(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 001 108 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.03.2016 Bulletin 2016/13

(51) Int Cl.:
F24C 7/08 *(2006.01)* ***H05B 6/06*** *(2006.01)*

(21) Application number: **14461570.5**

(22) Date of filing: **25.09.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Apparatus for operating an electronic household appliance**

(57) An apparatus (14) for operating an electronic household appliance (10), in particular a cooking hob having a plurality of treatment / cooking zones (12), comprises a plurality of first optical display devices, each of the plurality of treatment zones (12) being allocated with at least one of the plurality of first display devices (d1..d4); a plurality of first input devices (s7..s10), each of the plurality of treatment zones (12) being allocated with at least one of the plurality of first input devices (s7..s10), wherein the first input device (s7..s10) being allocated to a treatment zone (12) is arranged nearby the first display device (d1..d4) being allocated to the same treatment zone (12); and a control means (16) being connected to the plurality of first display devices (d1..d4) and to the plurality of first input devices (s7..s10). After selection of a main functionality of the household appliance (10) by a user, the control means (16) controls one of the plurality of first display devices (d1..d4) to display a predetermined preset value of a parameter of the main functionality, and controls the first input device (s7..s10) arranged nearby the first display device controlled in this way to select the preset value displayed by the first display device when being operated by a user.

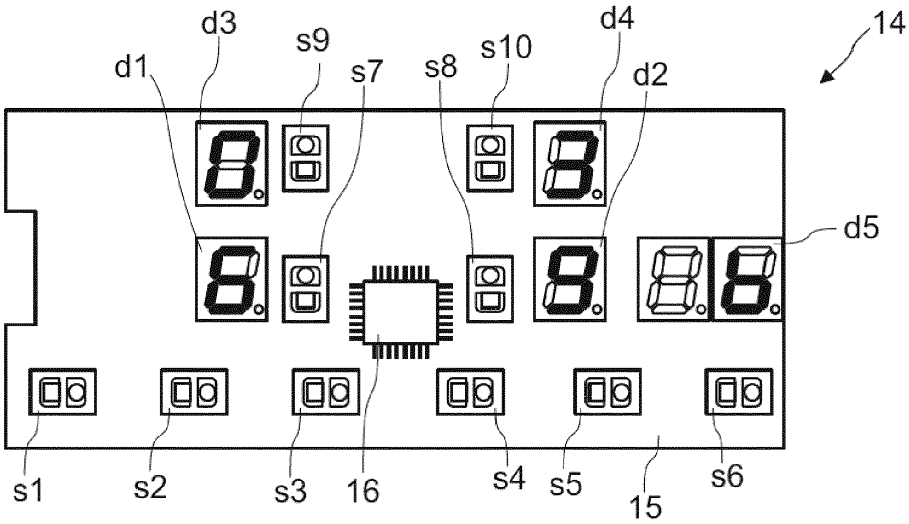

Fig. 2

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Description

[0001] The present invention relates to an apparatus for operating an electronic household appliance, in particular a cooking hob, having a plurality of treatment zones.

[0002] Cooking hobs having a plurality of cooking zones are widely used in private households. In recent years, the operating means for such cooking hobs are more and more configured as so-called "touch controls", i.e. having user interfaces comprising touch-sensitive and/or approach-sensitive input devices.

[0003] Conventional user interfaces having simple configuration usually comprise input devices for selecting one of the plurality of cooking zones and a further input device for inputting the desired power level of the selected cooking zone. This further input device usually includes a first input element "-" and a second input element "+". In case of a cooking hob providing power levels in the range of 0..9 the user must operate the second input element "+" nine times to input the power level "9" after having selected one of the cooking zones. Some type of cooking hobs provide power levels in the range of 0.. 19 or provide also half power levels such as "1.5". In case of such cooking hobs the user must operate the second input element "+" over a dozen times to input a high power level after having selected one of the cooking zones.

[0004] More expensive cooking hobs comprise user interfaces which are equipped with slider type input devices or turning knob type input devices for inputting the desired power level. It allows the user to set the power level discretionarily and easily. However, input devices of this kind involve the necessity to use additional electronic components, resulting in increasing costs of the user interface.

[0005] It is an object of the present invention to provide an improved apparatus for operating electronic household devices which facilitates the setting of parameter values by a user without the need of additional electronic components.

[0006] This object is achieved by an apparatus for operating an electronic household appliance comprising the features of independent claim 1. The dependent claims include various advantageous configurations of the present invention.

[0007] The apparatus for operating an electronic household appliance having a plurality of treatment zones according to the present invention comprises: a plurality of first optical display devices, each of the plurality of treatment zones being allocated with at least one of the plurality of first display devices; a plurality of first input devices, each of the plurality of treatment zones being allocated with at least one of the plurality of first input devices, wherein the first input device being allocated to a treatment zone is arranged nearby the first display device being allocated to the same treatment zone; and a control means being connected to the plurality of first display devices and to the plurality of first input devices. In addition, this apparatus is characterized in that, after selection of a main functionality of the household appliance by a user, the control means controls one of the plurality of first display devices to display a predetermined preset value of a parameter of the main functionality, and controls the first input device arranged nearby the first display device controlled in this way to select the preset value displayed by the first display device when being operated by a user.

[0008] The operating apparatus of the present invention is advantageously used for cooking hobs having a plurality of cooking zones.

[0009] The main functionality of the household appliance may be a power level input of a treatment zone or a timer function, for example. In this case, the parameter of the main functionality of the household device may be a power level or a time, for example.

[0010] Also, the operating apparatus of the present invention is advantageously used for user interfaces including input devices comprising at least one touch-sensitive and/or approach-sensitive operating element.

[0011] Further, the operating apparatus of the present invention is advantageously used for user interfaces including display devices comprising at least one seven-segment digital displaying element.

[0012] The operating apparatus of the present invention comprises a plurality of first optical display devices being allocated to the plurality of treatment zones, a plurality of first input devices being allocated to the plurality of treatment zones, and a control means being connected to the first display devices and the first input devices. By using these first display devices and first input devices also for displaying and selecting preset values of a parameter of a main functionality of the household appliance there is no need for additional electronic components. In addition, by displaying one or more preset values of the parameter of the main functionality the user can set a desired value of the parameter with a less number of operating steps in comparison to the conventional simple user interfaces described above, thus making the settings performed by a user faster and more efficient.

[0013] In a preferred configuration of the invention, after selection of a main functionality of the household appliance by a user, the control means controls the plurality of first display devices to display a plurality of different predetermined preset values of a parameter of the main functionality, and controls the plurality of first input devices to select the respective preset values displayed by the first display devices when being operated by a user.

[0014] In another preferred configuration of the invention, each of the plurality of first input devices includes one input element for selecting the respective one of the plurality of treatment zones, and a further input device is provided which comprises a first input element for decreasing the value of the parameter and a second input element for increasing the value of the parameter. In this configuration, the control means controls the further input

device to decrease or increase the value of the parameter starting from the selected preset value of the parameter when being operated by a user.

[0015] In another preferred configuration of the invention, each of the plurality of first input devices includes a first input element for decreasing the value of the parameter and a second input element for increasing the value of the parameter. In this configuration, the control means controls the plurality of first input devices to select the respective preset value of the parameter and to decrease or increase the value of the parameter starting from the selected preset value of the parameter when being operated by a user.

[0016] In this configuration it is preferred that a second input device including at least one input element is provided for selecting a treatment zone when being operated by a user.

[0017] In still another preferred configuration of the present invention, the operating apparatus further comprises at least one second display device not being allocated to one of the plurality of treatment zones and at least one second input device arranged nearby this at least one second display device. In this configuration, after selection of a main functionality of the household appliance by a user, the control means controls the at least one second display device to display another predetermined preset value of the parameter of the main functionality, and controls the at least one second input device to select the preset value displayed by the second display device when being operated by a user.

[0018] In still another preferred configuration of the invention, after selection of a main functionality by a user, the control means controls the first display devices to display the preset values of the parameter in a selection mode being different from an operation mode for displaying the values of the parameter finally set. The selection mode may be a flashing displaying of the preset values and/or a displaying of the preset values in a different color, for example.

[0019] The above object is also achieved by an electronic household appliance, in particular a cooking hob, comprising a plurality of treatment zones and an operating apparatus according to the present invention as described above.

[0020] The above object is further achieves by a control means being arranged for an operating apparatus according to the present invention as described above.

[0021] Still further, the above object is achieved by a method for controlling an electronic household appliance, in particular a cooking hob, having a plurality of treatment zones, wherein, after selection of a main functionality of the household appliance by a user, at least one of a plurality of first optical display devices is controlled to display a predetermined preset value of a parameter of the main functionality, wherein each of the plurality of treatment zones is allocated with at least one of the plurality of first display devices; and a first input device being allocated to one of the plurality of treatment zones and being arranged nearby the first display device displaying the preset value of the parameter is controlled to select the preset value displayed by the first display device as an input value of the parameter when being operated.

[0022] Further and above features and advantages of the present invention will be more fully understood when studying the following description of some preferred embodiments with reference to the accompanying drawings. In the - at least partly schematic - drawings:

Fig. 1 is a perspective view of a cooking hob according to an embodiment of the present invention;

Fig. 2 is a top view of an operating apparatus according to a first embodiment of the present invention showing the electronic components thereof; and

Fig. 3 is a top view of an operating apparatus according to a second embodiment of the present invention showing the electronic components thereof.

[0023] Figure 1 exemplarily shows a cooking hob 10 representing an embodiment of an electronic household appliance in the meaning of the present invention. The cooking hob 10 includes four cooking zones 12 representing treatment zones in the meaning of the present invention. The cooking zones 12 may comprise induction heaters or radiant heaters, for example.

[0024] Further, the cooking hob 10 comprises an operating apparatus 14 for operating the cooking hob 10, the operating apparatus 14 forming a user interface. Preferably, the operating apparatus 14 is of the so-called "touch control" type including touch-sensitive and/or approach-sensitive input elements.

[0025] Figure 2 shows electronic components of the operating apparatus 14 according to a first embodiment of the present invention. This operating apparatus 14 shown in Figure 2 is adapted to a cooking hob 12 having four cooking zones 12. Of course, the operating apparatus 14 may be modified to be used for household appliances 10 having less or more than four treatment zones 12.

[0026] The operating apparatus 14 comprises a printed circuit board 15 carrying a control means 16 such as a microcontroller.

[0027] Further, the operating apparatus 14 comprises four first optical display devices d1, d2, d3, d4 and one second optical display device d5. The first and second optical display devices d1..d5 are mounted on the printed circuit board and are connected to the control means 16. The first display devices d1..d4 each comprise one display element being configured as a seven-segment digital display element. The second display device d5 comprises two display elements each being configured as a seven-segment digital display element.

[0028] The first display device d1 is allocated to the cooking zone 12 on the front left-side position, the first display device d2 is allocated to the cooking zone 12 on the front right-side position, the first display device d3 is allocated to the cooking zone 12 on the back left-side position, and the first display device d4 is allocated to the cooking zone 12 on the back right-side position. The first display devices d1..d4 are arranged to display the power levels set for the respective cooking zones 12.

[0029] The second display device d5 is not allocated to any one of the cooking zones 12 but is arranged to display the time levels set or left, respectively, of a timer function of the operating apparatus 14.

[0030] Furthermore, the operating apparatus 14 comprises four first input devices s7, s8, s9, s10 mounted on the printed circuit board 15 and connected to the control means 16. The first input devices s7..s10 each comprise one touch-sensitive and/or approach-sensitive input element. The first input device s7 is allocated to the cooking zone 12 on the front left-side position and is positioned nearby the first display device d1 on the printed circuit board 15, the first input device s8 is allocated to the cooking zone 12 on the front right-side position and is positioned nearby the first display device d2 on the printed circuit board 15, the first input device s9 is allocated to the cooking zone 12 on the back left-side position and is positioned nearby the first display device d3 on the printed circuit board 15, and the first display device s10 is allocated to the cooking zone 12 on the back right-side position and is positioned nearby the first display device d4 on the printed circuit board 15. The first input devices s7..s10 are arranged to select the respective one of the four cooking zones 12 (main functionality in the meaning of the present invention) when being operated by a user.

[0031] Furthermore, the operating apparatus 14 comprises one second input devices s6 mounted on the printed circuit board 15 and connected to the control means 16. The second input devices s6 comprises one touch-sensitive and/or approach-sensitive input element. The second input device s6 is positioned nearby the second display device d5 on the printed circuit board 15, and is arranged to select the timer function of the operating apparatus 14 (main functionality in the meaning of the present invention) when being operated by a user.

[0032] Moreover, the operating apparatus 14 comprises a further input device s3, s4 mounted on the printed circuit board 15 and connected to the control means 16. The further input device includes one first touch-sensitive and/or approach-sensitive input element s3 and one second touch-sensitive and/or approach-sensitive input element s4. The first input element s3 of the further input device is configured as a "-" button for decreasing a parameter value (e.g. power level of cooking zone or time of timer function) when being operated by a user, and the second input element s4 of the further input device is configured as a "+" button for increasing the parameter value when being operated by a user.

[0033] In addition, the operating apparatus 14 comprises some additional input devices s1, s2, s5 mounted on the printed circuit board 15 and connected to the control means 16 and each including one first touch-sensitive and/or approach-sensitive input element. These additional input devices s1, s2, s5 are provided for additional setting possibilities of the operating apparatus 14.

[0034] The operation of the operating apparatus 14 described above with reference to Figure 2 is as follows.

[0035] First, a user selects one of the four cooking zones 12 she/he wants to use by operating the respective one of the four first input devices s7..s10. In a conventional operating apparatus 14, now the user has to operate the "-" and "+" input elements s3, s4 of the further input device several times for setting the desired value of the power level (parameter) of the selected cooking zone 12. according to the present invention, however, after selection of the desired cooking zone 12 (main functionality), the control means 16 of the operating apparatus 14 controls the first and second display devices d1..d5 to display different predetermined preset values of the power level (parameter) of the selected cooking zone 12. In the example shown in Figure 2, the first display device d3 displays the preset value "0", the first display device d4 displays the preset value "3", the first display device d1 displays the preset value "6", the first display device d2 displays the preset value "9", and the second display device d5 displays the preset value "b" for the boost mode.

[0036] By operating the first input device s6..s10 positioned nearby the display device d1..d5 displaying the preset value that corresponds to the settings desired by the user, the user can then select that displayed preset value as the input value for the power level of the selected cooking zone 12. In case the displayed preset value does not exactly correspond to the desired settings the user may operate one of the input elements s3, s4 of the further input device to decrease or increase the value of the power level starting from the preset value displayed by the respective display device d1..d5.

[0037] If, for example, the user wants to set the power level "6" for the cooking zone 12 on the back right-side the user first has to operate the first input device s10 to select the desired cooking zone 12 and then has to operate the first input device s7 to select the preset value displayed by the first display device d1 (instead of operating the "+" input element s4 six times as in conventional operating apparatuses). If, for example, the user wants to set the power level "8" for the cooking zone 12 on the front left-side the user first has to operate the first input device s7 to select the desired cooking zone 12, then has to operate the first input device s8 to select the preset value "9" displayed by the first display device d2, and then has to operate the first input element s3 of the further input device once to decrease the power level by "1" (instead of operating the "+" input element s4 eight times as in conventional operating apparatuses).

[0038] After the power level of the cooking zone 12 is finally set by the user, the first display device d1..d4 being

allocated to the respective cooking zone 12 displays the power level finally set in a steady light emitting operating mode.

[0039] When the user has operated one of the first and second input devices s6..s10 to select a preset value of the power level displayed by the first and second display devices d1..d5 the control means 16 has a predetermined standby time of e.g. 5 seconds for the user to operate the further input device s3, s4. After lapse of the standby time without the further input device being operated, the control means 16 assumes the selected preset value of the power level to be the desired power level and takes it as the input value of the power level of the respective cooking zone 12.

[0040] To improve the user's comfort even more it is preferred that the first and second display devices d1..d5 each display the preset values of the power level in a flashing selection mode. In this way, the user easily becomes aware that there are some preset values displayed by the first and second display devices d1..d5 presented to be selected by him/her.

[0041] As it can be seen from the above, the operating apparatus 14 of the invention omitting additional electronic components for e.g. a slider or turning knob type input device offers the possibility for the user to set parameter values of a main functionality of a household appliance by a smaller number of operating steps in comparison with conventional operating apparatuses.

[0042] Now, Figure 3 shows electronic components of the operating apparatus 14 according to a second embodiment of the present invention. The same or corresponding components are designated by the same reference signs, and a repeated description thereof can be omitted. The main differences of the operating apparatus 14 of Figure 3 in comparison to the first embodiment disclosed in Figure 2 is the essentially linear arrangement of the display devices d1..d5 and the input devices s1..s10 on the printed circuit board 15, and the configuration of the input devices s6..s10.

[0043] The operating apparatus 14 of Figure 3 comprises four first input devices s7, s8, s9, s10 each comprising one first touch-sensitive and/or approach-sensitive input element s7a, s8a, s9a, s10a and one second touch-sensitive and/or approach-sensitive input element s7b, s8b, s9b, s10b. The first and second input elements of the first input devices s7..s10 are arranged nearby the respective first display devices d1..d4 on opposite sides thereof.

[0044] Further, the operating apparatus 14 of Figure 3 comprises two second input devices s6-1, s6-2 which are arranged nearby the second display device d5 on opposite sides thereof. Both second input devices s6-1, s6-2 each comprise one first touch-sensitive and/or approach-sensitive input element s6-1a, s6-2a and one second touch-sensitive and/or approach-sensitive input element s6-1b, s6-2b.

[0045] The input elements s6-1a, s6-1b, s6-2a, s6-2b of the second input devices s6-1, s6-2 are arranged to select the respective one of the cooking zones 12 when being operated by a user. The first input elements s7a..s10a of the first input devices s7..s10 are configured as "-" buttons for decreasing a parameter value (e.g. power level of cooking zone or time of timer function) when being operated by a user, and the second input elements s7b..s10b of the first input devices s7..s10 are configured as "+" buttons for increasing the parameter value when being operated by a user.

[0046] The operation of the operating apparatus 14 described above with reference to Figure 3 is as follows.

[0047] First, a user selects one of the four cooking zones 12 he/she wants to use by operating the respective one of the four input elements s6-1a, s6-1b, s6-2a, s6-2b of the two second input devices s6-1, s6-2. In a conventional operating apparatus, now the user has to operate the "-" and "+" input elements s7a..s10a, s7b..s10b of the first input devices s7..s10 several times for setting the desired value of the power level (parameter) of the selected cooking zone 12. According to the present invention, however, after selection of the desired cooking zone 12, the control means 16 of the operating apparatus 14 controls the first and second display devices d1..d5 to display different predetermined preset values of the power level (parameter) of the selected cooking zone 12. In the example shown in Figure 2, the first display device d3 displays the preset value "0", the first display device d1 displays the preset value "2", the one display element of the second display device d5 displays the preset value "4", the other display element of the second display device d5 displays the preset value "6", the first display device d2 displays the preset value "8", and the first display device d4 displays the preset value "b" for the boost mode.

[0048] By operating one of the two input elements of the first input device s6-1..s10 positioned nearby the display device d1..d5 displaying the preset value that corresponds to the settings desired by the user, the user can then select that displayed preset value as the input value for the power level of the selected cooking zone 12. In case the displayed preset value does not exactly correspond to the desired settings the user may operate one of the two input elements of the respective input device s6-1..s10 to decrease or increase the value of the power level starting from the preset value displayed by the respective display device d1..d5.

[0049] If, for example, the user wants to set the power level "6" for the cooking zone 12 on the back right-side the user first has to operate the second input element s6-2b of the second input device s6-2 to select the desired cooking zone 12 and then has to operate the first input element s6-2a of the second input device s6-2 positioned nearby the second display device d5 to select the preset value displayed by this second display device d5. If, for example, the user wants to set the power level "9" for the cooking zone 12 on the front left-side the user first has to operate the second input element s6-1b of the second input device s6-1 to select the desired cooking

zone 12, then has to operate one of the input elements s8a, s8b of the first input device s8 to select the preset value "8" displayed by the first display device d2, and then has to operate the second input element s8b of the first input device s8 once to increase the power level by "1".

[0050] In the above discussed embodiments the display devices and input devices are used to facilitate the setting of the power level of a selected cooking zone. But with the operating apparatus 14 of the present invention other parameters of other main functionalities of a household appliance may also be set more easily such as e.g. the setting of the time of a timer function or the like.

LIST OF REFERENCES

[0051]

10	household appliance
12	treatment zones
14	operating apparatus
15	printed circuit board
16	control means
d1 - d4	first display devices
d5	second display device
s1, s2, s5	additional input devices
s3, s4	input elements of a further input device
s6	second input device
s6-1, s6-2	second input devices
s6-1a	first input element of second input device s6-1
s6-1b	second input element of second input device s6-1
s6-2a	first input element of second input device s6-2
s6-2b	second input element of second input device s6-2
s7-s10	first input devices
s7a	first input element of first input device s7
s7b	second input element of first input device s7
s8a	first input element of first input device s8
s8b	second input element of first input device s8
s9a	first input element of first input device s9
s9b	second input element of first input device s9
s10a	first input element of first input device s10
s10b	second input element of first input device s10

Claims

1. An apparatus (14) for operating an electronic household appliance (10), in particular a cooking hob, having a plurality of treatment zones (12), comprising:

a plurality of first optical display devices (d1..d4), each of said plurality of treatment zones (12) being allocated with at least one of said plurality of first display devices (d1..d4);

a plurality of first input devices (s7..s10), each of said plurality of treatment zones (12) being allocated with at least one of said plurality of first input devices (s7..s10), wherein the first input device (s7..s10) being allocated to a treatment zone (12) is arranged nearby the first display device (d1..d4) being allocated to the same treatment zone (12); and

a control means (16) being connected to said plurality of first display devices (d1..d4) and to said plurality of first input devices (s7..s10),

characterized in that

after selection of a main functionality of said household appliance (10) by a user, said control means (16) controls one of said plurality of first display devices (d1..d4) to display a predetermined preset value of a parameter of said main functionality, and controls said first input device (s7..s10) arranged nearby said first display device controlled in this way to select said preset value displayed by said first display device when being operated by a user.

2. The apparatus according to claim 1, wherein

after selection of a main functionality of said household appliance (10) by a user, said control means (16) controls said plurality of first display devices (d1..d4) to display a plurality of different predetermined preset values of a parameter of said main functionality, and controls said plurality of first input devices (s7..s10) to select the respective preset values displayed by said first display devices (d1..d4) when being operated by a user.

3. The apparatus according to claim 1 or 2, wherein

each of said plurality of first input devices (s7..s10) includes one input element for selecting the respective one of said plurality of treatment zones (12),

a further input device is provided which comprises a first input element (s3) for decreasing the value of said parameter and a second input element (s4) for increasing the value of said parameter, and

said control means (16) controls said further input device to decrease or increase the value of said parameter starting from the selected preset value of said parameter when being operated by a user.

4. The apparatus according to claim 1 or 2, wherein

each of said plurality of first input devices (s7..s10) includes a first input element (s7a..s10a) for decreasing the value of said parameter and a second input element (s7b..s10b) for increasing the value of said parameter, and

said control means (16) controls said plurality of first

input devices (s7..s10) to select the respective preset value of said parameter and to decrease or increase the value of said parameter starting from the selected preset value of said parameter when being operated by a user.

5. The apparatus according to claim 4, wherein
a second input device (s6-1, s6-2) including at least one input element (s6-1a, s6-1b, s6-2a, s6-2b) is provided for selecting a treatment zone (12) when being operated by a user.

6. The apparatus according to any one of preceding claims,
further comprising at least one second display device (d5) not being allocated to one of said plurality of treatment zones (12) and at least one second input device (s6, s6-1, s6-2) arranged nearby said at least one second display device (d5), wherein after selection of a main functionality of said household appliance (10) by a user, said control means (16) controls said at least one second display device (d5) to display another predetermined preset value of said parameter of said main functionality, and controls said at least one second input device (s6, s6-1, s6-2) to select said preset value displayed by said second display device (d5) when being operated by a user.

7. The apparatus according to any one of preceding claims, wherein
after selection of a main functionality by a user, said control means (16) controls said first display devices (d1..d4) to display said preset values of said parameter in a selection mode being different from an operation mode for displaying the values of said parameter finally set.

8. An electronic household appliance (10), in particular a cooking hob, comprising:

a plurality of treatment zones (12), and
an operating apparatus (14) according to any one of claims 1 to 7.

9. A control means (16) being arranged for an operating apparatus (14) according to any one of claims 1 to 7.

10. A method for controlling an electronic household appliance (10), in particular a cooking hob, having a plurality of treatment zones (12), wherein
after selection of a main functionality of said household appliance (10) by a user, at least one of a plurality of first optical display devices (d1..d4) is controlled to display a predetermined preset value of a parameter of said main functionality, wherein each of said plurality of treatment zones (12) is allocated with at least one of said plurality of first display devices (d1..d4); and
a first input device (s7..s10) being allocated to one of said plurality of treatment zones (12) and being arranged nearby said first display device (d1..d4) displaying said preset value of said parameter is controlled to select said preset value displayed by said first display device as an input value of said parameter when being operated.

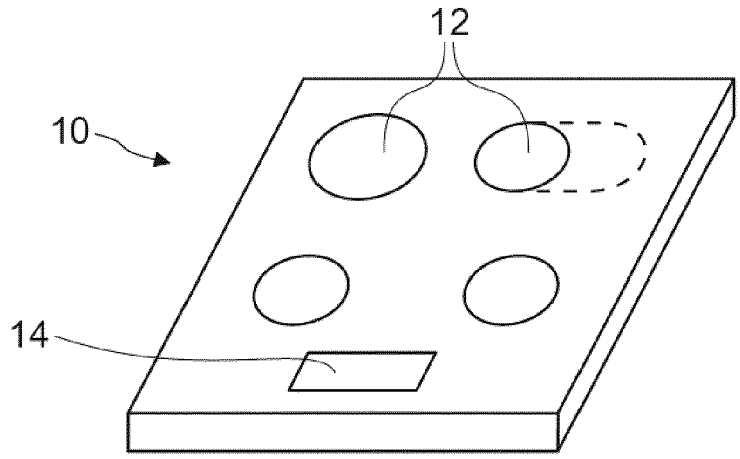


Fig. 1

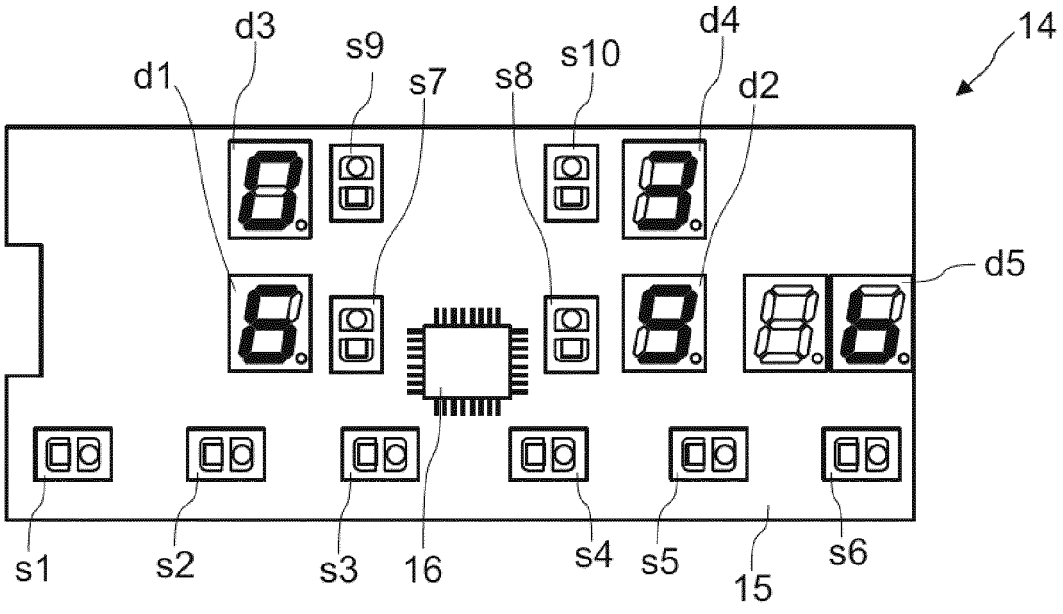
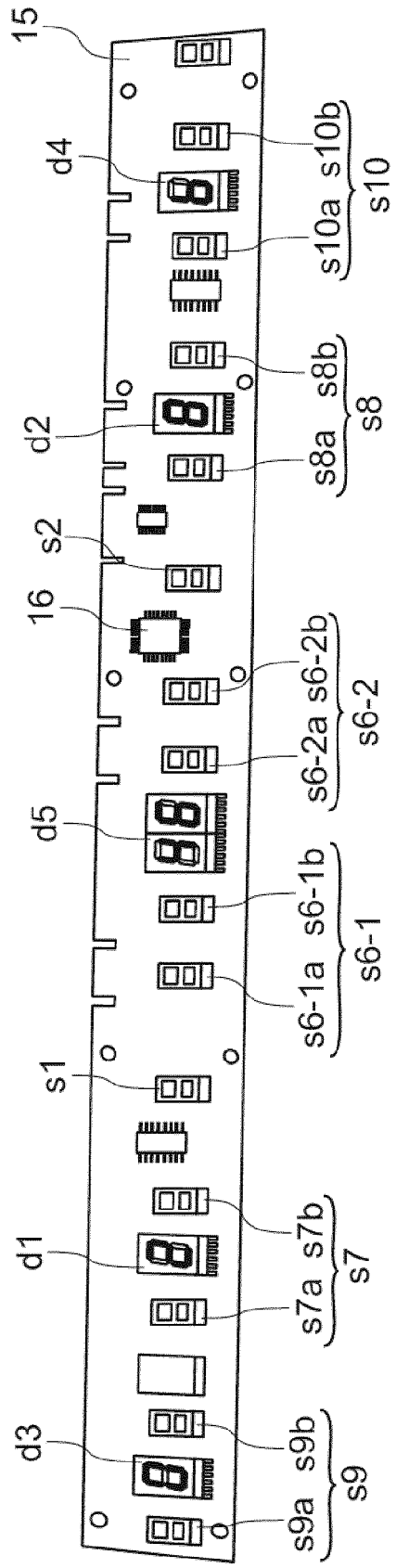


Fig. 2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d4
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s10a
s10
d2
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s2
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s6-2b
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d5
s6-1b
s6-1a
s6-1
s1
d1
s7b
s7a
s7
d3
s9b
s9a
s9

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 14 46 1570

DOCUMENTS CONSIDERED TO BE RELEVANT

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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
The Hague	26 March 2015	Adant, Vincent

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