cycles, said interface module (9) being adapted to control a display (5) of said household appliance (3); and
   - making said at least one piece of identification information about said programs/cycles displayable on said display (5), through said interface module (9), every time a program selector (7) is actuated.

2. Method according to claim 1, wherein said at least one piece of identification information about said programs/cycles comprises a program/cycle name and/or an image, in particular an icon, associated with said program/cycle and/or a program/cycle number.

3. Method according to claim 1 or 2, wherein said step of displaying provides to read, by means of second processing means (17), said at least one piece of identification information about said programs/cycles from said second memory means (19).

4. Method according to one or more of the preceding claims, wherein it is provided to display detailed information about said programs/cycles on said display (5) after a predetermined inactivity time has elapsed since said actuation of said program selector (7).

5. Method according to claim 4, wherein it is provided to transmit, by means of said second processing means (17), said at least one piece of identification

information about the program/ cycle which is currently displayed on said display (5), to first processing means (13) of a main module (11), which have read access to first memory means (15) for obtaining said detailed information about said displayed or selected program/cycle.

6. Method according to claim 5, wherein it is provided to display on said display (5) said detailed information about said displayed or selected program/cycle.

7. Method according to one or more of the preceding claims, wherein it is provided to connect said program selector (7) directly to said interface module (9).

8. Household appliance (3) comprising:

- a display (5) adapted to display information about operating programs, or cycles, of said household appliance (3);
- a program selector (7);
- an interface module (9) connected to said display (5) and comprising second processing means (17) adapted to control the operation of said display (5);
- a main module (11) configured for governing and controlling the entire operation of said household appliance (3),

said household appliance (3) being **characterized in that**
said interface module (9) comprises second memory means (19) adapted to store at least one piece of identification information about said programs/cycles of said household appliance (3), said at least one piece of identification information being univocal for each one of said programs/cycles.

9. Household appliance (3) according to claim 8, wherein said program selector (7) is connected to said interface module (9).

10. Household appliance (3) according to claim 8 or 9, wherein said interface module (9) allows displaying said at least one piece of identification information about said programs/cycles every time said program selector (7) is actuated.

11. Household appliance (3) according to one or more of claims 8 to 10, wherein said interface module (9) comprises second processing means (17) adapted to transmit said at least one piece of identification information about the program/cycle, which is currently displayed on said display (5), to first processing means (13) of said main module (11), which have read access to first memory means (15) for obtaining detailed information about said displayed or selected program/cycle.

12. Household appliance (3) according to claim 11, wherein said first processing means (13) transmit said detailed information about said displayed or selected program/cycle to said second processing means (17), which will then make it available for visualization on said display (5).

13. Household appliance (3) according to claim 12, wherein said detailed information about said displayed or selected program/cycle is displayed on said display (5) after a predetermined inactivity time has elapsed since said actuation of said program selector (7).

14. Computer program product which can be loaded into a memory of said household appliance (3), and which is adapted to implement the method according to one or more of claims 1 to 7.

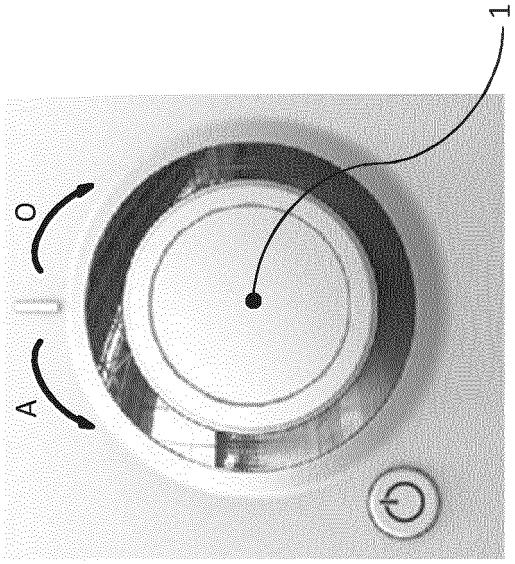


Fig. 1

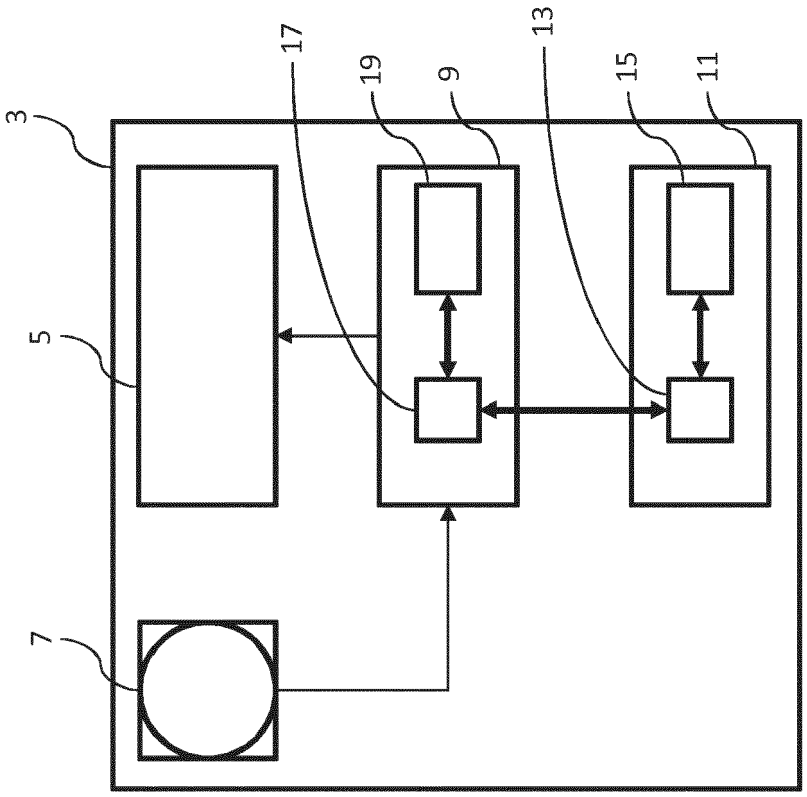


Fig. 2

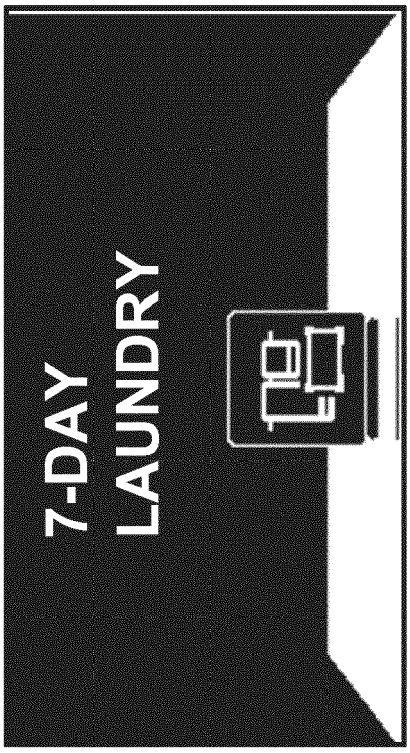

7-DAY
LAUNDRY

Fig. 3B

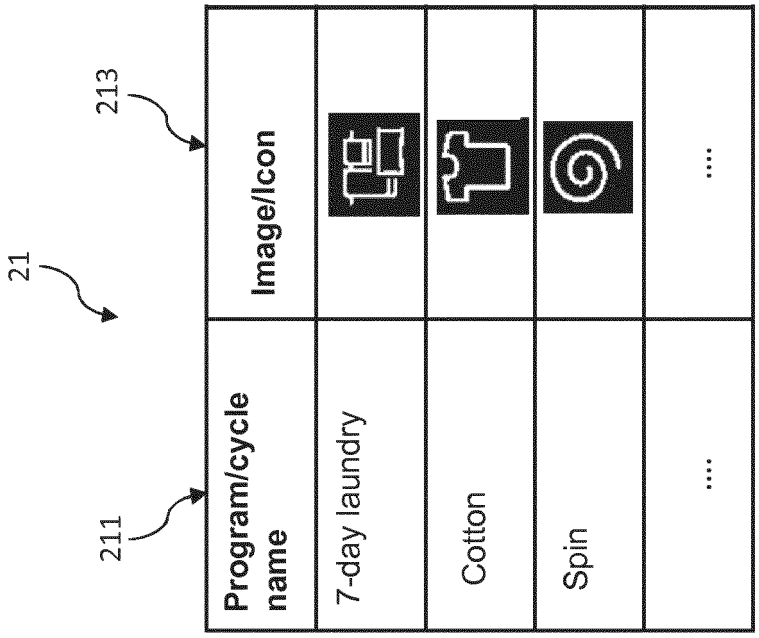

21
211
213
Program/cycle name
Image/Icon
7-day laundry
Cotton
Spin
....
....

Fig. 3A

23

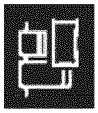
Program/cycle name	Image/ Icon	Temperature [Celsius degrees]	Spin speed [rpm]	Duration [h:mm]	....
7-day laundry		90	1200	2:55	....
Cotton		40	1000	1:45	....
Spin		--	1200	0:09	....
....	....	....	....	....	....

Fig. 3C

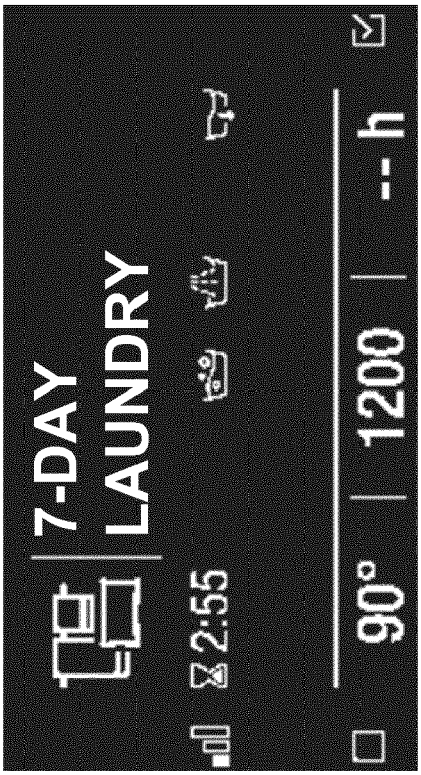


Fig. 3D

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EUROPEAN SEARCH REPORT

Application Number
EP 15 20 0656

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2007/004801 A2 (LG ELECTRONICS INC [KR]; JEONG SEONG HAE [KR]; AHN BYUNG HWAN [KR]) 11 January 2007 (2007-01-11) * paragraphs [0058] - [0066] * * paragraphs [0071] - [0094] * * figures 1, 2 *	1-14	INV. D06F33/02 ADD. D06F39/00
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X	EP 1 830 132 A2 (ELECTROLUX HOME PROD CORP [BE]) 5 September 2007 (2007-09-05) * paragraphs [0017] - [0031] * * figures 1-3 *	1-3	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 February 2016	Weidner, Maximilian

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 20 0656

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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