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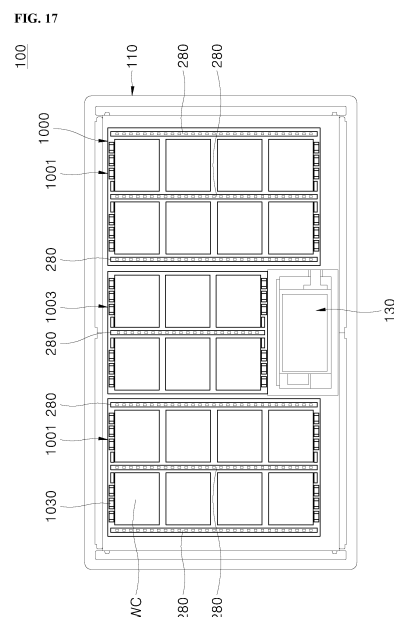
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(54) **COOKING APPARATUS**

(57) Disclosed herein is a cooking appliance. The cooking appliance includes a coil module including at least one of a heating coil and a sensing coil, and a lighting part configured to implement lighting, and the coil module and the lighting part are integrally formed.



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Description

TECHNICAL FIELD

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

BACKGROUND

[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.

[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.

[0004] A cooktop among open-type cooking appliances may be provided to heat food contained in a cooking vessel 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.

[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.

[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.

[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.

[0008] In an induction heating cooking appliance, one or more working coils and a circuit board may be provided. The working coil may perform a function of transmitting electromagnetic force to a cooking vessel. In

general, the working coil may be formed in a shape in which a wire is wound in a spiral form. The circuit board may perform a function of controlling induced current to be provided to the working coil through a circuit.

[0009] Recently, instead of a working coil having a shape in which a wire is wound in a spiral form, a working coil having a form in which a coil pattern is formed on a circuit board has also been used.

[0010] Among costs and time required to manufacture an induction heating cooking appliance, costs and time invested in manufacturing the working coil account for a large portion. Among these, a significant amount of cost and time is required for a cost of a wire and for winding the wire.

[0011] When the working coil is formed in a form in which a coil-shaped pattern is formed on a circuit board instead of forming the working coil by winding a wire, costs and time invested in manufacturing the working coil may be reduced.

SUMMARY

Technical Problems

[0012] 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.

[0013] Another object of the present disclosure is to provide a cooking appliance having an improved structure to allow an increase in assembly man-hours and manufacturing cost for implementing an indicator light to be suppressed.

[0014] Still another object of the present disclosure is to provide a cooking appliance having an improved structure to allow a connection structure between a light and an electrical part to be simplified.

Technical Solutions

[0015] A cooking appliance according to one embodiment of the present disclosure for achieving the above object is characterized in that a coil module provided with a heating coil and a lighting part configured to implement lighting are integrally formed.

[0016] According to another embodiment of the present disclosure, a coil module including at least one of a heating coil and a sensing coil, and a lighting part configured to implement lighting are integrally formed.

[0017] According to another embodiment of the present disclosure, a light emitting element is mounted on a coil module including a heating coil.

[0018] According to another embodiment of the present disclosure, a driving circuit for driving the light emitting element is patterned in a coil module in which the heating coil and the light emitting element are patterned.

[0019] A cooking appliance according to one aspect of the present disclosure may include: at least one coil

module including at least one of a heating coil for inductively heating a heating target and a sensing coil for sensing the heating target; and a lighting part disposed in the coil module and configured to emit light.

[0020] Preferably, the coil module and the lighting part may be integrally formed.

[0021] The lighting part may include a light emitting element installed in the coil module.

[0022] Preferably, a plurality of heating coils may be disposed along a horizontal direction, and the lighting part may be disposed at a position not overlapping the heating coils in an up-down direction.

[0023] Preferably, a plurality of sensing coils may be disposed along a horizontal direction, and the lighting part may be disposed at a position not overlapping the sensing coils in an up-down direction.

[0024] Preferably, the lighting part may be disposed at a position not overlapping the heating coil and the sensing coil in an up-down direction.

[0025] Preferably, a plurality of the heating coils may be disposed along a first direction, and with respect to the first direction, the lighting part may be disposed between a pair of the heating coils, or the heating coil may be disposed between a pair of the lighting parts.

[0026] Preferably, a plurality of the heating coils may be disposed along a first direction, and the heating coils and the lighting parts may be alternately disposed in the first direction.

[0027] Preferably, a plurality of the sensing coils may be disposed along a first direction, and with respect to the first direction, the lighting part may be disposed between a pair of the sensing coils.

[0028] The present disclosure may further include a top plate disposed above the coil module.

[0029] Preferably, with respect to an up-down direction, the lighting part may be disposed between at least a portion of the coil module and the top plate.

[0030] Preferably, with respect to the up-down direction, the lighting part may be disposed between the heating coil and the top plate.

[0031] Preferably, the coil module may be formed as a plurality of layers stacked in an up-down direction.

[0032] Preferably, the heating coil and the sensing coil may be disposed in different layers, and the lighting part may be disposed in the same layer as a layer in which at least a portion of the sensing coil is disposed.

[0033] Preferably, with respect to the up-down direction, the sensing coil may be disposed between the heating coil and the top plate.

[0034] The coil module may include a first coil part patterned in the coil module to form the heating coil.

[0035] The lighting part may include a light emitting element mounted on the coil module.

[0036] Preferably, the heating coil and the sensing coil may be disposed in different layers, and the light emitting element may be mounted in the same layer as a layer in which at least a portion of the sensing coil is patterned.

[0037] Preferably, with respect to an up-down direc-

tion, the light emitting element may be disposed between at least a portion of the coil module and the top plate.

[0038] Preferably, at least a portion of the light emitting element may be exposed toward the top plate.

[0039] The lighting part may further include a driving circuit patterned in the coil module and connected to the light emitting element.

[0040] Preferably, the driving circuit may be patterned in the same layer as a layer in which the light emitting element is mounted.

[0041] At least a portion of the lighting part may be disposed in a lowermost layer of the coil module.

[0042] Preferably, a light-transmitting hole may be formed in the coil module to penetrate in an up-down direction, and light emitted from the lighting part may pass through the coil module in the up-down direction through the light-transmitting hole.

[0043] The lighting part may include: a light emitting element at least partially disposed below the coil module and inside the light-transmitting hole in a horizontal direction to emit light upward; and a driving circuit patterned in the lowermost layer of the coil module and connected to the light emitting element.

[0044] The coil module may include a first coil module and a second coil module each including at least one heating coil.

[0045] Preferably, with respect to a first direction, the second coil module may be disposed between a pair of the first coil modules, and one lighting part may be disposed between the first coil module and the second coil module.

[0046] Preferably, in the first coil module, the lighting parts may be respectively disposed on both sides of each of the heating coils in the first direction.

[0047] Preferably, with respect to the first direction, a pair of the heating coils may be disposed in each of the first coil module and the second coil module, the lighting parts may be respectively disposed on both sides of each of the heating coils in the first coil module, and the lighting part may be disposed only between the pair of the heating coils in the second coil module.

Advantageous Effects

[0048] According to the cooking appliance of 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.

[0049] In addition, according to the present disclosure, the lighting part may be provided integrally with a heating coil assembly, so that installation of the lighting part may be easily and quickly performed without an additional assembly operation for installing the lighting part in the heating coil assembly, thereby effectively suppressing an

increase in assembly man-hours and manufacturing cost for implementing an indicator light.

[0050] In addition, according to the present disclosure, the lighting part may be provided integrally with the heating coil assembly, and a driving circuit for driving a light emitting element may be patterned on the heating coil assembly, thereby simplifying a connection structure between a light and an electrical part.

[0051] The present disclosure may allow a connection operation between the heating coil assembly and the electrical part to be easily and quickly performed, and may also provide an effect of preventing an accommodation space inside the cooktop in which the heating coil assembly and the electrical part are accommodated from becoming complicated due to a large number of wires.

BRIEF DESCRIPTION OF DRAWINGS

[0052] 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 showing a state in which electrical components are installed on a bottom surface of the supporter shown in FIG. 4.

FIG. 6 is a plan view schematically showing a configuration of the heating coil assembly shown in FIG. 4.

FIG. 7 is a cross-sectional view schematically showing a stacked structure of the coil module shown in FIG. 6.

FIG. 8 is a plan view showing a first example of an arrangement structure of the first coil module and the second coil module.

FIG. 9 is a plan view showing an example of the first coil substrate part according to one embodiment of the present disclosure.

FIG. 10 is an enlarged view showing a part of the first coil substrate part shown in FIG. 9.

FIG. 11 is a cross-sectional view schematically showing a stacked structure of the first coil part shown in FIG. 10.

FIG. 12 is a plan view showing an example of an arrangement structure of the sensing coil.

FIG. 13 is an enlarged view of a portion "21" of FIG. 12, showing an example of an arrangement structure of the sensing coil with respect to the heating coil.

FIG. 14 is an enlarged view showing the first terminal

shown in FIG. 10.

FIG. 15 is an enlarged view showing the second terminal shown in FIG. 10.

FIG. 16 is a plan view showing an example of the heating coil.

FIG. 17 is a plan view schematically showing a structure of a heating coil assembly according to another embodiment of the present disclosure.

FIG. 18 is a plan view schematically showing a structure of the first coil module shown in FIG. 17.

FIG. 19 is a plan view schematically showing a structure of the second coil module shown in FIG. 17.

FIG. 20 is a plan view showing the first coil module shown in FIG. 17 in a separated state.

FIG. 21 is a cross-sectional view schematically showing a stacked structure of the first coil module shown in FIG. 20.

FIG. 22 is a cross-sectional view showing another example of the first coil module shown in FIG. 21.

DETAILED DESCRIPTION

[0053] 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.

[0054] 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.

[0055] 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.*

[0056] 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.

[0057] 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.

[0058] 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.

[0059] 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.

[0060] 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.

[0061] 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.

[0062] 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.

[0063] For convenience, the left-right direction may be referred to as a first direction. Accordingly, a right side may be one side in the first direction, and a left side may be the other side in the first direction.

[0064] In addition, the width direction of the cooking appliance may also be referred to as a lateral direction. Accordingly, the right side may be one side in the lateral direction, and the left side may be the other side in the lateral direction.

[0065] In addition, a gravity direction may be defined as a downward direction, and a direction opposite to the gravity direction may be defined as an upward direction.

[0066] For convenience, a direction toward the front side and the rear side may be referred to as a second direction. Accordingly, the front side may be one side in the second direction, and the rear side may be the other side in the second direction.

[0067] In addition, the above-described up-down direction may be referred to as a third direction. Accordingly, an upward direction may be one side in the third direction, and a downward direction may be the other side in the third direction.

[0068] In addition, the above-described up-down direction may be referred to as a vertical direction. Then, a front-rear direction and a left-right direction, that is, a first direction and a second direction, may be collectively referred to as a 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 showing an exploded state of the cooktop shown in FIG. 2, and FIG. 5 is a view showing a state in which electrical components are installed on a bottom surface of the supporter shown in FIG. 4.

[0079] Referring to FIGS. 1 to 5, 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 111. The bottom portion 111 forms a lower surface of the case 110 and may define a lower boundary surface of the accommodation space. The bottom portion 111 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 111. 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 (hereinafter referred to as a "heating target"). 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. The cooktop control panel 130 may include an operation part including various switches for controlling an 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.

[0088] The cooktop 100 according to the present embodiment may include a heating coil assembly 140. The heating coil assembly 140 may be provided to constitute a heating part of the cooktop 100 and may be disposed in an accommodation space inside the cooktop 100.

[0089] The cooktop 100 may further 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.

[0090] 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.

[0091] According to the present embodiment, the accommodation space may be formed inside the supporter 150 and may be formed as a space surrounded by a bottom portion 111 of the case 110 and the supporter 150.

That is, various internal components constituting the cooktop 100 may be accommodated inside the supporter 150.

[0092] According to the present embodiment, the supporter 150 may also provide a coil base function. That is, a ferrite core 160 may be installed in the supporter 150, and the heating coil assembly 1000 may be installed above the supporter 150 in which the ferrite core 160 is installed.

[0093] As an example, the ferrite core 160 may be formed by a combination of a plurality of ferrite modules 161 provided separately. That is, the ferrite core 160 may be provided in a structure separable into a plurality of ferrite modules 161.

[0094] In the present embodiment, it is illustrated that each ferrite module 161 may be provided to be coupled to the supporter 150, respectively. For this purpose, a fitting structure for the ferrite modules may be formed on the supporter 150. Each ferrite module 161 may be coupled to the supporter 150 by being fitted to the structure.

[0095] Each ferrite module 161 includes ferrite capable of forming a magnetic field around the ferrite module 161. As an example, each ferrite module 161 may be provided in a form in which ferrite is insert-molded.

[0096] According to the ferrite core 160 formed by a combination of the plurality of ferrite modules 161 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 161 of the corresponding part.

[0097] Each indicator light L may be implemented by a lighting part 180. The lighting part 180 may be provided 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 part 180 and irradiated onto the light display region of the top plate 120.

[0098] In the present embodiment, the light display region is defined as a region in which light emitted from the lighting part 180 may be recognized from outside through the top plate 120, that is, a region on which light emitted from the lighting part 180 is irradiated on the top plate 120, and is a predetermined partial region among an entire region of the top plate 120.

[0099] As an example, the light display region may be a virtual region designated as a portion on which light emitted from the lighting part 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.

[0100] 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.

[0101] The lighting part 180 may include a plurality of light sources D, and in each lighting part 180, the plurality of light sources D may be disposed in the front-rear

direction at predetermined intervals. As an example, the lighting part 180 may be provided in a form in which the plurality of light sources D are mounted on a PCB. The number of the light sources D for each lighting part 180 and a length of the PCB in the front-rear direction may be appropriately set according to a size and intensity of light to be implemented through the lighting part 180.

[0102] A plurality of lighting parts 180 may also be disposed in the cooktop, and the plurality of lighting parts 180 may be disposed in the lateral direction at predetermined intervals. A number of the lighting parts 180 and intervals between the lighting parts 180 may be appropriately set in consideration of a size and number of the heating coils and intervals between the heating coils.

[0103] At least a part of the lighting part 180 may be disposed between the supporter 150 and the bottom portion 111. As an example, the lighting part 180 may be disposed in the accommodation space. More specifically, the lighting part 180 may be disposed in a space surrounded by the bottom portion 111 of the case 110 and the supporter 150.

[0104] 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.

[0105] 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 heating coil assembly 1000, 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 heating coil assembly 1000, and the coil control part may include an inverter PCB 174.

[Structure of Heating Coil Assembly]

[0106] FIG. 6 is a view schematically showing a configuration of the heating coil assembly shown in FIG. 4, and FIG. 7 is a cross-sectional view schematically showing a stacked structure of the coil module shown in FIG. 6.

[0107] Referring to FIGS. 4 and 6, the heating coil assembly 1000 may include a plurality of heating coils WC arranged in a horizontal direction. As an example, in the heating coil assembly 1000, the plurality of heating coils WC may be arranged along a first direction, that is, a lateral direction, and the plurality of heating coils WC may also be arranged with respect to a second direction, that is, a front-rear direction.

[0108] The heating coil assembly 140 may include at least one of coil modules 1001 and 1003. In the present embodiment, it is illustrated that the heating coil assembly 140 includes a plurality of coil modules 1001 and 1003.

[0109] As an example, the heating coil assembly 140 may include a plurality of coil modules 1001 and 1003 arranged in a horizontal direction. For example, the heating coil assembly 140 may include a plurality of coil modules 1001 and 1003 arranged in a first direction.

[0110] As shown in FIGS. 6 and 7, a plurality of heating coils WC may be disposed in a horizontal direction in each of the coil modules 1001 and 1003. Each heating coil WC may be provided in a form in which a spiral coil is formed as a pattern on a printed circuit board. That is, the heating coil 142 may be provided in a pattern form formed on the coil modules 1001 and 1003.

[0111] Each of the coil modules 1001 and 1003 may include a coil substrate stacked body 1010. The coil substrate stack 1010 may include a plurality of first coil substrate parts 1100 stacked in an up-down direction.

[0112] Each first coil substrate part 1100 may include a first coil part 1120. As an example, the first coil part 1120 may be formed as a result of a metal foil stacked on a surface of the first coil substrate part 1100 being patterned into a spiral coil shape.

[0113] According to the present embodiment, a plurality of first coil substrate parts 1100 may be stacked in an up-down direction to form one of the coil modules 1001 and 1003, and accordingly a plurality of first coil parts 1120 may be stacked in the up-down direction. The plurality of first coil parts 1120 stacked in the up-down direction may be connected to each other in the up-down direction to form each heating coil WC.

[0114] In addition, a plurality of first coil parts 1120 may be arranged in a horizontal direction on each first coil substrate part 1100, and accordingly the coil modules 1001 and 1003 may include a plurality of heating coils WC arranged in the horizontal direction.

[0115] In addition, the heating coil assembly 1000 of the present embodiment may include sensing coils SC for detecting a presence of a heating target, as shown in FIGS. 6 and 7. Each of the coil modules 1001 and 1003 may include a plurality of sensing coils SC arranged in a horizontal direction. As an example, in the heating coil assembly 1000, the plurality of sensing coils SC may be arranged along a first direction, that is, a lateral direction, and the plurality of sensing coils SC may also be arranged with respect to a second direction, that is, a front-rear direction.

[0116] Each sensing coil SC may be provided in a form in which a spiral coil is formed as a pattern on a printed circuit board. That is, the sensing coil SC may be provided in a pattern form formed on the coil modules 1001 and 1003.

[0117] According to the present embodiment, the coil substrate stacked body 1010 may include at least one second coil substrate part 1200. The second coil substrate part 1200 may be stacked together with the first coil substrate parts 1100 in an up-down direction. That is, at least one second coil substrate part 1200 and the plurality of first coil substrate parts 1100 may be stacked in the up-down direction to form one of the coil modules 1001 and

1003. Accordingly, in each of the coil modules 1001 and 1003, at least a portion of the heating coil WC and the sensing coil SC may be arranged in the up-down direction.

[0118] Each second coil substrate part 1200 may include a second coil part 1220. As an example, the second coil part 1220 may be formed as a result of a metal foil stacked on a surface of the second coil substrate part 1200 being patterned into a spiral coil shape.

[0119] Each sensing coil SC may be formed by one second coil part 1220, or may be formed as a result of a plurality of second coil parts 1220 stacked in an up-down direction being connected in the up-down direction.

[0120] In addition, a plurality of second coil parts 1220 may be arranged in a horizontal direction on each second coil substrate part 1200, and accordingly the coil modules 1001 and 1003 may include a plurality of sensing coils SC arranged in the horizontal direction.

[0121] In addition, the heating coil assembly 1000 of the present embodiment may further include a temperature sensor TS. The temperature sensor TS may be provided to measure a temperature of a heating target and may be disposed on the second coil substrate part 1200.

[0122] The temperature sensor TS may be disposed radially inward of the sensing coil SC in the horizontal direction. For example, the temperature sensor TS may be installed on the second coil substrate part 1200 and may be disposed in a region surrounded by the sensing coil SC.

[Structure of Heating Coil]

[0123] FIG. 9 is a plan view showing an example of the first coil substrate part according to one embodiment of the present disclosure, FIG. 10 is an enlarged view showing a portion of the first coil substrate part shown in FIG. 9, and FIG. 11 is a cross-sectional view schematically showing a stacked structure of the first coil part shown in FIG. 10. FIG. 12 is a plan view showing an example of an arrangement structure of the sensing coil, and FIG. 13 is an enlarged view of a portion "21" of FIG. 12, showing an example of an arrangement structure of the sensing coil with respect to the heating coil. FIG. 14 is an enlarged view showing the first terminal shown in FIG. 10, and FIG. 15 is an enlarged view showing the second terminal shown in FIG. 10.

[0124] According to the present embodiment, as shown in FIGS. 8 and 9 to 11, the heating coil WC may be formed by conductors stacked in a plurality of layers, more specifically electrical conductors. In the present embodiment, it is illustrated that the conductor is formed as the first coil part 1120, more specifically a coil pattern Cp to be described later is formed as the conductor.

[0125] The heating coil WC may be formed as a result of the first coil parts 1120 respectively provided on the plurality of first coil substrate parts 1100 stacked in an up-down direction being connected to each other in the up-

down direction. Each first coil substrate part 1100 may include a core 1110 and the first coil part 1120.

[0126] The core 1110 forms a framework of the first coil substrate part 1100 and may be formed of an insulating material. As an example, the core 1110 may be formed of a prepreg material. In the present embodiment, it is illustrated that the core 1110 is formed of a thermoset prepreg, more specifically a prepreg of FR4.

[0127] The first coil part 1120 may be disposed on both sides of the core 1110 in the up-down direction. For example, each first coil substrate part 1100 may be provided in a form in which one layer of the first coil part 1120 is formed on each of both sides of the core 1110 in the up-down direction.

[0128] As an example, the first coil part 1120 may be provided in a patterned form on both sides of the core 1110 in the up-down direction. For example, the first coil substrate part 1100 may be formed by a copper-clad laminate including the core 1110 and copper foils stacked on both sides of the core 1110 in the up-down direction. In this case, the first coil part 1120 may be formed as a result of the foil stacked on the core 1110 being patterned into a coil shape.

[0129] According to the present embodiment, the heating coil WC may be formed in a shape including a polygonal shape. For example, an outer shape of the heating coil WC in the horizontal direction (hereinafter referred to as an "outer shape of the heating coil") may be a polygonal shape.

[0130] In addition, the heating coil WC may be formed by the plurality of first coil substrate parts 1100 stacked in the up-down direction, as described above. The first coil substrate part 1100 may include a pattern region 1101 and non-pattern regions 1103 and 1105.

[0131] The pattern region 1101 corresponds to a region of the first coil substrate part 1100 in which the first coil part 1120 is disposed. The non-pattern regions 1103 and 1105 correspond to regions of the first coil substrate part 1100 in which the first coil part 1120 is not disposed. The pattern region 1101 and the non-pattern regions 1103 and 1105 may be disposed on a same plane and may be arranged in a horizontal direction.

[0132] The non-pattern regions 1103 and 1105 may include a first non-pattern region 1103. In each heating coil WC, the first non-pattern region 1103 may be disposed at a center in the horizontal direction. The first non-pattern region 1103 may also be disposed at a center of the first coil substrate part 1100 in the horizontal direction.

[0133] For example, the first non-pattern region 1103 may be disposed at a center in the horizontal direction of each heating coil WC and the first coil substrate part 1100. The pattern region 1101 may be disposed to surround the first non-pattern region 1103 from an outer side in the horizontal direction.

[0134] In the present embodiment, the expression "center" does not refer to an exact center, but refers to a region surrounded by the heating coil WC wound in a spiral shape, that is, a region including a center in a radial

direction of the heating coil WC and a surrounding region thereof.

[0135] At least a portion of the first coil part 1120 may surround the non-pattern regions 1103 and 1105 from an outer side in the horizontal direction. As an example, at least a portion of the first coil part 1120 may surround the first non-pattern region 1103 from an outer side in the horizontal direction.

[0136] The first coil part 1120 may include at least one coil pattern Cp disposed on an outer side of the first non-pattern region 1103 in the horizontal direction. In each first coil part 1120, each coil pattern Cp may be wound a plurality of times around the first non-pattern region 1103 as a center. The first coil part 1120 may be formed by the at least one coil pattern Cp provided in such a form.

[0137] Each first coil part 1120 may include a plurality of coil patterns Cp. In each first coil part 1120, the plurality of coil patterns Cp may be disposed to be spaced apart from each other by a predetermined distance along a radial direction of the heating coil WC.

[0138] As an example, each first coil part 1120 may include three to six coil patterns Cp. However, the present disclosure is not limited thereto, and each coil part 112 may include more than six coil patterns Cp.

[0139] In the present embodiment, it is illustrated that each first coil part 1120 includes three to six coil patterns Cp. According to this, in each first coil part 1120, three to six coil patterns Cp may be arranged along a radial direction of the heating coil WC. The coil patterns Cp disposed in each first coil part 1120 may be connected in the up-down direction with any one of the coil patterns Cp disposed in another first coil part 1120 adjacent in the up-down direction.

[0140] In addition, the first coil substrate part 1100 may further include a second non-pattern region 1105. The second non-pattern region 1105 corresponds to a region in which the first coil part 1120 is not formed, similarly to the first non-pattern region 1103.

[0141] With respect to the horizontal direction, the second non-pattern region 1105 may be disposed on an outer side of the first non-pattern region 1103. In the present embodiment, it is illustrated that the second non-pattern region 1105 is disposed on an outer side of the first non-pattern region 1103 in the first direction.

[0142] In addition, in each first coil substrate part 1100, the first non-pattern region 1103 and the second non-pattern region 1105 are not connected to each other in the horizontal direction. With respect to the horizontal direction, at least a portion of the sensing coil SC may be disposed between the first non-pattern region 1103 and the second non-pattern region 1105. That is, at least a portion of the first coil part 1120 may be disposed between the first non-pattern region 1103 and the second non-pattern region 1105.

[0143] According to the present embodiment, a plurality of second non-pattern regions 1105 may be arranged along the first direction for each heating coil WC. As an example, a pair of second non-pattern regions

1105 may be disposed for each heating coil WC. The pair of second non-pattern regions 1105 may be disposed on an outer side of the first non-pattern region 1103 in the first direction. That is, with respect to the first direction, the first non-pattern region 1103 may be disposed between the pair of second non-pattern regions 1105.

[0144] In addition, according to the present embodiment, a plurality of heating coils WC may be arranged along the first direction. The plurality of second non-pattern regions 1105 provided in the plurality of heating coils WC arranged as described above may be disposed at equal intervals along the first direction.

[0145] Meanwhile, as shown in FIGS. 6 and 7, a second coil substrate part 1200 may be disposed above or below the first coil substrate part 1100, and the sensing coil SC may be formed by the second coil substrate part 1200. The sensing coil SC may be disposed above or below the first coil substrate part 1100 and may be disposed in a region overlapping the first coil substrate part 1100 in the up-down direction.

[0146] In each of the coil modules 1001 and 1003, as shown in FIGS. 6 and 7 and FIGS. 12 and 13, the sensing coil SC may be disposed on an outer side of the heating coil WC in the vertical direction. For example, in each of the coil modules 1001 and 1003, the sensing coil SC and the heating coil WC may be arranged in the up-down direction.

[0147] With respect to the horizontal direction, at least a portion of the sensing coil SC may be disposed in the second non-pattern region 1105. Accordingly, as the plurality of second non-pattern regions 1105 are disposed at equal intervals along the first direction, the plurality of sensing coils SC may be disposed at equal intervals along the first direction.

[0148] As the plurality of second non-pattern regions 1105 are disposed at equal intervals along the first direction as described above, the plurality of sensing coils SC may be disposed at equal intervals along the first direction. According to the present embodiment, at least a portion of each sensing coil SC may be disposed in the second non-pattern region 1105. Accordingly, when a plurality of second non-pattern regions 1105 are disposed at equal intervals along the first direction, the plurality of sensing coils SC may be disposed at equal intervals along the first direction.

[0149] According to the present embodiment, the temperature sensor TS may be disposed on an inner side of the sensing coil SC in the horizontal direction. With respect to the horizontal direction, at least a portion of the temperature sensor TS may be disposed in the second non-pattern region 1105.

[0150] As an example, the temperature sensor TS may be disposed in the second non-pattern region 1105. That is, the temperature sensor TS installed on the second coil substrate part 1200 and the second non-pattern region 1105 formed on the first coil substrate part 1100 may be disposed to overlap each other in the up-down direction.

[0151] For this purpose, each sensing coil SC may be

disposed at a position that allows the entire temperature sensor TS to be disposed in the second non-pattern region 1105, that is, at a position that allows the entire temperature sensor TS to overlap the second non-pattern region 1105 in the up-down direction.

[0152] Meanwhile, each first coil part 1120 may include a first terminal 1121 and a second terminal 1122, as shown in FIGS. 9 and 10 and FIGS. 14 and 15. The first terminal 1121 and the second terminal 1122 may be provided to connect a plurality of coil patterns Cp arranged in the horizontal direction, that is, the plurality of coil patterns Cp forming one first coil part 1120.

[0153] With respect to the horizontal direction, the first terminal 1121 may be disposed on an outer side of the first non-pattern region 1103 and the second terminal 1122, and at least a portion of the second terminal 1122 may be disposed to contact the first non-pattern region 1103. According to this, with respect to the horizontal direction, the second non-pattern region 1105 may be disposed between the first terminal 1121 and the second terminal 1122.

[0154] Referring to FIGS. 6 and 12, the heating coil assembly 1000 of the present embodiment may further include a terminal part 1020. The terminal part 1020 may be provided to be connectable with at least one of the first terminal 1121 and the second terminal 1122.

[0155] The plurality of heating coils WC and sensing coils SC provided in the coil modules 1001 and 1003 may be connected to the terminal part 1020 within the coil modules 1001 and 1003 through wiring patterns Wpa, Wpb, and Wpc patterned on the coil modules 1001 and 1003, and may be connected to the electrical part 170 through the terminal part 1020.

[0156] That is, wiring for connecting the heating coils WC and the sensing coils SC to the terminal part 1020 may be formed in a patterned form on the coil modules 1001 and 1003 themselves, and connection between the heating coils WC and the sensing coils SC and the electrical part 170 may be achieved only by connecting the terminal part 1020 and the electrical part 170.

[0157] According to this, the heating coil WC and the sensing coil SC may be connected to the electrical part 170 by only a simple operation of connecting the terminal part 1020 and the electrical part 170, and a connection structure between the heating coil WC and the sensing coil SC and the electrical part 170 may be formed very simply.

[0158] In addition, since a separate wiring operation for connecting the heating coil WC and the sensing coil SC to the electrical part 170 is not required, a connection operation between the heating coil assembly 1000 and the electrical part 170 may be easily and quickly performed, and an accommodation space inside the cooktop 100 in which the heating coil assembly 1000 and the electrical part 170 are accommodated does not become complicated due to a large number of wires.

[Stacked Structure of Coil Substrate Stacked Body]

[0159] Referring to FIGS. 7 and 8, each of the coil modules 1001 and 1003 may be formed by a coil substrate stacked body 1010. The coil substrate stacked body 1010 may include a plurality of first coil substrate parts 1100 and at least one second coil substrate part 1200 stacked in the up-down direction.

[0160] The first coil substrate part 1100 may be formed in a form in which a core 1110 and a first coil part 1120 are stacked in the up-down direction, as shown in FIGS. 8 and 11. The second coil substrate part 1200 may be formed in a form in which a core 1210 and a second coil part 1220 are stacked in the up-down direction. The core 1210 forms a framework of the second coil substrate part 1200 and may be formed of the same or similar material as the core 1110 of the first coil substrate part 1100.

[0161] As an example, in the first coil substrate part 1100, the first coil part 1120 may be disposed on both sides of the core 1110 in the up-down direction. For example, the first coil part 1120 may be stacked on each of an upper surface and a lower surface of the core 1110.

[0162] In the second coil substrate part 1200, the first coil part 1120 may be disposed on one side of the core 1210 in the vertical direction, that is, below the core 1210, and the second coil part 1220 may be disposed on the other side of the core 1210 in the vertical direction, that is, above the core 1210. For example, the first coil part 1120 may be stacked on a lower surface of the core 1210, and the second coil part 1220 may be stacked on an upper surface of the core 1210.

[0163] As another example, in the second coil substrate part 1200, the second coil part 1220 may be disposed on both sides of the core 1210 in the up-down direction.

[0164] In the present embodiment, it is illustrated that the second coil substrate part 1200 includes the first coil part 1120 and the second coil part 1220, the first coil part 1120 is disposed below the core 1210, and the second coil part 1220 is disposed above the core 1210.

[0165] According to the present embodiment, the heating coil WC, more specifically the coil substrate stacked body 1010, may include six or more layers of first coil parts 1120. That is, the coil substrate stacked body 1010 may include six or more layers of first coil parts 1120 connected in the up-down direction and integrally coupled to each other.

[0166] The coil substrate stacked body 1010 may further include at least one layer of second coil parts 1220. For example, the coil substrate stacked body 1010 may include eight to twelve layers of first coil parts 1120 connected in the up-down direction and integrally coupled to each other, and one to two layers of second coil parts 1220.

[0167] The coil substrate stacked body 1010 may further include insulating layers stacked in the up-down direction together with the first coil parts 1120. In each coil substrate stacked body 1010, the coil parts 1120 and

1220 and the insulating layers may be disposed alternately in the up-down direction.

[0168] In the first coil substrate part 1100, the insulating layer may be formed by the core 1110. In the second coil substrate part 1200, the insulating layer may also be formed by the core 1210.

[0169] The insulating layer may also be disposed between the coil substrate parts 1100 and 1200. For example, an insulating layer may be disposed between a pair of first coil substrate parts 1100 adjacent in the up-down direction, and an insulating layer may also be disposed between the first coil substrate part 1100 and the second coil substrate part 1200. In addition, an insulating layer may also be disposed between a pair of second coil substrate parts 1200 adjacent in the up-down direction.

[0170] As an example, the insulating layer disposed between the coil substrate parts 1100 and 1200 as described above may be formed by an adhesive 1400. According to the present embodiment, the plurality of first coil substrate parts 1100 stacked in the up-down direction may be coupled by the adhesive 1400, and the first coil substrate part 1100 and the second coil substrate part 1200 may also be coupled by the adhesive 1400. In addition, the plurality of second coil substrate parts 1200 stacked in the up-down direction may also be coupled by the adhesive 1400.

[0171] According to this, insulating layers may be formed by the cores 1110 and 1210 respectively provided in the first coil substrate part and the second coil substrate part 1100 and 1200 (hereinafter referred to as "coil substrate parts"), and insulating layers may also be formed by the adhesives 1400 disposed between the coil substrate parts 1100 and 1200.

[0172] According to the present embodiment, one of the first coil part and the second coil part 1120 and 1220 (hereinafter referred to as "coil part") and insulating layers may be alternately disposed in the up-down direction. That is, the first coil part 1120 and insulating layers may be alternately disposed in the up-down direction, and the second coil part 1220 and insulating layers may also be alternately disposed.

[0173] In the plurality of insulating layers arranged in the up-down direction, the cores 1110 and 1210 and the adhesives 1400 may be alternately disposed in the up-down direction. For example, the coil parts 1120 and 1220 and the insulating layers may be stacked in the up-down direction in an order of "...first coil part 1120 - core 1110 - first coil part 1120 - adhesive 1400 - first coil part 1120...".

[0174] Meanwhile, the heating coil assembly 1000 of the present embodiment may further include outer layer portions 1300 and 1350. The outer layer portions 1300 and 1350 may be disposed on outer sides of the coil substrate stacked body 1010 in the up-down direction. As an example, the outer layer portions 1300 and 1350 may be respectively disposed above and below the coil substrate stacked body 1010, and a pair of the outer layer

portions 1300 and 1350 disposed in this manner may be stacked together with the coil substrate stacked body 1010 in the up-down direction. The pair of outer layer portions 1300 and 1350 stacked together with the coil substrate stacked body 1010 in the up-down direction may form an upper end and a lower end of the coil modules 1001 and 1003.

[0175] The outer layer portions 1300 and 1350 may be divided into a first outer layer portion 1300 and a second outer layer portion 1350. The first outer layer portion 1300 may include a plurality of first coil parts 1120 arranged in the horizontal direction, similarly to the first coil parts 1120. The second outer layer portion 1350 may include a plurality of second coil parts 1220 arranged in the horizontal direction, similarly to the second coil parts 1220.

[0176] The first outer layer portion 1300 may form the heating coil WC together with the plurality of first coil parts 1120 stacked in the up-down direction. In addition, the second outer layer portion 1350 may form the heating coil WC together with the second coil part 1220. That is, the first outer layer portion 1300 may be connected to the first coil part 1120 in the up-down direction, and the second outer layer portion 1350 may be connected to the second coil part 1220 in the up-down direction.

[0177] The first outer layer portion 1300 may be disposed at a position adjacent to the first coil substrate part 1100. As an example, the first outer layer portion 1300 may be disposed below the first coil substrate part 1100 and may be connected to the first coil part 1120 in the up-down direction. The first outer layer portion 1300 may form the heating coil WC together with the first coil part 1120.

[0178] The second outer layer portion 1350 may be disposed at a position adjacent to the second coil substrate part 1200. As an example, the second outer layer portion 1350 may be disposed above the second coil substrate part 1200 and may be connected to the second coil part 1220 in the up-down direction. The second outer layer portion 1350 may form the sensing coil SC together with the second coil part 1220.

[0179] For example, the coil substrate stacked body 1010 may be formed in a structure in which the second coil part 1220 is stacked above the plurality of first coil parts 1120. The coil substrate stacked body 1010 may be disposed between the first outer layer portion 1300 and the second outer layer portion 1350 spaced apart from each other in the up-down direction.

[0180] In this case, the first outer layer portion 1300 disposed below the first coil substrate part 1100 may form a lower end of the coil modules 1001 and 1003 and may form the heating coil WC together with the first coil part 1120. In addition, the second outer layer portion 1350 disposed above the second coil substrate part 1200 may form an upper end of the coil modules 1001 and 1003 and may form the sensing coil SC together with the second coil part 1220.

[0181] According to the present embodiment, in each

of the coil substrate parts 1100 and 1200, a pair of coil parts 1120 and 1220 may be disposed in the up-down direction. That is, two layers of the coil parts 1120 and 1220 may be formed in each of the coil substrate parts 1100 and 1200. The coil substrate stacked body 1010 formed in a form in which the plurality of coil substrate parts 1100 and 1200 are stacked may include the plurality of layers of the coil parts 1120 and 1220, and may include an even number of layers of the coil parts 1120 and 1220.

[0182] In addition, outer layer portions 1300 and 1350 may be coupled to both sides of the coil substrate stacked body 1010 in the up-down direction formed as described above, respectively, and accordingly, in each of the coil modules 1001 and 1003, the plurality of layers of the coil parts 1120 and 1220 may be disposed, and an even number of layers of the coil parts 1120 and 1220 may be disposed.

[0183] The outer layer portions 1300 and 1350 may be coupled to the coil substrate stacked body 1010 by an adhesive 1400 disposed between the coil parts 1120 and 1220 and the outer layer portions 1300 and 1350. The adhesive 1400 may form an insulating layer between the coil parts 1120 and 1220 and the outer layer portions 1300 and 1350 and may couple the coil substrate stacked body 1010 and the outer layer portions 1300 and 1350.

[0184] Although it is described above that the coil modules 1001 and 1003 are formed in a stacked form in which respective parts constituting the coil modules 1001 and 1003, for example the coil substrate parts 1100 and 1200, the coil parts 1120 and 1220, and conductors, are stacked, the coil modules 1001 and 1003 are formed in a form in which the respective parts constituting the coil modules 1001 and 1003 are integrated.

[0185] That is, the coil modules 1001 and 1003 of the present embodiment are formed integrally, and are not separated for each of the respective parts constituting the coil modules 1001 and 1003 unless a separate process such as cutting or chemical treatment is performed.

[Shape of Heating Coil]

[0186] FIG. 16 is a plan view showing an example of the heating coil.

[0187] Referring to FIGS. 9 and 16, the heating coil WC may be formed in a shape including a polygonal shape. For example, an outer shape of the heating coil WC in the horizontal direction may be a polygonal shape. In other words, a shape of the heating coil WC when the heating coil WC is viewed from above may be a polygonal shape.

[0188] As an example, the outer shape of the heating coil WC may be approximately rectangular. In addition, an outer shape of the coil modules 1001 and 1003 including the heating coil WC may also be a polygonal shape. In addition, the heating coil WC may be formed by a pattern coil patterned on an insulating layer. For example, the heating coil WC may be formed by a pattern coil patterned on the insulating layer rather than a Litz coil wound close to a circular shape.

[0189] As described above, as the heating coil WC is formed in a pattern form, the outer shape of the heating coil WC may be easily formed in a polygonal shape, more specifically approximately rectangular.

[0190] In addition, as the outer shape of the heating coil WC is formed in such a form, the heating coil WC may occupy a region very close to an edge of the coil modules 1001 and 1003, and thus a density of a region occupied by the heating coil WC within the coil modules 1001 and 1003 may be effectively increased.

[0191] In addition, an outer shape of the first coil substrate part 1100 in the horizontal direction (hereinafter referred to as "outer shape of the first coil substrate part") provided in each of the heating coils WC may be a polygonal shape. For example, the outer shape of the first coil substrate part 1100 may be approximately rectangular.

[0192] In addition, an outer shape of the core 1110 in the horizontal direction (hereinafter referred to as "outer shape of the core") forming a framework of each of the first coil substrate parts 1100 may be a polygonal shape, similar to shapes of the coil modules 1001 and 1003 and the first coil substrate part 1100.

[0193] As an example, the heating coil WC may be formed in a rectangular spiral shape. For example, the heating coil WC may be formed in a rectangular spiral shape in which a first straight line L1 that is a straight line in a first direction and a second straight line L2 that is a straight line in a second direction are alternately connected to each other. In addition, an outer shape of the core 1110 of the first coil substrate part 1100 forming the heating coil WC may be formed in a rectangular shape similar to the outer shape of the heating coil WC.

[0194] Accordingly, at least one of a plurality of outer edges of the heating coil WC may include a straight line parallel to one of a plurality of outer edges of the core 1110 closest thereto. For example, the first straight line L1 disposed at a frontmost side of the heating coil WC may be formed as a straight line parallel to a front outer edge of the core 1110, and the second straight line L2 disposed at a rightmost side of the heating coil WC may be formed as a straight line parallel to a right outer edge of the core 1110.

[0195] As the outer shape of the core 1110 and the outer shape of the heating coil WC are formed in the above-described form, the heating coil WC may occupy a region very close to an edge of the coil modules 1001 and 1003, and a density of a region occupied by the heating coil WC within the coil modules 1001 and 1003 may be effectively increased.

[0196] In addition, according to the present embodiment, each of the coil modules 1001 and 1003 may include a plurality of heating coils WC. That is, each of the coil modules 1001 and 1003 may include an assembly of the plurality of heating coils WC arranged in the horizontal direction. For example, each of the coil modules 1001 and 1003 may be provided with an assembly of the heating coils WC including eight heating coils WC

arranged in a form of 2 columns * 4 rows along the horizontal direction.

[0197] According to the present embodiment, an outer shape of the assembly of the heating coils WC may be a polygonal shape. That is, both the outer shape of each of the coil modules 1001 and 1003 and the outer shape of the assembly of the heating coils WC provided in the coil modules 1001 and 1003 may be polygonal shapes.

[0198] As an example, an outer shape of the assembly of the heating coils WC may be disposed in a rectangular shape. That is, the plurality of heating coils WC provided in each of the coil modules 1001 and 1003 may be disposed in a rectangular shape.

[Second Example of Lighting Part]

[0199] FIG. 17 is a plan view schematically showing a structure of a heating coil assembly according to another embodiment of the present disclosure, FIG. 18 is a plan view schematically showing a structure of a first coil module shown in FIG. 17, and FIG. 19 is a plan view schematically showing a structure of a second coil module shown in FIG. 17. In addition, FIG. 20 is a plan view showing the first coil module shown in FIG. 17 in a separated manner, and FIG. 21 is a cross-sectional view schematically showing a stacked structure of the first coil module shown in FIG. 20.

[0200] Referring to FIGS. 17 to 19, each of the indicator lights L (see FIG. 3) may be implemented by the lighting part 280. A main difference between the lighting part 280 exemplified in the present embodiment and the lighting part 180 exemplified in the previous embodiment (see FIG. 4) is that the lighting part 280 of the present embodiment is formed integrally with the coil modules 1001 and 1003.

[0201] According to the present embodiment, the lighting part 280 may be provided in a form formed integrally with the coil modules 1001 and 1003, rather than being provided separately from the heating coil assembly 140 and installed on the supporter 150. The lighting part 280 may include a light emitting element 181 installed in the coil modules 1001 and 1003.

[0202] In each of the lighting parts 280, a plurality of light emitting elements 181 may be disposed in the front-rear direction at predetermined intervals. The number of the light emitting elements 181 for each lighting part 280 may be appropriately increased or decreased according to a size and intensity of light to be implemented through the lighting part 280. As an example, an LED may be applied as the light emitting element 181, but a type of a light source applicable as the light emitting element 181 is not limited to the LED.

[0203] In each of the coil modules 1001 and 1003, the lighting part 280 may be disposed at a position not overlapping the heating coil WC in the up-down direction. In addition, the lighting part 280 may be disposed at a position not overlapping the sensing coil SC in the up-down direction, as shown in FIGS. 18 to 20. As an

example, the lighting part 280 may be disposed at a position not overlapping the heating coil WC and the sensing coil SC in the up-down direction.

[0204] According to the present embodiment, a blank region B may be provided in each of the coil modules 1001 and 1003. In each of the coil modules 1001 and 1003, the blank region B may be formed as a region in which the heating coil WC and the sensing coil SC are not disposed. For example, the blank region B may be formed as a region in which no pattern related to or connected to the heating coil WC or the sensing coil SC, such as a coil pattern for forming the heating coil WC or the sensing coil SC, or a terminal or a wiring pattern, is disposed.

[0205] With respect to the first direction, the blank region B may be disposed between a pair of heating coils WC. For example, each of the coil modules 1001 and 1003 may include a plurality of heating coils WC arranged in two columns, and the blank region B may be disposed between the heating coils WC of a first column and the heating coils WC of a second column.

[0206] In addition, the blank region B may be disposed at an outermost side of the coil modules 1001 and 1003 in a second direction. For example, the blank region B may be disposed at at least one of a left side of the heating coil WC of a leftmost column and a right side of the heating coil WC of a rightmost column among the plurality of heating coils WC arranged in a plurality of columns.

[0207] As an example, the first coil module 1001 may include a plurality of heating coils WC arranged in two columns, and three columns of the blank regions B may be disposed in the first coil module 1001. For example, in the first coil module 1001, the blank regions B may be disposed at a left side of the heating coil WC of a left column, a right side of the heating coil WC of a right column, and between the heating coil WC of the left column and the heating coil WC of the right column, respectively. That is, in the first coil module 1001, the heating coils WC and the blank regions B may be alternately disposed in the first direction.

[0208] The lighting part 280 of the present embodiment may be disposed in the blank region B. Accordingly, the lighting part 280 may be disposed between a pair of heating coils WC or may be disposed on both sides of the heating coil WC in the first direction. That is, with respect to the first direction, the lighting part 280 may be disposed between a pair of heating coils WC, or the heating coil WC may be disposed between a pair of lighting parts 280.

[0209] As an example, the first coil module 1001 may include a plurality of heating coils WC arranged in two columns, and three columns of the lighting parts 280 may be disposed in the first coil module 1001. For example, in the first coil module 1001, the lighting parts 280 may be disposed at a left side of the heating coil WC of a left column, a right side of the heating coil WC of a right column, and between the heating coil WC of the left column and the heating coil WC of the right column,

respectively. That is, in the first coil module 1001, the heating coils WC and the lighting parts 280 may be alternately disposed in the first direction.

[0210] In addition, with respect to the first direction, the lighting part 280 may be disposed between a pair of sensing coils SC. According to the present embodiment, the blank region B may be disposed between the sensing coils SC arranged in two columns, and the lighting part 280 may be disposed in the blank region B.

[0211] Meanwhile, the heating coil assembly 1000 may include a plurality of coil modules 1001 and 1003 arranged in the horizontal direction, as shown in FIGS. 17 to 19. For example, the heating coil assembly 1000 may include at least one first coil module 1001 and a second coil module 1003 arranged in the horizontal direction.

[0212] As an example, the heating coil assembly 1000 may include a pair of first coil modules 1001 arranged in the first direction, and one second coil module 1003 disposed between the pair of first coil modules 1001. In addition, the heating coil assembly 1000 may include the lighting part 280 disposed between the first coil module 1001 and the second coil module 1003.

[0213] With respect to the first direction, the second coil module 1003 may be disposed between the pair of first coil modules 1001, and one lighting part 280 may be disposed between the first coil module 1001 and the second coil module 1003.

[0214] In each of the first coil modules 1001, the lighting parts 280 may be disposed on both sides of each of the heating coils WC in the first direction. In the second coil module 1003, the lighting part 280 may be disposed between a pair of heating coils WC adjacent to each other in the first direction.

[0215] As an example, when a pair of heating coils WC are disposed in each of the first coil module 1001 and the second coil module 1003 in the first direction, in the first coil module 1001, the lighting parts 280 may be disposed on both sides of each of the heating coils WC, and in the second coil module 1003, the lighting part 280 may be disposed only between the pair of heating coils WC.

[0216] For example, in the first coil module 1001, the heating coils WC and the lighting parts 280 may be arranged in a form of "lighting part 280 - heating coil WC - lighting part 280 - heating coil WC - lighting part 280" along the first direction. In the second coil module 1003, the heating coils WC and the lighting parts 280 may be arranged in a form of "heating coil WC - lighting part 280 - heating coil WC" along the first direction.

[0217] As another example, not only in the first coil module 1001 but also in the second coil module 1003, the lighting parts 280 may be disposed on both sides of each of the heating coils WC in the first direction.

[0218] As still another example, when a plurality of second coil modules 1003 are arranged along the first direction between a pair of first coil modules 1001, in at least one of the second coil modules 1003, the lighting parts 280 may be disposed on both sides of each of the

heating coils WC in the first direction.

[0219] As yet another example, when the first coil module 1001 and the second coil module 1003 each include only one column of heating coils WC, the lighting parts 280 may be disposed on both sides of each of the heating coils WC in the first direction.

[0220] According to the present embodiment, an outer shape of the heating coil WC may be approximately rectangular, and accordingly, an approximately rectangular space may be formed between a pair of heating coils WC adjacent to each other in the first direction.

[0221] That is, as the heating coils WC are formed in a rectangular shape, a shape of the blank region B formed between the heating coils WC may also be formed in a rectangular shape, more specifically in a bar shape elongated in the second direction.

[0222] Meanwhile, the lighting part 180 may be provided to effectively implement the indicator light L (see FIG. 3) having a line shape elongated in the second direction, and for this purpose, the lighting part 180 may be formed in a bar shape elongated in the second direction.

[0223] As described above, as both the shape of the lighting part 180 and the shape of the blank region B in which the lighting part 180 is disposed are formed in a bar shape elongated in the second direction, most of the blank region B may be occupied by the lighting part 180. As most of a space occupied by the blank region B is filled by the lighting part 180 in this manner, a portion unnecessarily wasted due to the blank region B within the coil modules 1001 and 1003 may be minimized.

[0224] That is, as the heating coil WC is formed in a rectangular shape, an installation space for the lighting part 180 implementing the indicator light having a line shape elongated in the second direction may be effectively secured on the coil modules 1001 and 1003, and space waste caused thereby may be minimized, whereby installation of the lighting part 180 for implementing lighting may be very effectively achieved while increase in a size of the heating coil assembly 100 is minimized.

[0225] Meanwhile, referring to FIGS. 17, 20, and 21, the top plate 120 may be disposed above the heating coil assembly 1000, and the lighting part 280 may be disposed above at least a portion of the heating coil assembly 1000. That is, with respect to the up-down direction, the lighting part 280 may be disposed between at least a portion of the coil modules 1001 and 1003 and the top plate 120.

[0226] As an example, the lighting part 280 may be disposed above the heating coil WC. That is, with respect to the up-down direction, the lighting part 280 may be disposed between the heating coil WC and the top plate 120.

[0227] According to the present embodiment, the coil modules 1001 and 1003 may be formed as a plurality of layers stacked in the up-down direction, and the heating coil WC and the sensing coil SC may be disposed in different layers. For example, the heating coil WC may be

formed by first coil parts 1120 stacked in a plurality of layers along the up-down direction, and the sensing coil SC may be disposed on an outer side of the heating coil WC in the up-down direction. The lighting part 280 may be disposed in the same layer as a layer in which at least a portion of the sensing coil SC is disposed.

[0228] As an example, the sensing coil SC may be disposed in a layer above a layer in which the first coil parts 1120 are disposed. The lighting part 280 may be disposed in the same layer as a layer in which the second coil parts 1220 forming the sensing coil SC are disposed. For example, when the sensing coil SC is formed by the second coil parts 1220 stacked in a plurality of layers, the lighting part 280 may be disposed in a layer in which one of the second coil parts 1220 is disposed.

[0229] As an example, the lighting part 280 may be disposed in the same layer as a layer in which a second coil part 1220 disposed at an uppermost position among the plurality of second coil parts 1220 is disposed.

[0230] As described above, the lighting part 280 may include the light emitting element 181 installed in the coil modules 1001 and 1003. According to the present embodiment, in the coil modules 1001 and 1003, at least one of the first coil part 1120 for forming the heating coil WC and the second coil part 1220 for forming the sensing coil SC may be patterned. The light emitting element 181 may be mounted on any one layer of the coil modules 1001 and 1003.

[0231] The light emitting element 181 may be disposed in the same layer as a layer in which at least a portion of the sensing coil SC is disposed. As an example, the light emitting element 181 may be mounted in the same layer as a layer in which a second coil part 1220 disposed at an uppermost portion among the plurality of second coil parts 1220 is disposed.

[0232] The light emitting element 181 mounted on the coil modules 1001 and 1003 as described above may be disposed between at least a portion of the coil modules 1001 and 1003 and the top plate 120. At least a portion of the light emitting element 181 may be exposed toward the top plate 120, and accordingly, the light emitting element 181 may emit light toward a light display region 121 of the top plate 120.

[0233] In addition, the lighting part 280 may include a driving circuit 183. The driving circuit 183 may be provided for driving the light emitting element 181 and may be formed in the coil modules 1001 and 1003. The driving circuit 183 may be connected to the light emitting element 181 and may perform functions of supplying power to the light emitting element 181 and transmitting a signal.

[0234] As an example, the driving circuit 183 may be provided in a form patterned in the blank region B of the coil modules 1001 and 1003. For example, the light emitting element 181 and the driving circuit 183 may be disposed in the blank region B, and patterns related to the heating coil WC or the sensing coil SC are not disposed in the blank region B.

[0235] Among a plurality of layers constituting the coil

modules 1001 and 1003, the driving circuit 183 may be patterned in the same layer as a layer in which the light emitting element 181 is mounted. As an example, the light emitting element 181 and the driving circuit 183 may be disposed in an uppermost layer among the plurality of layers constituting the coil modules 1001 and 1003. For example, the light emitting element 181 and the driving circuit 183 may be patterned in a second outer layer portion 1350 disposed at an upper end of the coil modules 1001 and 1003.

[0236] In this case, each of the light emitting elements 181 may be disposed in a space formed between the heating coil assembly 1000 and the top plate 120. That is, each of the light emitting elements 181 provided in the lighting part 280 may be disposed at a position directly facing the top plate 120, and no structure blocking light is disposed between the light emitting element 181 and the top plate 120. Accordingly, light emitted from the light emitting element 181 may directly reach the light display region 121 of the top plate 120 without being obstructed by another structure.

[0237] As described above, the lighting part 280 may be integrally provided with the heating coil assembly 1000. Accordingly, installation of the lighting part 280 may be easily and quickly performed without an additional assembly operation for installing the lighting part 280 in the heating coil assembly 1000.

[0238] In addition, according to the present embodiment, the lighting part 280 may be integrally provided with the heating coil assembly 1000, and the driving circuit 183 for driving the light emitting element 181 may be formed in a form patterned on the heating coil assembly 1000.

[0239] Accordingly, there is no need to additionally provide separate wiring for connecting the lighting part 280 and the electrical part 170 (see FIG. 4), and connection between the lighting part 280 and the electrical part 170 may also be achieved together only by connection between the heating coil assembly 1000 and the electrical part 170 through the terminal part. That is, a connection structure between the heating coil assembly 1000 including the lighting part 280 and the electrical part 170 may be formed very simply.

[0240] According to the present embodiment, the heating coil WC for implementing a heating function and the lighting part 280 for implementing lighting may be formed in a form patterned together in the coil modules 1001 and 1003, and they may be simply connected to the electrical part 170 only by connection between the heating coil assembly 1000 and the electrical part 170 through the terminal part.

[0241] Accordingly, the cooking appliance of the present embodiment may not only allow connection between the heating coil assembly 1000 and the electrical part 170 to be easily and quickly performed, but may also provide an effect of preventing an accommodation space inside the cooktop in which the heating coil assembly 1000 and the electrical part 170 are accommodated from becoming

complicated due to a large number of wires.

[0242] In the present embodiment, it is illustrated that each of the indicator lights L (see FIG. 3) is formed as a straight line extending in the front-rear direction and the plurality of indicator lights L are arranged in the lateral direction, but the present disclosure is not limited thereto.

[0243] As another example, each of the indicator lights L may be formed as a straight line extending in the lateral direction, and the plurality of indicator lights L may be arranged in the front-rear direction. In this case, in each of the lighting parts 280, the plurality of light emitting elements 181 may be disposed in the lateral direction at predetermined intervals, and the plurality of lighting parts 280 may be arranged in the front-rear direction.

[0244] When the lighting part 280 is disposed in such a form, a portion of the lighting part 280 may be disposed at a position overlapping the sensing coil SC (see FIG. 6) in the up-down direction, and interference between the lighting part 280 and the temperature sensor TS may occur.

[0245] If the heating coil assembly does not include the sensing coil SC and the temperature sensor TS, or if positions of the sensing coil SC and the temperature sensor TS are changed to positions where a portion of the lighting part 280 does not overlap or interfere with the sensing coil SC and the temperature sensor TS, even when the lighting part 280 is disposed in such a form, the lighting part 280 may sufficiently effectively implement a function of the indicator light L.

[0246] As still another example, the indicator lights L may be provided in a form in which a plurality of indicator lights L arranged in the lateral direction and a plurality of indicator lights L arranged in the front-rear direction are combined. For example, the indicator lights L may be provided in a form in which the plurality of indicator lights L form a grid pattern.

[0247] 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 of the cooktop and horizontal lines turned on at both front and rear sides of the heating target are combined.

[Third Example of Lighting Part]

[0248] FIG. 22 is a cross-sectional view showing another example of the first coil module shown in FIG. 21.

[0249] As another example, the lighting part 380 may be disposed below the heating coil assembly 1000. In this case, at least a portion of the heating coil assembly 1000 may be disposed between the light emitting element 181 and the top plate 120, and light emitted from the light emitting element 181 may pass through the heating coil assembly 1000 in the up-down direction and reach the light display region 121 of the top plate 120.

[0250] In the present embodiment, at least a portion of

the lighting part 380 is exemplified as being disposed in a lowermost layer of the heating coil assembly 1000. According to this, at least a portion of the lighting part 380 may be disposed in the same layer as a layer in which a first coil part 1120 disposed at a lowermost portion among the plurality of first coil parts 1120 is disposed.

[0251] For example, the driving circuit 183 may be patterned in a first outer layer portion 1300 disposed at a lower end of the coil modules 1001 and 1003, and the light emitting element 181 may be connected to the driving circuit 183.

[0252] In addition, a light-transmitting hole ha may be provided in the heating coil assembly 1000. The light-transmitting hole ha may be formed in a hole shape penetrating the heating coil assembly 1000 in the vertical direction and may be disposed in the blank region B.

[0253] According to the present embodiment, at least a portion of the light emitting element 181 may be disposed in a region overlapping the light-transmitting hole ha in the vertical direction. In the present embodiment, the entire light emitting element 181 is exemplified as being disposed inside the light-transmitting hole ha in the horizontal direction.

[0254] The light emitting element 181 may be disposed below the coil modules 1001 and 1003 and inside the light-transmitting hole ha in the horizontal direction to emit light upward. Light emitted from the light emitting element 181 may pass through the heating coil assembly 1000 in the up-down direction through the light-transmitting hole ha and reach the light display region 121 of the top plate 120.

[0255] As an example, each of the light emitting elements 181 disposed inside the light-transmitting hole ha in the horizontal direction may be bonded to the heating coil assembly 1000 by a method such as soldering and may be electrically connected to the driving circuit 183.

[0256] For example, when the driving circuit 183 is patterned in the first outer layer portion 1300, the light emitting element 181 may be bonded to the first outer layer portion 1300, and accordingly, the light emitting element 181 may be connected to the driving circuit 183 and simultaneously fixed to a lower end of the heating coil assembly 1000.

[0257] As described above, as the lighting part 380 is disposed below the heating coil assembly 1000, the lighting part 380 may be disposed at a position spaced downward from the top plate 120 by approximately a thickness of the heating coil assembly 1000. That is, under a condition in which the lighting part 380 is integrally provided with the heating coil assembly 1000, the lighting part 380 may be disposed at a position farthest from the top plate 120.

[0258] As the lighting part 380 is provided below the heating coil assembly 1000 in the above-described form, the lighting part 380 may be disposed at a position spaced apart from the top plate 120 heated to a high temperature, that is, at a position less affected by heat.

[0259] The cooking appliance of the present embodi-

ment, which the lighting part 380 as described above may allow lighting to be effectively implemented even in a high-temperature environment in which food is heated and cooked, and may effectively prevent performance degradation and lifespan reduction of the lighting part 380 due to overheating.

[0260] 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]

[0261]

10: Oven part
11: Door
13: Main control panel
100: Cooktop
105: Control part
110: Case
120: Top plate
130: Cooktop control panel
150: Supporter
160: Ferrite core
180, 280, 380: Lighting part
181: Light emitting element
183: Driving circuit
1000: Heating coil assembly
1001: First coil module
1003: Second coil module
1010: Coil substrate stacked body
1020: Terminal part
1100: First coil substrate part
1110: Core
1120: First coil part
1200: Second coil substrate part
1210: Core
1220: Second coil part
1300: First outer layer portion
1350: Second outer layer portion
B: Blank region
Ha: Light-transmitting hole

Claims

1. A cooking appliance comprising:

at least one coil module including at least one of a heating coil for inductively heating a heating target, and a sensing coil for sensing the heating target; and
a lighting part disposed in the coil module and

- emitting light.
2. The cooking appliance of claim 1, wherein the coil module and the lighting part are integrally formed.
 3. The cooking appliance of claim 1, wherein the lighting part includes a light emitting element installed in the coil module.
 4. The cooking appliance of claim 1, wherein a plurality of heating coils are disposed along a horizontal direction, and wherein the lighting part is disposed at a position not overlapping the heating coil in an up-down direction.
 5. The cooking appliance of claim 1, wherein a plurality of sensing coils are disposed along a horizontal direction, and wherein the lighting part is disposed at a position not overlapping the sensing coil in an up-down direction.
 6. The cooking appliance of claim 5, wherein a plurality of heating coils are disposed along a horizontal direction, and wherein the lighting part is disposed at a position not overlapping the heating coil and the sensing coil in an up-down direction.
 7. The cooking appliance of claim 1, wherein a plurality of the heating coils are disposed along a first direction, and wherein, with respect to the first direction, the lighting part is disposed between a pair of the heating coils, or the heating coil is disposed between a pair of the lighting parts.
 8. The cooking appliance of claim 1, wherein a plurality of the heating coils are disposed along a first direction, and wherein the heating coils and the lighting parts are alternately disposed in the first direction.
 9. The cooking appliance of claim 1, wherein a plurality of the sensing coils are disposed along a first direction, and wherein, with respect to the first direction, the lighting part is disposed between a pair of the sensing coils.
 10. The cooking appliance of claim 1, further comprising a top plate disposed above the coil module, wherein, with respect to an up-down direction, the lighting part is disposed between at least a portion of the coil module and the top plate.
 11. The cooking appliance of claim 10, wherein, with respect to the up-down direction, the lighting part is disposed between the heating coil and the top plate.
 12. The cooking appliance of claim 10, wherein the coil module is formed as a plurality of layers stacked in an up-down direction, wherein the heating coil and the sensing coil are disposed in different layers, and wherein the lighting part is disposed in the same layer as a layer in which at least a portion of the sensing coil is disposed.
 13. The cooking appliance of claim 1, wherein the coil module includes a first coil part patterned in the coil module to form the heating coil, and wherein the lighting part includes a light emitting element mounted on the coil module.
 14. The method of claim 13, wherein the coil module is formed as a plurality of layers stacked in an up-down direction, wherein the heating coil and the sensing coil are disposed in different layers, and wherein the light emitting element is mounted in the same layer as a layer in which at least a portion of the sensing coil is patterned.
 15. The method of claim 13, wherein the lighting part further includes a driving circuit patterned in the coil module and connected to the light emitting element.
 16. The cooking appliance of claim 15, wherein the coil module is formed as a plurality of layers stacked in an up-down direction, and wherein the driving circuit is patterned in the same layer as a layer in which the light emitting element is mounted.
 17. The cooking appliance of claim 1, wherein the coil module is formed as a plurality of layers stacked in an up-down direction, wherein at least a portion of the lighting part is disposed in a lowermost layer of the coil module, wherein a light-transmitting hole is formed in the coil module to penetrate in the up-down direction, and wherein light emitted from the lighting part passes through the coil module in the up-down direction through the light-transmitting hole.
 18. The cooking appliance of claim 17, wherein the lighting part comprises: a light emitting element at least partially disposed below the coil module and inside the light-transmitting hole in a horizontal direction to emit light upward; and a driving circuit patterned in the lowermost layer

of the coil module and connected to the light emitting element.

- 19.** The cooking appliance of claim 1, wherein the coil module includes a first coil module and a second coil module each including at least one heating coil, 5

wherein, with respect to a first direction, the second coil module is disposed between a pair of the first coil modules, and one lighting part is disposed between the first coil module and the second coil module, and 10

wherein, in the first coil module, the lighting parts are respectively disposed on both sides of each of the heating coils in the first direction. 15

- 20.** The method of claim 19, wherein, with respect to the first direction, a pair of the heating coils are disposed in each of the first coil module and the second coil module, the lighting parts are respectively disposed on both sides of each of the heating coils in the first coil module, and the lighting part is disposed only between the pair of the heating coils in the second coil module. 20

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FIG. 1

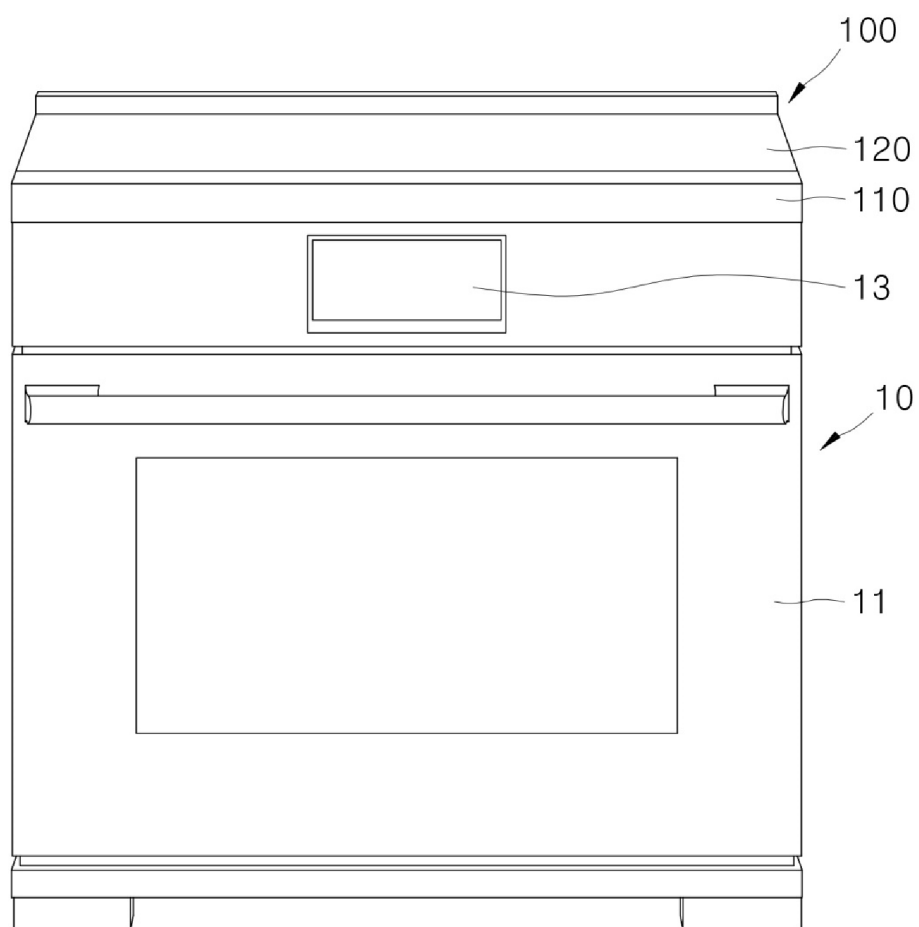


FIG. 2

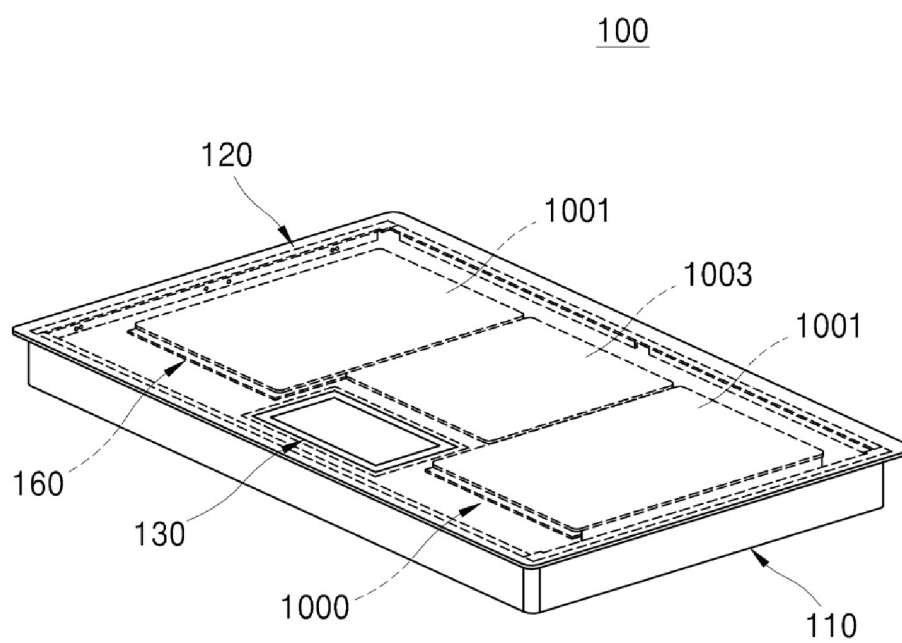


FIG. 3

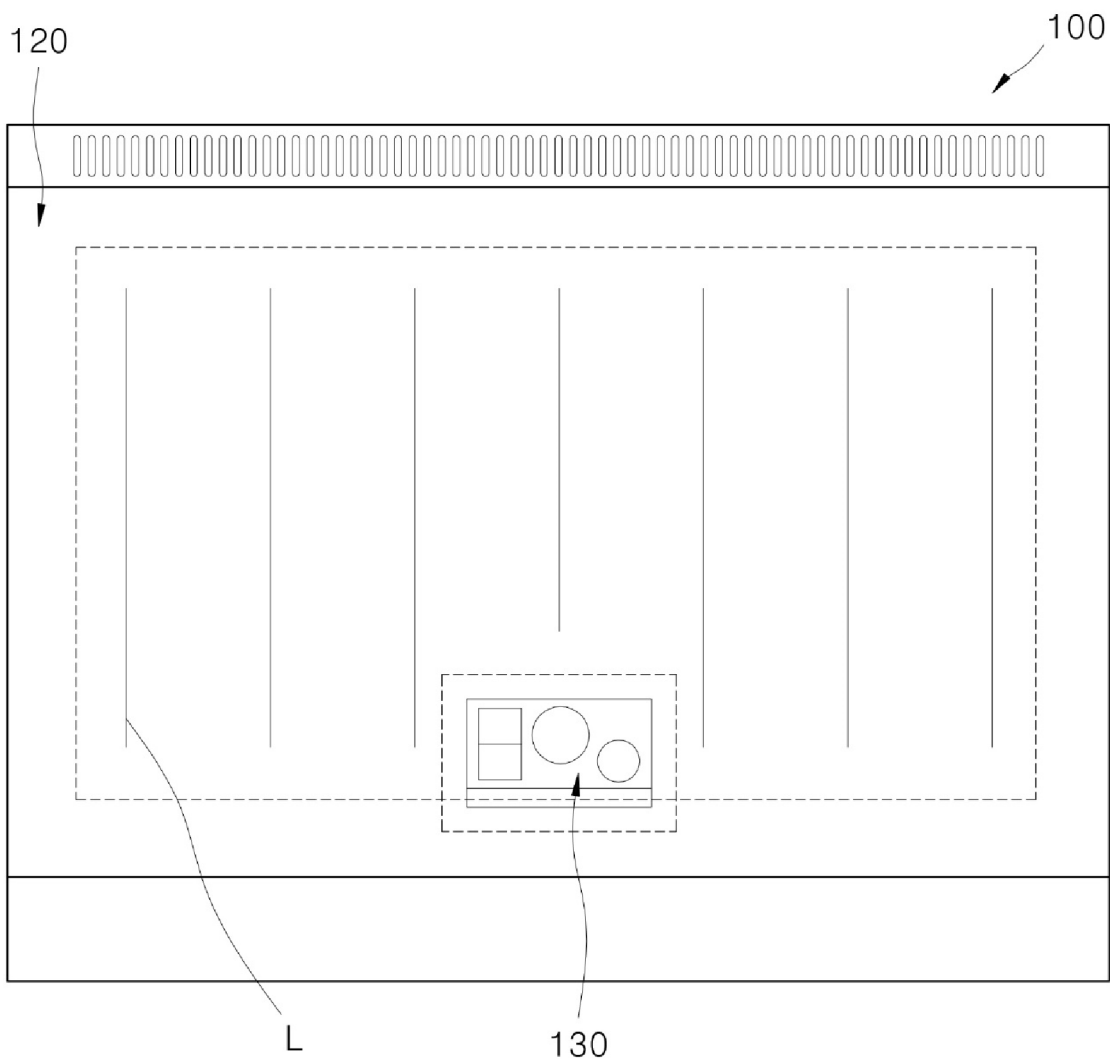


FIG. 4

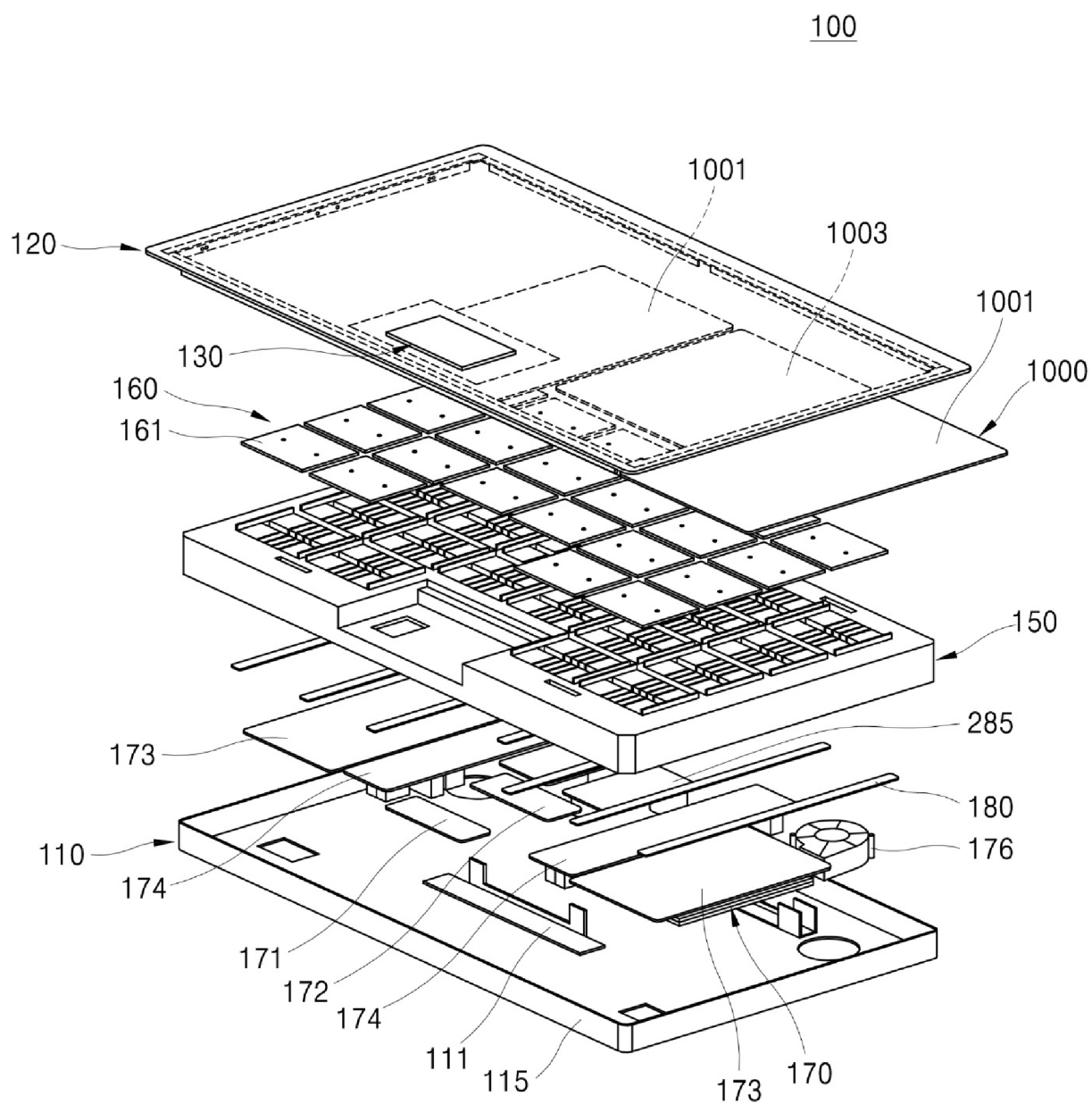


FIG. 5

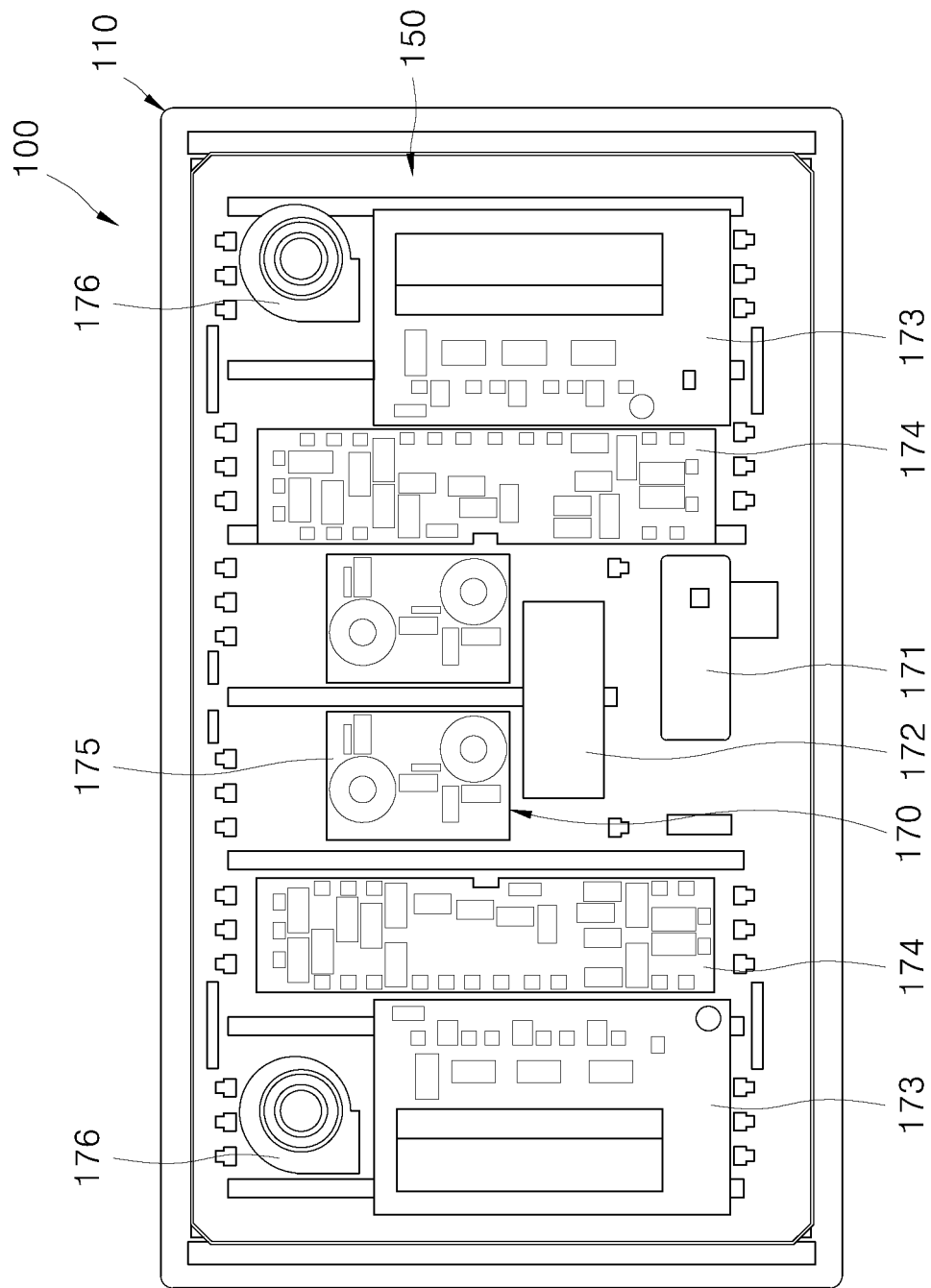


FIG. 6

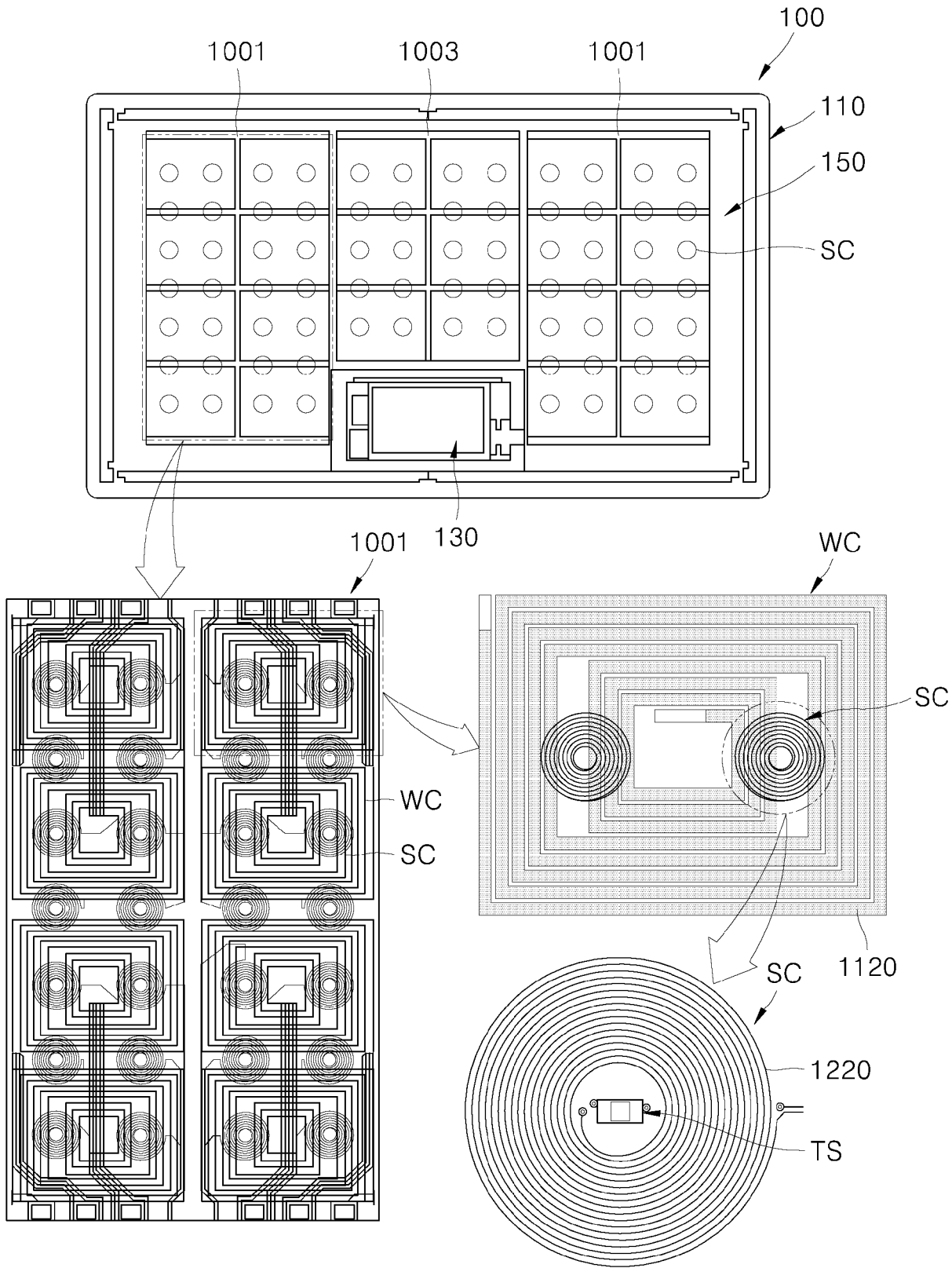


FIG. 7

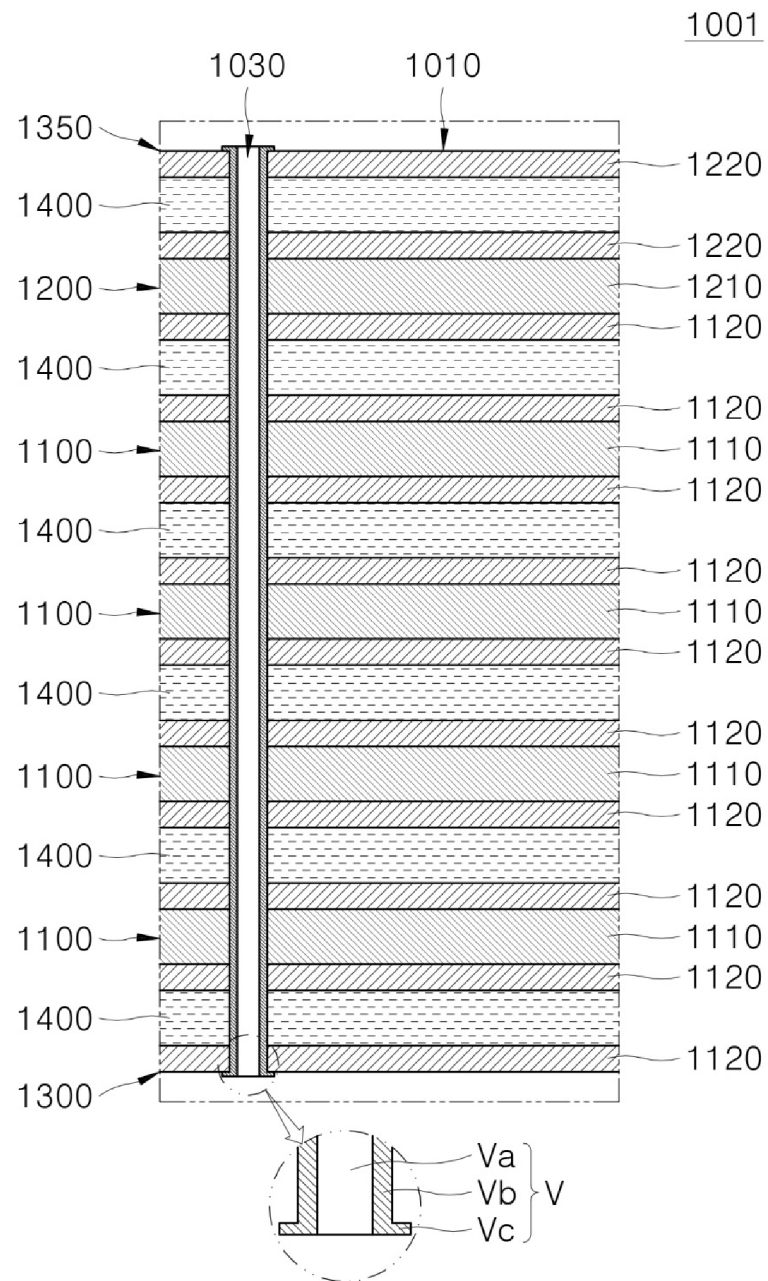


FIG. 8

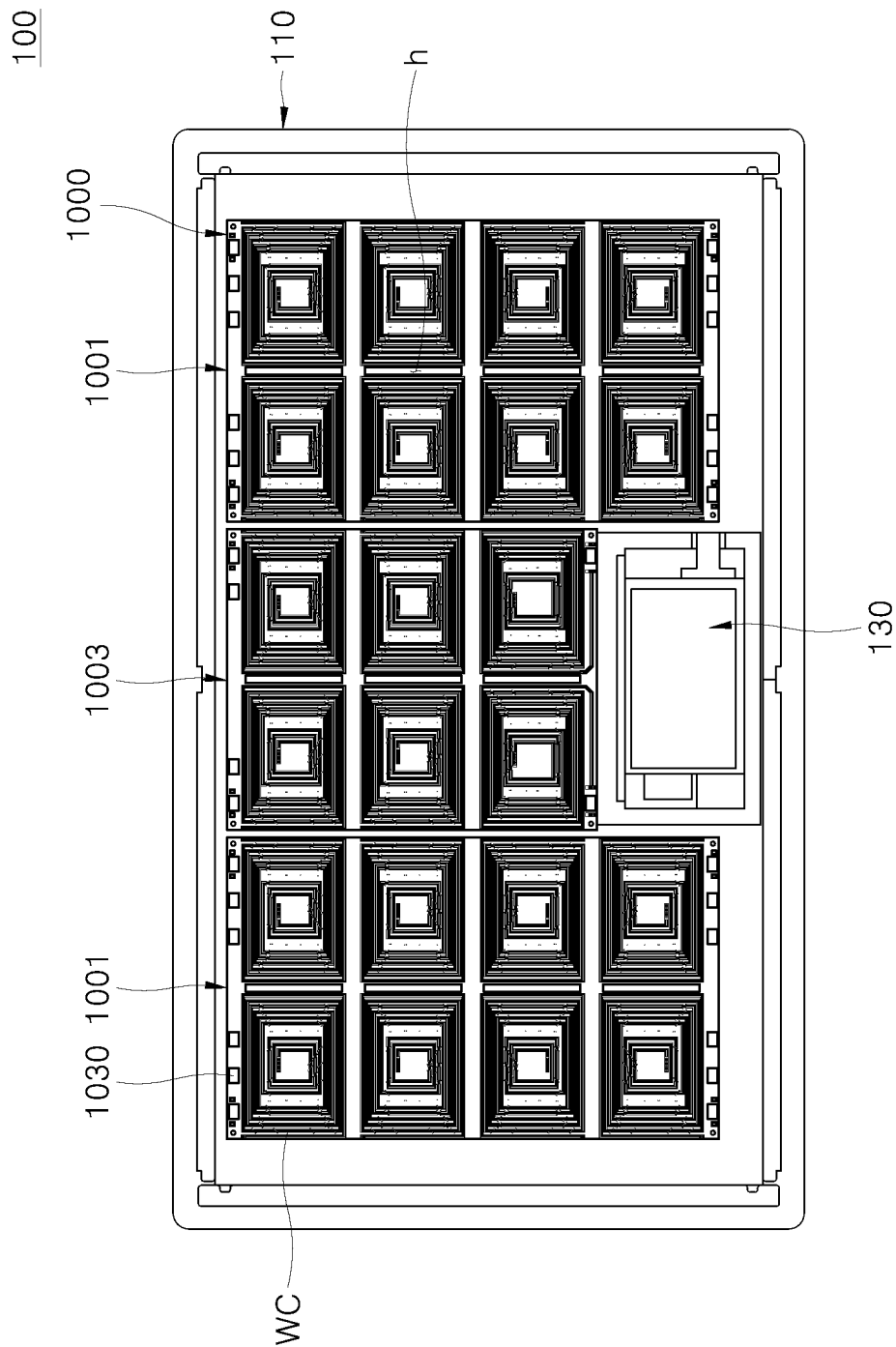


FIG. 9

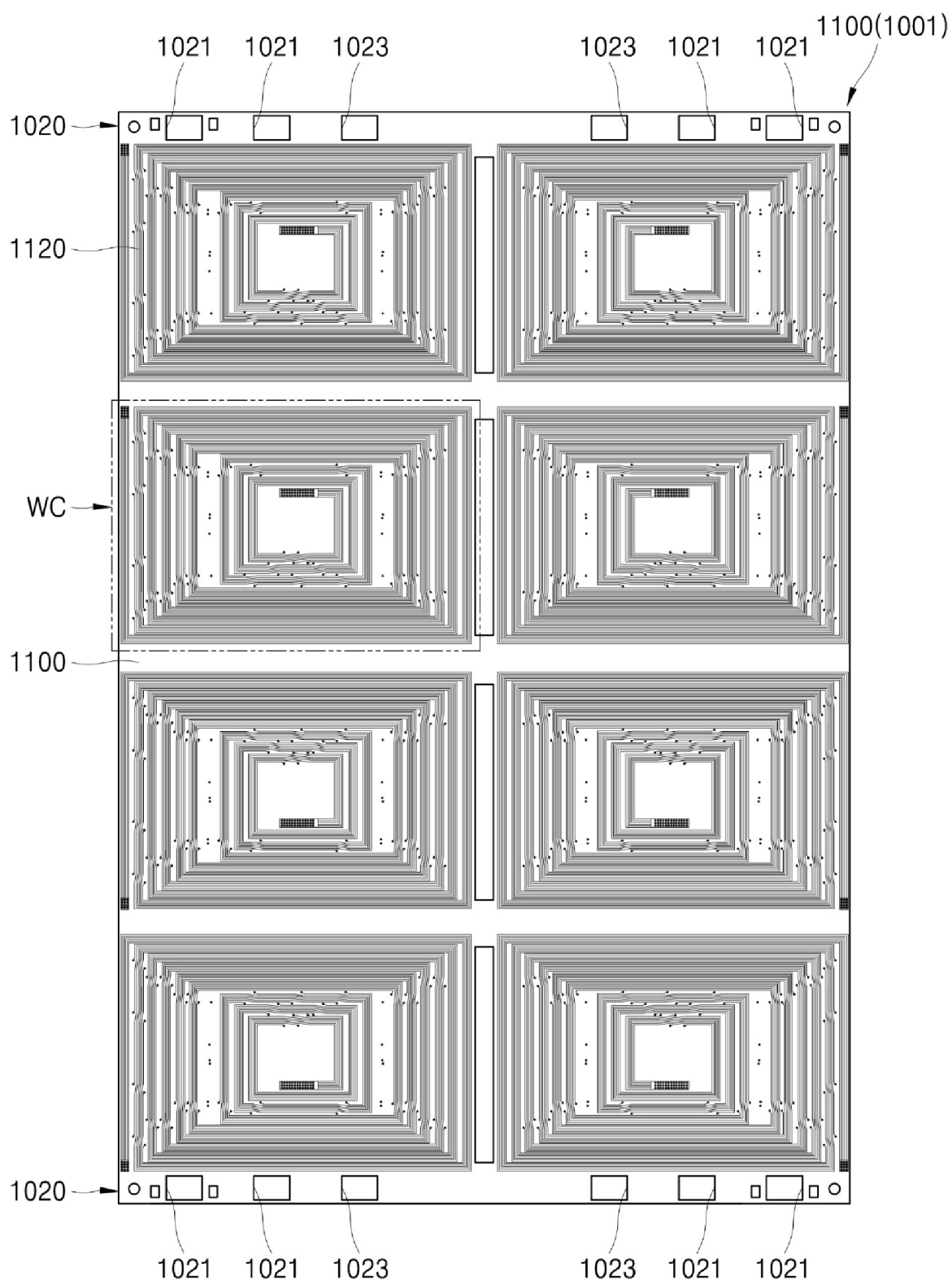


FIG. 10

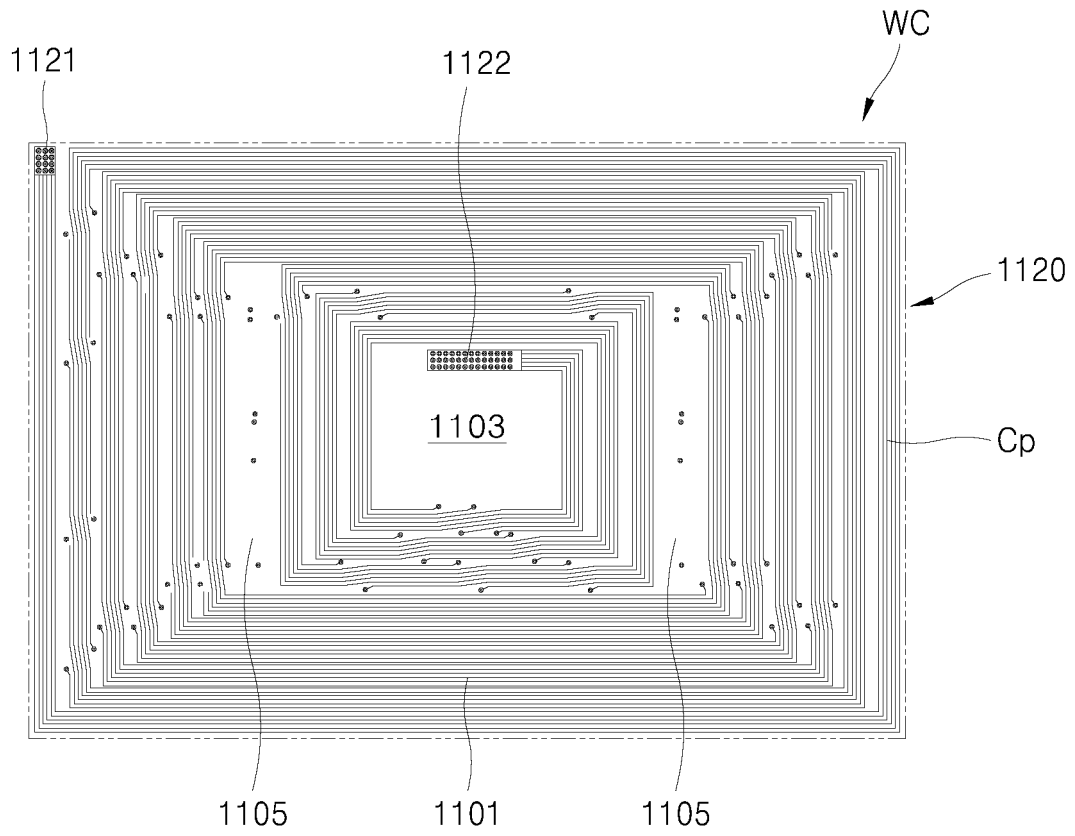


FIG. 11

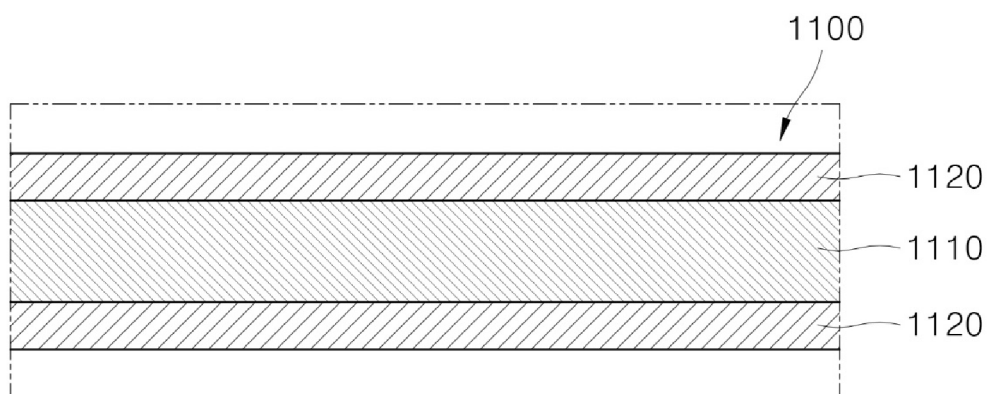


FIG. 12

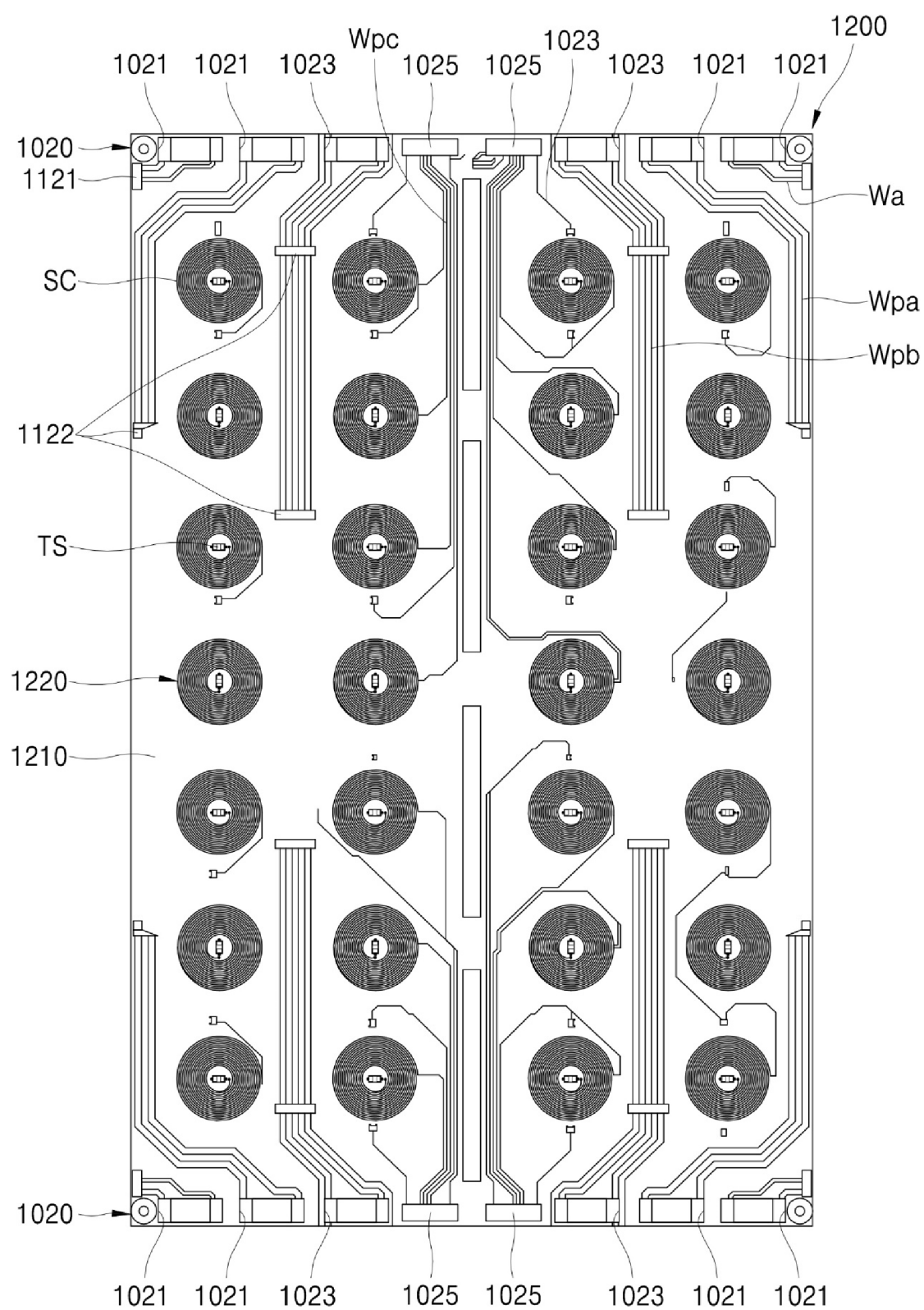


FIG. 13

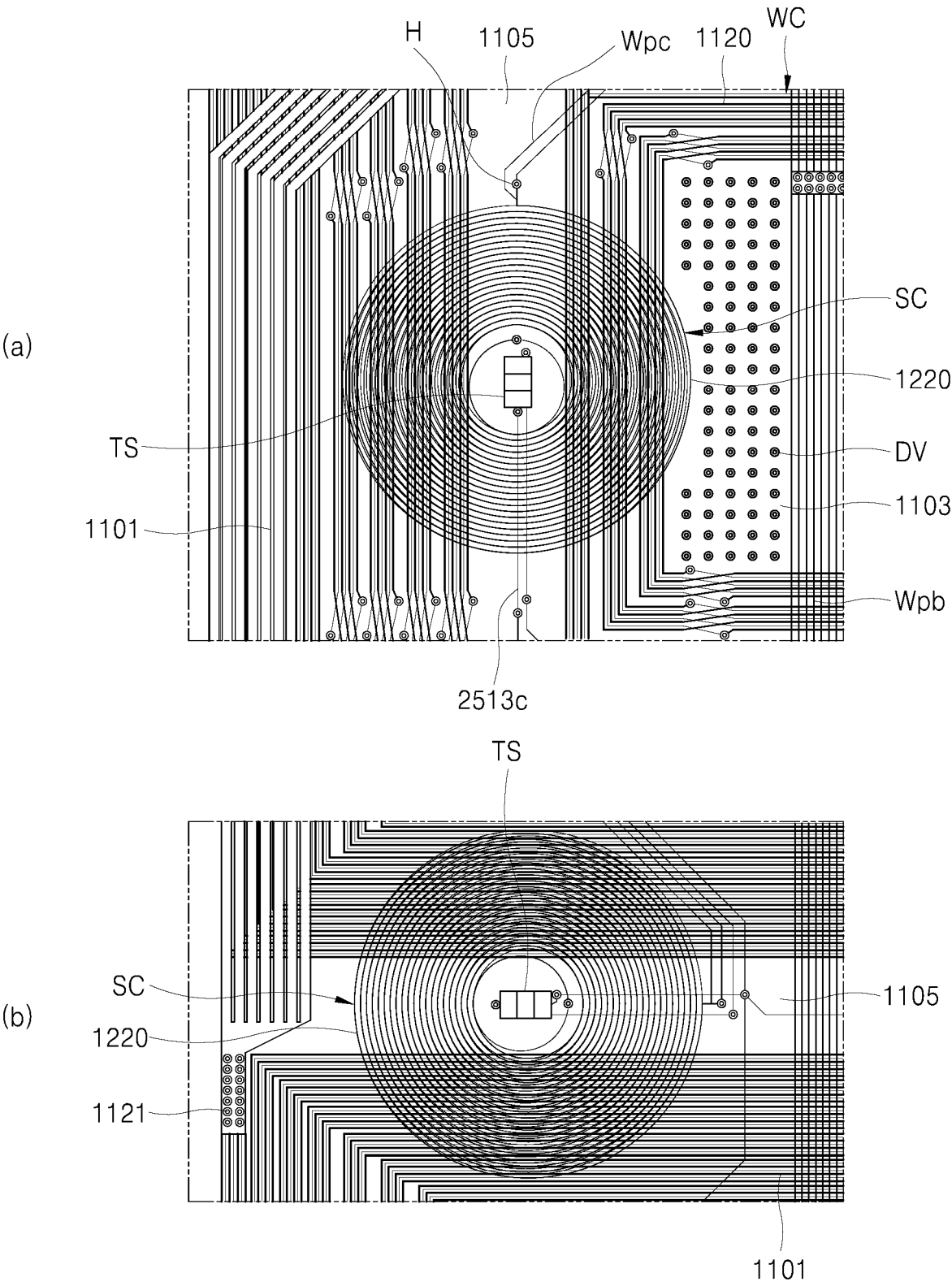


FIG. 14

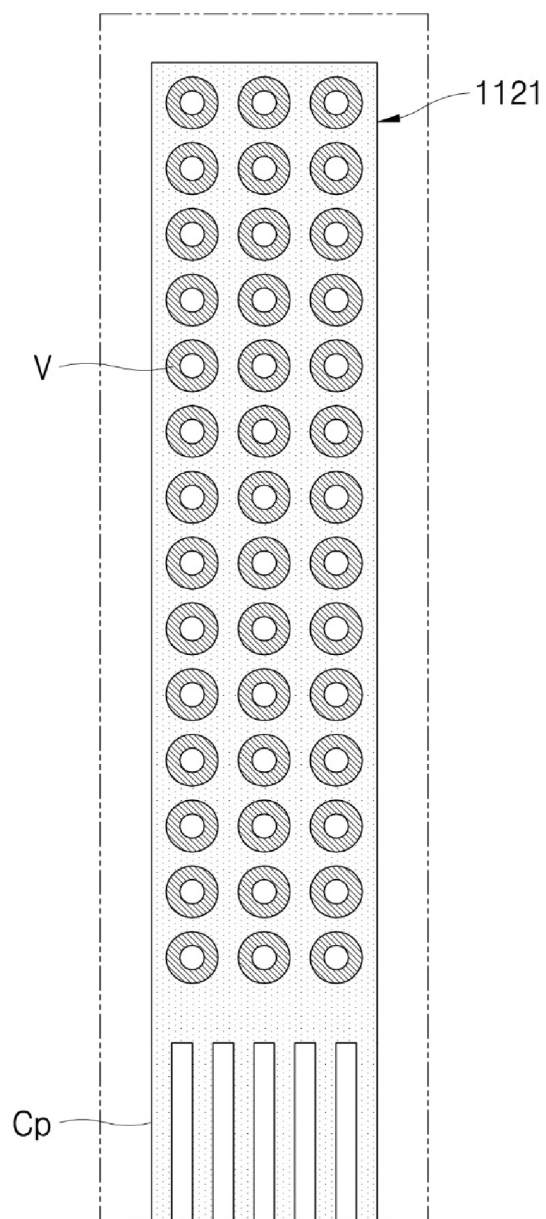


FIG. 15

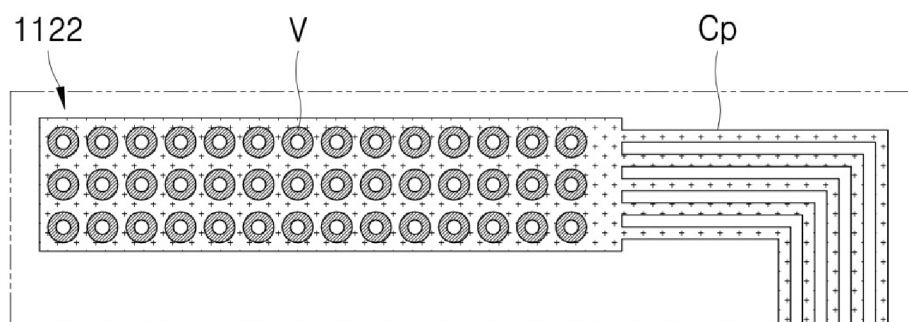


FIG. 16

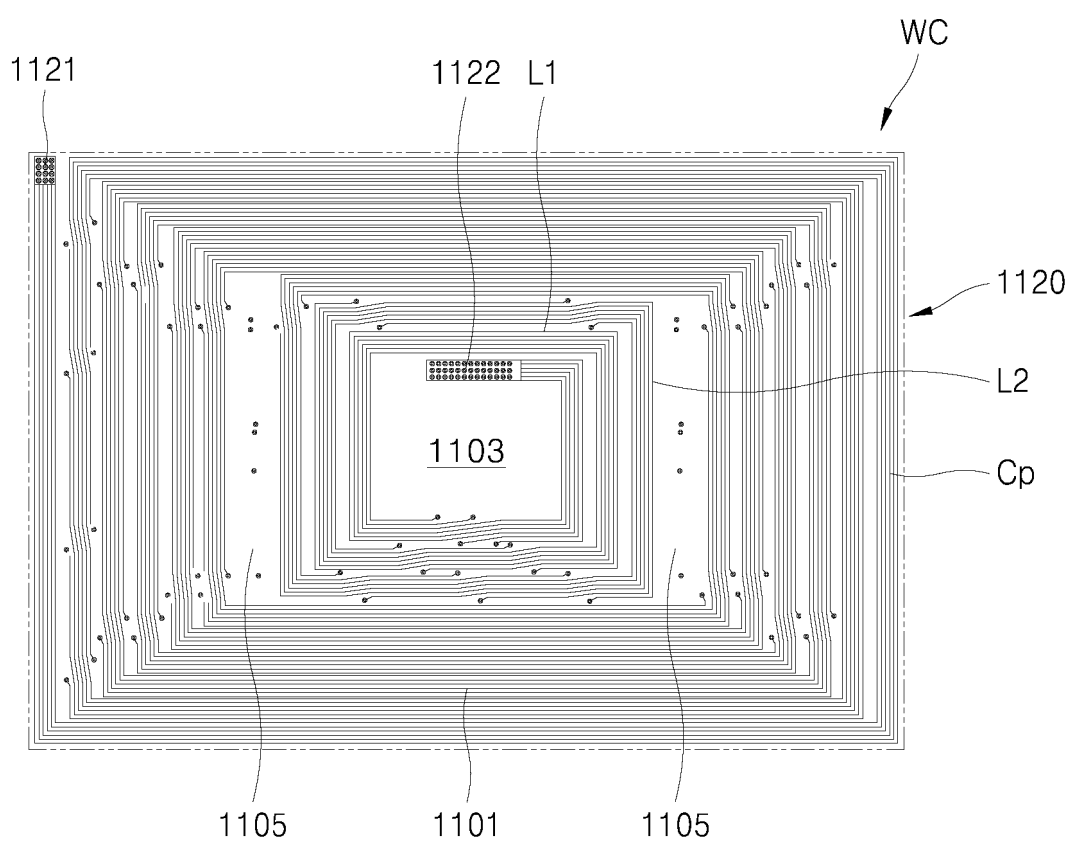


FIG. 17

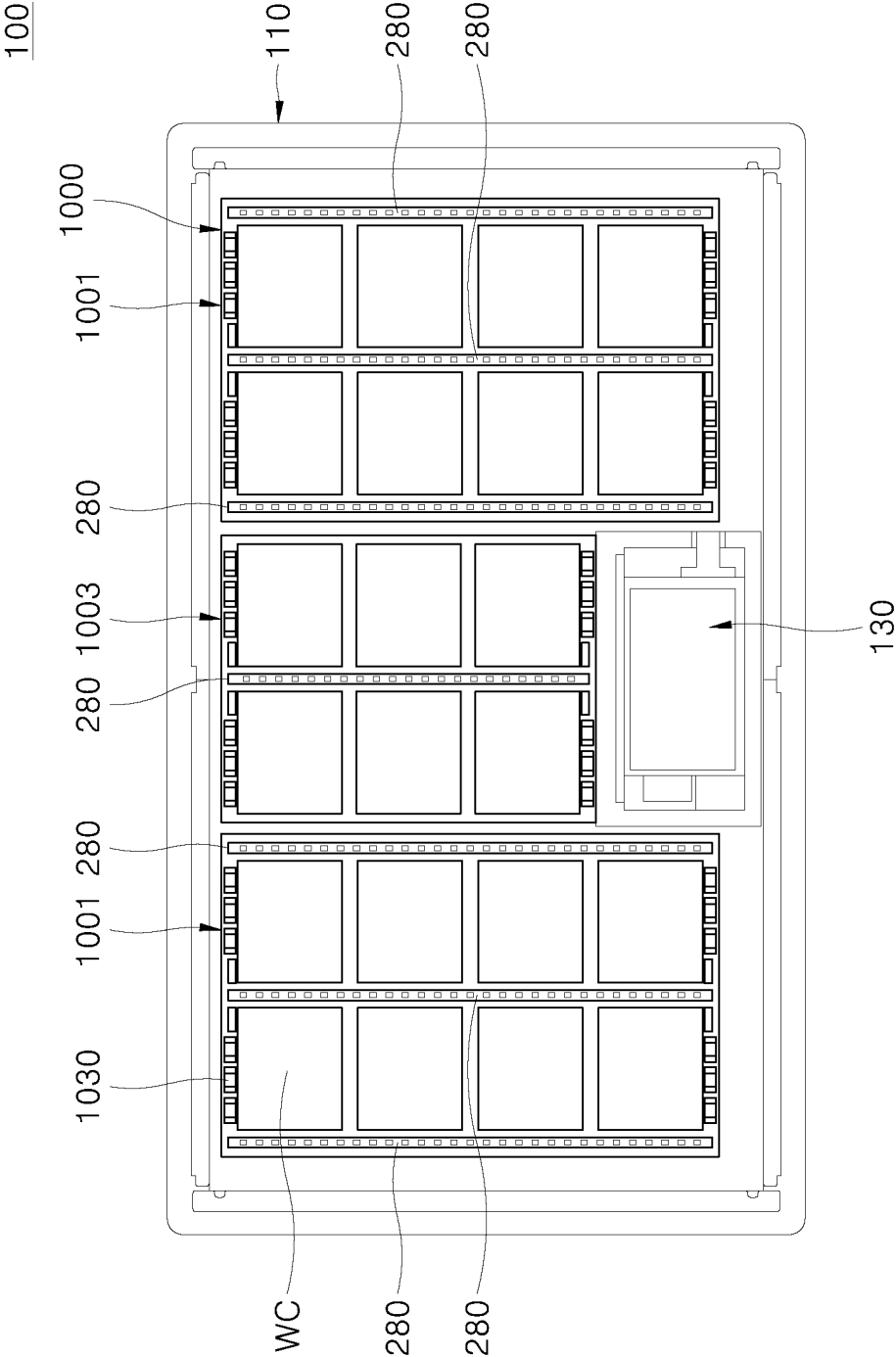


FIG. 18

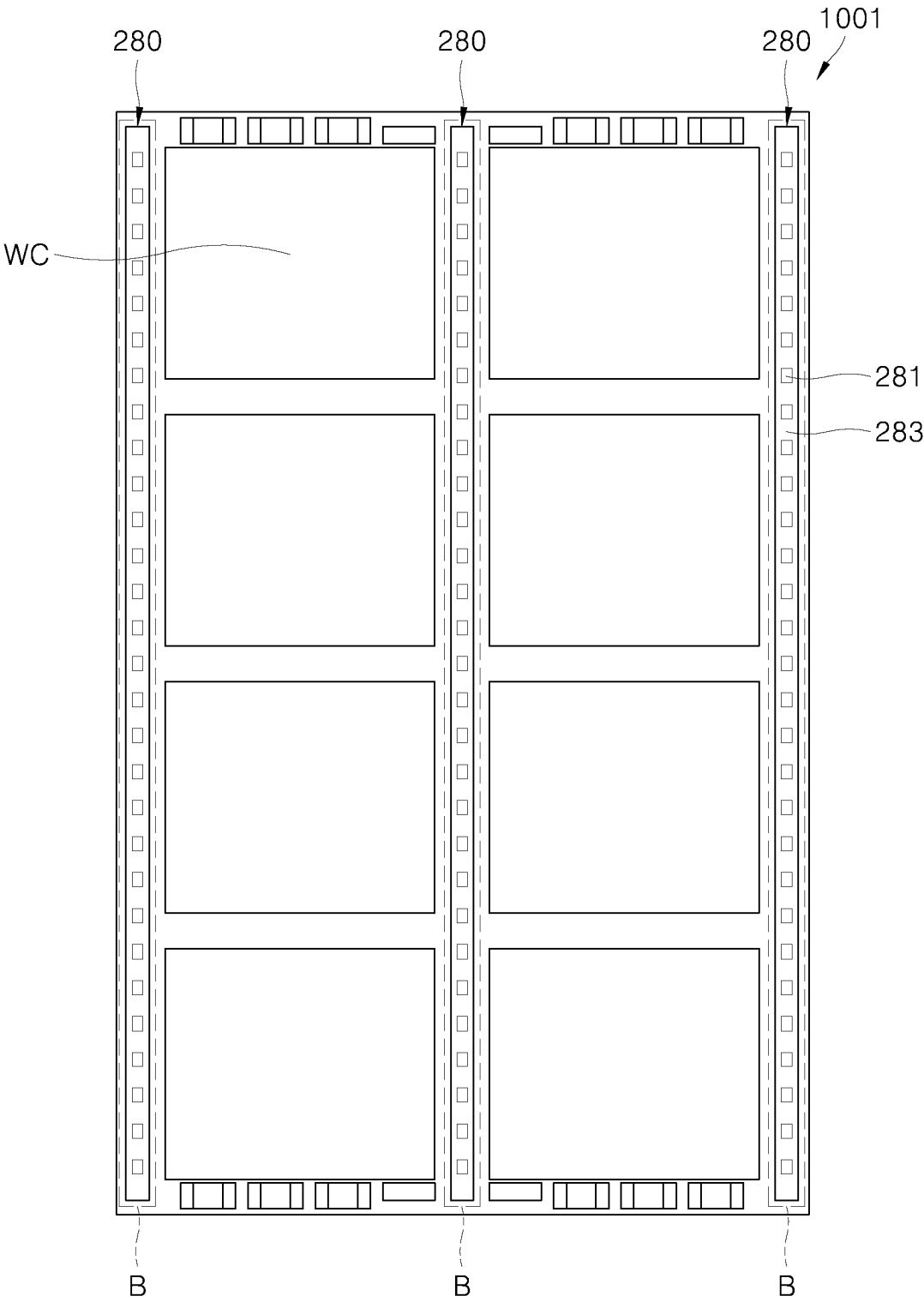


FIG. 19

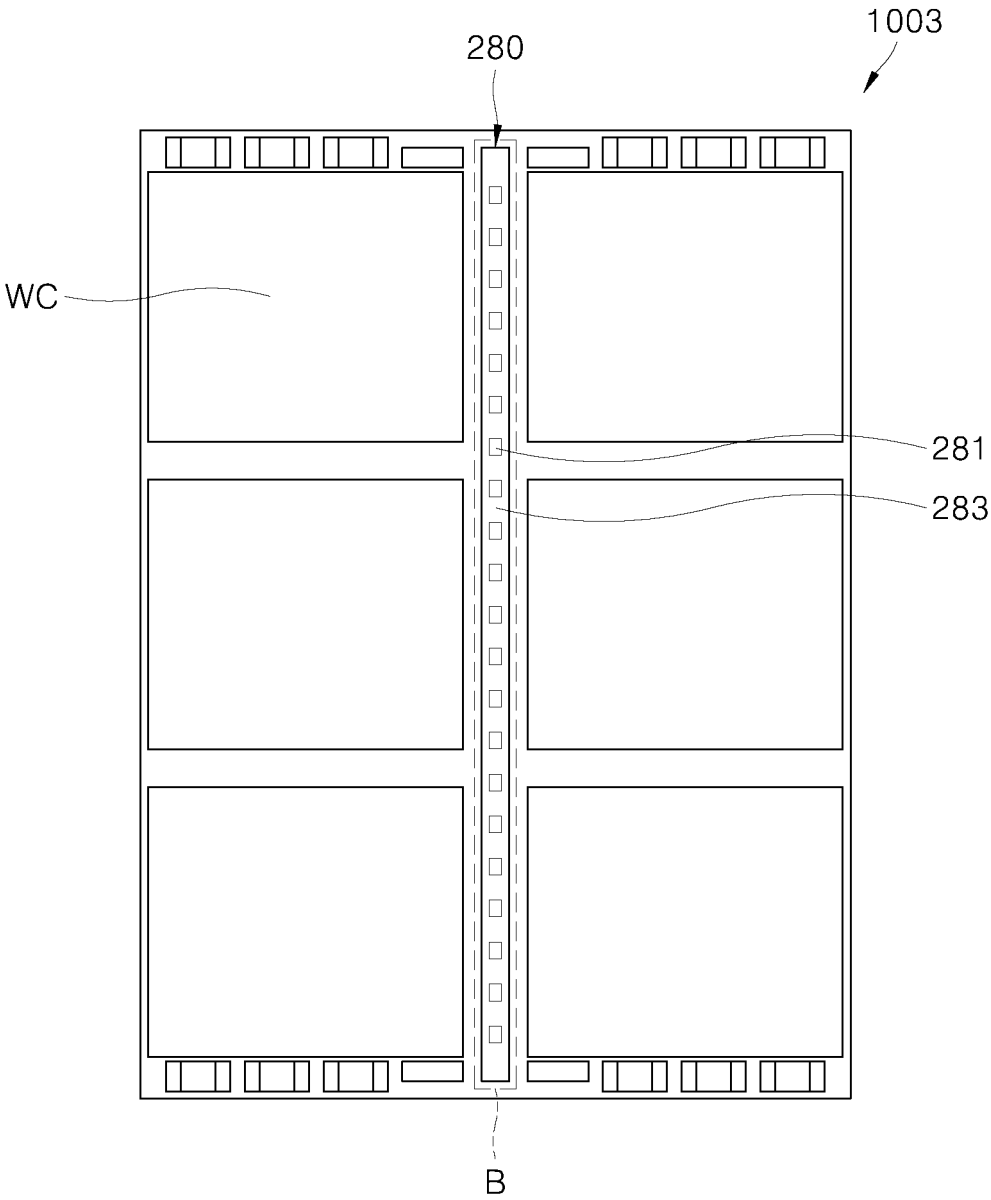


FIG. 20

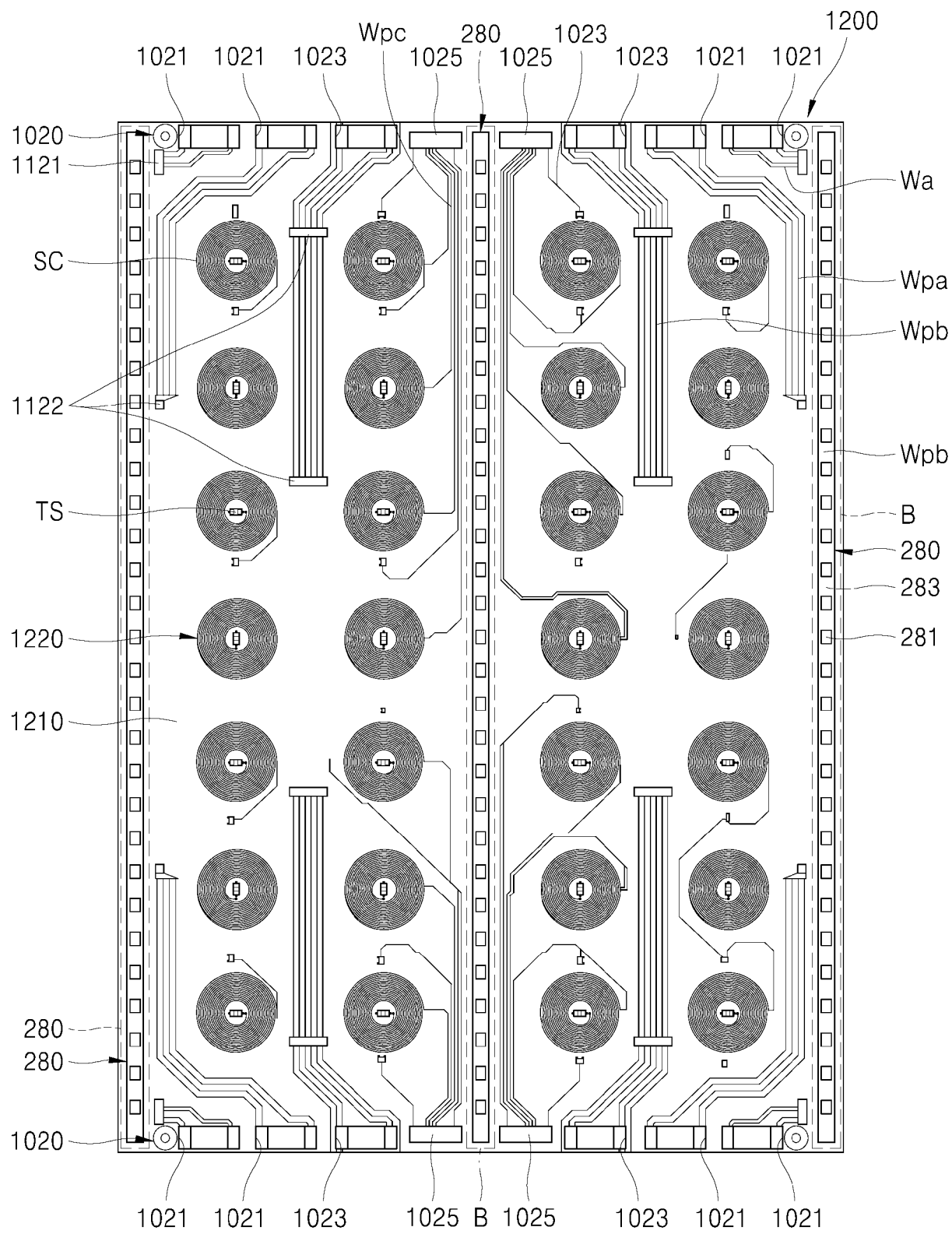


FIG. 21

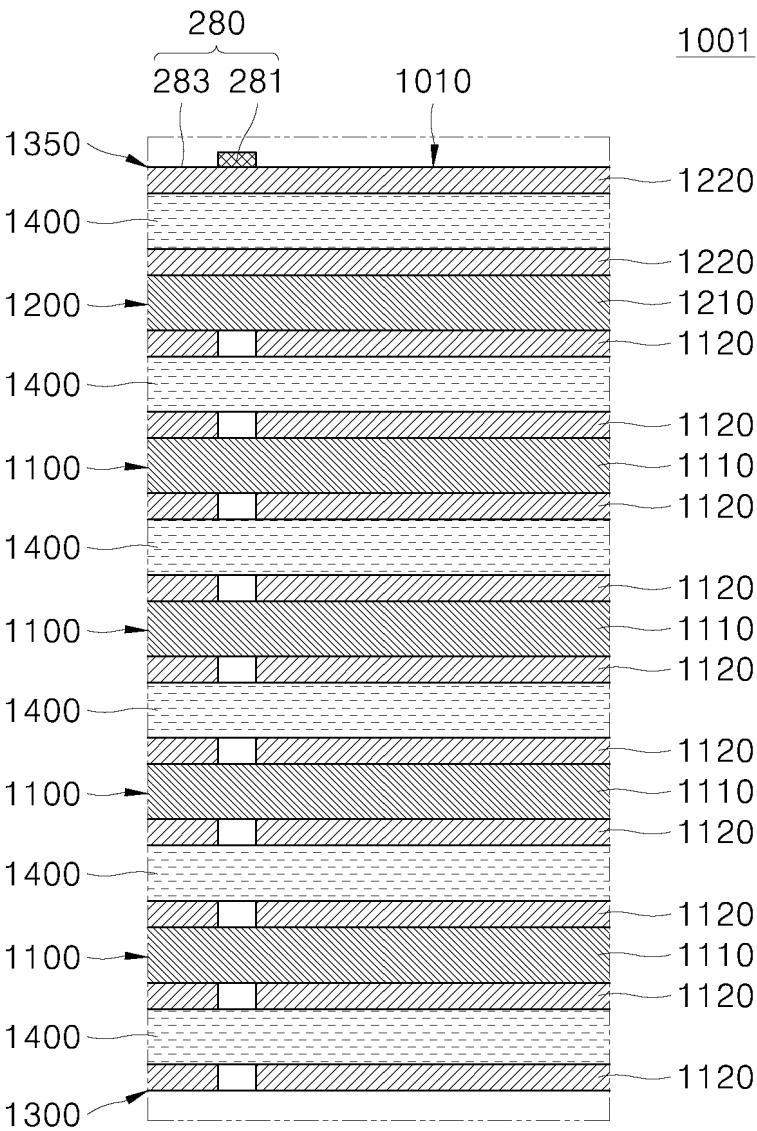
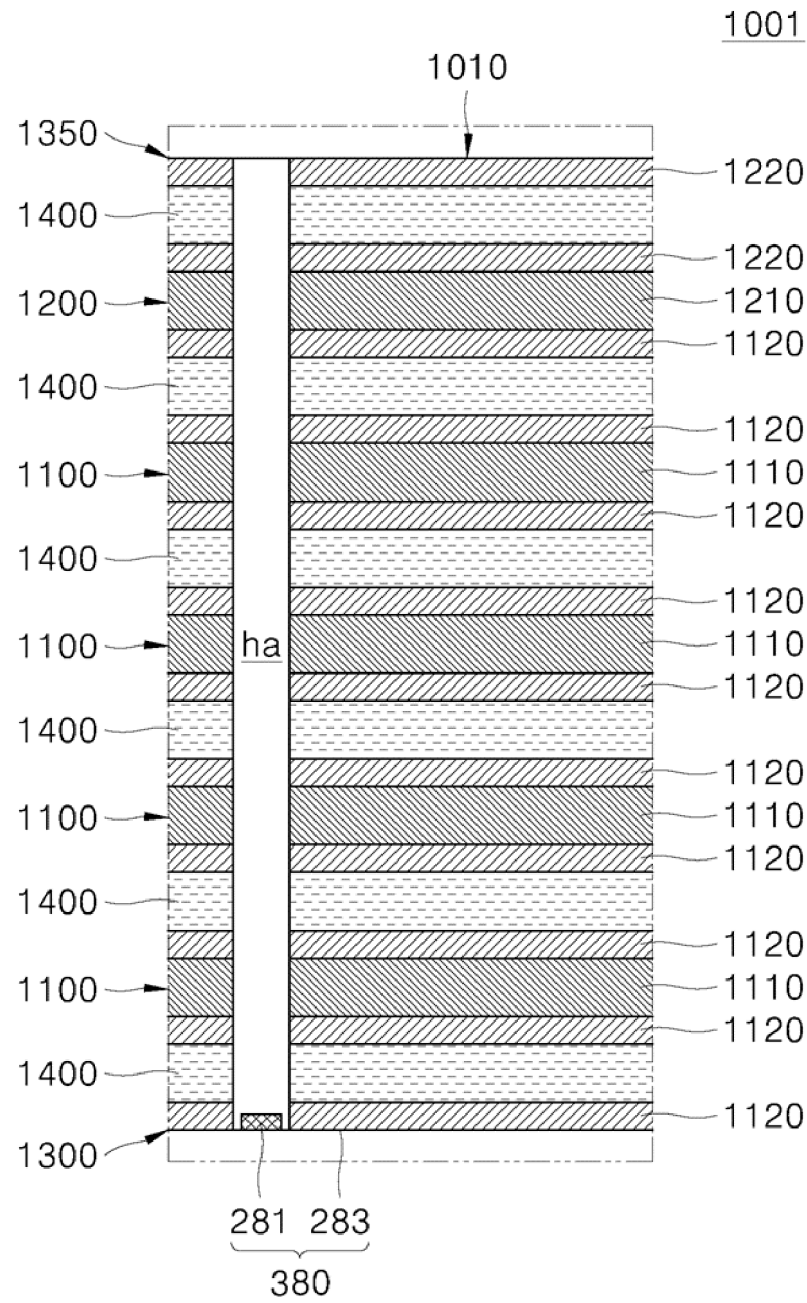


FIG. 22



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014236

A. CLASSIFICATION OF SUBJECT MATTER

H05B 6/12(2006.01)i; H05B 6/06(2006.01)i; F24C 15/34(2006.01)i; F24C 15/10(2006.01)i; F24C 3/12(2006.01)i;
H02M 1/10(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); F24C 15/10(2006.01); F24C 7/08(2006.01); H02M 7/48(2007.01); 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) & keywords: 유도가열(induction heating), 쿡탑(cooktop), 코일(coil), 조명(light), 센서(sensor)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2014-035933 A (PANASONIC CORP.) 24 February 2014 (2014-02-24) See paragraphs [0029]-[0038]; and figure 2.	1-4,7-8,13,19-20
Y		5-6,9-12,14-18
Y	KR 10-2019-0038171 A (LG ELECTRONICS INC.) 08 April 2019 (2019-04-08) See paragraphs [0051]-[0052]; and figures 1-5.	5-6,9-12,14-16
X	KR 10-2023-0112603 A (LG ELECTRONICS INC.) 27 July 2023 (2023-07-27) See paragraphs [0041]-[0065]; and figures 3-8.	1-4,7-8,13,19-20
Y		17-18
X	KR 10-2021-0078795 A (LG ELECTRONICS INC.) 29 June 2021 (2021-06-29) See paragraph [0038]; and figure 2.	1-4,7-8,13,19-20

☒ 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

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

26 December 2024

Date of mailing of the international search report

27 December 2024

Name and mailing address of the ISA/KR

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014236

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2023-090729 A1 (COWAY CO., LTD.) 25 May 2023 (2023-05-25) See paragraphs [0015]-[0027]; and figure 2.	1-20

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2024/014236

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
JP	2014-035933	A	24 February 2014	DE	112013003978	T5	25 June 2015
				WO	2014-024459	A1	13 February 2014
KR	10-2019-0038171	A	08 April 2019	EP	3462815	A1	03 April 2019
				EP	3462815	B1	20 April 2022
				US	2019-0104573	A1	04 April 2019
KR	10-2023-0112603	A	27 July 2023	KR	10-2019-0131388	A	26 November 2019
				KR	10-2560312	B1	26 July 2023
				WO	2019-221577	A1	21 November 2019
KR	10-2021-0078795	A	29 June 2021	WO	2021-125506	A1	24 June 2021
WO	2023-090729	A1	25 May 2023	CN	118266264	A	28 June 2024
				KR	10-2023-0073898	A	26 May 2023