



(11)

EP 4 773 739 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.07.2026 Bulletin 2026/28

(21) Application number: **24868752.7**

(22) Date of filing: **23.09.2024**

(51) International Patent Classification (IPC):
H05B 6/12 (2006.01) **F24C 15/10** (2006.01)
F24C 15/00 (2006.01) **F24C 7/08** (2006.01)
H05B 6/06 (2006.01) **F24C 15/34** (2006.01)
F24C 3/12 (2006.01)

(52) Cooperative Patent Classification (CPC):
F24C 3/12; F24C 7/08; F24C 15/00; F24C 15/10;
F24C 15/34; H05B 6/06; H05B 6/12

(86) International application number:
PCT/KR2024/014282

(87) International publication number:
WO 2025/063776 (27.03.2025 Gazette 2025/13)

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

(30) Priority: **21.09.2023 KR 20230126657**
21.09.2023 KR 20230126658
22.09.2023 KR 20230127458
26.09.2023 KR 20230129155
22.02.2024 KR 20240026117
10.09.2024 KR 20240122894

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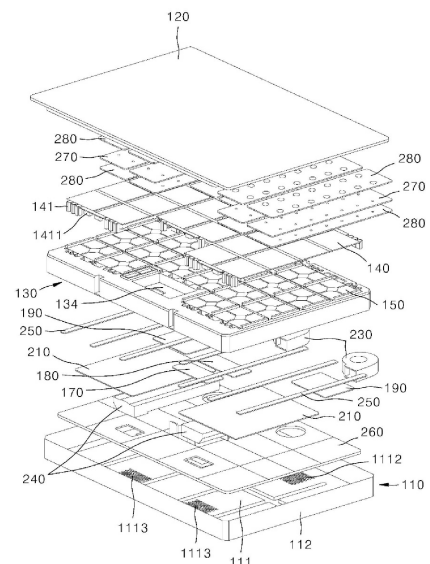
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(54) **ELECTRIC RANGE**

(57) An electric range of one embodiment comprises: an upper supporter accommodated in a case; and a lower supporter, which is disposed below the upper supporter, is accommodated in the case and supports the upper supporter, wherein the upper supporter includes a first support part protruding from the lower surface thereof, and the lower supporter can include a second support part that protrudes from the upper surface thereof and is coupled to the first support part. The first support part can include: a protruding part protruding from the upper supporter; and a linear recessed part which is formed by a recessed portion of the protruding part, and of which both sides are open.

FIG. 3



EP 4 773 739 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to an electric range, and more particularly, to an electric range of an induction heating type.

BACKGROUND

[0002] The content described in this section merely provides background information on the present disclosure and does not constitute prior art.

[0003] Various types of cooking appliances for heating food are used in homes or restaurants. The above-described cooking appliances comprise a gas range using gas and an electric range using electricity.

[0004] The electric range is largely divided into a resistance heating type and an induction heating type.

[0005] The electric resistance type is a method of generating heat by applying a current to a metal resistance wire or a non-metal heating element such as silicon carbide, and heating a heating target (for example, a cooking vessel such as a pot, a frying pan, and the like) by radiating or conducting the generated heat.

[0006] The induction heating type is a method of generating a magnetic field around a coil by applying high-frequency power to the coil, and heating a heating target made of a metal component by using an eddy current generated in the magnetic field.

[0007] Referring to a basic heating principle of the induction heating type, when a current is applied to a working coil, heat is generated while the heating target is induction-heated, and the heating target is heated by the generated heat.

[0008] In a general electric range, an area of a coil to which power is applied is formed to be large. In addition, an object to be heated is heated only when the object is placed at a position overlapping the coil having the large area.

[0009] Accordingly, since the coil of the electric range occupies a large area, a heating region corresponding to a small number of coils having a large area is provided on an upper portion of the electric range.

[0010] Since the heating region is large and the number thereof is small, a small number of heating regions is provided in a cover plate of the electric range having a limited area. In addition, since an area of each heating region is large, even when a plurality of heating regions is provided in the electric range, a region not heated between the heating regions occupies a large area.

[0011] Due to such a structure, a space in which the heating target can be placed in the electric range becomes narrow, and even when a small-sized object is heated, one heating region having a large area is entirely used, so that power consumption may increase. This causes inconvenience to a user.

[0012] In order to compensate for such disadvantages,

a coil having a plate-shaped structure with a small area may be disposed in the electric range. When a plurality of coils having a small area is disposed in the electric range, a space between the coils is reduced, and only a coil on which the heating target is placed operates, so that space efficiency of the electric range may be improved and power consumption may also be reduced.

SUMMARY

Technical Problems

[0013] An object of the present disclosure is to provide an electric range having a stable coupling structure and a support structure between components provided therein.

[0014] Another object of the present disclosure is to provide a coupling structure and a support structure between an upper supporter and a lower supporter, which are components provided therein.

[0015] The objects of the present disclosure are not limited to the above-mentioned objects, and other objects and advantages of the present disclosure not mentioned above may be understood by the following description and will be more clearly understood by embodiments of the present disclosure. In addition, it will be readily understood that the objects and advantages of the present disclosure may be realized by means and combinations thereof set forth in the claims.

Technical Solutions

[0016] An embodiment of an electric range comprises: an upper supporter received in a case; and a lower supporter disposed below the upper supporter, received in the case, and supporting the upper supporter, wherein the upper supporter may comprise a first support part protruding from a lower surface, and the lower supporter may comprise a second support part protruding from an upper surface and coupled with the first support part.

[0017] The first support part may comprise: a protruding part protruding from the upper supporter; and a linear recessed part formed by recessing a portion of the protruding part and having both sides open.

[0018] The second support part may comprise: an insertion part having an upper portion fitted into the recessed part and formed in a plate shape; and a reinforcement part integrally formed with the insertion part, protruding from a side surface of the insertion part, and reinforcing rigidity of the insertion part.

[0019] The first support part and the second support part protrude from each other and are coupled with each other by shape fitting at ends thereof, whereby a space in which a component is disposed between the upper supporter and the lower supporter may be secured.

[0020] The first support part may comprise a plurality of first-1 support parts disposed to be spaced apart from each other, and the second support part may comprise a plurality of second-1 support parts disposed to be spaced

apart from each other and each comprising an insertion part having a length corresponding to a length of the recessed part of the first-1 support part.

[0021] The first support part may comprise a first-2 support part formed longer than the first-1 support part in a longitudinal direction, and the second support part may comprise a second-2 support part comprising an insertion part having a length corresponding to a length of the recessed part of the first-2 support part.

[0022] The second-2 support part may comprise a pair of insertion parts spaced apart from each other, and a connection part connecting the pair of insertion parts and reinforcing rigidity of the insertion parts.

[0023] The reinforcement part may be provided as a plurality of reinforcement parts and coupled to both surfaces of the insertion part, and may comprise an inclined section having a width decreasing toward an upper side, and may be provided such that a width thereof is smallest at an upper end.

[0024] The reinforcement part may have a height lower than a height of the insertion part, and an upper end of the reinforcement part may be provided to support at least a portion of the protruding part.

[0025] The reinforcement part and the connection part may be provided to have the same height.

[0026] An operator may easily check whether wiring is placed between the first support part and the second support part to interfere with assembly of the electric range by examining whether the first support part and the second support part are normally coupled.

Advantageous Effects

[0027] In the electric range according to the present disclosure, the first support part and the second support part protrude from each other and are coupled with each other by shape fitting at ends thereof, whereby a space in which a component is disposed between the upper supporter and the lower supporter is secured, and at the same time the lower supporter may stably support a load of the upper supporter.

[0028] Accordingly, sagging of the upper supporter downward due to the load of the upper supporter to which various components are coupled may be effectively prevented by support of the lower supporter.

[0029] In addition, in the electric range according to the present disclosure, the insertion part is inserted into the protruding part, whereby the first support part and the second support part may be stably coupled with each other.

[0030] If wiring disposed between the upper supporter and the lower supporter is located at a portion where the first support part and the second support part are coupled, the first support part and the second support part cannot be completely coupled. Accordingly, an operator assembling the electric range may easily check whether wiring is disposed between the first support part and the second support part to interfere with assembly of

the electric range by examining whether the first support part and the second support part are normally coupled.

[0031] Therefore, the operator may easily identify a position of the wiring and adjust the position by checking whether the first support part and the second support part are normally coupled, thereby smoothly performing an assembly operation of the electric range.

[0032] Along with the above-mentioned effects, specific effects of the present disclosure will be described together while describing specific details for carrying out the present disclosure below.

BRIEF DESCRIPTION OF DRAWINGS

[0033] 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 an electric range according to an embodiment;

FIG. 2 is a front view illustrating an electric range according to an embodiment;

FIG. 3 is an exploded perspective view illustrating an electric range according to an embodiment;

FIG. 4A is a plan view in which a cover plate is omitted from FIG. 1;

FIG. 4B is a view illustrating a coil board according to an embodiment;

FIG. 5 is a cross-sectional view taken along a line 5-5 of FIG. 4;

FIG. 6 is a bottom view illustrating an electric range according to an embodiment;

FIG. 7 is a view in which a case is omitted from FIG. 6;

FIG. 8 is a perspective view illustrating an upper supporter according to an embodiment;

FIG. 9 is a plan view illustrating an upper supporter according to an embodiment;

FIG. 10 is a cross-sectional view taken along a line 10-10 of FIG. 9;

FIG. 11 is a cross-sectional view taken along a line 11-11 of FIG. 9;

FIG. 12 is an exploded perspective view illustrating an upper supporter and a ferrite module;

FIG. 13 is a plan view illustrating a state in which the ferrite module is coupled to the upper supporter;

FIG. 14 is a plan view illustrating a state in which a coil board is coupled in the state of FIG. 13;

FIG. 15 is a bottom view of the upper supporter;

FIG. 16 is a view illustrating a state in which an indicator board is coupled in the state of FIG. 15;

FIG. 17 is a view illustrating a state in which various components are coupled in the state of FIG. 16;

FIG. 18 is an exploded perspective view of an upper supporter and a case;

FIG. 19A is a bottom view of an upper supporter according to an embodiment;

FIG. 19B is a plan view of a lower supporter accord-

ing to an embodiment;
 FIG. 20 is a view enlarging a portion of FIG. 19A;
 FIG. 21 is a plan view in which a lower supporter and
 a case are coupled;
 FIG. 22 is a view enlarging a portion of FIG. 21;
 FIG. 23 is an exploded perspective view of a lower
 supporter and a case;
 FIG. 24 is a view enlarging a portion of FIG. 23;
 FIG. 25 is a cross-sectional view illustrating a portion
 of an electric range;
 FIG. 26 is a view enlarging portion 26 of FIG. 25; and
 FIG. 27 is a view enlarging portion 27 of FIG. 25.

DETAILED DESCRIPTION

[0034] 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.

[0035] 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.

[0036] Throughout the disclosure, unless specifically stated to the contrary, each component may be singular or plural.

[0037] In the disclosure, singular forms include plural forms as well, unless explicitly indicated otherwise. In the present application, terms such as "constitute" or "comprise" should not be interpreted as necessarily including all of the various components or steps described in the disclosure, but should be interpreted as meaning that some of the components or steps may not be included, or that additional components or steps may be further included.

[0038] 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.

[0039] Throughout the disclosure, "upper," "lower," or "up-down direction" refers to an upper side, a lower side, or an up-down direction of the electric range in a state in which the electric range is installed for normal use. "Both lateral directions" or "lateral direction" refers to a direction orthogonal to the up-down direction. Both lateral directions or lateral direction may include "left-right direction" and "front-rear direction," and the left-right direction and the front-rear direction are orthogonal to each other.

[0040] FIG. 1 is a perspective view illustrating an electric range according to an embodiment. FIG. 2 is a front view illustrating an electric range according to an embodiment. FIG. 3 is an exploded perspective view illustrating an electric range according to an embodiment.

[0041] An electric range according to an embodiment may heat a heating target by an induction heating method. In this case, the heating target may be, for example, a cooking vessel containing a metal material such as stainless steel, iron, and the like.

[0042] The induction heating method is a method of generating a magnetic field around a working coil 140a by applying high-frequency power to the working coil 140a, and heating a heating target made of a metal component by using an eddy current generated by the generated magnetic field.

[0043] That is, the working coil 140a and a ferrite material are disposed to be adjacent to each other, and when high-frequency power is applied to the working coil 140a, the working coil 140a may generate a magnetic field.

[0044] When a magnetic field is generated around the working coil 140a in this manner and a heating target is placed within a region of the generated magnetic field, an eddy current is induced in the heating target by the magnetic field, and Joule's heat is generated by the eddy current so that the heating target may be heated. As a cooking vessel, which is the heating target, is heated, food contained in the heating target may be heated and cooked.

[0045] An electric range of an embodiment may comprise a case 110, a cover plate 120, an upper supporter 130, a coil board 140, and a ferrite module 150.

[0046] The case 110 may function to protect components constituting the electric range. For example, the case 110 may be provided of an aluminum material, but is not limited thereto. Meanwhile, the case 110 may be thermally insulated to suppress heat generated by the coil board 140 from being released to the outside.

[0047] Components constituting the electric range may be accommodated in the case 110, and an upper portion is open, but the open portion may be closed by the cover plate 120. The case 110 may be formed in a box shape by processing a plate-shaped material as a whole.

[0048] The case 110 may comprise a bottom plate 111 and a side wall 112. The bottom plate 111 may form a bottom surface of the case 110. The bottom plate 111 may support internal components of the electric range.

[0049] The side wall 112 may be bent from the bottom plate 111 to form a space for accommodating components. The side wall 112 may be bent from an edge of the bottom plate 111 in an upper direction to form a side surface of the electric range.

[0050] The side walls 112 may be disposed on respective sides of the bottom plate 111 generally formed in a rectangular shape. The side wall 112 may reinforce rigidity of the entire case 110. That is, the side wall 112 formed to be bent from the bottom plate 111 may sup-

press the plate-shaped bottom plate 111 from being bent or damaged due to a weight of internal components or an external force.

[0051] In addition, the cover plate 120 may be coupled to an upper portion of the side wall 112. As the case 110 and the cover plate 120 are coupled in this manner, an interior of the case 110 is closed, and a space in which various components are disposed may be provided inside the case 110.

[0052] The cover plate 120 is coupled to an upper end of the case 110, and the heating target may be disposed on an upper surface thereof. The cover plate 120 may close an open upper portion of the case 110 to protect components accommodated in the case 110.

[0053] A heating target may be placed on an upper surface of the cover plate 120, and a magnetic field generated in the coil board and the ferrite module 150 may pass through the cover plate 120 to reach the heating target. The cover plate 120 may be provided of, for example, a material including ceramic, but is not limited thereto.

[0054] The cover plate 120 may be formed of, for example, a glass material and may be manufactured to be transparent or translucent so that light emitted from the indicator board 250 passes therethrough.

[0055] An input interface 160 for receiving an input from a user may be installed in the electric range. The input interface 160 is installed to overlap a specific region of the cover plate 120 and may display a specific image.

[0056] For example, the input interface 160 may be embedded flat in the cover plate 120 or may be installed to contact a lower surface of the cover plate 120.

[0057] The input interface 160 may receive a touch input from a user, and the electric range may be driven based on the received touch input.

[0058] For example, the input interface 160 may be implemented as a module for inputting a heating intensity, a heating time, and the like desired by the user, and may be implemented as a physical button, a touch panel, or the like.

[0059] As an example, the input interface 160 may be a thin film transistor liquid crystal display (TFT LCD), but is not limited thereto.

[0060] The cover plate 120 may be provided with a cover frame 121 for coupling the upper supporter 130 and the cover plate 120. The cover plate 120 may be formed to protrude downward from the cover plate 120 at a position corresponding to a side plate 136 of the upper supporter 130 adjacent to an edge of the cover plate 120.

[0061] When the cover plate 120 is coupled to the upper supporter 130, the cover frame 121 may be disposed to surround the side plate 136 of the upper supporter 130 from an outside. A hole is formed in the cover frame 121, and a protrusion may be formed in the upper supporter 130 at a position corresponding to the hole.

[0062] Accordingly, at a position where the cover frame 121 and the side plate 136 of the upper supporter 130 overlap each other in a lateral direction, the protrusion of

the upper supporter 130 is inserted into the hole of the cover frame 121 so that the cover plate 120 and the upper supporter 130 may be coupled to each other.

[0063] The upper supporter 130 may be accommodated in the case 110. The upper supporter 130 is accommodated in the case 110, and various components used for operation of the electric range may be coupled thereto.

[0064] The coil board 140 and the ferrite module 150 forming a magnetic field may be disposed above the upper supporter 130. In addition, various circuit boards used to operate the electric range and a cooling device for cooling the circuit boards may be disposed below the upper supporter 130.

[0065] As many components are disposed as described above, the upper supporter 130 may have a complex shape. Accordingly, the upper supporter 130 may be easily manufactured in a complex shape by injection molding a plastic material, for example. A detailed structure of the upper supporter 130 will be described below in detail.

[0066] The coil board 140 is disposed above the upper supporter 130, is provided as a plurality of coil boards spaced apart from each other in a lateral direction, and a working coil 140a may be printed thereon.

[0067] A general working coil 140a is manufactured by winding a coil in a spiral manner. In the case of the working coil 140a, the entire working coil 140a may be enlarged in order to wind the coil. A large working coil 140a decreases space efficiency of a heating region of the electric range and increases power consumption.

[0068] In the embodiment, the coil board 140 on which the working coil 140a is printed may be used. In the coil board 140, the working coil 140a may be provided by being printed on the coil board 140 rather than by being wound.

[0069] When the working coil 140a is printed, the working coil 140a may be densely printed in a small area, and may also be printed to form multiple layers in an up-down direction of the board.

[0070] Accordingly, when the working coil 140a is printed on the coil board 140, compared with a method of winding the working coil 140a, the area of the coil board 140 may be reduced and the length of the working coil 140a may be sufficiently extended. Accordingly, the coil board 140 having the working coil 140a with a small area may be manufactured.

[0071] In addition, since the coil board 140 has a thin-film form, the coil board 140 on which the working coil 140a is provided may have a very slim form compared with a method of winding the working coil 140a.

[0072] Accordingly, in the embodiment, by using the coil board 140 on which the working coil 140a is printed, a volume occupied by the working coil 140a may be reduced and a total length of the working coil 140a may be sufficiently extended. Accordingly, the entire electric range may be manufactured in a slim form.

[0073] As illustrated in FIG. 3, compared with a method

of winding the working coil 140a, in the embodiment, a large number of coil boards 140 having a small area may be disposed in the electric range. Accordingly, a plurality of working coils 140a may be densely disposed on an upper portion of the electric range.

[0074] The coil board 140 may be arranged without a gap with an adjacent coil board 140 compared with a method of winding the working coil 140a. Due to such a structure, a plurality of coil boards 140 may be densely disposed in the electric range without an empty space.

[0075] Accordingly, since an empty space without the working coil 140a may be minimized in a region in which the coil boards 140 are disposed, a large number of heating targets may be simultaneously heated, and space efficiency of the electric range may be improved.

[0076] In addition, since the working coil 140a is printed on the coil board 140, the working coil 140a does not necessarily need to be disposed in a circular shape, and for example, corresponding to a shape of a rectangular coil board 140, the working coil 140a may have a substantially rectangular shape and may be printed in a spiral form.

[0077] Due to the above-described structure, when combined as a whole, the working coil 140a having a very long total length may be provided. In addition, the working coils 140a may be densely disposed on the coil board 140, and each of the working coils 140a may operate independently while being separated from each other.

[0078] Accordingly, only the working coils 140a located at a portion at least partially overlapping the heating target may operate to form a magnetic field, and the remaining working coils 140a may not operate. Due to such a structure, a user may freely place the heating target anywhere on the cover plate 120.

[0079] Accordingly, convenience is provided to the user, and since the working coils 140a not overlapping the heating target do not operate, power consumption may be significantly reduced.

[0080] The ferrite modules 150 may be disposed above the upper supporter 130, disposed below the coil board 140, and provided as a plurality of ferrite modules disposed at positions corresponding to each of the plurality of working coils 140a.

[0081] Since the working coils 140a are printed on the coil board 140, when high-frequency power is applied to the working coils 140a, a magnetic field is formed around the ferrite modules 150 and the coil board 140, and the formed magnetic field may form an eddy current in the heating target.

[0082] The ferrite modules 150 may be disposed below the coil board 140 in a number corresponding to positions corresponding to the working coils 140a. In the embodiment, the ferrite modules 150 may be provided to have a rectangular shape as a whole.

[0083] The ferrite modules 150 may be formed by insert molding a ferrite material and a plastic material. In this case, in one ferrite module 150, the ferrite material

may be disposed as a plurality of pieces spaced apart from each other. The ferrite module 150 will be described in detail below.

[0084] Various boards provided with various control elements and electric circuits for operation of the electric range may be provided in the electric range. The boards may be provided as a main board 170, an Electro Magnetic Interference (EMI) filter 190, an Switched Mode Power Supply (SMPS) board 180, an inverter board 210, a resonant board 220, and an indicator board 250.

[0085] The main board 170 may be provided with a controller for controlling the electric range. The main board 170 may receive power from an external power source and may be provided to communicate with an external device by wire or wirelessly.

[0086] The EMI filter 190 may suppress electromagnetic interference generated by electricity. The EMI filter 190 may receive AC power from the external power source. In addition, the EMI filter 190 may reduce noise (that is, Electro Magnetic Interference (EMI)) of the received AC power and may provide the AC power with reduced noise to the SMPS board 180.

[0087] The SMPS board 180 may supply electricity to the electric range. The SMPS board 180 may receive the AC power with reduced noise from the EMI filter 190. In addition, the SMPS board 180 may rectify the supplied AC power into DC power and may provide the rectified DC power to the inverter board 210.

[0088] The inverter board 210 may apply a resonant current to the working coil 140a. The inverter board 210 may comprise an inverter part applying the resonant current to the working coil 140a through a switching operation. A plurality of inverter parts may be provided, and the switching operation of the inverter part may be controlled by the controller provided in the main board 170.

[0089] Here, the inverter part may receive the DC power from the SMPS board 180 and may apply the resonant current to the working coil 140a by performing the switching operation based on the received DC power.

[0090] In addition, the inverter part may comprise two switching elements, and the two switching elements may be alternately turned on and turned off by switching signals provided from the controller. Further, a high-frequency alternating current (i.e., a resonance current) may be generated by switching operations of the two switching elements, and the generated high-frequency alternating current may be applied to the working coil 140a.

[0091] Referring to FIGS. 3 and 7, the inverter board 210 according to an embodiment may comprise a resonance capacitor. That is, the inverter board 210 illustrated in FIG. 3 is in a form in which the inverter part and the resonance capacitor are integrated.

[0092] Referring to FIG. 17, the inverter board 210 according to another embodiment may comprise only the inverter part without comprising the resonance capacitor. In this case, a separate resonance board 220

comprising the resonance capacitor may be provided in the electric range.

[0093] Hereinafter, the resonance board 220 and the resonance capacitor will be described first. The resonance capacitor is electrically connected to the inverter part, and when a resonance current is applied to the working coil 140a by switching operations of the inverter part, resonance starts.

[0094] In addition, when the resonance capacitor resonates, a current flowing through the working coil 140a connected to the resonance capacitor increases. That is, through such a process, an eddy current may be induced in a heating target disposed above the working coil 140a connected to the resonance capacitor.

[0095] A plurality of resonance capacitors may be provided. In the case of an integrated type in which the inverter part and the resonance capacitor are all provided on the inverter board 210, the resonance capacitor may be disposed on the inverter board 210 to be spaced apart from the inverter part.

[0096] Of course, when the inverter board 210 and the resonance board 220 are separated from each other and separately provided, the resonance capacitor may be provided on the resonance board 220.

[0097] The indicator board 250 may comprise a light source. For example, the light source may be provided in a form in which a plurality of LEDs are aligned in a row.

[0098] The indicator board 250 may be turned on when the electric range operates to inform a user whether the heating part operates. In addition, the indicator board 250 may inform the user of an operating state of the electric range by changing lighting patterns, colors, and the like of the plurality of LEDs.

[0099] The electric range may comprise a lower supporter 260 disposed above the bottom plate 111 of the case 110. The lower supporter 260 may be disposed below the upper supporter 130, received in the case 110, disposed below boards coupled to a lower surface of the upper supporter 130, and support the upper supporter 130.

[0100] The lower supporter 260 is formed in a plate shape, and holes may be formed in portions corresponding to the inlet hole 1112 and the outlet hole 1113 so that air flows through the inlet hole 1112 and the outlet hole 1113 formed in the bottom plate 111, which will be described later.

[0101] A plurality of boards, the blowing fan 230, the heat sink 240, the ferrite module 150, and the coil board 140 are disposed on the upper supporter 130, and the upper supporter 130 may support loads of these components. Since a plurality of components are coupled to the upper supporter, deformation in which the upper supporter 130 sags downward may occur due to loads of these components.

[0102] Accordingly, the lower supporter 260 may be disposed below the upper supporter 130 to support the upper supporter 130 to which the plurality of components are coupled, thereby suppressing the upper supporter

130 from sagging downward.

[0103] When the electric range is assembled, the lower supporter 260 may be disposed at a position spaced apart from the lower supporter 260 in an up-down direction by a distance sufficient to support relatively large elements provided on the various boards, the blowing fan 230 having a larger volume than other components, and the heat sink 240.

[0104] On an upper surface of the lower supporter 260, protrusions for supporting the upper supporter 130 or components coupled to the lower surface of the upper supporter 130 may protrude toward an upper side. Meanwhile, on an upper surface of the bottom plate 111 of the case 110, protrusions for supporting the lower supporter 260 may protrude toward an upper side.

[0105] Various boards may be disposed above the lower supporter 260. Accordingly, it is necessary to electrically insulate the boards that may contact the lower supporter 260 from the bottom plate 111 of the case 110, which is made of a material such as aluminum, to prevent electric leakage and electrical short.

[0106] Accordingly, the lower supporter 260 is formed of an electrically insulating material and may be disposed between the bottom plate 111 of the case 110 and the boards to electrically insulate the boards from the bottom plate 111. The lower supporter 260 may be formed of, for example, an electrically insulating material such as MICA or a plastic material.

[0107] The electric range may comprise a heat insulating material 270 and a MICA sheet 280. The heat insulating material 270 may be disposed between the upper supporter 130 and the cover plate 120 to suppress heat transfer from a heating target to the upper supporter 130.

[0108] Heat generated as the heating target is heated may pass through the cover plate 120 and be transmitted to the upper supporter 130 disposed inside the electric range and various components coupled thereto.

[0109] Such heat transfer heats the inside of the electric range and may adversely affect an operation of the electric range particularly when transmitted to various boards. Accordingly, by disposing the heat insulating material 270 between the cover plate 120 and the upper supporter 130, heat transfer from the heating target to the inside of the electric range may be suppressed to prevent heating of internal components, thereby improving operational performance of the electric range.

[0110] For example, the heat insulating material 270 may be formed of a carbon material having good heat insulating performance even when manufactured with a relatively thin thickness, but is not limited thereto.

[0111] The heat insulating material 270 is formed in a plate shape and may be provided as a plurality of heat insulating materials to cover the coil board 140. The heat insulating material 270 may be separated from each other in a left-right direction of the electric range as a whole and may be integrally formed in a front-rear direction. That is, a longitudinal direction of one heat insulating material 270 may be disposed parallel to a front-rear

direction of the electric range.

[0112] The MICA sheet 280 is disposed between the upper supporter 130 and the cover plate 120 and may be disposed at at least one of a position above the heat insulating material 270 or a position below the heat insulating material 270.

[0113] In the embodiment shown in FIG. 3, the MICA sheet 280 is disposed both above and below the heat insulating material 270. In another embodiment, the MICA sheet 280 may be disposed only at one of a position above or below the heat insulating material 270.

[0114] The MICA sheet 280 may be provided in a shape corresponding to the heat insulating material 270. Accordingly, the MICA sheet 280 may be separated from each other in the left-right direction of the electric range as a whole and may be integrally formed in the front-rear direction. That is, a longitudinal direction of one heat insulating material 270 may be disposed parallel to a front-rear direction of the electric range.

[0115] The MICA sheet 280 is formed of a MICA material and, together with the heat insulating material 270, may suppress heat transfer from the heating target to the upper supporter 130 inside the electric range. In addition, the MICA sheet 280 is disposed to contact the heat insulating material 270 and may suppress the heat insulating material 270 from being damaged by an impact.

[0116] In particular, since the heat insulating material 270 of a carbon material is weak to impact and is easily damaged, the MICA sheet 280 may support the heat insulating material 270 to suppress damage of the heat insulating material 270 and increase durability of the heat insulating material 270.

[0117] Meanwhile, the heat insulating material 270 and the MICA sheet 280 may be formed to have a shorter length than others at a portion where the input interface 160 is disposed so as not to cover the input interface 160, and may avoid the input interface 160.

[0118] FIG. 4A is a plan view in which the cover plate 120 is omitted from FIG. 1. FIG. 4B is a view illustrating the coil board 140 according to an embodiment. FIG. 5 is a cross-sectional view taken in a direction of 5-5 in FIG. 4A. FIG. 6 is a bottom view illustrating an electric range according to an embodiment.

[0119] Elements that generate heat during operation of the electric range may be mounted on various boards.

[0120] For example, switching elements responsible for on/off control in the electric range generate a large amount of heat. Accordingly, these elements require forced cooling in order to suppress occurrence of operation stop or failure of the electric range due to overheating.

[0121] To this end, the electric range may comprise a blowing fan 230 and a heat sink 240. The blowing fan 230 and the heat sink 240 may serve to cool various boards and other components that are heated.

[0122] The blowing fan 230 may be coupled to the lower surface of the upper supporter 130 and disposed at a position spaced apart from the boards. The blowing

fan 230 may be provided to face the heat sink 240 so as to discharge air. The blowing fan 230 is electrically connected to the main board 170, and an operation thereof may be controlled by a controller provided in the main board 170.

[0123] The heat sink 240 may be disposed below the upper supporter 130, and a longitudinal direction thereof may be disposed parallel to an air discharge direction of the blowing fan 230. The heat sink 240 may be coupled to the lower surface of the inverter board 210.

[0124] In the embodiment, since the inverter boards 210 are provided as a pair disposed to be spaced apart from each other, the heat sinks 240 may be provided as a pair to be coupled to the respective inverter boards 210. Corresponding to the pair of heat sinks 240, the blowing fans 230 may be provided as a pair respectively disposed at positions corresponding to the pair of heat sinks 240.

[0125] A plurality of cooling fins are formed in the heat sink 240, and an air flow path through which air passes in a direction parallel to a longitudinal direction thereof may be formed therein. Accordingly, air discharged from an outlet of the blowing fan 230 cools the heat sink 240 while passing through an outer surface of the heat sink 240 and an internal air flow path of the heat sink 240, and accordingly the inverter board 210 may be effectively cooled.

[0126] The heat sink 240 may be coupled to the inverter board 210 to increase a heat dissipation area of the inverter board 210 so that the inverter board 210 is effectively cooled by air flowing by the blowing fan 230.

[0127] Since the inverter board 210 comprises an inverter part that is a switching element, the inverter part consumes a relatively large amount of power and thus may be heated to a higher temperature than other elements. Accordingly, the heat sink 240 may be coupled to the inverter board 210 to effectively cool the inverter part.

[0128] Meanwhile, since air flowing by the blowing fan 230 flows along the entire lower side of the lower supporter 260, boards other than the inverter board 210 are also cooled by the forced air flow, and thus an inside of the electric range may be cooled as a whole.

[0129] As illustrated in FIG. 6, the bottom plate 111 of the case 110 may comprise an inlet hole 1112 and a outlet hole 1113. The inlet hole 1112 is formed at a position corresponding to the blowing fan 230, and air may flow in from outside.

[0130] The outlet hole 1113 is formed at a position corresponding to an air discharge portion of the heat sink 240, and air may be discharged. The outlet hole 1113 may be formed at a position adjacent to an outlet of the air flow path formed in the heat sink 240. Since the heat sink 240 and the blowing fan 230 are each formed as a pair, the inlet holes 1112 and the outlet holes 1113 may also be formed as a pair corresponding thereto.

[0131] The working coil 140a may be formed in multiple layers on the coil board 140. For example, a sensing coil for sensing a heating target is printed on an uppermost portion of the coil board 140, and a plurality of working coils 140a may be disposed below the sensing coil while

forming respective layers.

[0132] FIG. 4B illustrates a cross section of a portion of the coil board 140 where the working coil 140a disposed below the sensing coil is located.

[0133] In FIG. 4B, the working coil 140a has an overall rectangular outline and is formed in a spiral shape. Due to such a structure, while having a shape corresponding to the rectangular seating groove 131 and the ferrite module 150, the working coil 140a may be densely printed so that a total length of the working coil 140a increases.

[0134] However, in another embodiment, the working coil 140a may have an outer shape formed as a polygon, a circle, or an ellipse.

[0135] As described above, one working coil 140a illustrated in FIG. 4B may be provided as a plurality of working coils while forming layers spaced apart from each other in an up-down direction of the coil board 140. However, for clarity of description, hereinafter, the working coil 140a that overlaps in the up-down direction and forms a plurality of layers may be referred to as one same working coil 140a.

[0136] As illustrated in FIG. 4B, a plurality of working coils 140a may be disposed in a lateral direction of the coil board 140 on one coil board 140.

[0137] In FIG. 4B, for example, one coil board 140 is illustrated in which two working coils 140a are printed in a left-right direction and four working coils 140a are printed in a front-rear direction. However, the present disclosure is not limited thereto, and the size of the coil board 140 and the number of working coils 140a printed on one coil board 140 may be changed in consideration of a shape or size of the entire electric range and ease of assembly or disassembly.

[0138] Meanwhile, a through hole 1419 may be formed between the working coils 140a adjacent to each other in one coil board 140. The first piece 1321 of the upper supporter 130 may be fitted into the through hole 1419. As the first piece 1321 is fitted into the through hole 1419, the coil board 140 may be placed at a designed position. The through hole 1419 may have a shape corresponding to the first piece 1321 and the slit 1323 of the upper supporter 130.

[0139] In addition, due to such a structure, the slit 1323 formed in the first piece 1321 is not blocked by the coil board 140, and light emitted from the indicator board 250 may pass through the slit 1323 hole of the upper supporter 130 and transmit through the cover plate 120.

[0140] One working coil 140a is disposed at a position corresponding to one ferrite module 150 and may overlap with the ferrite module 150 in an up-down direction. That is, one working coil 140a may be disposed to correspond to one ferrite module 150.

[0141] At this time, a coil boundary part 1412 may be provided between the working coils 140a adjacent to each other. The coil boundary part 1412 is disposed such that a longitudinal direction thereof intersects with a longitudinal direction of the through hole 1419, and of course the through hole 1419 is not formed in the coil boundary

part 1412.

[0142] A lower surface of the coil board 140 is supported by the second piece 1322, and at this time the coil boundary part 1412 may be disposed at a position corresponding to the second piece 1322 of the boundary rib 132.

[0143] In FIG. 5, a flow direction of air is illustrated by arrows. When the blowing fan 230 operates, air may be introduced from outside into the electric range through the inlet hole 1112. A portion of the introduced air passes through an outer surface of the heat sink 240 and an air flow path formed inside the heat sink 240, and a remainder of the introduced air may be diffused throughout an interior of the case 110 of the electric range.

[0144] Air forcibly flowing inside the case 110 may be discharged to the outside through the outlet hole 1113. In particular, the inverter board 210 to which the heat sink 240 is coupled may be effectively cooled by the forced flow of air. Accordingly, the inverter part, which is a switching element heated to a high temperature, may be effectively cooled by the heat sink 240 and the air.

[0145] In the embodiment, the blowing fan 230 is coupled to the lower surface of the upper supporter 130, the heat sink 240 is coupled to the inverter board 210, and the inverter board 210 is coupled to the lower surface of the upper supporter 130. As a result, since both the blowing fan 230 and the heat sink 240, which are cooling devices, are coupled to the upper supporter 130, the case 110 may not comprise a separate structure for coupling the blowing fan 230 and the heat sink 240.

[0146] Accordingly, a support structure of the electric range is simplified as a whole, thereby simplifying a structure of the electric range and reducing manufacturing cost.

[0147] In addition, since a structure contacting the blowing fan 230 and the heat sink 240 is omitted from the case 110, assembly and disassembly of the case 110 become easy, and maintenance work of the electric range may become easy.

[0148] FIG. 7 is a view in which the case 110 is omitted from FIG. 6. FIG. 8 is a perspective view illustrating the upper supporter 130 according to an embodiment. FIG. 9 is a plan view illustrating the upper supporter 130 according to an embodiment.

[0149] FIG. 10 is a cross-sectional view taken along a line 10-10 of FIG. 9. FIG. 11 is a cross-sectional view taken along a line 11-11 of FIG. 9.

[0150] The upper supporter 130 may comprise a flat plate 135 disposed in a direction parallel to a lateral direction of the electric range, and a side plate 136 bent downward from an edge of the flat plate 135. The ferrite module 150 and the coil board 140 are disposed on the flat plate 135, and the side plate 136 may support the flat plate 135 at the edge of the flat plate 135.

[0151] The upper supporter 130 may comprise a seating groove 131 and a boundary rib 132.

[0152] The seating grooves 131 are formed by recessing the flat plate 135, are disposed to be aligned with

each other in a left-right direction and a front-rear direction of the upper supporter 130, and may be provided as a plurality of seating grooves so that each of the plurality of ferrite modules 150 is seated therein. The seating groove 131 is generally formed in a rectangular shape, and thus the coil board 140 and the ferrite module 150 having a rectangular shape may be fitted into the seating groove 131.

[0153] The boundary rib 132 forms boundaries of the plurality of seating grooves 131, is provided to protrude from an upper surface of the upper supporter 130, and may be provided as a plurality of boundary ribs.

[0154] The boundary rib 132 may comprise a first piece 1321 and a second piece 1322. A longitudinal direction of the first piece 1321 may be disposed in a lateral direction. A longitudinal direction of the second piece 1322 may be disposed in a direction intersecting the longitudinal direction of the first piece 1321.

[0155] Referring to FIG. 4A, the longitudinal direction of the first piece 1321 may be disposed in a front-rear direction, and the longitudinal direction of the second piece 1322 may be disposed in a left-right direction. Since the first piece 1321 and the second piece 1322 are disposed such that the longitudinal directions thereof intersect each other, the upper surface of the upper supporter 130 may be entirely formed in a grid shape.

[0156] A slit 1323 may be formed in the first piece 1321. The slit 1323 may be formed to penetrate the upper supporter 130 and may have a narrow and long hole shape. The indicator board 250 may be disposed at a position corresponding to a position where the slit 1323 is formed in the upper supporter 130.

[0157] Accordingly, since the first piece 1321 and the slit 1323 have longitudinal directions parallel to a front-rear direction of the upper supporter 130, the indicator board 250 may also have a longitudinal direction parallel to the front-rear direction of the upper supporter 130 correspondingly.

[0158] In the indicator board 250, the light source emits light toward an upper side, and the emitted light passes through the slit 1323 and transmits through the cover plate 120 made of glass, so that a user may see the emitted light.

[0159] Since the slit 1323 and the indicator board 250 are disposed such that longitudinal directions thereof are parallel to the front-rear direction of the upper supporter 130 and are spaced apart from each other, the user may see emitted light that is elongated in the front-rear direction and spaced apart in a left-right direction as a whole.

[0160] The first piece 1321 may be formed to have a relatively greater height, and the second piece 1322 may be formed to have a height lower than that of the first piece 1321. Since the slit 1323 is formed in the first piece 1321 and light passing through the slit 1323 needs to be clearly visible to the user without being diffused, the first piece 1321 may be formed relatively high so that the light is not diffused until passing through an upper surface of the cover plate 120.

[0161] The heat insulating material 270 and the MICA sheet 280 disposed above the first piece 1321 are separated from each other at the slit 1323, and thus the heat insulating material 270 and the MICA sheet 280 do not cover the slit 1323, so that light passing through the slit 1323 may directly reach the cover plate 120.

[0162] The second piece 1322 is formed to have a relatively lower height, and the heat insulating material 270 and the MICA sheet 280 may be disposed above the second piece 1322. The heat insulating material 270 or the MICA sheet 280 may be disposed such that a longitudinal direction thereof is parallel to the front-rear direction of the upper supporter 130.

[0163] Accordingly, the heat insulating material 270 and the MICA sheet 280 may be integrally disposed in the front-rear direction of the upper supporter 130 and may be disposed to be separated from each other in the left-right direction. The heat insulating material 270 and the MICA sheet 280 may be separated from each other with the first piece 1321 as a boundary.

[0164] That is, the plurality of heat insulating materials 270 and MICA sheets 280 may be separated from each other by the first piece 1321 and may be disposed above the second piece 1322. Accordingly, the second piece 1322 may be formed to have a relatively low height to define a space in which the heat insulating material 270, the MICA sheet 280, and the coil boundary part 1412 of the coil board 140 are disposed.

[0165] The ferrite module 150 may comprise a ferrite core 151 and a core fixing part 152. When high-frequency power is applied to the working coil 140a printed on the coil board 140, a magnetic field is formed around the working coil 140a, and the formed magnetic field may form an eddy current in the heating target. The ferrite core 151 may raise the formed magnetic field toward an upper side where the heating target is located.

[0166] The core fixing part 152 has the ferrite core 151 mounted thereon and may fix the ferrite core 151 to the seating groove 131. The core fixing part 152 is coupled to the upper supporter 130, is formed by insert molding together with the ferrite core 151, and may fix the ferrite core 151.

[0167] The core fixing part 152 forms an outer shape of the ferrite module 150 and may be formed entirely in a rectangular shape. Meanwhile, the ferrite core 151 may be formed as a plurality of pieces and may be coupled to the core fixing part 152 by insert molding. Accordingly, the ferrite module 150 may have an overall rectangular shape.

[0168] FIG. 12 is an exploded perspective view illustrating the upper supporter 130 and the ferrite module 150. FIG. 13 is a plan view illustrating a state in which the ferrite module 150 is coupled to the upper supporter 130. FIG. 14 is a plan view illustrating a state in which the coil board 140 is coupled in the state of FIG. 13.

[0169] As illustrated in FIGS. 12 to 14, first, the ferrite module 150 may be mounted in the seating groove 131 formed on an upper portion of the upper supporter 130.

Next, after the ferrite module 150 is mounted, the coil board 140 may be mounted on the upper supporter 130. In this order, mounting of the coil board 140 on the upper supporter 130 may be completed.

[0170] The coil board 140 and the ferrite module 150 may be provided to be supported by the boundary rib 132 in a state placed in the seating groove 131.

[0171] Each ferrite module 150 may be independently inserted into each seating groove 131. When each ferrite module 150 is inserted into the seating groove 131, side surfaces of the ferrite module 150 may be stably supported by the first piece 1321 and the second piece 1322 of the boundary rib 132.

[0172] When the coil board 140 is placed on the upper portion of the upper supporter 130, a lower surface of the coil board 140 may be supported by the second piece 1322 of the boundary rib 132. At this time, the coil boundary part 1412 of the coil board 140 may be positioned on an upper surface of the second piece 1322.

[0173] The first piece 1321 of the boundary rib 132 may be fitted into the through hole 1419 of the coil board 140. Accordingly, the coil board 140 is placed at a designed position and may be supported by the first piece 1321 so that movement of the upper supporter 130 in a lateral direction may be suppressed.

[0174] In order to stably mount the coil board 140 on the upper supporter 130, a board coupling part 141 may be provided. The board coupling part 141 is coupled to the coil board 140 and may couple the coil board 140 to the upper supporter 130. The board coupling part 141 may be integrally formed with the coil board 140 or may be separately manufactured and coupled to the coil board 140.

[0175] The board coupling part 141 may be formed to protrude from an end of the coil board 140 in a longitudinal direction. The protruding board coupling part 141 may be coupled to the upper supporter 130 by a fastening member such as a screw bolt.

[0176] A connection pin 1411 may be provided at an edge of the coil board 140. When the coil board 140 is mounted on the upper supporter 130 by the board coupling part 141, the connection pin 1411 contacts a terminal formed in the upper supporter 130, and accordingly the connection pin 1411 and the terminal of the upper supporter 130 may be electrically connected to each other.

[0177] A terminal of the upper supporter 130 may be electrically connected to other electrical components by a cable or the like.

[0178] In the embodiment, the ferrite module 150 may be easily and stably mounted on the upper supporter 130 by the seating groove 131 formed on an upper portion of the upper supporter 130 and the boundary rib 132 formed to surround the seating groove 131.

[0179] Further, since the first piece 1321 is fitted into the coil board 140, when the coil board 140 is mounted on the upper supporter 130, the coil board 140 may be positioned at a designed location and does not move

in a lateral direction of the upper supporter 130, that is, in a left-right direction and a front-rear direction of the upper supporter 130, thereby allowing the coil board 140 to be easily assembled to the upper supporter 130.

[0180] The electric range may comprise an input interface 160 seated on an upper portion of the upper supporter 130. The input interface 160 may be coupled to the upper supporter 130. To this end, the upper supporter 130 may be formed such that an upper surface thereof is recessed downward and may comprise an insertion groove 134 into which the input interface 160 is inserted.

[0181] The insertion groove 134 may be provided in a substantially rectangular shape to correspond to the input interface 160 having a rectangular shape. The insertion groove 134 and the input interface 160 may be disposed at a front central portion of the electric range so that a user may easily perform an input from the user's point of view.

[0182] A hole through which a cable or the like may pass may be formed in a bottom of the insertion groove 134 to electrically connect the input interface 160 and other components.

[0183] FIG. 15 is a bottom view of the upper supporter 130. FIG. 16 is a view illustrating a state in which the indicator board 250 is coupled in the state of FIG. 15. FIG. 17 is a view illustrating a state in which various components are coupled in the state of FIG. 16.

[0184] Various boards may be coupled to a lower surface of the upper supporter 130. These boards may be coupled, for example, by fastening members such as screw bolts.

[0185] The main board 170 may be coupled to the lower surface of the upper supporter 130 and may include a controller configured to control the electric range.

[0186] The SMPS board 180 may be coupled to the lower surface of the upper supporter 130 and may supply power to the electric range. The SMPS boards 180 may be provided as a pair to supply power to the plurality of working coils 140a.

[0187] The EMI filter 190 may be coupled to the lower surface of the upper supporter 130 and may suppress electromagnetic interference generated by electricity. Since the EMI filter 190 is electrically connected to the SMPS boards 180, the EMI filters 190 may be provided as a pair to respectively correspond to the pair of SMPS boards 180.

[0188] The inverter board 210 may be coupled to the lower surface of the upper supporter 130 and may apply a resonant current to the working coil 140a. The inverter boards 210 may also be provided as a pair to supply resonant current to the plurality of working coils 140a.

[0189] Meanwhile, as shown in FIG. 17, an electric range may be provided in which the inverter board 210 and the resonant board 220 are separated from each other. The resonant board 220 may be coupled to the lower surface of the upper supporter 130, may be disposed separately from the inverter board 210, and may include a resonant capacitor.

[0190] As described above, various boards required for operation of the electric range may be provided on the lower surface of the upper supporter 130. At this time, the boards may be disposed at positions spaced apart from each other on the lower surface of the upper supporter 130.

[0191] The boards may be coupled to the lower surface of the upper supporter 130 in an inverted state. That is, among elements provided on each board, elements occupying a relatively large volume may be disposed to be positioned below the board.

[0192] Due to such a structure, the various boards may be easily coupled to the lower surface of the upper supporter 130 without obstruction.

[0193] Meanwhile, the indicator boards 250 may be coupled to the lower surface of the upper supporter 130, may be provided as a plurality of indicator boards spaced apart from each other, and may include a light source. The indicator board 250, unlike the other boards, may be disposed at a position partially overlapping with another board.

[0194] The indicator board 250 may be formed in a bar shape, and a longitudinal direction thereof may be disposed parallel to a lateral direction of the upper supporter 130.

[0195] Referring to FIGS. 15 and 16, the slits 1323 formed in the upper supporter 130 may be formed such that a longitudinal direction thereof is parallel to a front-rear direction of the upper supporter 130, and may be aligned in a single row in the front-rear direction. Further, the slits 1323 may be disposed to be spaced apart from each other in a left-right direction of the upper supporter 130.

[0196] The indicator board 250 may be disposed at a position overlapping with the slits 1323 through which light passes. Accordingly, the indicator board 250 may be disposed on the lower surface of the upper supporter 130 so as to cover the slits 1323.

[0197] Thus, the indicator boards 250 may be provided as a plurality of indicator boards, each having a longitudinal direction parallel to the front-rear direction of the upper supporter 130 and being spaced apart from each other in the left-right direction of the upper supporter 130.

[0198] Except for the indicator board 250, the various boards for operating the electric range described above may be coupled to the lower surface of the upper supporter 130 so as to be spaced apart from each other. Even boards provided as a pair may have respective pieces spaced apart from each other.

[0199] In addition, a blowing fan 230 constituting a cooling device may be disposed on the lower surface of the upper supporter 130 at a position spaced apart from the boards. Meanwhile, the heat sink 240 constituting the cooling device may be coupled to the upper supporter 130 in a state of being coupled to a lower surface of the inverter board 210.

[0200] In the embodiment, the ferrite module 150 and the coil board 140 may be coupled to an upper portion of

the supporter, and various boards for operating the electric range and the cooling device may be coupled to a lower surface of the supporter.

[0201] As described above, most components, including boards that operate by receiving electrical power and are involved in operation of the electric range, electrical components such as the blowing fan 230, and other components, may be coupled to the upper supporter 130. Accordingly, assembly and disassembly of the electric range may be significantly facilitated.

[0202] That is, when assembling the electric range, the ferrite module 150, the coil board 140, and the input interface 160 may first be assembled on the upper portion of the upper supporter 130, and various boards and the cooling device may be assembled on the lower surface of the upper supporter 130.

[0203] Next, after disposing the heat insulating material 270 and the MICA sheet 280 above the upper supporter 130, and disposing the lower supporter 260 below the upper supporter 130, the cover plate 120 and the case 110 may be coupled, thereby completing assembly of the electric range.

[0204] At this time, since the case 110 does not include a support structure for supporting components coupled to the upper supporter 130, it is not necessary to match those components to a support structure, and thus assembly of the case 110 may become very easy.

[0205] Similarly, when disassembling the electric range for repair, if the case 110 and the cover plate 120 are disassembled and the lower supporter 260 is disassembled, the upper supporter 130 to which various components are coupled may be directly accessed, and a defective component may be easily replaced.

[0206] In addition, since the ferrite modules 150 are separated from each other and respectively inserted into the seating grooves 131 of the upper supporter 130, only a defective ferrite module 150 may be replaced, thereby facilitating repair work of the electric range.

[0207] Meanwhile, referring to FIGS. 15 to 17, assembly of various components on the lower surface of the upper supporter 130 may be performed in the following order. First, the indicator board 250 may be coupled to the lower surface of the upper supporter 130 so as to cover the slit 1323 at a position where the slit 1323 is formed.

[0208] Next, various boards and the blowing fan 230 may be disposed at designed positions on the lower surface of the upper supporter 130 and may be coupled to the upper supporter 130. At this time, the heat sink 240 may be coupled to the inverter board 210. Of course, except for the heat sink 240 and the indicator board 250, the various boards may be coupled to the lower surface of the upper supporter 130 at positions spaced apart from each other.

[0209] Next, a cable coupling operation for electrical connection between the various electrical components and for electrical connection with an external power source may be performed.

[0210] Further, disassembly may be performed in a

reverse order of the above-described assembly process.

[0211] FIG. 18 is an exploded perspective view illustrating the upper supporter 130 and the case 110. FIG. 19A is a bottom view illustrating the upper supporter 130 according to an embodiment.

[0212] In the electric range of the embodiment, the lower supporter 260 may serve to stably support the upper supporter 130. However, boards, the blowing fan 230, the air guide 310, and other components are coupled to a lower surface of the lower supporter 260, and these components have volumes and thus may occupy a considerable space.

[0213] Accordingly, the lower supporter 260 does not directly contact the upper supporter 130 and needs to be spaced apart from the upper supporter 130 in an up-down direction. In such a structure, the lower supporter 260 and the upper supporter 130 require a support structure for coupling and supporting each other.

[0214] In addition, since many components are coupled to the upper supporter 130, a sagging phenomenon may occur due to loads of the components. Such sagging may be particularly pronounced in a central portion of the upper supporter 130.

[0215] An edge of the upper supporter 130 is provided with the side plate 136, and although the side plate 136 may reinforce rigidity of the upper supporter 130, the central portion of the upper supporter 130 does not have such a rigidity reinforcing structure.

[0216] Accordingly, the central portion of the upper supporter 130 needs to be provided with a structure supported by the lower supporter 260. Hereinafter, a structure for supporting and reinforcing rigidity will be described. First, referring to FIG. 19A, the air guide 310 coupled to a lower surface of the upper supporter 130 will be described.

[0217] The air guide 310 may be disposed below the upper supporter 130, and a longitudinal direction thereof may be disposed in a direction parallel to an air discharge direction of the blowing fan 230. The air guide 310 may be disposed to surround the heat sink 240 and may guide flow of air passing through the heat sink 240.

[0218] The air guide 310 may guide flow of air discharged from the blowing fan 230, and the heat sink 240 may be disposed inside the air guide 310. The air guide 310 may surround the heat sink 240 and may allow air to flow inside and around the heat sink 240, thereby effectively cooling the heat sink 240, and thus overheating of a board to which the heat sink 240 is coupled may be effectively suppressed.

[0219] An inlet of the air guide 310 may be connected to an outlet of the blowing fan 230, and air discharged from the blowing fan 230 may flow into the air guide 310.

[0220] A heat sink 240 may be disposed in an internal space formed by the air guide 310, and air forcibly flowing by the blowing fan 230 may cool the heat sink 240, be discharged to an outside of the air guide 310, pass through the bottom plate 111, and be discharged to an outside of the electric range.

[0221] As illustrated in FIG. 19A, the air guide 310 according to an embodiment may be provided to be coupled to the inverter board 210. For example, the air guide 310 may be coupled, by a fastening member, to the heat sink 240 at a position corresponding to the heat sink 240 coupled to a lower surface of the inverter board 210. Since the inverter boards 210 may be provided as a pair and the heat sinks 240 may be disposed respectively on the inverter boards 210, the heat sinks 240 may also be provided as a pair.

[0222] Compared to other boards, the inverter board 210 may have a relatively large area and may include a relatively large number of heat-generating elements, and thus it may be necessary to effectively suppress overheating of the inverter board 210.

[0223] Accordingly, in the embodiment, the heat sink 240 and the air guide 310 may be disposed on the lower surface of the inverter board 210 so that the inverter board 210 may be cooled by air forcibly flowed by the blowing fan 230.

[0224] In the embodiment, by coupling the air guide 310 to the lower surface of the inverter board 210, the air guide 310 occupying a considerable volume may consequently be coupled to the upper supporter 130.

[0225] As described above, most components, including boards that operate by receiving electrical power and are involved in operation of the electric range, electrical components such as the blowing fan 230, the heat sink 240, the air guide 310, and other components, may be coupled to the upper supporter 130. Accordingly, assembly and disassembly of the electric range may be significantly facilitated.

[0226] FIG. 19B is a plan view illustrating the lower supporter according to an embodiment.

[0227] In another embodiment, the air guide 310 may be coupled to the lower supporter 260. Unlike the above-described embodiment in which the air guide 310 is coupled to the upper supporter 130, the air guide 310 may be coupled to the lower supporter 260.

[0228] For example, the air guide 310 may be disposed at a position corresponding to the heat sink 240 in the lower supporter 260. The air guide 310 may be coupled to an upper surface of the lower supporter 260 by a fastening member.

[0229] The heat sink 240 may be coupled to the upper supporter 130, and when the upper supporter 130 and the lower supporter 260 are coupled to each other in a state in which the air guide 310 is coupled to the lower supporter 260, the heat sink 240 may be accommodated in an internal space of the air guide 310.

[0230] In the embodiment, assembly of the heat sink 240 and the air guide 310 may be completed by coupling the lower supporter 260 and the upper supporter 130 in a state in which the air guide 310 is coupled to the lower supporter 260 and the heat sink 240 is coupled to the upper supporter 130.

[0231] By coupling the air guide 310 to the lower supporter 260, a need to consider a placement space and a

coupling structure of the air guide 310 in the lower supporter 260, to which a plurality of boards, the heat sink 240, the blowing fan 230, and other components are coupled, may be reduced even though the air guide 310 occupies a considerable volume.

[0232] Accordingly, spatial arrangement of components and other design aspects of the electric range may be facilitated.

[0233] FIG. 20 is a view enlarging a portion of FIG. 19A. FIG. 21 is a plan view illustrating a state in which the lower supporter 260 and the case 110 are coupled. FIG. 22 is a view enlarging a portion of FIG. 21. Referring to FIG. 21, the lower supporter 260 may comprise an air inlet 261 and an air outlet 262.

[0234] The lower supporter 260 may have the air inlet 261 formed at a position corresponding to the blowing fan 230 so that air flowing into the blowing fan 230 passes therethrough. Since the blowing fan 230 may be disposed above the lower supporter 260, air introduced into the blowing fan 230 may be introduced from below the lower supporter 260, pass through the lower supporter 260, and flow into the blowing fan 230.

[0235] Accordingly, the air inlet 261 may be formed in the lower supporter 260, and air may pass through the lower supporter 260 via the air inlet 261 and may be introduced into the blowing fan 230.

[0236] The air outlet 262 may be formed at a position corresponding to an outlet of the air guide 310, and air may be discharged. Air discharged from the outlet of the air guide 310 may pass through the lower supporter 260 through the air outlet 262 and be discharged to a lower side of the lower supporter 260.

[0237] The bottom plate 111 of the case 110 may comprise an inlet hole 1112 and an outlet hole 1113. The inlet hole 1112 may be formed at a position corresponding to the blowing fan 230 and the air inlet 261, and air may be introduced therethrough. The outlet hole 1113 may be formed at a position corresponding to the air outlet 262, and air may be discharged therethrough. Other details regarding the inlet hole 1112 and the outlet hole 1113 have already been described above.

[0238] In the upper supporter 130 and the lower supporter 260 disposed to be spaced apart from each other in an up-down direction of the electric range, a first support part 431 may be provided in the upper supporter 130 and a second support part 561 may be provided in the lower supporter 260 for support.

[0239] The upper supporter 130 may comprise the first support part 431 protruding from a lower surface, and the lower supporter 260 may comprise the second support part 561 protruding from an upper surface and coupled to the first support part 431. The first support part 431 and the second support part 561 may be disposed at positions corresponding to each other.

[0240] The first support part 431 and the second support part 561 protrude from each other and are coupled to each other by shape fitting at ends thereof, whereby a space in which components are disposed between the

upper supporter 130 and the lower supporter 260 is secured, and at the same time the lower supporter 260 may stably support a load of the upper supporter 130.

[0241] Accordingly, sagging of the upper supporter 130 downward due to a load of the upper supporter 130 to which various components are coupled may be effectively prevented by support of the lower supporter 260.

[0242] Although the first support part 431 and the second support part 561 are each disposed to be spaced apart from each other as a plurality of pieces, the first support part 431 and the second support part 561 may be disposed at central portions of the upper supporter 130 and the lower supporter 260 as a whole.

[0243] As described above, the upper supporter 130 may sag due to components coupled thereto, and such sagging may be significant in a central portion. Accordingly, in the embodiment, the first support part 431 and the second support part 561 capable of suppressing such sagging of the upper supporter 130 are disposed at the central portion of the upper supporter 130 where sagging is significant, thereby effectively suppressing sagging of the upper supporter 130 and deformation and malfunction of components caused thereby.

[0244] Meanwhile, the upper supporter 130 and the lower supporter 260 may be formed of a material having good moldability in order to form the first support part 431 and the second support part 561 having a relatively complex structure. In addition, the lower supporter 260 needs to be formed of a material having good electrical insulation.

[0245] Accordingly, the upper supporter 130 and the lower supporter 260 may be manufactured by injection molding using a plastic material having good moldability and electrical insulation. Specifically, the upper supporter 130 and the lower supporter 260 may be formed of a polycarbonate (PC) material having excellent moldability and insulation. However, the material is not limited thereto.

[0246] Meanwhile, the lower supporter 260 may be provided to have a predetermined thickness so as to support a load of the upper supporter 130 and prevent the lower supporter 260 from sagging due to the load of the upper supporter 130. In addition, the bottom plate 111 of the case 110 may support the upper supporter 130 so that the upper supporter 130 does not sag.

[0247] Due to such a structure, the upper supporter 130 is effectively supported by the lower supporter 260 and the case 110, thereby effectively suppressing sagging of the upper supporter 130 downward due to loads of components coupled thereto.

[0248] Meanwhile, the case 110 may support the lower supporter 260 and may be formed of a steel plate having good rigidity so as to suppress external electromagnetic waves from reaching boards provided inside the electric range.

[0249] For example, the case 110 may be formed of a material having good durability and corrosion resistance, such as a hot-dip galvanized steel plate, a galvanized

steel plate, or a stainless steel plate. However, the material is not limited thereto.

[0250] In addition, protrusions or protruding lines having a downwardly convex shape or an upwardly convex shape may be formed in the bottom plate 111 of the case 110 by rolling processing, so that rigidity is reinforced and deformation of the bottom plate 111 itself may be suppressed even under loads of the upper supporter 130 and the lower supporter 260.

[0251] FIG. 23 is an exploded perspective view illustrating the lower supporter 260 and the case 110. FIG. 24 is a view enlarging a portion of FIG. 23.

[0252] The first support part 431 may comprise a protruding part 4311 and a recessed part 4312. The protruding part 4311 may protrude from the upper supporter 130. The protruding part 4311 may contact the second support part 561 and be supported by the second support part 561.

[0253] The recessed part 4312 may be formed by recessing a portion of the protruding part 4311 and may be formed in a linear shape having both sides open. The insertion part 5611 of the second support part 561 is fitted into the recessed part 4312, and accordingly, when the first support part 431 and the second support part 561 are coupled, the insertion part 5611 is fitted into the recessed part 4312 so that the upper supporter 130 and the lower supporter 260 may maintain a stable coupled state without being separated from each other.

[0254] The second support part 561 may be disposed at a position corresponding to the first support part 431. Accordingly, when the electric range is assembled, the first support part 431 and the second support part 561 are coupled to each other, and the lower supporter 260 may support the upper supporter 130.

[0255] The second support part 561 may comprise an insertion part 5611 and a reinforcement part 5612. An upper portion of the insertion part 5611 is fitted into the recessed part 4312 and may be formed in a plate shape.

[0256] The recessed part 4312 of the first support part 431 may be formed in a narrow and long linear slit shape. Accordingly, the insertion part 5611 of the second support part 561 fitted into the recessed part 4312 is formed in a plate shape corresponding to the shape of the recessed part 4312 and may be formed to have a narrow and long shape when viewed in a plan view of the lower supporter 260.

[0257] When the insertion part 5611 is fitted into the recessed part 4312, the first support part 431 and the second support part 561 do not slide and separate from each other, and therefore the upper supporter 130 and the lower supporter 260 may stably maintain the coupled state.

[0258] The reinforcement part 5612 may be integrally formed with the insertion part 5611 and protrude from a side surface of the insertion part 5611 to reinforce rigidity of the insertion part 5611.

[0259] Since the insertion part 5611 is formed in a plate shape, the insertion part 5611 may be deformed or da-

maged by an external force applied in a lateral direction. Such deformation or damage may cause an assembly failure between the upper part and the lower part.

[0260] Accordingly, the reinforcement part 5612 may reinforce rigidity of the insertion part 5611, thereby effectively suppressing deformation or damage of the insertion part 5611 caused by an external force applied in a lateral direction during an assembly or disassembly process of the electric range.

[0261] A plurality of reinforcement parts 5612 may be provided so as to be respectively coupled to both surfaces of the insertion part 5611. The reinforcement parts 5612 may be formed to respectively extend from both surfaces of the insertion part 5611. In addition, in order to increase a reinforcing force of the reinforcement part 5612, a plurality of reinforcement parts 5612 may also be provided on one surface of the insertion part 5611.

[0262] Lateral lengths of the plurality of reinforcement parts 5612 may be identical to each other or may be different from each other. A plurality of second support parts 561 are provided, and lengths of the reinforcement parts 5612 provided in the respective second support parts 561 may be identical to each other or may be different from each other.

[0263] The reinforcement part 5612 may comprise an inclined section 5612a whose width becomes narrower toward an upper direction, and may be provided such that the width is smallest at an upper end.

[0264] Various components may be disposed in a space between the upper supporter 130 and the lower supporter 260, and a number of wirings may also be disposed for electrical connection of electrical components. Accordingly, a sufficient space needs to be formed between the upper supporter 130 and the lower supporter 260 to arrange the components and the wirings.

[0265] Since the reinforcement part 5612 occupies such a space between the upper supporter 130 and the lower supporter 260, it is necessary to reduce a volume thereof in order to secure a space for arranging components and wirings.

[0266] A lower end of the reinforcement part 5612 may be integrally formed with a bottom surface of the lower supporter 260 to increase rigidity of the reinforcement part 5612. Accordingly, a lower end and a lower portion of the reinforcement part 5612 may be formed with a relatively large width to increase rigidity of the reinforcement part 5612, and the width may be reduced toward an upper portion of the reinforcement part 5612 so that, in particular, a space in which wirings are disposed may be secured.

[0267] Meanwhile, an upper end of the reinforcement part 5612 may be formed to have a predetermined width. Due to such a structure, the upper end of the reinforcement part 5612 may contact and support the first support part 431.

[0268] A plurality of the first support parts 431 and the second support parts 561 may be provided, and shapes and arrangement positions of the plurality of the first

support parts 431 and the second support parts 561 may be different from each other.

[0269] The first support part 431 may comprise a first-1 support part 4313 and a first-2 support part 4314 having different arrangement positions. The second support part 561 may comprise a second-1 support part 5613 and a second-2 support part 5614 having different shapes and arrangement positions.

[0270] The first support part 431 may comprise a plurality of first-1 support parts 4313 disposed to be spaced apart from each other. The second support part 561 may comprise a plurality of second-1 support parts 5613 disposed to be spaced apart from each other and including an insertion part 5611 having a length corresponding to a length of the recessed part 4312 of the first-1 support part 4313.

[0271] The second-1 support part 5613 may have a shape and structure having lower rigidity than the second-2 support part 5614, and a support strength with respect to the upper supporter 130 may also be lower than that of the second-2 support part 5614.

[0272] The first support part 431 may comprise a first-2 support part 4314 formed to be longer in a longitudinal direction than the first-1 support part 4313. The second support part 561 may comprise a second-2 support part 5614 having an insertion part 5611 with a length corresponding to a length of the recessed part 4312 of the first-2 support part 4314.

[0273] The first-2 support part 4314 and the second-2 support part 5614 are formed longer than the first-1 support part 4313 and the second-1 support part 5613 and therefore may support a greater load than the first-1 support part 4313 and the second-1 support part 5613.

[0274] The second-2 support part 5614 may comprise a pair of insertion parts 5611 spaced apart from each other. In addition, the second-2 support part 5614 may comprise a connection part 5614a connecting the pair of insertion parts 5611 and reinforcing rigidity of the insertion parts 5611.

[0275] In the second-2 support part 5614, the pair of insertion parts 5611 are disposed adjacent to each other, the pair of insertion parts 5611 are connected by the connection part 5614a, and the connection part 5614a may reinforce rigidity of the insertion parts 5611.

[0276] Due to such a structure, the second-2 support part 5614 may more stably withstand a load and an external force applied thereto than the second-1 support part 5613.

[0277] In the lower supporter 260, the second-1 support part 5613 and the second-2 support part 5614 may be appropriately disposed. Considering the structure, since the second-1 support part 5613 comprises one insertion part 5611 and does not comprise the connection part 5614a, the second-1 support part 5613 may have a relatively simple structure and thus be easy to manufacture, but may have relatively lower rigidity than the second-2 support part 5614.

[0278] Conversely, since the second-2 support part

5614 comprises two insertion parts 5611 and the connection part 5614a, the second-2 support part 5614 has relatively higher rigidity than the second-1 support part 5613 and thus may withstand a relatively heavy load or strong external force, while being more difficult to manufacture and occupying a larger space.

[0279] In consideration of such aspects, the second-1 support part 5613 and the second-2 support part 5614 may be disposed in appropriate numbers in the lower supporter 260. Of course, when emphasis is placed on manufacturability and space efficiency, only the second-1 support parts 5613 may be disposed. In addition, when emphasis is placed on rigidity, only the second-2 support parts 5614 may be disposed.

[0280] In the embodiment illustrated in the respective drawings, both the second-1 support parts 5613 and the second-2 support parts 5614 are disposed in consideration of manufacturability, space efficiency, and rigidity as a whole, and a larger number of the second-1 support parts 5613 are disposed.

[0281] In this case, since the second-2 support part 5614 has high rigidity and can withstand a relatively large load and external force, the second-2 support part 5614 is preferably disposed at a position where a large load acts on the upper supporter 130 and sagging may greatly occur accordingly. This will be described in detail below.

[0282] The first-2 support part 4314 may be provided as a pair respectively disposed at positions corresponding to a pair of the second-2 support parts 5614. Accordingly, the pair of first-2 support parts 4314 may be disposed to be spaced apart from each other at relatively close positions compared with distances between the plurality of first-1 support parts 4313.

[0283] In the embodiment, the second-2 support part 5614 may be disposed at a position closer to the blowing fan 230 than the second-1 support part 5613. The blowing fan 230 may have a considerable load. Accordingly, the lower supporter 260 may sag downward due to the load of the blowing fan 230.

[0284] In the embodiment, the second-2 support part 5614 having a structure capable of supporting a greater load is disposed at a position adjacent to the blowing fan 230 so that the second-2 support part 5614 may effectively support the load of the blowing fan 230. Accordingly, sagging of the lower supporter 260 to which the blowing fan 230 and various other components are coupled due to the load may be effectively suppressed.

[0285] The electric range may comprise a main board 170 and an SMPS board 180. The main board 170 may be coupled to the lower surface of the upper supporter 130 and may include a controller configured to control the electric range. The SMPS board 180 may be coupled to the lower surface of the upper supporter 130 and may supply power to the electric range. Detailed descriptions of the main board 170 and the SMPS board 180 are as described above.

[0286] In the embodiment, the main board 170 and the SMPS board 180 may be coupled to a central portion of a

lower surface of the lower supporter 260. Accordingly, the second support part 561 disposed at the central portion of the lower supporter 260 and the main board 170 and the SMPS board 180 may overlap in position. Accordingly, an appropriate arrangement with respect to the lower supporter 260 is required so that these components do not overlap with each other.

[0287] In the embodiment, a plurality of second-1 support parts 5613 may be provided and disposed to have a considerable distance from each other. In addition, the second-1 support parts 5613 and the second-2 support parts 5614 may also be disposed to have a considerable distance from each other. Accordingly, the main board 170 and the SMPS board 180 may be disposed between the respective support parts.

[0288] For example, the main board 170 may be disposed between the plurality of second-1 support parts 5613 disposed at positions spaced apart from each other. The SMPS board 180 may be disposed between the second-1 support part 5613 and the second-2 support part 5614 disposed at positions spaced apart from each other. In another embodiment, arrangement positions of the main board 170 and the SMPS board 180 described above may be changed with each other.

[0289] Due to such a structure, the second support part 561, the main board 170, and the SMPS board 180 may be disposed at the central portion of the lower supporter 260 without overlapping with each other.

[0290] FIG. 25 is a cross-sectional view illustrating a portion of the electric range. FIG. 26 is a view enlarging a portion 26 of FIG. 25. FIG. 27 is a view enlarging a portion 27 of FIG. 25.

[0291] Referring to FIG. 26, the connection part 5614a of the second-2 support part 5614 may have a height lower than that of the insertion part 5611, and an upper end of the connection part 5614a may be provided to support at least a portion of the protruding part 4311.

[0292] An upper end of the insertion part 5611 may contact or may not contact an upper surface (ceiling) of the recessed part 4312. Even when the upper end of the insertion part 5611 does not contact the upper end of the recessed part 4312, the upper end of the connection part 5614a may contact a lower end of the protruding part 4311 to support the protruding part 4311.

[0293] Accordingly, regardless of a length by which an upper portion of the insertion part 5611 protrudes upward from the upper end of the connection part 5614a, the second support part 561 of the lower supporter 260 may stably support the first support part 431 of the upper supporter 130.

[0294] Similarly, the reinforcement part 5612 may have a height lower than that of the insertion part 5611, and an upper end of the reinforcement part 5612 may be provided to support at least a portion of the protruding part 4311.

[0295] Even when the upper end of the insertion part 5611 does not contact the upper end of the recessed part 4312, the upper end of the reinforcement part 5612 may

contact the lower end of the protruding part 4311 to support the protruding part 4311.

[0296] Accordingly, regardless of a length by which the upper portion of the insertion part 5611 protrudes upward from the upper end of the reinforcement part 5612, the second support part 561 of the lower supporter 260 may stably support the first support part 431 of the upper supporter 130. Accordingly, the reinforcement part 5612 or the connection part 5614a may stably support the first support part 431.

[0297] Meanwhile, the second-2 support part 5614 may comprise both the reinforcement part 5612 and the connection part 5614a. In such a case, heights of the reinforcement part 5612 and the connection part 5614a may be provided to be identical. Due to such a structure, the protruding part 4311 contacting upper surfaces of the reinforcement part 5612 and the connection part 5614a may not be inclined due to a difference in height between the reinforcement part 5612 and the connection part 5614a.

[0298] Accordingly, both sides of the protruding part 4311 separated by the recessed part 4312 in the second-1 support part 5613 may be stably supported while maintaining horizontality by the reinforcement part 5612 and the connection part 5614a, respectively.

[0299] In the embodiment, as the insertion part 5611 is inserted into the protruding part 4311, the first support part 431 and the second support part 561 may be stably coupled to each other.

[0300] If a wiring located between the upper supporter 130 and the lower supporter 260 is positioned at a portion where the first support part 431 and the second support part 561 are coupled, the first support part 431 and the second support part 561 cannot be completely coupled. Accordingly, an operator assembling the electric range may check whether the first support part 431 and the second support part 561 are normally coupled, thereby easily confirming whether the wiring is placed between the first support part 431 and the second support part 561 and interferes with assembly of the electric range.

[0301] Accordingly, the operator may check whether the first support part 431 and the second support part 561 are normally coupled, easily identify a position of the wiring, and adjust the position of the wiring, thereby smoothly performing an assembly operation of the electric range.

[0302] Although the present disclosure has been described above with reference to the illustrated drawings by way of example, it is apparent that the present disclosure is not limited to the embodiments and drawings disclosed in the present specification, and that various modifications may be made by a person having ordinary skill in the art within the scope of the technical idea of the present disclosure. In addition, even if the operational effects according to the configuration of the present disclosure are not explicitly described when describing the above embodiments of the present disclosure, predictable effects resulting from the configuration must also be

recognized.

Claims

1. An electric range comprising:

a case;

an upper supporter accommodated in the case;
a plurality of coil boards disposed above the upper supporter, disposed to be spaced apart from each other, and having working coils printed thereon;

a plurality of ferrite modules disposed above the upper supporter, disposed below the coil boards, and disposed at positions corresponding to each of the plurality of working coils; and
a lower supporter disposed below the upper supporter, accommodated in the case, and supporting the upper supporter,
wherein the upper supporter comprises a first support part protruding from a lower surface thereof, and the lower supporter comprises a second support part protruding from an upper surface thereof and coupled with the first support part.

2. The electric range according to claim 1, wherein the first support part comprises:

a protruding part protruding from the upper supporter; and
a recessed part formed by recessing a portion of the protruding part and having a linear shape with both sides open.

3. The electric range according to claim 2, wherein the second support part comprises:

an insertion part having an upper portion fitted into the recessed part and formed in a plate shape; and
a reinforcement part integrally formed with the insertion part and protruding from a side surface of the insertion part to reinforce rigidity of the insertion part.

4. The electric range according to claim 3, wherein the first support part comprises a plurality of first-1 support parts disposed to be spaced apart from each other, and the second support part comprises a plurality of second-1 support parts disposed to be spaced apart from each other and including the insertion part having a length corresponding to a length of the recessed part of the first-1 support part.

5. The electric range according to claim 4, wherein the

first support part comprises a first-2 support part formed to be longer in a longitudinal direction than the first-1 support part, and
the second support part comprises a second-2 support part including the insertion part having a length corresponding to a length of the recessed part of the first-2 support part.

6. The electric range according to claim 5, wherein the second-2 support part comprises:

a pair of insertion parts spaced apart from each other; and
a connection part connecting the pair of insertion parts and reinforcing rigidity of the insertion parts.

7. The electric range according to claim 6, wherein the first-2 support parts are provided as a pair respectively disposed at positions corresponding to the pair of second-2 support parts.

8. The electric range according to claim 6, wherein the connection part has a height lower than a height of the insertion part, and an upper end of the connection part is provided to support at least a portion of the protruding part.

9. The electric range according to claim 3, wherein the reinforcement part:

is provided as a plurality of reinforcement parts respectively coupled to both surfaces of the insertion part;
comprises an inclined section whose width becomes narrower toward an upper direction; and

is provided such that a width thereof is smallest at an upper end.

10. The electric range according to claim, wherein the reinforcement part has a height lower than a height of the insertion part, and an upper end of the reinforcement part is provided to support at least a portion of the protruding part.

11. The electric range according to claim 8, wherein the reinforcement part and the connection part have identical heights.

12. The electric range according to claim 5, further comprising:

a blowing fan coupled to a lower surface of the upper supporter; and
an air guide disposed below the upper supporter and having a longitudinal direction disposed parallel to an air discharge direction of the blow-

ing fan,
 wherein the second-2 support part is disposed at
 a position closer to the blowing fan than the
 second-1 support part.

5

13. The electric range according to claim 12, wherein the
 lower supporter comprises:

an air inlet formed at a position corresponding to
 the blowing fan and through which air flowing 10
 into the blowing fan passes; and
 an air outlet formed at a position corresponding
 to an outlet of the air guide and through which air
 is discharged.

15

14. The electric range according to claim 5, further com-
 prising:

a main board coupled to a lower surface of the
 upper supporter and comprising a controller 20
 configured to control the electric range; and
 an SMPS board coupled to the lower surface of
 the upper supporter and configured to supply
 electricity to the electric range,
 wherein the main board is disposed between a 25
 plurality of the second-1 support parts disposed
 at positions spaced apart from each other.

15. The electric range according to claim 14, wherein the
 SMPS board is disposed between the second-1 30
 support part and the second-2 support part disposed
 at positions spaced apart from each other.

16. The electric range according to claim 1, further com-
 prising: 35

a blowing fan coupled to a lower surface of the
 upper supporter; and
 an air guide having a longitudinal direction dis-
 posed parallel to an air discharge direction of the 40
 blowing fan,
 wherein the air guide is provided to be coupled to
 the lower supporter.

17. The electric range according to claim 1, wherein the
 case comprises: 45

a bottom plate forming a bottom surface of the
 case; and
 a side wall bent from the bottom plate to form an 50
 accommodation space for components, and

wherein the lower supporter is disposed above the
 bottom plate and comprises holes respectively
 formed at portions corresponding to an inlet hole 55
 and an outlet hole of air formed in the bottom plate.

FIG. 1

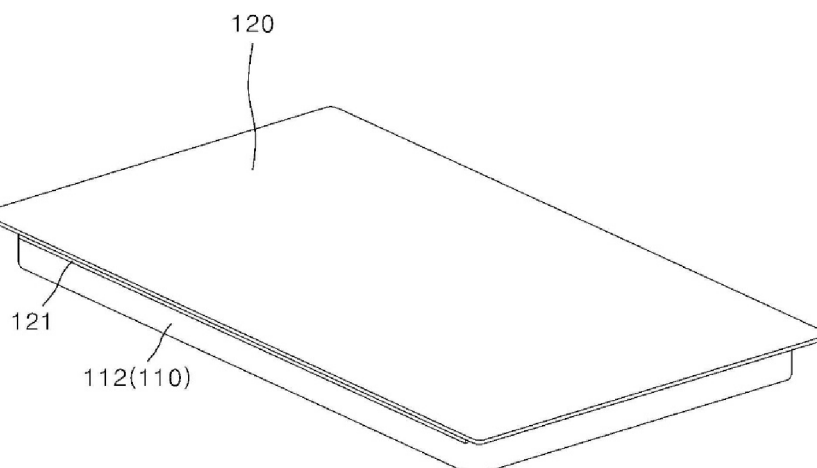


FIG. 2

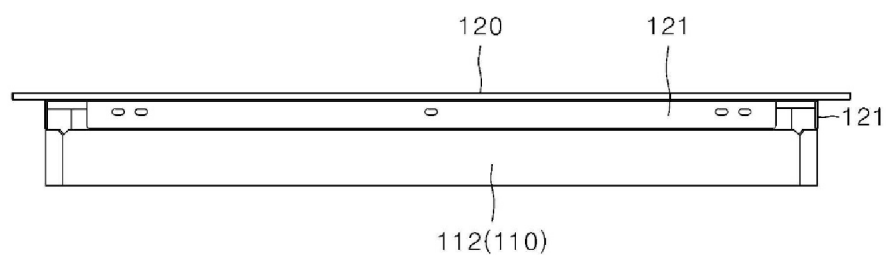


FIG. 3

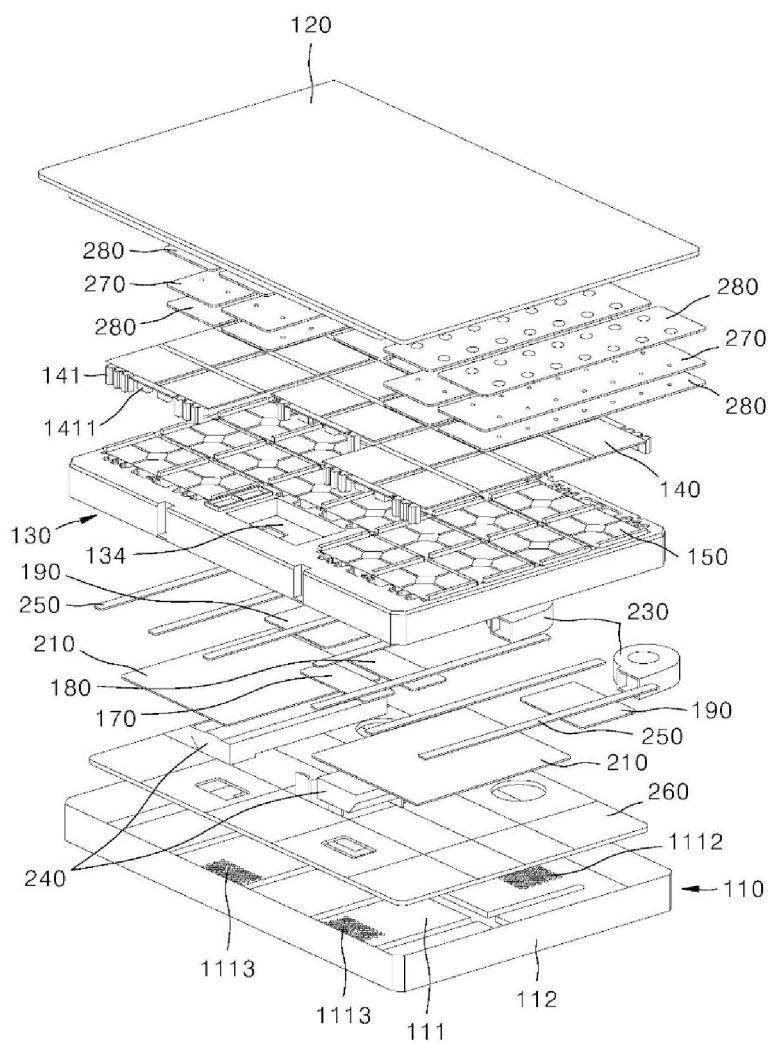


FIG. 4A

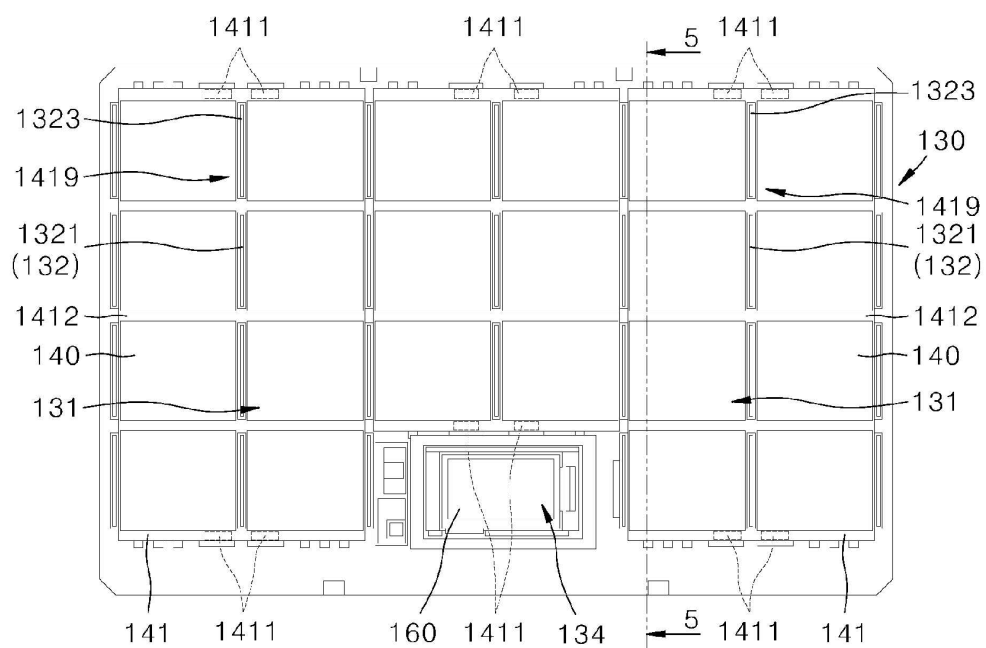


FIG. 4B

140

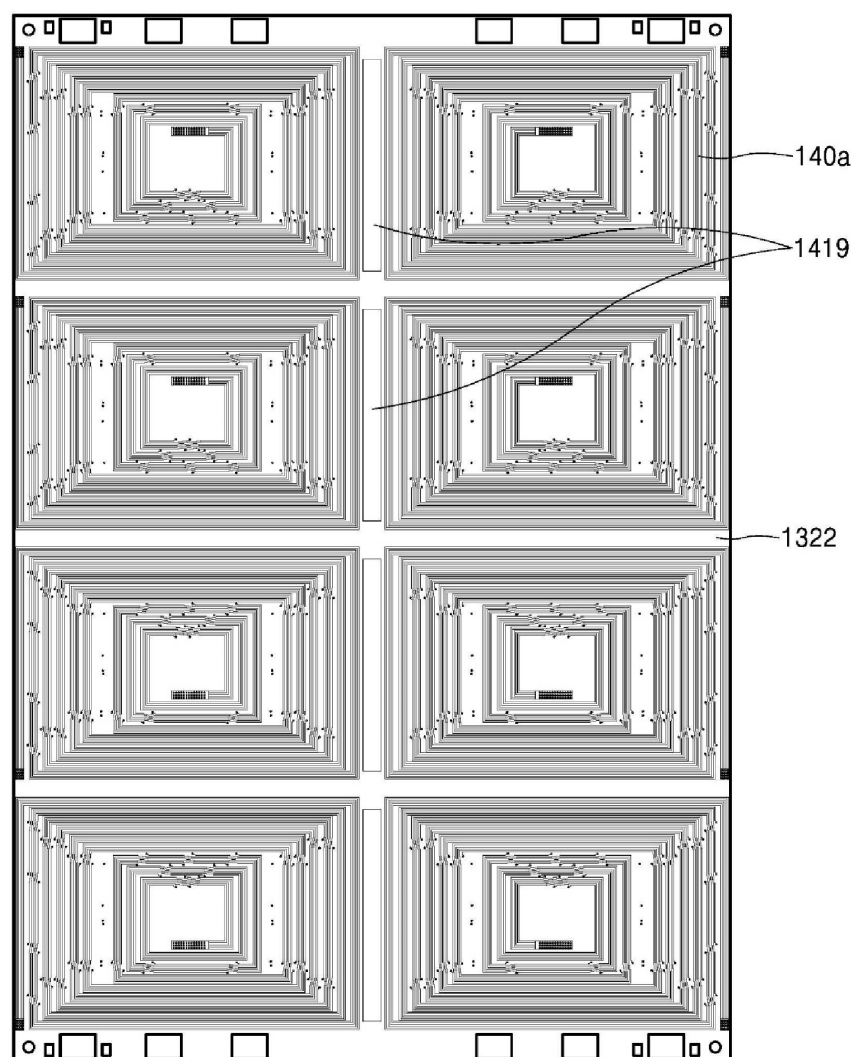


FIG. 5

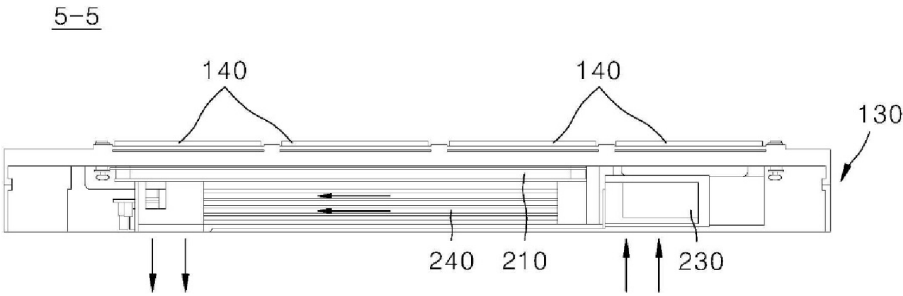


FIG. 6

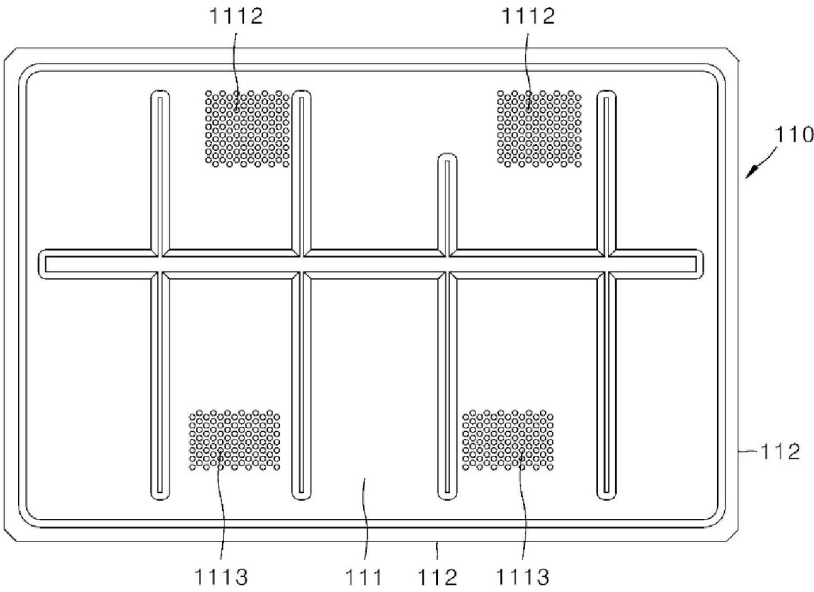


FIG. 7

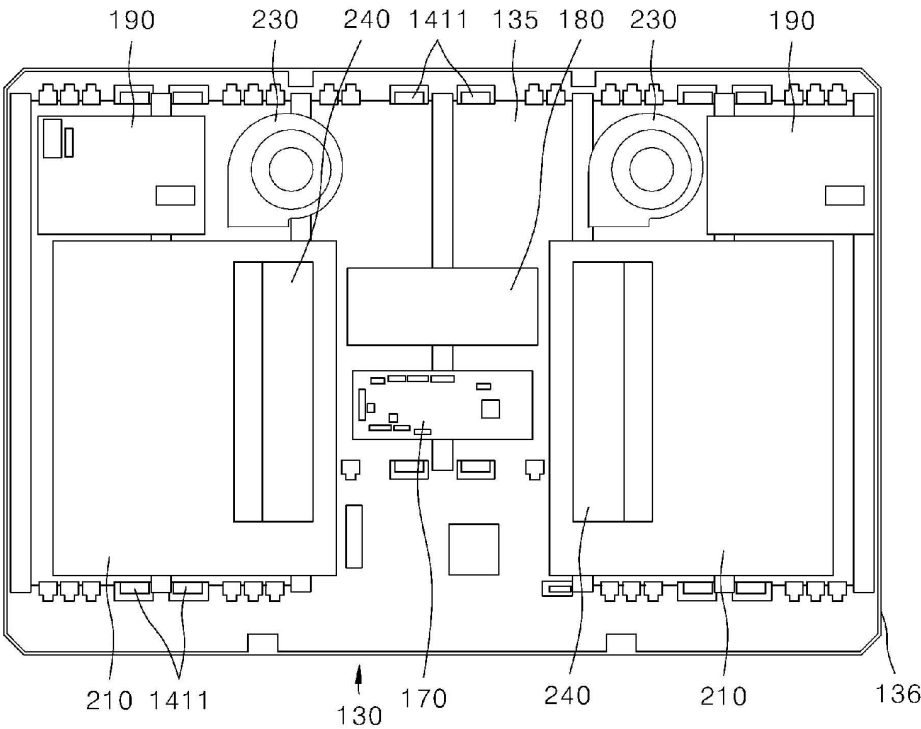


FIG. 8

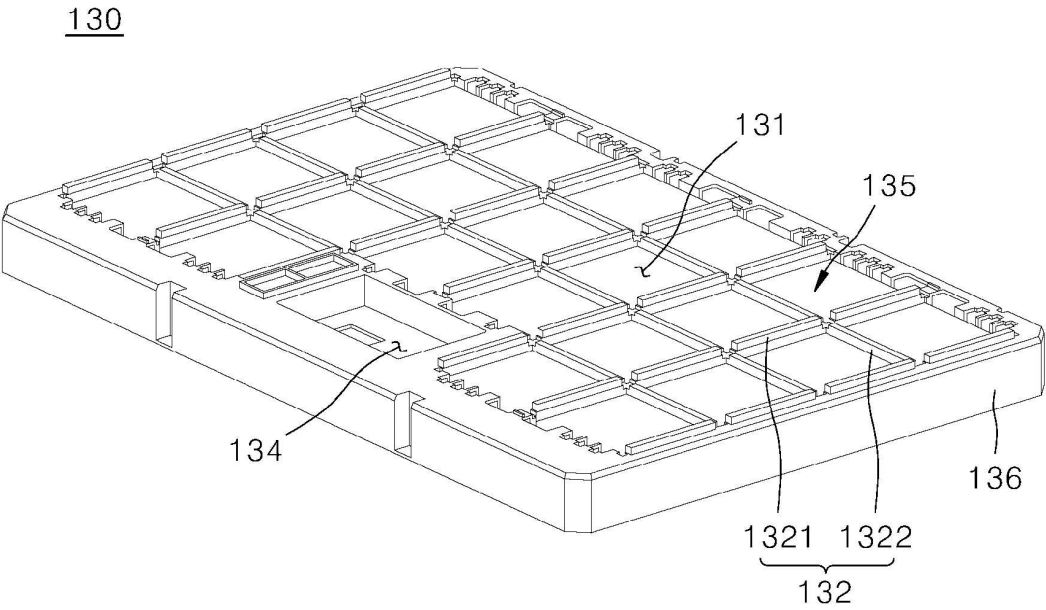


FIG. 9

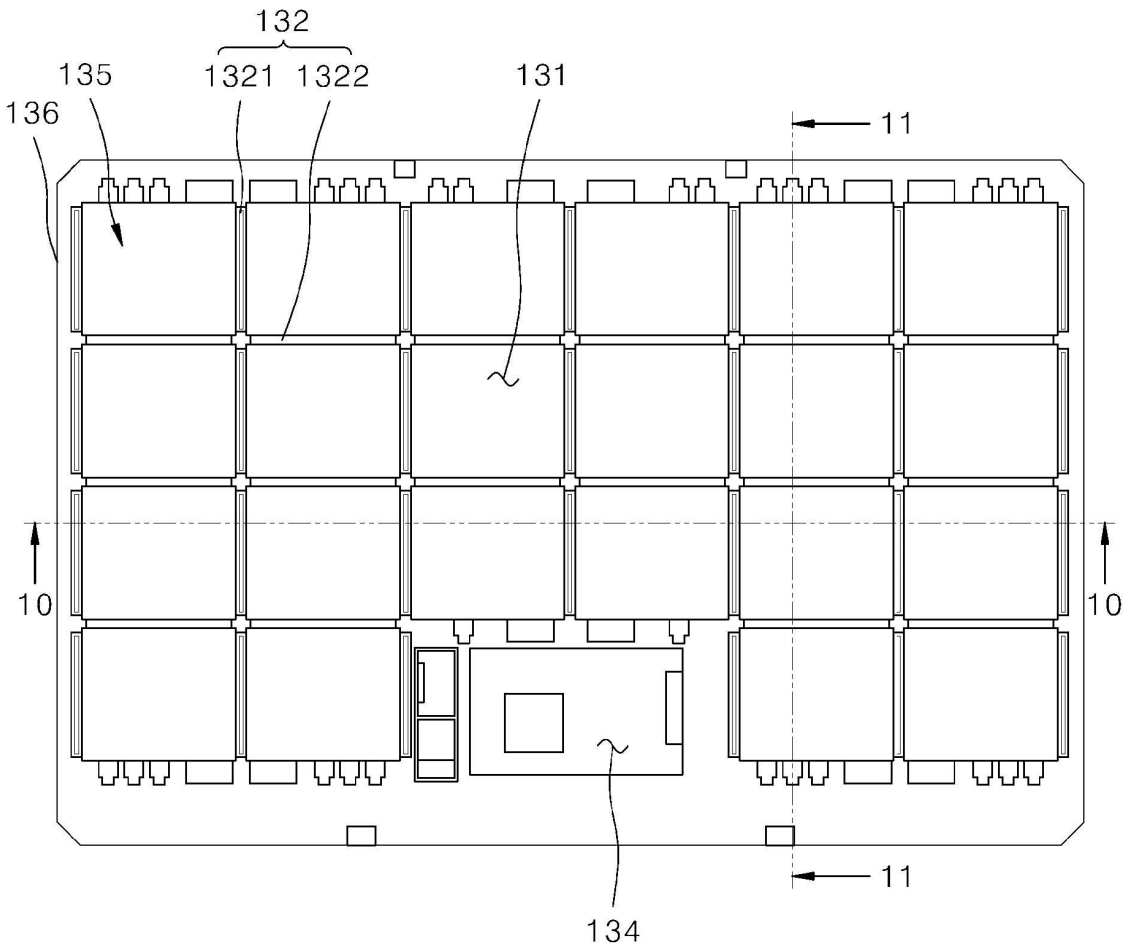


FIG. 10

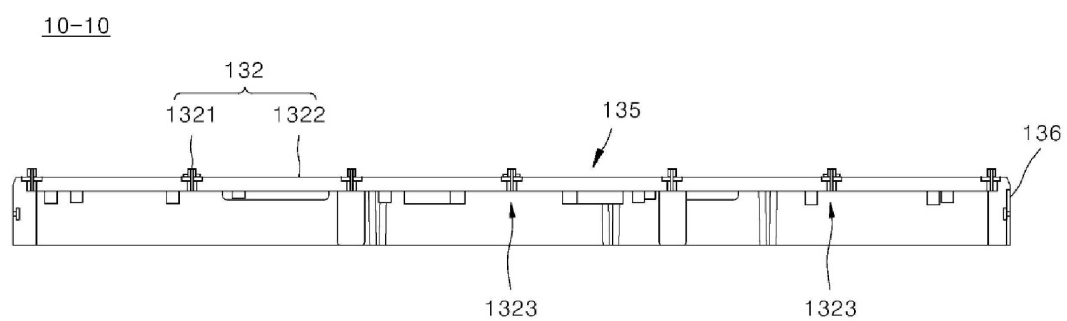


FIG. 11

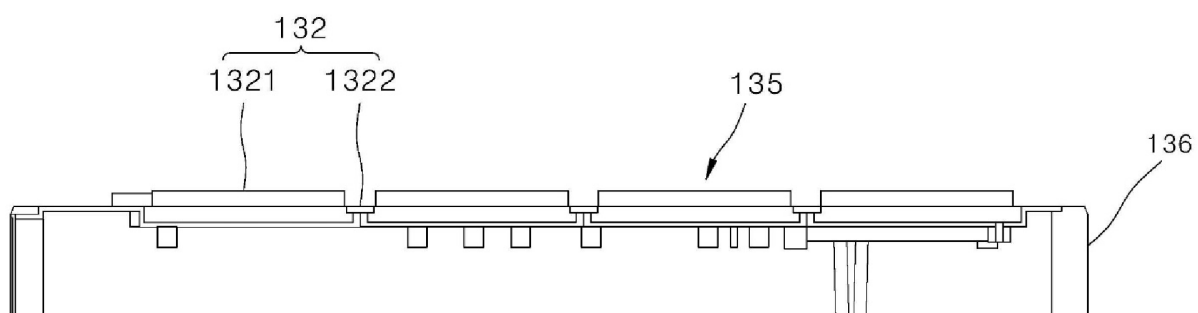


FIG. 12

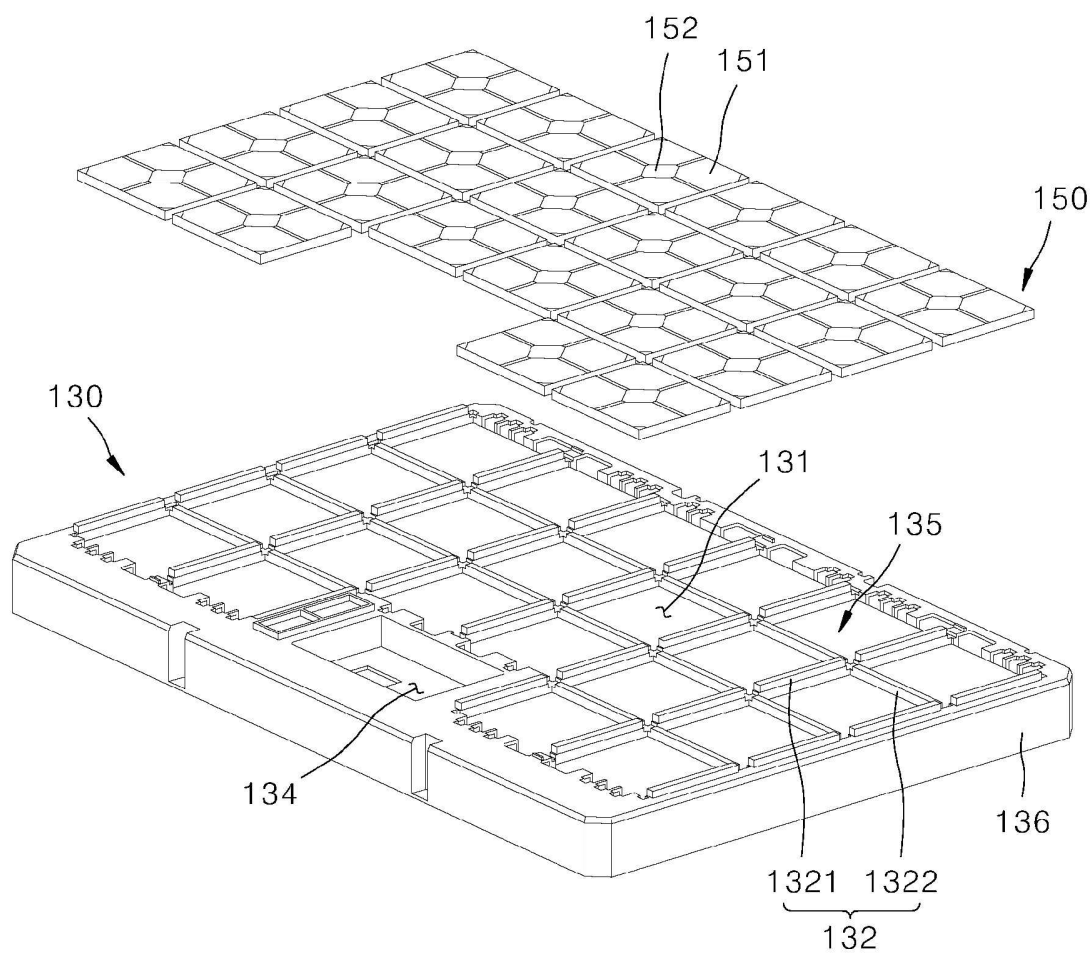


FIG. 13

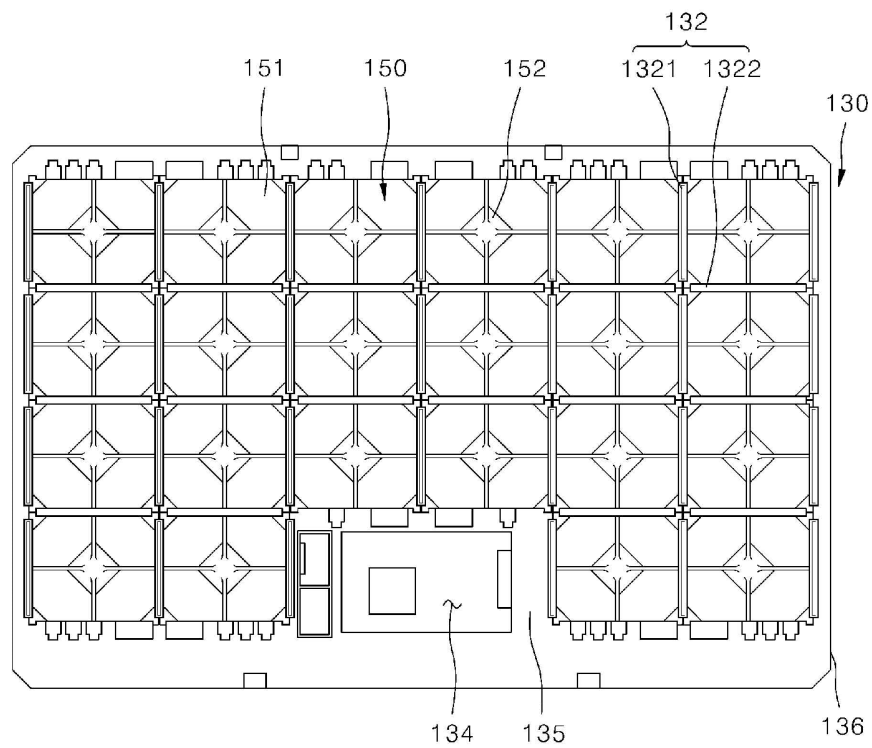


FIG. 14

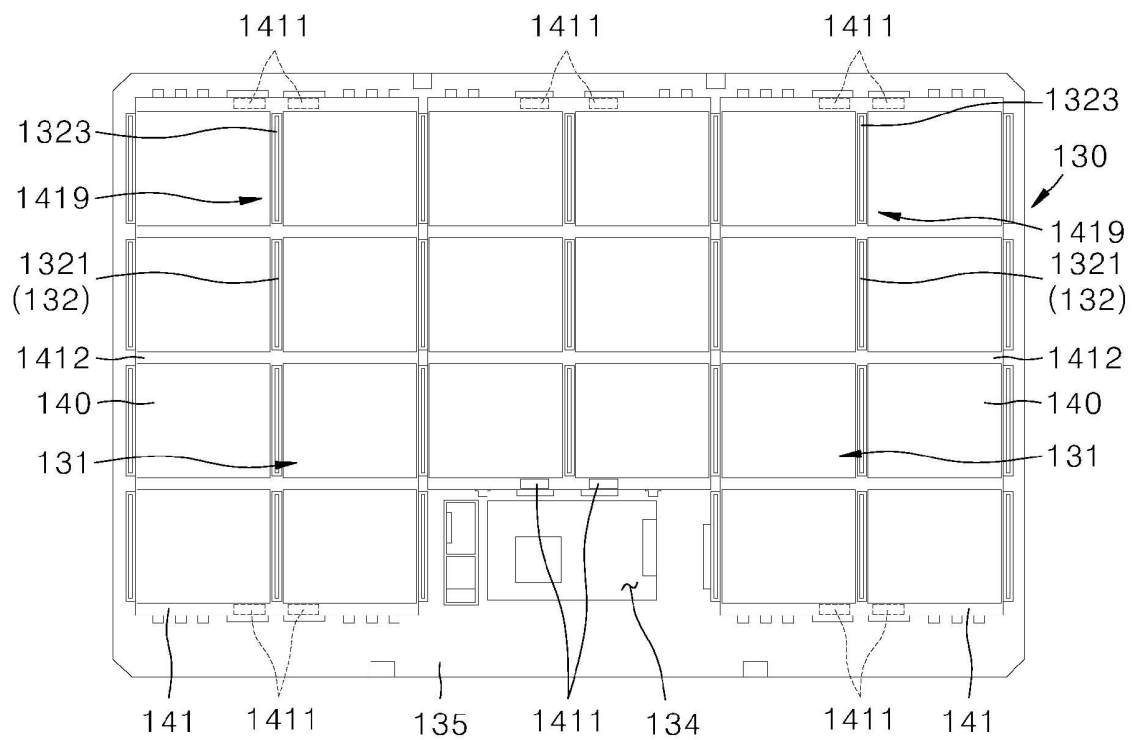


FIG. 15

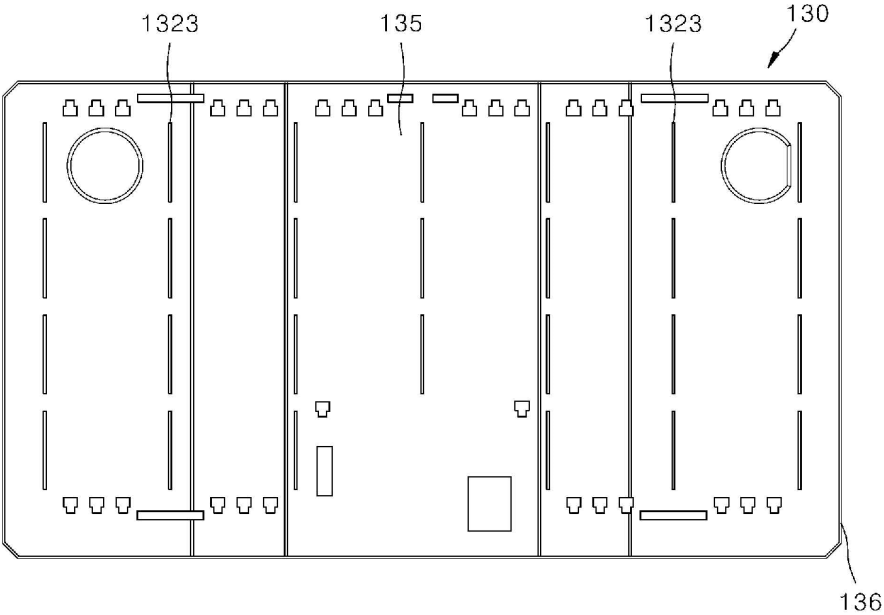


FIG. 16

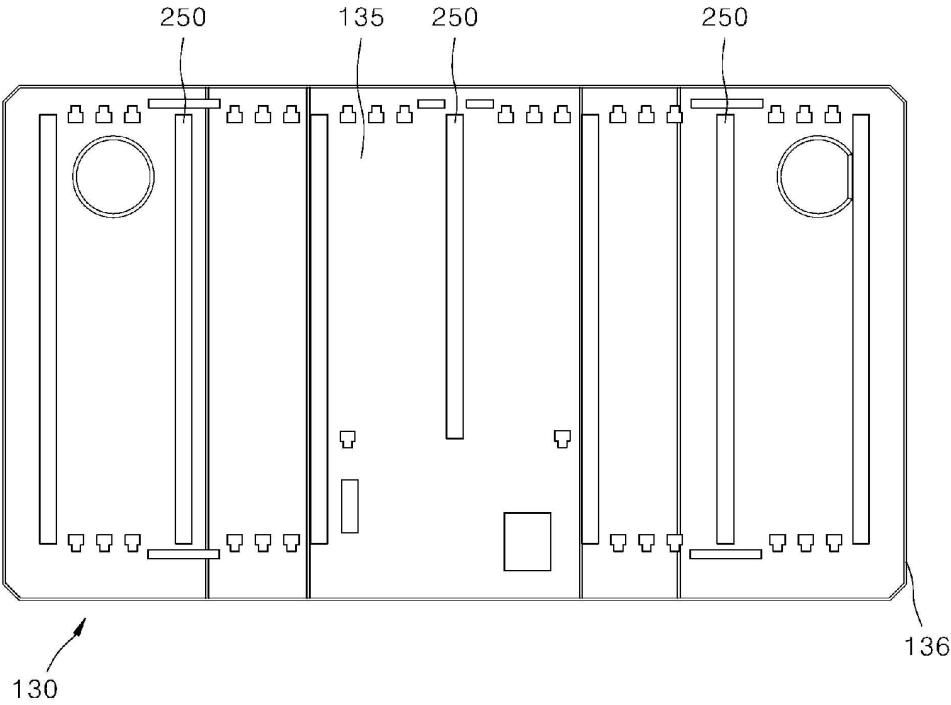


FIG. 17

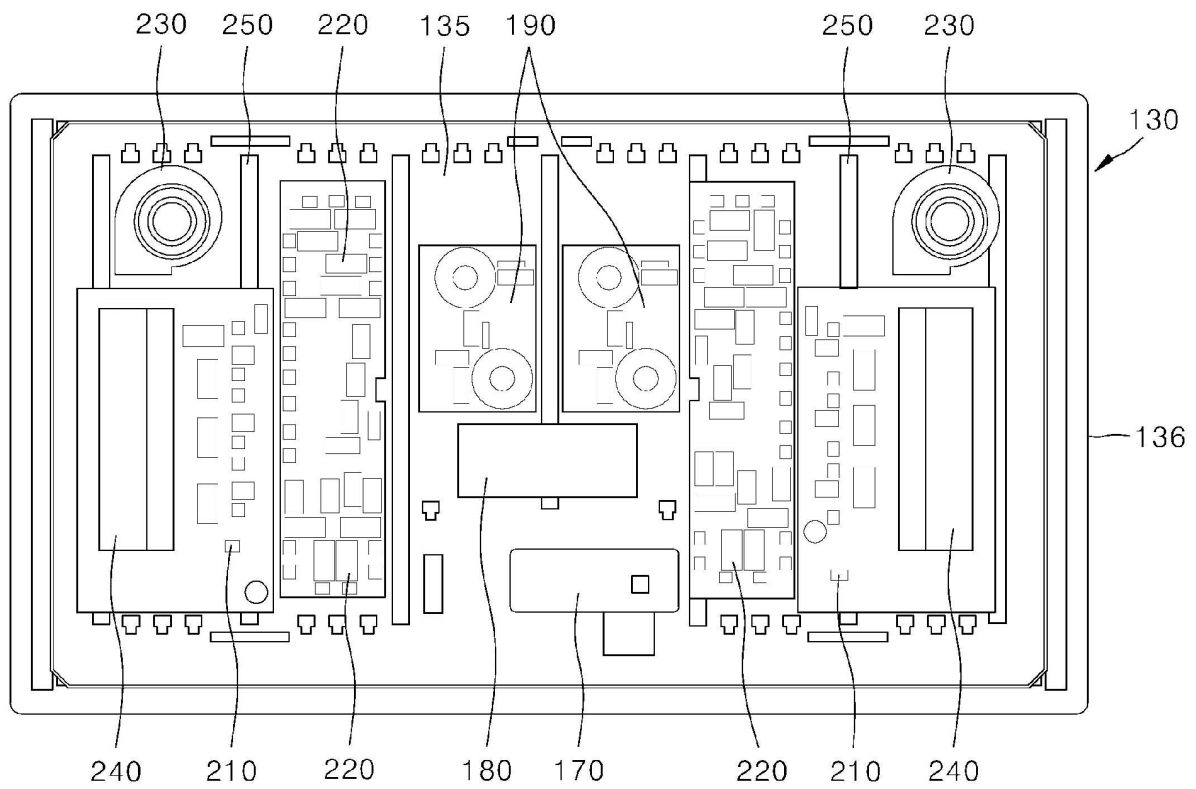


FIG. 18

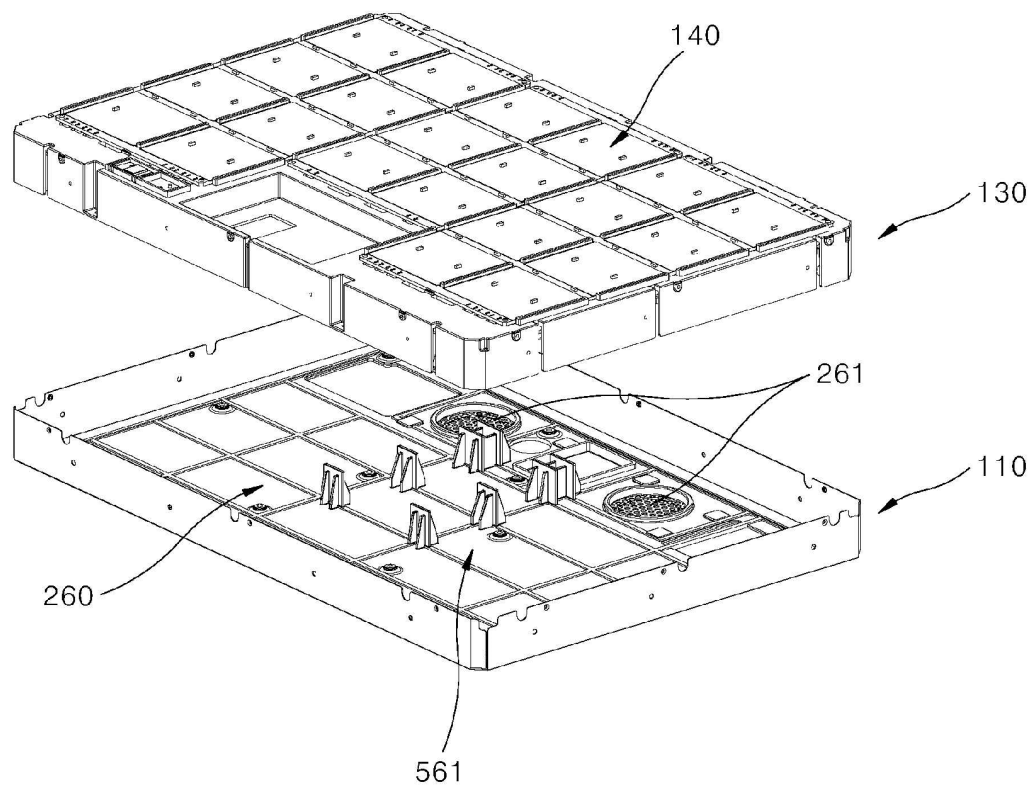


FIG. 19A

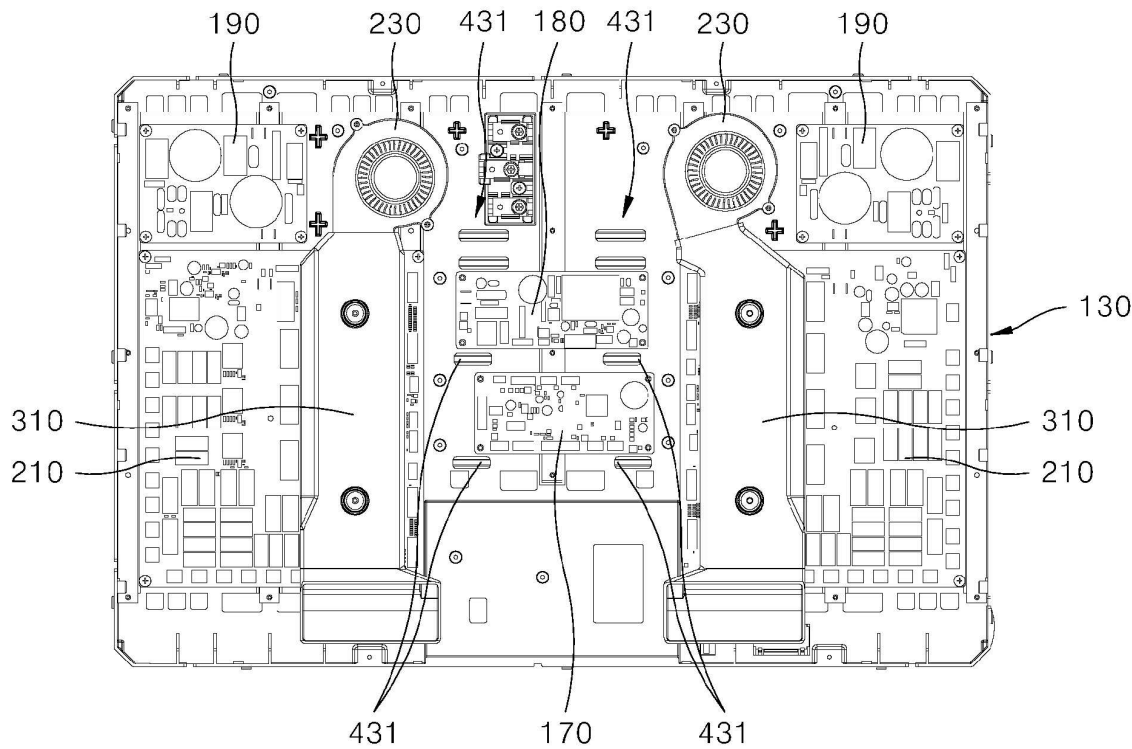


FIG. 19B

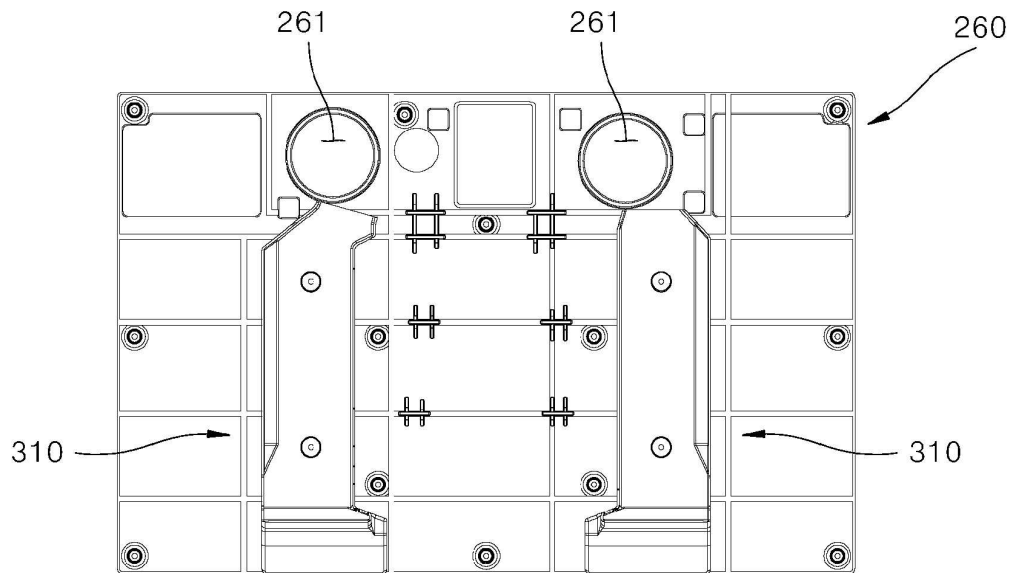


FIG. 20

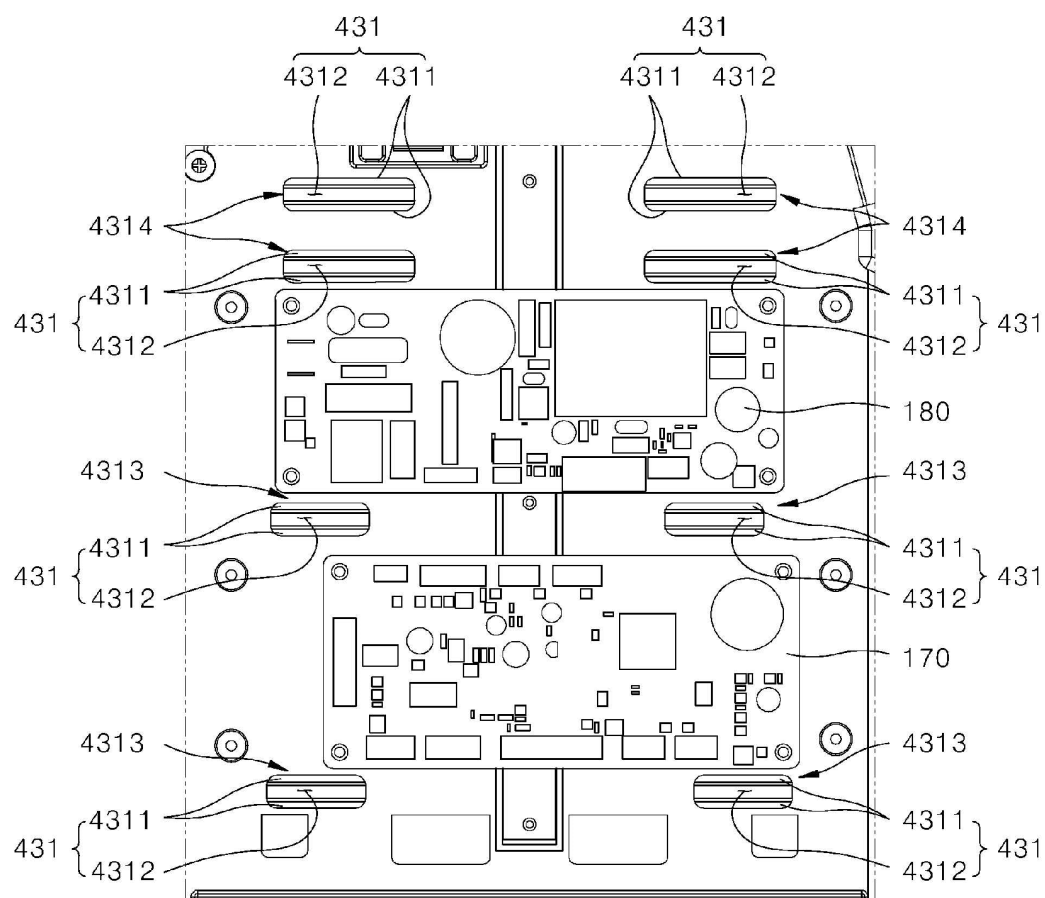


FIG. 21

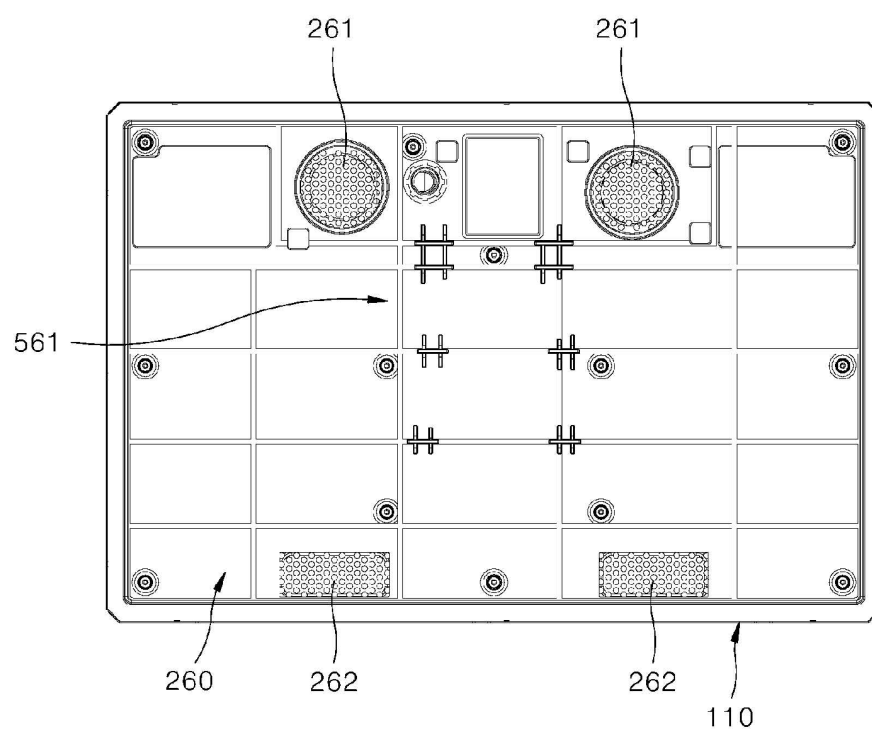


FIG. 22

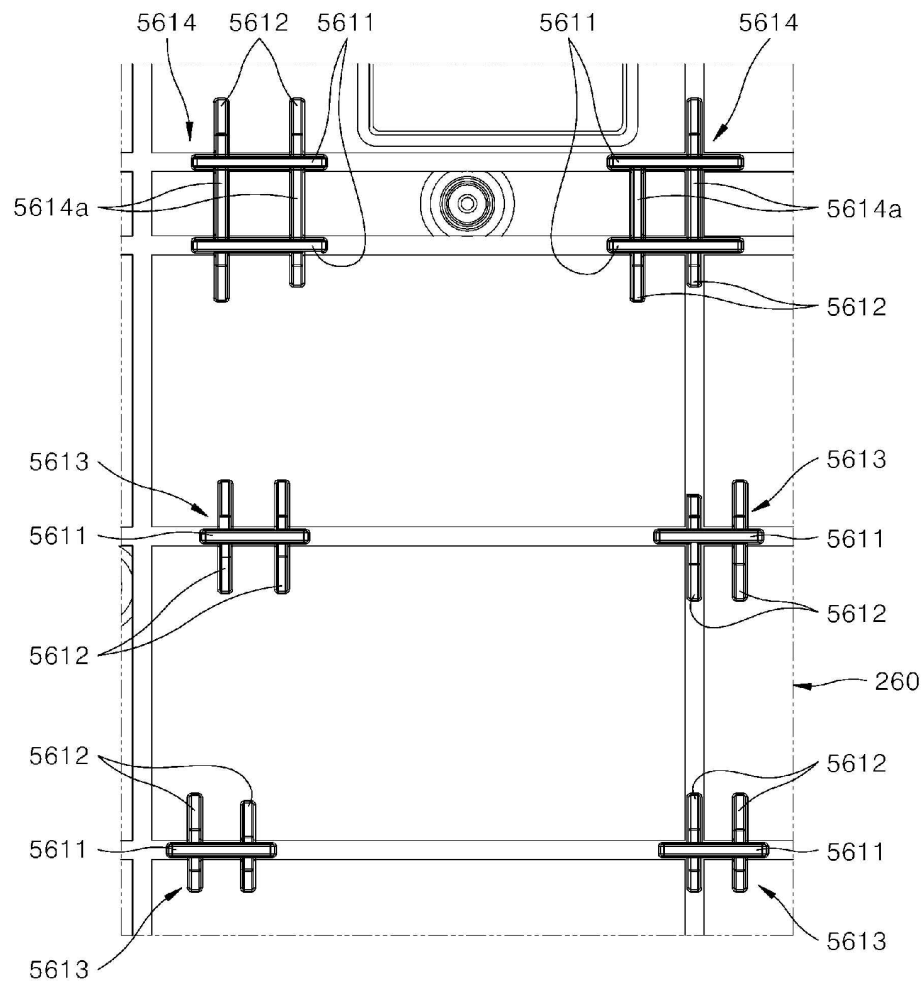


FIG. 23

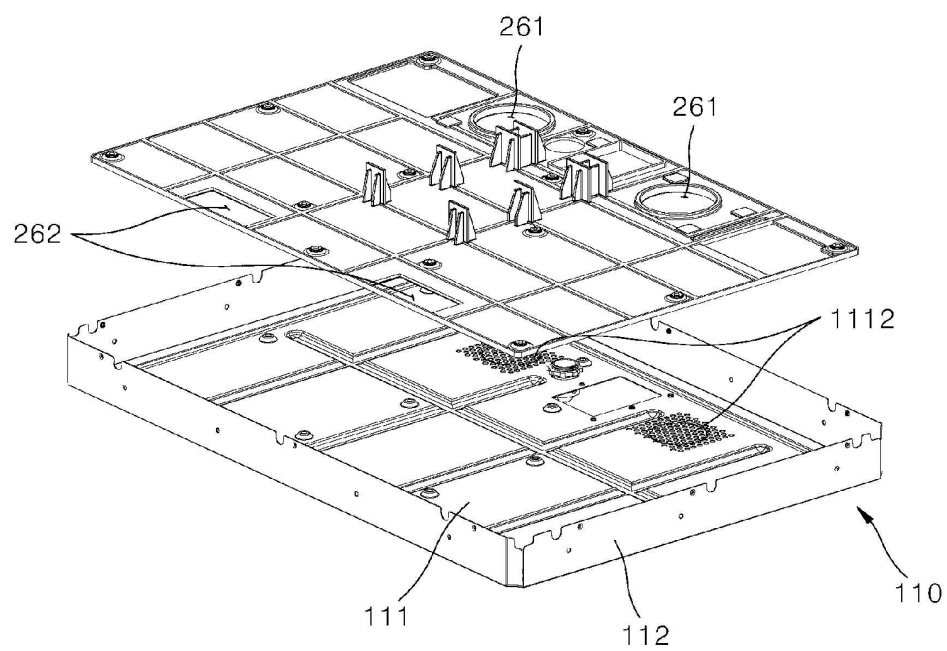


FIG. 24

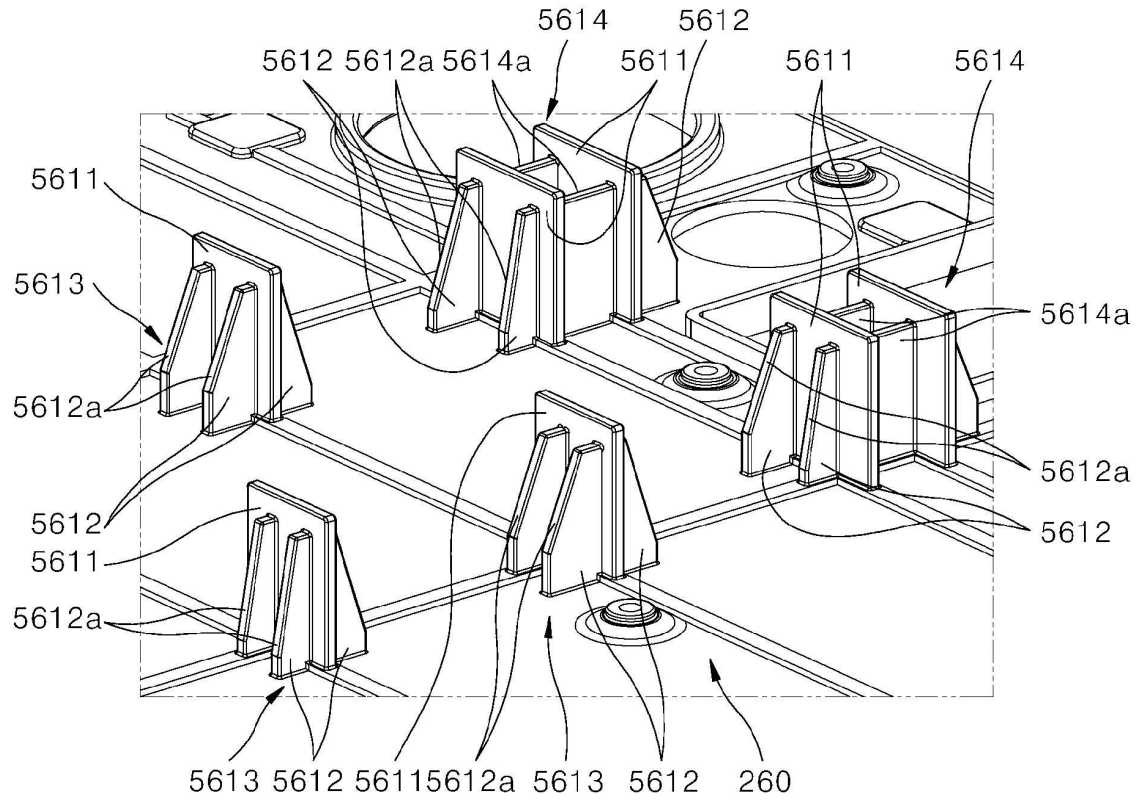


FIG. 25

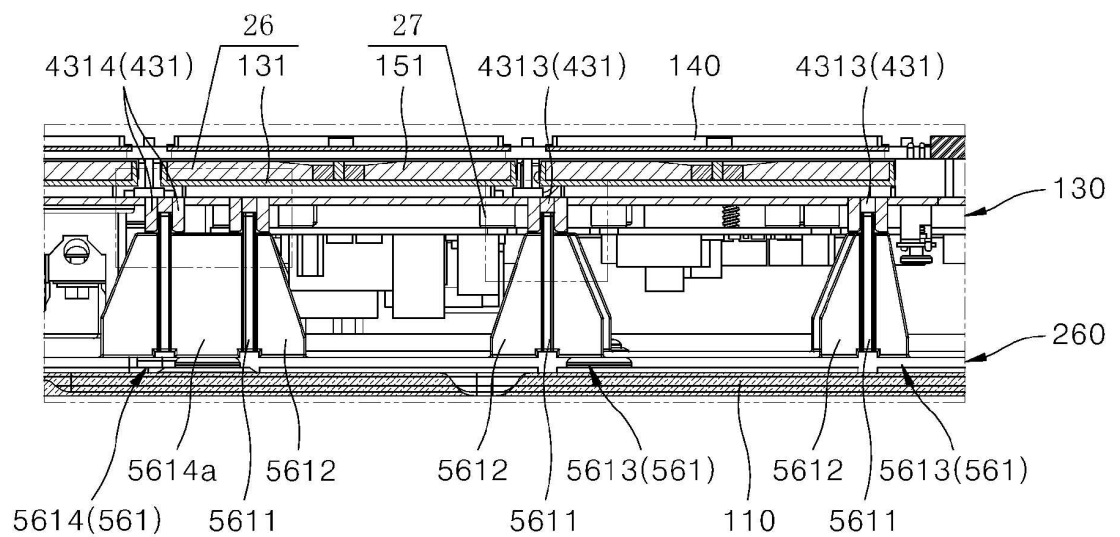


FIG. 26

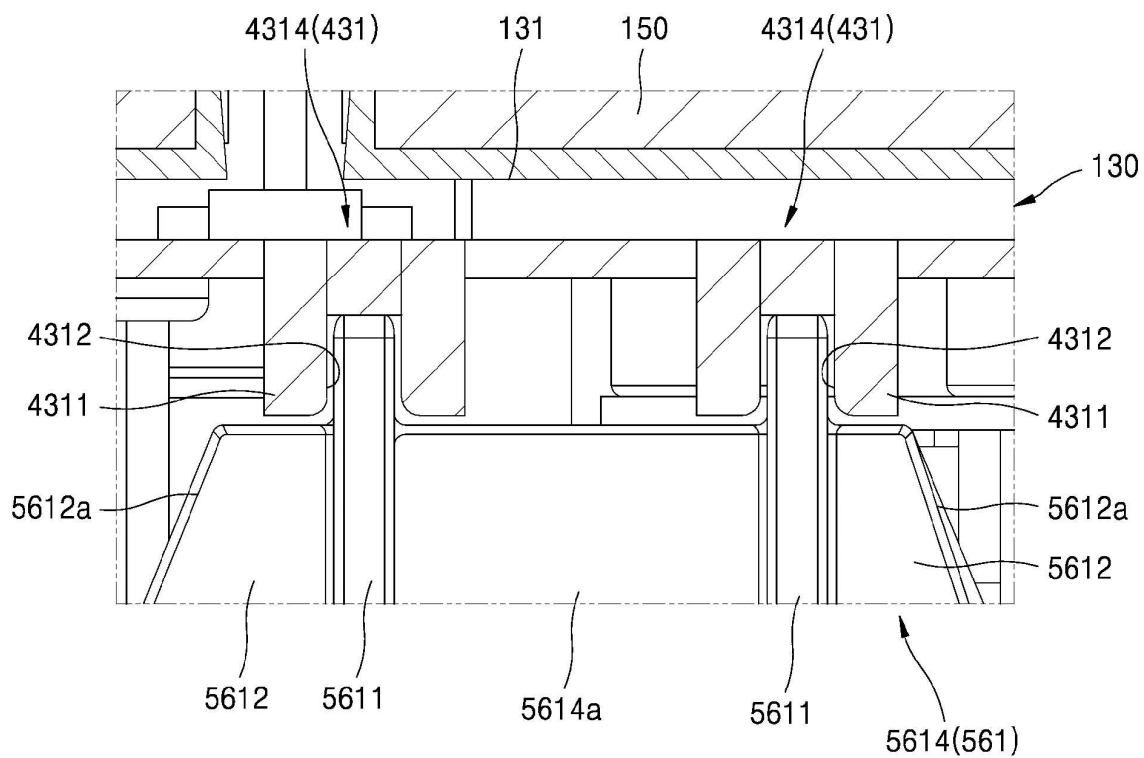
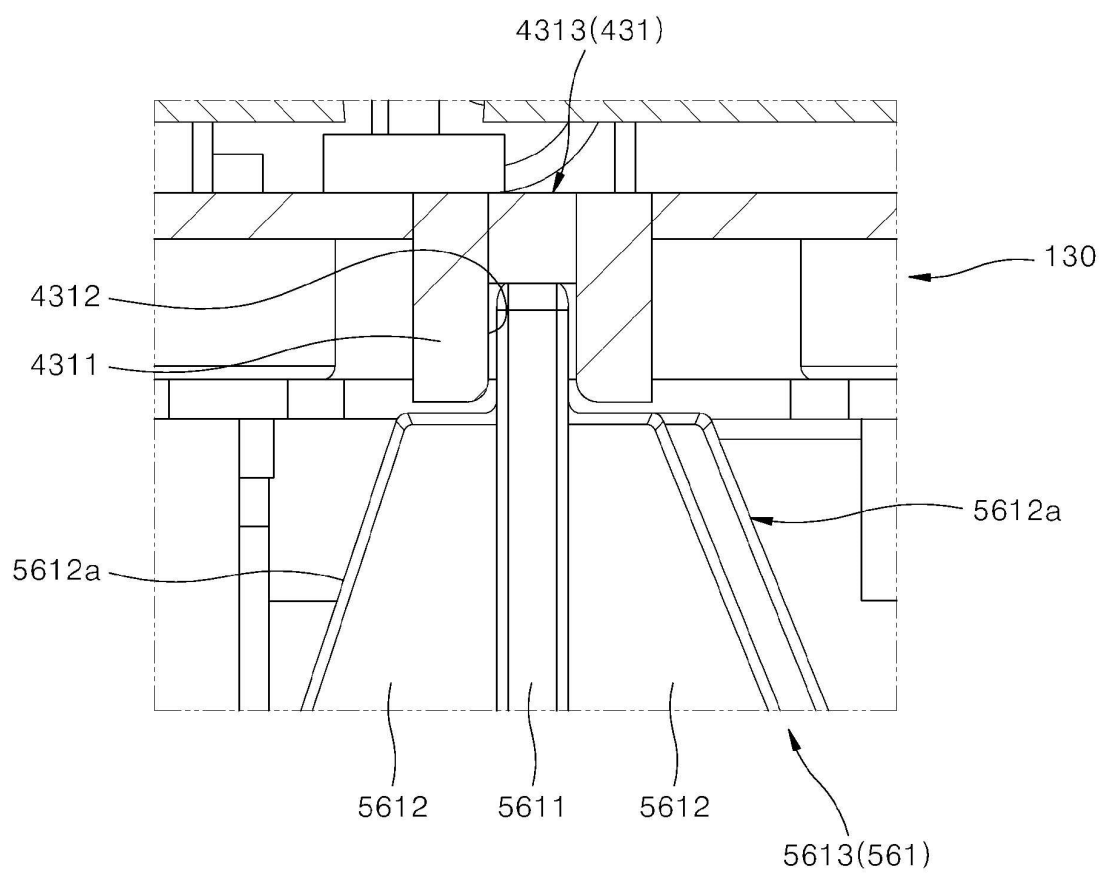


FIG. 27



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014282

A. CLASSIFICATION OF SUBJECT MATTER

H05B 6/12(2006.01)i; **F24C 15/10**(2006.01)i; **F24C 15/00**(2006.01)i; **F24C 7/08**(2006.01)i; **H05B 6/06**(2006.01)i;
F24C 15/34(2006.01)i; **F24C 3/12**(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H05B 6/12(2006.01); A47J 27/00(2006.01); A47J 36/00(2006.01); F24C 15/00(2006.01); F24C 7/08(2006.01);
H01F 38/14(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: upper supporter, working coil, ferrite module, lower supporter, protrude, combine,
dent, fit, cooker, air guide, fan, SMPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2023-0099250 A (LG ELECTRONICS INC.) 04 July 2023 (2023-07-04) See paragraphs [0053]-[0149]; claim 1; and figures 3-7.	1-3,9-10,16-17
A		4-8,11-15
Y	JP 2021-150442 A (SHIMADA PHYS & CHEM INDUSTRY CO., LTD.) 27 September 2021 (2021-09-27) See paragraphs [0018], [0226] and [0233]; claim 29; and figures 12 and 17.	1-3,9-10,16-17
Y	JP 2010-113893 A (MITSUBISHI ELECTRIC CORP. et al.) 20 May 2010 (2010-05-20) See paragraph [0011]; and figures 3 and 8.	1-3,9-10,16-17
Y	KR 10-2022-0080379 A (LG ELECTRONICS INC.) 14 June 2022 (2022-06-14) See paragraph [0186]; and figures 9-11.	2-3,9-10

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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“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

24 December 2024

Date of mailing of the international search report

24 December 2024

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014282

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 209644646 U (ZHEJIANG SHAOXING SUPOR DOMESTIC ELECTRICAL APPLIANCE CO., LTD.) 19 November 2019 (2019-11-19) See paragraph [0060]; claim 2; and figures 2-10.	3,9-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2024/014282

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
KR	10-2023-0099250	A	04 July 2023	EP	4096362	A1	30 November 2022
				EP	4350219	A1	10 April 2024
				EP	4351276	A1	10 April 2024
				KR	10-2022-0161028	A	06 December 2022
				KR	10-2023-0023222	A	17 February 2023
				US	2022-0381437	A1	01 December 2022
				US	2024-0255153	A1	01 August 2024
				US	2024-0263800	A1	08 August 2024
				WO	2022-250494	A1	01 December 2022
				WO	2022-250496	A1	01 December 2022
JP	2021-150442	A	27 September 2021	JP	7084956	B2	15 June 2022
JP	2010-113893	A	20 May 2010	JP	4964214	B2	27 June 2012
KR	10-2022-0080379	A	14 June 2022	None			
CN	209644646	U	19 November 2019	None			