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(54) **HEATING COOKER**

(57) A heating cooker is provided that includes an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger, and a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power. When the operation position detecting means is operated first at start of heating, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means. When the operation position detecting means is operated after start of heating, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a movement distance and a movement direction of sliding of the finger along the operation position detecting means regardless of the setting level determined in the operation position detecting means at the time of a first operation at start of heating.

Fig. 1A

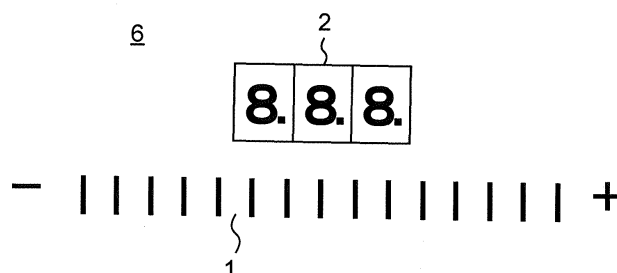
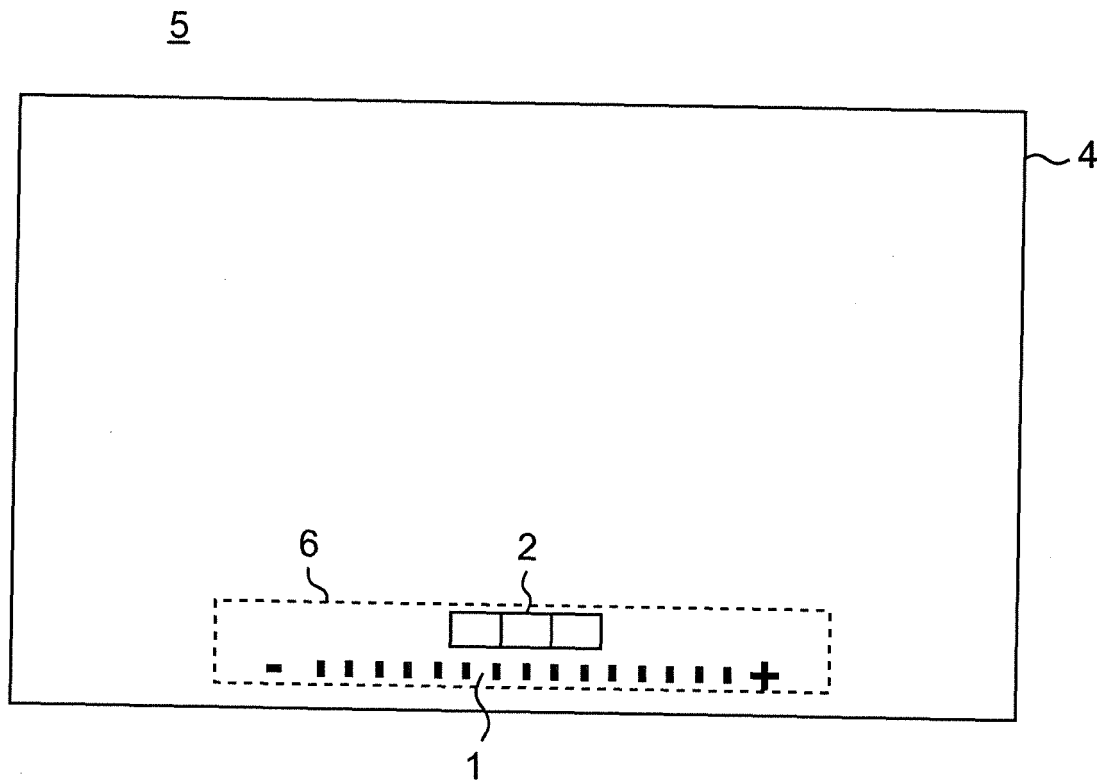


Fig. 1B



Description

TECHNICAL FIELD

[0001] This disclosure relates to a heating cooker including a touch operation type input unit.

BACKGROUND ART

[0002] With regard to a setting input method of a conventional heating cooker, for example, it is disclosed that, in a heating cooker including an operation unit made up of a plurality of electrodes arranged continuously in a left-right direction and assigned with respective setting values, the setting related to heating control is achieved depending on a setting value assigned to the electrode touched by a user (see, e.g., Patent Document 1). The heating cooker is disposed with respective liquid crystal panels under the electrodes and switches display for each setting parameter (heating power, time).

[0003] In the heating cooker, control settings related to heating setting, timer time setting, etc. are achieved depending on a setting value assigned to the touched electrode in accordance with a direct specifying operation of inputting a setting value from an absolute position operated by a user's finger without changing the position of the finger touching a single electrode or a slide operation of sliding the finger along an input unit from a state of touching the electrode with the finger.

[0004] Fig. 13 is a diagram of the conventional heating cooker described in Patent Document 1. As depicted in Fig. 13, the heating cooker is made up of a top plate 101, a transparency window portion 104 formed in the top plate 101, an input unit 103 made up of electrodes arranged continuously in a left-right direction, an a display unit 102 made up of liquid crystal panels etc. disposed under the electrodes and switching display of a heating power level etc. for each setting parameter (heating power, time).

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0005] Patent Document 1: JP2009-54331A

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0006] It is an object of this disclosure to provide a heating cooker including an operation unit achieving convenient display such that a setting level can easily finely be changed by only sliding a finger without repeating an operation a number of times and that a setting level can correctly be adjusted even if one does not sufficiently know which setting level is achieved by operating what position. It is an object of this disclosure to provide a

heating cooker that may suppress the occurrence of a slide operation of inputting a setting value by moving an operation position, which is one of unintended operations, when it is desired to perform a direct specifying operation of inputting a setting value from an absolute position operated by a user. It is an object of this disclosure to provide a heating cooker allowing a user to select a desired input operation without realizing an absolute position of an operating finger when it is desired to perform only the slide operation.

MEANS FOR SOLVING PROBLEM

[0007] For the purpose of solving the above problem, a heating cooker according to the present disclosure includes:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and

a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power, wherein

when the operation position detecting means is operated first at start of heating, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means,

when the operation position detecting means is operated after start of heating, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a movement distance and a movement direction of sliding of the finger along the operation position detecting means regardless of the setting level determined in the operation position detecting means at the time of a first operation at start of heating.

EFFECT OF THE INVENTION

[0008] The heating cooker according to this disclosure allows a user to quickly, easily, and accurately make a fine level adjustment of a setting parameter related to heating. The heating cooker according to this disclosure can suppress the occurrence of the slide operation of inputting a setting value by sliding (moving) an operation position, which is one of unintended operations, when it is desired to perform an operation of uniquely determining a setting level of the setting parameter depending on an absolute position operated by a user. The heating cooker according to this disclosure allows a user to select a desired input method without realizing an absolute position of an operating finger when it is desired to change the setting level through the slide operation.

BRIEF DESCRIPTION OF DRAWINGS

[0009]

Fig. 1A is a schematic of an operation/display unit of a heating cooker according to a first embodiment. Fig. 1B is an arrangement diagram of the operation/display unit on an upper surface of the heating cooker according to the first embodiment.

Fig. 2 is a diagram of a flow of operation/display at the time of heating in the heating cooker according to the first embodiment.

Fig. 3 is a diagram of a flow of operation/display at the time of setting a timer time in the heating cooker according to the first embodiment.

Fig. 4 is a diagram of a flow of operation/display when an effective range differs at the start and after start of heating in a heating cooker according to a second embodiment.

Fig. 5A is a diagram of a flow of operation/display when a level change amount corresponding to a slide distance differs at the time of increase in level in a heating cooker according to a third embodiment.

Fig. 5B is a diagram of a flow of operation/display when a level change amount corresponding to a slide distance differs at the time of decrease in level in a heating cooker according to a third embodiment.

Fig. 6A is a diagram of a flow of operation/display when a level change amount corresponding to a slide distance differs at the time of increase in level in the heating cooker according to the third embodiment.

Fig. 6B is a diagram of a flow of operation/display when a level change amount corresponding to a slide distance differs at the time of decrease in level in the heating cooker according to the third embodiment.

Fig. 7A-7E is a diagram of a flow of operation/display at the time of a heating mode in a heating cooker according to a fourth embodiment.

Fig. 8A-8D is a diagram of a flow of operation/display at the start of the heating mode in a heating cooker according to a fifth embodiment.

Fig. 9A-9D is a diagram of a flow of operation/display at the time of setting a timer time in a heating cooker according to a sixth embodiment.

Fig. 10A-10C is a diagram of a flow of operation/display when a setting level is changed through a slide operation in a heating cooker according to a seventh embodiment.

Fig. 11 is a schematic of an operation unit and a display unit two-dimensionally arranged in a heating cooker according to an eighth embodiment.

Fig. 12 is a schematic of an operation/display unit having guide display in a heating cooker according to a ninth embodiment.

Fig. 13 is a schematic of an input unit and a display unit of a conventional heating cooker.

MODE FOR CARRYING OUT THE INVENTION

[0010] A first aspect of the invention is a heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and

a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power.

[0011] When the operation position detecting means is operated first at start of heating, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means.

[0012] When the operation position detecting means is operated after start of heating, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a movement distance and a movement direction of sliding of the finger along the operation position detecting means regardless of the setting level determined in the operation position detecting means at the time of a first operation at start of heating.

[0013] The first aspect of the invention can provide the heating cooker including an operation unit that enables a user to finely and easily change a setting level related to heating by only sliding a finger without repeating an operation a number of times, that enables a user to correctly adjust a setting level even if the user does not know which setting level is achieved by operating what position, that is inexpensive and convenient, and that achieves simple and clear display.

[0014] A second aspect of the invention is a heating cooker wherein, especially in the first aspect of the invention, when the first operation is performed at start of heating, detection of an operation position is made effective only in a partial range of the operation position detecting means, and wherein when a slide operation is continuously performed without separating the finger from the first operation at start of heating, detection of a movement distance of the finger is made effective in a range wider than the partial range of the operation position detecting means.

[0015] According to the second aspect of the invention, for example, if a user slides a finger placed near an end in a portion of the operation position detecting means without separating the finger to change a setting level when operating the operation position detecting means first at the start of heating, a movement distance may be detected when the user slides the finger in either of both directions along the operation position detecting means. This is convenient since the setting level can be either increased or decreased.

[0016] A third aspect of the invention is a heating cook-

er wherein, especially in the first or second aspect of the invention, when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is larger than an increase amount of the level of the setting parameter corresponding to a movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

[0017] According to the third aspect of the invention, for example, when a temperature of a cooked object is excessively raised due to excessive heating such as when a setting level of heating power is inappropriate, or when the cooked object boils over, the setting heating power or the setting temperature can immediately significantly be reduced to deal therewith.

[0018] A fourth aspect of the invention is a heating cooker wherein, especially in the third aspect of the invention, when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, if a movement distance of sliding of the finger is shorter than a predetermined distance, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is equal to an increase amount of the setting level of the setting parameter corresponding to the same movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

[0019] According to the fourth aspect of the invention, when the distance of sliding of the finger is shorter than the predetermined value, it is considered that the user has an intention to make a fine adjustment even if the setting level is reduced, and the fine adjustment is enabled. When the distance of sliding of the finger is longer than the predetermined value, it is considered that the user has an intention to hurriedly decrease the setting level, and the setting heating power and the setting temperature may immediately significantly be reduced.

[0020] A fifth aspect of the invention is a heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and

a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power.

When the first setting level displaying means displays a setting level of any of the setting parameters, if a distance of sliding of the user's finger along the operation position detecting means is less than a first predetermined value, the heating cooker dis-

plays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and

if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means.

[0021] The fifth aspect of the invention enables the suppression of occurrence of the slide operation of inputting a setting value by sliding (moving) an operation position, which is one of unintended operations, when it is desired to perform the operation of uniquely determining the setting level of the setting parameter depending on the absolute position operated by a user. When it is desired to change the setting level through the slide operation, the user is allowed to select a desired input method without realizing the absolute position of the operating finger.

[0022] A sixth aspect of the invention is a heating cooker wherein, especially in the fifth aspect of the invention, when the first setting level displaying means does not display the setting level of the setting parameter, if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and

if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker disables the operation so as not to display the setting level on the first setting level displaying means.

[0023] While the first setting level displaying means displays nothing such as during a standby state, it is considered that no operational intention is generated to change the setting level through the slide operation. In such state, according to the sixth aspect of the invention, the effective operation method can be limited only to the operation in which the setting level is uniquely determined depending on a position operated when the user operates the operation position detecting means. In other words, the operation of changing the setting value of the setting parameter in accordance with distance and direction of sliding is unnecessary under such a situation and can be disabled.

[0024] A seventh aspect of the invention is a heating cooker wherein, especially in the fifth aspect of the invention, when the first setting level displaying means does not display the setting level of the setting parameter,

if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and

if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on a position initially touched by the user's finger or depending on a position at which the distance of sliding becomes equal to or greater than the first predetermined value, and changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding along the operation position detecting means by using the position initially touched by the user's finger as a base point or by using the position at which the distance of sliding becomes equal to or greater than the first predetermined value as a base point.

[0025] According to the seventh aspect of the invention, while the first setting level displaying means displays nothing such as during a standby state, the setting level of the setting parameter uniquely determined depending on a position of the operation position detecting means touched by the user with a finger is displayed on the first setting level displaying means and, when a slide operation is performed from this time point without separating the finger, the setting level can be changed. Therefore, a setting level determined by roughly operating the absolute position at the time of initial setting of the setting parameter can further finely be adjusted through the slide operation to match the desired setting level, so that the setting level can easily and accurately be set in a wide range by one operation.

[0026] A eighth aspect of the invention is a heating cooker wherein, especially in the fifth aspect of the invention,

the first setting level displaying means displays a setting level of any of a plurality of setting parameters including at least heating power, and wherein

if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the setting level of the setting parameter displayed is a setting level of the setting parameter different from the setting level displayed if the distance is less than the first predetermined value.

[0027] According to the eighth aspect of the invention, two setting parameters can be set depending on a difference in operation method in the one-dimensionally-disposed operation position detecting means. In other words, two setting parameters can be operated by one operation. This enables the reduction in the time required for operation and the elimination of the necessity of operation and component for selecting a setting parameter

operated by another switch, and it is not necessary to display a setting value to be selected by using a liquid crystal panel.

[0028] A ninth aspect of the invention is a heating cooker wherein, especially in the fifth or seventh aspect of the invention, when the user's finger is slid along the operation position detecting means from one arbitrary point to another point on the operation position detecting means, a change amount of the setting value of the setting parameter displayed on the first setting level displaying means is made smaller than a difference in the setting parameter uniquely determined depending on an operated position of the operation position detecting means between a setting level assigned to the one point for display and a setting level assigned to the other point for display.

[0029] According to the ninth aspect of the invention, when the setting level is relatively changed through the slide operation, it is not necessary to enable a change to all the setting levels in the range of the operation position detecting means and a difference in the setting level per unit distance can be made smaller. Therefore, after rapidly and roughly setting the setting level, the user can easily make a fine adjustment of the setting level.

[0030] A tenth aspect of the invention is a heating cooker wherein, especially in any one of the first thru ninth aspects of the invention, a guide display indicative of a setting level is disposed at only one position except the vicinities of end portions of the operation position detecting means.

[0031] According to the tenth aspect of the invention, the operation position corresponding to the target setting level can easily be estimated at the time of a first operation. Therefore, since an adjustment can be made from the setting level after the appropriately started operation, the time until determination of the setting level may be shortened. Additionally, complicated display may be prevented on the operation position detection means.

[0032] A eleventh aspect of the invention is a heating cooker comprising:

a two-dimensional operation position detecting means two-dimensionally disposed and detecting a position operated by a user's finger; and

a second setting level displaying means displaying each of setting levels of a plurality of setting parameters including at least heating power.

When the second setting level displaying means displays at least one setting level of the plurality of the setting parameters,

if a distance of sliding of the user's finger on a predetermined region surface of the two-dimensional operation position detecting means is less than a second predetermined value, the heating cooker displays on the second setting level displaying means a setting level uniquely determined depending on a position in an operated predetermined one direction of the two-dimensional operation position detecting

means, and

if a distance of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means is equal to or greater than the second predetermined value, the heating cooker displays a setting level of the setting parameter corresponding to a direction of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means having a larger movement amount between a movement amount in the predetermined one direction and a movement amount in the other direction orthogonally crossing the predetermined one direction and changes the displayed setting level depending on a movement distance and a movement direction of the finger.

[0033] According to the eleventh aspect of the invention, settings and changes can selectively be achieved depending on a direction of operation in the operation of the two-dimensional operation position detecting means having a plurality of two-dimensionally arranged setting parameters. To an operation associated with specification of an absolute position requiring an intuitive quick operation, a main setting parameter such as the heating power in a heating mode and the temperature setting in a temperature adjusting mode can particularly be applied. For example, the slide operation in the left-right direction can be set to change the setting level of the main setting parameter and, for example, the slide operation in the front-back direction orthogonally crossing the left-right direction can be set to set/change a setting time of a cooking timer in each of cooking modes.

[0034] A twelfth aspect of the invention is a heating cooker, especially in any one of the first thru eleventh aspects of the invention, further comprising a control unit controlling heating output, wherein the control unit controls the heating output in accordance with the setting level of the setting parameter displayed by the first setting level displaying means or the second setting level displaying means when the user separates the finger from the operation position detecting means.

[0035] According to the twelfth aspect of the invention, the user can finely adjust the setting level while viewing the display on the setting level displaying means, and the heating can easily be started by separating the finger when the display reaches a desired setting level.

[0036] Embodiments will now be described in detail with reference to the drawings as needed. It is noted that detailed description will not be provided more than necessary in some cases. For example, detailed description of already well-known facts and repeated description of substantially the same constituent elements may not be provided. This is for the purpose of avoiding unnecessary redundancy of the following description and facilitating understanding by those skilled in the art.

[0037] The inventor (s) provides the accompanying drawings and the following description for sufficient un-

derstanding of this disclosure by those skilled in the art and it is not intended to limit the subject matter described in the claims thereto.

5 First Embodiment

1.1. Configuration of Operation/Display Unit of Heating Cooker According to First Embodiment

[0038] Fig. 1A is a schematic of an operation/display unit 6 of a heating cooker 5 according to a first embodiment. Fig. 1B is an arrangement diagram of the operation/display unit 6 on an upper surface of the heating cooker 5 according to the first embodiment.

[0039] As depicted in Fig. 1A, the heating cooker 5 according to the first embodiment includes an operation position detecting means 1 extended like a belt in the left-right direction and detecting a position operated by a touch of a user's finger. The left side of the operation position detecting means 1 is marked with a minus sign for indicating a direction of decreasing a setting level, and the right side of the operation position detecting means 1 is marked with a plus sign for indicating a direction of increasing a setting level. In the vicinity of the operation position detecting means 1, a first setting level displaying means 2 is included that displays a setting level of a plurality of setting parameters such as a heating power, a time, and a temperature.

[0040] As depicted in Fig. 1B, the operation/display unit 6 of the heating cooker 5 according to the first embodiment is disposed at a front end in the front-back direction of the upper surface of the heating cooker 5.

35 1.2. Operation of Operation/Display Unit of Heating Cooker According to First Embodiment

[0041] An operation of the operation/display unit 6 in the heating cooker 5 according to the first embodiment will be described with reference to Figs. 2 and 3.

[0042] Fig. 2 is a diagram of a flow of operation/display at the time of heating power setting in the heating cooker according to the first embodiment. By way of example, description will be made of the case of setting the heating power having 18 levels of setting values from "1", "1.", "2", "2.", "3",... to "8", "8.", "9", and "9." It is noted that "1." means an intermediate level between "1" and "2". The entire length of the operation position detecting means 1 is divided into 18 portions and the heating powers "1" to "9." are respectively assigned to the divided portions.

[0043] Fig. 2(a) depicts a first operation of the heating power setting at the start of heating. When a user's finger 10 operates a place near the center of the operation position detecting means 1, the operation position detecting means 1 detects the operation position and the first setting level displaying means 2 displays a setting value "5" assigned in advance in accordance with the operation position. Subsequently, the user separately gives an instruction for heating start, the heating is started at the

heating power setting value "5".

[0044] The first operation of heating power setting at the start of heating may be a first heating power setting operation after giving the instruction for heating start. In this case, for example, an initial heating power at the start of heating may tentatively be set and the operation as described above may be allowed to be performed only for the heating power setting operated first during a predetermined time after the heating start. Actual heating may be started immediately after giving the instruction for heating start or immediately after performing the first heating power setting operation within the predetermined time. If the first heating power setting operation is not performed within the predetermined time, the heating may be started after a certain time has elapsed.

[0045] Figs. 2(b) and 2(c) depict an operation after the start of heating. As depicted in Fig. 2(b), it is assumed that the user's finger 10 is placed at an arbitrary position on the operation position detecting means 1. At this time point, the display of the first setting level displaying means 2 does not change from "5".

[0046] As depicted in Fig. 2(c), it is assumed that the user slides the finger 10 to the right while being in contact with the operation position detecting means 1. In this case, the value of heating power displayed on the first setting level displaying means 2 is changed from "5" to "7." in accordance with the distance and direction of the sliding. Therefore, the slide distance depicted in Fig. 2(c) is a distance changing the heating power setting level by 2.5 and it is preliminarily determined that the slide operation to the right increases the heating power setting level.

[0047] Fig. 3 is a diagram of a flow of operation/display at the time of setting a timer time in the heating cooker according to the first embodiment. In this case, the timer time can be set that has 100 levels of setting values from "0" minutes, "1" minute, "2" minutes, ... to "98" minutes, and "99" minutes. The entire length of the operation position detecting means 1 is divided into 10 portions and 10 minutes of the timer time are assigned to each of the divided positions.

[0048] Fig. 3(a) depicts a first operation at the start of a timer operation. When the user's finger 10 operates a place near the center of the operation position detecting means 1, the operation position detecting means 1 detects the operation position and the first setting level displaying means 2 displays a setting value of "50" minutes assigned in advance in accordance with the operation position.

[0049] Figs. 3(b) and 3(c) depict an operation after the start of the timer operation. As depicted in Fig. 3(b), it is assumed that the user's finger 10 is placed at an arbitrary position on the operation position detecting means 1. At this time point, the display of the first setting level displaying means 2 does not change from "50" minutes.

[0050] As depicted in Fig. 3(c), it is assumed that the user slides the finger 10 to the left while being in contact with the operation position detecting means 1. In this

case, the value of timer time displayed on the first setting level displaying means 2 is changed from "50" minutes to "40" minutes in accordance with the distance and direction of the sliding. Therefore, the slide distance depicted in Fig. 3(c) is a distance changing the setting level by 10 and it is preliminarily determined that the slide operation to the left decreases the timer time setting level.

1.3. Conclusion of First Embodiment

[0051] In the heating cooker according to the first embodiment including the configuration as described above, an operation position corresponding to a target value can roughly be comprehended from visual information of an operation range at the time of the first operation, which enables a quick operation. At the time of operation after the start of heating, a gap from the target value can be readjusted without being affected by the absolute position of the operation. Since the setting level can easily be changed by only sliding a finger without performing an operation a number of times, this is convenient for a user. Moreover, even if a correct absolute position is not known in terms of which setting level is achieved by operating what position, the setting level can finely be adjusted after operating an approximate position.

[0052] In the heating cooker according to the first embodiment, a setting value change amount relative to a slide distance per unit distance of the operation position detecting means 1 at the time of adjustment of the setting value through the slide operation after the start of heating may be made smaller than a difference in the setting value per unit distance of the setting value assigned in advance to the operation position of the operation position detecting means 1. For example, when the operation position detecting means 1 depicted in Fig. 3 is operated at the position depicted in Fig. 3(a) at time of the first operation at the start of the timer operation, "50" minutes are displayed. If it is assumed that "75" minutes are displayed when the position depicted in Fig. 3(b) is first operated, a difference between both is 25 minutes. On the other hand, as described above, when the slide operation of the finger is performed from the position depicted in Fig. 3(b) to the position depicted in Fig. 3(c), a change amount of the setting level is 10 minutes in the decreasing direction. Therefore, the density of the change amount of the setting value at the time of the slide operation is made smaller than the density of the setting value at the time of the first operation at the start of heating. Such setting enables a user to operate an approximate absolute position at the time of the first operation at the start of heating and to subsequently make a fine adjustment of the setting value already set once, depending on a movement amount that is a relative value.

Second Embodiment

2.1. Configuration of Operation/Display Unit of Heating Cooker According to Second Embodiment

[0053] A configuration of the operation/display unit of the heating cooker 5 according to the second embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

2.2. Operation of Operation/Display Unit of Heating Cooker According to Second Embodiment

[0054] An operation of the operation/display unit 6 in the heating cooker 5 according to the second embodiment will be described with reference to Fig. 4.

[0055] In the operation/display unit 6 in the heating cooker 5 according to the second embodiment, the detection of the operation position is made effective only in a partial range of the operation position detecting means 1 when the first operation is performed at the start of heating, at the start of the timer operation, etc. Subsequently, if a slide operation is performed without separating the finger 10, the effective range of detection of the operation position detecting means 1 is made wider. For example, the detection of the operation position is made effective in the entire range of the operation position detecting means 1 to measure the movement distance of the finger 10. Fig. 4 depicts an operation of such a case and depicts the operation of setting the timer time having 100 levels of setting values from "0" minutes, "1" minute, "2" minutes,... to "98" minutes, and "99" minutes by way of example.

[0056] Fig. 4(a) depicts the first operation at the start of the timer operation. In this case, the detection of the operation position is made effective only in a partial range of the operation position detecting means 1 and, by way of example, the operation is effective within the positions of the effective range depicted in Fig. 4(a) not reaching the both end portions from the center thereof. The entire length of the operation position detecting means 1 has the effective range divided into 10 portions and 10 minutes of time are assigned to each of the divided portions. When the user's finger 10 operates a place near the right end of the effective range of the operation position detecting means 1, the operation position detecting means 1 detects the operation position and the first setting level displaying means 2 displays the setting value of "90" minutes assigned in advance in accordance with the operation position.

[0057] If a slide operation is performed without separating the finger 10 from the first operation position, a fine adjustment enabled mode is achieved. In this fine adjustment enabled mode, the change amount of the setting value corresponding to the movement distance of the finger 10 is set at the density lower than the density of

the divided setting values at the time of the first operation. Therefore, the numeric value of the first setting level displaying means 2 slowly changes depending on the movement distance from the first operation position.

[0058] Fig. 4(b) depicts an operation when the user slides the finger 10 operated in the state depicted in Fig. 4(a) to a position beyond the right end portion of the effective range in Fig. 4(a) while the finger is kept in contact with the operation position detecting means 1 without separating the finger. In this case, the detection of the operation position detecting means 1 is made effective in the entire range. The entire range may not particularly be displayed. The time displayed on the first setting level displaying means 2 is changed from "90" minutes to "99" minutes in accordance with the distance and direction of the slide operation.

[0059] It is assumed that the detection is effective in the entire range of the operation position detecting means 1 from the time of the first operation. If the vicinity of the left end or right end portion of the operation position detecting means 1 is first operated in such a situation and a slide operation is attempted directly from the first operation without separating the finger 10, the detection is terminated in the fine adjustment enabled mode before reaching the minimum or maximum setting level even when the finger 10 is further slid to the left or right. Therefore, a fine adjustment of changing the setting level can be made only in one direction in the vicinity of the left end or right end portion of the operation position detecting means 1. This is because the change amount of the setting value corresponding to the movement distance of the finger 10 is set in the fine adjustment enabled mode at the density lower than the density of the divided setting values at the time of the first operation.

[0060] Since the effective range of the operation is provided wider at the time of fine adjustment as compared to the time of the first operation in this embodiment, the problem as in the situation described above does not occur and the convenience is improved.

[0061] It is desirable that the effective range of the operation position detecting means 1 is expanded if the slide operation is performed without separating the finger 10 from the time of the first operation, and is set to the narrow range of the time of the first operation if the slide operation is performed after the finger 10 is once separated and then brought into contact again. In this case, a sign such as a scale is desirably displayed only for the narrow effective range.

2.3. Conclusion of Second Embodiment

[0062] Although the change amount of the setting value corresponding to the movement distance of the finger is set in the fine adjustment enabled mode at the density lower than the density of the divided setting values at the time of the first operation in this embodiment, the effective range of the operation is provided wider at the time of fine adjustment as compared to the time of the first op-

eration and, therefore, a value can sufficiently conveniently be set in the vicinity of the left end or right end portion of the operation position detecting means 1 in the fine adjustment enabled mode.

Third Embodiment

3.1. Configuration of Operation/Display Unit of Heating Cooker According to Third Embodiment

[0063] A configuration of the operation/display unit of the heating cooker 5 according to the third embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

3.2. Operation of Operation/Display Unit of Heating Cooker According to Third Embodiment

[0064] An operation of the operation/display unit 6 in the heating cooker 5 according to the third embodiment will be described with reference to Figs. 5 and 6.

[0065] In the heating cooker 5 according to the third embodiment, when the finger 10 is slid along the operation position detecting means 1 in the direction of decreasing the level of the setting parameter displayed by the first setting level displaying means 2, a decrease amount of the level of the setting parameter corresponding to a distance is larger than an increase amount of the level of the setting parameter corresponding to a distance when the finger 10 is slid along the operation position detecting means 1 in the direction of increasing the level of the setting parameter displayed by the first setting level displaying means 2.

[0066] Figs. 5A and 5B are diagrams of the operation described above. Fig. 5A depicts a relation between a slide distance and a level increase amount when the finger 10 is slid along the operation position detecting means 1 to the right to increase a level. In this case, the level increase amount is increased by +1 in accordance with the slide distance. Fig. 5B depicts a relation between a slide distance and a level decrease amount when the finger 10 is slid along the operation position detecting means 1 to the left to decrease a level. In this case, the level decrease amount is decreased by -2 in accordance with the slide distance.

[0067] For example, if a temperature of a cooked object is excessively raised or the cooked object boils over while a user is unaware, this embodiment enables the user to immediately reduce the heating power to deal therewith.

[0068] With regard to a decrease amount of the level of the setting parameter corresponding to a distance when the finger 10 is slid along the operation position detecting means 1 in the direction of decreasing the level of the setting parameter displayed by the first setting level displaying means 2, if the distance of sliding is shorter than a predetermined distance, the decrease amount may be made equal to an increase amount of the level

of the setting parameter corresponding to a distance when the finger 10 is slid along the operation position detecting means 1 in the direction of increasing the level of the setting parameter displayed by the first setting level displaying means 2 and, if the distance is longer than the predetermined distance, the decrease amount may be made larger than the increase amount in the increasing direction.

[0069] Figs. 6A and 6B are diagrams of the operation described above. Fig. 6A depicts a relation between a slide distance and a level increase amount when the finger 10 is slid along the operation position detecting means 1 to the right to increase a level. In this case, the level increase amount is increased by +1 in accordance with the slide distance. Fig. 6B depicts a relation between a slide distance and a level decrease amount when the finger 10 is slid along the operation position detecting means 1 to the left to decrease a level. In this case, if the slide distance is shorter than a predetermined distance corresponding to a change amount within two, the level decrease amount is decreased by -1 in accordance with the slide distance and, if the slide distance is longer as in the case of a change amount exceeding two, the level decrease amount is decreased by -2 in accordance with the slide distance.

[0070] This embodiment enables a fine adjustment if the distance of sliding of the finger 10 is short and, for example, if a temperature of a cooked object is excessively raised or the cooked object boils over while a user is unaware, the user can perform the operation for a large slide distance to immediately reduce the heating power to deal therewith.

3.3. Conclusion of Third Embodiment

[0071] At least in the case that the distance of sliding of the finger 10 along the operation position detecting means 1 is longer than the predetermined distance in this embodiment, when the finger 10 is slid along the operation position detecting means 1 in the direction of decreasing the level of the setting parameter displayed by the first setting level displaying means 2, a decrease amount of the level of the setting parameter corresponding to a distance is larger than an increase amount of the level of the setting parameter corresponding to a distance when the finger 10 is slid along the operation position detecting means 1 in the direction of increasing the level of the setting parameter displayed by the first setting level displaying means 2. This enables the user to immediately reduce the heating power, for example.

Fourth Embodiment

4.1. Configuration of Operation/Display Unit of Heating Cooker According to Fourth Embodiment

[0072] A configuration of the operation/display unit of the heating cooker 5 according to the fourth embodiment

is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

4.2. Operation of Operation/Display Unit of Heating Cooker According to Fourth Embodiment

[0073] An operation of the operation/display unit 6 in the heating cooker 5 according to the fourth embodiment will be described with reference to Fig. 7.

[0074] Fig. 7 is a diagram of a flow of operation/display at the time of a heating mode in the heating cooker 5 according to the fourth embodiment. By way of example, description will be made of the case of setting the heating power having 9 levels of setting values from "1", "2", "3",... to "8", and "9". The entire length of the operation position detecting means 1 is divided into 9 portions and the heating powers "1" to "9" are respectively assigned to the divided portions.

[0075] Fig. 7A depicts a display example of the first setting level displaying means 2 before the start of heating. In Fig. 7A, "2" is displayed on the first setting level displaying means 2. At this point, the first setting level displaying means 2 may be in a state of displaying a setting level when the setting parameter of the heating power setting is once set or a setting level when the setting parameter is set to a default value such as "5" before the start of heating.

[0076] Fig. 7B depicts a state when a user touches the operation position detecting means 1 to start an input operation of the setting parameter of heating power setting. When the user's finger 10 touches near the center of the operation position detecting means 1, the operation position detecting means 1 detects the position touched by the finger 10 and the first setting level displaying means 2 displays a setting value "5" assigned in advance in accordance with the operation position.

[0077] Fig. 7C depicts the display content of the first setting level displaying means 2 when a movement distance D of sliding of the finger 10 along the operation position detecting means 1 is less than a first predetermined value C. While the movement distance D of sliding of the finger 10 is less than the first predetermined value C, the setting value "5" is continuously displayed. In Fig. 7D, when the user separates the finger 10 at this position, the setting level of the setting parameter uniquely determined depending on a position operated by the user is determined, and the setting value "5" assigned in advance is displayed in accordance with the position initially touched by the finger 10 on the first setting level displaying means 2 and is fixed as the setting level.

[0078] On the other hand, when the finger 10 is simply slid without separating the finger 10 as in Fig. 7D and reaches a position at which the movement distance D becomes equal to or greater than the first predetermined value C, a change amount of the setting parameter is determined in accordance with the distance and direction of sliding, and the setting level corresponding to the

change amount from the initially displayed setting value "2" is displayed on the first setting level displaying means 2. In this case, when the movement distance D of sliding of the finger 10 becomes equal to or greater than the first predetermined value C, the change amount of the setting parameter is "1" and the first setting level displaying means 2 displays "3", which is the sum of the original setting value "2" and the change amount "1". When the finger 10 is further slid to the position of Fig. 7E, the change amount corresponding to the movement distance D is "2" and the first setting level displaying means 2 displays "4", which is the sum of the original setting value "2" and the change amount "2". If the user separates the finger 10 from the operation position detecting means 1 in this state, "4" displayed on the first setting level displaying means 2 is fixed as the setting level.

[0079] Although the change amount is a change amount in the increasing direction since the finger 10 is slid to the right in the example depicted in Fig. 7, if the finger 10 is inversely slid to the left, the change amount is a change amount in the decreasing direction, i.e., a negative change amount and, therefore, the setting level decreases.

[0080] As described above, the user can intuitively perform an operation and the operation is fixed when the user's finger 10 is separated. In particular, the setting value displayed immediately before the separation of the finger 10 is defined as the fixed value. However, if the setting level is displayed in advance on the first setting level displaying means 2 as depicted in Fig. 7A, the display suddenly changes when one point (a base point of slide operation) is touched as depicted in Fig. 7B in an attempt to relatively change the setting value through the slide operation and, if the slide operation is performed from this state, the display is switched to the level next to the originally displayed setting value when the movement distance D becomes equal to or greater than the first predetermined value C. In this case, it is considered that a user attempting the slide operation may have a strange feeling because the display different from the purpose is performed. As a countermeasure, for example, the display may not be changed immediately after the operation depicted in Fig. 7B and may be switched to the display of the setting level determined by the absolute position if the position of the finger 10 is not changed for a predetermined time, and the originally displayed setting level may continuously be displayed if the finger 10 is moved during a predetermined time immediately after the operation depicted in Fig. 7B and may finally be switched to the display of the setting level determined by the absolute position if the movement of the finger 10 is stopped for a predetermined time while the movement distance D is less than the first predetermined value C.

4.3. Conclusion of Fourth Embodiment

[0081] If the first setting level displaying means dis-

plays the setting level of the setting parameter and a distance of sliding of a user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker according to the fourth embodiment displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means. If the distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means.

[0082] In this way, when it is desired to perform an operation uniquely determining the setting level of the setting parameter depending on the absolute position operated by a user, the heating cooker according to this embodiment can suppress the occurrence of the slide operation of inputting a setting value by sliding (moving) an operation position, which is one of unintended operations. When it is desired to change the setting level through the slide operation, the heating cooker according to this embodiment allows the user to select a desired input method without realizing the absolute position of the operating finger.

Fifth Embodiment

5.1. Configuration of Operation/Display Unit of Heating Cooker According to Fifth Embodiment

[0083] A configuration of the operation/display unit of the heating cooker 5 according to the fifth embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

[0084] 5.2. Operation of Operation/Display Unit of Heating Cooker According to Fifth Embodiment

[0085] An operation of the operation/display unit 6 in the heating cooker 5 according to the fifth embodiment will be described with reference to Fig. 8.

[0086] Although the operation position detecting means 1 is operated while the setting level is displayed on the first setting level displaying means 2 before the operation in the heating cooker according to the fourth embodiment depicted in Fig. 7 as described above, the operation position detecting means 1 is operated while nothing is displayed on the first setting level displaying means 2 at the start of the heating mode in the heating cooker according to this embodiment depicted in Fig. 8. Fig. 8 depicts a flow of operations and displays in this case.

[0087] Fig. 8A depicts a display example of the first setting level displaying means 2 before the start of heating and nothing is displayed on the first setting level displaying means 2.

[0088] Fig. 8B depicts a state when a user touches the operation position detecting means 1 before the start of heating so as to start an input operation of the setting parameter of heating power setting. When the user's finger 10 touches near the center of the operation position detecting means 1, the operation position detecting means 1 detects the position touched by the finger 10 and the first setting level displaying means 2 displays a setting value "5" assigned in advance in accordance with the operation position.

[0089] Fig. 8C depicts the display content of the first setting level displaying means 2 when the movement distance D of sliding of the finger 10 along the operation position detecting means 1 is less than the first predetermined value C. While the movement distance D of sliding of the finger 10 is less than the first predetermined value C, the setting value "5" depicted in Fig. 8B is continuously displayed. When the user separates the finger 10 at this position, the setting value "5" assigned in advance is displayed without change in accordance with the position initially touched by the finger 10 on the first setting level displaying means 2 and is fixed as the setting level.

[0090] On the other hand, when the finger 10 is simply slid without separating the finger 10 and reaches a position at which the movement distance D becomes equal to or greater than the first predetermined value C, a change amount of the setting parameter is determined in accordance with the distance and direction of sliding, and the setting level corresponding to the change amount from the setting value "5" displayed in accordance with the initially touched position is displayed on the first setting level displaying means 2. In this case, when the movement distance D of sliding of the finger 10 becomes equal to or greater than the first predetermined value C, the change amount of the setting parameter is "1" and the first setting level displaying means 2 displays "6", which is the sum of the original setting value "5" and the change amount "1". When the finger 10 is further slid to the position of Fig. 8D, the change amount corresponding to the movement distance D is "2" and the first setting level displaying means 2 displays "7", which is the sum of the original setting value "5" and the change amount "2". If the user separates the finger 10 from the operation position detecting means 1 in this state, "7" displayed on the first setting level displaying means 2 is fixed as the setting level. The heating cooker of this embodiment performs the heating at the heating power corresponding to the setting level "7".

[0091] Although the change amount is a change amount in the increasing direction since the finger 10 is slid to the right in the example depicted in Fig. 8, if the finger 10 is inversely slid to the left, the change amount is a change amount in the decreasing direction, i.e., a negative change amount and, therefore, the setting level decreases.

[0092] If nothing is displayed on the first setting level displaying means 2 as depicted in Fig. 8A and the move-

ment distance D of sliding of the finger 10 becomes equal to or greater than the first predetermined value C, the operation position detecting means 1 may disable the setting operation of the setting level and cause the first setting level displaying means 2 to display nothing again. In this way, the operation method of the operation position detecting means 1 can be limited only to the operation method of uniquely determining a setting value of the setting parameter depending on an absolute position operated by a user, in accordance with a mode of the heating cooker. Therefore, for example, if a periphery of the operation unit is wiped with a wiping cloth for maintenance, the setting level can be prevented from being set due to false recognition as a slide operation of the operation position detecting means 1.

5.3. Conclusion of Fifth Embodiment

[0093] If the first setting level displaying means does not display the setting level of the setting parameter at first and a distance of sliding of a user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker according to the fifth embodiment displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an initially operated position of the operation position detecting means. If the distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker displays on the first setting level displaying means a level value that is the sum of the setting level of the setting parameter uniquely determined depending on an initially operated position of the operation position detecting means and a change amount corresponding to the distance D of sliding, or disables the operation so as not to display the setting level on the first setting level displaying means.

[0094] In this way, while the first setting level displaying means displays nothing such as during a standby state, it is considered that no operational intention is generated in a user to change the setting level through the slide operation and, therefore, the heating cooker according to this embodiment can limit the operation method of the operation position detecting means only to the operation method of uniquely determining the setting level of the setting parameter depending on an absolute position operated by the user. In other words, the unnecessary operation of changing the setting value of the setting parameter in accordance with distance and direction of sliding can be eliminated under such a situation.

Sixth Embodiment

6.1. Configuration of Operation/Display Unit of Heating Cooker According to Sixth Embodiment

[0095] A configuration of the operation/display unit of

the heating cooker 5 according to the sixth embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

6.2. Operation of Operation/Display Unit of Heating Cooker According to Sixth Embodiment

[0096] An operation of the operation/display unit 6 in the heating cooker 5 according to the sixth embodiment will be described with reference to Fig. 9.

[0097] The heating cooker according to the sixth embodiment depicted in Fig. 9 represents a flow of operation and display at the time of setting a timer time. By way of example, description will be made of the case of setting the timer time having 100 levels of setting values from "1" minute, "2" minutes,... to "98" minutes, "99" minutes, and "100" minutes. The entire length of the operation position detecting means 1 is divided into 10 portions and 10 minutes of time are assigned to each of the divided portions.

[0098] Fig. 9A depicts the display of the first setting level displaying means 2 before the start of heating and nothing is displayed on the first setting level displaying means 2.

[0099] Fig. 9B depicts a state when a user touches the operation position detecting means 1 during a mode of setting the timer time. When the user's finger 10 touches near the center of the operation position detecting means 1, the operation position detecting means 1 detects the position touched by the finger 10 and the first setting level displaying means 2 displays a setting value "50" assigned in advance in accordance with the operation position.

[0100] Fig. 9B depicts the display content of the first setting level displaying means 2 when the movement distance D of sliding of the finger 10 along the operation position detecting means 1 is less than the first predetermined value C. While the movement distance D of sliding of the finger 10 is less than the first predetermined value C, the setting value "50" displayed in Fig. 9B is continuously displayed and, when the user separates the finger 10 at this position, the setting value "50" assigned in advance is displayed without change in accordance with the position initially touched by the finger 10 on the first setting level displaying means 2 and is fixed as the setting level.

[0101] On the other hand, when the finger 10 is simply slid without separating the finger 10 and reaches a position at which the movement distance D becomes equal to or greater than the first predetermined value C, a change amount of the setting parameter is "1" and the first setting level displaying means 2 displays "51", which is the sum of the original setting value "50" and the change amount "1". When the finger 10 is further slid in the same direction, the change amount corresponding to the movement distance D increases to "2", "3", "4", etc. and the setting level displayed on the first setting level displaying means 2 increases to "52", "53", "54",

etc. When the finger 10 is slid to the position of Fig. 9D, the change amount corresponding to the movement distance D is "20" and the first setting level displaying means 2 displays "70", which is the sum of the original setting value "50" and the change amount "20". If the user separates the finger 10 from the operation position detecting means 1 in this state, "70" displayed on the first setting level displaying means 2 is fixed as the setting level. The heating cooker of this embodiment has the timer time set to "70" minutes and operates such that, for example, if heating is started, the heating is automatically stopped after 70 minutes.

[0102] Although the change amount is a change amount in the increasing direction since the finger 10 is slid to the right in the example depicted in Fig. 9, if the finger 10 is inversely slid to the left, the change amount is a change amount in the decreasing direction, i.e., a negative change amount and, therefore, the setting level decreases.

[0103] Although the operation of the timer time setting depicted in Fig. 9 is almost the same as the operation of the heating power setting depicted in Fig. 8, the timer time depicted in Fig. 9 has 100 setting levels, which are extremely larger than the 9 setting levels of the heating power setting depicted in Fig. 8. Therefore, the operation position detecting means 1 depicted in Fig. 9 must be set such that the change amount corresponding to the movement distance D becomes larger when the finger 10 is slid. If the number of setting levels is extremely large as in the case of the timer time setting, the relation between the movement distance D and the change amount may be, for example, a nonlinear relation like a logarithmic function rather than a linear relation. In particular, by setting a smaller rate of change in the change amount associated with an increase/decrease amount of the movement distance D when the movement distance D is smaller and setting a larger rate of change in the change amount associated with an increase/decrease amount of the movement distance D when the movement distance D becomes larger, a fine adjustment can minutely be made through the slide operation and, if it is desired to largely change the setting level, the rate of change in the change amount is made larger by making the movement distance D larger. Therefore, a fine adjustment and a large change can selectively be used for a wide range of setting levels depending on the movement distance D, which makes the input operation easy.

[0104] Instead of linearly or nonlinearly increasing/decreasing the change amount depending on the movement distance D, a movement speed of the finger 10 may be detected to set a smaller rate of change in the change amount associated with an increase/decrease amount of the movement distance D when the movement speed is slower and set a larger rate of change in the change amount associated with an increase/decrease amount of the movement distance D when the movement speed is faster. As a result, when it is desired to make a fine adjustment of the setting level, the movement of the finger

10 can be made slower to make a fine adjustment of the slowly changing setting level and, when it is desired to largely change the setting level, the movement of the finger 10 can be made faster to roughly adjust the largely changing setting level and the movement speed of the finger 10 can be reduced near the desired setting level to directly simply making a fine adjustment as well.

6.3 Conclusion of Sixth Embodiment

[0105] In the heating cooker according to the sixth embodiment, particularly, the setting level of the setting parameter displayed on the first setting level displaying means is changed depending on the distance and movement direction of sliding along the operation position detecting means by using as a base point the position at which the distance of sliding of the user's finger becomes equal to or larger than the first predetermined value. Therefore, while the first setting level displaying means displays nothing such as during a standby state, the setting level of the setting parameter uniquely determined depending on a position of the operation position detecting means touched by the user with a finger is displayed on the first setting level displaying means and, when the slide operation is performed from this time point without separating the finger, the setting level can be changed, and a setting level determined by roughly operating the absolute position at the time of initial setting of the setting parameter can further finely be adjusted through the slide operation to match the desired setting level, so that the setting level can easily and accurately be set in a wide range by one operation.

[0106] Alternatively, the setting parameter to be set may be differentiated between when the movement distance D of sliding of the finger 10 along the operation position detecting means 1 is less than the first predetermined value C and when the distance is equal to or greater than the first predetermined value C. For example, the level setting of heating power may be assigned out of a plurality of the setting parameters to the absolute position input operation in which the first setting level displaying means 2 displays the setting level of the setting parameter uniquely determined depending on an operated position, and the changing of the setting level of the timer time may be assigned out of a plurality of the setting parameters to the operation of determining a change amount of the setting parameter depending on movement distance and direction of sliding.

[0107] As a result, a setting parameter having a smaller number of setting levels like, for example, the heating power setting, can quickly be set by touching a position corresponding to a desired setting level with the finger 10 in accordance with the absolute position thereof, and a setting parameter having a large number of setting levels like, for example, the timer time setting, can be operated by determining a change amount of the setting parameter depending on the movement distance and direction of the slide operation of the finger 10. Since a plurality

of setting parameters can be set depending on a difference in the operation method through the one operation position detecting means 1, this eliminates the need for an operation of selecting the setting parameter to be operated by using a liquid crystal panel etc. Therefore, a simple operation mechanism can inexpensively be configured.

Seventh Embodiment

7.1. Configuration of Operation/Display Unit of Heating Cooker According to Seventh Embodiment

[0108] A configuration of the operation/display unit of the heating cooker 5 according to the seventh embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

7.2. Operation of Operation/Display Unit of Heating Cooker According to Seventh Embodiment

[0109] An operation of the operation/display unit 6 in the heating cooker 5 according to the seventh embodiment will be described with reference to Fig. 10.

[0110] Fig. 10 is a diagram of a flow of operation and display when a setting level of the timer time is changed through a slide operation to the operation position detecting means 1 in the heating cooker according to the seventh embodiment. In Fig. 10, the setting parameter has 100 setting levels from "1" to "100". The entire length of the operation position detecting means 1 is divided into 10 portions and 10 minutes of time are assigned to each of the divided portions. The operation position detecting means 1 depicted in Fig. 10 has guide display of timer time that is a setting level assigned in advance to each of the divided portions for easier understanding.

[0111] The guide display may be displayed only when a large number of setting levels exists as in the time of setting the timer time. The guide display may be switched to appropriate display depending on a setting parameter to be operated. Even when the guide display corresponding to each of the setting parameters is always displayed in the vicinity of the operation position detecting means 1, this acts as a guide for inputting the setting level of the setting parameter uniquely determined depending on a position of operation and a user's input work can be assisted.

[0112] Fig. 10A depicts the display of the first setting level displaying means 2 when the display position of the guide display of "80" is operated on the operation position detecting means 1. When the user wants to input the setting level of the timer time as "80" minutes, the setting level of the timer time is fixed to "80" minutes by separating the finger 10 after this operation and "80" is displayed on the first setting level displaying means 2.

[0113] Fig. 10B depicts the display of the first setting

level displaying means 2 when the display position of the guide display of "50" is subsequently operated on the operation position detecting means 1. When the user wants to input the setting level of the timer time as "50" minutes, the setting level of the timer time is fixed to "50" minutes by separating the finger 10 after this operation and "50" is displayed on the first setting level displaying means 2.

[0114] After "50" is displayed in the above operation of Fig. 10B, if a slide operation is performed to the right without separating the finger 10 and the finger 10 is moved to the display position of the guide display of "80", "56" is displayed on the first setting level displaying means 2 as depicted in Fig. 10C. A difference of 30 exists between the display of "80" on the first setting level displaying means 2 when the display position of the guide display of "80" is operated in Fig. 10A and the display of "50" on the first setting level displaying means 2 when the display position of the guide display of "50" is operated in Fig. 10B. However, after the display position of the guide display of "50" is operated in Fig. 10B, if a slide operation is performed without separating the finger 10 to the display position of the guide display of "80" in Fig. 10C, the display of "56" on the first setting level displaying means 2 has an increment of 6. Therefore, the increment is made smaller than the difference of 30 between Fig. 10A and Fig. 10B.

7.3. Conclusion of Seventh Embodiment

[0115] In the heating cooker of this embodiment, the setting level is assigned to the operation position of the operation position detecting means 1 such that when the finger 10 is slid along the operation position detecting means 1 from one arbitrary point to another point on the operation position detecting means 1, a change amount of the setting value of the setting parameter is made smaller than a difference in the setting parameter uniquely determined depending on an operated position between the setting level assigned to the one point and the setting level assigned to the other point.

[0116] As a result, even if the setting parameter has a large number of the setting levels, an approximate level can be specified by one operation and, when the slide operation is associated or the slide operation is subsequently performed after the setting level is once set, the setting level can finely be adjusted. Therefore, a fine adjustment and a large change can selectively be used for a wide range of the setting level, which makes the input operation easy.

[0117] Even when the direction of the slide operation is the decreasing direction, a fine adjustment can be made in the decreasing direction of the setting level as is the case with the increasing direction. Even when the base point of the slide operation is a point corresponding to the numeric number displayed on the first setting level displaying means 2 other than "50", the setting level can finely be adjusted from the displayed value correspond-

ing to the base point depending on the movement distance of the slide operation.

[0118] Eighth Embodiment

8.1. Configuration of Operation/Display Unit of Heating Cooker According to Eighth Embodiment

[0119] Fig. 11 is a schematic of an example of the operation unit and the display unit two-dimensionally arranged in the heating cooker according to the eighth embodiment. The operation position detecting means 1 is disposed in a belt shape in line and detects a one-dimensional position in a predetermined direction operated by the user's finger 10, while a two-dimensional operation position detecting means 4 depicted in Fig. 11 is disposed on a region surface formed by one plane surface or curved surface and detects a two-dimensional position on the region surface operated by the user's finger 10.

[0120] The two-dimensional operation position detecting means 4 detects a two-dimensional position to detect two setting parameters at the same time and can detect a leftward/rightward setting parameter and a forward/backward setting parameter in this embodiment. The center of the left end of the two-dimensional operation position detecting means 4 is marked with a minus sign for indicating a direction of decreasing the setting level of the leftward/rightward setting parameter, and the center of the right end of the two-dimensional operation position detecting means 4 is marked with a plus sign for indicating a direction of increasing the setting level of the leftward/rightward setting parameter. Similarly, the center of the front end of the two-dimensional operation position detecting means 4 is marked with a minus sign for indicating a direction of decreasing the setting level of forward/backward setting parameter, and the center of the back end of the two-dimensional operation position detecting means 4 is marked with a plus sign for indicating a direction of increasing the setting level of the forward/backward setting parameter.

[0121] A configuration for detecting a two-dimensional position in the two-dimensional operation position detecting means 4 may be those detecting a position from distribution of magnitude of individual input levels with a plurality of electrostatic input units arranged in a matrix shape or those acquiring an input value with a contact or electrostatic two-dimensional touch panel.

[0122] In the vicinity of the two-dimensional operation position detecting means 4, a second setting level displaying means 2a is included that displays a setting level of a plurality of setting parameters such as a heating power setting value, a time, and a temperature.

[0123] A square frame is set outside the two-dimensional operation position detecting means 4 and a region surface capable of detecting a two-dimensional position is located inside the frame.

[0124] In this embodiment depicted in Fig. 11, the leftward/rightward setting parameter of the two-dimensional operation position detecting means 4 corresponds to the

setting level of the heating power setting, and the forward/backward setting parameter corresponds to the setting level of the timer time. In Fig. 11, the downward direction indicates the "forward direction" and the upward direction indicates the "backward direction".

[0125] The setting level of the heating power setting has, for example, nine setting values from "1", "2", "3",... to "8", and "9". The entire length between left and right of the region surface of the two-dimensional operation position detecting means 4 is divided into nine portions and the heating powers "1" to "9" are respectively assigned to the divided portions.

[0126] When the user's finger 10 touches a position of a slide start point 15 on the region surface of the two-dimensional operation position detecting means 4, the second setting level displaying means 2a displays a setting value assigned in advance in accordance with the operation position (in Fig. 11, the setting value "6"). The setting value is determined at any positions on the region surface from a position for the leftward/rightward setting parameter corresponding to the heating power setting.

[0127] If the finger 10 is separated when the movement distance of sliding of the finger 10 is less than a second predetermined value from the slide start point 15, the setting level of the heating power setting is fixed to and input as "6". Therefore, when the movement distance of sliding of the finger 10 is less than the second predetermined value in the two-dimensional operation position detecting means 4 of this embodiment, one-dimensional input is performed only for the leftward/rightward setting parameter. The leftward/rightward setting parameter and the forward/backward setting parameter may correspond to respective different setting levels, and the same effect can be produced regardless of which setting parameter is only input when the movement distance is less than the second predetermined value.

8.2. Operation of Operation/Display Unit of Heating Cooker According to Eighth Embodiment

[0128] Description will be made of an operation of the operation/display unit of the heating cooker when the slide operation is further performed. In the basic operation of the slide operation with the finger 10 kept in contact with the region surface, the second setting level displaying means 2a displays the setting level of the setting parameter corresponding to a direction of sliding of the finger 10 having a larger movement amount between a movement amount in the direction corresponding to one setting parameter and a movement amount in the direction corresponding to the other setting parameter orthogonally crossing therewith, and a value of the setting level is changed and displayed depending on the movement distance and the movement direction of the finger 10.

[0129] Describing a specific example, it is assumed that while the heating power setting value "5" is displayed on the second setting level displaying means 2a, the user's finger 10 first touches the position of the slide start

point 15 and moves to a slide via-point 17 along a locus indicated by a thick dotted line (of Fig. 11) without separating the finger 10 from the region surface and that the movement distance is already equal to or greater than the second predetermined value when the slide via-point 17 is reached. The movement distance may be measured as a linear distance between the slide start point 15 and the position currently touched by the finger 10, i.e., the slide via-point 17, or may be measured as a distance along the locus. It is assumed that the positional relation between the slide start point 15 and the slide via-point 17 represents rightward movement of a distance X_m in the left-right direction and backward movement of a distance Y_m in the front-back direction.

[0130] In Fig. 11, a thin dotted line indicates a movement distance equal amount line 18 on which the movement distances become equal between the rightward direction and the backward direction when the slide start point 15 is defined as the base point in the case of movement in the direction of increasing both the forward/backward and leftward/rightward setting levels. In Fig. 11, since the distance $X_m >$ the distance Y_m is satisfied and the slide via-point 17 is located in a lower right region relative to the movement distance equal amount line 18, the setting level of the heating power is displayed on the second setting level displaying means 2a depending on the rightward movement having a longer movement distance. In particular, a change amount "+1" corresponding to the movement distance X_m is applied to the displayed heating power setting level, and "6" acquired by adding the change amount "+1" to the original heating power setting level "5" is displayed on the second setting level displaying means 2a. If the finger 10 is separated in this state, the heating power setting level is changed in accordance with the displayed heating power setting level "6".

[0131] On the other hand, it is assumed that the finger 10 is further continuously moved to the position of a slide end point 16 without separating the finger 10 at the slide via-point 17. When a locus indicated by the thick dotted line moves across the movement distance equal amount line 18 from the lower right region to an upper left region, a backward movement distance becomes longer than a rightward movement distance and, therefore, the display of the second setting level displaying means 2a changes from the setting level "6" of the heating power that is the leftward/rightward setting parameter displayed up to this point, to the display indicative of the setting level of the timer time that is the forward/backward setting parameter, for example, "30". It is noted that "30" displayed as the setting level of the timer time is determined depending on the backward movement amount from the slide start point 15 when the locus of sliding of the finger 10 crosses the movement distance equal amount line 18. When the sliding is continued in this state to the slide end point 16, the positional relation between the slide start point 15 and the slide end point 16 represents rightward movement of a distance X_e in the left-right direction and back-

ward movement of a distance Y_e in the front-back direction. Since the position of the slide end point 16 is on the upper left side relative to the movement distance equal amount line 18 and, therefore, the distance $X_e <$ the distance Y_e is satisfied, a change amount "+70" corresponding to the backward movement distance Y_e , i.e., a longer movement distance, is applied and the second setting level displaying means 2a displays "70" acquired by adding the change amount "+70" to the initial value "0" of the timer time.

[0132] In this way, the two-dimensional operation position detecting means 4 two-dimensionally detects an operation on the region surface. In other words, the two-dimensional operation position detecting means 4 enables selective operation of two setting parameters through one operation and, therefore, a plurality of setting parameters can be input through an intuitive simple operation.

[0133] When the movement distance of the slide operation is less than the second predetermined value, the two-dimensional operation position detecting means 4 performs one-dimensional input using only the leftward/rightward setting parameter. In this case, the one-dimensional input may be performed for the other setting parameter arranged in the front-back direction or another direction and the input may be performed for any setting level uniquely determined depending on a position in a predetermined one direction.

[0134] The predetermined one direction may be determined depending on a position at which the operated position is located and, for example, the setting parameter having a displayed scale position closer to the operated position may be operated. In this case, desirably, scales may be crossed at the respective singular points of a plurality of the setting parameters.

[0135] Specifically, assuming that the leftward/rightward setting parameter is the heating power while the forward/backward setting parameter is the timer time as in this embodiment depicted in Fig. 11, the singular points of the respective setting parameters are a lowest heating power level "1" of the heating power and "0" of the timer time (i.e., at the time of setting without timer time). Since the position of the heating power "1" is the left end and the position of the timer time "0" is the front end, when the scales are crossed at the respective singular points, the scale of the left-right axis and the scale of the front-back axis are positioned at the front end and the left end, respectively, and are crossed with each other at a position in a left front corner portion. In this case, for example, assuming that the region surface is square, regions of positions closer to the respective scales can be divided by a straight line connecting the left front corner portion and a right back corner portion such that the right front region relative to the straight line can be set to a setting region of the heating power that is the left-right setting parameter, while the left back region relative to the straight line can be set to a setting region of the timer time that is the front-back setting parameter.

[0136] If the singular points of the two setting parameters are both located at an end portion, the shape of the combined scale is an L-shape. For example, if either of the setting parameters is a parameter that can be set to be both positive and negative, since the singular point is "0" and is not located at an end portion, the shape of scales crossing each other at the singular points is a T-shape. If both of the two setting parameters have the singular points at positions other than the end portions, the shape is a cross shape.

8.3. Conclusion of Eighth Embodiment

[0137] The heating cooker of this embodiment has the two-dimensional operation position detecting means two-dimensionally disposed and detecting a position operated by a user's finger and the second setting level displaying means displaying each of the setting levels of a plurality of the setting parameters including at least the heating power and, if the second setting level displaying means displays at least one setting level of a plurality of the setting parameters and the distance of sliding of the user's finger within the range of the two-dimensional operation position detecting means is less than the second predetermined value, the heating cooker displays on the second setting level displaying means the setting level uniquely determined depending on a position in an operated predetermined one direction of the two-dimensional operation position detecting means, so as to display the setting level of the setting parameter corresponding to a direction of sliding of the user's finger within the range of the two-dimensional operation position detecting means having a larger movement amount between a movement amount in the predetermined one direction and a movement amount in the other direction orthogonally crossing the predetermined one direction and to change the displayed setting level depending on the movement distance and the movement direction of the finger.

[0138] In this way, a plurality of the setting parameters can selectively be set and changed depending on an operation direction in the operation of the two-dimensionally disposed two-dimensional operation position detecting means.

Ninth Embodiment

9.1. Configuration of Operation/Display Unit of Heating Cooker According to Ninth Embodiment

[0139] A configuration of the operation/display unit of the heating cooker 5 according to the ninth embodiment is substantially the same as the heating cooker 5 according to the first embodiment and, therefore, a difference between both will hereinafter mainly be described.

9.2. Operation of Operation/Display Unit of Heating Cooker According to Ninth Embodiment

[0140] The operation/display unit in the heating cooker 5 according to the ninth embodiment will be described with reference to Fig. 12.

[0141] The heating cooker 5 according to the ninth embodiment is disposed with guide display indicative of the setting level at least at only one position on the operation position detecting means 1. As depicted in Fig. 12, guide display 3 is disposed at one position at the center of the operation position detecting means 1 and indicates that "5", "50 minutes", and "180 °C" are set in the case of setting the heating power, the timer time, and the temperature, respectively.

[0142] This is convenient because at the first operation at the start of heating, a user can perform the operation while checking the guide display 3 as a guide for the operation position. If a plurality of setting parameters is set by the one operation position detecting means 1, the heating cooker 5 needs the only one guide display 3 and therefore can be prevented from being complicated.

[0143] The guide display 3 according to this embodiment may be disposed in the vicinity of the two-dimensional operation position detecting means 4 depicted in Fig. 10.

9.3. Conclusion of Ninth Embodiment

[0144] The heating cooker 5 according to the ninth embodiment has the guide display indicative of the setting level disposed at only one position on the operation position detecting means 1. The reason why the one guide display 3 is sufficient (works) is that the embodiments according to this disclosure only require display of an approximate position of a rough setting value at the first operation. In other words, the reason is that it is not necessary to indicate a highly accurate and correct absolute position from the start. This is because a user can subsequently make a fine adjustment through a slide operation while viewing the display of the first setting level displaying means 2. In this case, a value displayed as the guide display 3 is preferably a setting value highly frequently used in general. In this embodiment, the heating power "5" is the setting for medium heating power suitable for starting heating and the temperature "180 °C" is the most frequently used temperature for cooking of fried food or grilled food.

[0145] A control unit (not depicted) of the heating cooker 5 may provide control such that the heating cooker 5 starts heating output in accordance with the level of the setting parameter displayed by the first setting level displaying means 2 when the user separates the finger from the operation position detecting means 1. This enables the user to easily start heating with desired setting while viewing the display of the first setting level displaying means 2. For example, since the setting value is not fixed as long as the slide operation is continued even if the

display of the setting level exceeds a target value, the user can perform the slide operation at ease.

INDUSTRIAL APPLICABILITY

[0146] Since the heating cooker according to this disclosure allows a user to quickly and accurately set the setting parameter such as heating power and temperature, the present invention is widely applicable to general devices to which a user inputs a setting value.

EXPLANATIONS OF LETTERS OR NUMERALS

[0147]

- 1 operation position detecting means
- 2 first setting level displaying means
- 2a second setting level displaying means
- 3 guide display
- 4 two-dimensional operation position detecting means
- 5 heating cooker
- 6 operation/display unit

Claims

1. A heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and
a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power, wherein when the operation position detecting means is operated first at start of heating, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means,
when the operation position detecting means is operated after start of heating, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a movement distance and a movement direction of sliding of the finger along the operation position detecting means regardless of the setting level determined in the operation position detecting means at the time of a first operation at start of heating.

2. The heating cooker of claim 1, wherein when the first operation is performed at start of heating, detection of an operation position is made effective only in a partial range of the operation position detecting means, and wherein when a slide operation is con-

tinuously performed without separating the finger from the first operation at start of heating, detection of a movement distance of the finger is made effective in a range wider than the partial range of the operation position detecting means.

3. The heating cooker of claim 1 or 2, wherein when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is larger than an increase amount of the level of the setting parameter corresponding to a movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

4. The heating cooker of claim 3, wherein when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, if a movement distance of sliding of the finger is shorter than a predetermined distance, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is equal to an increase amount of the setting level of the setting parameter corresponding to the same movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

5. A heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and
a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power, wherein when the first setting level displaying means displays a setting level of any of the setting parameters,
if a distance of sliding of the user's finger along the operation position detecting means is less than a first predetermined value, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and
if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value,

the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means.

6. The heating cooker of claim 5, wherein when the first setting level displaying means does not display the setting level of the setting parameter, if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker disables the operation so as not to display the setting level on the first setting level displaying means.
7. The heating cooker of claim 5, wherein when the first setting level displaying means does not display the setting level of the setting parameter, if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on a position initially touched by the user's finger or depending on a position at which the distance of sliding becomes equal to or greater than the first predetermined value, and changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding along the operation position detecting means by using the position initially touched by the user's finger as a base point or by using the position at which the distance of sliding becomes equal to or greater than the first predetermined value as a base point.
8. The heating cooker of claim 5, wherein the first setting level displaying means displays a setting level of any of a plurality of setting parameters including at least heating power, and wherein if a distance of sliding of the user's finger along the

operation position detecting means is equal to or greater than the first predetermined value, the setting level of the setting parameter displayed is a setting level of the setting parameter different from the setting level displayed if the distance is less than the first predetermined value.

9. The heating cooker of claim 5 or 7, wherein when the user's finger is slid along the operation position detecting means from one arbitrary point to another point on the operation position detecting means, a change amount of the setting value of the setting parameter displayed on the first setting level displaying means is made smaller than a difference in the setting parameter uniquely determined depending on an operated position of the operation position detecting means between a setting level assigned to the one point for display and a setting level assigned to the other point for display.
10. The heating cooker of any one of claims 1 to 9, wherein a guide display indicative of a setting level is disposed at only one position except the vicinities of end portions of the operation position detecting means.
11. A heating cooker comprising:
 - a two-dimensional operation position detecting means two-dimensionally disposed and detecting a position operated by a user's finger; and
 - a second setting level displaying means displaying each of setting levels of a plurality of setting parameters including at least heating power, wherein when the second setting level displaying means displays at least one setting level of the plurality of the setting parameters, if a distance of sliding of the user's finger on a predetermined region surface of the two-dimensional operation position detecting means is less than a second predetermined value, the heating cooker displays on the second setting level displaying means a setting level uniquely determined depending on a position in an operated predetermined one direction of the two-dimensional operation position detecting means, and if a distance of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means is equal to or greater than the second predetermined value, the heating cooker displays a setting level of the setting parameter corresponding to a direction of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means having a larger movement amount between a movement amount in the predetermined one di-

rection and a movement amount in the other direction orthogonally crossing the predetermined one direction and changes the displayed setting level depending on a movement distance and a movement direction of the finger.

12. The heating cooker of any one of claims 1 to 11, further comprising a control unit controlling heating output, wherein the control unit controls the heating output in accordance with the setting level of the setting parameter displayed by the first setting level displaying means or the second setting level displaying means when the user separates the finger from the operation position detecting means.

Amended claims under Art. 19.1 PCT

1. A heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and
a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power, wherein when the operation position detecting means is operated first at start of heating, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means,
when the operation position detecting means is operated after start of heating, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means, by using as a starting point the setting level displayed on the first setting level displaying means before the operation of the operation position detecting means, depending on a movement distance and a movement direction of sliding of the finger along the operation position detecting means regardless of the setting level determined in the operation position detecting means at the time of a first operation at start of heating.

2. The heating cooker of claim 1, wherein when the first operation is performed at start of heating, detection of an operation position is made effective only in a partial range of the operation position detecting means, and wherein when a slide operation is continuously performed without separating the finger from the first operation at start of heating, detection of a movement distance of the finger is made effective in a range wider than the partial range of the

operation position detecting means.

3. The heating cooker of claim 1 or 2, wherein when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is larger than an increase amount of the level of the setting parameter corresponding to a movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

4. The heating cooker of claim 3, wherein when the finger is slid along the operation position detecting means in a direction of decreasing the setting level of the setting parameter displayed by the first setting level displaying means, if a movement distance of sliding of the finger is shorter than a predetermined distance, a decrease amount of the level of the setting parameter corresponding to a movement distance in this case is equal to an increase amount of the setting level of the setting parameter corresponding to the same movement distance when the finger is slid along the operation position detecting means in a direction of increasing the setting level of the setting parameter displayed by the first setting level displaying means.

5. A heating cooker comprising:

an operation position detecting means one-dimensionally disposed and detecting a position operated by a user's finger; and
a first setting level displaying means displaying a setting level of one or more setting parameters including at least heating power, wherein when the first setting level displaying means displays a setting level of any of the setting parameters,
if a distance of sliding of the user's finger along the operation position detecting means is less than a first predetermined value, the heating cooker displays on the first setting level displaying means a setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and
if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker changes the setting level of the setting parameter displayed on the first setting level displaying means, by using as a starting point the setting level displayed on the first

setting level displaying means before the operation of the operation position detecting means, depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means.

6. The heating cooker of claim 5, wherein when the first setting level displaying means does not display the setting level of the setting parameter, if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker disables the operation so as not to display the setting level on the first setting level displaying means.
7. The heating cooker of claim 5, wherein when the first setting level displaying means does not display the setting level of the setting parameter, if a distance of sliding of the user's finger along the operation position detecting means is less than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on an operated position of the operation position detecting means, and if a distance of sliding of the user's finger along the operation position detecting means is equal to or greater than the first predetermined value, the heating cooker displays on the first setting level displaying means the setting level of the setting parameter uniquely determined depending on a position initially touched by the user's finger or depending on a position at which the distance of sliding becomes equal to or greater than the first predetermined value, and changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding along the operation position detecting means by using the position initially touched by the user's finger as a base point or by using the position at which the distance of sliding becomes equal to or greater than the first predetermined value as a base point.
8. The heating cooker of claim 5, wherein the first setting level displaying means displays a setting level of any of a plurality of setting parameters including at least heating power, and wherein if a distance of sliding of the user's finger along the operation position detecting means is equal to or

greater than the first predetermined value, the setting level of the setting parameter displayed is a setting level of the setting parameter different from the setting level displayed if the distance is less than the first predetermined value.

9. The heating cooker of claim 5 or 7, wherein when the user's finger is slid along the operation position detecting means from one arbitrary point to another point on the operation position detecting means, a change amount of the setting value of the setting parameter displayed on the first setting level displaying means is made smaller than a difference in the setting parameter uniquely determined depending on an operated position of the operation position detecting means between a setting level assigned to the one point for display and a setting level assigned to the other point for display.
10. The heating cooker of any one of claims 1 to 9, wherein a guide display indicative of a setting level is disposed at only one position except the vicinities of end portions of the operation position detecting means.
11. A heating cooker comprising:
 - a two-dimensional operation position detecting means two-dimensionally disposed and detecting a position operated by a user's finger; and
 - a second setting level displaying means displaying each of setting levels of a plurality of setting parameters including at least heating power, wherein when the second setting level displaying means displays at least one setting level of the plurality of the setting parameters, if a distance of sliding of the user's finger on a predetermined region surface of the two-dimensional operation position detecting means is less than a second predetermined value, the heating cooker displays on the second setting level displaying means a setting level uniquely determined depending on a position in an operated predetermined one direction of the two-dimensional operation position detecting means, and if a distance of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means is equal to or greater than the second predetermined value, the heating cooker displays a setting level of the setting parameter corresponding to a direction of sliding of the user's finger on the predetermined region surface of the two-dimensional operation position detecting means having a larger movement amount between a movement amount in the predetermined one direction and a movement amount in the other di-

rection orthogonally crossing the predetermined one direction and changes the displayed setting level depending on a movement distance and a movement direction of the finger.

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12. The heating cooker of any one of claims 1 to 11, further comprising a control unit controlling heating output, wherein the control unit controls the heating output in accordance with the setting level of the setting parameter displayed by the first setting level displaying means or the second setting level displaying means when the user separates the finger from the operation position detecting means.

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Statement under Art. 19.1 PCT

In claim 1, the terms "changes the setting level of the setting parameter displayed on the first setting level displaying means" are amended to the ones "changes the setting level of the setting parameter displayed on the first setting level displaying means, by using as a starting point the setting level displayed on the first setting level displaying means before the operation of the operation position detecting means". This amendment is filed for the purpose of making clear the difference between the present invention and the cited documents, and is based on the paragraphs 0041-0044 in the specification and Fig. 2.

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In claim 5, the terms "changes the setting level of the setting parameter displayed on the first setting level displaying means depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means" are amended to the ones "changes the setting level of the setting parameter displayed on the first setting level displaying means, by using as a starting point the setting level displayed on the first setting level displaying means before the operation of the operation position detecting means, depending on a distance and a movement direction of sliding of the user's finger along the operation position detecting means". This amendment is filed for the purpose of making clear the difference between the present invention and the cited documents, and is based on the paragraphs 0073-0076 in the specification and Fig. 7.

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Fig. 1A

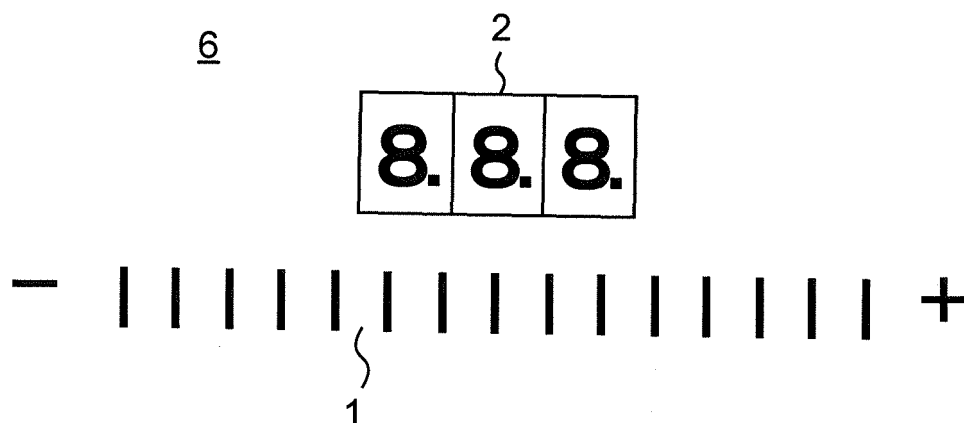


Fig. 1B

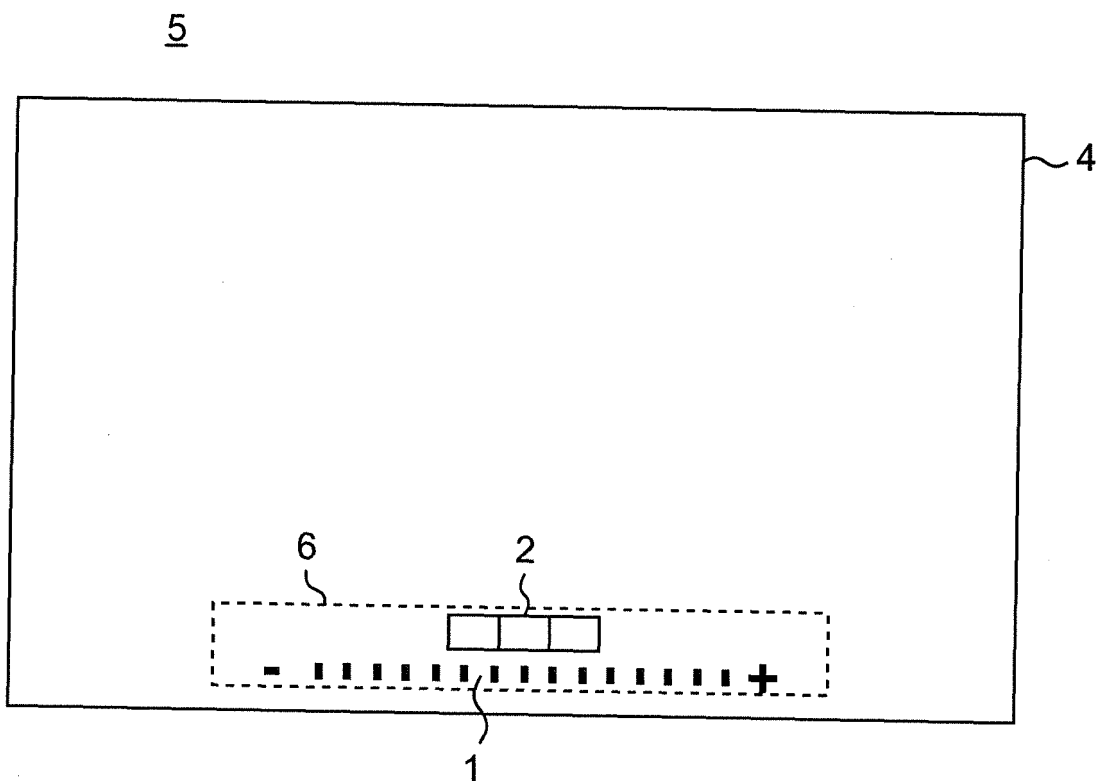


Fig.2

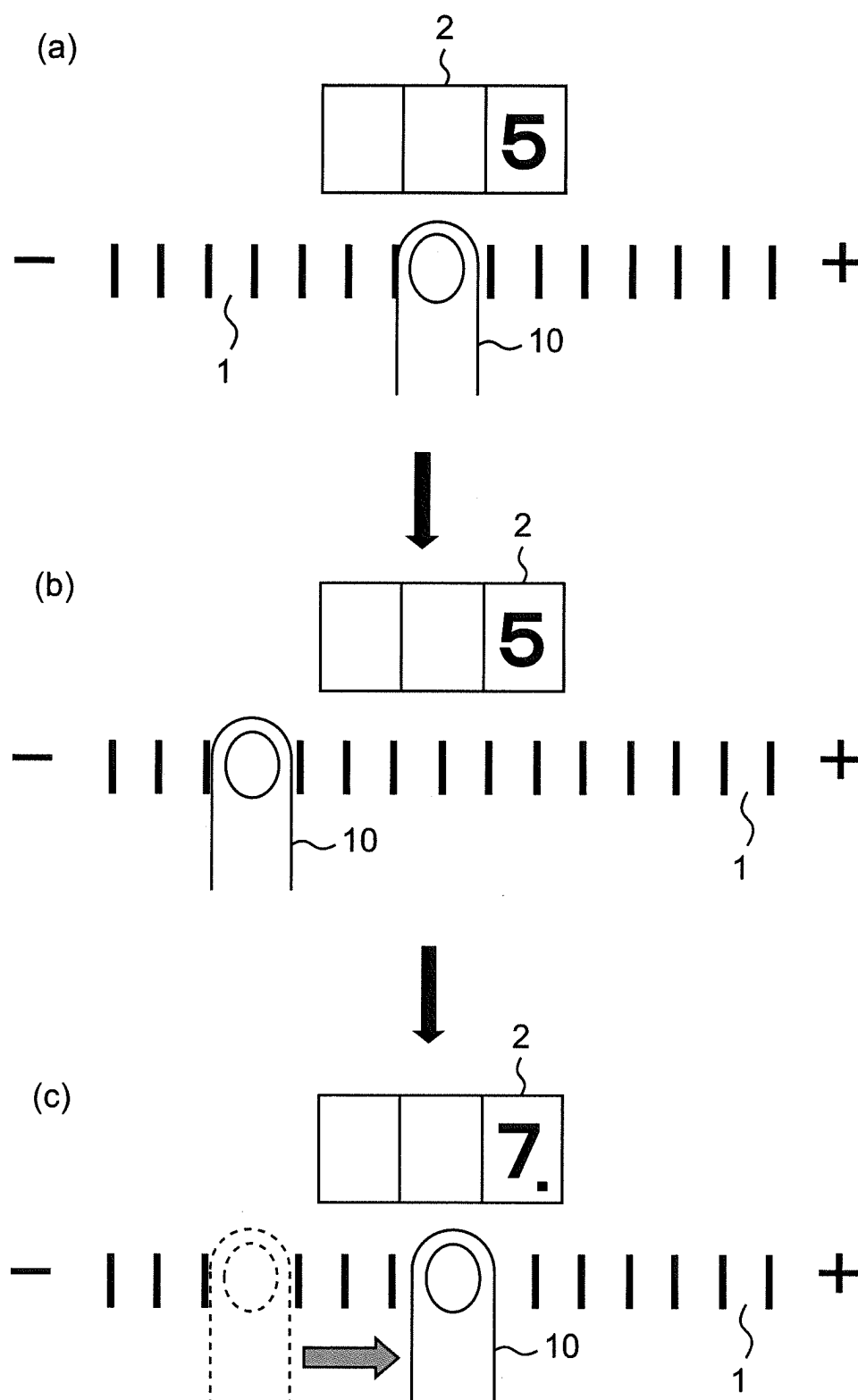


Fig.3

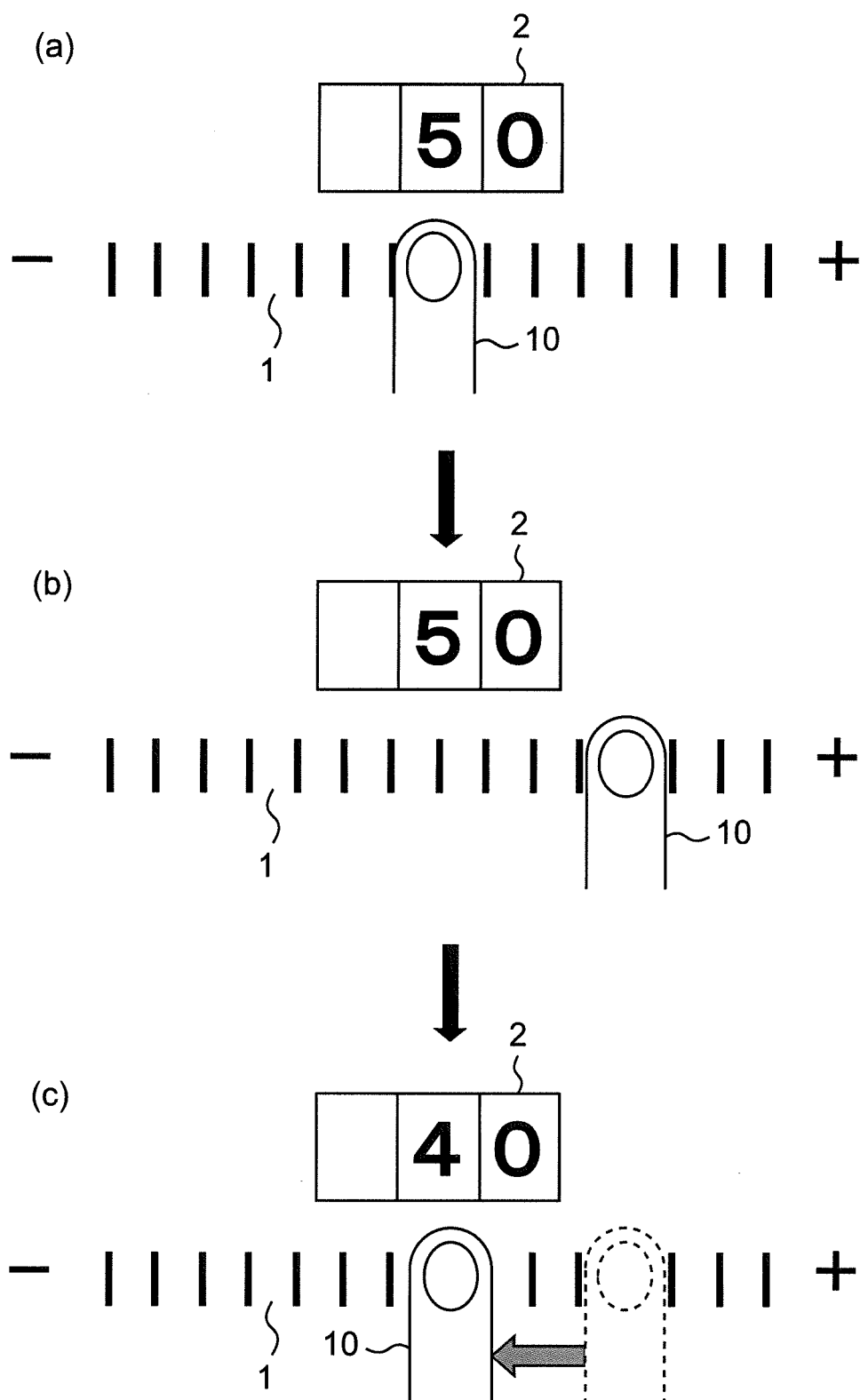


Fig. 4

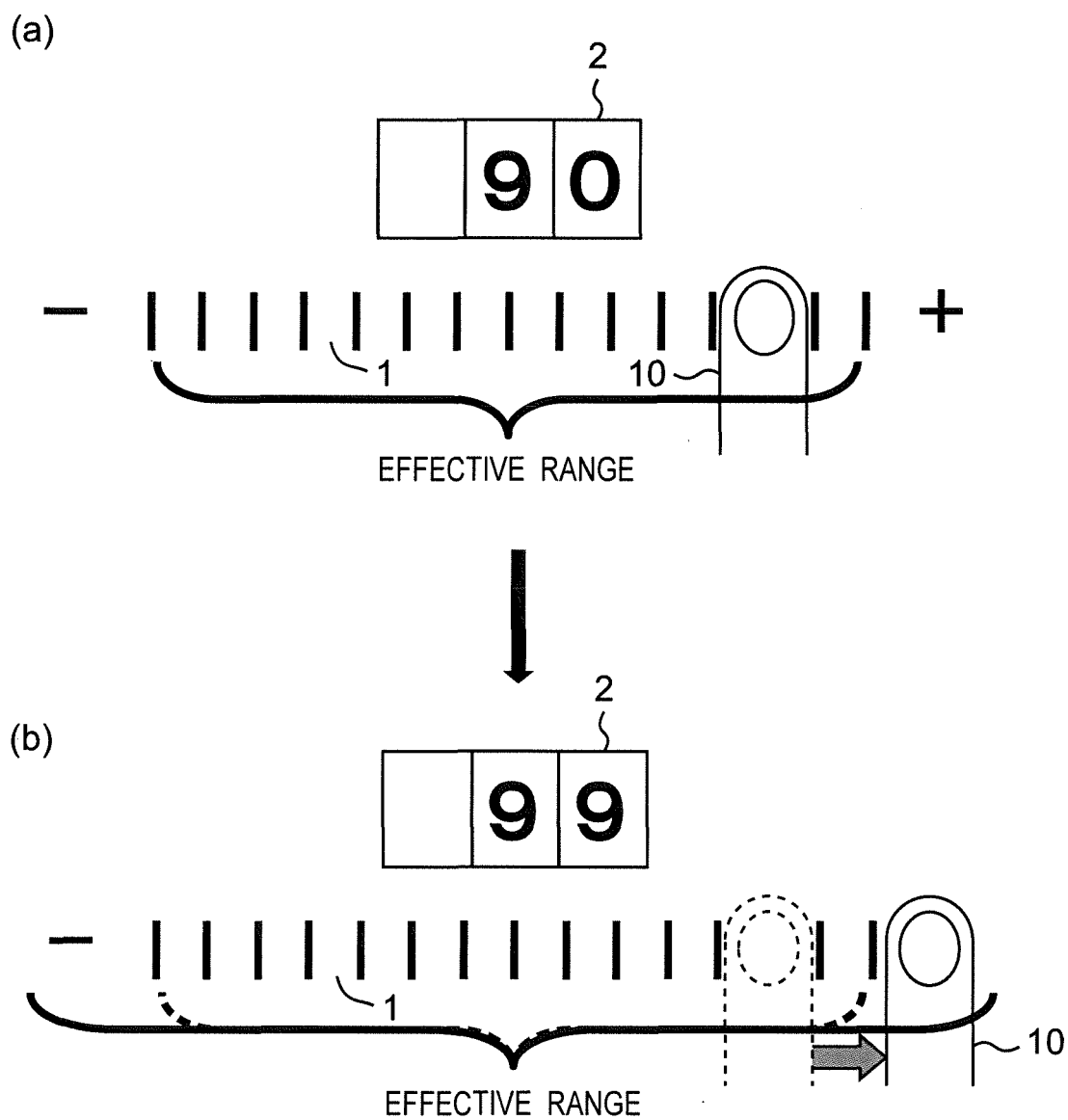


Fig.5A

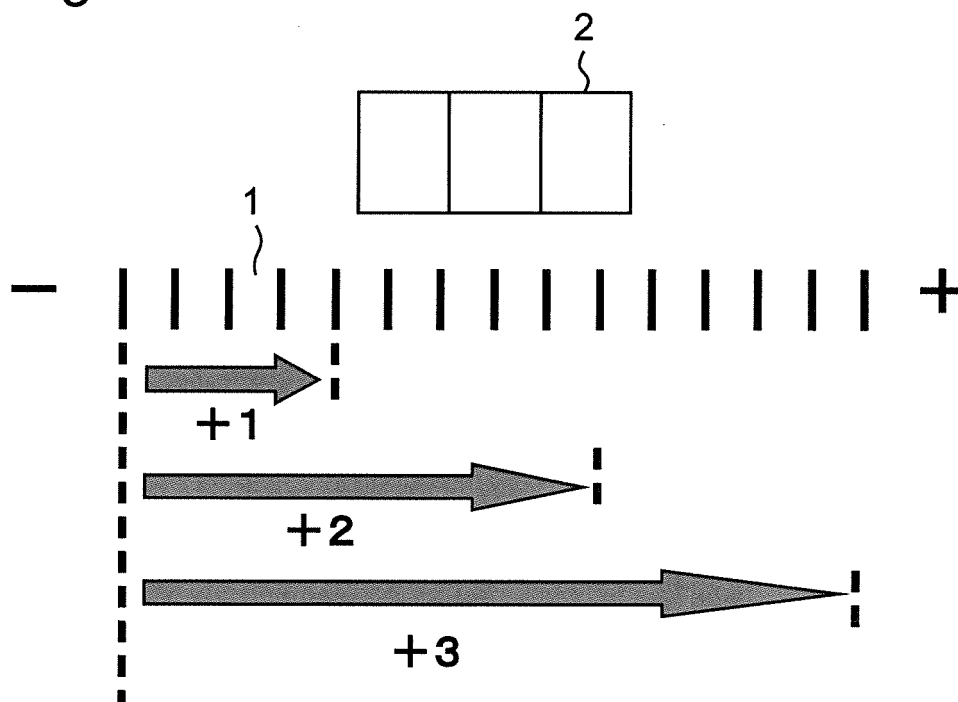


Fig.5B

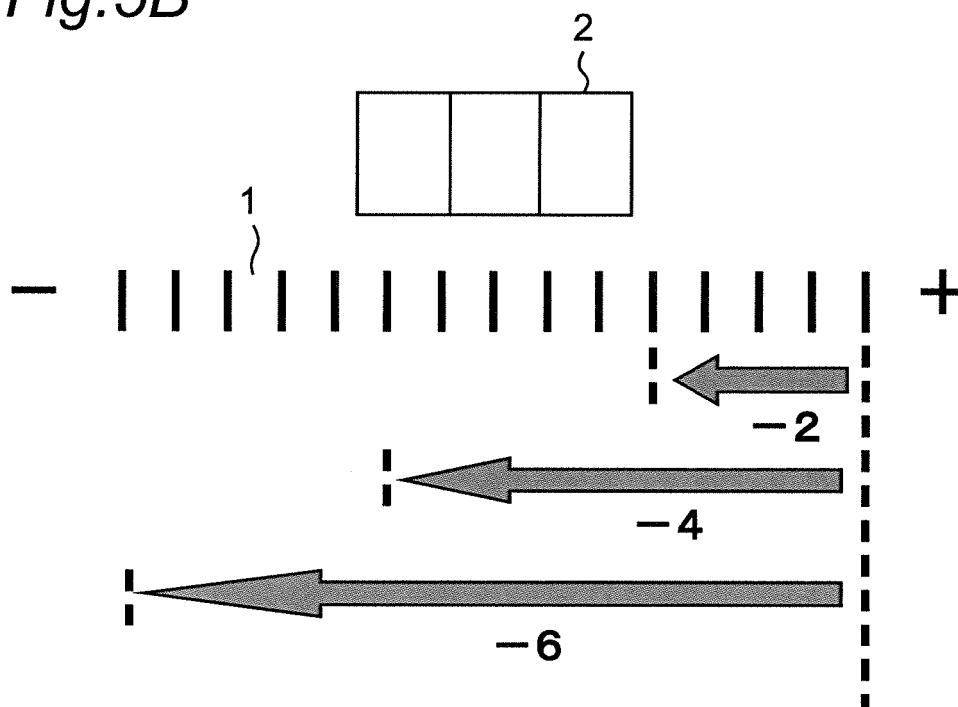


Fig.6A

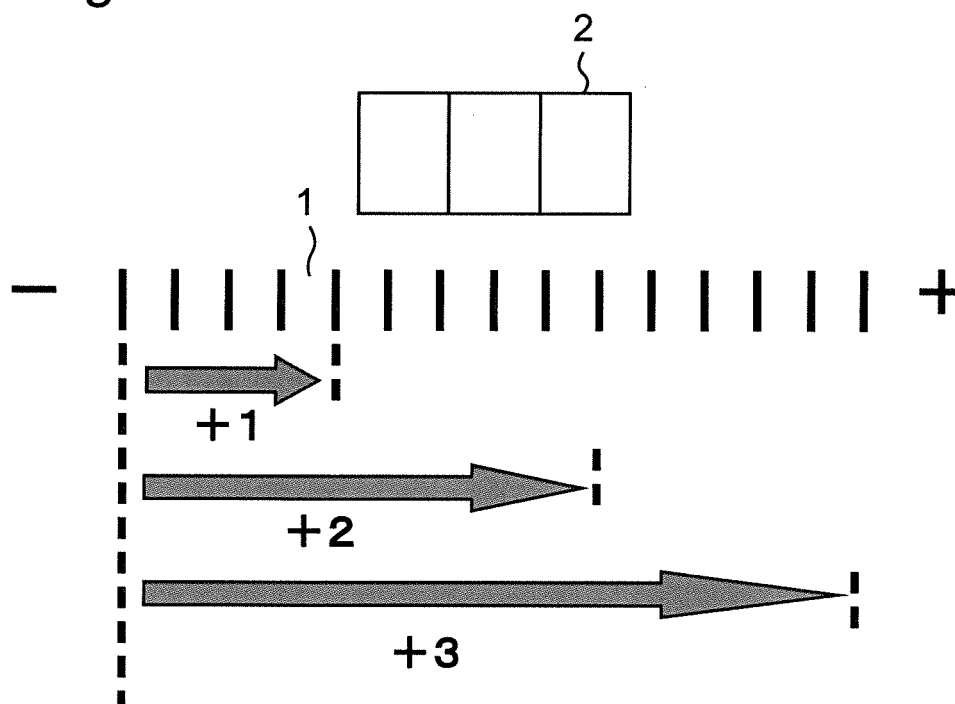


Fig.6B

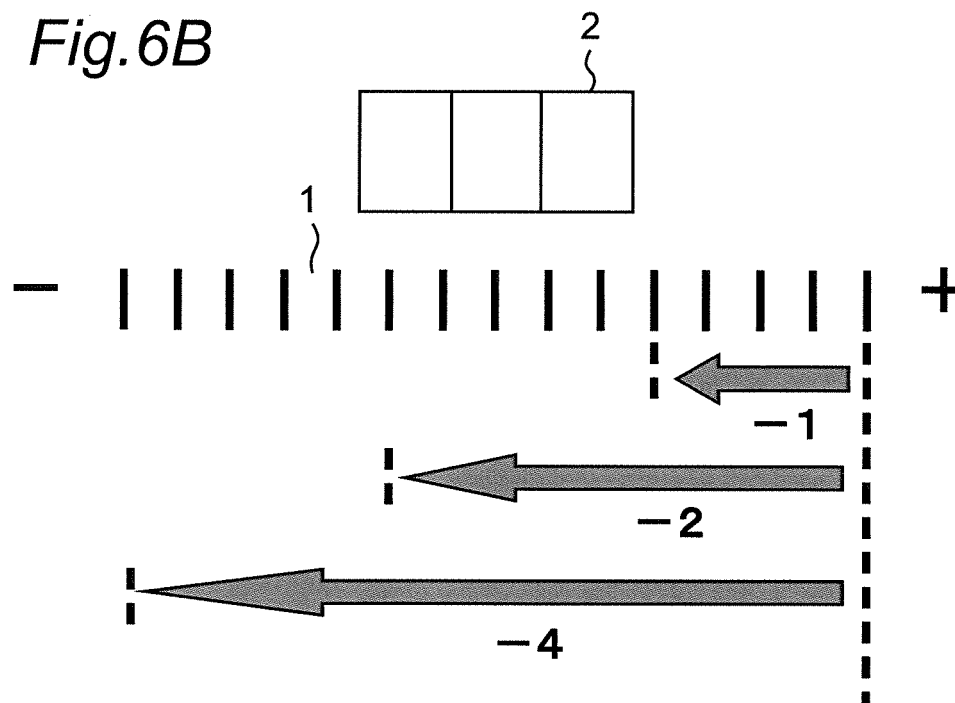


Fig.7A

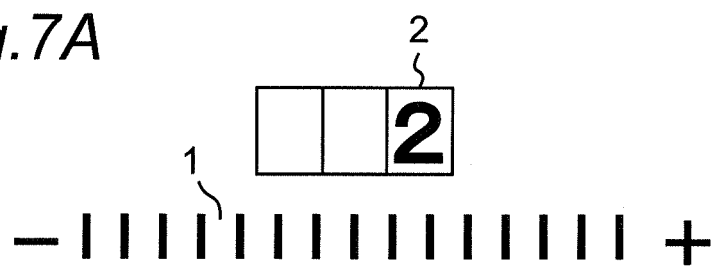


Fig.7B

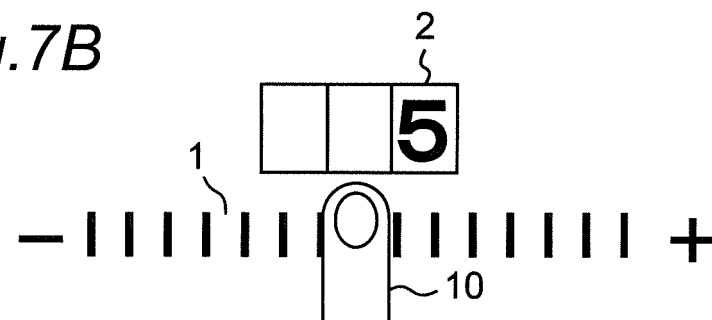


Fig.7C

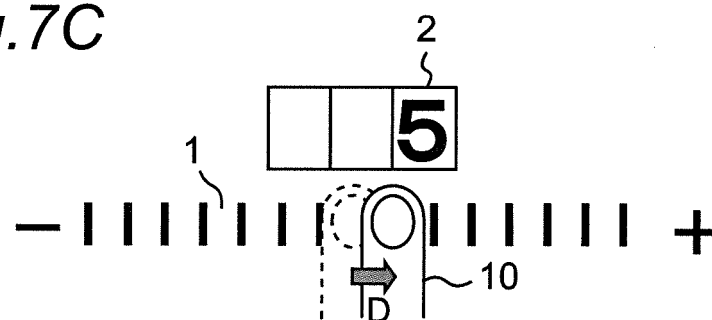


Fig.7D

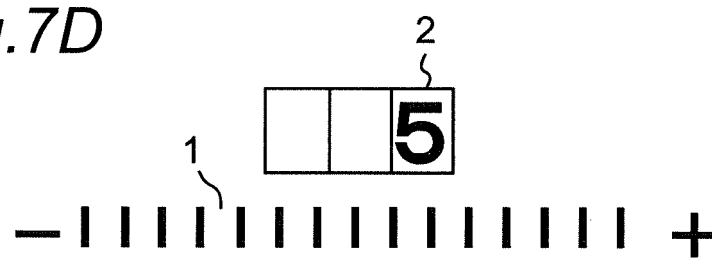


Fig.7E

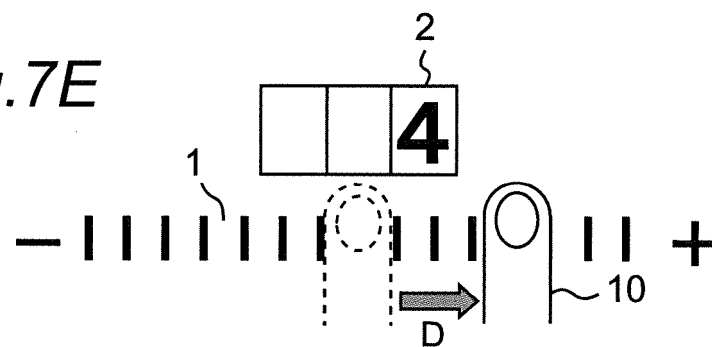


Fig.8A

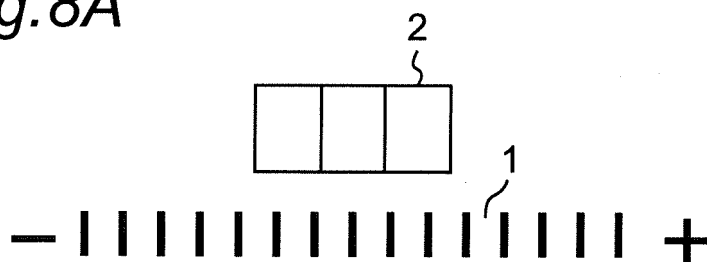


Fig.8B

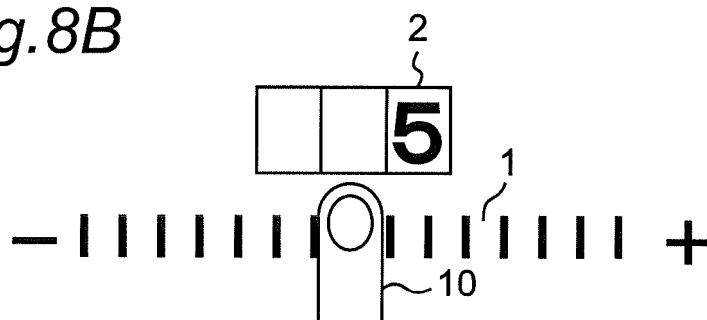


Fig.8C

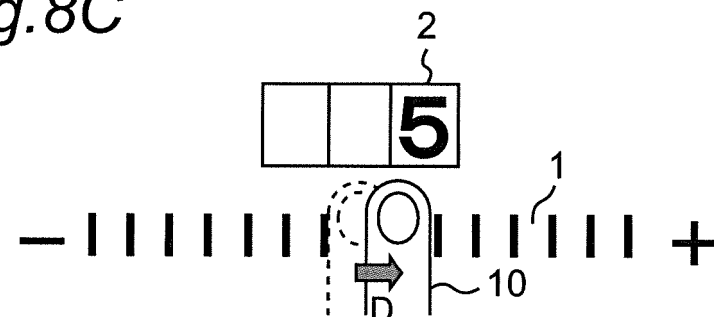


Fig.8D

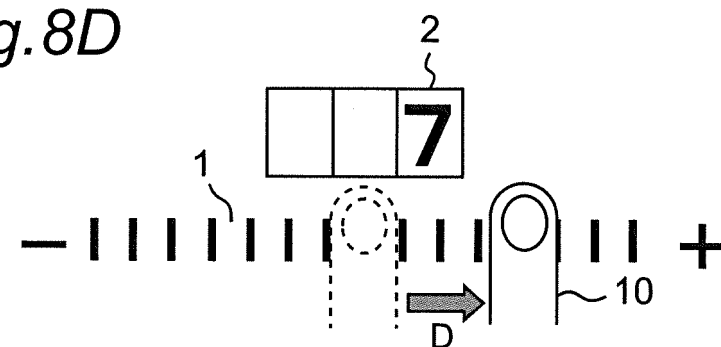


Fig.9A

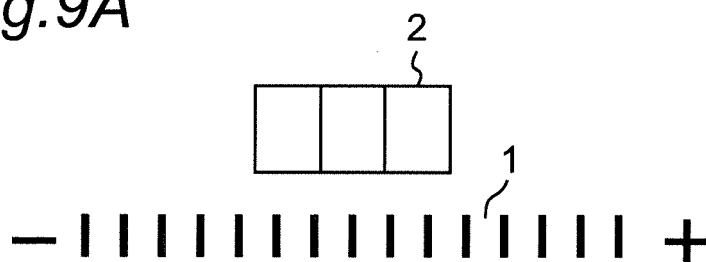


Fig.9B

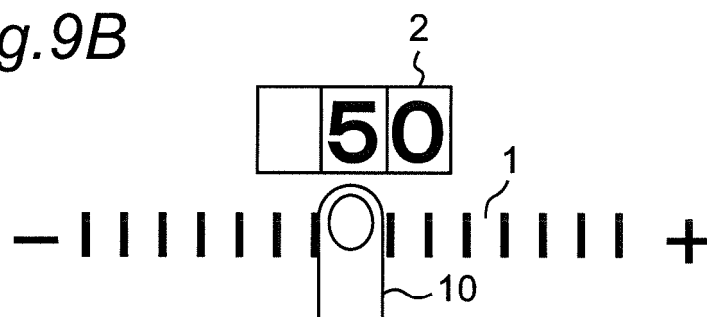


Fig.9C

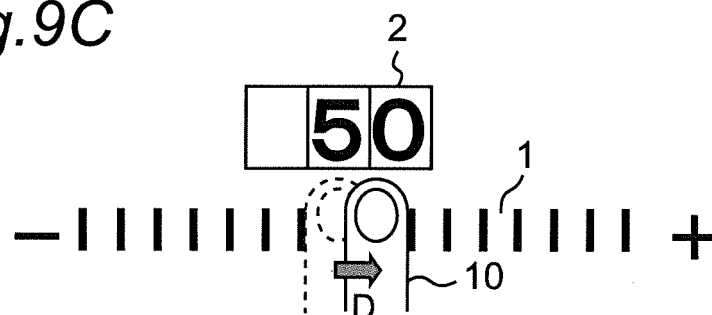


Fig.9D

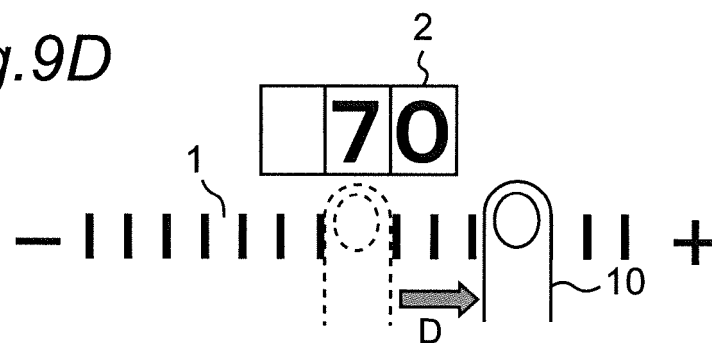


Fig. 10A

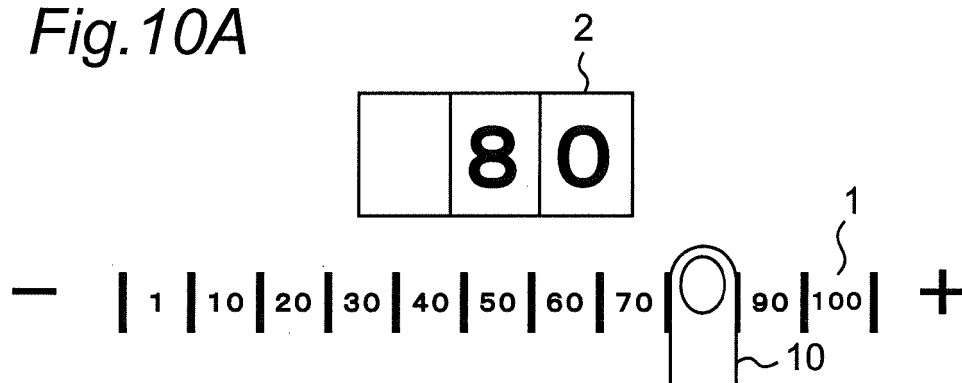


Fig. 10B

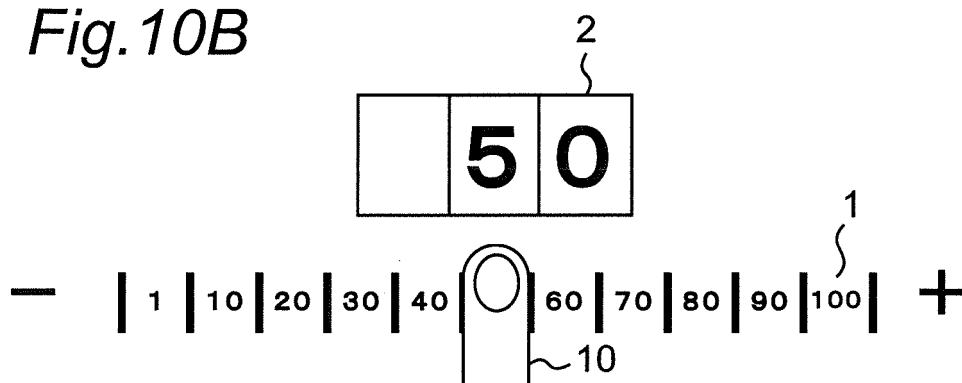


Fig. 10C

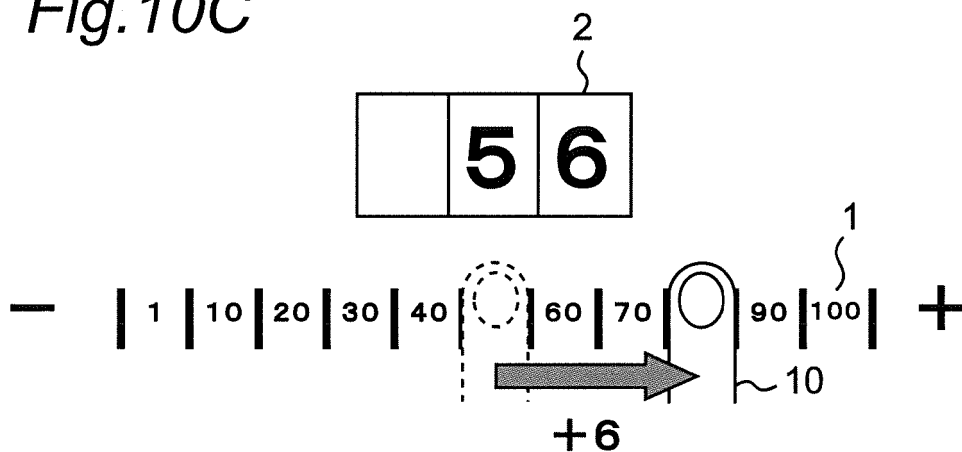


Fig.11

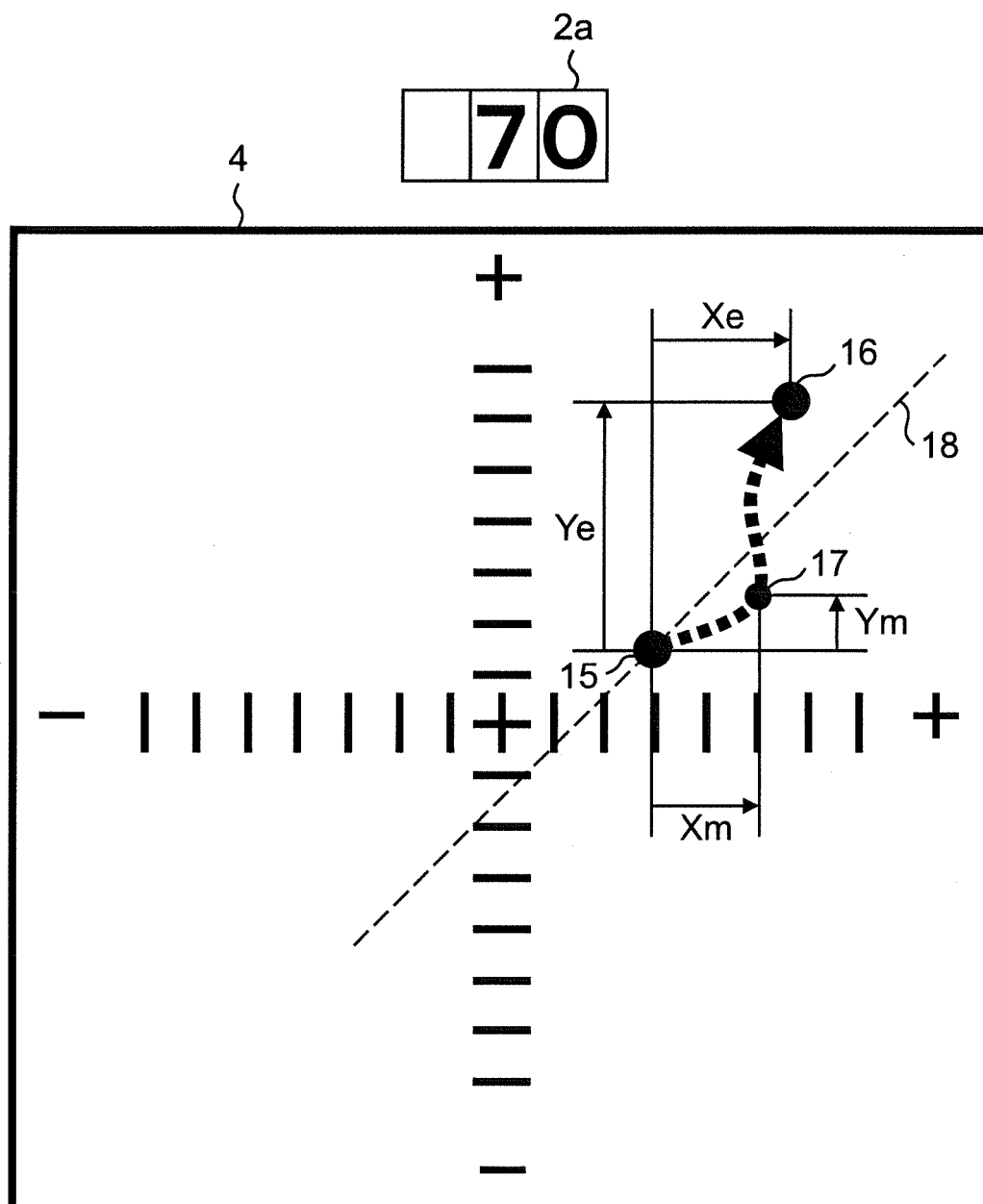


Fig. 12

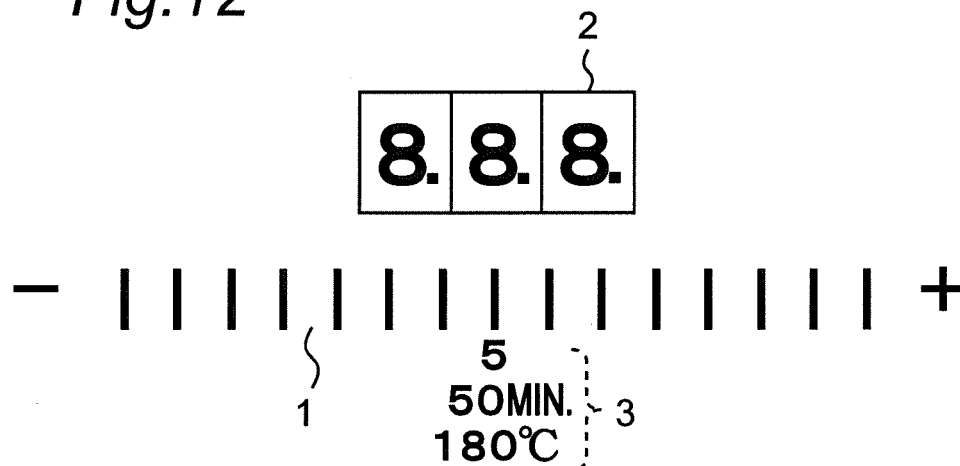
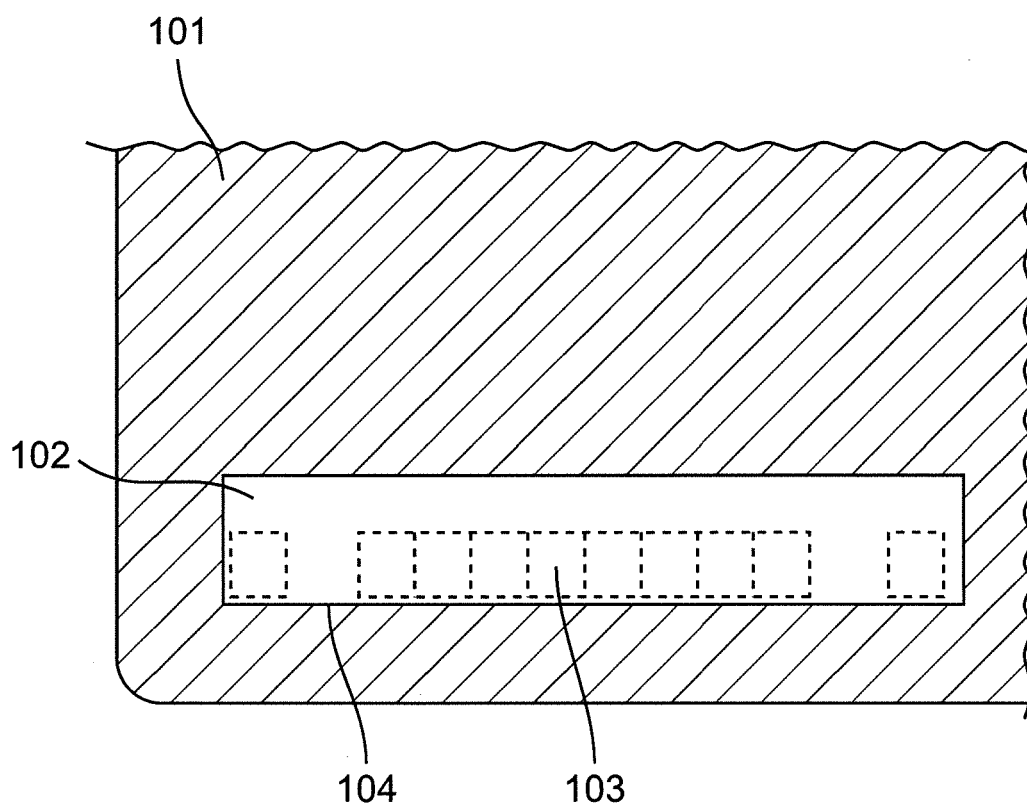


Fig. 13



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/002283

A. CLASSIFICATION OF SUBJECT MATTER

F24C15/00(2006.01)i, F24C7/02(2006.01)i, H05B6/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24C15/00, F24C7/02, H05B6/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2014

Kokai Jitsuyo Shinan Koho 1971-2014 Toroku Jitsuyo Shinan Koho 1994-2014

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2008-141733 A (Philipp Harald), 19 June 2008 (19.06.2008), paragraphs [0053] to [0058]; fig. 2B & GB 2443296 A & DE 102007049559 A1	1, 2, 5, 7, 9, 12
Y	US 2008/0217320 A1 (BSH BOSCH UND SIEMENS HAUSGERATE GMBH), 11 September 2008 (11.09.2008), entire text; all drawings & EP 1920195 A & WO 2007/023067 A1 & DE 102005040346 A1 & AT 514040 T & ES 2366446 T	1, 2, 5, 7, 9, 12
A	JP 2010-210175 A (Panasonic Corp.), 24 September 2010 (24.09.2010), paragraphs [0056], [0060] to [0070] (Family: none)	1-12

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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Date of the actual completion of the international search
16 July, 2014 (16.07.14)Date of mailing of the international search report
29 July, 2014 (29.07.14)Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/002283

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005-265216 A (Toshiba Corp.), 29 September 2005 (29.09.2005), paragraphs [0032] to [0040] (Family: none)	1-12
A	JP 2005-317237 A (Matsushita Electric Industrial Co., Ltd.), 10 November 2005 (10.11.2005), paragraph [0029]; fig. 10 (Family: none)	1-12
A	WO 2006/133976 A1 (BSH BOSCH UND SIEMENS HAUSGERATE GMBH), 21 December 2006 (21.12.2006), entire text; fig. 1, 2 & EP 1893919 A & DE 102005027199 A1	1-12

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2009054331 A [0005]