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(71) Applicant: Merloni Elettrodomestici S.p.A.  
I-60044 Fabriano (AN) (IT)

(72) Inventors:  
• Aisa, Valerio  
I-60044 Fabriano (AN) (IT)  
• Mariotti, Costantino  
I-06028 Sigillo (PG) (IT)  
• Salvucci, Giuseppe  
I-62027 San Severino Marche (MC) (IT)

(54) Washing machine with an electronic control system, having a simplified programming and programming method thereof

(57) A washing machine is described, comprising all the known elements for its functioning, from among which an electronic control system and manual command means (3;3A), said washing machine (1;1A) being able to carry out, in function of information obtained by way of said command means (3;3A), at least one predetermined treating cycle from among a plurality of different possible treating cycles, whether they are predetermined or not, the carrying out of said treating cycles depends upon numerous parameters relative to characteristics of the products to be washed. According to the invention, said control system comprises an electronic programmer to which memory

means and sensor means are associated arranged within the machine, and for the selection of a treating cycle predetermined and stored in said memory means, said programmer has the necessity of a single information, inputted by the user by way of said manual command means (3;3A), relative to a characteristic parameter of the products to be washed, the other parameters that determine said treating cycle being obtained in an automatic way by the programmer, by way of coded data in said memory means and/or by way of said sensor means.

FIG. 1

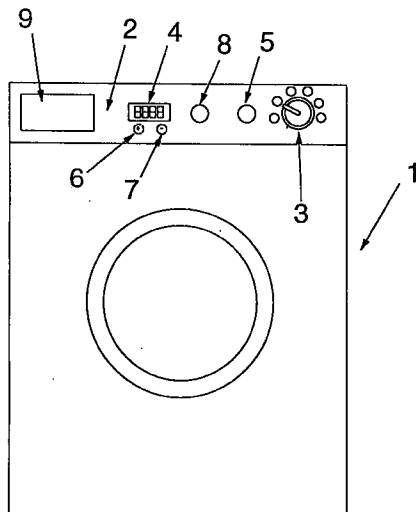
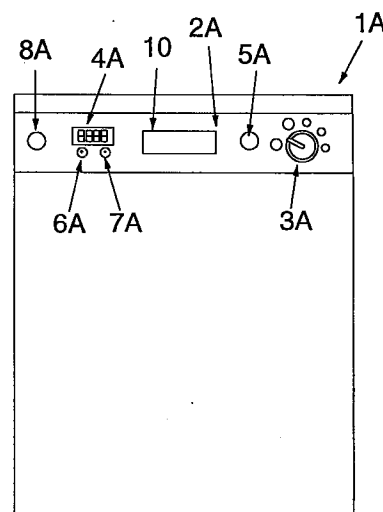


FIG. 2



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## Description

The present invention refers to an electronically controlled household appliance, in particular to a washing machine as described in the preamble of claim 1.

It is known that the evolution of electronic technologies and of the relative methods of control is offering ever increasing opportunities, in view of realising household appliances equipped with new functions and improved performance, characterised in a greater respect for the environment and having lower production costs.

However, the increasing complexity of the control systems of such household appliances often result in the necessity of greater diligence in programming by way of the user, in order to be able to obtain the maximum from the capacity of the product.

For instance, in the case of washing machines, the known art regarding electronically controlled household appliances substantially provides for two types of programming approaches, typically expressed by German and Japanese producers of household appliances.

The German type of approach, also known as the "input system" provides for a user-appliance interface, i.e. a control panel, equipped with lots of buttons, lights and dials, provided for selecting the multitude of possible parameters and functions. Such control panel is obviously made more complicated by the increase of the functions, as a consequence of the utilisation of the electronic control techniques.

In this case, therefore, the user has to input a great number of parameters and select the various functions of interest, and the electronic control system of the machine, acting on the inputs received and elaborating them, provides for carrying out a complete washing cycle.

In other words, therefore, the user is able to completely dominate a highly sophisticated washing machine, but the complexity of its control panel is directly proportional to the number of functions provided and the cost of the machine itself.

The programming approach followed by the Japanese producers is the total opposite, in practice, they propose with household appliances a technique which is widely used in the case of cameras, i.e. the functioning can be either completely automatic or manual, according to the discretion of the user.

In this case, the electronically controlled washing machine provides, in normal use, a single command means, which corresponds to the starting button of the washing cycle; the user is not therefore called upon to insert any input being particular to the electronic control system, thus in such situation it can be stated that the washing machine completely "dominates" the user.

According to the Japanese type of approach, in some applications, the machines are also equipped with a complicated keyboard, for the completely manual programming of the multitude of operative parameters. However, in the case in which the manual programming

option is selected, the user has to face the problems of complexity as expressed above, with reference to the programming approach of the "input system".

In substance, therefore, the approaches of the known type to the programming of evolved household appliances present, on the one hand, the problem of excessive complexity, deriving from the number of commands, or on the other hand appliances being completely automated, that not all users are prepared to accept (for instance, if the results of an automatic wash are not acceptable for the user, the user cannot bring about modifications to the cycle without great complications).

Moreover, in the first case, the user is called upon to supply numerous types of information (fabric type, quantity of fabric, washing temperature, spin speed, water hardness, etc.) that calls for a certain mental care and reasoning, and without which the household appliance, notwithstanding its capacity, is not able to function correctly; in view of its complexity, it may occur that the user forgets to supply some important information.

In a certain sense, therefore, this constitutes an impediment for the diffusion of innovative products in the household appliance sector and consumer goods in general.

The purpose of the present invention is that of overcoming the abovementioned drawbacks and of indicating a new method of managing and of realising a control panel of a household appliance with a sophisticated electronic control, with the aim of rendering the dialogue between the user and the household appliance extremely simple and, at the same time, however being able to fully satisfy the mutual necessity, from the user to the machine and vice versa, of information being actually necessary.

Such purposes are reached according to the present invention by a washing machine and a method for the programming of a washing machine incorporating the characteristics of the annexed claims.

The characteristics and advantages of the present invention shall however result in being clear from the following detailed description and annexed drawings, supplied purely as an explanatory and non-limiting example, wherein:

- figure 1 schematically represents a laundry washing machine realised according to the details of the present invention;
- figure 2 schematically represents a dishwashing machine realised according to the details of the present invention;
- figure 3 schematically represents a detailed view of the machine of figure 1 or 2, according to a possible variant of the present invention.

The aims that the present invention intends to reach are obtained substantially by way of the electronic control system of the household appliance, which is

equipped to carry out the three following related and complimentary actions:

1 Ask the user information of the type being purely "qualitative" (such as for instance the delicacy of the laundry, the level of dirtiness and fragility of the dishes), i.e. information deriving directly from the experience of the user, and in such a way that the inputting of such information is realised with extremely simplified operations and being of a limited number, such as the rotating of a single dial and the pressing of a single button.

2 Supply, with appropriate means (such as a led or liquid crystal display, indicating lamps, the illumination of graphic symbols) only the information that is really useful for the user, and in a qualitative form, for instance by way of symbols, levels and/or shapes, thus avoiding ambiguous signs and markings, of difficult interpretation.

3 Automatically obtain, by way of appropriate sensors, all the typical "quantitative" data, which is difficult for the user to input, necessary for the optimal management of the appliance, i.e. information relative to functional conditions of the machine and/or to the physical and chemical characteristics of the items onto which the apparatus operation is based, such as for instance the temperature of the washing liquid, the water hardness, the concentration of the detergent in the washing liquid, the level of humidity, the characteristics or type of dirt, etc.

The information obtained in the way mentioned above is then elaborated by the electronic control system and translated into appropriate actions, having the aim of managing the household appliance in such a way so as to obtain the maximum global performance in relation to a determined functional condition.

For instance, in the case of a laundry washing machine, the performance desired can be understood as the washing of the laundry without wearing the fibres, with a saving of water and electricity and having respect for the environment, to be obtained in relation to functional conditions of the machine such as the value of the power supply, the hardness level of the water, the quantity of detergents introduced by the user, the quantity and type of laundry, the quantity and type of dirt, the load unbalance entity of the laundry in the basket, etc.

The great advantage of household appliances realised according to the details of the present invention is thus represented by the fact that they are able to bring together the presence of highly sophisticated functions and performance with an extreme simplicity of use. With this aim, a fundamental characteristic of the so called "user-interface" of such household appliances according to the invention, i.e. their control panels, is the extreme simplicity, which is also translated in a considerable aesthetic sobriety.

The present description shall be executed with particular reference to washing machines, such as a laun-

dry washing machine and a dishwashing machine, on which the present invention finds a use being particularly advantageous.

Such laundry washing machine and dishwashing machine are schematically represented in figures 1 and 2.

As can be seen from figure 1, the laundry washing machine indicated as a whole with 1 has an extremely simplified control panel 2.

For the aims of the invention a smooth turning dial, indicated with 3, a LED display, indicated with 4 and a program starting button, indicated with 5 are in fact sufficient: as shall be explained in the following of the present description, such means are sufficient for exchanging with the user information being strictly necessary for obtaining the desired results, i.e. a washing program predetermined or complete, that the household appliance is able to express, in virtue of its sensor means and the control technique based on fuzzy logic.

On the panel 2 two buttons are further supplied, respectively indicated with 6 and 7, and respectively carrying the symbols "+" and "-".

On the control panel 2 a traditional general switch of the machine is finally indicated with 8, for enabling the electrical power supply, and with 9 a drawer of a washing agents dispenser; the panel 2 can also eventually have indicating lamps for signalling one or more functional conditions of the machine.

As is seen, the dishwashing machine of figure 2 in practice has the same control elements as those represented in figure 1 on the laundry washing machine, and for this reason the elements have been distinguished with the same reference numbers, with the addition of the letter "A"; with 10 a handle is indicated for realising the opening of the frontal loading door of the dishwashing machine; naturally in the case of the dishwasher the drawer of the washing agents dispenser is not present, because such device, as is known, is housed on the inner door of the machine.

Therefore, according to the aims of the present invention, the only substantial difference between the control panels 2 and 2A of the dishwashing machine and the laundry washing machine is the printing on the controls 3 and 3A.

In the case of the laundry washing machine 1, the dial 3 will be provided for the selection from among six options, corresponding to the following types of laundry to be washed: woollens, delicate fabrics, synthetics, coloured fabrics, very strong fabrics, or very dirty; such options can for instance be represented by way of graphic symbols, the likes of which recall the type of laundry.

In the case of the dishwashing machine 1A, the dial 3A will be for instance provided with the selection from among five options, corresponding to the following types of dishes to be washed: crystal, pots and pans, dishes with a normal level of soil, dishes with a low level of soil, wherein with crystal particularly delicate items are intended, such as for instance crystal glasses,

whereas with pots and pans, items that can withstand vigorous treatment are intended, such for instance pans with a particularly resistant soil.

The electronic control system of the two washing machines 1 and 1A is of the type based on the use of a microcontroller, to which appropriate means are associated for realising the various actions in relation to the type of washing required; such control system provides for, in other words, a programmer, or timer, of the electronic type with which appropriate memory means are associated, within which the rules for realising the washing programs is stored in an appropriate manner.

To such control system sensor means are also associated, which allow for the control system in practice to obtain all the necessary quantitative information for the carrying out of the normal washing cycle.

In the case of the laundry washing machine 1, such sensor means comprise:

- a sensor of the quantity and/or the type of laundry;
- a sensor of the mains water hardness;
- a sensor of the detergents concentration in the washing water;
- a sensor of the type of soil associated to the laundry;
- a sensor of the laundry load balance inside the basket of the machine.

In the case of the dishwashing machine 1A such sensor means comprise:

- a sensor of the mains water hardness;
- a sensor of the type of soil associated to the dishes;
- a sensor of the detergents concentration in the washing water;
- a sensor of the presence of foam in the washing liquid.

It is not considered necessary herein to describe in detail the aforementioned types of sensors and their methods of use inasmuch they are already known.

As an indication, regarding a detailed description of the greater part of such sensors and their methods of use in the case of washing machines, the Italian patent applications N° TO92A000668, TO93A000796, TO94A000058, TO93A000798, in the name of the same applicant are cited.

It is sufficient herein to mention, as already stated, that the presence of such sensors and the elaboration techniques according to the *fuzzy logic*, allow the control system of the machines 1 and 1A to carry out in an automatic manner, the greater part of the operations provided and to considerably simplify the interactivity with the user, because, as will be seen, according to the invention the latter is called upon to supply only one information being strictly necessary for the control system.

The functioning of the washing machines of figures 1 and 2 is very simply. In the case of the laundry wash-

ing machine 1 and the dishwashing machine 1A, the only operations that the user has to carry out are the following:

- turn on the machine by way of the general switch 8 or 8A;
- load the laundry to be washed in the basket of the laundry washing machine, or the dishes in the baskets of the dishwashing machine;
- introduce in the machine the necessary washing agents;
- appropriately position the control dial 3 or 3A, for indicating the most delicate item to be washed, in the case of the laundry washing machine, or the type of dishes, or their grade of dirtiness, in the case of the dishwashing machine 1A;
- press the program starting button 5 or 5A.

To such actions of the user, the laundry washing machine 1 and the dishwashing machine 1A will reply in the following way.

Upon turning on the washing machine 1 or 1A, by way of the general switch 8 or 8A by the user, the electronic control system will make appear on a display 4 or 4A a simplified graphic information, expressing the level of water hardness present in the mains supply with which the washing machine is connected.

Such value of the water hardness shown on the display 4 or 4A is a "historic" value, i.e. obtained by way of measures carried out by the abovementioned hardness sensor, day after day, wash after wash, and stored, with a technique in itself known, in an appropriate way, in permanent memory means associated to the microcontroller which manages the control system of the machine.

In the case of the laundry washing machine 1, three water hardness levels are established, i.e. low, medium or high, that are represented for instance on the display 4 or 4A respectively by way of one, two or three horizontal bars.

Such information relative to the water hardness is used by the user for carrying out, in the best way possible, the dosage of the detergents, in accordance with the amount specified by the producer of the washing agent; it is in fact known that such companies usually indicate, on the package of their products, the best quantity of detergent to use in accordance with the level of hardness of the water coming from the mains supply.

In the case of the dishwashing machine 1B, on the display 4A seven levels of water hardness are indicated; such information being more accurate, represented for instance by a number of horizontal bars corresponding to the hardness level memorised, is useful to the user for appropriately adjusting the brightener dosing device; it is in fact known that, similarly as that which takes place for the detergents in the case of laundry washing machines, the recommended dosage of brightener to be associated to each wash of dishes varies according to the hardness of the water.

Once the laundry or the dishes to be washed have been inserted, and the detergent and/or brightener has been added, the user can close the loading door of the machine and appropriately position the control dial 3 or 3A, for indicating to the control system the most delicate item to be washed, in the case of the laundry washing machine, or the type of dishes or the dirt level, in the case of the dishwashing machine 1A. At this point the user can start the washing cycle, pressing the appropriate button 5 or 5A.

Upon such action, the control system provides for making appear on the display 4 or 4A the temperature value that the control system itself has chosen in an automatic manner, in function of the "qualitative" information that the user inputted by way of the dial 3 or 3A, in virtue of the knowledge base encoded in the memory means.

The user, only if desired, can modify such temperature value, but only within determined "safety" limits which the machine allows; i.e. be it in the case of the laundry washing machine 1 or in the case of the dishwashing machine 1A. In particular, the temperature can be modified by the user by way of the appropriate increase buttons 6 or 6A (+) or the decrease buttons 7 or 7A (-).

In relation to the above it is to be noted that the control system of the laundry washing machine 1 imposes, so as to avoid damaging the fabric, a maximum limit to the temperature value, above which the user cannot go; such maximum limit is strictly correlated to the position selected by way of the dial 3, through which the user supplies the information relative to the most delicate item loaded in the machine.

In the case of the dishwashing machine 1A, for every position of the dial 3A that can be selected, a maximum temperature value and a minimum temperature value are associated and the user can therefore propose the eventual variations, by way of buttons 6A and 7A, only within such range; in the case of the dishwashing machine the maximum limit has the purpose to avoid damaging the dishes, while the lower limit has the purpose of guaranteeing the washing performance; even in such case the imposed limits are correlated to the position selected by way of the dial 3A.

After displaying the temperature value, eventually but as mentioned not necessarily adjustable by the user, on the display 4 or 4A a time estimate of the activated washing cycle appears, calculated by the microcontroller of the control system by way of its internal clock; such time indication, that can for instance be expressed in hours and minutes, is updated by the control system with the passing of time, so as to give a backward count.

The washing program is therefore managed by the control system, that will appropriately command the various agent devices of the machine, making use of the information obtained by way of its various sensors, its programmed functional rules and the information coming from the user. With such aim, as mentioned, the

control system of the machine according to the invention is programmed according to the fuzzy logic technique, in virtue of the capacity of such technique to manage information being of the "qualitative" type.

From that described above it results in being clear that the dial 3 or 3A is an instrument that allows the user to condition in an important manner the washing strategy chosen by the control system from among the various strategies available, in consideration of the data detected by the sensors; in other words, therefore, the user does in fact have the possibility of dominating the machine, despite the high level of technology, with a very simple operation, such as rotating the dial.

With this aim it is to be considered once again that the information associated to the dial 3 or 3A is of the qualitative type, i.e. being substantially relative to a single characteristic of the article that the machine has to treat, and deriving from the day to day experience of the user.

The inputting of such information is of no difficulty to the user, but is of fundamental importance for the washing machine, and constitutes an instrument for involving and creating responsibility in the user.

It is to finally be noted that the control system of the machine according to the invention can be when needed programmed for controlling, within certain limits, the correctness of the selection carried out by the user of the dial 3; in other words, therefore, the control system is able to detect eventual discrepancies between the type of laundry actually introduced in the machine 1 and the type of laundry selected by way of the dial 3.

As an example we can cite a case wherein the user introduces in the laundry washing machine towelling items and incorrectly selects the washing cycle for synthetics. In the specific case, the control system will be able to detect the discrepancy between the inputted information and the reality, by way of the said sensor of the type of laundry (for such aims note, as previously mentioned, the Italian patent application TO93A000798) and eventually indicate such discrepancy to the user.

From the given description the characteristics and advantages of the present invention result in being clear. In particular according to the invention an intermediate programming approach is offered respect those mentioned in the opening of the present description, based on which:

- the complexity of numerous commands is avoided, typical of the "input system", thus simplifying user-machine interaction;
- total automation is refused, so as to avoid "conflicting" situations between the appliance and the user (for instance the aforementioned case of an automatic wash being unsatisfactory for the user, who cannot execute simple modifications to a program if not with extreme difficulty);

- the passage from "fully automatic" "fully manual" is similarly refused, which as a matter of fact do not solve the problems of the user;
- an interaction of the type being purely "qualitative" is proposed to the user, i.e. relative to a limited number of inputs (substantially only one), that do not require any mental force, inasmuch related to the common sense and experience of the user, and of such to stimulate in a very discrete manner the involvement of the user in choosing the predetermined washing cycle, to be realised, in accordance with the delicacy of the fabrics or dishes.

All the above having the aim of making the electronically controlled household appliance of easier use for the user and at the same time able to carry out advanced operative cycles, in virtue of its sensor means and its advanced control system, based on the fuzzy logic, according to the invention, as already said, the complete programming is allowed of a normal washing cycle by way of a single, simple and evident manual selection action.

It is clear that numerous variants are possible by the skilled man to the washing machine described as an example, without for this departing from the range of novelty inherent in the inventive idea.

For instance the possibility is cited of equipping the washing machine with an infra-red remote control unit, or a small key pad, hidden in an appropriate housing within the cabinet of the machine, being close to the dial 3 or 3A; on such remote control or key pad the mentioned increase keys 6 or 6A and the decrease keys 7 or 7A of the temperature chosen by the control system for the wash can be transferred.

Figure 3 schematically illustrates a possible variant of the present invention, according to which the said key board is integrated in the dial 3 (or 3A) of the washing machine.

The dial 3 of figure 3 is in particular of the type able to take on two axially functional positions, i.e.:

- a first position, in which the dial 3 results in being housed, against the action of appropriate mechanical-kinematic means (realised according to the known art), within a suitable housing present on the control panel 2; in such position, therefore, the frontal surface of the dial 3 results in being substantially flush with the frontal surface of the control panel 2;
- a second position, of selection, in which the dial 3, due to the action of the said mechanical-kinematic means, exits said housing, so as to enable its rotation as desired by the user for programming the machine.

The exchange between the two positions is obtained by way of simple pressure on the frontal surface of the dial 3; said mechanical-kinematic means, comprising for instance a mobile element having inclined planes and a spiral spring, are of the known

type (generally known as push-push) and are already used on household appliances.

As can be seen in figure 3, in the central part 11 of the dial 3 the housing for a plurality of keys 12 is obtained; such keys 12, that can comprise the previously mentioned keys 6 and 7, are of the type normally used with remote control units, or of the type in which the selection of the desired function simply takes place by simply touching the actual key, without the necessity of excessive pressure; naturally appropriate means are provided for the connection of such keys to the control system.

It is therefore clear that, according to the variant of figure 3, the styling of the control panel 2 of the machine results in being even more simplified, inasmuch all the control means of the machine, preferably with the exception of the ON/OFF key (8), can be integrated in the program selection dial 3.

In another possible variant the selection dial 3 or 3A could be substituted with a suitable cursor, i.e. a linear movement selector rather than an angular movement selector.

From the previous description it results in being clear that the machine according to the invention is able to realise a plurality of different predetermined washing programs, or standard, that the control system is able to manage in an automatic manner, in virtue of its knowledge base and in function of the single "qualitative" information inputted by the user and of the "quantitative" information obtained by way of the said sensor means.

It is in any event to be mentioned that, according to another possible variant of the invention, some optional modifying features can be provided, with the aim of satisfying the needs of even the most demanding users, or "conservative", bound to the traditional way of washing.

Such various options can be managed by the mentioned infra-red remote control, or by way of the mentioned key pad, being integral or not to the dial 3 or 3A, that is substantially the same as that of the remote control.

By way of such remote control or key pad, and eventually with the use of the display 4 or 4A, it could for instance be possible, in the case of the laundry washing machine, to input a delayed wash (1 to 24 hours), modify the washing temperature (as described above), select a program of rinsing only, or spinning only, or with the exclusion of spinning, or a rapid program. Similarly, in the case of the dishwashing machine, there could be provided, apart from the aforementioned delayed wash, a soaking program, i.e. an operative cycle of the dishwashing machine comprising a simple soaking of the dishes, with the aim of avoiding hardening of the residues, in such a way as to be able to carry out the washing cycle at a later time.

It is however to be noted that the carrying out of the normal functional cycles of the machine according to the invention, i.e. the execution of predetermined washing programs, depends upon the options mentioned above, which in fact concern particular functions to be

assigned to a washing cycle, which in practice are rarely employed.

### Claims

1. Washing machine, comprising all the known elements for its functioning, from among which an electronic control system and manual command means (3;3A), said washing machine (1;1A) being able to carry out, in function of the information obtained by way of said command means (3;3A), at least one predetermined treating cycle from among a plurality of different possible treating cycles, whether they are predetermined or not, the carrying out of said treating cycles depends upon numerous parameters relative to characteristics of the products to be washed, characterised in that said control system comprises an electronic programmer to which memory means and sensor means are associated arranged within the machine, and that for the selection of a treating cycle predetermined and stored in said memory means, said programmer has the necessity of a single information, inputted by the user by way of said manual command means (3;3A), relative to a characteristic parameter of the products to be washed, the other parameters that determine said treating cycle being obtained in an automatic way by the programmer, through data coded in said memory means and/or through said sensor means.
2. Washing machine, according to claim 1, characterised in that said command means comprise a rotating dial (3;3A) or a linear selector, for inputting said single information relative to the characteristic parameter of the products to be washed.
3. Washing machine, according to at least one of the previous claims, characterised in that a display device is provided, in particular of the led or LCD type, for displaying the data representing the level of the water hardness coming from the mains and/or of a temperature value for the washing liquid, chosen by the programmer in an automatic manner in function of said single information and/or of an estimated duration for the selected treating cycle.
4. Washing machine, according to at least one of the previous claims, characterised in that facultative use command means (6,7;6A,7A) are provided, for modifying the predetermined treating cycle and/or for creating particular cycles, said facultative command means comprising at least a key (6,7;6A,7A) for an eventual modification of a temperature value of the washing liquid chosen in an automatic manner by the programmer.

5. Washing machine, according to at least one of the previous claims, characterised in that a remote control or key pad normally hidden is provided, where said facultative command means are present.

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6. Washing machine, according to claim 2, characterised in that said rotating dial (3;3A) is of the type able to take on two different axial functional positions, i.e.:

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- a first position, in which the dial (3) results in being housed within an appropriate seat on the control panel of the machine (2), wherein in said position the frontal surface of the dial results in being substantially flush with the surface of the frontal wall of the panel (2);
- a second position, in which the dial (3) exits said seat, so as to allow rotation of the same.

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7. Washing machine, according to the previous claim, characterised in that in the intermediate part of said dial (3) a seat (11) is obtained for one or more command keys (12), said command keys being in particular of a facultative use (6,7;6A,7A), for modifying the predetermined treating cycle and/or for the selection of particular treating cycles.

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8. Programming method of a washing machine, of the type comprising manual command means (3,5;3A,5A) and an electronic control system being programmed for realising, in function of the information obtained by way of said command means (3,5;3A,5A), a predetermined treating cycle from among a plurality of possible different treating cycles available, characterised in that, with the aims of realising a treating cycle from those that can be selected, said control system:

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- requires a single information of the qualitative type from the user, i.e. one information being relative to a single characteristic of the type of article that the machine has to treat, deriving directly from the experience of the user,
- automatically obtains, by way of sensor means associated to said control system and in function of said single information of the qualitative type inputted by the user, all the information of the quantitative type necessary for managing said predetermined treating cycle, said quantitative information being in particular relative to functional conditions of the machine and/or to physical and chemical characteristics of the items onto which the machine operation is directed.

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9. Method, according to claim 8, characterised in that said washing machine is a laundry washing machine (1) and that said information of a qualitative type is relative to the type of laundry to be

washed and/or of the relative level of dirt (woollens, delicates, synthetics, coloured fabrics, resilient fabrics), the user having to in particular indicate to the control system the most delicate laundry item from among those to be washed.

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10. Method, according to claim 8, characterised in that said washing machine is a dishwashing machine (1A) and that said information of the qualitative type is relative to the type of dishes to be washed and/or relative to the level of dirt (crystal, pots and pans, slightly dirty dishes or very dirty dishes).

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11. Method according to claim 8, characterised in that said information of the quantitative type, obtained in an automatic way by said control system by way of said sensor means, comprise the quantity of laundry introduced to the machine and/or the level of the water hardness coming from the mains supply and/or the level of concentration of detergents in the washing liquid and/or the type of dirt and/or the temperature of the washing liquid and/or the balance level of the laundry load.

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12. Method, according to at least one of the previous claims, characterised in that upon switching on the washing machine (1;1A), by way of a general switch (8;8A), the electronic control system provides for making appear on a display (4;4A) graphic information apt at expressing the level of the water hardness present in the mains supply with which the washing machine is connected, said displayed level of the water hardness being in particular a historic value, in particular obtained by the control system based on measures carried out over time by a water hardness sensor.

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13. Method, according to claim 11 or 12, characterised in that said washing machine is a laundry washing machine (1) and that the control system is able to indicate on said display (4;4A) a water hardness level from among a plurality of possible levels (low, medium, high), said information relative to the level of water hardness being useful for the user with the aims of the following dosing of detergents to be introduced to the machine.

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14. Method, according to claim 11 or 12, characterised in that said washing machine is a dish-washing machine (1B) and that the control system is able to indicate on said display (4;4A) a water hardness level from among a plurality of possible levels, said information relative to the level of water hardness being useful for the user with the aims of adjusting a dosage device of a washing agent, in particular a brightener.

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15. Method, according to at least one of the previous claims, characterised in that upon starting, by way

of an appropriate key (5;5A), of said complete treating cycle, the control system provides for making appear on the display (4;4A) the temperature value of the washing liquid that the same control system has chosen in an automatic manner, in function of said single information of the qualitative type inputted by the user, wherein in particular said temperature value can when necessary be modified by the user within determined limits imposed by said control system.

16. Method, according to the previous claim, characterised in that, in the case of a laundry washing machine, the control system imposes a higher limit to the temperature value that can be modified by the user, with the aim of avoiding any damage to the laundry, said higher limit being strictly related to the information of the qualitative type inputted by the user.

17. Method, according to claim 15, characterised in that, in the case of a dishwashing machine, the control system imposes a maximum limit and a minimum limit to the temperature value that can be modified by the user, the maximum limit being provided so as to avoid damage to the dishes, the minimum value being provided for guaranteeing the performance of the wash.

18. Method, according to at least one of the previous claims, characterised in that the control system is able to estimate the duration of the started complete treating program, and to indicate such on the display (4;4A), the indication of such duration being in particular updated by the control system over time, by way of rear counting.

FIG. 1

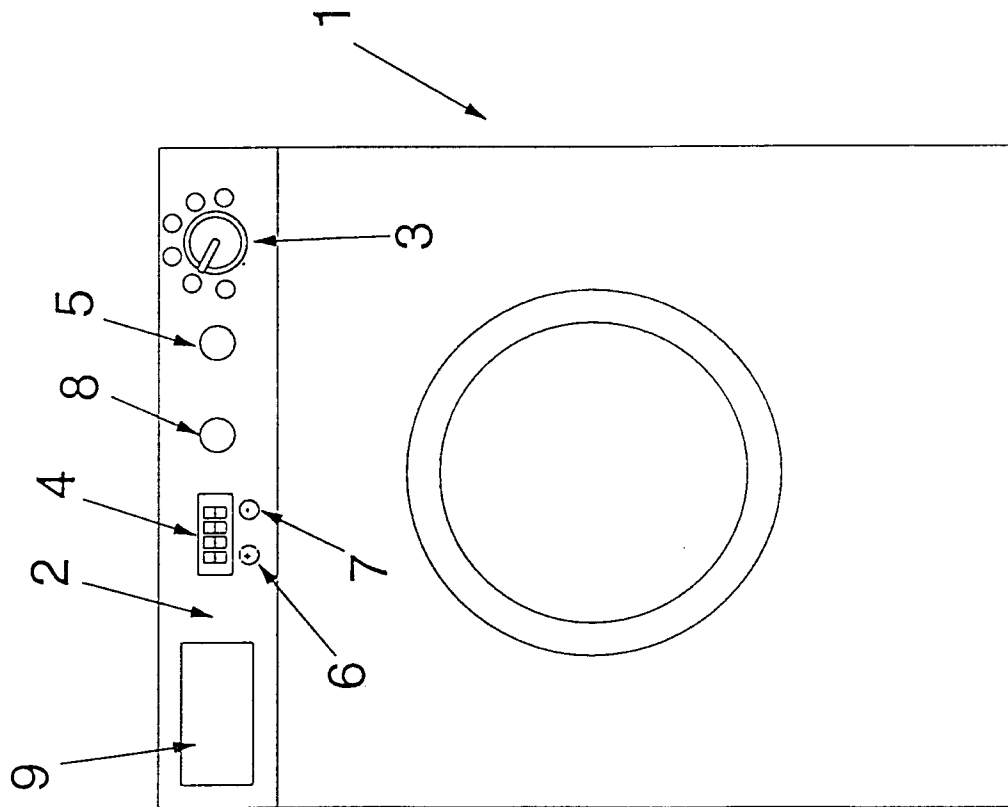


FIG. 2

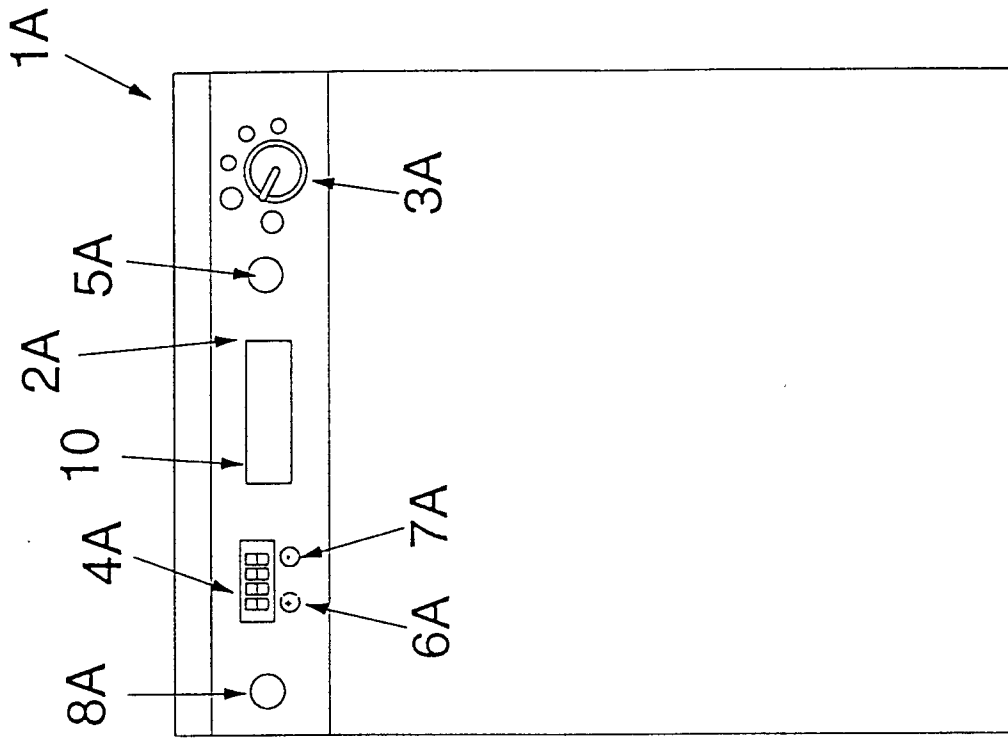
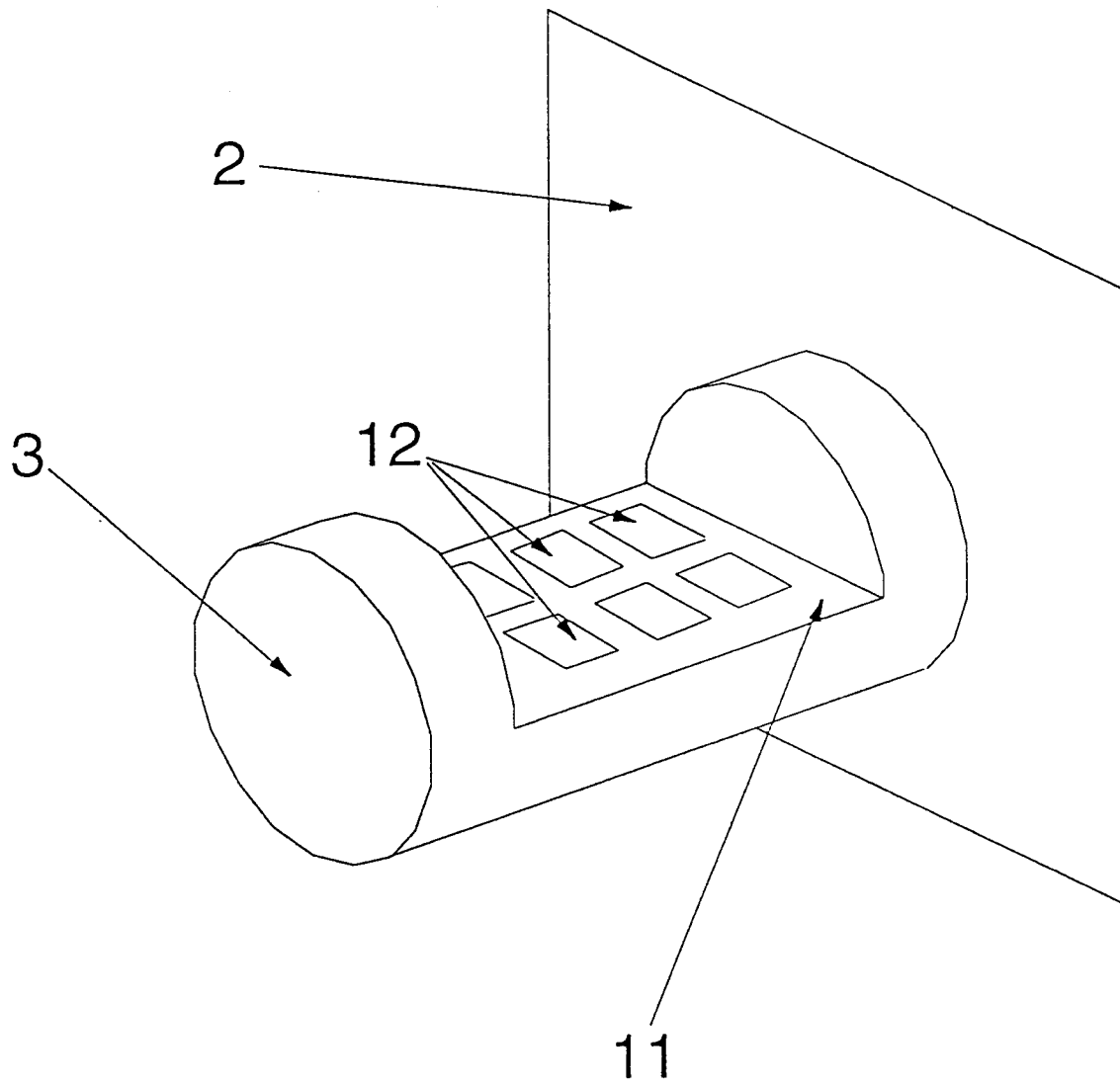


FIG. 3





European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 96 10 1395

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB-A-2 008 286 (N.V. PHILIPS GLOEILAMPENFABRIEKEN) * page 3, line 12 - page 6, line 19; claims; figures 1,2 * ---	1-4,8,9, 11,16	D06F39/00 A47L15/46
X	FR-A-2 429 579 (BOSCH-SIEMENS HAUSGERÄTE GMBH) * the whole document * ---	1,2, 8-10,18 4,11	
A	EP-A-0 225 550 (MIELE & CIE GMBH)  * the whole document * ---	1,2,4,8, 9,11,15, 16	
A	EP-A-0 055 159 (ESSWEIN S.A.)  * page 2, line 21 - page 3, line 28; figure 1 * ---	1,2,5,8, 9,15	
A	FR-A-2 455 648 (LICENTIA PATENT-VERWALTUNGS-GMBH) * claim 1 * ---	12,13	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	GB-A-2 262 541 (BOSCH-SIEMENS HAUSGERÄTE GMBH) * abstract * -----	14	D06F A47L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 May 1996	Examiner Courier, G
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone                      Y : particularly relevant if combined with another document of the same category                      A : technological background                      O : non-written disclosure                      P : intermediate document</p> <p>T : theory or principle underlying the invention                      E : earlier patent document, but published on, or after the filing date                      D : document cited in the application                      L : document cited for other reasons                      .....                      &amp; : member of the same patent family, corresponding document</p>			

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