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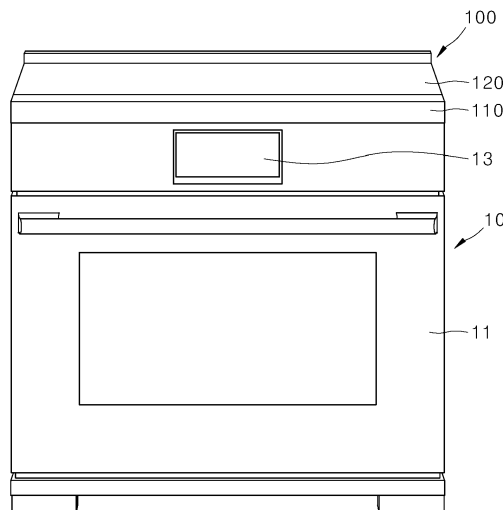
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(54) **COOKING APPARATUS**

(57) Disclosed herein is a cooking appliance. The cooking appliance includes a supporter disposed in an accommodation space surrounded by a case and a top plate, and a lighting module supported by the supporter

and configured to emit light toward the top plate, and at least a portion of the lighting module is disposed between a bottom portion of the case and the supporter.

FIG. 1



**Description****TECHNICAL FIELD**

- 5   **[0001]** The present disclosure relates to a cooking appliance, and more particularly, to a cooking appliance including a cooktop.

**BACKGROUND**

- 10   **[0002]** A cooking appliance is a type of home appliance for cooking food, which is installed in a kitchen space and cooks food according to a user's intention. Such cooking appliances may be classified in various ways depending on the heat source used, the form, or the type of fuel.

- 15   **[0003]** When cooking appliances are classified according to a form in which food is cooked, they may be classified into open-type cooking appliances and closed-type cooking appliances depending on a form of a space in which food is placed. Closed-type cooking appliances include an oven, a microwave oven, and the like, and open-type cooking appliances include a cooktop, a hob, and the like.

- 20   **[0004]** Among open-type cooking appliances, a cooktop is provided to allow a cooking target contained in a cooking vessel to be heated through at least one heating zone. Such a cooktop may be provided in a form including a heating zone using electricity, or in a form including a heating zone using gas. In addition, the cooktop may be implemented alone, and may also be implemented in a form of an oven range including an oven below the cooktop.

- 25   **[0005]** As an example of a cooktop including a heating zone using electricity, there is an induction heating cooking appliance. The induction heating cooking appliance is a cooking appliance that performs a cooking function by an induction heating method. In the induction heating cooking appliance, when current is applied to a heating coil, an eddy current is generated in a cooking vessel made of a magnetic material, and food may be cooked by the cooking vessel heated due to electrical resistance of the cooking vessel to the eddy current.

- 30   **[0006]** Such an induction heating cooking appliance does not require combustion of gas and thus does not generate combustion exhaust gas. In addition, the induction heating cooking appliance allows heat to be generated directly in the vessel itself, thereby minimizing a transfer process through radiation or conduction of heat, so that a cooking target may be heated at a high speed.

- 35   **[0007]** In general, in an induction heating cooking appliance, a position at which a cooking vessel is to be placed is indicated on a top plate above a heating coil, and heating of the cooking vessel by the heating coil is performed in a state in which the cooking vessel is placed at the indicated portion.

**SUMMARY**

- 35   Technical Problems

- 40   **[0008]** An object of the present disclosure is to provide a cooking appliance having an improved structure to allow information related to a heating target to be effectively displayed through an indicator light.

- 45   **[0009]** Another object of the present disclosure is to provide a cooking appliance having an improved structure to allow an increase in size due to a structure for implementing an indicator light to be suppressed.

- 50   **[0010]** Still another object of the present disclosure is to provide a cooking appliance having an improved structure to allow access to electrical components to be facilitated.

**Technical Solutions**

- 55   **[0011]** A cooking appliance according to one embodiment of the present disclosure for achieving the above object includes a supporter disposed in an accommodation space surrounded by a case and a top plate, and a lighting module supported by the supporter and configured to emit light toward the top plate, and is characterized in that at least a portion of the lighting module is disposed between a bottom portion of the case and the supporter.

- 60   **[0012]** A cooking appliance according to one aspect of the present disclosure may include: a case forming an accommodation space therein and having an open upper side; a top plate disposed above the case to cover the accommodation space; a supporter disposed below the top plate; and a lighting module supported by the supporter and configured to emit light toward a light display region of the top plate.

- 65   **[0013]** The case may include a bottom portion defining a lower boundary surface of the accommodation space.

- 70   **[0014]** At least a portion of the lighting module may be disposed between the supporter and the bottom portion.

- 75   **[0015]** The lighting module may include a light source part configured to emit light, and a substrate part on which the light source part is mounted.

- [0016] The substrate part may be disposed between the supporter and the bottom portion.
- [0017] The cooking appliance may further include a coil assembly disposed between the top plate and the supporter.
- [0018] The light source part may be disposed between the substrate part and the coil assembly.
- [0019] The cooking appliance may further include a diffusion member disposed between the lighting module and the top plate to diffuse light emitted from the lighting module.
- [0020] The cooking appliance may further include a coil assembly disposed between the top plate and the supporter.
- [0021] The supporter and the coil assembly may each be provided with a light-transmitting hole forming a passage connecting the lighting module and the light display region.
- [0022] The cooking appliance may further include a diffusion member installed on the supporter or the coil assembly to cover the light-transmitting hole.
- [0023] The diffusion member may diffuse light directed toward the light display region through the light-transmitting hole.
- [0024] The supporter may be provided with a lower support surface disposed to face the bottom portion, and the lighting module may be installed on the lower support surface.
- [0025] The cooking appliance may further include an electrical part including at least one of a power processing part configured to supply power to the coil assembly and a coil control part configured to control operation of the coil assembly.
- [0026] At least a portion of the electrical part may be disposed between the supporter and the bottom portion.
- [0027] The power processing part and the coil control part may be installed on the lower support surface.
- [0028] At least one of the power processing part and the coil control part may include a substrate part installed on the lower support surface and a circuit element mounted on the substrate part.
- [0029] The circuit element may be disposed between the bottom portion and the substrate part.
- [0030] The electrical part may be disposed in the accommodation space, and the supporter and the case may be detachably coupled.
- [0031] The case may be separated from the supporter to open the accommodation space downward.
- [0032] The cooking appliance may further include a coil assembly disposed between the top plate and the electrical part.
- [0033] The supporter may be disposed between the coil assembly and the electrical part to support the coil assembly and the electrical part, respectively.
- [0034] The cooking appliance may further include a coil assembly disposed between the top plate and the lighting module.
- [0035] The coil assembly may include a plurality of heating coils disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and a light-transmitting hole forming a passage connecting the lighting module and the light display region.
- [0036] In the horizontal direction, the light-transmitting hole may be disposed between the heating coils.
- [0037] The coil assembly may include a substrate part disposed between the top plate and the lighting module, a heating coil formed as a pattern on the substrate part, and a light-transmitting hole formed in the substrate part to form a passage connecting the lighting module and the light display region.
- [0038] A plurality of the heating coils may be disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and the light-transmitting hole may be disposed between the heating coils and formed to penetrate the substrate part in a vertical direction.
- [0039] In the lateral direction, the light-transmitting hole may be disposed between the heating coils.
- [0040] In the lateral direction, the light-transmitting hole may be disposed between the heating coils and outside the heating coils.
- [0041] The heating coils and the light-transmitting holes may be alternately arranged in the lateral direction.
- [0042] In the lateral direction, the light-transmitting holes may be disposed between the pattern coil arrays.
- [0043] Each of the pattern coil arrays may include a plurality of heating coils arranged along a front-rear direction.
- [0044] The coil assembly may further include a sensing coil disposed between the heating coils.
- [0045] In one of the pattern coil arrays, the plurality of heating coils and the sensing coil may be arranged along a front-rear direction.
- [0046] The plurality of pattern coil arrays and the light-transmitting holes may be arranged along the lateral direction.
- [0047] The heating coils and the sensing coil may be stacked in a vertical direction to form the coil assembly.
- [0048] The light-transmitting hole may be formed to penetrate the coil assembly and may be disposed in a region where the heating coil is not disposed.

#### Advantageous Effects

- [0049] According to the present disclosure, by effectively displaying information related to a heating target through an indicator light, usability of the cooking appliance may be improved, for example, by allowing a user to easily and quickly grasp information related to a position of the heating target, a heating state of the heating target, a temperature, and the like.

**[0050]** Further, the present disclosure adopts a structure in which a lighting module is installed in a gap inevitably formed between heating coils and in a gap formed between a lower surface of a supporter and electrical components.

**[0051]** According to the present disclosure, installation of the lighting module may be effectively achieved inside the cooktop without a need to secure a separate space for installation of the lighting module, thereby providing a cooking appliance having an increased number of heating coils or improved performance while maintaining a compact size.

**[0052]** Further, according to the present disclosure, easy access of a worker to electrical components may be achieved by only a simple operation of separating the case from the cooktop, thereby providing an effect in which maintenance work of the cooking appliance may be easily and quickly performed.

## BRIEF DESCRIPTION OF DRAWINGS

**[0053]** The accompanying drawings constitute a part of the specification, illustrate one or more embodiments in the disclosure, and together with the specification, explain the disclosure, wherein:

FIG. 1 is a perspective view illustrating a cooking appliance according to an embodiment of the present disclosure.  
 FIG. 2 is a plan view illustrating the cooktop shown in FIG. 1 in a separated state.  
 FIG. 3 is a view illustrating a lighting state of the indicator light of the cooktop shown in FIG. 2.  
 FIG. 4 is an exploded perspective view illustrating an exploded state of the cooktop shown in FIG. 2.  
 FIG. 5 is a view illustrating a configuration of the heating part shown in FIG. 4.  
 FIG. 6 is a view illustrating an arrangement structure of the heating coil and the sensing coil shown in FIG. 5.  
 FIG. 7 is a view illustrating an example of an arrangement structure of the sensing coil.  
 FIG. 8 is a view illustrating a state in which electrical components are installed on a lower surface of the supporter.  
 FIG. 9 is a bottom view illustrating the lower surface of the supporter.  
 FIG. 10 is a bottom view illustrating a state in which a lighting module is installed on the lower surface of the supporter.  
 FIG. 11 is a bottom view illustrating a state in which various PCBs and a fan are installed on the lower surface of the supporter.  
 FIG. 12 is a side cross-sectional view illustrating a state in which electrical components are installed on the supporter shown in FIG. 11.  
 FIG. 13 is a side view illustrating an assembled state of the cooktop.  
 FIG. 14 is a bottom perspective view illustrating a state in which the case is separated from the cooktop shown in FIG. 13.  
 FIG. 15 is a plan view illustrating a state in which the coil assembly is installed on an upper surface of the supporter.  
 FIG. 16 is a plan view illustrating a state in which a diffusion member is installed on the supporter.  
 FIG. 17 is a front cross-sectional view illustrating a state in which the diffusion member is installed on the supporter.  
 FIG. 18 is an enlarged view illustrating a portion of FIG. 17.  
 FIG. 19 is a plan view illustrating a light-emittable area of the indicator light shown in FIG. 16.  
 FIG. 20 is a plan view illustrating another example of the indicator light.  
 FIG. 21 is a plan view illustrating a light-emittable region of the indicator light shown in FIG. 20.  
 FIG. 22 is a plan view illustrating still another example of the indicator light.  
 FIG. 23 is a configuration diagram schematically illustrating a configuration of the cooktop.  
 FIG. 24 is a plan view schematically illustrating divided regions of the top plate.  
 FIG. 25 is a view illustrating an example of a state in which a heating target region is indicated on the top plate shown in FIG. 24.  
 FIG. 26 is a view illustrating a state in which all indicator lights are lit on the top plate shown in FIG. 24.  
 FIG. 27 is a plan view illustrating a power-off state of the cooktop.  
 FIGS. 28 to 32 are views illustrating examples of a welcome light implementation state of the cooktop.  
 FIG. 33 is a view illustrating an example of a heating target detection state of the cooktop.  
 FIG. 34 is a view illustrating an example of an operation process of the cooktop in the state shown in FIG. 33.  
 FIG. 35 is a view illustrating a heating progress state of the cooktop.  
 FIG. 36 is a view illustrating a boiling detection state of the cooktop.  
 FIG. 37 is a view illustrating an example of a screen displayed on a control panel of the cooktop in the state shown in FIG. 36.  
 FIG. 38 is a view illustrating an example of a state in which the cooktop detects movement of a heating target.  
 FIG. 39 is a view illustrating an example of a screen displayed on a control panel of the cooktop in the state shown in FIG. 38.  
 FIG. 40 is a view illustrating an example of a state in which the cooktop detects an additionally placed heating target.  
 FIG. 41 is a view illustrating an example of a screen displayed on a control panel of the cooktop in the state shown in FIG. 40.

FIG. 42 is a view illustrating an example of a state in which an automatic cooking mode of the cooktop is in progress.

FIG. 43 is a view illustrating an example of an operation process of the cooktop in the state shown in FIG. 42.

FIG. 44 is a view illustrating a residual heat indication state of the cooktop.

FIG. 45 is a view illustrating an example of a screen displayed on a control panel of the cooktop in the state shown in FIG. 44.

FIG. 46 is a perspective view illustrating a cooking appliance according to another embodiment of the present disclosure.

FIG. 47 is a plan view illustrating the cooktop shown in FIG. 46 in a separated state.

FIG. 48 is a view illustrating a lighting state of the indicator light and a screen display state of a control panel of the cooktop.

FIG. 49 is a view illustrating a divided state of the heating part shown in FIG. 48.

FIGS. 50 to 53 are views illustrating examples of a heating target detection state of the cooktop.

## DETAILED DESCRIPTION

**[0054]** The above-described aspects, features and advantages are specifically described hereafter with reference to accompanying drawings such that one having ordinary skill in the art to which the disclosure pertains can embody the technical spirit of the disclosure easily. In the disclosure, detailed description of known technologies in relation to the subject matter of the disclosure is omitted if it is deemed to make the gist of the disclosure unnecessarily vague. Hereafter, preferred embodiments according to the disclosure are specifically described with reference to the accompanying drawings. In the drawings, identical reference numerals can denote identical or similar components.

**[0055]** The terms "first", "second" and the like are used herein only to distinguish one component from another component. Thus, the components are not to be limited by the terms. Certainly, a first component can be a second component, unless stated to the contrary.

**[0056]** Embodiments are not limited to the embodiments set forth herein, and can be modified and changed in various different forms. The embodiments in the disclosure are provided such that the disclosure can be thorough and complete and fully convey its scope to one having ordinary skill in the art. Accordingly, all modifications, equivalents or replacements as well as a replacement of the configuration of any one embodiment with the configuration of another embodiment or an addition of the configuration of any one embodiment to the configuration of another embodiment, within the technical spirit and scope of the disclosure, are to be included in the scope of the disclosure.

**[0057]** The accompanying drawings are provided for a better understanding of the embodiments set forth herein and are not intended to limit the technical spirit of the disclosure. It is to be understood that all the modifications, equivalents or replacements within the spirit and technical scope of the disclosure are included in the scope of the disclosure. The sizes or thicknesses of the components in the drawings are exaggerated or reduced to ensure ease of understanding and the like. However, the protection scope of the subject matter of the disclosure is not to be interpreted in a limited way.

**[0058]** The terms in the disclosure are used only to describe specific embodiments or examples and not intended to limit the subject matter of the disclosure. In the disclosure, singular forms include plural forms as well, unless explicitly indicated otherwise. In the disclosure, the terms "comprise", "comprised of" and the like specify the presence of stated features, integers, steps, operations, elements, components or combinations thereof but do not imply the exclusion of the presence or addition of one or more other features, integers, steps, operations, elements, components or combinations thereof.

**[0059]** The terms "first", "second" and the like are used herein only to distinguish one component from another component, and the components are not to be limited by the terms.

**[0060]** When any one component is described as "connected" or "coupled" to another component, any one component can be directly connected or coupled to another component, but an additional component can be "interposed" between the two components or the two components can be "connected" or "coupled" by an additional component. When any one component is described as "directly connected" or "directly coupled" to another component, an additional component cannot be "interposed" between the two components or the two components cannot be "connected" or "coupled" by an additional component.

**[0061]** When any one component is described as being "on (or under)" another component, any one component can be directly on (or under) another component, and an additional component can be interposed between the two components.

**[0062]** Unless otherwise defined, all the terms including technical or scientific terms used herein have the same meaning as commonly understood by one having ordinary skill in the art. Additionally, terms such as those defined in commonly used dictionaries are to be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art, and unless explicitly defined herein, are not to be interpreted in an ideal way or an overly formal way.

**[0063]** In the state where a cooking appliance stands on the floor, a direction in which a door is installed with respect to the center of the cooking appliance is defined as a forward direction. Accordingly, a direction toward the inside of the cooking appliance with the door open is defined as a rearward direction. For convenience, the forward direction and the rearward direction can be referred to as a first direction. Then the forward direction is referred to as one direction of the first

direction, and the rearward direction is referred to as the other direction of the first direction.

**[0064]** Additionally, a gravitational direction can be defined as a downward direction, and a direction opposite to the gravitational direction can be defined as an upward direction.

**[0065]** Further, a horizontal direction across a front-rear direction of the cooking appliance, i.e., a widthwise direction of the cooking appliance that is seen in front of the door of the cooking appliance, can be referred to as a left-right direction. For convenience, the left-right direction can be referred to as a second direction. Then the right side can be referred to as one direction of the second direction, and the left side can be referred to as the other direction of the second direction.

**[0066]** Further, the widthwise direction of the cooking appliance can also be referred to as a lateral direction. Then the right side can also be referred to as one side of the lateral direction, and the left side can be referred to the other side of the lateral direction.

**[0067]** Additionally, an up-down direction can be referred to as a third direction. Then an upward direction can be referred to as one direction of the third direction, and a downward direction can be referred to as the other direction of the third direction.

**[0068]** Furthermore, the up-down direction can be referred to as a vertical direction. Then the front-rear direction and the left-right direction, i.e., the first direction and the second direction, can be referred to as the horizontal direction.

**[0069]** Throughout the disclosure, the terms "A and/or B" as used herein can denote A, B or A and B, and the terms "C to D" can denote C or greater and D or less, unless stated to the contrary.

[Entire structure of cooking appliance]

**[0070]** FIG. 1 is a perspective view illustrating a cooking appliance according to an embodiment of the present disclosure, FIG. 2 is a plan view illustrating the cooktop shown in FIG. 1 in a separated state, and FIG. 3 is a view illustrating a lighting state of the indicator light of the cooktop shown in FIG. 2.

**[0071]** Referring to FIGS. 1 to 3, the cooking appliance of the present embodiment may include a cooktop 100. The cooking appliance of the present embodiment may further include an oven part 10. In the present embodiment, the cooking appliance is exemplified as being provided in the form of an oven range.

**[0072]** The cooking appliance of the present embodiment provided in the form of an oven range may provide both a function of an oven, which is a closed-type cooking appliance, and a function of a cooktop, which is an open-type cooking appliance. Such a cooking appliance may include the oven part 10 and the cooktop 100.

**[0073]** A cooking chamber may be formed inside the oven part 10. In the oven part, food may be cooked while an interior of the cooking chamber is heated.

**[0074]** The oven part 10 may be provided with a heating part for heating the cooking chamber. The heating part may be provided as a heating device using gas fuel, or may be provided as a heater using electricity.

**[0075]** The cooking appliance may be provided with a door 11 configured to selectively open and close the cooking chamber in a rotatable manner. As an example, the door may be provided in a form that opens and closes the cooking chamber in a pull-down manner in which an upper end thereof rotates up and down about a lower end.

**[0076]** A control panel 13 (hereinafter referred to as a "main control panel") may be provided on an upper front portion of the cooking appliance. The main control panel 13 may form a part of a front exterior of the cooking appliance. The main control panel 13 may be provided with various switches for controlling operation of the cooking appliance and a display for indicating an operating state of the cooking appliance.

**[0077]** A cooktop 100 may be disposed above the oven part 10. The cooktop may be provided to heat food or a container containing food placed on an upper portion of the cooktop 100.

[Overall structure of cooktop]

**[0078]** FIG. 4 is an exploded perspective view illustrating an exploded state of the cooktop shown in FIG. 2.

**[0079]** Referring to FIGS. 1 to 4, the cooktop 100 may include a case 110 and a top plate 120. According to the present embodiment, an exterior of the cooktop 100 may be formed by the case 110 and the top plate 120. The case 110 is disposed below the top plate 120 and may form a front surface, a rear surface, side surfaces, and a lower surface of the cooktop. The top plate 120 is disposed at an upper end of the cooktop 100 and may form an upper-surface exterior of the cooktop 100.

**[0080]** An accommodation space may be formed inside the case 110. The accommodation space formed inside the case 110 may be open toward above. As an example, the case 110 may be formed in a hexahedral shape having an open upper side. Various internal components constituting the cooktop 100 may be accommodated in the accommodation space surrounded by the top plate 120 and the case 110.

**[0081]** According to the present embodiment, the case 110 may include a bottom portion 105. The bottom portion 105 forms a lower surface of the case 110 and may define a lower boundary surface of the accommodation space. The bottom portion 105 is disposed below the top plate 120 and may form a plane parallel to the top plate 120.

**[0082]** The case 110 may further include a sidewall portion 113. The sidewall portion 113 may form a front surface, a rear

surface, and both side surfaces of the case 110, and may be formed in a wall shape extending in the vertical direction upward from an edge of the bottom portion 105. The sidewall portion 113 may define a horizontal boundary surface of the accommodation space.

**[0083]** The cooktop 100 may be provided with a heating part for heating food to be cooked or a container containing food. The heating part may be provided with at least one heating zone. For example, the heating zone may be provided in a form including a heating coil or a heating wire coil using electricity.

**[0084]** In the present embodiment, the cooktop 100 is exemplified as being provided in a form of an induction heating cooking appliance. The heating zone of the cooktop 100 may include a heating coil. The heating zone including the heating coil may operate by a high-frequency current applied by an inverter to generate a strong magnetic field line.

**[0085]** Magnetic field lines generated in the heating zone including the heating coil induce an eddy current in a vessel, and as the eddy current flows in the vessel, heat is generated so that the vessel may be heated, and as the vessel is heated, food contained in the vessel may be heated.

**[0086]** The cooktop 100 of the present embodiment may further include a control panel 130 (hereinafter referred to as a "cooktop control panel"). The cooktop control panel 130 may be disposed on the top plate 120 and may be disposed at a position offset toward a front. The cooktop control panel 130 may be provided with various switches for controlling operation of the cooktop 100 and a display for indicating an operating state of the cooktop 100.

**[0087]** The cooktop 100 may be provided with a plurality of indicator lights L. The indicator lights L may be displayed on the top plate 120 of the cooktop. The indicator lights L may display information related to a position of food to be heated or a cooking vessel containing the food (hereinafter referred to as a "heating target"), a heating state of the heating target, a temperature, and the like.

[Heating part]

**[0088]** FIG. 5 is a view illustrating a configuration of the heating part shown in FIG. 4, FIG. 6 is a view illustrating an arrangement structure of the heating coil and the sensing coil shown in FIG. 5, and FIG. 7 is a view illustrating an example of an arrangement structure of the sensing coil.

**[0089]** Referring to FIGS. 4 and 5, the cooktop 100 may include a coil assembly 140. The coil assembly 140 is provided to constitute a heating part of the cooktop 100 and may be disposed in the accommodation space inside the cooktop 100.

**[0090]** The coil assembly 140 may include a plurality of heating coils 142. As an example, each heating coil 142 may be provided in a form in which a spiral coil is formed as a pattern on a substrate. That is, the heating coils 142 may be provided in a pattern form formed on a pattern coil array 141.

**[0091]** The pattern coil array 141 may be provided with a plurality of heating coils 142. That is, in the pattern coil array 141, a plurality of heating coils 142 may be formed in a pattern form on a PCB-type substrate part B. In the pattern coil PCB, a plurality of heating coils 142 may be arranged in a front-rear direction, and a plurality of heating coils 142 may also be arranged in a lateral direction.

**[0092]** The coil assembly 140 may include a plurality of pattern coil arrays 141. As an example, the coil assembly 140 may include a plurality of pattern coil arrays 141 arranged in the lateral direction.

**[0093]** Each heating coil 142 provided in each pattern coil array 141 may be formed in a quadrangular pattern. In another example, the heating coil 142 may be formed in a hexagonal pattern or in a circular pattern. In still another example, the heating coil 142 may be provided in a wire-wound form instead of a PCB-patterned form.

**[0094]** The heating coil 142 may transmit electromagnetic force to the heating target. The pattern coil array 141 in which the heating coils 142 are formed may apply high-frequency power to the heating coils 142 and may circuitously control provision of an induced current to the heating coils 142.

**[0095]** In the pattern coil array 141, not only the heating coils 142 but also sensing coils 143 may be formed together. The pattern coil array 141 may be provided with a plurality of sensing coils 143. That is, in the pattern coil array 141, a plurality of sensing coils 143 may be arranged in the front-rear direction, and a plurality of sensing coils 143 may also be arranged in the lateral direction.

**[0096]** The sensing coils 143 may be provided in a form patterned on a PCB (hereinafter, referred to as a "sensing coil PCB") different from a PCB (hereinafter, referred to as a "heating coil PCB") on which the heating coils 142 are patterned. The pattern coil array 141 may be provided in a form in which the heating coil PCB and the sensing coil PCB are stacked in an up-down direction. As an example, the pattern coil array 141 may be formed in a form in which 10 to 12 heating coil PCBs and two vessel-detection PCBs are stacked in the up-down direction.

**[0097]** At least one of the heating coil PCB and the sensing coil PCB may be provided in a form in which coils are patterned on both surfaces of a substrate. In the present embodiment, the heating coils 142 are exemplified as being respectively patterned on both surfaces of the heating coil PCB, and the sensing coils 143 are exemplified as being respectively patterned on both surfaces of the sensing coil PCB.

**[0098]** When the heating coil PCBs and the sensing coil PCBs provided as described above are stacked, an insulating adhesive such as prepreg may be applied therebetween. Accordingly, insulation and bonding between the stacked

heating coil PCBs and sensing coil PCBs may be achieved.

**[0099]** As shown in FIGS. 5 and 6, each sensing coil 143 may be disposed inside a formation region of each heating coil 142, and may also be disposed between formation regions of two adjacent heating coils 142.

**[0100]** As an example, in one pattern coil array 141, a plurality of heating coils 142 may be arranged in the front-rear direction, and in the pattern coil array 141, a plurality of sensing coils 143 may also be arranged in the front-rear direction.

**[0101]** Some of the sensing coils 143 may be disposed inside formation regions of respective heating coils 142, and other sensing coils 143 may be disposed between two heating coils 142 adjacent in the front-rear direction.

**[0102]** In the present embodiment, two sensing coils 143 are respectively disposed inside each heating coil 142 formation region, and two sensing coils 143 are respectively disposed between two heating coils 142 adjacent in the front-rear direction.

**[0103]** In addition, the coil assembly 140 may be provided with a temperature sensor 144. The temperature sensor 144 may be installed on the pattern coil array 141 to measure temperature. As an example, the temperature sensors 144 may be respectively disposed at centers of the sensing coils 143.

**[0104]** As an example, the coil assembly 140 may be provided in a form in which the heating coils 142, the sensing coils 143, and the temperature sensors 144 are integrally configured. For example, the pattern coil array 141 may be formed in a form in which a heating coil PCB provided with the heating coils 142 and a sensing coil PCB provided with the sensing coils 143 and the temperature sensors 144 are stacked, and the coil assembly 140 may be provided in a form including one or more such pattern coil PCBs.

**[0105]** As described above, a plurality of heating coils 142 and sensing coils 143 may be disposed in the coil assembly 140. The number of heating coils 142 and the number of sensing coils 143 may vary depending on a size of the cooktop.

**[0106]** For example, in a cooktop of a 36-inch model and some models among 30-inch models, about 22 heating coils 142 and about 76 sensing coils 143 may be disposed, and in a cooktop of some models among 30-inch models and a 24-inch model, about 16 heating coils 142 and about 56 sensing coils 143 may be disposed. In addition, in a 24-inch model, 5 heating coils 142 and 26 sensing coils 143 may be disposed.

[Supporter]

**[0107]** FIG. 8 is a view illustrating a state in which electrical components are installed on a lower surface of the supporter, and FIG. 9 is a bottom view illustrating the lower surface of the supporter. FIG. 10 is a bottom view illustrating a state in which a lighting module 180 is installed on the lower surface of the supporter, FIG. 11 is a bottom view illustrating a state in which various PCBs and a fan are installed on the lower surface of the supporter, and FIG. 12 is a side cross-sectional view illustrating a state in which electrical components are installed on the supporter shown in FIG. 11. FIG. 13 is a side view illustrating an assembled state of the cooktop, and FIG. 14 is a bottom perspective view illustrating a state in which a case is separated from the cooktop shown in FIG. 13.

**[0108]** Referring to FIGS. 4, 8, and 9, the cooktop 100 according to the present embodiment may include a supporter 150. The supporter 150 may be disposed below the top plate 120. The supporter 150 may be disposed in a space surrounded by the top plate 120 and the case 110, that is, an accommodation space.

**[0109]** The supporter 150 may form a framework for supporting various internal components constituting the cooktop inside the cooktop 100. As an example, the supporter 150 may be formed in a hexahedral shape having an open lower side. For example, the supporter 150 may be formed in a shape substantially corresponding to a vertically inverted shape of the case 110, but may be formed in a slightly smaller size than the case 110.

**[0110]** According to the present embodiment, the supporter 150 may include supporter bodies 151 and 152. The supporter bodies 151 and 152 may form a horizontal framework of the supporter 150 and may form a plane parallel to the bottom portion 105 of the case 110 or the top plate 120. As an example, an upper surface 151 of the supporter bodies 151 and 152 (hereinafter, referred to as an "upper support surface of the supporter") may form a plane parallel to the top plate 120, and a lower surface 152 of the supporter bodies 151 and 152 (hereinafter, referred to as a "lower support surface of the supporter") may form a plane parallel to the bottom portion 105 of the case 110.

**[0111]** The supporter 150 may further include a side portion 153. The side portion 153 may form a front surface, a rear surface, and both side surfaces of the supporter 150 and may be formed in a wall shape extending in a vertical direction downward from an edge of the supporter bodies 151 and 152.

**[0112]** As an example, the supporter 150 may be provided as an injection-molded product in which the supporter bodies 151 and 152 and the side portion 153 are integrally molded.

**[0113]** According to the present embodiment, the accommodation space may be formed inside the supporter 150 and may be formed as a space surrounded by the bottom portion 105 of the case 110 and the supporter 150. That is, various internal components constituting the cooktop 100 may be accommodated inside the supporter 150.

[Installation structure of coil assembly and ferrite core]

**[0114]** The supporter 150 may be disposed below the coil assembly 140 and may support the coil assembly 140 from below. That is, the coil assembly 140 may be disposed between the supporter 150 and the top plate 120 and may be installed on the coil assembly 140.

**[0115]** According to the present embodiment, the supporter 150 may also provide a coil base function. That is, a ferrite core 160 may be installed on the supporter 150, more specifically on the upper support surface 151, and the coil assembly 140 may be installed above the supporter 150 on which the ferrite core 160 is installed in this manner. For example, the ferrite core 160 may be disposed between the supporter 150 and the top plate 120 and may be installed on the upper support surface 151. The coil assembly 140 may be disposed above the ferrite core 160.

**[0116]** As an example, the ferrite core 160 may be formed by a combination of a plurality of ferrite modules provided separately. That is, the ferrite core 160 may be provided in a structure separable into a plurality of ferrite modules.

**[0117]** In the present embodiment, each ferrite module is exemplified as being provided so as to be respectively coupled to the upper support surface 151. For this purpose, a fitting structure for the ferrite modules may be formed on the upper support surface 151. Each ferrite module may be coupled to the upper support surface 151 by being fitted to the structure.

**[0118]** Each ferrite module includes ferrite capable of forming a magnetic field around the ferrite module. As an example, each ferrite module may be provided in a form in which ferrite is insert-molded.

**[0119]** According to the ferrite core 160 formed by a combination of the plurality of ferrite modules provided as described above, a work man-hour required to install the ferrite core 160 in the cooktop 100 may be reduced. The ferrite core 160 also has an advantage in that, when a part of the ferrite core 160 is damaged, repair is possible by replacing the ferrite module of the corresponding part.

[Lighting module]

**[0120]** Referring to FIGS. 3 and 4 and FIGS. 8 to 11, each indicator light L may be implemented by a lighting module 180. The lighting module 180 may be provided so as to emit light toward a light display region of the top plate 120. As an example, the indicator light L may be implemented by light emitted from the lighting module 180 and projected onto the light display region of the top plate 120.

**[0121]** In the present embodiment, the light display region is defined as a region in which light emitted from the lighting module 180 may be recognized from outside through the top plate 120, that is, a region on which light emitted from the lighting module 180 is projected on the top plate 120, and is a predetermined partial region among an entire region of the top plate 120.

**[0122]** As an example, the light display region may be a virtual region designated as a portion on which light emitted from the lighting module 180 is projected on the top plate 120. In this case, the light display region is not a portion visibly marked on the top plate 120 by a separate surface treatment on a surface of the top plate 120 or the like, but merely corresponds to a virtual region.

**[0123]** In another example, the light display region may be a region visibly marked on the top plate 120 by a separate surface treatment on a surface of the top plate 120 or the like.

**[0124]** The lighting module 180 may include a light source part D. As an example, an LED may be applied as the light source part D, but a type of light source applicable to the light source part D is not limited to an LED. In the present embodiment, the light source part D is exemplified as being provided in a form using an LED as a light source.

**[0125]** The lighting module 180 may include a plurality of light source parts D, and in each lighting module 180, the plurality of light source parts D may be disposed in the front-rear direction at predetermined intervals. As an example, the lighting module 180 may be provided in a form in which the plurality of light source parts D are mounted on a PCB-type substrate part B. A number of the light source parts D for each lighting module 180 and a length of the substrate part B in the front-rear direction may be appropriately set according to a size and intensity of light to be implemented through the lighting module 180.

**[0126]** A plurality of lighting modules 180 may also be disposed in the cooktop, and the plurality of lighting modules 180 may be disposed in the lateral direction at predetermined intervals. A number of the lighting modules 180 and intervals between the lighting modules 180 may be appropriately set in consideration of a size and number of the heating coils 142 and intervals between the heating coils 142.

**[0127]** At least a part of the lighting module 180 may be disposed between the supporter 150 and the bottom portion 105. As an example, the lighting module 180 may be disposed in the accommodation space. More specifically, the lighting module 180 may be disposed in a space surrounded by the bottom portion 105 of the case 110 and the supporter 150.

**[0128]** The lighting module 180 may be supported by the supporter 150. As an example, the lighting module 180 may be coupled to the lower support surface 152 of the supporter 150. The lighting module 180 may be coupled to the lower support surface 152 of the supporter 150 in a state in which the light source part D faces upward.

**[0129]** The supporter 150 may be provided with a plurality of light-transmitting holes h. Each of the light-transmitting

holes h may be formed to vertically penetrate the supporter 150. In addition, the coil assembly 140 may also be provided with a plurality of light-transmitting holes h, and these may be formed in the substrate B disposed between the top plate 120 and the lighting module 180.

**[0130]** According to the present embodiment, the plurality of heating coils 142 may be disposed to be spaced apart at predetermined intervals along a horizontal direction. The light-transmitting holes h may be disposed between the heating coils 142 disposed to be spaced apart in this manner.

**[0131]** As an example, a plurality of pattern coil arrays 141 may be arranged along a lateral direction. With respect to the lateral direction, the light-transmitting holes h may be disposed between the pattern coil arrays 141.

**[0132]** In addition, the plurality of heating coils 142 respectively provided in the pattern coil array 141 may be disposed to be spaced apart at predetermined intervals along a lateral direction. In the coil assembly 140, the light-transmitting holes h may be disposed therebetween. With respect to the lateral direction, the light-transmitting holes h may be disposed between the heating coils 142 and outside the heating coils 142.

**[0133]** For example, the light-transmitting holes h may be disposed in regions of the coil assembly 140 where the heating coils 142 are not disposed, and in the coil assembly 140, the heating coils 142 and the light-transmitting holes h may be alternately disposed in the lateral direction.

**[0134]** In the coil assembly 140, the light-transmitting holes h may be formed to vertically penetrate the coil assembly 140. The plurality of light-transmitting holes h formed in the coil assembly 140 in this manner may be connected in a vertical direction to the plurality of light-transmitting holes h provided in the supporter 150. That is, each of the light-transmitting holes h provided in the coil assembly 140 may respectively communicate with each of the light-transmitting holes h provided in the supporter 150.

**[0135]** The light-transmitting holes h provided in the supporter 150 and the coil assembly 140 as described above may form a passage connecting the lighting module 180 and the light display region.

**[0136]** According to the present embodiment, the substrate B of the lighting module 180 may be disposed below the supporter bodies 151 and 152 and coupled to the lower support surface 152 of the supporter 150. At least a portion of the light source D mounted on the upper surface of the substrate B may be exposed toward the light-transmitting hole h formed in the supporter 150.

**[0137]** As an example, the light source D may be disposed vertically below the light-transmitting hole h. As another example, at least a portion of the light source D may be inserted into the light-transmitting hole h formed in the supporter 150.

**[0138]** The light emitted from the light source D may pass through the supporter 150 and the coil assembly 140 via the light-transmitting hole h disposed above the light source D and may be irradiated upward. The indicator light L may be implemented by the light irradiated upward toward the light display region in this manner.

#### [Structure for Installation of Electrical Part]

**[0139]** Various electrical components may be installed in the interior of the cooktop 100, that is, in the accommodation space. For example, in the internal space of the cooktop 100, a main PCB 171, a switching mode power supply (SMPS) 162, an inverter PCB 163, a resonant PCB 164, an EMI filter 165, and a fan 176 may be disposed.

**[0140]** Hereinafter, the electrical components described above will be collectively referred to as an electrical part 170. The electrical part 170 may include at least one of a power processing part and a coil control part. The power processing part is provided to supply power to the coil assembly 140, and the power processing part may include a switching mode power supply (SMPS) 162 and an EMI filter 165. The coil control part is provided to control operation of the coil assembly 140, and the coil control part may include an inverter PCB 174.

**[0141]** According to the present embodiment, at least one of the power processing part and the coil control part constituting the electrical part 170 may include a substrate B and circuit elements E. As an example, various electrical components provided in the electrical part 170 may respectively include a substrate B and circuit elements E mounted on the substrate B.

**[0142]** The electrical part 170 may be disposed below the supporter bodies 151 and 152 and may be disposed in a space between the bottom portion 105 of the case 110 and the supporter bodies 151 and 152.

**[0143]** As an example, the electrical part 170 may be installed on the lower support surface 152 of the supporter 150, as shown in FIGS. 4, 11, and 12. The electrical part 170 may be assembled to the supporter in a form coupled to the lower support surface 152 of the supporter 150 to face downward. That is, the electrical part 170 may be assembled to the supporter 150 in an inverted state.

**[0144]** For example, the electrical components may be assembled in a form in which the substrate B is installed on the lower support surface 152 and the circuit elements E face downward. When the substrate B is installed on the lower support surface 152 with the circuit elements E facing downward, the circuit elements E may be disposed between the bottom portion of the case 110 and the substrate B.

**[0145]** As an example, the supporter 150 may be provided with fastening bosses 155. The fastening bosses 155 may be

formed to protrude downward from the lower support surface 152 of the supporter 150. For example, each of the substrates B constituting the electrical components may be coupled to the supporter 150 by screws fastened to the fastening bosses 155.

**[0146]** The case 110 may be provided with support protrusions 115. The support protrusions 115 may be disposed in the interior of the cooktop 100, that is, in the accommodation space, and may protrude upward from the bottom portion 105 of the case 110 toward the electrical components.

**[0147]** The support protrusions 115 may support the electrical components from below, thereby serving to suppress occurrence of sagging of the electrical components such as the main PCB 171, the switching mode power supply 172, the inverter PCB 173, the resonant PCB 174, and the EMI filter 175.

[Structure for Installation of Components Using Supporter]

**[0148]** In a cooktop 100 having a plurality of heating coils 142, such as the cooktop 100 of the present embodiment, each of the heating coils 142 should be individually controlled. A large number of electrical components such as the main PCB 171, the switching mode power supply 172, the inverter PCB 173, the resonant PCB 174, and the EMI filter 175 should be disposed in the interior of the cooktop 100, and the number thereof increases as the number of heating coils 142 increases. Therefore, in the interior of a cooktop 100 having a plurality of heating coils 142, such as the cooktop 100 of the present embodiment, a space sufficient to accommodate the electrical components should be secured.

**[0149]** However, when the overall size of the cooktop 100, particularly the thickness of the cooktop 100, is to be reduced in a situation where the number of electrical components increases, it is not easy to sufficiently secure, in the interior of the cooktop 100, a space capable of accommodating the electrical components. In particular, when the lighting module 180 is additionally provided in the cooktop 100, it is not easy to secure, in the interior of the cooktop 100, a space required to accommodate the electrical components.

**[0150]** In consideration of this, in the present embodiment, the lighting module 180 may be installed in a form stacked on the supporter 150 together with the coil assembly 140. To this end, the coil assembly 140 may be installed on the upper support surface 151, and the lighting module 180 may be installed on the lower support surface 152 of the supporter 150. That is, the lighting module 180 may be installed on the lower support surface 152 of the supporter 150 together with various electrical components disposed below the supporter bodies 151 and 152.

**[0151]** The position of the lighting module 180 with respect to the coil assembly 140 may be set between the heating coils 142. That is, with respect to a direction parallel to a horizontal plane formed by the coil assembly 140, each lighting module 180 may be disposed in a gap between the heating coils 142.

**[0152]** In addition, a vertical position of the lighting module 180 with respect to the electrical components may be set between the supporter bodies 151 and 152 and the electrical components. That is, each lighting module 180 may be disposed in a gap between the electrical components disposed below the supporter bodies 151 and 152 and the supporter bodies 151 and 152.

**[0153]** According to the present embodiment, the electrical components may be coupled to fastening bosses 155 protruding from the supporter 150, and accordingly a gap may be formed between the electrical components coupled to the supporter 150 and the lower surface of the supporter 150. In the present embodiment, the lighting module 180 may be disposed in the gap formed between the lower surface of the supporter 150 and the electrical components in this manner.

**[0154]** According to the present embodiment, the lighting module 180 may be installed on the supporter 150 before other electrical components are installed on the supporter 150. For example, in a state in which no electrical component is installed on the lower support surface 152 of the supporter 150 (see FIG. 9), after the lighting module 180 is first installed on the lower support surface 152 of the supporter 150 (see FIG. 10), the remaining other electrical components such as the main PCB 171 may be installed.

**[0155]** In addition, a horizontal position of at least one of the plurality of lighting modules 180 may be set between the electrical components. That is, with respect to a direction parallel to a horizontal plane formed by the supporter 150, at least one lighting module 180 may be disposed in a gap between the electrical components.

**[0156]** In the present embodiment, since the lighting module 180 is installed in a gap inevitably formed between the heating coils 142 and in a gap formed between the lower surface of the supporter 150 and the electrical components, it is not necessary to secure, in the interior of the cooktop 100, a separate space for installation of the lighting module 180.

**[0157]** That is, since the lighting module 180 may be effectively installed in the interior of the cooktop 100 without the need to secure a separate space for installation of the lighting module 180, a cooking appliance in which the number of heating coils 142 is increased or performance is improved while maintaining a compact size may be provided.

**[0158]** As an example, assembly of components inside the cooktop 100 may be performed in the following order.

**[0159]** First, the ferrite core 160 may be installed on the upper support surface 151. As an example, installation of the ferrite core 160 may be performed in a form in which a plurality of ferrite modules constituting the ferrite core 160 are fittingly engaged with the upper support surface 151.

**[0160]** Then, the coil assembly 140 may be installed above the ferrite core 160 installed on the upper surface of the

supporter 150 as described above. Installation of the coil assembly 140 may be performed in a form in which the coil assembly 140 is seated on the ferrite core 160 or the coil assembly 140 is coupled to the upper surface of the supporter 150 above the ferrite core 160.

**[0161]** When assembly of the supporter 150, the ferrite core 160, and the coil assembly 140 is completed, installation of the lighting module 180 may be performed in a state in which the supporter 150 is inverted so that the lower support surface 152 of the supporter 150 faces upward. Installation of the lighting module 180 may be performed in a form in which the lighting module 180 is coupled to the lower support surface 152 of the supporter 150 in a state in which the lighting module 180 is brought into close contact with the lower surface of the supporter 150.

**[0162]** After assembly of the supporter 150 and the lighting module 180 is completed in this manner, installation of the electrical part 170 may be performed. The electrical part 170 may be coupled to the lower support surface 152 of the supporter 150 so that the electrical components face downward. That is, the electrical part 170 may be assembled to the supporter 150 in an inverted state.

**[0163]** After assembly of the electrical part 170 is completed, assembly of the case 110 and the supporter 150 may be performed. As an example, assembly of the case 110 and the supporter 150 may be performed by coupling between the sidewall portion 113 of the case 110 and the side portion 153 of the supporter 150.

**[0164]** Then, from above the case 110 and the supporter 150, the top plate 120 may be coupled to at least one of the case 110 and the supporter 150, thereby enabling assembly of the case 110, the supporter 150, and the top plate 120.

**[0165]** By assembly of the coil assembly 140, the ferrite core 160, the supporter 150, the lighting module 180, and the electrical part 170 in the interior of the cooktop 100 in the form described above, in the cooktop 100 of the present embodiment, an assembly structure in which the coil assembly 140, the ferrite core 160, the supporter 150, the lighting module 180, and the electrical part 170 are stacked in a vertical direction may be provided.

**[0166]** At this time, the coil assembly 140 is installed on the upper support surface 151, and the electrical part 170 is installed on the opposite surface, that is, the lower surface of the supporter 150. Accordingly, the coil assembly 140 and the electrical components are installed together on the same single member (supporter body) and may be disposed at very close positions with a single thin member (supporter body) interposed therebetween.

**[0167]** A plurality of through-holes may be formed in the supporter bodies 151 and 152 to penetrate in a vertical direction, and wiring for connecting the coil assembly 140 and the electrical components may vertically penetrate the supporter 150 through the through-holes.

**[0168]** That is, since the coil assembly 140 and the electrical part 170 are disposed at very close positions and installed together on a single member, simplification of wiring for connecting the coil assembly 140 and the electrical components can be effectively achieved.

**[0169]** In a conventional cooktop structure, electrical components are installed on a lower surface of a case, and a ferrite core, coils, and a top plate are sequentially stacked thereabove. In order to repair electrical components in a cooktop having such a structure, components stacked above the electrical components, that is, the ferrite core, the coils, the top plate, and the like, should first be removed. That is, in a conventional cooktop, a complex and cumbersome operation had to be performed in which almost all components had to be disassembled in the reverse order of assembly in order to repair the electrical components.

**[0170]** In contrast, in the cooktop 100 of the present embodiment, the electrical components are not installed on the case 110 but are installed on the supporter 150, and the supporter 150 is separably coupled to the case 110. That is, in the cooktop 100 of the present embodiment, only the case 110 disposed at a lower side of the cooktop 100 may be separated from the cooktop 100, and even when the case 110 is separated from the cooktop 100, the electrical components may remain fixed in the interior of the cooktop 100.

**[0171]** Accordingly, in the cooktop 100 of the present embodiment, when only the case 110 disposed at the lower side of the cooktop 100 is separated, access to a space inside the cooktop 100 in which the electrical components are installed becomes possible. In this state, replacement of the electrical components installed in the cooktop 100 may be easily and quickly performed.

**[0172]** That is, the cooking appliance of the present embodiment may provide an effect of enabling easy access of an operator to the electrical components by only a simple operation of separating the case 110 from the cooktop 100, thereby enabling maintenance work of the cooking appliance to be performed easily and quickly.

[Structure Related to Indicator Light]

**[0173]** FIG. 16 is a plan view illustrating a state in which a diffusion member is installed on the supporter, FIG. 17 is a front cross-sectional view illustrating a state in which the diffusion member is installed on the supporter. FIG. 18 is an enlarged view of a portion of FIG. 17, and FIG. 19 is a plan view illustrating a light-emittable region of the indicator light shown in FIG. 16. FIG. 20 is a plan view illustrating another example of the indicator light, FIG. 21 is a plan view illustrating a light-emittable region of the indicator light shown in FIG. 20, and FIG. 22 is a plan view illustrating still another example of the indicator light.

**[0174]** Referring to FIGS. 16 to 18, the cooktop 100 may be provided with a diffusion member 190. The diffusion member 190 is provided so that the lighting module 180 including the light source D, which is a point light source, may implement a surface light source.

**[0175]** The diffusion member 190 enables the lighting module 180 to implement a surface light source, thereby enabling lighting to be implemented in a form in which boundaries between the respective light sources are concealed, while allowing light of the lighting displayed through the light display region of the top plate 120, that is, light of the indicator light L, to appear in a softly diffused form.

**[0176]** As an example, the diffusion member 190 may be provided in a sheet form attached to the coil assembly 140. For example, the diffusion member 190 may be provided in a sheet form attached to at least one of an upper surface and a lower surface of the substrate B of the coil assembly 140. The diffusion member 190 may be attached to the coil assembly 140 while covering the light-transmitting holes h.

**[0177]** As another example, a lighting cover may be installed above the lighting module 180. The lighting cover may surround the lighting module 180 from above and may protrude upward above the coil assembly. The lighting cover is provided to protect the light source D and to allow light emitted from the light source D to be transmitted.

**[0178]** The diffusion member 190 may be provided on an upper surface of the lighting cover. For example, the diffusion member 190 may be formed in a form attached or coated on the upper surface of the lighting cover.

**[0179]** As another example, at least a portion of the lighting cover as described above may be formed of a material capable of diffusing light. In this case, the diffusion member 190 may be at least a portion of the lighting cover.

**[0180]** Referring to FIGS. 3 and 19, a plurality of indicator lights L may be disposed in the light display region of the cooktop 100. As an example, the plurality of indicator lights L may be arranged in a front-rear direction and may be arranged to form a straight line along the front-rear direction. A combination of the indicator lights L arranged in this manner (hereinafter, referred to as a "vertical indicator light array 125B") may be arranged in plural along a lateral direction.

**[0181]** For example, the plurality of vertical indicator light arrays 125B may be disposed to be spaced apart at predetermined intervals along a lateral direction. Intervals between the vertical indicator light arrays 125B may be set to correspond to a lateral length of each heating coil 142. As an example, each vertical indicator light array 125B may be disposed between the heating coils 142.

**[0182]** In this case, the indicator lights L may be provided in a form in which at least one of a plurality of vertical lines is turned on. For example, the indicator lights L may be provided in a vertical line form turned on at both lateral sides of a heating target seated on the top plate 120 of the cooktop 100.

**[0183]** As another example, as shown in FIGS. 3, 20, and 21, a form in which a plurality of indicator lights L are arranged in a lateral direction and are arranged to form a straight line along the lateral direction may be additionally provided. A combination of the indicator lights L arranged in this manner (hereinafter, referred to as a "horizontal indicator light array 125A") may be arranged in plural along a lateral direction.

**[0184]** For example, the plurality of horizontal indicator light arrays 125A may be disposed to be spaced apart at predetermined intervals along a front-rear direction. Intervals between the horizontal indicator light arrays 125A may be set to correspond to a front-rear length of each heating coil 142. As an example, each horizontal indicator light array 125A may be disposed between the heating coils 142.

**[0185]** In this case, the indicator lights L may be provided in a form in which at least one of a plurality of vertical lines and horizontal lines is turned on. For example, the indicator lights L may be provided in a form in which vertical lines turned on at both lateral sides of a heating target seated on the top plate 120 of the cooktop 100 and horizontal lines turned on at both front and rear sides of the heating target are combined.

**[0186]** As still another example, as shown in FIG. 22, the vertical indicator light arrays 125B and the horizontal indicator light arrays 125A may be disposed only at portions adjacent to corners of the heating coils 142. In this case, the indicator lights L may be provided in a form in which they are respectively turned on at both front corners and both rear corners of a heating target seated on the top plate 120 of the cooktop 100.

#### [Configuration Related to UI/UX of Cooktop]

**[0187]** FIG. 23 is a block diagram schematically illustrating a configuration of a cooktop, and FIG. 24 is a plan view schematically illustrating divided regions of a top plate. FIG. 25 is a view illustrating an example of a state in which a heating target region is displayed on the top plate shown in FIG. 24, and FIG. 26 is a view illustrating a state in which all indicator lights are turned on on the top plate shown in FIG. 24.

**[0188]** Referring to FIGS. 5 to 6 and FIGS. 23 to 24, the top plate 120 forms an upper exterior of the cooktop 100, and a heating target serving as a cooking target of the cooktop 100 may be seated on the top plate 120. The top plate 120 may include a plurality of divided regions Vp arranged in a horizontal direction. That is, the top plate 120 may be divided into the plurality of divided regions Vp arranged in the horizontal direction.

**[0189]** In the present embodiment, the divided region Vp may be defined as a region to which influence of the heating coil 142 disposed below the divided region Vp extends. For example, when 30 heating coils 142 are arranged in a horizontal

direction below the top plate 120, 30 divided regions Vp corresponding thereto may be arranged in the horizontal direction on the top plate 120.

**[0190]** At this time, each divided region Vp may be disposed vertically above a heating coil 142 closest thereto. For example, a shape and size of an area occupied by each divided region Vp in the horizontal direction may be set to correspond to a shape and size of an area occupied by the heating coil 142 closest thereto in the horizontal direction.

**[0191]** That is, it may be said that a heating coil 142 having a horizontal shape and size corresponding thereto is disposed below each divided region Vp in a vertical direction.

**[0192]** Each divided region Vp may be classified as either a seating region or a non-seating region. To this end, the cooktop 100 may be provided with a heating-target detection part. The heating-target detection part may detect whether a heating target is seated in each divided region Vp so that each divided region Vp may be classified as either the seating region or the non-seating region.

**[0193]** In the present embodiment, the heating-target detection part is exemplified as including a plurality of sensing coils 143. As an example, some of the sensing coils 143 may be disposed inside each divided region Vp, and others of the sensing coils 143 may be disposed between two divided regions Vp adjacent in the front-rear direction.

**[0194]** For example, two sensing coils 143 may be disposed in each divided region Vp. Two sensing coils 143 may be disposed on a boundary line between two divided regions Vp adjacent in the front-rear direction.

**[0195]** At this time, inside each divided region Vp, the two sensing coils 143 may be disposed to be spaced apart from each other by a predetermined interval in the lateral direction. The two sensing coils 143 disposed on the boundary line between two divided regions Vp may also be disposed to be spaced apart from each other by a predetermined interval in the lateral direction.

**[0196]** Each sensing coil 143 may detect whether a heating target is seated in the divided region Vp in which the sensing coil 143 is disposed, and according to the detection result, the divided region Vp may be classified as either the seating region or the non-seating region.

**[0197]** According to the present embodiment, the cooking appliance of the present embodiment may include a control part 105. The control part 105 may be provided to control an operation of the cooking appliance. The control part 105 may classify each divided region Vp as either the seating region or the non-seating region based on the detection result of the sensing coils 143. In addition, the control part 105 may control an operation of the heating coils 142 based on a signal input through the control panel 130, the sensing coils 143, and a detection result of the temperature detection part 144.

**[0198]** For example, when at least one of the sensing coils 143 disposed in a certain divided region Vp detects the presence of a heating target, the divided region Vp in which the sensing coil 143 that detected the presence of the heating target is disposed may be determined as a seating region.

**[0199]** In addition, when at least one of the sensing coils 143 disposed on a boundary line between two divided regions Vp detects the presence of a heating target, the two divided regions Vp adjacent to both front-rear sides of the sensing coil 143 that detected the presence of the heating target may be determined as seating regions.

**[0200]** Referring to FIG. 25, as a result of a combination of the seating regions determined as described above, information on a shape and a position of a heating target region Vr may be identified. In the present embodiment, one heating target region Vr is defined as an aggregate of seating regions identified as a detection result for one heating target.

**[0201]** For example, when one heating target is seated on the top plate 120, one heating target region Vr may be identified as a detection result of the heating-target detection part, and when two heating targets are seated on the top plate 120, two heating target regions Vr may be identified as detection results of the heating-target detection part.

**[0202]** Each heating target region Vr is identified as a result of a combination of at least one seating region. When two or more seating regions are included in one heating target region Vr, the seating regions are disposed at positions connected to each other in a horizontal direction.

**[0203]** Information on a shape and a position of the heating target region Vr identified as described above may be displayed on the top plate 120 by a display part, as shown in FIGS. 23 to 26.

**[0204]** In the present embodiment, the display part is exemplified as including a plurality of indicator lights L disposed on the top plate 120. The display part may display information on a shape and a position of the heating target region Vr on the top plate 120 by using the plurality of indicator lights L arranged in a horizontal direction on the top plate 120.

**[0205]** For example, the display part may display information on a shape and a position of the heating target region Vr on the top plate 120 in a manner of turning on one of the plurality of indicator lights L that is closest to a horizontal-direction boundary surface of the heating target region Vr.

**[0206]** According to the present embodiment, the heating target region Vr may include one seating region or may be formed by a combination of two or more seating regions. That is, at least one seating region is included in the heating target region Vr.

**[0207]** A horizontal-direction boundary surface of the heating target region Vr may be defined by a horizontal-direction boundary surface of a seating region disposed in the heating target region Vr. When a plurality of seating regions are disposed in the heating target region Vr, the horizontal-direction boundary surface of the heating target region Vr may be defined by a horizontal-direction boundary surface of one disposed at an outermost side in the horizontal direction among

the plurality of seating regions disposed in the heating target region Vr.

**[0208]** Each indicator light L included in the display part may be disposed on a horizontal-direction boundary surface of a corresponding divided region Vp.

**[0209]** For example, a lateral-direction boundary surface of the heating target region Vr may be defined by a lateral-direction boundary surface of one disposed at an outermost side in the lateral direction among the plurality of seating regions disposed in the heating target region Vr. For example, when two seating regions adjacent in the lateral direction are disposed in the heating target region Vr, a left boundary surface of the seating region disposed at a left side and a right boundary surface of the seating region disposed at a right side may become the lateral-direction boundary surface of the heating target region Vr.

**[0210]** Each indicator light L included in the display part may be disposed on a lateral-direction boundary surface of a corresponding divided region Vp.

**[0211]** Hereinafter, an operation of the display part will be described by taking, as an example, a case in which each indicator light L is disposed on a lateral-direction boundary surface of a divided region Vp.

**[0212]** According to the present embodiment, when a heating target is seated on the top plate 120, the heating-target detection part including a plurality of sensing coils 143 disposed below the top plate 120 may detect the heating target. According to a detection result of the heating-target detection part, the divided regions Vp are classified as either seating regions or non-seating regions. As a result of a combination of the seating regions identified as described above, information on a shape and a position of the heating target region Vr may be identified.

**[0213]** Information on a shape and a position of the heating target region Vr identified as described above may be displayed on the top plate 120 by the display part. The display part may display information on a shape and a position of the heating target region Vr on the top plate 120 by turning on one of the plurality of indicator lights L that is closest to a lateral-direction boundary surface of the heating target region Vr.

**[0214]** At this time, at least one pair of indicator lights L may be turned on at both lateral sides of the heating target region Vr. That is, an indicator light L closest to one lateral-direction boundary surface of the heating target region Vr and an indicator light L closest to the other lateral-direction boundary surface of the heating target region Vr may be turned on, respectively.

**[0215]** For example, when three seating regions adjacent in the lateral direction are disposed in the heating target region Vr, an indicator light L disposed on a left boundary surface of the seating region disposed at a leftmost side and an indicator light L disposed on a right boundary surface of the seating region disposed at a rightmost side may be turned on together.

**[0216]** That is, when seating regions of three rows are disposed in the heating target region Vr, an indicator light L disposed on a left boundary surface of the seating region disposed in a first row and an indicator light L disposed on a right boundary surface of the seating region disposed in a third row may be turned on together.

**[0217]** In addition, when seating regions of a plurality of columns are disposed in the heating target region Vr, the indicator lights L may be turned on in the above-described manner in seating regions of all columns.

**[0218]** For example, when nine seating regions are disposed in the heating target region Vr in an arrangement of three rows and three columns, indicator lights L disposed on left boundary surfaces of all seating regions disposed in a first row and indicator lights L disposed on right boundary surfaces of all seating regions disposed in a third row may be turned on together.

**[0219]** The indicator lights L turned on as described above may indicate positions of lateral-direction boundary surfaces at both lateral sides of the heating target region Vr. In addition, by the indicator lights L turned on as described above, a lateral-direction length and a front-rear-direction length of the heating target region Vr may be identified together, and accordingly, a position and a shape of the heating target region Vr may be identified.

**[0220]** Meanwhile, the cooktop 100 may include a heating detection part. The heating detection part is provided to detect a heating state of the heating target seated on the top plate 120.

**[0221]** In the present embodiment, the heating detection part is exemplified as including a plurality of temperature sensors 144. Each temperature sensor 144 may be disposed at a center of each sensing coil 143. Such temperature sensors 144 may be disposed in respective divided regions Vp.

**[0222]** The display part may change a lighting state of the indicator lights L based on a detection result of the heating detection part. For example, the display part may change a color of the indicator lights L or change a blinking pattern of the indicator lights L based on the detection result of the heating detection part.

**[0223]** For example, when a temperature of the heating target detected by the temperature sensor 144 disposed in a certain divided region Vp is equal to or higher than a predetermined temperature, a color of the indicator light L disposed in the corresponding divided region Vp may change from white to red, or the indicator light L disposed in the corresponding divided region Vp may perform an operation of blinking rapidly.

[Example of UI/UX of the Cooktop]

**[0224]** FIG. 27 is a plan view illustrating a power-off state of the cooktop, and FIGS. 28 to 32 are views illustrating an

example of a welcome light implementation state of the cooktop. FIG. 33 is a view illustrating an example of a heating target detection state of the cooktop. FIG. 34 is a view illustrating an example of an operation process of the cooktop in the state illustrated in FIG. 33, and FIG. 35 is a view illustrating a heating progress state of the cooktop. FIG. 36 is a view illustrating a boiling detection state of the cooktop, and FIG. 37 is a view illustrating an example of a screen displayed on a control panel of the cooktop in the state illustrated in FIG. 36. FIG. 38 is a view illustrating an example of a state in which the cooktop detects movement of a heating target, and FIG. 39 is a view illustrating an example of a screen displayed on the control panel of the cooktop in the state illustrated in FIG. 38. FIG. 40 is a view illustrating an example of a state in which the cooktop detects an additionally seated heating target, and FIG. 41 is a view illustrating an example of a screen displayed on the control panel of the cooktop in the state illustrated in FIG. 40. FIG. 42 is a view illustrating an example of a state in which an automatic cooking mode is in progress in the cooktop, and FIG. 43 is a view illustrating an example of an operation process of the cooktop in the state illustrated in FIG. 42. FIG. 44 is a view illustrating a residual heat indication state of the cooktop, and FIG. 45 is a view illustrating an example of a screen displayed on the control panel of the cooktop in the state illustrated in FIG. 44.

**[0225]** Hereinafter, a UI/UX implemented in the cooktop of a cooking appliance according to one embodiment of the present invention will be described with reference to FIGS. 27 to 45.

**[0226]** As illustrated in FIG. 27, when a power of the cooktop 100 is turned on in a state in which the power of the cooktop 100 is off, welcome lights may be implemented on the top plate 120 of the cooktop 100, as illustrated in FIGS. 28 to 32. The welcome lights may be implemented by turning on the indicator lights L, and may be implemented in an animation form expressed by blinking operations of the indicator lights L according to positions. In addition, the welcome lights may be implemented in a form further including blinking operations of a logo light La provided separately from the indicator lights L.

**[0227]** Referring to FIGS. 23 and 33, when a heating target P is seated on the cooktop 100, a position of the heating target P may be detected by the sensing coils 143. According to a position and a number of the sensing coils 143 that detect the heating target P among the plurality of sensing coils 143 provided in the cooktop 100, a size and a position of the heating target P may be identified, and an approximate shape of the heating target P may also be identified.

**[0228]** According to a size and a position of the heating target P detected by the sensing coils 143 as described above, indicator lights L may be turned on. For example, the indicator lights L may be turned on at both lateral sides of the heating target P, and a front-rear length of each indicator light L may be formed to be longer than a front-rear length of the heating target P. For example, the heating target P may be disposed inside a region surrounded by a pair of indicator lights L turned on as described above.

**[0229]** By the indicator lights turned on as described above, it may be indicated which region among heating portions is a region that heats the heating target P. That is, it may be clearly indicated which of the plurality of heating coils 142 heats the heating target P seated on the cooktop 100. For example, a position and a number of the heating coils 142 prepared to heat the heating target P seated on the cooktop may be clearly indicated by the indicator lights.

**[0230]** When the heating target P is detected in the cooktop 100 as described above, information on a shape and a position of the heating target region Vr may be displayed on a screen of the cooktop control panel 130 provided in the cooktop 100.

**[0231]** For example, a basic screen 131 representing a shape of the top plate 120 and an icon I corresponding to the heating target P detected in the cooktop 100 may be displayed on a display of the cooktop control panel 130. For example, the icon I may be provided in a form corresponding to a size and a shape of the heating target P. For example, a position of the icon I on the basic screen 131 may be represented to correspond to a position of the heating target region Vr on the top plate 120.

**[0232]** For example, the icon I may represent information on a shape of the heating target region Vr. That is, the icon I may represent not only information on a position of the heating target region Vr but also information on a shape and a size of the heating target region Vr.

**[0233]** In addition, the icon I may display information on at least one of a cooking mode, a target heating temperature, a current temperature, and a heating time in the heating target region Vr. In addition, the icon I may be provided in the form of a touch button for selecting an operation associated with the icon I.

**[0234]** In addition, the cooktop control panel 130 may include a setting menu bar 135 provided with various touch buttons for setting functions of the cooktop 100. The setting menu bar 135 may be disposed at a position biased toward a front side of the cooktop control panel 130.

**[0235]** As illustrated in FIG. 34, a user may select the heating target P indicated by the icon I by touching or pressing the icon I (a). In this case, the user may perform an operation for controlling an operation of the cooking appliance with respect to the selected heating target P.

**[0236]** For example, when the user presses the icon I to select the heating target P indicated by the icon I, a setting screen 135a may be switched to a state for selecting a desired heating temperature (b). In this state, the user may press a touch button 136 of the setting screen 135a to select a desired heating temperature for the corresponding heating target P.

**[0237]** When the operation of the cooktop control panel 130 as described above is completed and heating of the heating target P is started accordingly, as illustrated in FIG. 35, the start of heating of the heating target P may be indicated through

the indicator lights L.

**[0238]** For example, whether heating of the heating target P has started may be indicated through a color change of the indicator lights. For example, when heating of the heating target P starts, a color of the indicator lights L may change from white to red. That is, a user may recognize that heating of the heating target P has started by observing the indicator lights L displayed in red.

**[0239]** As another example, whether the heating target P is being heated may be indicated through a change in a blinking pattern of the indicator lights L, and may also be indicated through a change in a shape of the indicator lights L.

**[0240]** In addition, information on a heating state of the heating target P may be displayed by the cooktop control panel 130. On the cooktop control panel 130, the icon I may represent information on a shape of the heating target region Vr.

**[0241]** For example, information on the heating state of the heating target P may be displayed through a change in at least one of a shape or a color of the icon I. For example, whether the heating target P is being heated may be indicated by changing a color of the icon I to red or by displaying a specific character or symbol on the icon I.

**[0242]** In the cooktop 100 of the present embodiment, whether food contained in the heating target P is boiling may also be indicated through the indicator lights L. For example, as illustrated in FIG. 36, when boiling of the food contained in the heating target P is detected by the cooktop 100, a lighting pattern of the indicator lights L may change.

**[0243]** For example, when boiling of food contained in the heating target P is detected by the cooktop 100, a state of the indicator lights L may change from a continuously turned-on state to a blinking state, or may change from a slowly blinking state to a rapidly blinking state.

**[0244]** Determination of whether boiling has occurred may be performed by a vibration sensor installed in the cooktop 100 or may be performed by a vision system installed outside the cooktop 100.

**[0245]** In addition, when boiling of the food contained in the heating target P is detected by the cooktop 100 as described above, as illustrated in FIGS. 36 and 37, the cooktop 100 may automatically lower an output of the heating part to suppress occurrence of food overflow. In this case, the cooktop 100 may provide a user notification through the cooktop control panel 130 indicating that a temperature of the heating target P is maintained at a constant level by automatically lowering the output, and may also provide such user notification through the indicator lights L.

**[0246]** For example, when the cooktop 100 automatically lowers the output of the heating unit to suppress occurrence of food overflow, a state of the indicator lights L may change from a rapidly blinking state to a slowly blinking state, or may change from a blinking state to a continuously turned-on state.

**[0247]** In addition, the cooktop 100 of the present embodiment may track and display a change in a position of the heating target P on the cooktop 100, as illustrated in FIGS. 23 and 38. For example, when the position of the heating target P seated on the top plate 120 changes, the cooktop 100 may detect the change through the sensing coils 143, and the detected result may be indicated through the indicator lights L.

**[0248]** For example, a lighting position of the indicator lights L may also change following the change in the position of the heating target P. In addition, the detection result of such a change in the position of the heating target P may also be displayed through the cooktop control panel 130, as illustrated in FIG. 39.

**[0249]** Referring to FIG. 40, when an additional heating target P is placed on the top plate 120, the indicator lights L may additionally be turned on accordingly. In addition, each of the indicator lights L may be turned on in a form and size suitable for representing a size and a shape of the heating target P to be displayed.

**[0250]** In addition, as illustrated in FIGS. 40 and 41, an icon I may also be added on the cooktop control panel 130. Each icon I may be provided in a form corresponding to a size and a shape of the heating target P or the heating target region Vr to be displayed. In addition, a position of each icon I on the basic screen 131 may be represented to correspond to a position of the heating target P or the heating target region Vr on the top plate 120.

**[0251]** Referring to FIGS. 42 and 43, a user may select the heating target P indicated by the icon I by pressing any one of the icons I displayed on the cooktop control panel 130 as described above, and may perform an operation for controlling an operation of the cooking appliance with respect to the selected heating target P.

**[0252]** In addition, the cooktop 100 may automatically recommend cooking modes suitable for a shape of the selected heating target P. The user may select any one of the recommended cooking modes so that the cooktop 100 performs automatic cooking.

**[0253]** For example, as illustrated in FIG. 43, when the user touches or presses a touch button for performing automatic cooking (a) and then touches or presses the icon I to select the heating target P indicated by the icon I (ab), the cooktop control panel 130 may output an operation selection screen 137 instead of outputting the basic screen 131 and the icon I (c). Recommended cooking modes may be displayed on the operation selection screen 137, and the user may select any one of the cooking modes displayed on the operation selection screen 137 by touching or pressing it (d).

**[0254]** As illustrated in FIGS. 44 and 45, when heating of a plurality of heating targets P is in progress, the user may stop heating of any one of them. In this case, the user may touch or press any one of the icons I displayed on the cooktop control panel 130 as being heated so that an operation of the heating part indicated by the corresponding icon I is stopped (a).

**[0255]** When an operation of any heating unit is stopped by the operation as described above, the cooktop 100 may display information related thereto.

**[0256]** For example, the cooktop 100 may indicate that residual heat is present in a region where the operation of the heating part has been stopped through the indicator lights. For example, the indicator lights L may be turned on in red at both sides of the region where the residual heat is present and may operate in a slowly blinking manner.

**[0257]** In addition, a position of the region where the residual heat is present may also be displayed on the cooktop control panel 130. For example, an icon Ia representing that residual heat is present by a specific character or symbol may be displayed on the cooktop control panel 130.

**[0258]** In addition, a position of the region where the residual heat is present may also be displayed on the cooktop control panel 130. For example, an icon Ia representing that residual heat is present by a specific character or symbol may be displayed on the cooktop control panel 130.

**[0259]** Even when the heating target P is removed from a region where the operation of the heating part has been stopped, it may be indicated through the indicator lights L that residual heat remains in the region from which the heating target P has been removed. In addition, the position of the region where the residual heat is present may also be displayed on the cooktop control panel 130 (c). In this case, an icon Ib indicating the residual heat may be displayed in a form different from the icon Ia that indicates the residual heat in a state before the heating target P is removed.

**[0260]** Meanwhile, among the plurality of heating targets P placed on the cooktop 100, for a heating target for which automatic cooking is being performed, an icon Ib displaying information corresponding thereto may be output on the cooktop control panel 130.

[Another Embodiment of the Cooktop]

**[0261]** FIG. 46 is a perspective view illustrating a cooking appliance according to another embodiment of the present invention, FIG. 47 is a plan view illustrating the cooktop illustrated in FIG. 46 in a separated state, and FIG. 48 is a view illustrating an illumination state of indicator lights of the cooktop and a screen display state of a control panel. In addition, FIG. 49 is a view illustrating a divided state of heating units illustrated in FIG. 48, and FIGS. 50 to 53 are views illustrating examples of heating target detection states of the cooktop.

**[0262]** Referring to FIGS. 46 to 48, the cooking appliance according to another embodiment of the present invention may further include an operation member N. For example, the operation member N may be provided on a main control panel 23. For example, the main control panel 23 provided at an upper front side of the cooking appliance may include a plurality of operation members N for controlling an operation of the cooking appliance and a display 24 for displaying an operating state of the cooking appliance.

**[0263]** The operation member N may be configured to be operable for either one of the oven part 10 and the cooktop 200, or may be configured to be operable for both the oven part 10 and the cooktop 200. In the present embodiment, the operation member N is exemplified as being configured to be operable for the cooktop 200. Such an operation member N may be operated for the oven part 10 when the oven part 10 is operated.

**[0264]** According to the present embodiment, a predetermined number of operation members N may be disposed to be spaced apart from each other in the lateral direction on the main control panel 23. In addition, the divided regions Vp of the top plate 120 may be classified into a predetermined number of unit regions Vu, as illustrated in FIG. 49. That is, the divided regions Vp of the top plate 120 may be classified into unit regions Vu having the same number as the number of operation members N.

**[0265]** According to the present embodiment, different operation members N may be assigned to the respective unit regions Vu. For example, the top plate 120 may include twelve divided regions Vp arranged in two rows and six columns, and the divided regions Vp may be classified into six unit regions Vu. In this case, each unit region Vu may include two divided regions Vp disposed in the same column.

**[0266]** However, the number and arrangement form of the divided regions Vp, and the classification form of the unit regions Vu as well as the shape and size of each unit region Vu are not limited thereto, and it should be noted that the divided regions Vp of the top plate 120 may be classified into unit regions Vu in various forms.

**[0267]** For example, the top plate 120 may include twenty-four divided regions arranged in four rows and six columns, and the divided regions may be classified into six unit regions Vu, and each unit region Vu may include four divided regions Vp arranged in two rows and two columns.

**[0268]** Hereinafter, a case, in which six operation members N are provided on the main control panel 23, and the top plate 120 is divided into twelve divided regions Vp and six unit regions Vu, will be described as an example, to explain the configuration and operation of a cooking appliance according to another embodiment of the present disclosure.

**[0269]** According to the present embodiment, a predetermined number of operation members N may be arranged in the lateral direction. In addition, a predetermined number of unit regions Vu, that is, the number of unit regions Vu corresponding to the number of operation members N, may also be arranged in the same direction as the arrangement direction of the operation members N, that is, in the lateral direction.

**[0270]** In addition, different operation members N may be assigned to the respective unit regions Vu. For example, among the plurality of unit regions Vu, a unit region Vu disposed at the leftmost side may be assigned an operation member

N1 (hereinafter referred to as a "first operation member") disposed at the leftmost side among the plurality of operation members N, and a unit region Vu disposed at the rightmost side among the plurality of unit regions Vu may be assigned an operation member N6 (hereinafter referred to as a "sixth operation member") disposed at the rightmost side among the plurality of operation members N.

**[0271]** Each operation member N may be activated according to a vessel detection result of the cooktop 200. The activated operation member N may control an operation of the cooking appliance, more specifically an operation of the cooktop 200.

**[0272]** Selection of which one among the plurality of operation members N is to be activated may depend on a result of identifying a shape and a position of the heating target region Vr. That is, the selection of which one among the plurality of operation members N is to be activated may depend on the vessel detection result of the cooktop 200.

**[0273]** For example, among the plurality of operation members N, one operation member N assigned to a unit region Vu disposed within the heating target region Vr may be activated.

**[0274]** Each operation member N may include a knob 25. The knob 25 may be provided in a form capable of being rotationally operated. Through rotational operation of the knob 25, whether a heating part operates may be selected, a heating temperature of the heating part may be selected, or one of a plurality of cooking modes may be selected.

**[0275]** In addition, the operation member N according to the present embodiment may further include a knob ring 26. The knob ring 26 may surround the knob 25 and may be installed in the cooking appliance so as to be rotatable independently of the knob 25. For example, the knob ring 26 may be disposed radially outward of the knob 25. For example, the knob ring 26 may be formed in a ring shape surrounding the knob 25 from a radially outer side.

**[0276]** The knob ring 26 may perform a function of supporting the knob 25, and a function of finishing an exterior around the knob 25 so as to improve an appearance quality of the cooking appliance. In addition, the knob ring 26 of the present embodiment may perform a function as a timer operation switch and a function as a display for indicating a timer time and a heating power level.

**[0277]** The knob ring 26 may be installed to be rotatable independently relative to the knob 25, and a timer time may be set through a rotational manipulation of the knob ring 26 installed as described above. In addition, the knob ring 26 may include a display, and the timer time and the heating power level may be displayed through the display (see FIG. 53).

**[0278]** Referring to FIGS. 48 and 49, the cooktop 200 according to another embodiment of the present disclosure may include a cooktop control panel 230. The cooktop control panel 230 may include a display for displaying an operating state of the cooktop and various switches for controlling an operation of the cooktop 200. As an example, the display and the various switches may be provided in the form of a touch panel 231.

**[0279]** In addition, the cooktop control panel 130 may be provided with a heating zone indicator part D. The heating zone indicator part D may be configured to indicate whether the operation member N is activated. The heating zone indicator part D may be configured to indicate which one among a plurality of operation members N is activated. In addition, the heating zone indicator part D may be configured to indicate a position of a divided region that is a manipulation target of the activated operation member N (hereinafter referred to as a "target heating zone position").

**[0280]** According to the present embodiment, a set number of heating zone indicator parts D, that is, a number of heating zone indicator parts D corresponding to the number of operation members N, may be arranged in the same direction as an arrangement direction of the operation members N, that is, in a lateral direction. For example, six operation members N and six heating zone indicator parts D may be arranged in the lateral direction on the cooktop control panel 130.

**[0281]** In addition, a different heating zone indicator part D may be assigned to each operation member N. For example, a heating zone indicator part D1 (hereinafter referred to as a "first heating zone indicator part") disposed at a leftmost position among the plurality of heating zone indicator parts D may be assigned to an operation member N disposed at a leftmost position among the plurality of operation members N, and a heating zone indicator part D6 (hereinafter referred to as a "sixth heating zone indicator part") disposed at a rightmost position among the plurality of heating zone indicator parts D may be assigned to an operation member N disposed at a rightmost position among the plurality of operation members N.

**[0282]** As an example, each heating zone indicator part D may be disposed on an upper surface of the cooking appliance formed by the top plate 120. The heating zone indicator part D may be disposed at a rear side of the operation member N.

**[0283]** The heating zone indicator part D may be configured to be illuminated, as illustrated in FIG. 50. According to the present embodiment, among the plurality of heating zone indicator parts D, a heating zone indicator part D assigned to the activated operation member N may be illuminated. For example, when a sixth operation member N is activated, a sixth heating zone indicator part D6 may be illuminated.

**[0284]** Each heating zone indicator part D may include a plurality of auxiliary indicator lights 233. The auxiliary indicator lights 233 may be configured to indicate positions of an entire plurality of divided regions Vp included in the top plate 120.

**[0285]** The auxiliary indicator lights 233 provided in each heating zone indicator part D may be arranged in a form corresponding to an arrangement form of the heating zones, that is, an arrangement form of the divided regions Vp. For example, a total of twelve auxiliary indicator lights 233 may be arranged in each heating zone indicator part D to form two rows and six columns. Each auxiliary indicator light 233 may be independently illuminated.

**[0286]** According to the present embodiment, among the plurality of divided regions Vp, auxiliary indicator lights 233 corresponding to positions of the divided regions Vp disposed within a heating target region Vr may be illuminated.

**[0287]** Referring to FIGS. 23 and 50, when the heating target is seated on the cooktop 200, a position of the heating target may be detected by the sensing coil 143. According to a size and position of the heating target detected by the sensing coil 143, an indicator light L may be illuminated.

**[0288]** By the illumination of the indicator light L as described above, a position and a number of heating coils 142 prepared to heat the heating target seated on the cooktop 200 may be clearly indicated by the indicator light L. In addition, when the indicator light L is illuminated as described above, each heating zone indicator part D may clearly indicate a target heating zone position.

**[0289]** As an example, when the heating target (right circular mark) is disposed in a region assigned to two columns of unit regions Vu disposed at a rightmost position among six columns of unit regions Vu, the sixth heating zone indicator part D6 may indicate the target heating zone position. When the heating target is disposed only in two rows of unit regions Vu disposed at a front side among the two columns of unit regions Vu, among a total of twelve auxiliary indicator lights 233 of the sixth heating zone indicator part D6, only two auxiliary indicator lights 233 disposed at a right front side may be illuminated.

**[0290]** The user may clearly recognize that the sixth operation member N should be manipulated to heat the heating target by observing that the auxiliary indicator lights 233 are illuminated in the sixth heating zone indicator part D6. In addition, the user may recognize that the heating coils 142 assigned to two unit regions Vu disposed at the right front side will be operated by manipulation of the sixth operation member N by observing that the auxiliary indicator lights 233 are illuminated in the sixth heating zone indicator part D6.

**[0291]** As another example, when the heating target (left rectangular mark) is disposed in two columns of unit regions Vu disposed at a leftmost position among six columns of unit regions Vu, the first heating zone indicator part D1 may indicate the target heating zone position. When the heating target is disposed in the entirety of the two columns of unit regions Vu, that is, in a total of four unit regions Vu, among a total of twelve auxiliary indicator lights 233 of the first heating zone indicator part D1, four auxiliary indicator lights 233 disposed at a left side may be illuminated.

**[0292]** The user may clearly recognize that the first operation member N should be manipulated to heat the heating target by observing that the auxiliary indicator lights 233 are illuminated in the first heating zone indicator part D1. In addition, the user may recognize that the heating coils 142 assigned to four unit regions Vu disposed at the left side will be operated by manipulation of the first operation member N by observing that the auxiliary indicator lights 233 are illuminated in the first heating zone indicator part D1.

**[0293]** As another example, when a heating target region Vr includes only one divided region Vp within one unit region Vu including two divided regions Vp, the indicator light L may be illuminated such that only the heating target region Vr, rather than the entirety of the unit region Vu, is specified. For example, the indicator lights L may be illuminated only at both sides of one divided region Vp included in the heating target region Vr.

**[0294]** As illustrated in FIGS. 23 and 51, the heating target (right circular mark) may be disposed in two columns of unit regions Vu disposed at a rightmost position among six columns of unit regions Vu, and the heating target may be disposed to occupy only a portion of a region assigned to each heating zone.

**[0295]** In this case, in each unit region Vu, only some of a plurality of heating coils 142 assigned to the corresponding unit region Vu may participate in heating of the heating target, and the indicator light L may be illuminated to reflect this. For example, the indicator light L may indicate that only four among a total of eight heating coils 142 included in four unit regions Vu will participate in heating of the heating target.

**[0296]** Even in this case, since the heating target is disposed in four unit regions Vu at the right side, four auxiliary indicator lights 233 disposed at the right side may be illuminated in the sixth heating zone indicator part D6.

**[0297]** As illustrated in FIG. 52, when a plurality of heating targets are disposed on the cooktop 200 along the lateral direction and a plurality of heating targets are also disposed along the front-rear direction, matching targets of the operation members N and the heating zone indicator parts D may be selected in consideration of relative lateral positions and relative front-rear positions among heating target regions Vr.

**[0298]** As an example, matching targets of the operation members N and the heating zone indicator parts D may be assigned according to relative lateral positions among the heating target regions Vr. For example, among a plurality of heating target regions Vr, a heating target region Vr disposed at a leftmost position may be selected as a matching target of the first operation member N and the first heating zone indicator part D1, and among the plurality of heating target regions Vr, a heating target region Vr disposed at a rightmost position may be selected as a matching target of the sixth operation member N and the sixth heating zone indicator part D6.

**[0299]** In addition, matching targets of the operation members N and the heating zone indicator parts D may be selected according to relative front-rear positions among the heating target regions Vr. As an example, among two heating target regions Vr (two small circular marks disposed second from the right) disposed at the same position in the lateral direction, one disposed at a more rear side may be selected as a matching target of one disposed at a more left side among two operation members N and heating zone indicator parts D.

**[0300]** For example, among the two heating target regions Vr, one disposed at a more rear side may be selected as a matching target of the fourth operation member N and the fourth heating zone indicator part D4, and among the two heating target regions Vr, one disposed at a more front side may be selected as a matching target of the fifth operation member N and the fifth heating zone indicator part D5.

**[0301]** Referring to FIGS. 23 and 53, when a position of the heating target seated on the cooktop 200 is detected by the sensing coil 143, a position and a number of heating coils 142 prepared to heat the heating target seated on the cooktop 200 may be clearly indicated by the indicator light L, and a target of the operation member N that should be manipulated to heat the heating target may be clearly indicated by the heating zone indicator part D.

**[0302]** In the state described above, the user may manipulate the knob 25 by pressing and rotating the knob 25. By manipulation of the knob 25, a heating power level of the heating zone may be adjusted. In addition, the user may manipulate the knob ring 26 by rotating the knob ring 26. By manipulation of the knob ring 26, a timer time may be adjusted.

**[0303]** The embodiments are described above with reference to a number of illustrative embodiments thereof. However, the embodiments are provided as examples, and numerous other modifications and equivalent embodiments can be drawn by one having ordinary skill in the art from the embodiments. Thus, the technical scope of protection of the subject matter of the disclosure is to be defined according to the following claims.

#### [Description of Reference Numerals]

##### [0304]

|         |                       |      |                             |
|---------|-----------------------|------|-----------------------------|
| 10:     | Oven part             | 151: | Upper support surface       |
| 11:     | Door                  | 152: | Lower support surface       |
| 13, 23; | Main control panel    | 153: | Side portion                |
| 24:     | Display               | 155: | Fastening boss              |
| 100:    | Cooktop               | 160: | Ferrite core                |
| 105:    | Control part          | 161: | Ferrite module              |
| 110:    | Case                  | 170: | Electrical part             |
| 111:    | Bottom portion        | 171: | Main PCB                    |
| 113:    | Sidewall portion      | 172: | Switching mode power supply |
| 115:    | Support protrusion    | 173: | Inverter PCB                |
| 120:    | Top plate             | 174: | Resonant PCB                |
| 130:    | Cooktop control panel | 175: | EMI filter                  |
| 140:    | Coil assembly         | 176: | Fan                         |
| 141:    | Pattern coil array    | 180: | Lighting module             |
| 142:    | Heating coil          | 190: | Diffusion member            |
| 143:    | Sensing coil          | 233: | Auxiliary indicator light   |
| 144:    | Temperature sensor    | B:   | Substrate part              |
| 150:    | Supporter             | D:   | Heating zone indicator part |
|         |                       | N:   | Operation member            |

#### Claims

1. A cooking appliance comprising: a case forming an accommodation space therein and having an open upper side;

a top plate disposed above the case to cover the accommodation space;

a supporter disposed below the top plate; and

a lighting module supported by the supporter and configured to emit light toward a light display region of the top plate,

wherein the case includes a bottom portion defining a lower boundary surface of the accommodation space, and wherein at least a portion of the lighting module is disposed between the supporter and the bottom portion.

2. The cooking appliance of claim 1, wherein the lighting module includes a light source part configured to emit light, and a substrate part on which the light source part is mounted, and wherein the substrate part is disposed between the supporter and the bottom portion.

3. The cooking appliance of claim 2, further comprising a coil assembly disposed between the top plate and the supporter,  
wherein the light source part is disposed between the substrate part and the coil assembly.
- 5 4. The cooking appliance of claim 1, further comprising a diffusion member disposed between the lighting module and the top plate to diffuse light emitted from the lighting module.
5. The cooking appliance of claim 1, further comprising a coil assembly disposed between the top plate and the supporter,  
10 wherein the supporter and the coil assembly are respectively provided with a light-transmitting hole forming a passage connecting the lighting module and the light display region.
6. The cooking appliance of claim 5, further comprising a diffusion member installed on the supporter or the coil assembly to cover the light-transmitting hole,  
15 wherein the diffusion member diffuses light directed toward the light display region through the light-transmitting hole.
7. The cooking appliance of claim 1, wherein the supporter is provided with a lower support surface disposed to face the bottom portion, and  
20 wherein the lighting module is installed on the lower support surface.
8. The cooking appliance of claim 1, further comprising: a coil assembly disposed between the top plate and the supporter; and  
25 an electrical part including at least one of a power processing part configured to supply power to the coil assembly and a coil control part configured to control operation of the coil assembly,  
wherein at least a portion of the electrical part is disposed between the supporter and the bottom portion.
9. The cooking appliance of claim 8, wherein the supporter is provided with a lower support surface disposed to face the bottom portion, and  
30 wherein the power processing part and the coil control part are installed on the lower support surface.
10. The cooking appliance of claim 8, wherein the supporter is provided with a lower support surface disposed to face the bottom portion,  
35 wherein at least one of the power processing part and the coil control part includes a substrate part installed on the lower support surface and a circuit element mounted on the substrate part, and wherein the circuit element is disposed between the bottom portion and the substrate part.
11. The cooking appliance of claim 8, wherein the electrical part is disposed in the accommodation space, wherein the supporter and the case are detachably coupled, and  
40 wherein the case is separated from the supporter to open the accommodation space downward.
12. The cooking appliance of claim 8, further comprising a coil assembly disposed between the top plate and the electrical part,  
45 wherein the supporter is disposed between the coil assembly and the electrical part to support the coil assembly and the electrical part, respectively.
13. The cooking appliance of claim 1,  
50 further comprising a coil assembly disposed between the top plate and the lighting module,  
wherein the coil assembly includes a plurality of heating coils disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and a light-transmitting hole forming a passage connecting the lighting module and the light display region, and  
wherein the light-transmitting hole is disposed between the heating coils in the horizontal direction.
- 55 14. The cooking appliance of claim 1, further comprising a coil assembly disposed between the top plate and the supporter,  
wherein the coil assembly includes a substrate part disposed between the top plate and the lighting module, a

heating coil formed as a pattern on the substrate part, and a light-transmitting hole formed in the substrate part to form a passage connecting the lighting module and the light display region, wherein a plurality of the heating coils are disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and  
 wherein the light-transmitting hole is disposed between the heating coils and is formed to penetrate the substrate part in a vertical direction.

**15.** The cooking appliance of claim 1, further comprising a coil assembly disposed between the top plate and the lighting module,

wherein the coil assembly includes a plurality of heating coils disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and a plurality of light-transmitting holes forming passages connecting the lighting module and the light display region, and wherein the light-transmitting holes are disposed between the heating coils in a lateral direction.

**16.** The cooking appliance of claim 15, wherein, in the lateral direction, the light-transmitting holes are disposed between the heating coils and outside the heating coils, and wherein the heating coils and the light-transmitting holes are alternately arranged in the lateral direction.

**17.** The cooking appliance of claim 1, further comprising a coil assembly disposed between the top plate and the lighting module,

wherein the coil assembly includes a plurality of pattern coil arrays arranged along a lateral direction, and a plurality of light-transmitting holes forming passages connecting the lighting module and the light display region, and wherein the light-transmitting holes are disposed between the pattern coil arrays in the lateral direction.

**18.** The cooking appliance of claim 17, wherein each of the pattern coil arrays includes a plurality of heating coils arranged along a front-rear direction,

wherein the coil assembly further includes a sensing coil disposed between the heating coils, wherein, in one of the pattern coil arrays, the plurality of heating coils and the sensing coil are arranged along the front-rear direction, and wherein the plurality of pattern coil arrays and the light-transmitting holes are arranged along the lateral direction.

**19.** The cooking appliance of claim 18, wherein the heating coils and the sensing coil are stacked in a vertical direction to form the coil assembly.

**20.** The cooking appliance of claim 1, further comprising a coil assembly disposed between the top plate and the lighting module,

wherein the coil assembly includes a plurality of heating coils disposed to be spaced apart from each other by a predetermined interval along a horizontal direction, and a plurality of light-transmitting holes forming passages connecting the lighting module and the light display region, and wherein the light-transmitting holes are formed to penetrate the coil assembly and are disposed in regions where the heating coils are not disposed.

FIG. 1

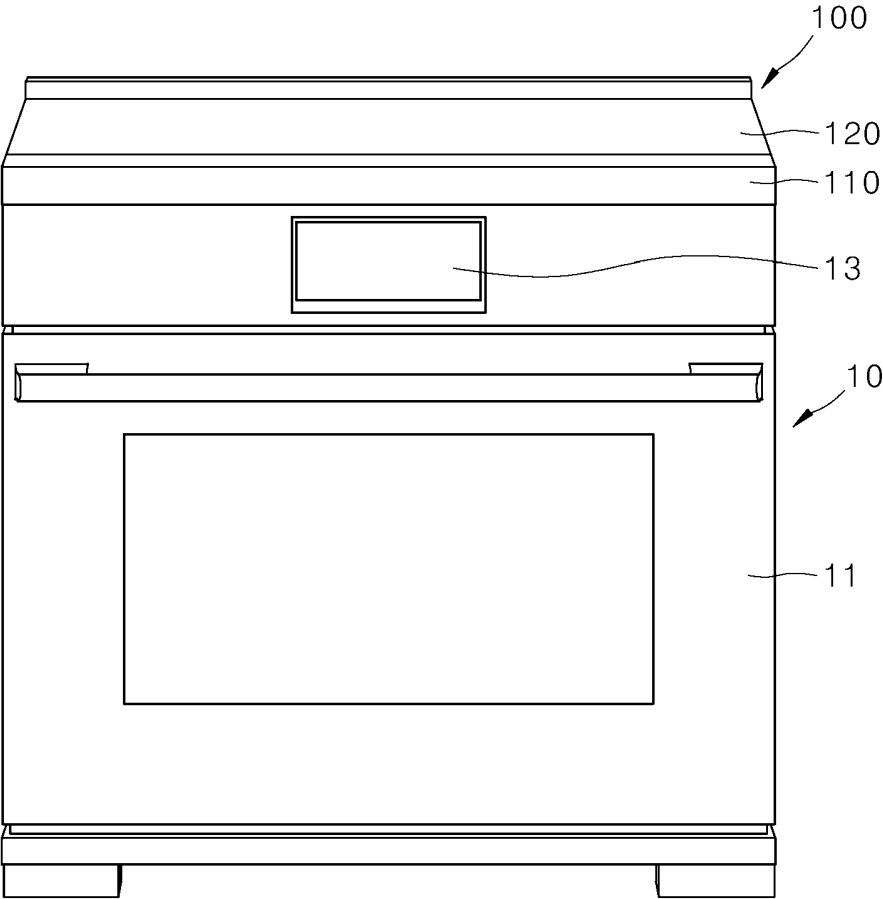
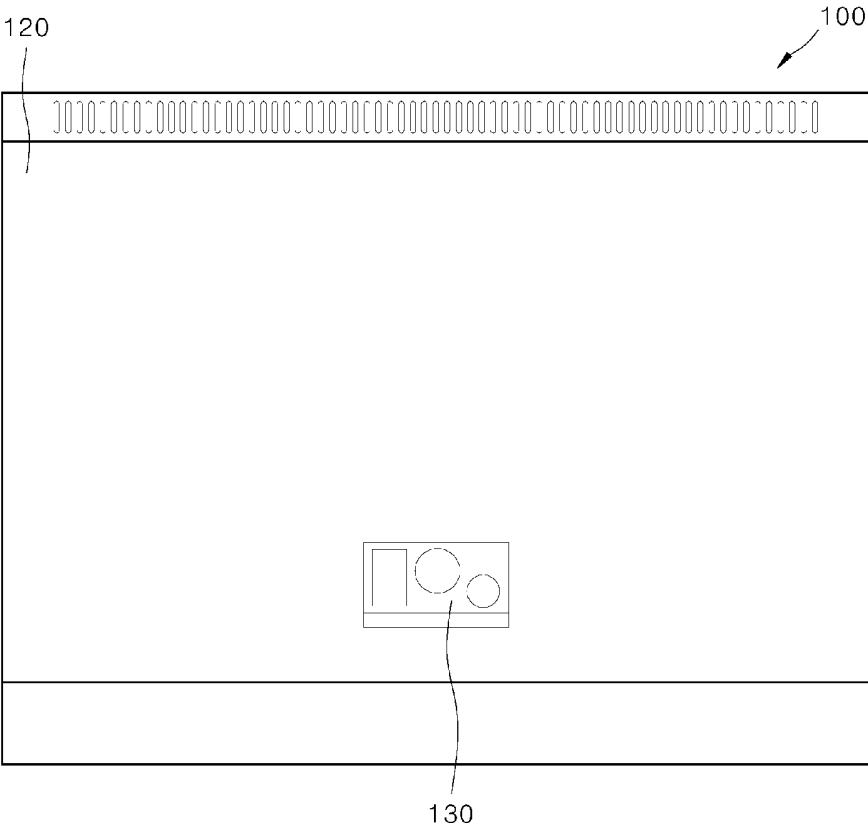
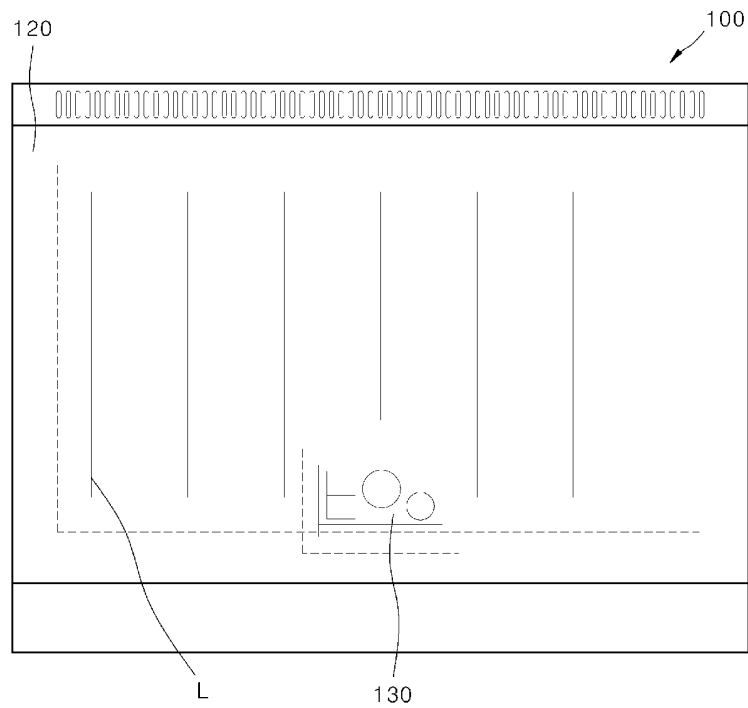


FIG. 2



**FIG. 3**



**FIG. 4**

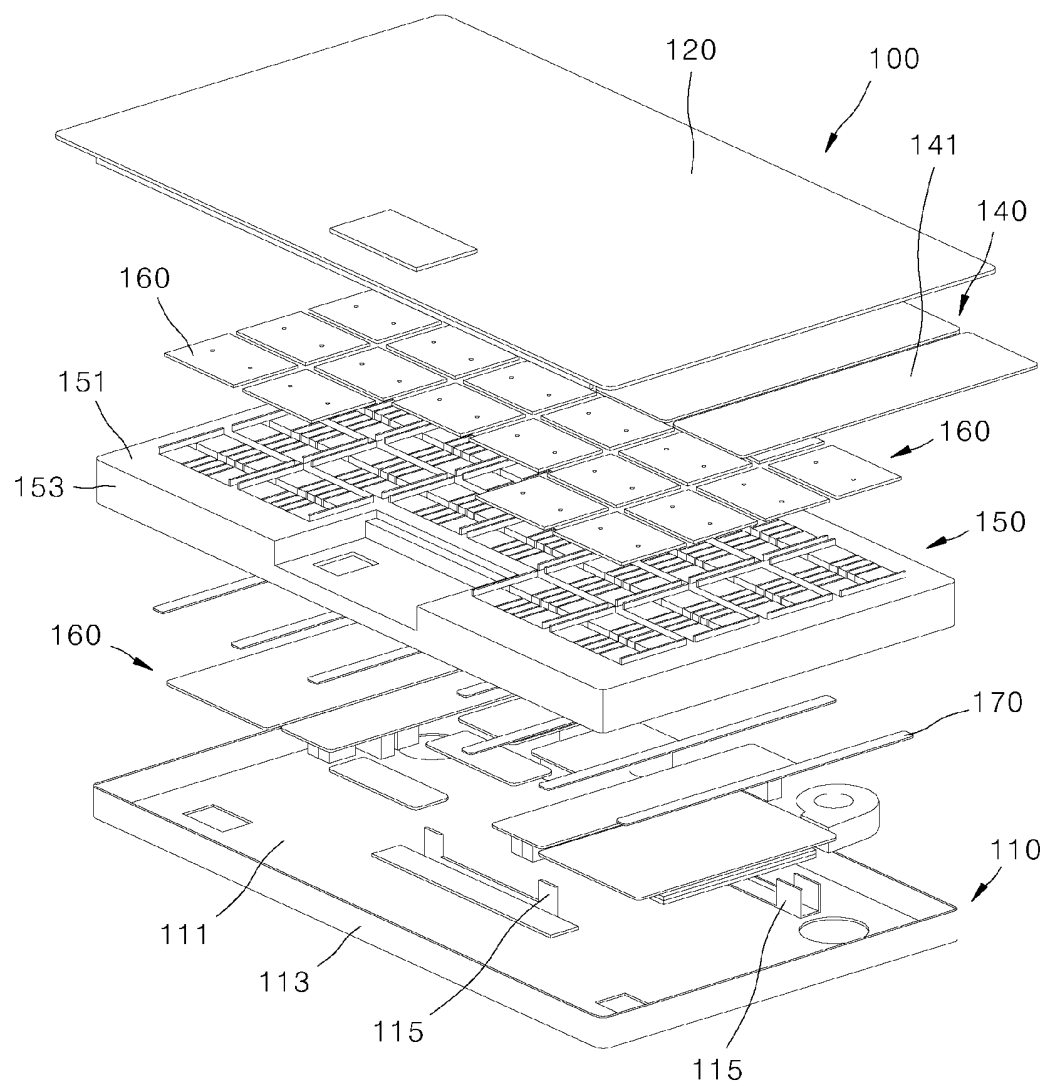


FIG. 5

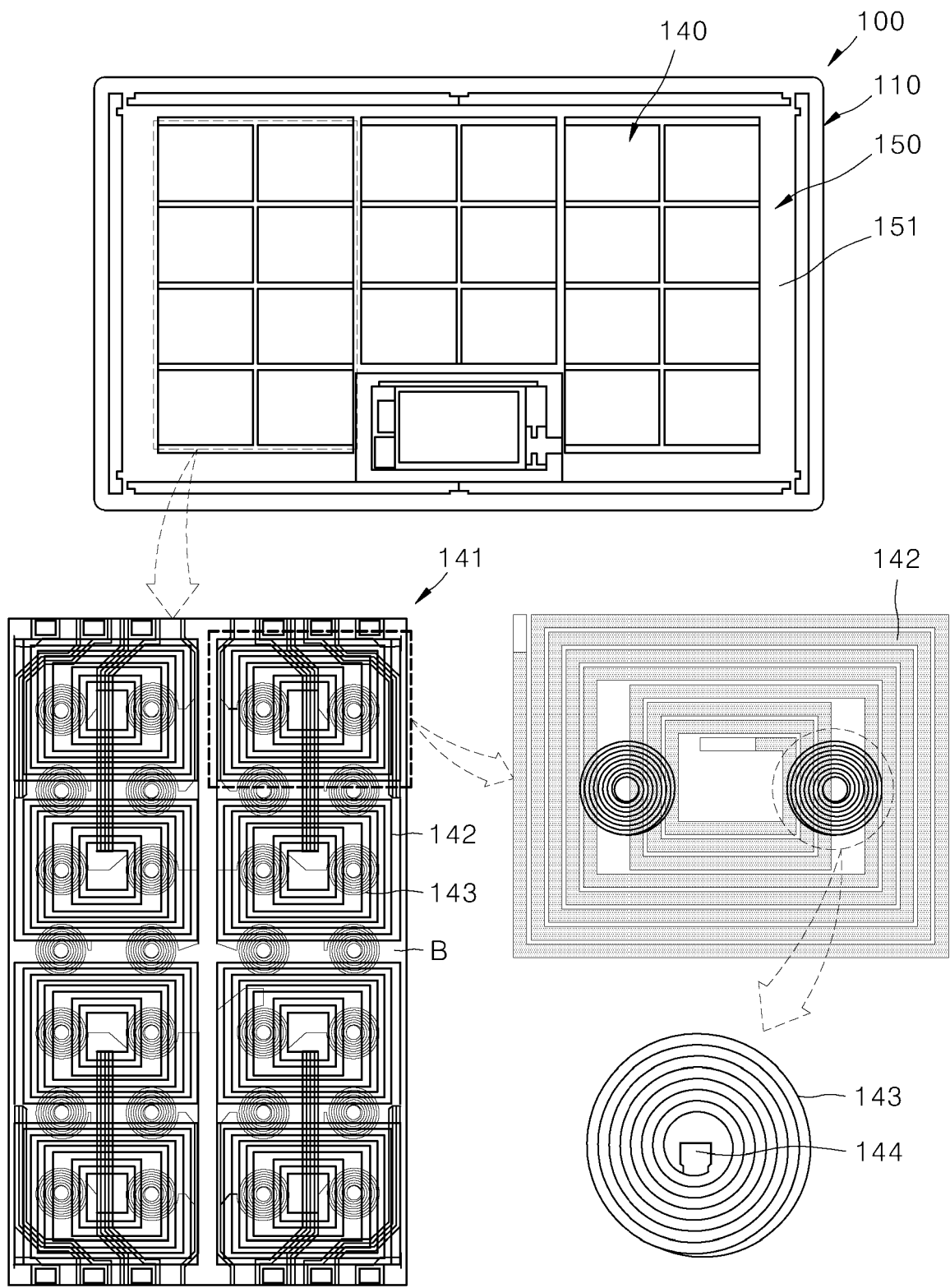


FIG. 6

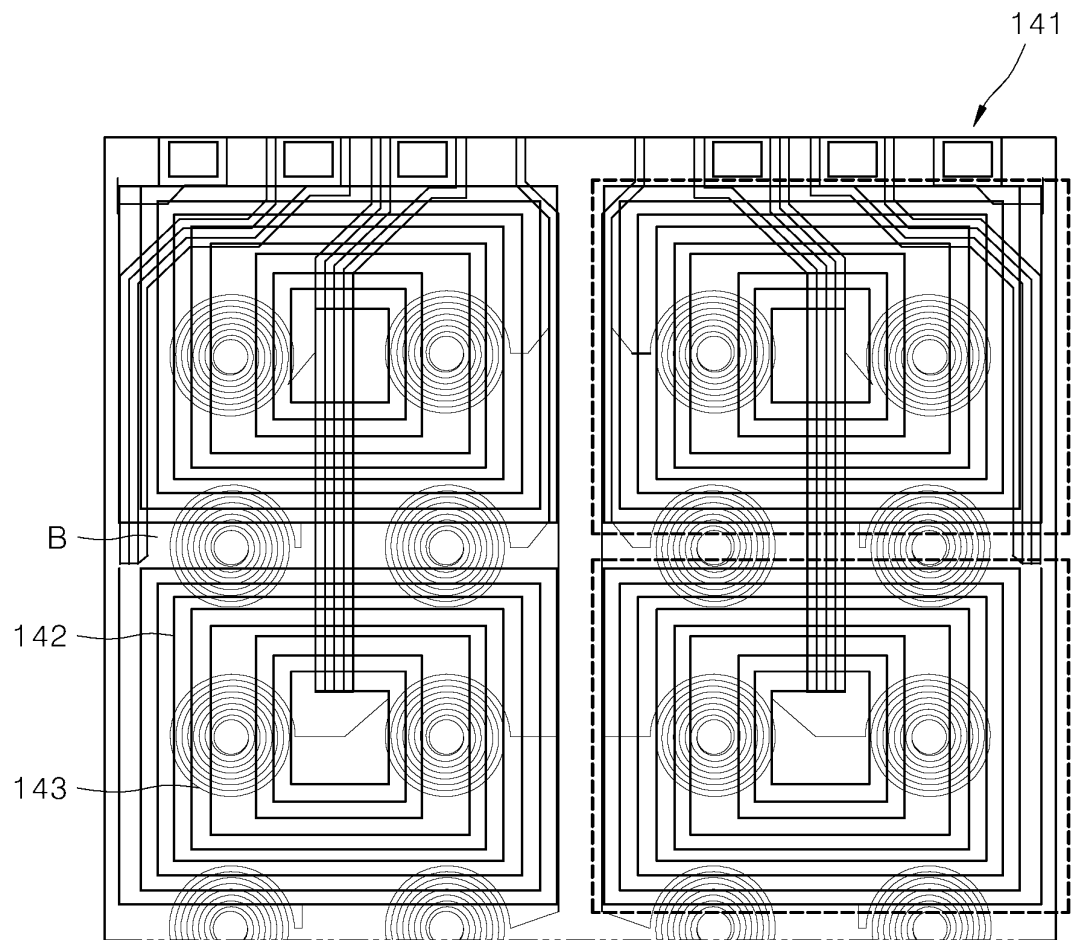


FIG. 7

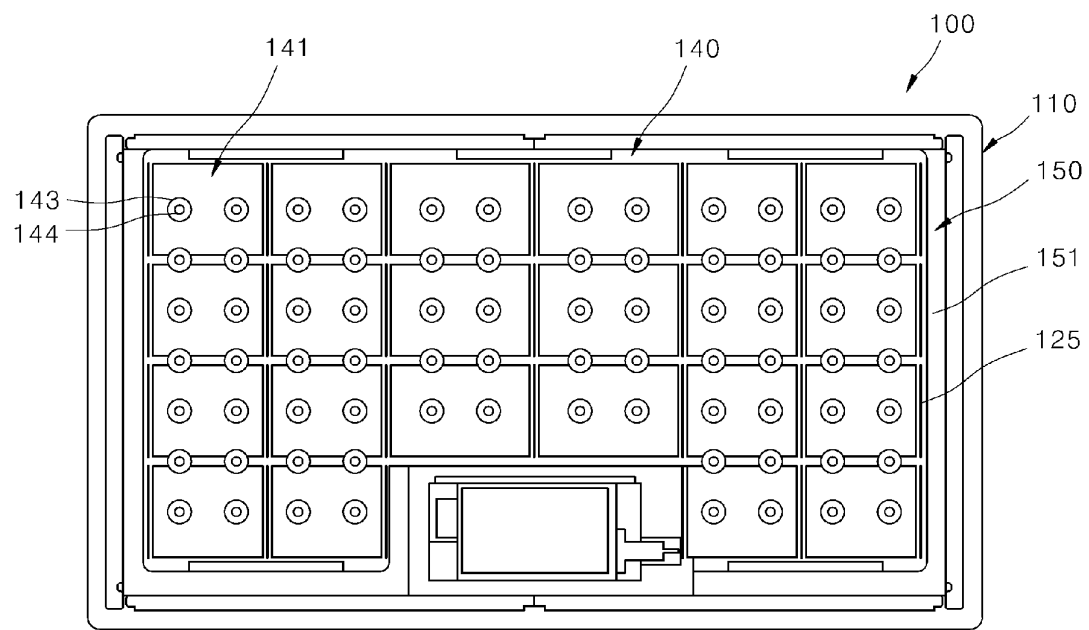


FIG. 8

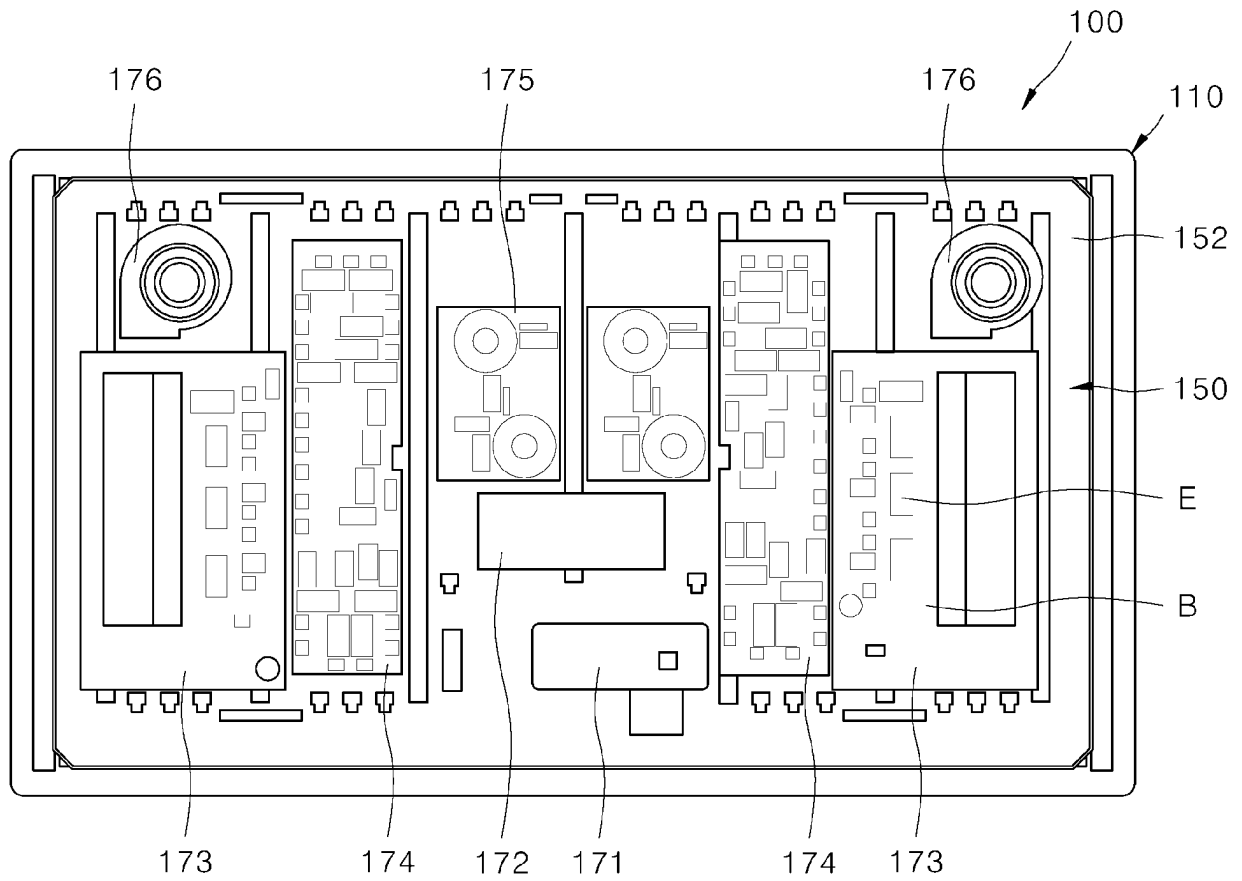


FIG. 9

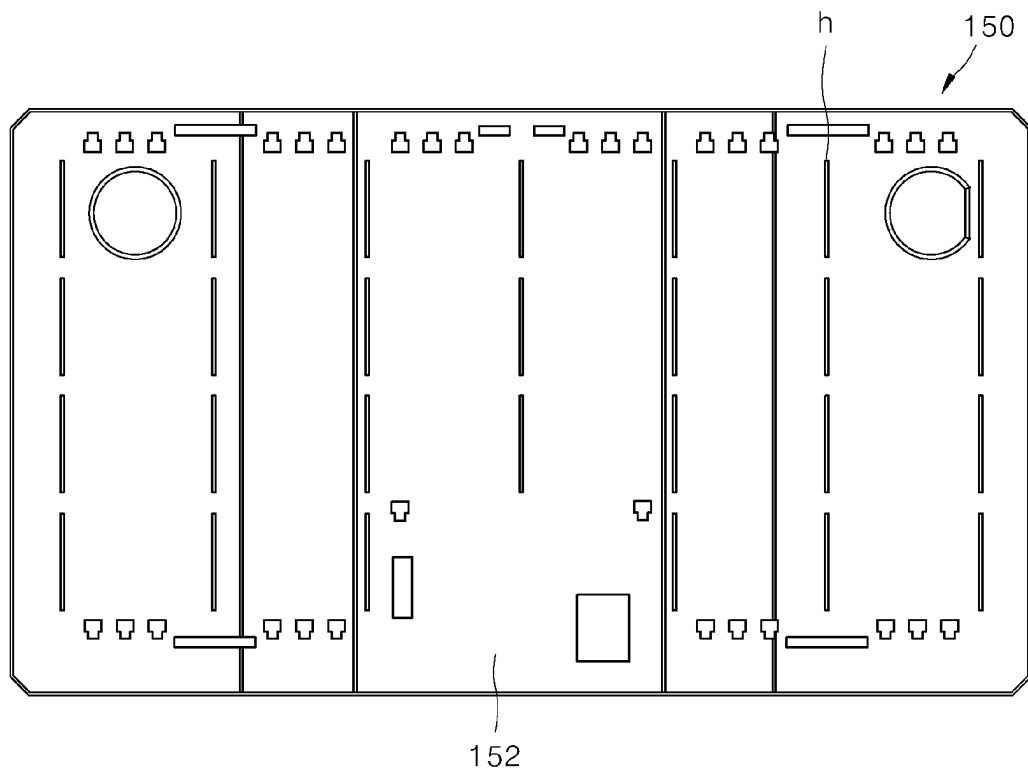


FIG. 10

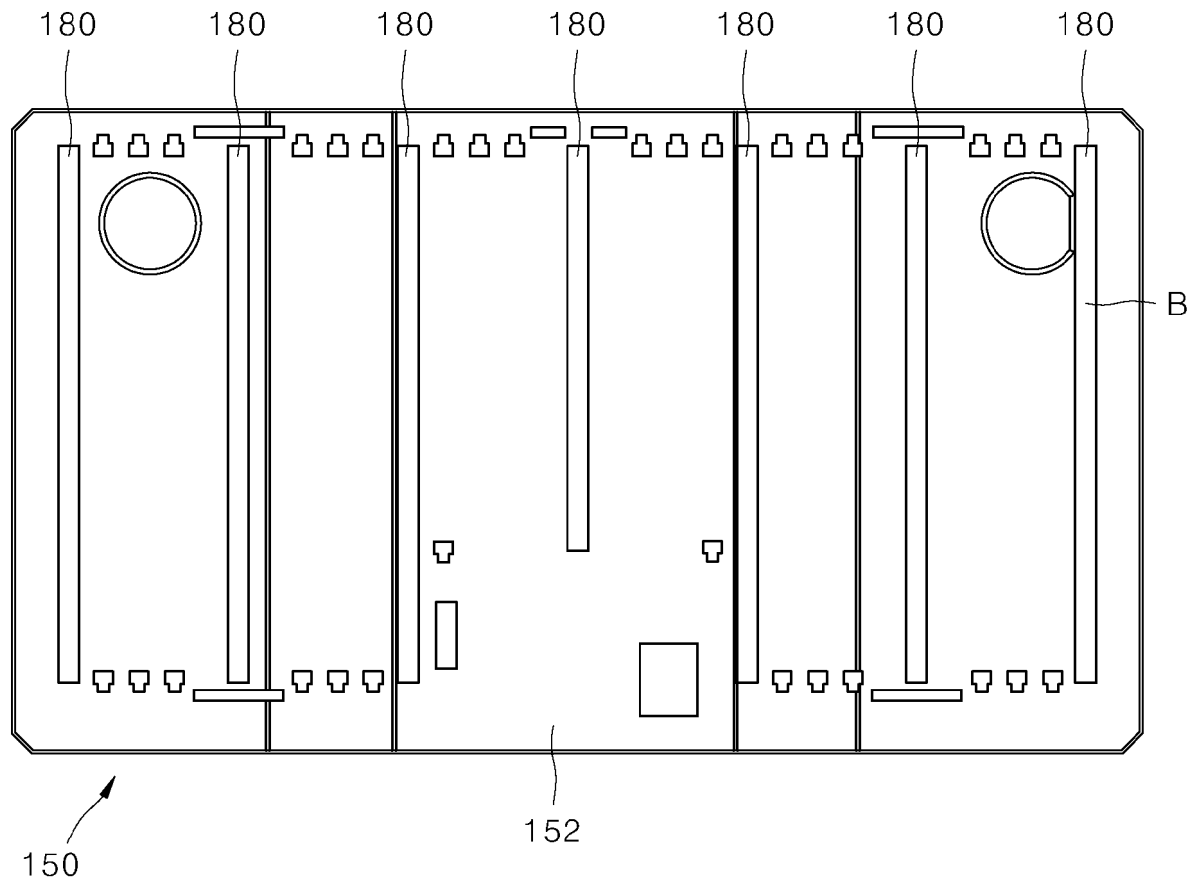


FIG. 11

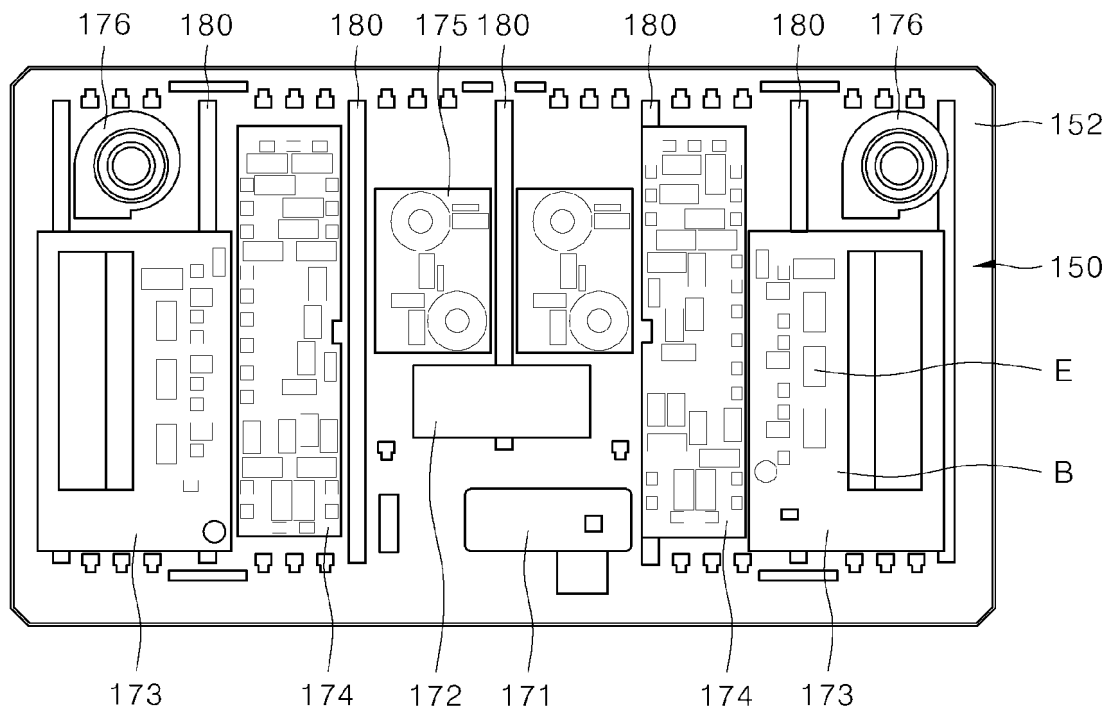


FIG. 12

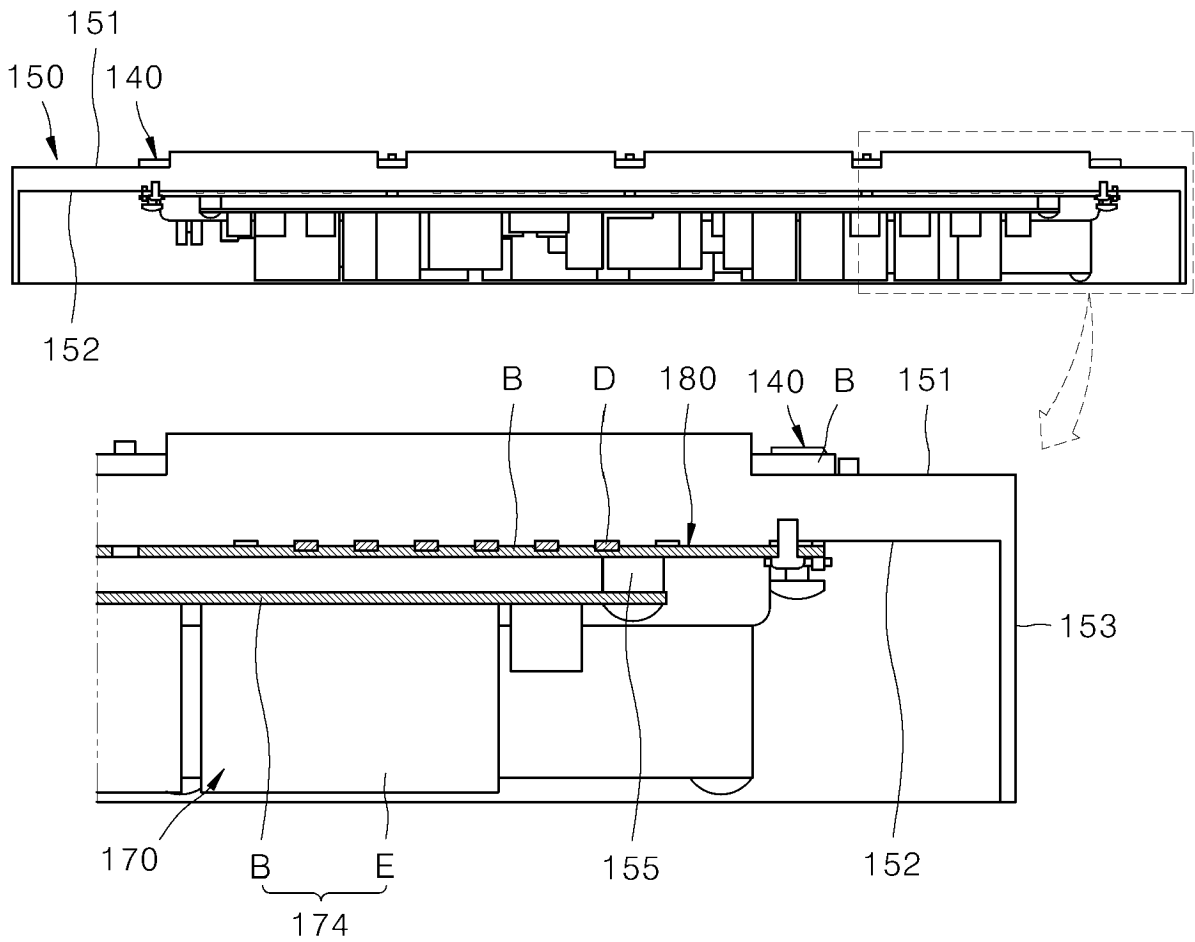


FIG. 13

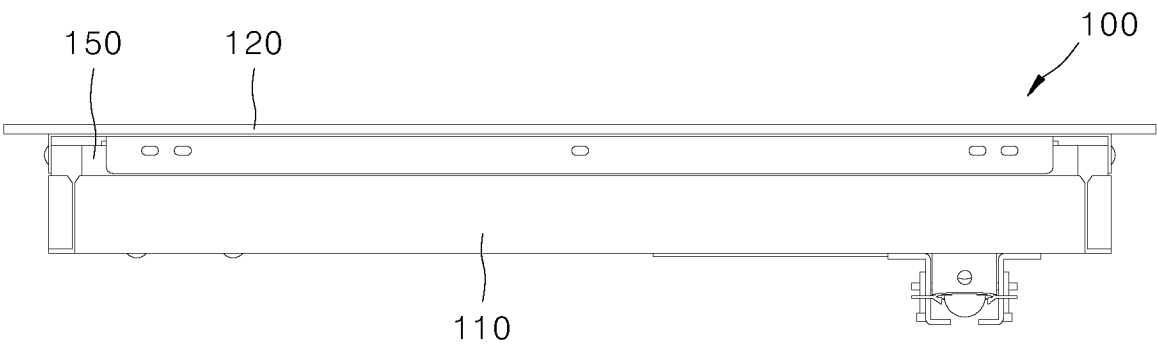


FIG. 14

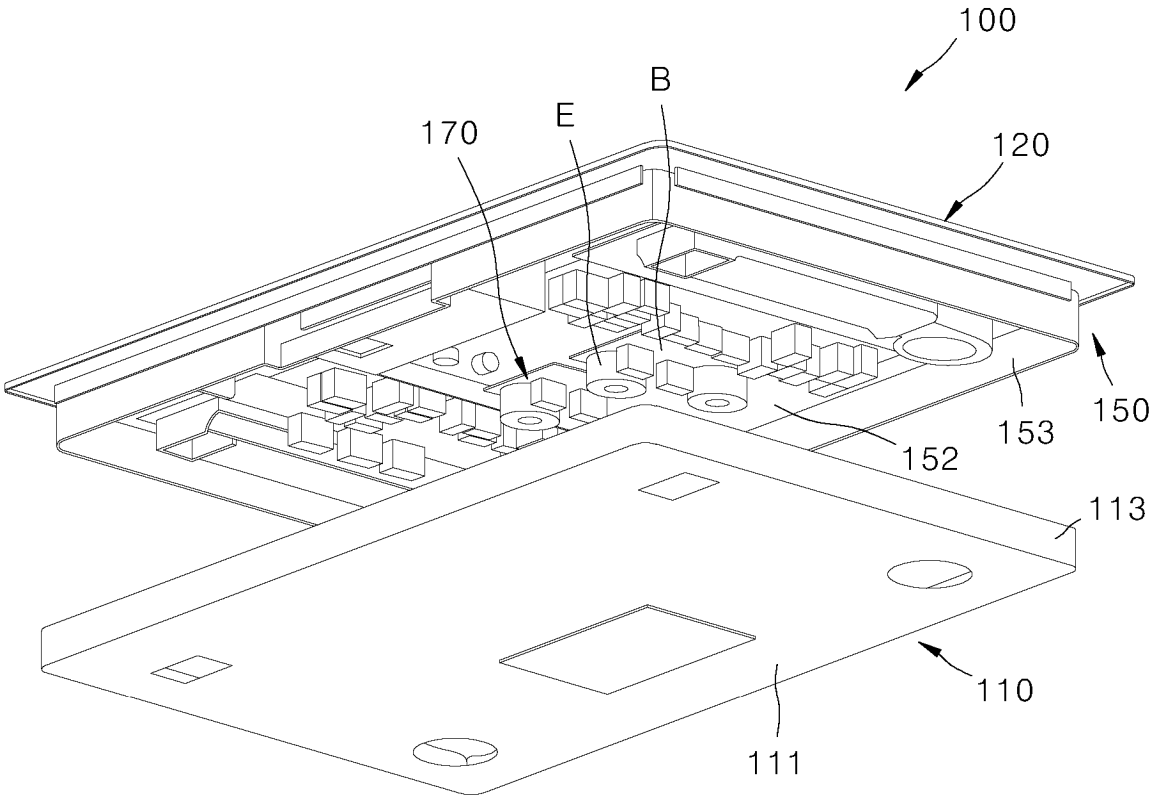


FIG. 15

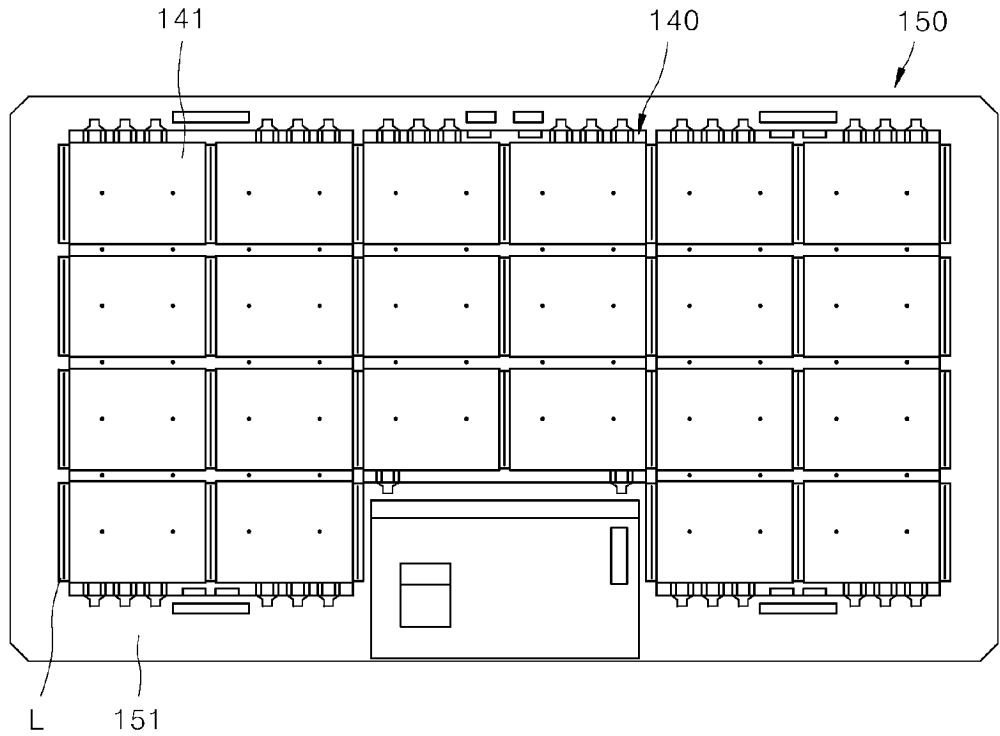


FIG. 16

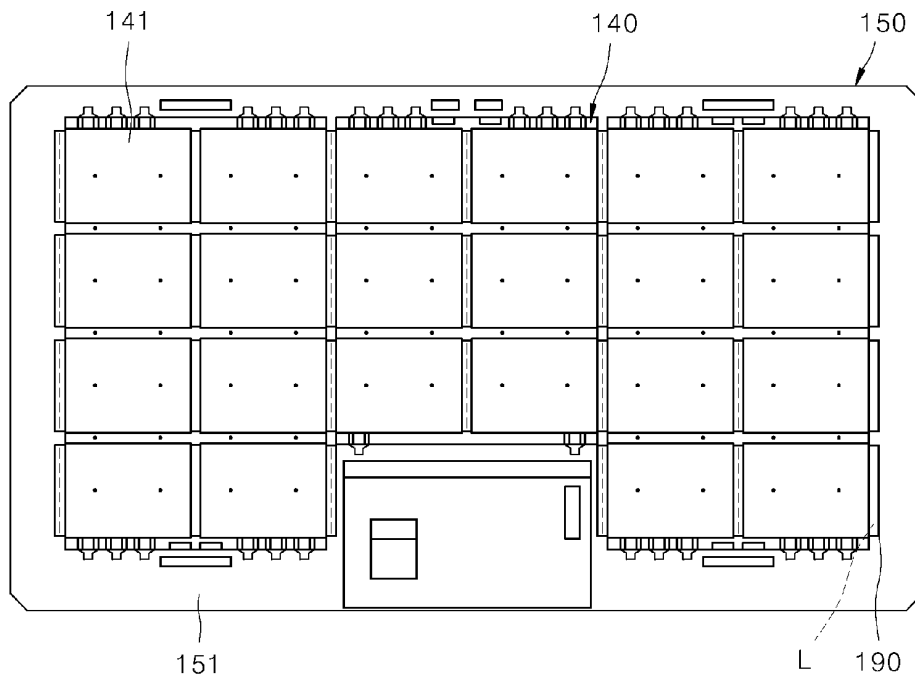


FIG. 17

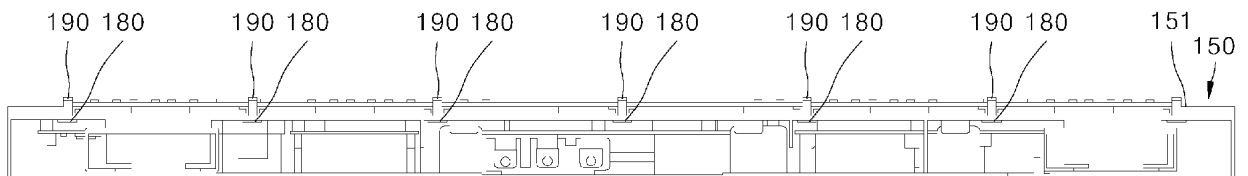


FIG. 18

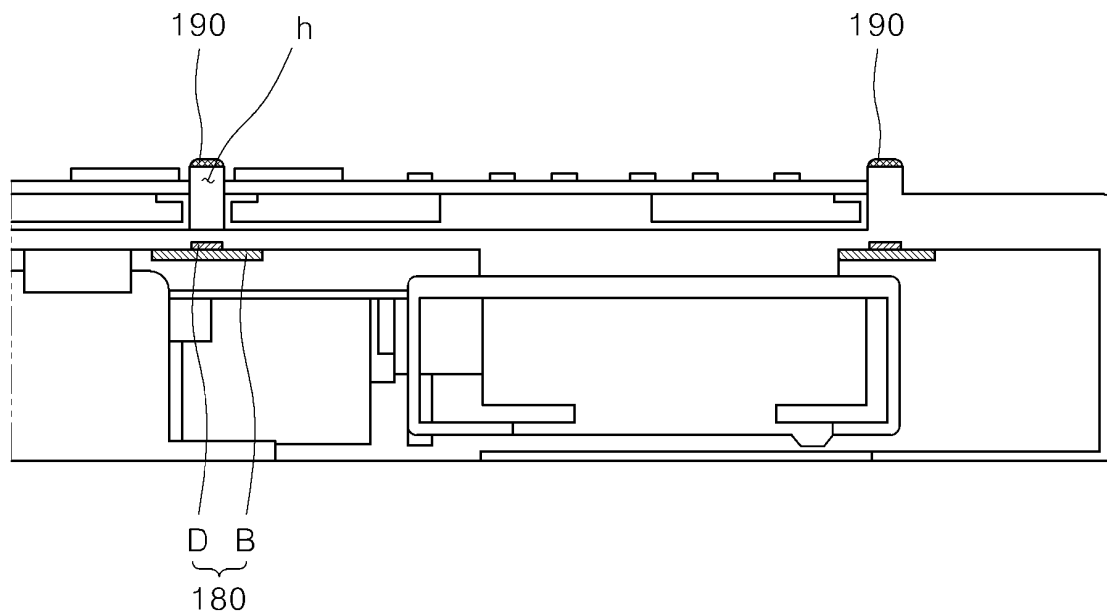


FIG. 19

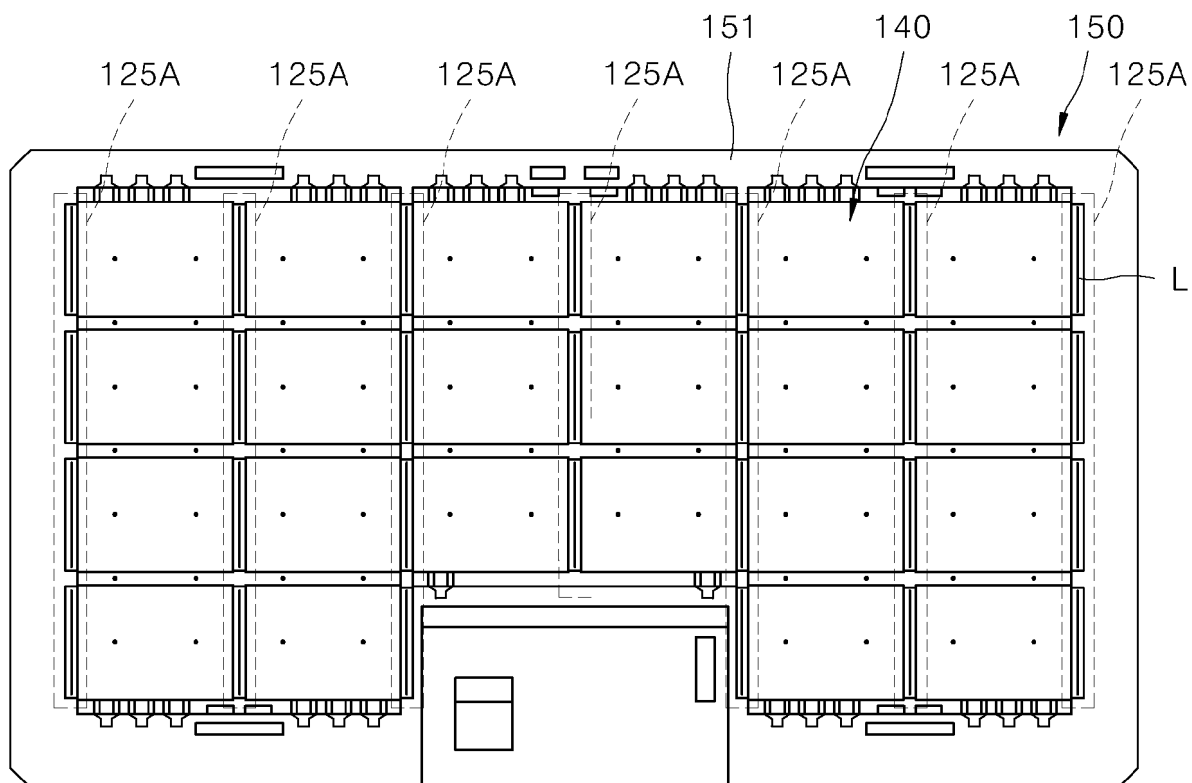


FIG. 20

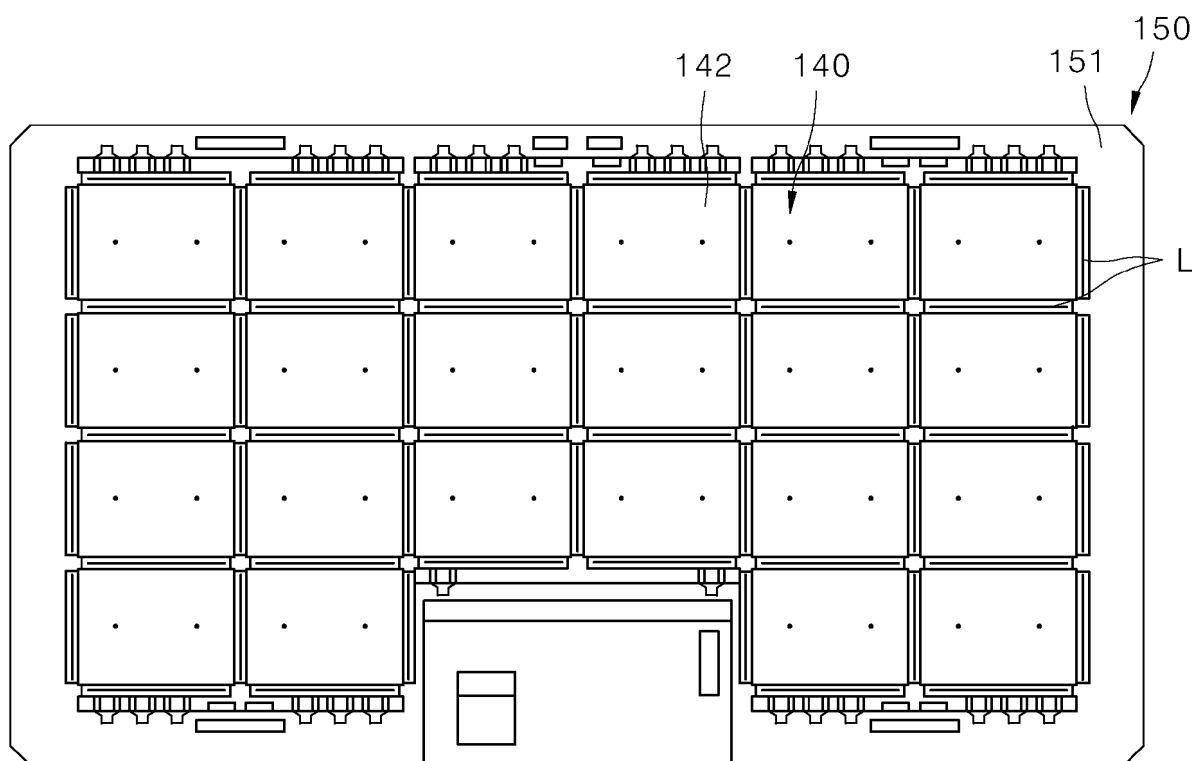


FIG. 21

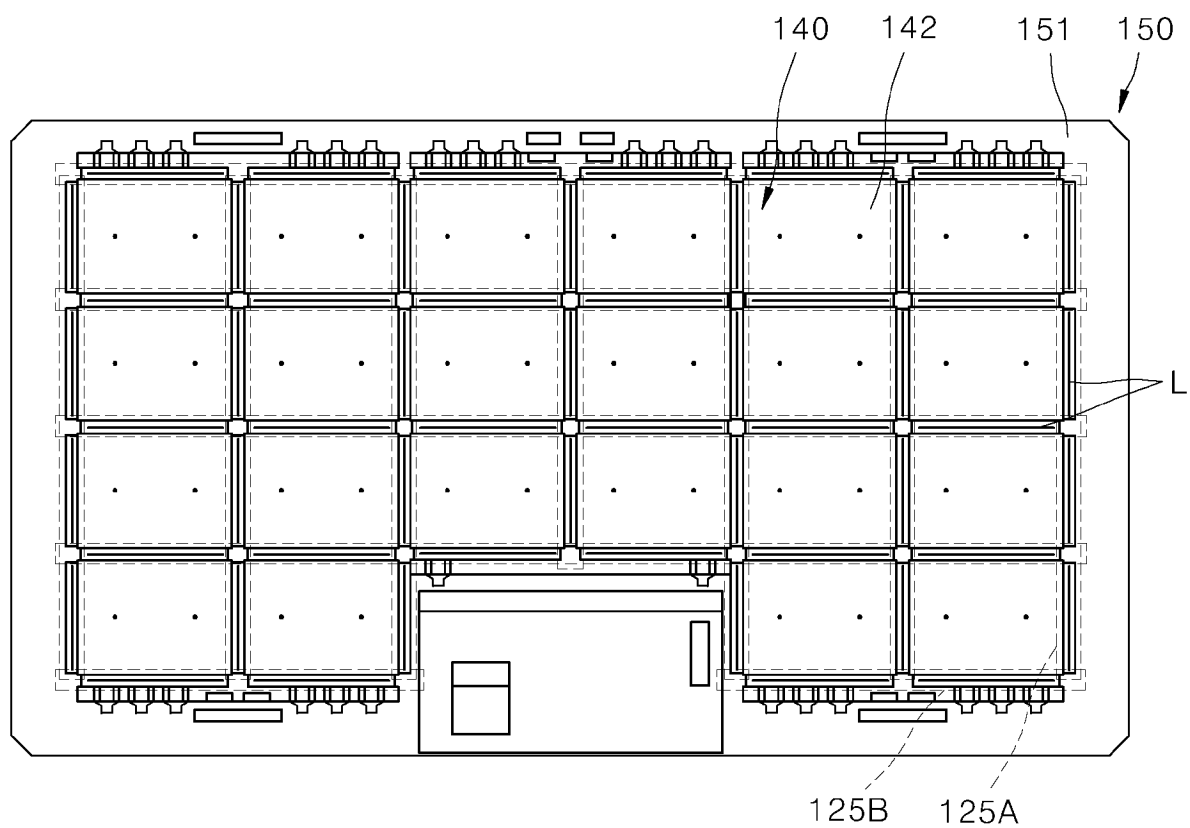


FIG. 22

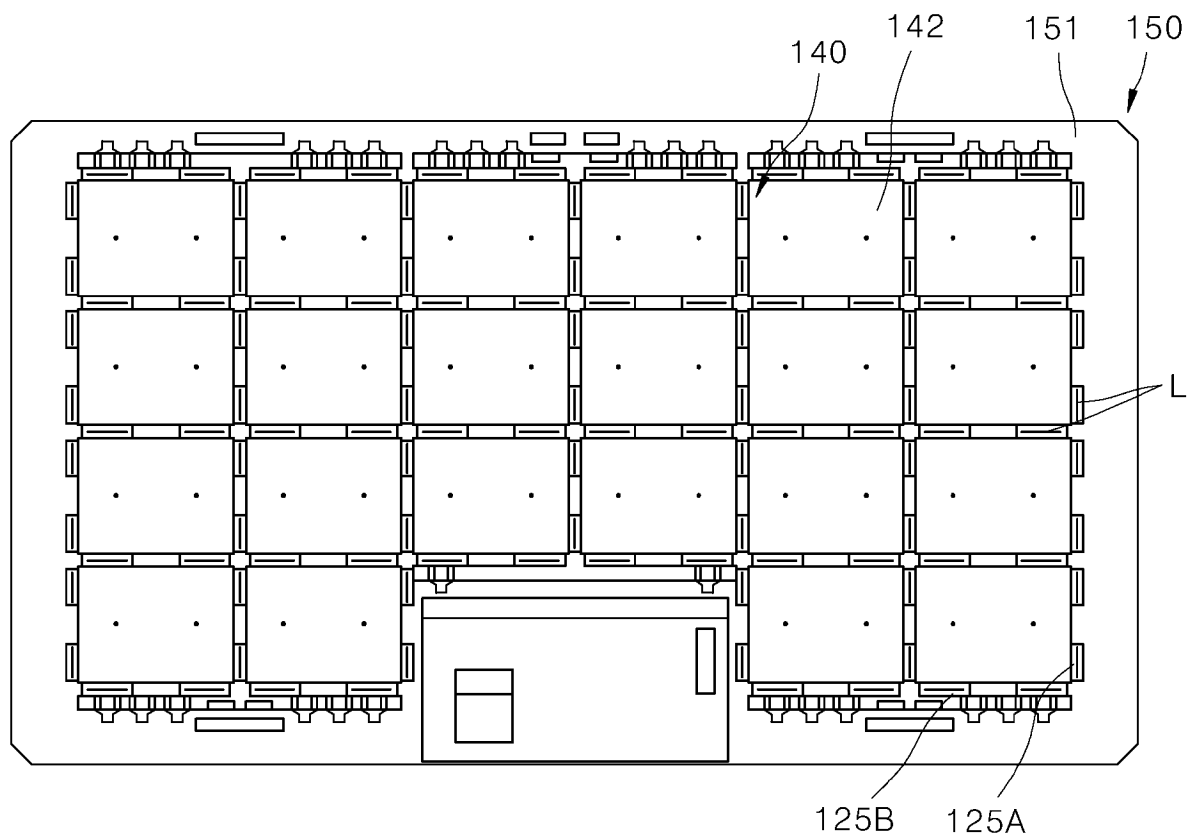


FIG. 23

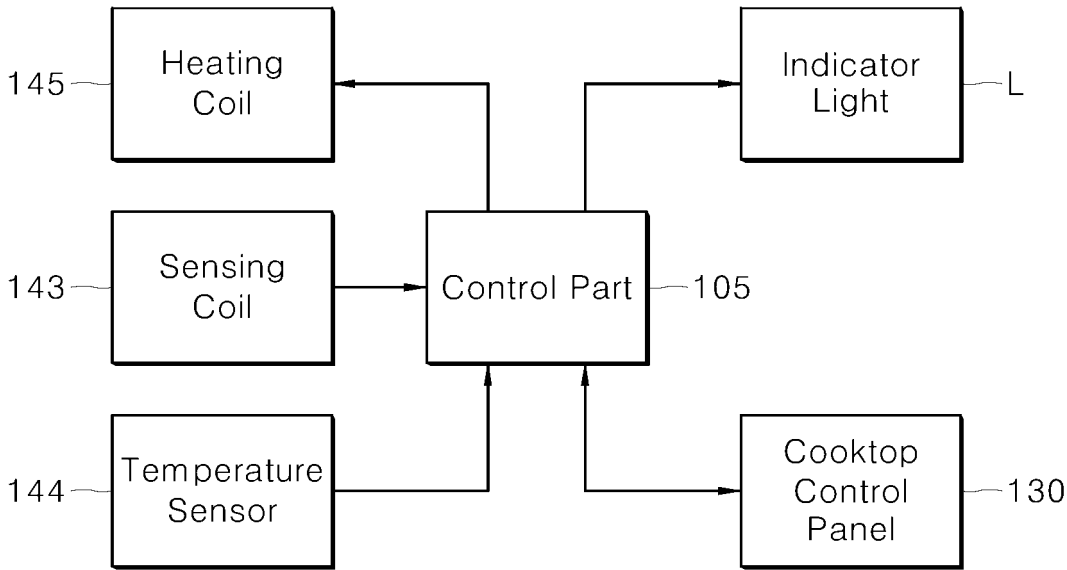


FIG. 24

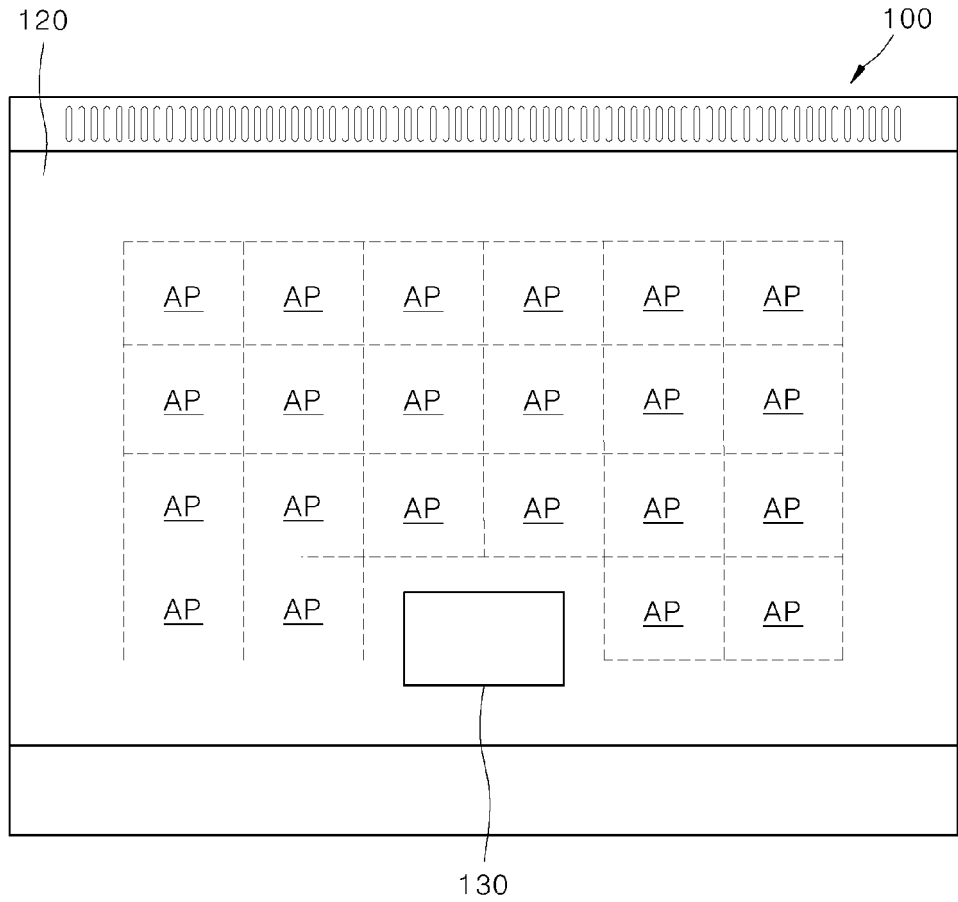


FIG. 25

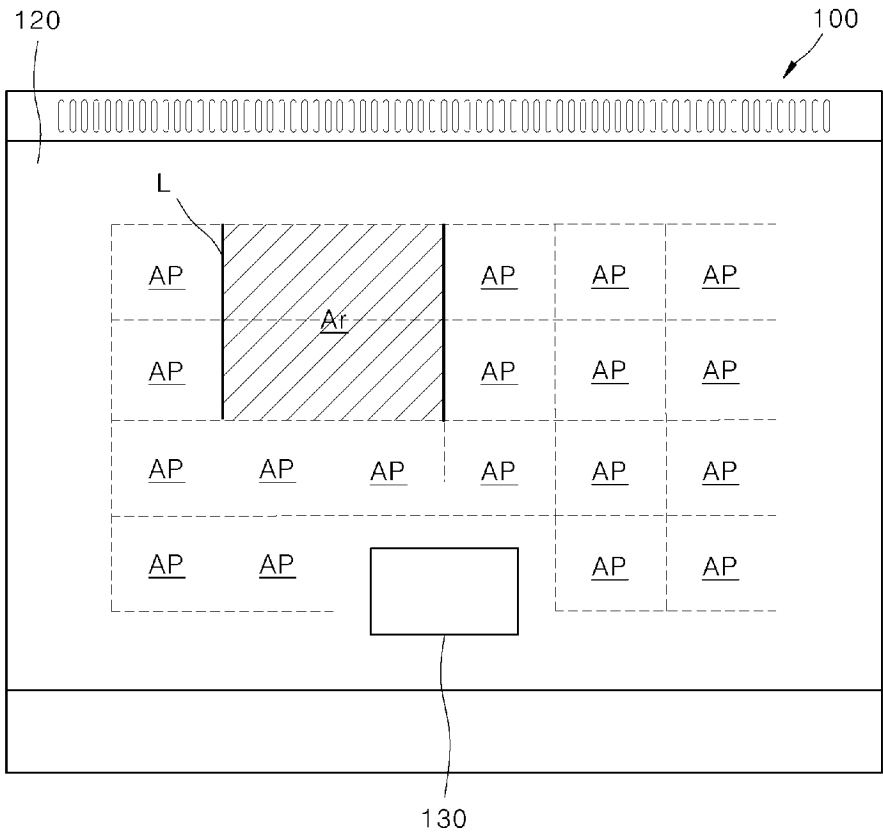


FIG. 26

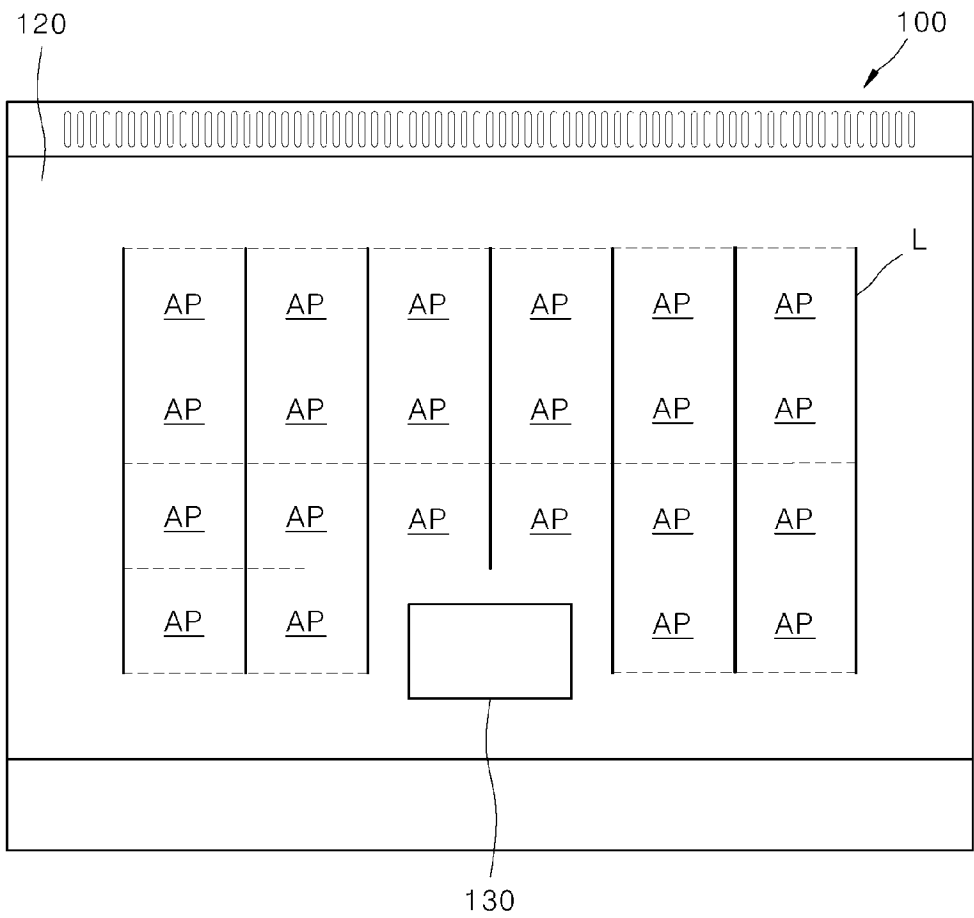


FIG. 27

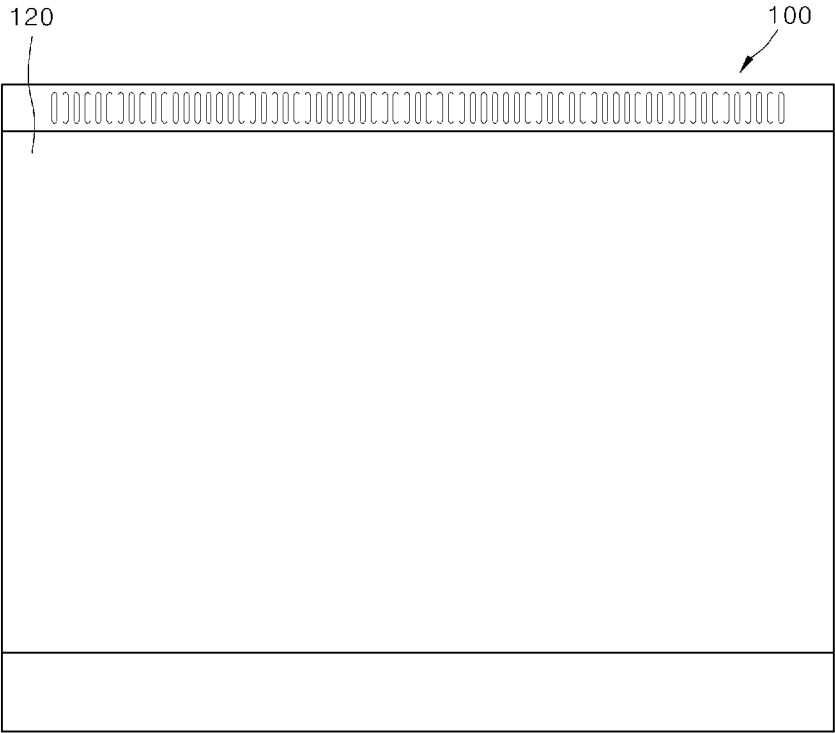


FIG. 28

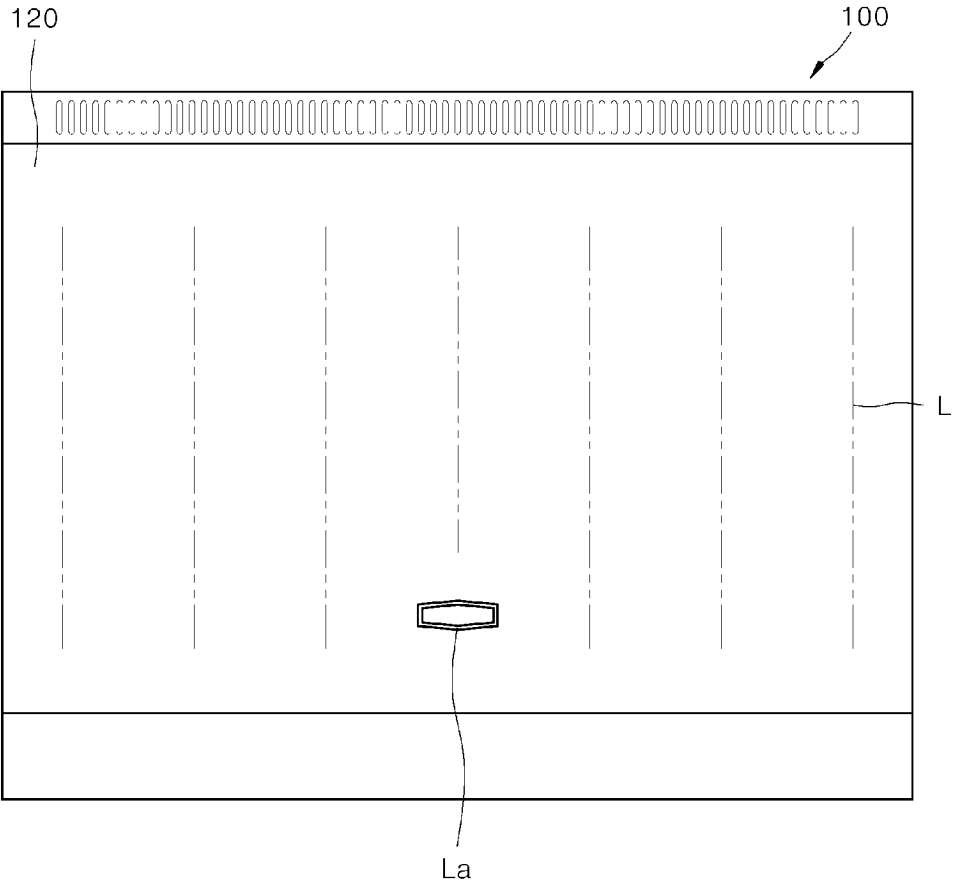


FIG. 29

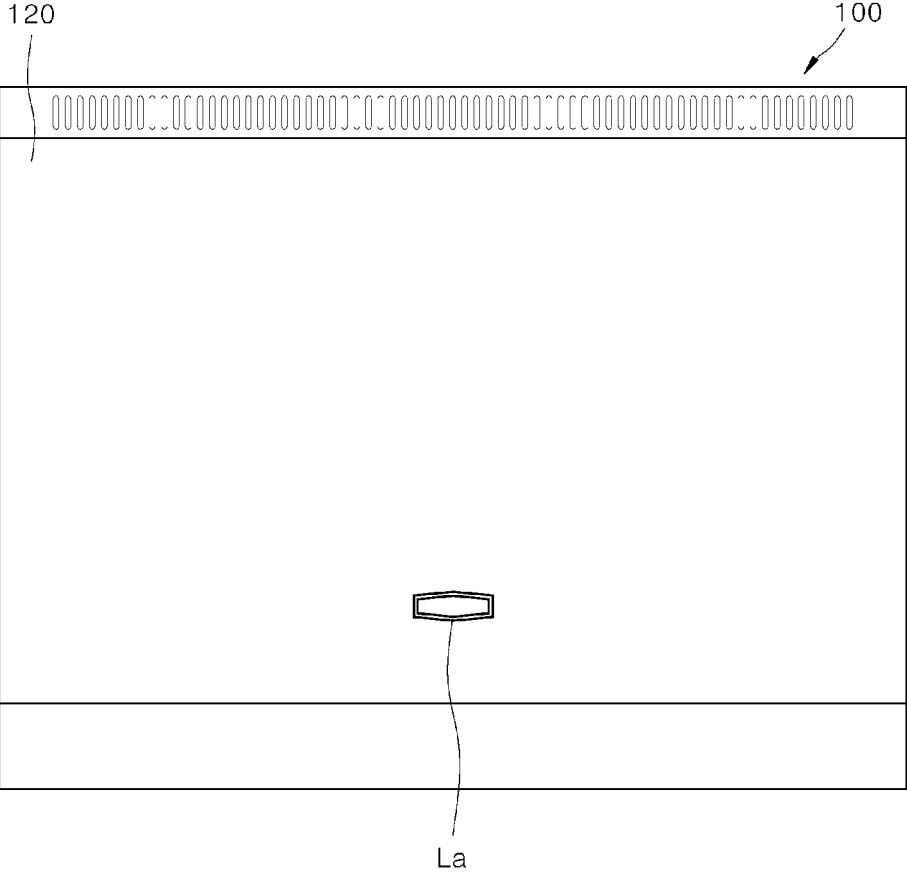


FIG. 30

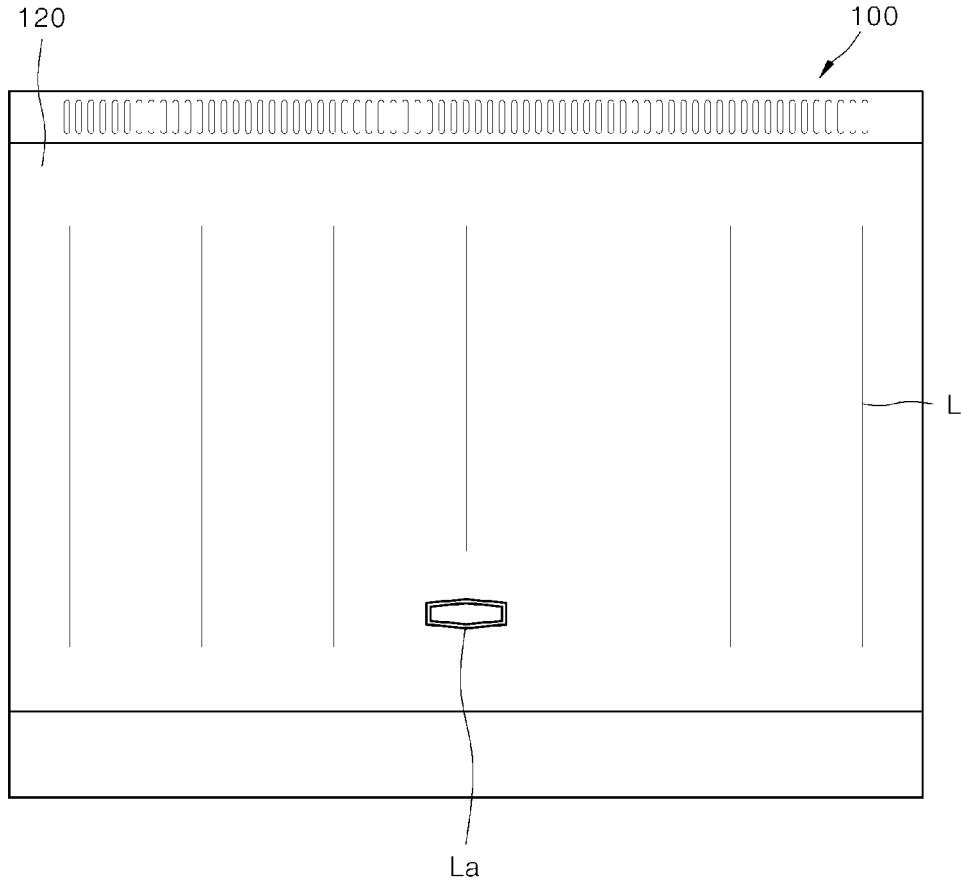


FIG. 31

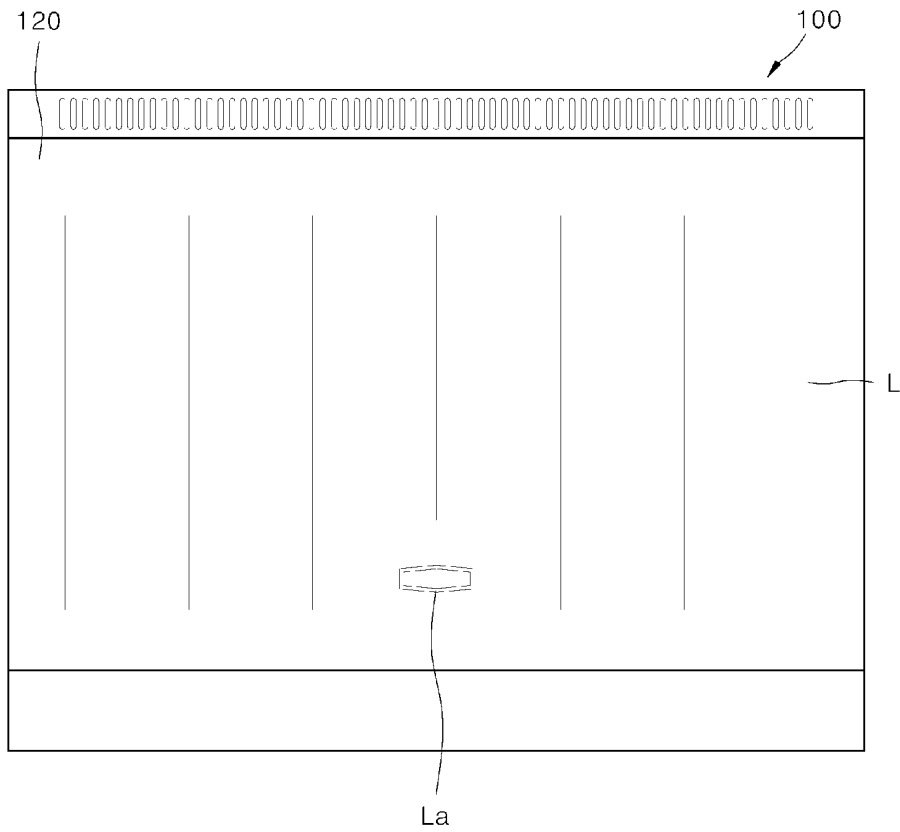


FIG. 32

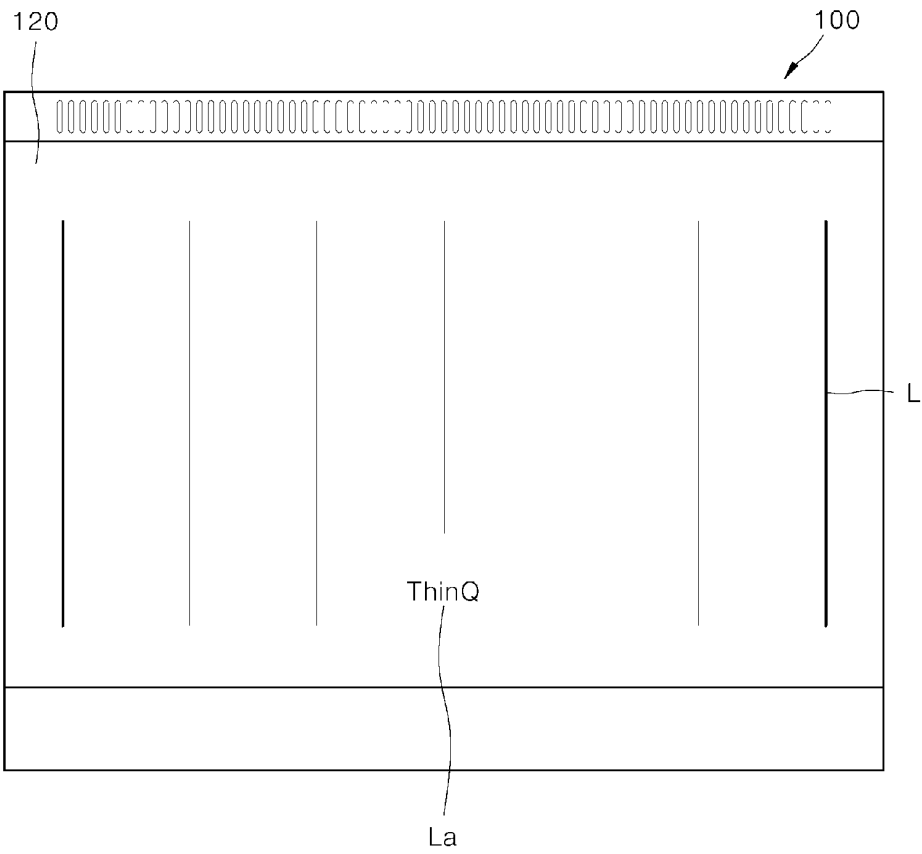


FIG. 33

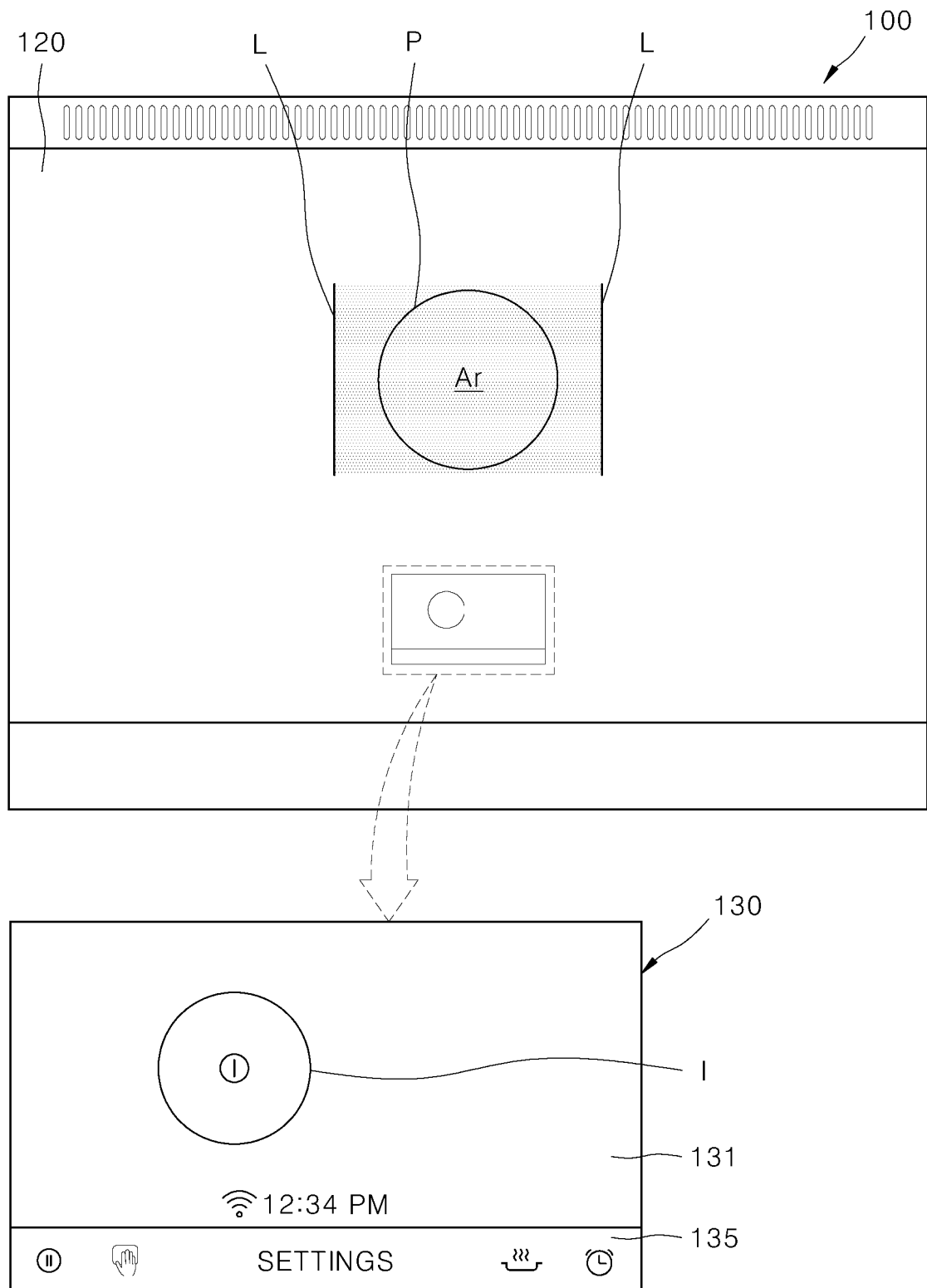


FIG. 34

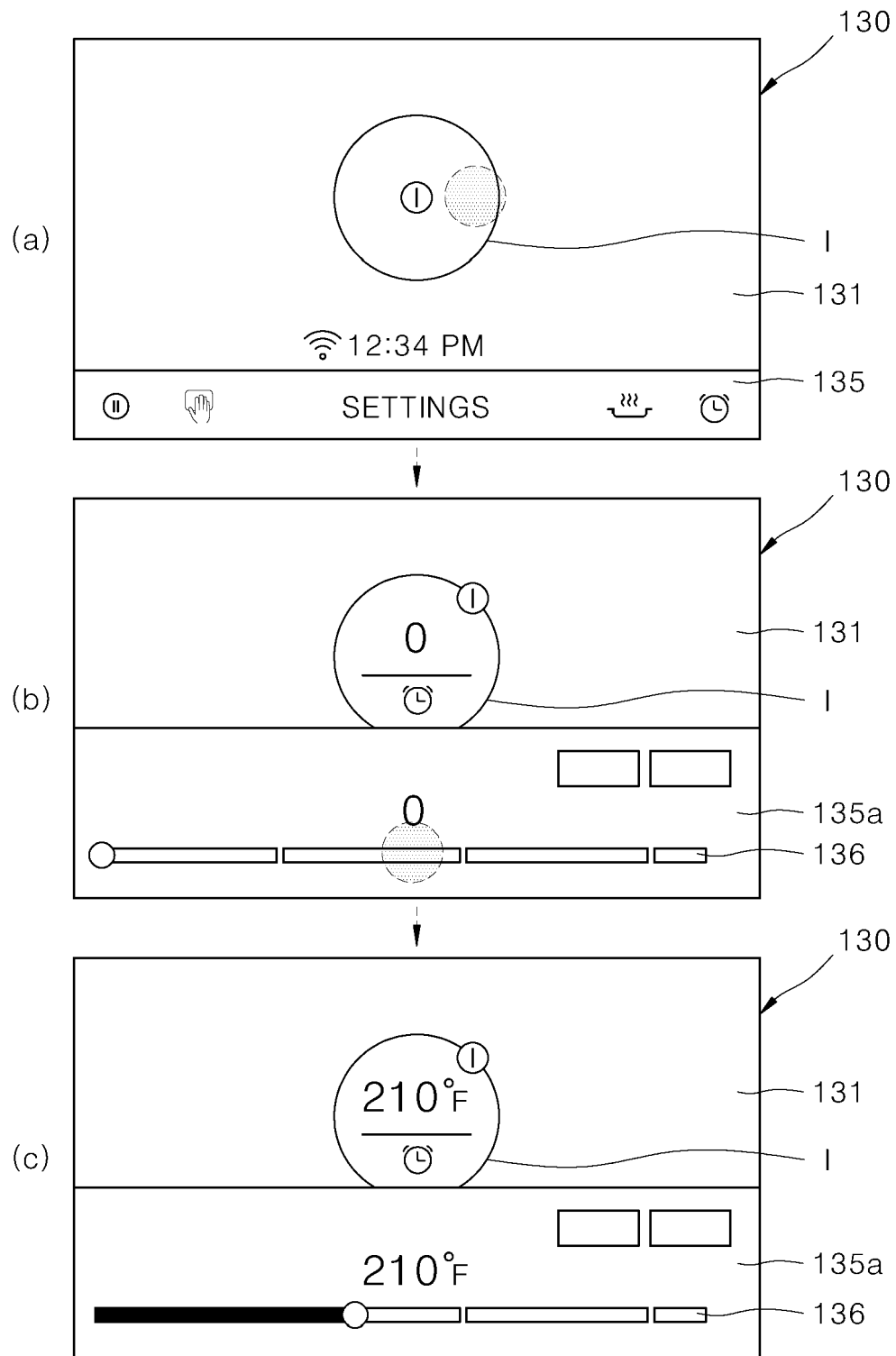


FIG. 35

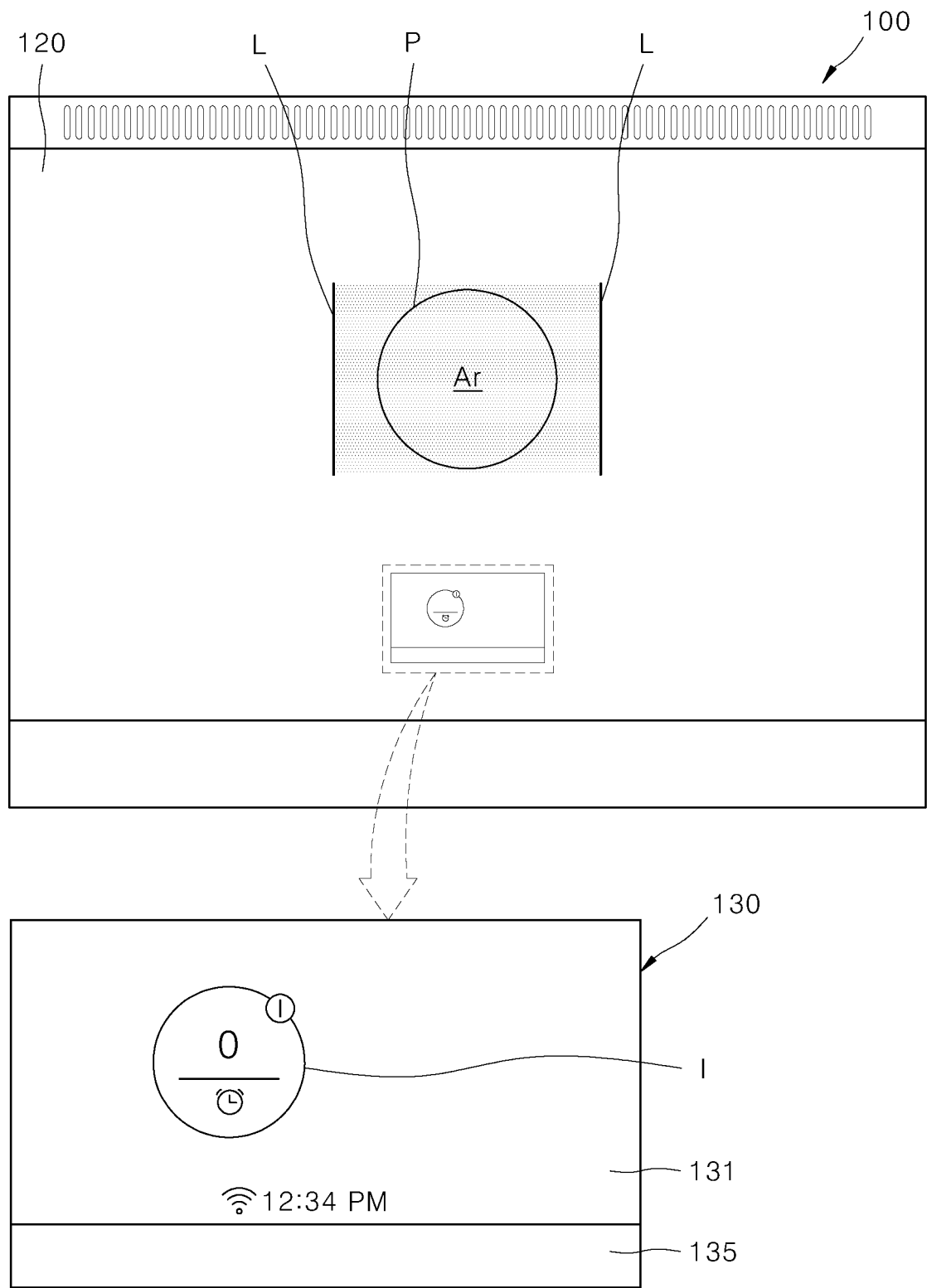


FIG. 36

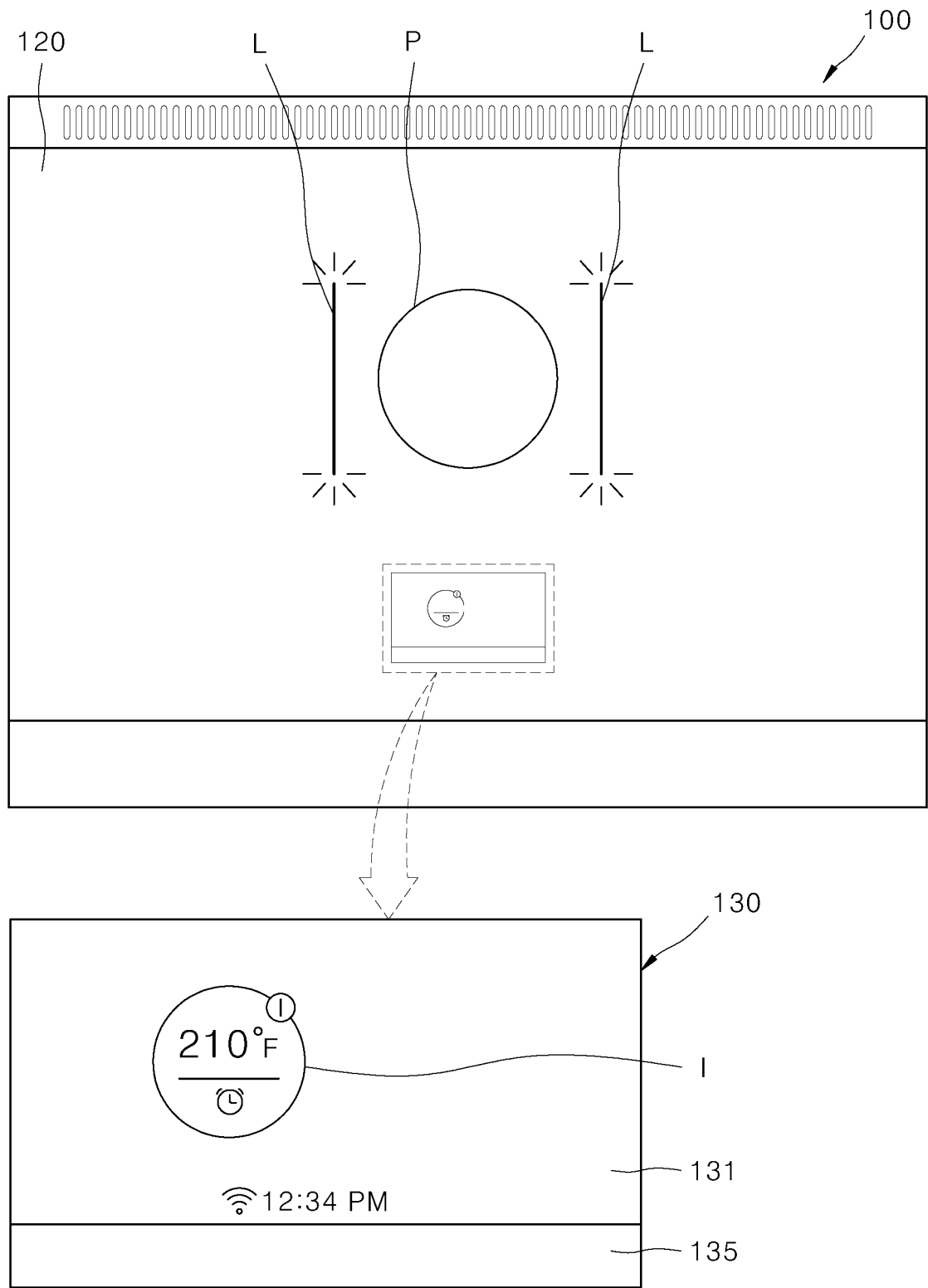


FIG. 37

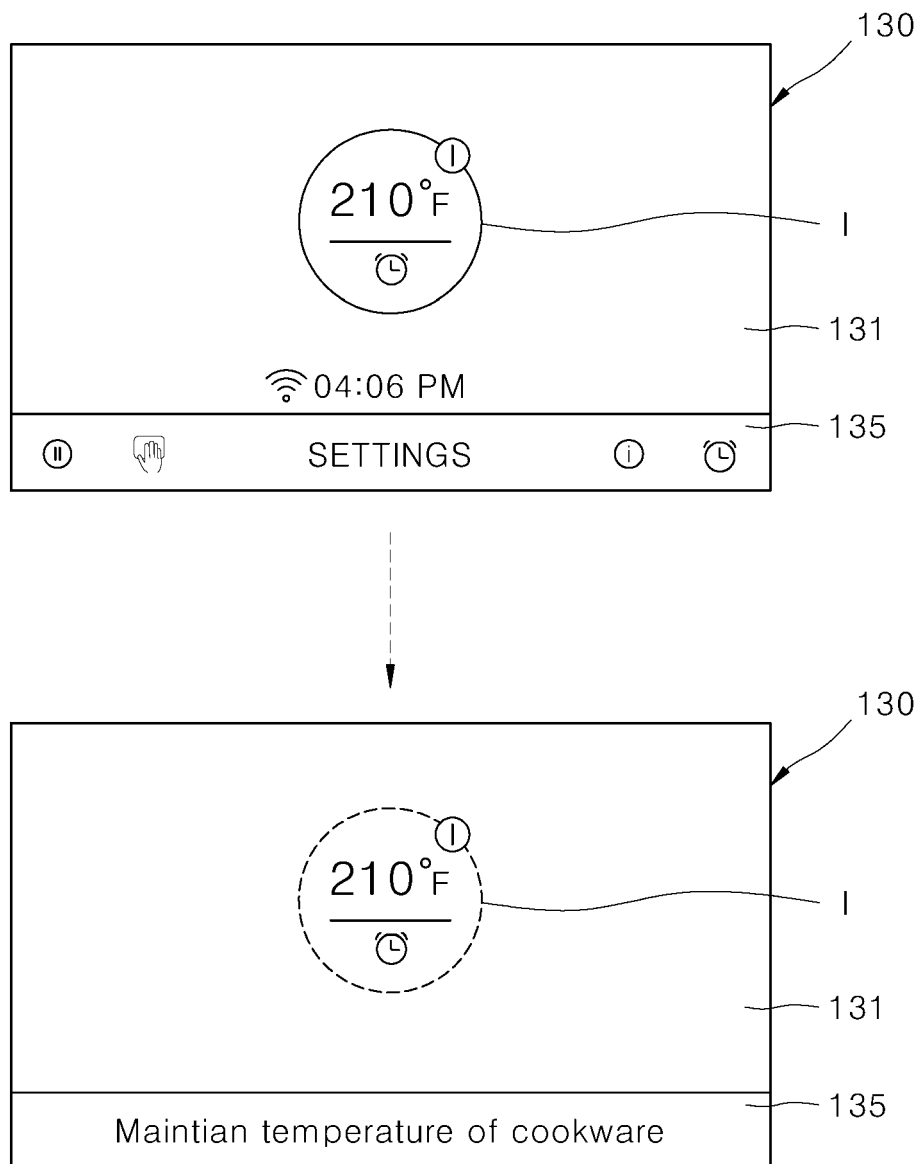


FIG. 38

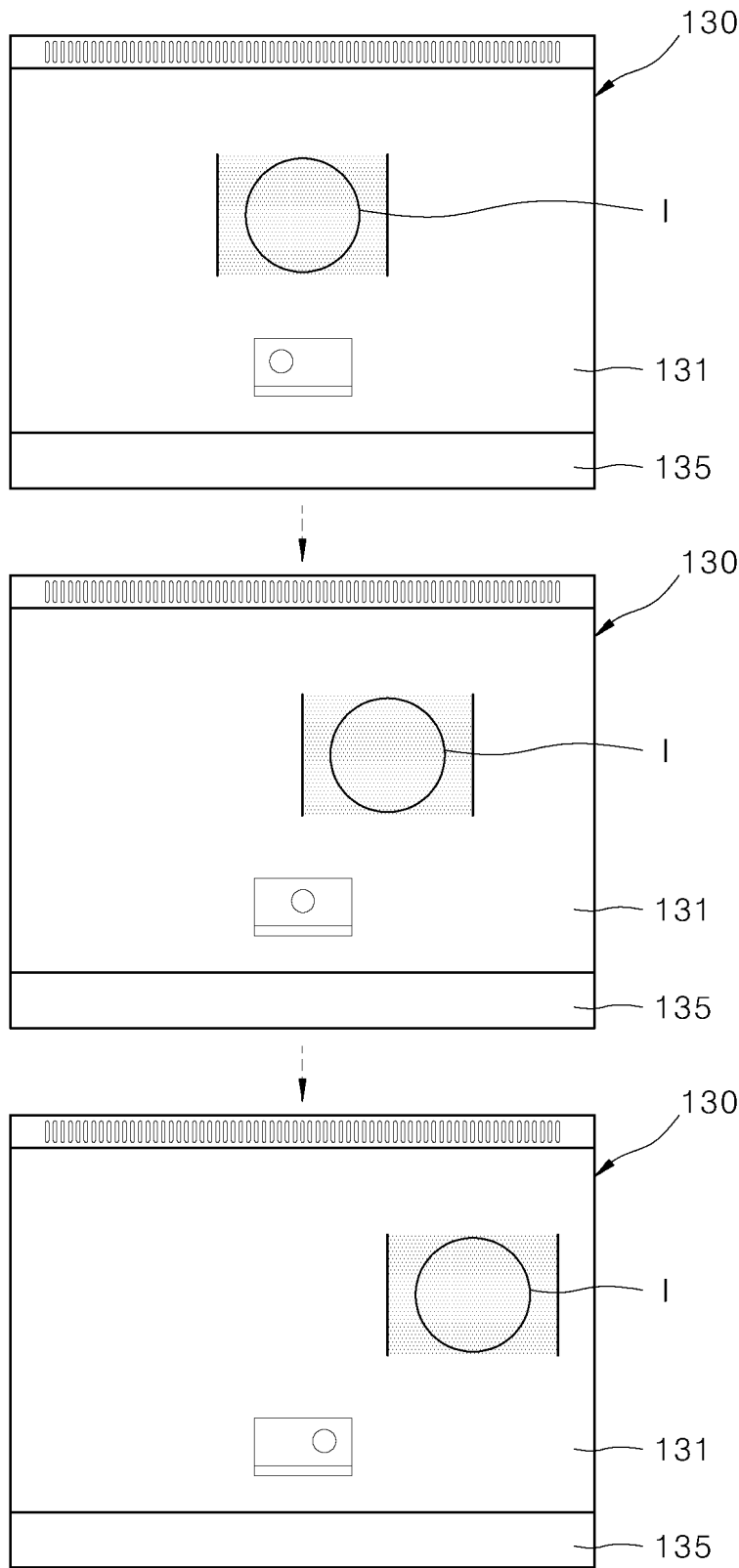


FIG. 39

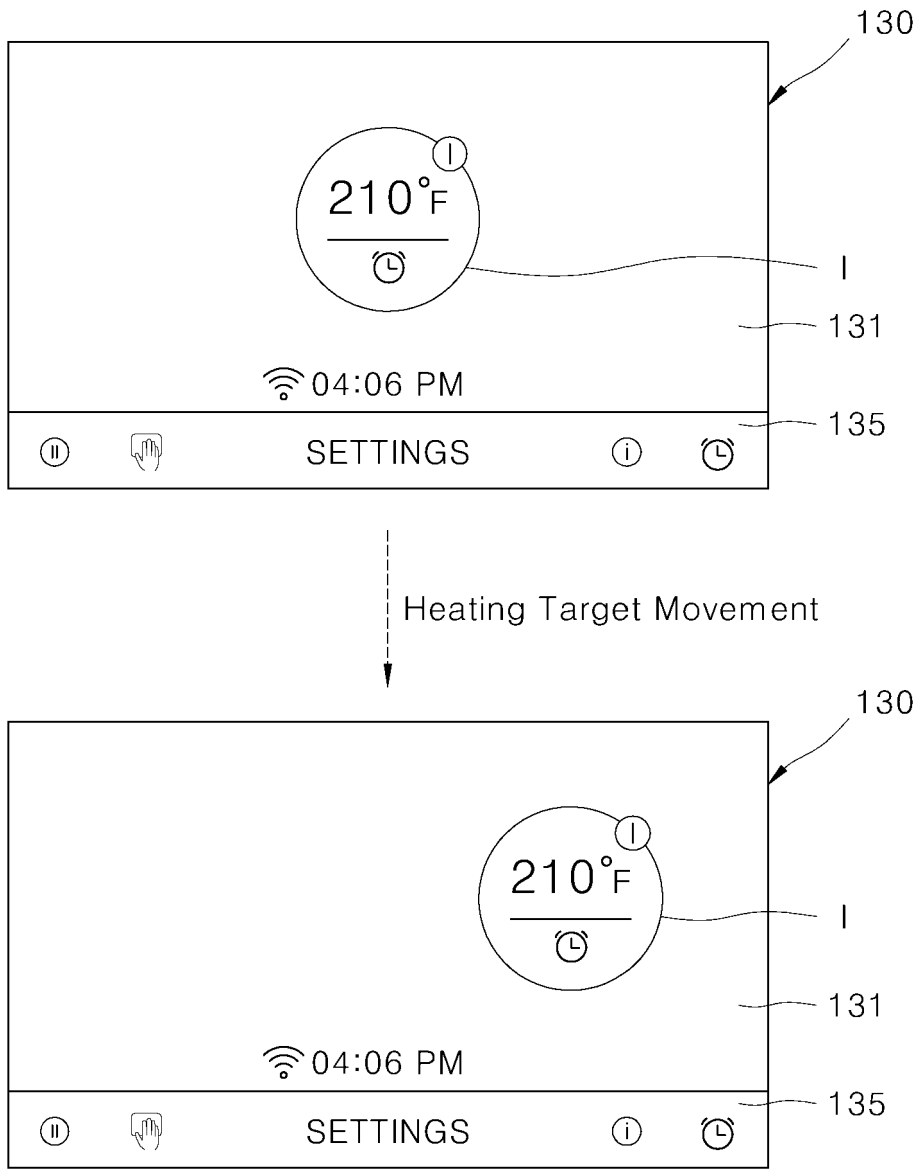


FIG. 40

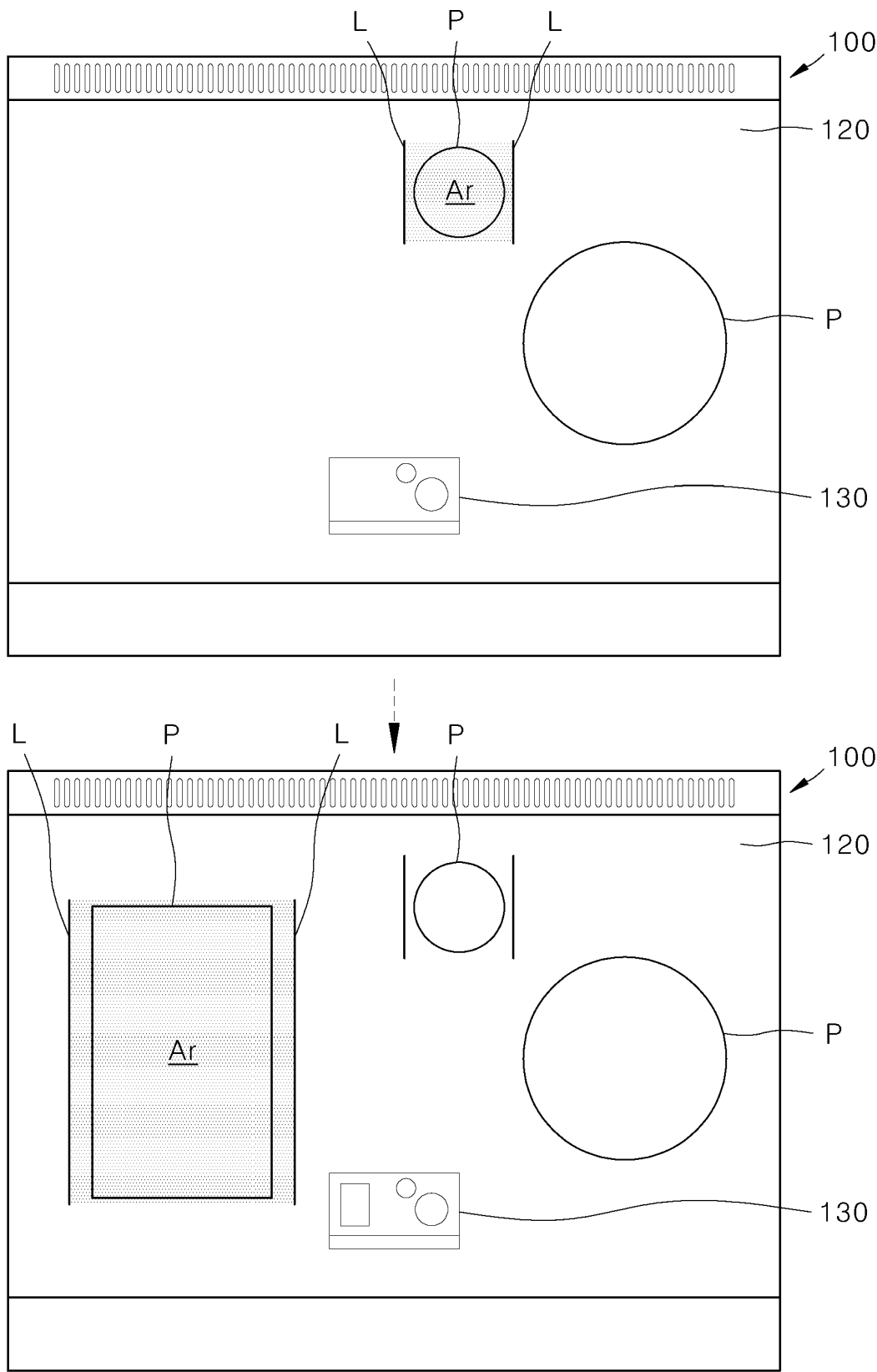


FIG. 41

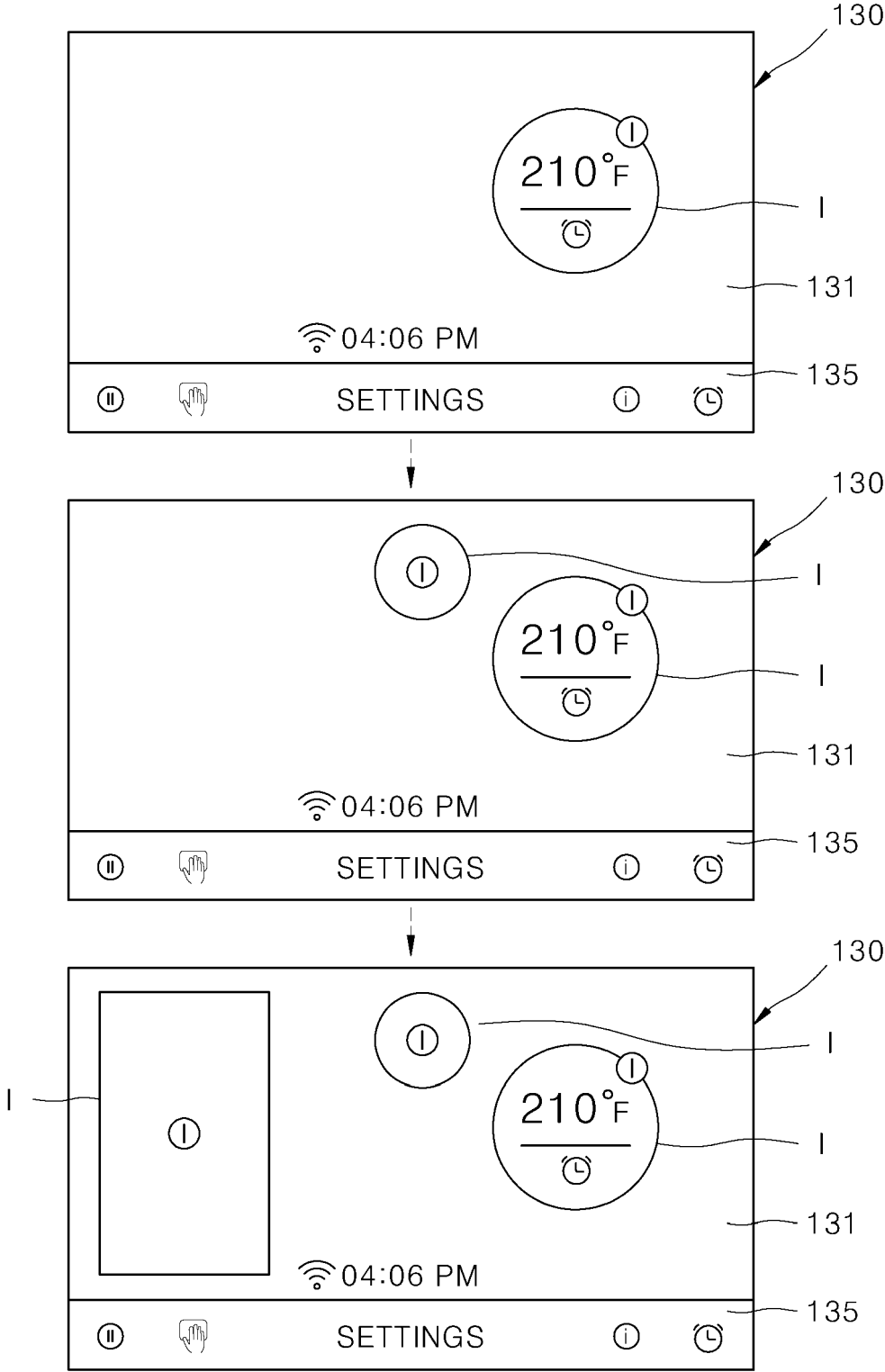


FIG. 42

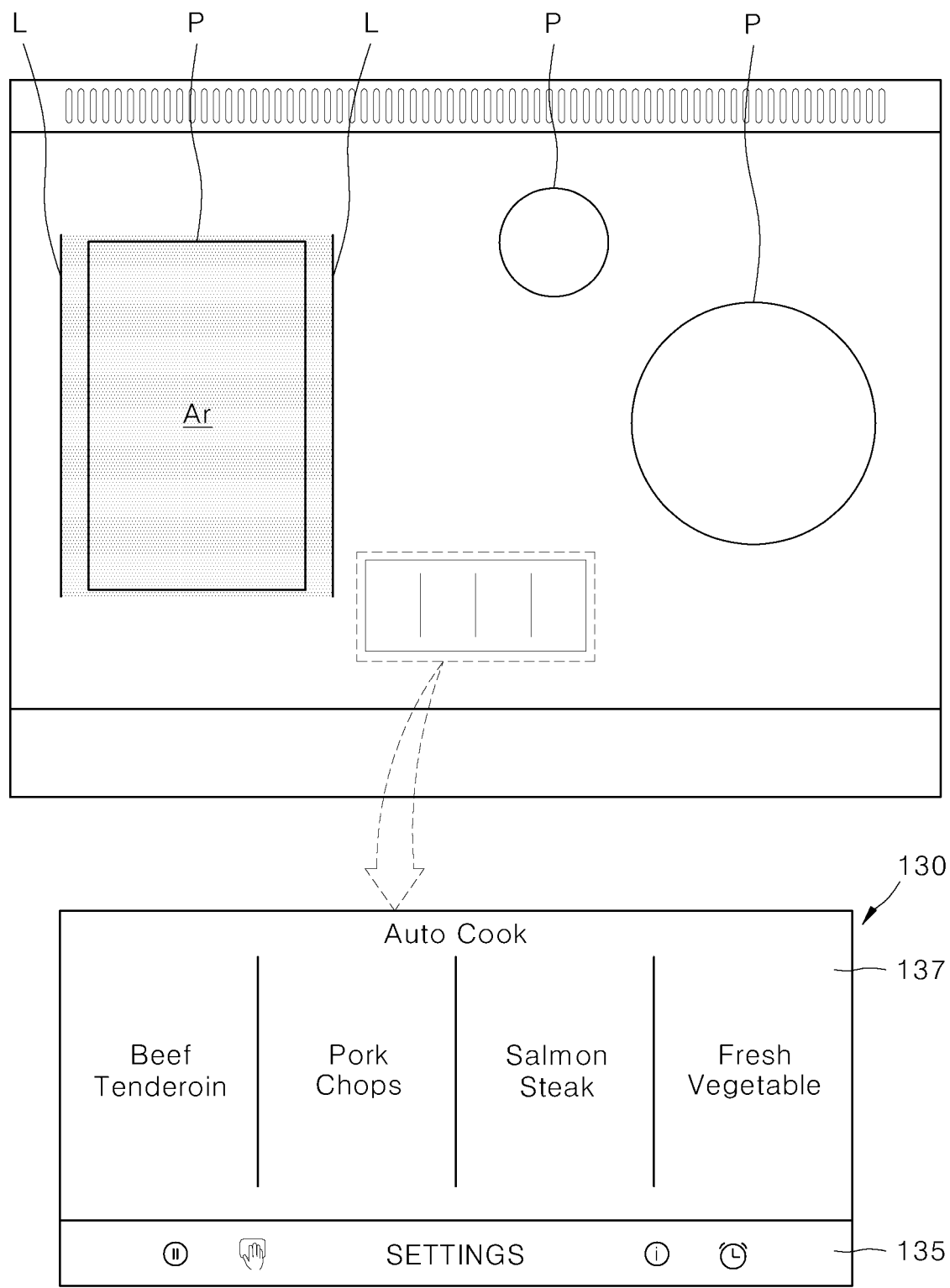


FIG. 43

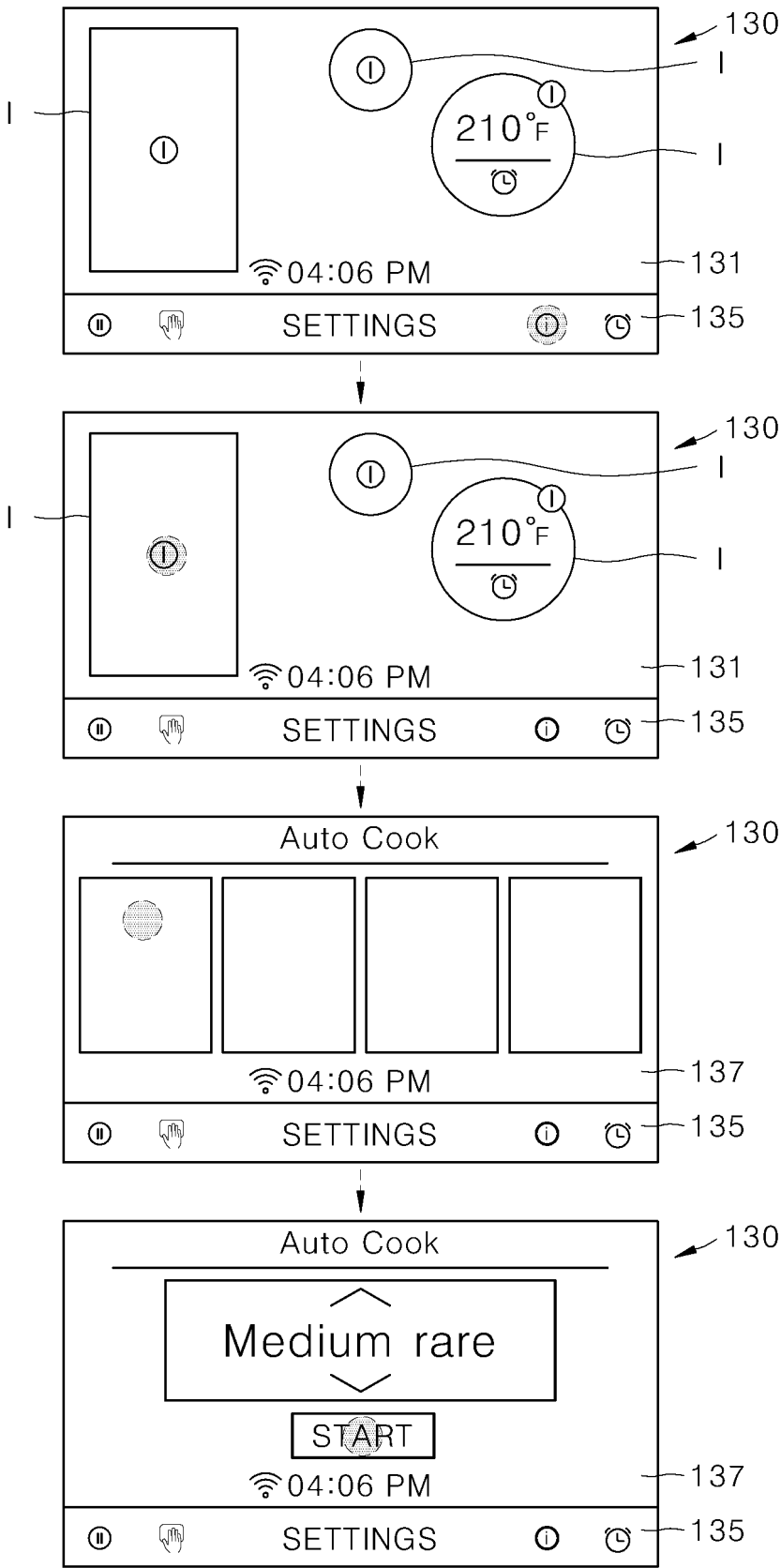


FIG. 44

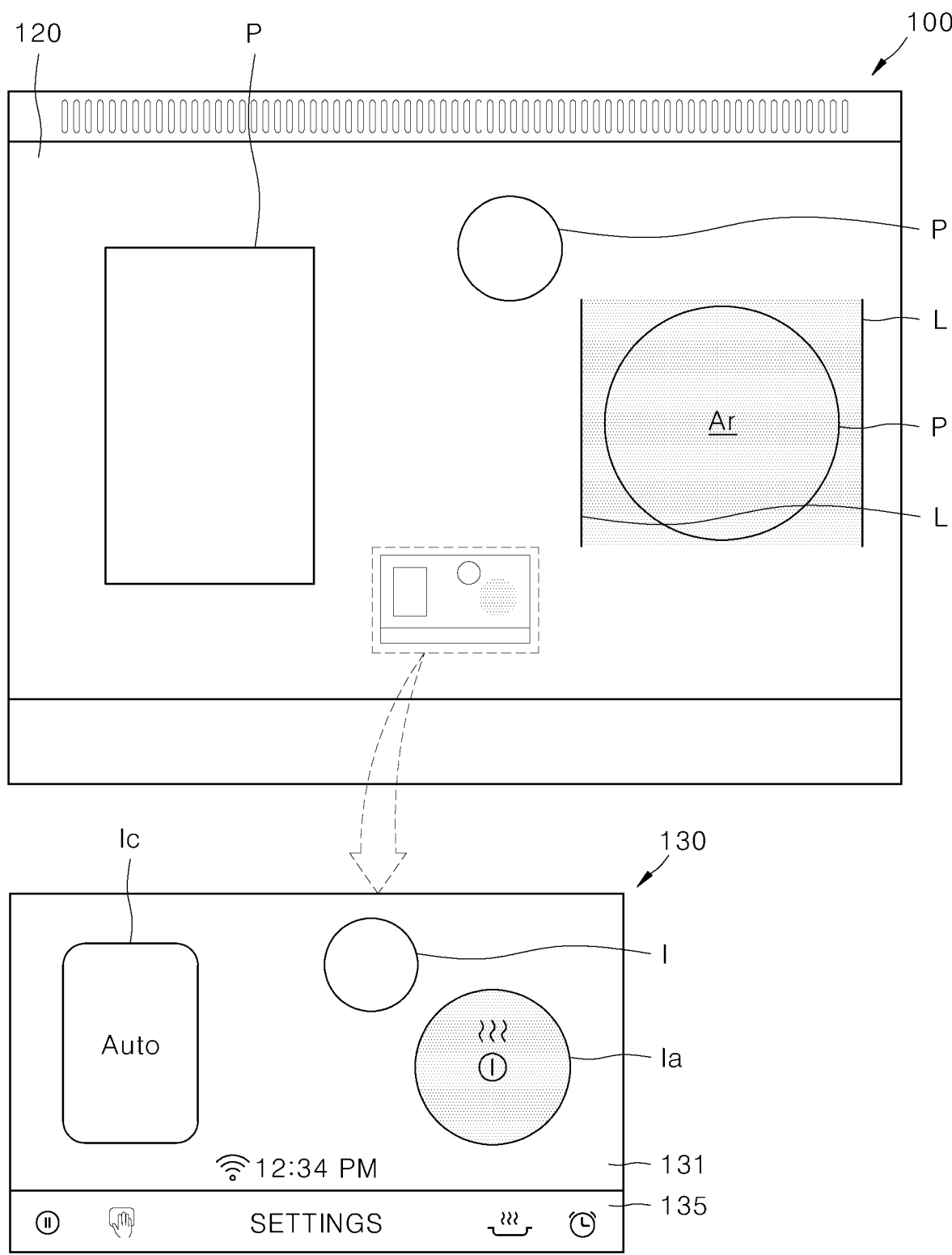


FIG. 45

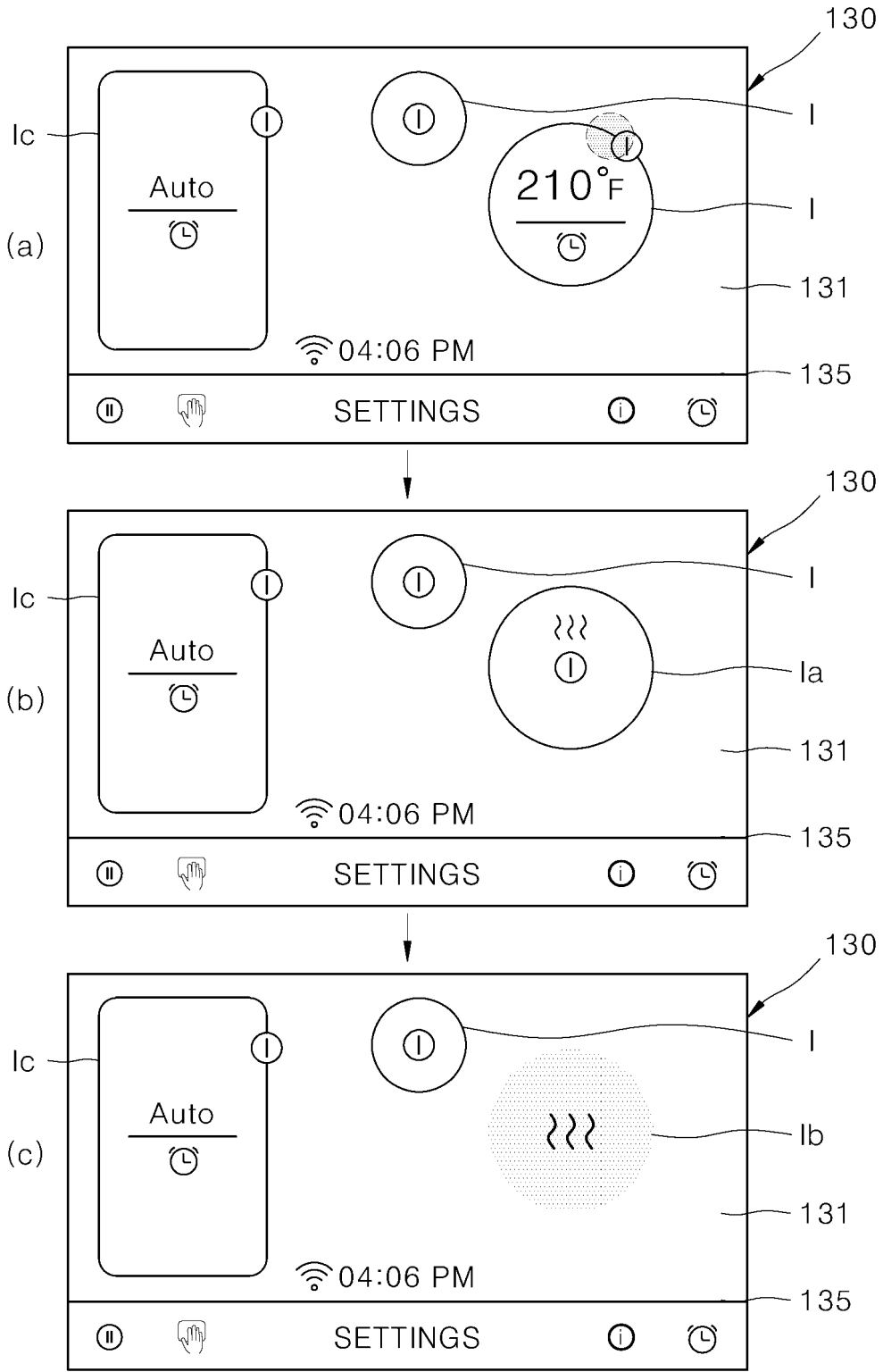


FIG. 46

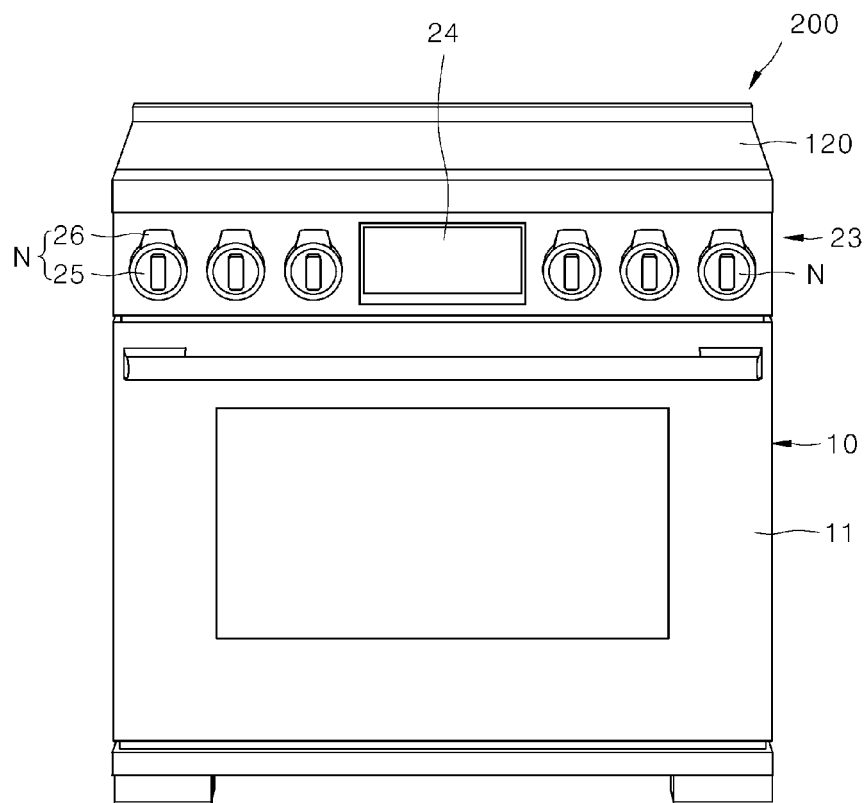


FIG. 47

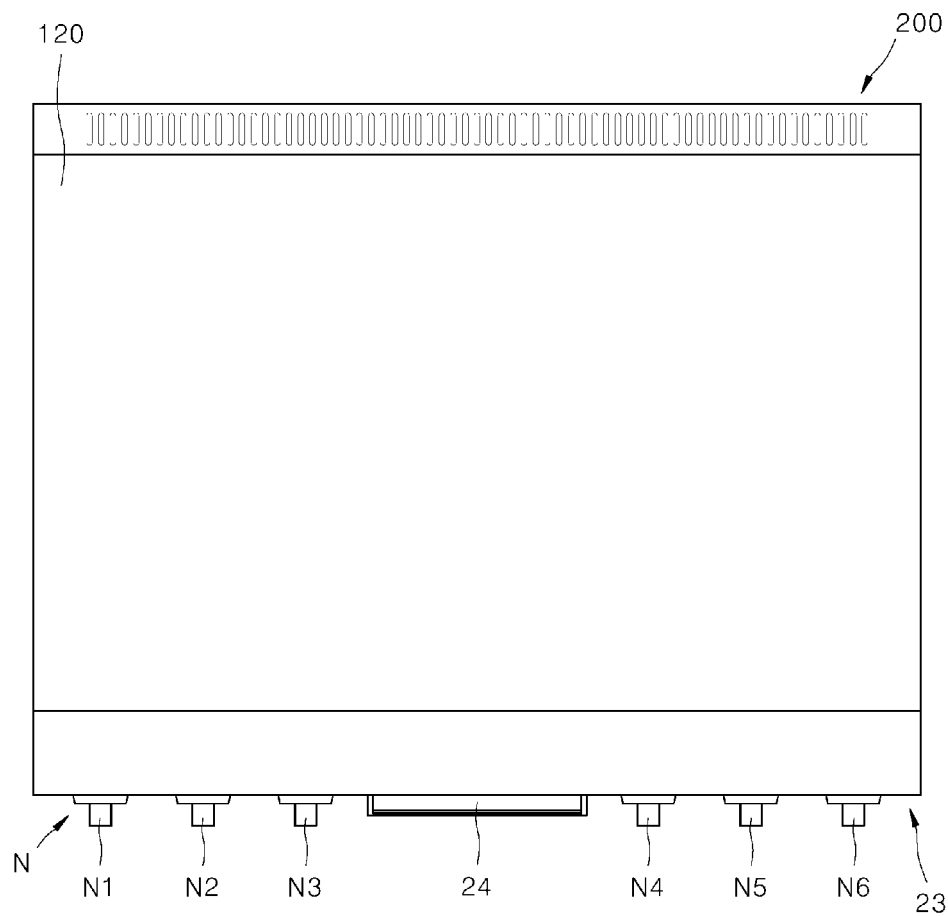


FIG. 48

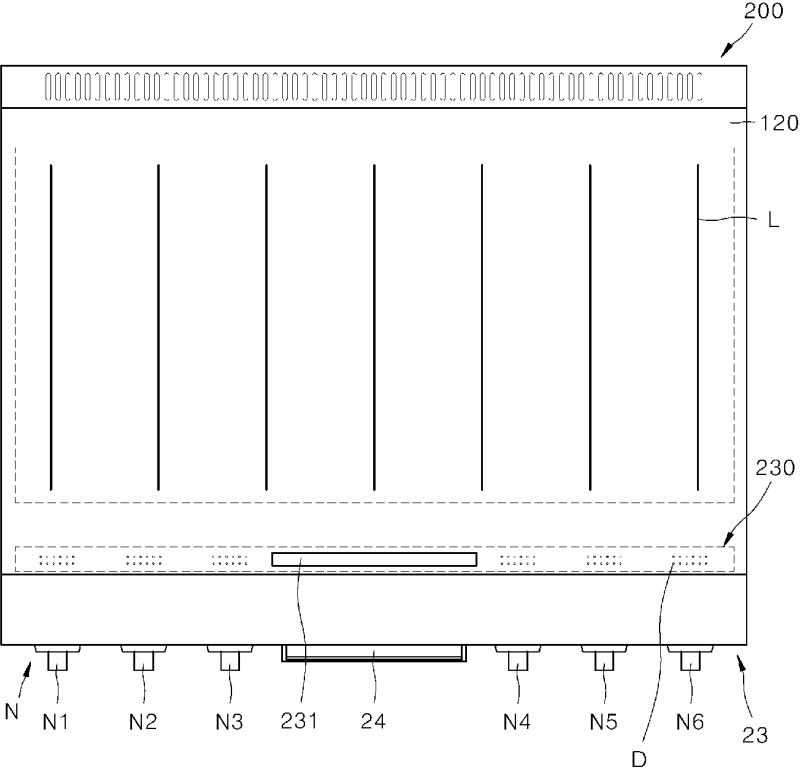


FIG. 49

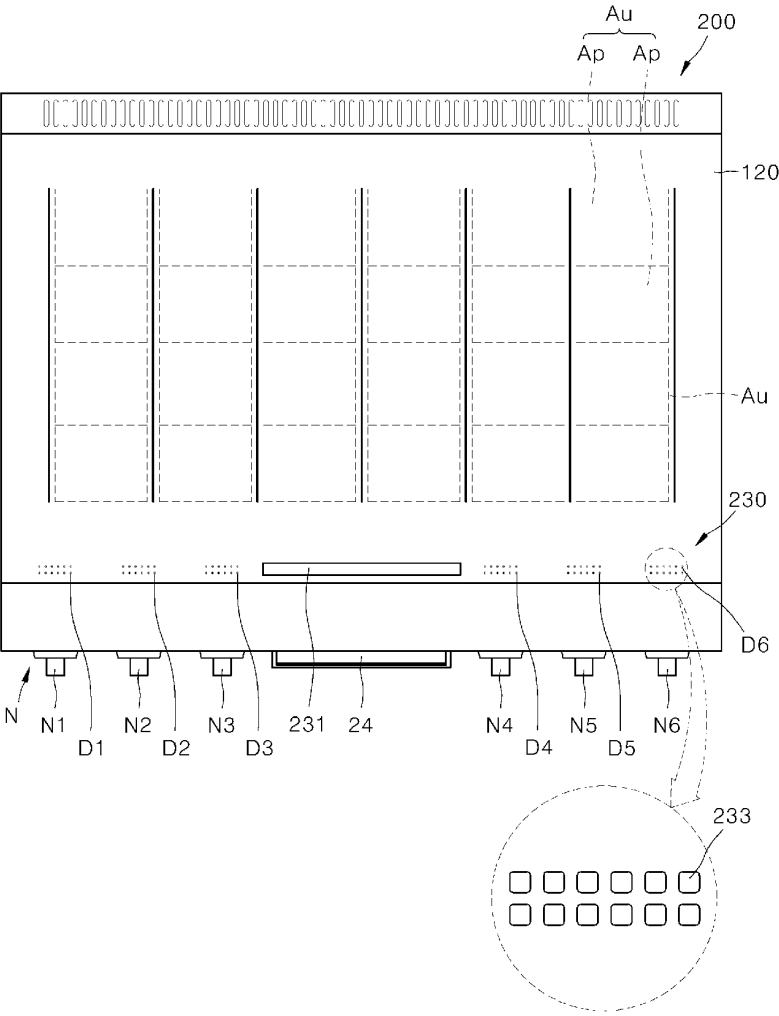


FIG. 50

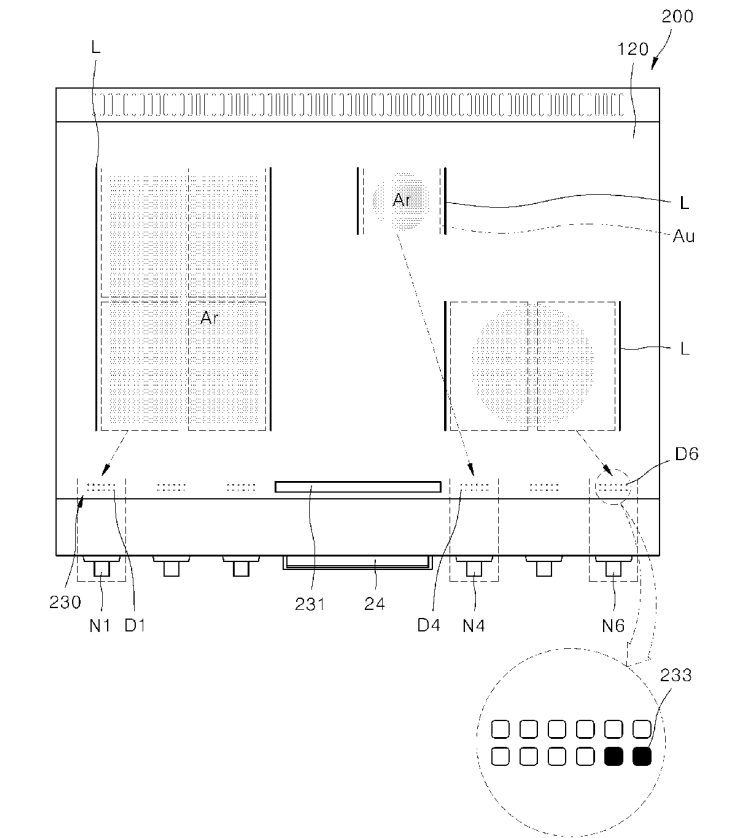


FIG. 51

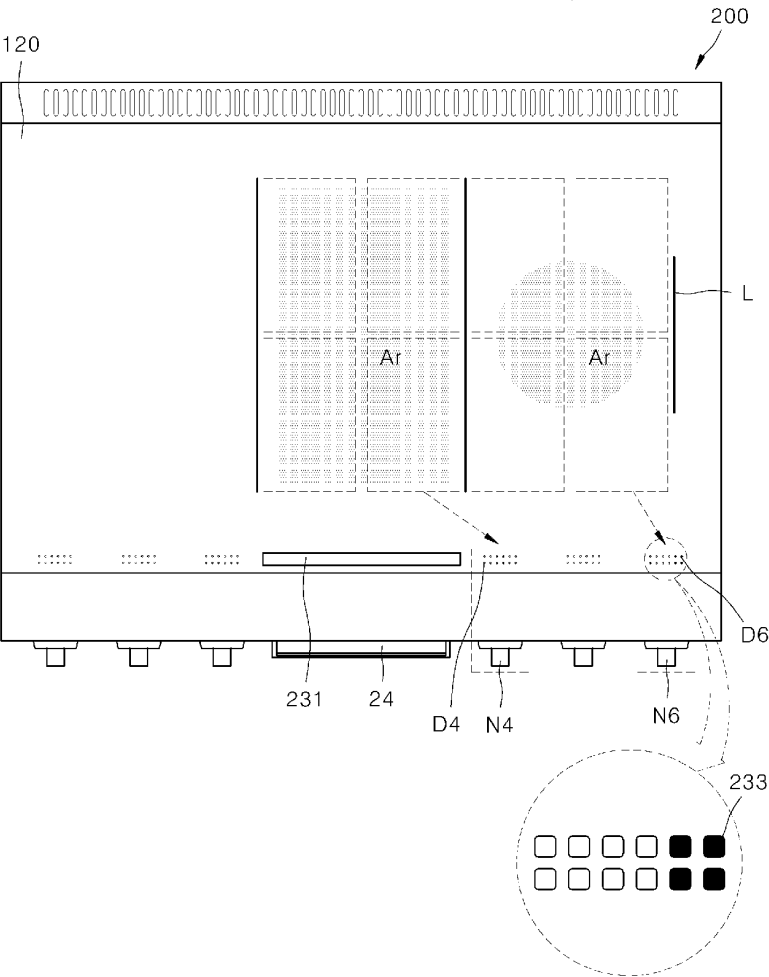


FIG. 52

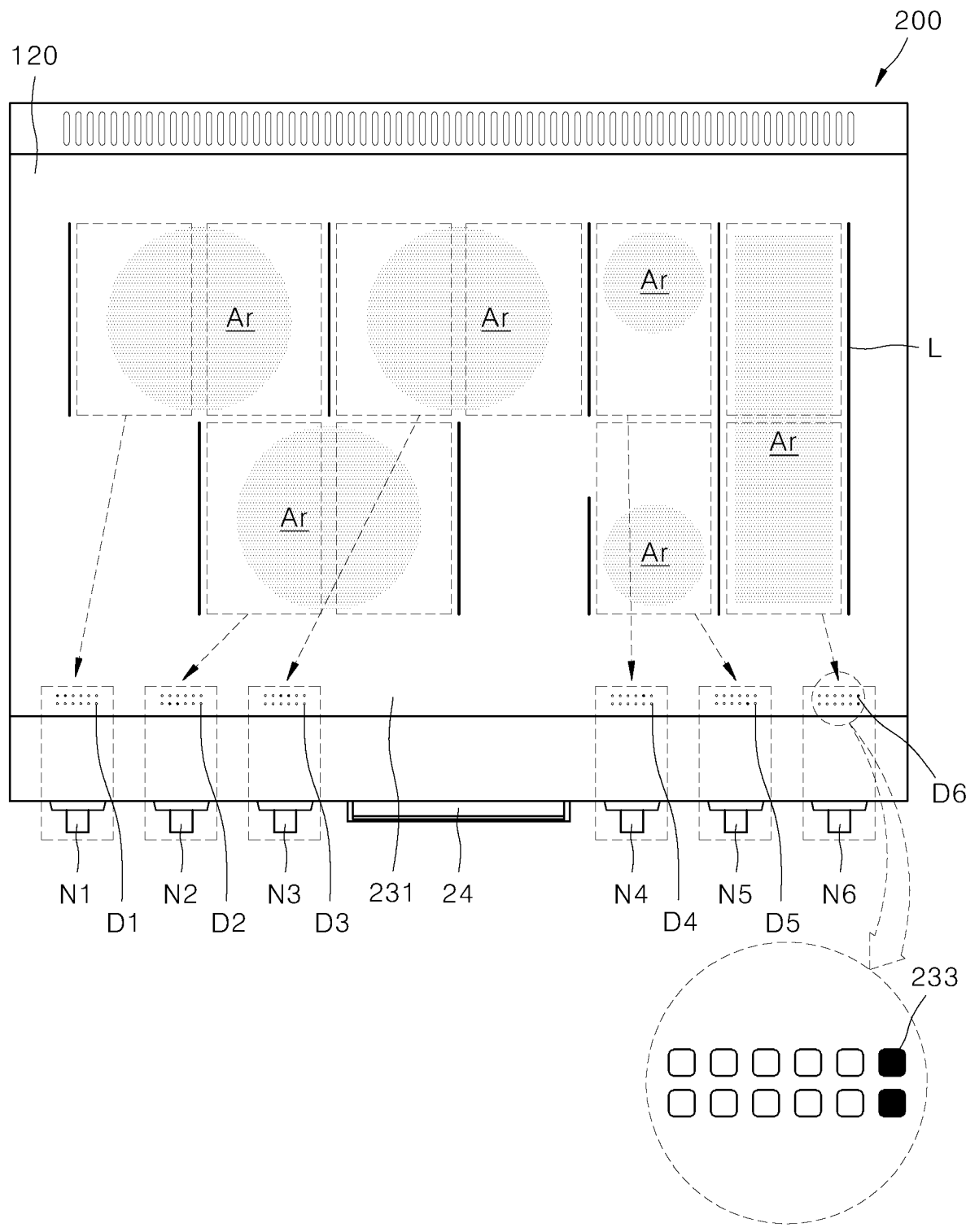
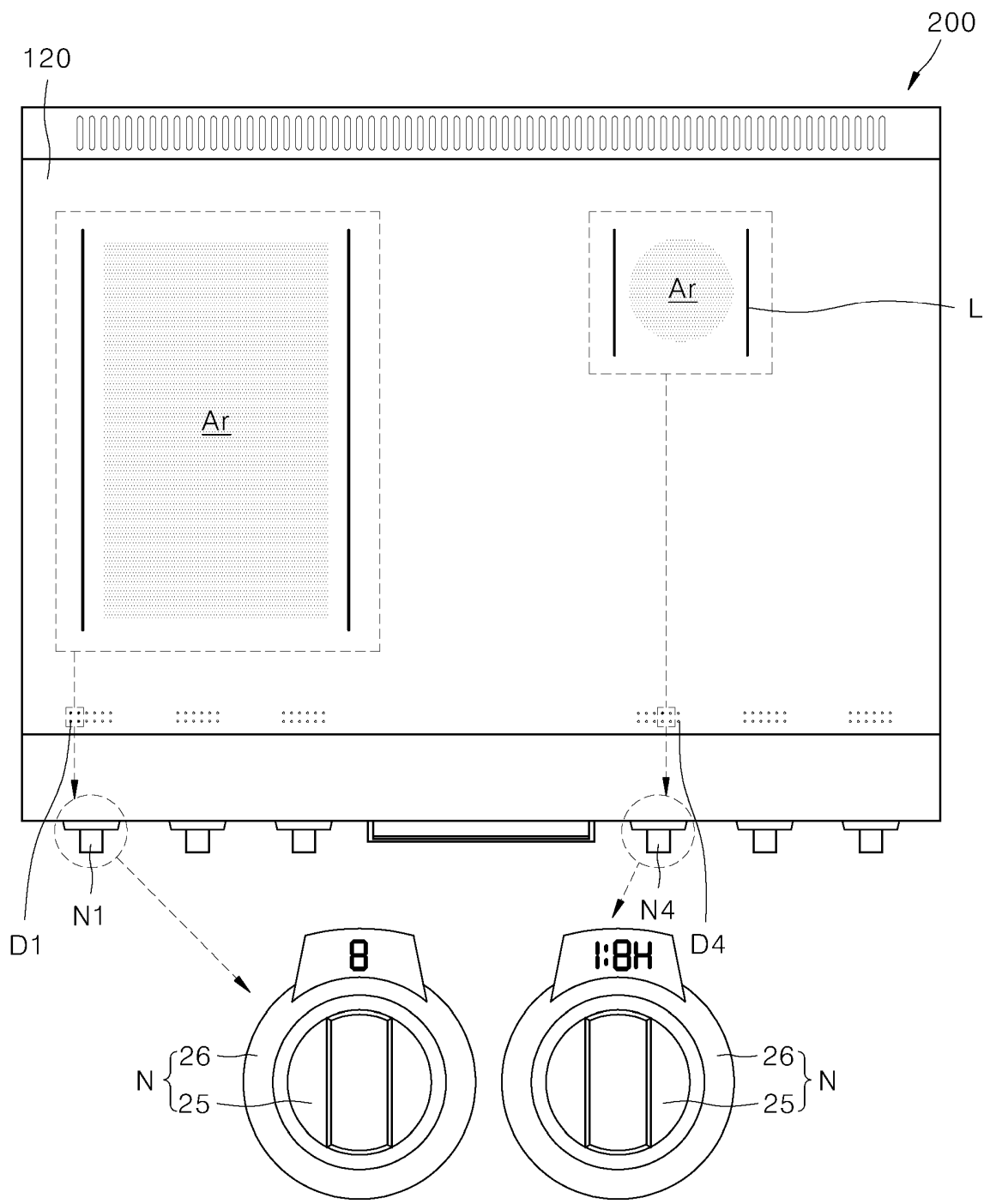


FIG. 53



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014142

**A. CLASSIFICATION OF SUBJECT MATTER****H05B 6/12**(2006.01)i; **H05B 6/06**(2006.01)i; **F24C 7/08**(2006.01)i; **F24C 15/10**(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)

H05B 6/12(2006.01); B23K 9/00(2006.01); F24C 15/10(2006.01); H05B 6/04(2006.01); H05B 6/06(2006.01)

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

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) &amp; keywords: cooker, induction, heating coil, case, support, hold, cover, light

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                           | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| X         | KR 10-2270491 B1 (SAMSUNG ELECTRONICS CO., LTD.) 29 June 2021 (2021-06-29)<br>See paragraphs [0064]-[0125]; and figures 2-8. | 1-2,4                 |
| Y         |                                                                                                                              | 3,8-11                |
| A         |                                                                                                                              | 5-7,12-20             |
| Y         | KR 10-2020-0129003 A (LG ELECTRONICS INC.) 17 November 2020 (2020-11-17)<br>See paragraphs [0079]-[0162]; and figure 7.      | 3,8-11                |
| A         | US 2020-0359470 A1 (WHIRLPOOL CORPORATION) 12 November 2020 (2020-11-12)<br>See paragraphs [0024]-[0041]; and figures 1-11.  | 1-20                  |
| A         | US 2008-0099449 A1 (ENGLAND, Raymond O. et al.) 01 May 2008 (2008-05-01)<br>See paragraphs [0018]-[0062]; and figures 1-8.   | 1-20                  |



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“D” document cited by the applicant in the international application

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Date of the actual completion of the international search

**24 December 2024**

Date of mailing of the international search report

**24 December 2024**

Name and mailing address of the ISA/KR

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Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/KR2024/014142**

|                                        |                                                                                                                     |                       |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------|
| C. DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                     |                       |
| Category*                              | Citation of document, with indication, where appropriate, of the relevant passages                                  | Relevant to claim No. |
| A                                      | KR 10-1971765 B1 (LG ELECTRONICS INC.) 23 April 2019 (2019-04-23)<br>See paragraphs [0055]-[0139]; and figures 3-6. | 1-20                  |

# EP 4 773 733 A1

## INTERNATIONAL SEARCH REPORT Information on patent family members

International application No.

**PCT/KR2024/014142**

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55

| Patent document<br>cited in search report | Publication date<br>(day/month/year) | Patent family member(s) | Publication date<br>(day/month/year) |
|-------------------------------------------|--------------------------------------|-------------------------|--------------------------------------|
| KR 10-2270491 B1                          | 29 June 2021                         | CN 106574781 A          | 19 April 2017                        |
|                                           |                                      | CN 106574781 B          | 09 March 2021                        |
|                                           |                                      | EP 3150921 A1           | 05 April 2017                        |
|                                           |                                      | EP 3150921 A4           | 17 January 2018                      |
|                                           |                                      | EP 3150921 B1           | 06 October 2021                      |
|                                           |                                      | JP 2017-517132 A        | 22 June 2017                         |
|                                           |                                      | JP 6622296 B2           | 18 December 2019                     |
|                                           |                                      | KR 10-2015-0137803 A    | 09 December 2015                     |
|                                           |                                      | US 10834787 B2          | 10 November 2020                     |
|                                           |                                      | US 11191130 B2          | 30 November 2021                     |
|                                           |                                      | US 2017-0196048 A1      | 06 July 2017                         |
|                                           |                                      | US 2021-0037617 A1      | 04 February 2021                     |
|                                           |                                      | WO 2015-182914 A1       | 03 December 2015                     |
| KR 10-2020-0129003 A                      | 17 November 2020                     | EP 3737212 A1           | 11 November 2020                     |
|                                           |                                      | EP 3737212 B1           | 20 December 2023                     |
|                                           |                                      | EP 4355029 A2           | 17 April 2024                        |
|                                           |                                      | KR 10-2024-0076756 A    | 30 May 2024                          |
|                                           |                                      | KR 10-2665228 B1        | 09 May 2024                          |
|                                           |                                      | US 12089320 B2          | 10 September 2024                    |
|                                           |                                      | US 2020-0359469 A1      | 12 November 2020                     |
| US 2020-0359470 A1                        | 12 November 2020                     | EP 3736501 A1           | 11 November 2020                     |
|                                           |                                      | US 11246190 B2          | 08 February 2022                     |
| US 2008-0099449 A1                        | 01 May 2008                          | US 7554060 B2           | 30 June 2009                         |
|                                           |                                      | WO 2008-042805 A2       | 10 April 2008                        |
|                                           |                                      | WO 2008-042805 A3       | 21 August 2008                       |
| KR 10-1971765 B1                          | 23 April 2019                        | CN 107575907 A          | 12 January 2018                      |
|                                           |                                      | CN 107575907 B          | 05 July 2019                         |
|                                           |                                      | EP 3267115 A1           | 10 January 2018                      |
|                                           |                                      | EP 3267115 B1           | 20 May 2020                          |
|                                           |                                      | KR 10-2018-0004523 A    | 12 January 2018                      |
|                                           |                                      | US 10641496 B2          | 05 May 2020                          |
|                                           |                                      | US 2018-0003391 A1      | 04 January 2018                      |

Form PCT/ISA/210 (patent family annex) (July 2022)