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(71) Applicant: **LG ELECTRONICS INC.**
Yeongdeungpo-gu
Seoul 07336 (KR)

(72) Inventor: **YANG, Jaeyoung**
Seoul 06772 (KR)

(74) Representative: **Vossius & Partner**
Patentanwälte Rechtsanwälte mbB
Siebertstrasse 3
81675 München (DE)

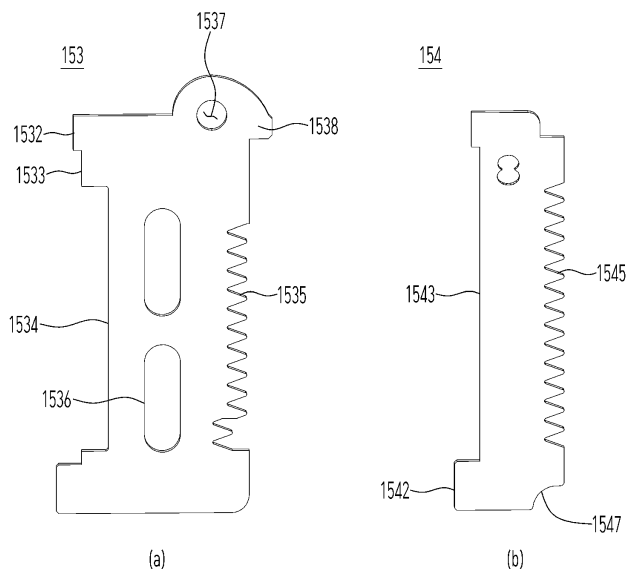
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(54) **HAIRDRYER**

(57) The present disclosure provides a hair dryer. The hair dryer includes: a cylindrical case; and a heater module housed inside the case. The heater module includes: a cylindrical heater core; a plurality of support walls radially arranged around an outer circumference of the heater core, each including a coil seating portion formed at an outer end; and a heating coil in contact with

the coil seating portion and spirally wound around an outside of the heater core. The support wall includes an air circulation hole. The hair dryer may allow air to circulate effectively within the heater module, thereby ensuring that air is discharged at a uniform temperature and intensity.

FIG. 15



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Description**TECHNICAL FIELD**

[0001] The present disclosure relates to a hair dryer.

BACKGROUND

[0002] When it is intended to remove a desired amount of moisture from hair of a human in a wet state or to style the hair to a desired shape from a current shape, a hair dryer configured to discharge gas through a gas discharge port may be used.

[0003] The hair dryer may be provided therein with a fan unit and the like configured to cause gas to flow. The hair dryer including the internal components may be designed for a user to be able to conveniently use the same in consideration of the weight thereof.

[0004] When a heater module is positioned at a head part and the temperature of a case increases due to the heat generated by the heater module, there may be a risk of burn injury and internal components such as a controller may be affected. Accordingly, there is need for a structure in which the heat generated by the heater module is fully transmitted to air passing through a passage without being transmitted to the outside or other portions.

[0005] In order to use the hair dryer without wires, the hair dryer must include a battery built therein and must assure an additional space in which the battery is mounted. There is need for a hair dryer which is additionally provided with components such as an ion generator and to which accessories are coupled for the purpose of function enhancement.

[0006] Because the hair dryer is used in the state of being gripped by a user hand, it is necessary to optimally dispose components in order to prevent the hair dryer from being overly enlarged.

DISCLOSURE**TECHNICAL PROBLEM**

[0007] The present disclosure aims to provide a hair dryer with a heater module configured to facilitate air circulation and ensure a uniform temperature within the heater module.

[0008] The case may include a cylindrical head case having open front and rear ends, wherein the head case includes a handle connection portion formed at a bottom. The hair dryer may include: a head assembly including the heater module and a handle fastening hole formed at a position corresponding to the handle connection portion, wherein the head assembly is inserted from a rear of the head case to a front of the head case; and a handle frame fastening the head assembly inside the head case, wherein an upper end of the handle frame is inserted into the handle connection portion and the handle fastening

hole. The handle fastening hole may include a straight section. The upper end of the handle frame may include a straight section corresponding to the straight section of the handle fastening hole.

[0009] The hair dryer may include: a coupling rib formed inside the head case; a rib guide formed on the head assembly at a position corresponding to the coupling rib; and a rib groove formed at an end of the rib guide in a circumferential direction. The coupling rib may be configured to move along the rib guide to be fastened in the rib groove such that the head case and the head assembly are fixed. Based on that the coupling rib is inserted into the coupling groove, the handle connection portion and the fastening hole may be overlapped.

[0010] The head assembly may include: a head frame including a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and a board module positioned at a rear of the heater module and fastened to the head frame. The handle fastening hole may be positioned between the heater module and the board module.

[0011] The case may include a cylindrical head case having open front and rear ends. The hair dryer may include a head assembly including the heater module, wherein the head assembly is inserted from a rear of the head case to a front of the head case. The head assembly may include: a head frame including a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and a board module positioned at a rear of the heater module and fastened to the head frame.

[0012] The board module may include: a first head board; a second head board positioned at a front of the first head board; a middle board frame positioned between the first head board and the second head board; an elastic wire cap inserted into a connection hole of the middle board frame and including a wire hole; and a connector wire passing through the wire cap and connecting the first head board and the second head board.

[0013] The wire cap may include: a cap body positioned around an inner circumference of the connection hole, wherein the wire hole is formed in a center of the cap body; a first locking portion extending from the cap body and positioned on a first side of the middle board frame; and a second locking portion extending from the cap body and positioned on a second side of the middle board frame. The second locking portion may include an inclined surface.

[0014] The hair dryer may include a cutout extending from the wire hole to a side of the wire cap.

TECHNICAL SOLUTION

[0015] The present disclosure provides a hair dryer. The hair dryer includes: a cylindrical case; and a heater module housed inside the case. The heater module includes: a cylindrical heater core; a plurality of support walls radially arranged around an outer circumference of

the heater core, each including a coil seating portion formed at an outer end; and a heating coil in contact with the coil seating portion and spirally wound around an outside of the heater core. The support wall includes an air circulation hole.

[0016] The support walls may include a plurality of first support walls, each including a first coil seating portion formed at an outer end and a coil groove formed at an inner end. The coil may include: an outer coil in contact with the first coil seating portion and spirally wound around the outside of the heater core; and an inner coil passing through the coil groove and the heater core and positioned between the outer coil and the heater core.

[0017] The hair dryer may further include a plurality of second support walls arranged between the plurality of first support walls, each having a shorter radial length than the first support wall. Each of the plurality of second support walls may include a second coil seating portion at an outer end, wherein the inner coil is seated in the second coil seating portion.

[0018] The hair dryer may include a head frame including an air discharge guide at a front. The air discharge guide has a curved surface narrowing towards the front, and the heater module is housed inside the head frame. The second support wall may include an air cutout formed at a front outer edge thereof and having a shape corresponding to the curved surface of the air discharge guide.

[0019] The air circulation hole may be formed in the first support wall, and the second coil seating portion of the second support wall and the heater module may be positioned at a same distance from a center.

[0020] The air circulation hole may be positioned between the coil groove and the first coil seating portion.

[0021] The air circulation hole may extend in a direction parallel to an axial direction of the heater core.

[0022] The coil seating portion may have a serrated shape.

[0023] The hair dryer may include a cylindrical outer insulation housing surrounding an outer circumference of the support wall. The support wall may include a stopper protrusion positioned on one axial side.

[0024] The heater core may include: wall fixing grooves positioned both axial ends; and a cylindrical inner insulation housing positioned between the wall fixing grooves.

[0025] The hair dryer may further include an ionizer located inside the heater core and configured to generate negative ions.

[0026] The hair dryer may include: a temperature sensor fixed to a front end of the support wall; and a sensor wire connected to the temperature sensor, passing through the heater core, and extending to a rear end of the heater core.

[0027] The heating coil may be connected to at least one of a bimetal or a fuse.

[0028] The hair dryer may include: a head board positioned inside the case; a heater terminal connected to an end of the heating coil and including a terminal hole; and a

heater connector extending from the head board, wherein the heater terminal is inserted into the heater connector. The heater connector may include: a pair of fastening rails into which sides of the heater terminal are inserted; and a hook positioned between the pair of fastening rails and inserted into the terminal hole.

[0029] The case may include a cylindrical head case having open front and rear ends, wherein the head case includes a handle connection portion formed at a bottom.

The hair dryer may include: a head assembly including the heater module and a handle fastening hole formed at a position corresponding to the handle connection portion, wherein the head assembly is inserted from a rear of the head case to a front of the head case; and a handle frame fastening the head assembly inside the head case, wherein an upper end of the handle frame is inserted into the handle connection portion and the handle fastening hole. The handle fastening hole may include a straight section. The upper end of the handle frame may include a straight section corresponding to the straight section of the handle fastening hole.

[0030] The hair dryer may include: a coupling rib formed inside the head case; a rib guide formed on the head assembly at a position corresponding to the coupling rib; and a rib groove formed at an end of the rib guide in a circumferential direction. The coupling rib may be configured to move along the rib guide to be fastened in the rib groove such that the head case and the head assembly are fixed. Based on that the coupling rib is inserted into the coupling groove, the handle connection portion and the fastening hole may be overlapped.

[0031] The head assembly may include: a head frame including a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and a board module positioned at a rear of the heater module and fastened to the head frame. The handle fastening hole may be positioned between the heater module and the board module.

[0032] The case may include a cylindrical head case having open front and rear ends. The hair dryer may include a head assembly including the heater module, wherein the head assembly is inserted from a rear of the head case to a front of the head case. The head assembly may include: a head frame including a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and a board module positioned at a rear of the heater module and fastened to the head frame.

[0033] The board module may include: a first head board; a second head board positioned at a front of the first head board; a middle board frame positioned between the first head board and the second head board; an elastic wire cap inserted into a connection hole of the middle board frame and including a wire hole; and a connector wire passing through the wire cap and connecting the first head board and the second head board.

[0034] The wire cap may include: a cap body positioned around an inner circumference of the connection

hole, wherein the wire hole is formed in a center of the cap body; a first locking portion extending from the cap body and positioned on a first side of the middle board frame; and a second locking portion extending from the cap body and positioned on a second side of the middle board frame. The second locking portion may include an inclined surface.

[0035] The hair dryer may include a cutout extending from the wire hole to a side of the wire cap.

ADVANTAGEOUS EFFECTS

[0036] The hair dryer of the present disclosure may allow a head portion to be fastened based on an overlapping structure without screws exposed to the outside.

[0037] In addition, the hair dryer of the present disclosure may prevent air leakage by placing a sealing ring and a middle board frame in the head portion.

[0038] Further, the hair dryer of the present disclosure may efficiently arrange a head board, which is stacked in multiple layers, within a limited space.

[0039] Additionally, the hair dryer of the present disclosure may allow air to circulate effectively within a heater module, thereby ensuring that air is discharged at a uniform temperature and intensity.

[0040] Effects obtainable from the present disclosure are not limited by the above mentioned effects, and other unmentioned effects can be clearly understood from the above description by those having ordinary skill in the technical field to which the present disclosure pertains.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041]

FIG. 1 is a front perspective view of a hair dryer according to an embodiment of the present disclosure.

FIG. 2 is a rear perspective view of the hair dryer according to an embodiment of the present disclosure.

FIG. 3 is a cross-sectional view illustrating the interior of the hair dryer according to an embodiment of the present disclosure.

FIG. 4 is a view illustrating a state in which a nozzle module of the hair dryer is combined according to an embodiment of the present disclosure.

FIG. 5 is a view illustrating a method of assembling a head portion of the hair dryer according to an embodiment of the present disclosure.

FIG. 6 is an exploded perspective view of a head assembly of the hair dryer according to an embodiment of the present disclosure.

FIGS. 7 and 8 are cross-sectional views illustrating a connection portion between the head portion and a handle portion of the hair dryer according to an embodiment of the present disclosure.

FIG. 9 is a cross-sectional view illustrating a board

module of the hair dryer according to an embodiment of the present disclosure.

FIG. 10 is an exploded perspective view illustrating the board module of the hair dryer according to an embodiment of the present disclosure.

FIG. 11 is a cross-sectional view illustrating a wire cap and a connector wire of the hair dryer according to an embodiment of the present disclosure.

FIG. 12 is a perspective view of the wire cap of the hair dryer according to an embodiment of the present disclosure.

FIG. 13 is a rear perspective view illustrating a heater module of the hair dryer according to an embodiment of the present disclosure.

FIG. 14 is a rear view illustrating the heater module of the hair dryer according to an embodiment of the present disclosure.

FIG. 15 is a view illustrating a support wall of the heater module of the hair dryer according to an embodiment of the present disclosure.

FIGS. 16 to 20 are views illustrating a process of assembling the heater module of the hair dryer according to an embodiment of the present disclosure.

FIG. 21 is a view illustrating a heater terminal and a heater cable of the hair dryer according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0042] Hereinafter, an embodiment of the present disclosure will be described in detail with reference to the accompanying drawings to be easily implemented by those skilled in the art to which the present disclosure belongs.

[0043] However, the present disclosure may be implemented in many different forms and is not limited to embodiments described herein. In addition, in order to clearly describe the present disclosure, components irrelevant to the description are omitted, and like reference numerals are assigned to similar components throughout the specification.

[0044] In this specification, duplicate descriptions of the same components are omitted.

[0045] Further, in this specification, it will be understood that when a component is referred to as being "connected with" another component, the component may be directly connected with the other component or intervening components may also be present. In contrast, it will be understood that when a component is referred to as being "directly connected with" another component in this specification, there are no intervening components present.

[0046] Further, in this specification, the terminology used herein is for the purpose of describing a specific embodiment only and is not intended to be limiting of the present disclosure.

[0047] Further, in this specification, the singular forms "a" and "an" are intended to include the plural forms as

well, unless the context clearly indicates otherwise.

[0048] Further, in this specification, it will be further understood that the terms "comprises," "comprising," "includes," and "including" specify the presence of the certain features, numbers, steps, operations, elements, and parts or combinations thereof, but do not preclude the presence or addition of one or more other features, numbers, steps, operations, elements, and parts or combinations thereof.

[0049] Further, in this specification, the term 'and/or' includes a combination of a plurality of listed items or one of the plurality of listed items. In this specification, 'A or B' may include 'A,' 'B,' or 'both A and B.'

[0050] The present disclosure relates to a portable device capable of being used handheld by a user and, more particularly, to an electronic device that is small in size and designed to be used handheld by a user. Since the portable device is not used in a stationary position but rather is held and used directly by the user, the portable device needs to be lightweight, and the grip comfort of a handle 102 is important. Additionally, because the portable device is prone to contamination from external substances, a waterproof feature may be necessary.

[0051] The portable device of the present disclosure relates to beauty devices. For example, the portable device relates to a hair dryer 100. While the present disclosure is described based on the hair dryer 100, the present disclosure is not limited thereto. Portable devices such as handheld skincare devices or body care devices may also be included in the scope of the present disclosure.

[0052] FIG. 1 is a front perspective view of the hair dryer 100 according to an embodiment of the present disclosure. FIG. 2 is a rear perspective view of the hair dryer 100 according to an embodiment of the present disclosure. FIG. 3 is a cross-sectional view of the hair dryer 100 according to an embodiment of the present disclosure, taken along line A-A of FIG. 2.

[0053] In the drawings, the x-axis represents the left-right direction, the y-axis represents the front-back direction, and the z-axis represents the up-down direction. When viewed from the front, +x is to the right when viewed from the front, -x is to the left. Further, +y is forward, -y is backward, +z is upward, and -z is downward.

[0054] The hair dryer 100 according to an embodiment of the present disclosure includes a main body including a head portion 101 and a handle portion 102. The handle portion 102 includes an air inlet 104 through which air is drawn from the outside at the bottom thereof, and the head portion 101 includes an air outlet 103 through which air is discharged.

[0055] The interior of the main body 101 and 102 of the hair dryer 100 includes an air flow path extending from the air inlet 104 to the air outlet 103. The air flow path of the present disclosure is not a straight path. Specifically, the air flow path moves vertically at the handle portion 102 and then bends horizontally at the head portion 101.

[0056] The air inlet 104 may be located at the bottom of the handle portion 102, and the air outlet 103 may be located at the front of the head portion 101. The handle portion 102 and the head portion 101 have shapes corresponding to the direction in which the air flow path extends. For usability, the handle portion 102 may extend in a direction slightly tilted forward from the vertical direction with respect to the head portion 101.

[0057] The handle portion 102 may be formed as a cylinder with a diameter that capable of being gripped by the user, and the head portion 101 may be formed as a cylinder with a larger diameter than the handle portion 102. The diameter of the handle portion 102 may be uniform from the bottom to the top, but the head portion 101 may have a slightly smaller diameter at the front to guide air towards the air outlet 103.

[0058] The air inlet 104 may include air intake holes 1283 formed around the circumference of the handle portion 102 and a filter 1293 to prevent the ingress of other foreign substances such as dust. A filter frame on which the filter 1293 is fixed may be located at the bottom of the handle portion 102 to form the air inlet 104.

[0059] The filter 1293 is made of a different material from cases 111 and 121 forming the exterior of the hair dryer 100. Since the filter 1293 is a thin film component, the filter 1293 may be damaged by external impacts. Therefore, a filter cover 128 may be further included to protect the filter 1293, and the filter cover 128 may be configured to be detachable for cleaning and replacing the filter 1293.

[0060] The air outlet 103 is located at the front of the head portion 101 and may include a circular opening. As shown in FIG. 3, the heating coil of a heater module 150 of the present disclosure has a donut shape with an empty central part, and the air outlet 103 may also have a ring shape related thereto.

[0061] FIG. 4 illustrates a state in which a nozzle 200 is attached to the main body. To change the way that air is discharged as desired by the user, various types of nozzles 200 may be attached to and detached from the air outlet 103.

[0062] A ring-shaped opening such as the air outlet 103 in FIG. 1 allows air to come out over a wide area, and thus the ring-shaped opening is convenient for drying hair. However, for purposes such as styling or scalp care, it is advantageous to change a pattern in which air is discharged.

[0063] Thus, the detachable nozzle 200 may be used to change the air discharge pattern according to the intended use. Since the central part of the air outlet 103 is an area where air is not discharged, a nozzle attachment portion 113 may be placed thereon. A head magnet 1132 that attaches to the nozzle 200 may be positioned in the nozzle attachment portion 113.

[0064] Referring to FIG. 3, the head case 111, which forms the exterior of the head portion 101, is a cylindrical member with open front and rear ends. The head case 111 may be designed such that the front end has a slightly

smaller diameter to facilitate air flow.

[0065] The heater module 150 that heats air as well as a board module 130 that controls the hair dryer 100 may be positioned inside the head case 111. The board module 130 may have a plurality of printed circuit boards 132 stacked in a layered structure. A touch display 135 that provides the user with information about the operating status of the hair dryer 100 and allows for touch input may be positioned at the rear of the board module 130,

[0066] In addition to the board module 130, a switch board for buttons and a board for an air motor 171 may be positioned at the handle portion 102. For convenience of explanation, a board on the board module 130 is referred to as a head board 132.

[0067] The heater module 150 and board module 130 of the head portion 101 may be combined through a head frame 112 to form a single head assembly 114. The head assembly 114 may be inserted from the rear to the front of the head case 111 to assemble the head portion 101.

[0068] With respect to the handle connection portion 1115, the heater module 150 may be positioned at the front of the head portion 101, while the board module 130 may be located at the rear of the head portion 101.

[0069] The heater module 150 may include a coil 156 that receives power and heats air. The coil 156 may be designed to have high resistance to increase the heat output and may be wound in a spiral shape or bent in a serpentine shape to maximize the contact area with air.

[0070] In the present embodiment, a serpentine-shaped heating coil that extends inward and then bends outward is used. The coil 156 is arranged in a spiral shape inside the head portion 101.

[0071] Since the heating coil of the heater module 150 is arranged in a ring shape, an empty space is formed in the center. The heater module 150 of the present disclosure may use this space by placing an ionizer 158 for generating ions inside the coil 156.

[0072] The board module 130 may be positioned spaced apart in the rear direction from the heater module 150. The space between the heater module 150 and the board module 130 may provide a space for providing the air supplied from the handle portion 102 to the heater module 150 by changing the path, thereby protecting the board module 130 from the heat of the heater module 150. In addition, the heat generated by the board module 130 is cooled by the cold air supplied from the handle portion 102, thereby preventing any overheating issues with the board module 130.

[0073] The handle connection portion 1115 coupled to the top of the handle portion 102 may be located at the central part of the head portion 101. The handle connection portion 1115 into which the upper end of the handle portion 102 is inserted may be located at the lower part of the cylindrical member of the head case 111.

[0074] The handle portion 102 may include a handle frame 122 that houses various components and a handle case 121 that surrounds the exterior of the handle frame 122 and forms the appearance. In addition, the air motor

171 that directs the air flow such that air is drawn into the air inlet 104 positioned at the bottom of the handle portion 102.

[0075] A power input cable 191 connected to an external power source is positioned at the bottom of the handle portion 102. A power connection cable 192 that is connected to the power input cable 191 and extends to the head board 132 of the head portion 101 may be included inside the handle portion 102.

[0076] To prevent a portion connected to the lower part of the handle portion 102 from bending and breaking, the power input cable 191 may include an anti-breakage rib 1912 that extend radially from the power input cable 191.

[0077] Physical buttons 162 and 166 may be implemented for the user to operate the primary functions of the hair dryer 100. The handle portion 102 may include a power button 162 for turning the power on/off and an operation button 166 for adjusting the intensity or temperature of air. The power button 162 may be positioned at the front of the handle portion 102, and the operation button 166 may be located at the rear thereof.

[0078] The buttons may use one of several types, such as a push button, a toggle switch, or a slide switch 1625. In the present embodiment, the power button is implemented as a slide switch, and the function change is implemented as a push button.

[0079] The air motor 171, which is positioned below the buttons 162 and 166, forces the air flow from the air inlet 104, which is positioned at the bottom of the handle portion 102, to the air outlet 103. The air motor 171 may generate vibration and noise. To mitigate such vibration and noise, an elastic motor damper 173 that surrounds the outer surface of the air motor 171 may be used.

[0080] FIG. 5 is a diagram illustrating a method of assembling the head portion 101 of the hair dryer 100 according to an embodiment of the present disclosure.

[0081] Referring to FIG. 5, the head portion 101 of the hair dryer 100 according to the present disclosure may include the head case 111 that forms the exterior and the head assembly 114 that forms the interior. The head case 111 is a cylindrical member with open front and rear ends, and the head case 111 may be formed such that the head case 111 has a smaller diameter at the front end and a larger diameter at the rear end.

[0082] A handle is inserted into the lower part of the handle connection portion 1115. The handle connection portion 1115 protrudes in the direction of the handle from the head case 111, thereby allowing the handle frame 122 and handle case 121 to be fixed.

[0083] The handle frame 122 may be coupled to the inside of the handle connection portion 1115, and the handle case 121 may be coupled to the outside of the handle connection portion 1115. The end of the handle case 121 is in close contact with the side of the head case 111, thereby forming a joint where the surfaces of the two members meet and bend.

[0084] Since such members are coupled to both the

inside and outside of the handle connection portion 1115, it becomes difficult for foreign substances to enter, thereby preventing moisture from infiltrating and air from leaking without additional sealing components.

[0085] The head assembly 114 combines the heater module 150 and the board module 130, which are mounted inside the head portion 101. The head frame 112 may be used to fasten the heater module 150 and the board module 130 together.

[0086] The head frame 112 may be configured in a cylindrical shape corresponding to the shape of the head case 111. Since the rear of the head case 111 is larger than the front, the head assembly 114 may be inserted from a rear opening 1113 of the head case 111 towards the front as shown in FIG. 5.

[0087] FIG. 6 is an exploded perspective view of the head assembly 114 of the hair dryer 100 according to an embodiment of the present disclosure, and FIG. 7 is a cross-sectional view of the head portion 101 of the hair dryer 100 according to the present disclosure.

[0088] The head assembly 114 includes the heater module 150 that heats air entering from the handle and the board module 130 that houses a controller for controlling the hair dryer 100. The heater module 150 and the board module 130 may be fastened by the head frame 112.

[0089] The head frame 112 includes an air discharge guide 112a that guides air to the air outlet 103 at the front and a heater housing 112b where the heater module 150 is seated. A head hook groove 1127 for fastening the board module 130 may be positioned at an end 112d extending rearward from the heater housing 112b. A space 112c between the heater housing 112b and the head hook groove 1127 is separated. The space 112c corresponds to the position of the handle connection portion 1115, and a handle fastening hole 1125 that overlaps with the handle connection portion 1115 is included therein.

[0090] The handle fastening hole 1125 is a part where the air rising along the handle portion 102 enters the head portion 101. As shown in FIG. 6, the head frame 112 includes a part of the handle fastening hole 1125 and has an open rear end. When the board module 130 is coupled to the head frame 112, the handle fastening hole 1125 may be formed by blocking the open rear end of the handle fastening hole 1125 with the head frame 112.

[0091] The air discharge guide 112a, which is located at the front of the head frame 112, may include a ring-shaped discharge hole 1122 through which air heated by the heater module 150 is discharged and a front portion 1112 where the nozzle attachment portion 113 is positioned at the center of the discharge hole 1122. As shown in FIG. 7, the air discharge guide 112a may include a discharge flow path 1123 with a narrowing inclined surface to increase the speed of air discharge. The head frame 112 extends to the rear of the heater module 150 and is open at the rear to allow insertion of the heater module 150. A head hook hole 1128 located at the rear

end of the heater module 150 is fastened to a head hook 1318 of the head frame 112. The head hook hole 1128 formed at the rear end of the head frame 112 and the head hook 1318 formed on the outer surface of the board frame 131 are fastened together to form the head assembly 114.

[0092] The heater module 150 may include a plurality of support walls 153 and 154 radially fitted on the outer surface of a cylindrical heater core 151 and a heating coil 156 wound around the circumference of the support walls. The heating coil 156 is wound in a spiral shape and forms two layers in the radial direction. A first support wall 153, which supports an outer coil 1561, has a greater radial length than a second support wall 154, which supports an inner coil 1562.

[0093] The interior of the heater core 151 provides a space for components such as the ionizer 158, and a wiring 1582 for the ionizer and a wiring 1592 for a temperature sensor located at the front may extend from the inside of the heater core 151 to the rear of the heater core 151. The heater module 150 includes a ring-shaped heater duct located on the outer circumference of the heater core 151. To prevent heat from being transferred to the outside of the heater duct, a cylindrical inner insulation housing 1512 and a cylindrical outer insulation housing 152 may be provided on the inner and outer sides of the heater duct, respectively. The inner insulation housing 1512 and outer insulation housing 152 may be made of materials with low thermal conductivity such as mica.

[0094] The nozzle attachment portion 113, which is positioned at the center of the air discharge guide 112a, may be coupled to the front of the heater core 151. The nozzle attachment portion 113 may include the head magnet 1132 for attaching to the accessory nozzle 200, a magnet seating portion 1311 where the head magnet 1132 is placed, a screw 1137 for fastening the magnet seating portion 1311 to the head frame 112, and a magnet cover 1134 for covering the head magnet 1132.

[0095] A ring-shaped ring frame 1135 may be included around the head magnet 1132, and a ring-shaped nozzle attachment groove 1136 may be formed between the head magnet 1132 and the ring frame 1135 to guide the position of the accessory nozzle 200.

[0096] As shown in FIG. 7, a plurality of head boards 1321, 1322, and 1323 may be arranged in a layered structure, and cylindrical board frames 1311 and 1312 that house the head boards 1321, 1322, and 1323 may be included. To house the plurality of head boards 1321, 1322, and 1323, the board frames 1311 and 1312 are composed of multiple pieces, which may be assembled to form a single board module 130.

[0097] When components significantly affected by electromagnetic waves such as a wireless communication module 134a are mounted, electromagnetic shielding is necessary. To avoid interference between components mounted between the plurality of head boards

1321, 1322, and 1323 and to prevent the strong pressure of air from impacting the rear display 135, a middle board frame 1313 may be further included between the head boards 1321 and 1322.

[0098] As shown in FIG. 2, the touch display 135 may be positioned on the rear surface of the board module 130, and the rear end of the board module 130 is exposed to the rear of the head frame 112, forming the appearance of the rear of the head portion 101.

[0099] The head case 111 includes openings at the front and rear. To prevent air from escaping through a gap between the head assembly 114 and the head case 111, the head case 111 may include a front sealing ring 1128 positioned at the front of the head assembly 114 and a rear sealing ring 137 positioned at the rear thereof.

[0100] The front sealing ring 1128 is positioned on the air discharge guide 112a. Since the head case 111 includes the ring-shaped front portion 1112 arranged along the edge, the front sealing ring 1128 may be positioned between the air discharge guide 112a of the head frame 112 and the ring-shaped front of the head case 111 and arranged to overlap in the front-rear direction.

[0101] As shown in FIGS. 5 and 6, the rear sealing ring 137 may be positioned around the outer circumference of the board frame 131 of the board module 130. As shown in FIG. 7, the rear sealing ring 137 overlaps with the head case 111 and the board module 130 in the radial direction.

[0102] Referring to FIG. 5, when the head assembly 114 is coupled to the head case 111, the head assembly 114 may be inserted from the rear of the head case 111 and then rotated (①->②). Since the handle fastening hole 1125 located at the bottom of the head assembly 114 and the handle connection portion 1115 of the head case 111 need to be aligned in the same position, a guiding mechanism is necessary to ensure proper insertion into the correct position.

[0103] To guide the insertion position of the head assembly 114, a coupling rib 1116 protruding from the inner surface of the head case 111 and a rib guide 1316 formed on the outer surface of the head assembly 114 may be included. A plurality of coupling ribs 1116 may protrude from the inner surface of the head case 111 and be arranged along the inner circumference. The coupling rib 1116 may be positioned adjacent to the rear of the head case 111.

[0104] The rib guide 1316, which is a groove formed on the outer surface of the head assembly 114, extends longitudinally in the front-rear direction as shown in FIG. 5. To align the coupling rib 1116 protruding from the inner surface of the head case 111 with the rib guide 1316, the head case 111 and the head assembly 114 may be aligned, and then the head assembly 114 may be inserted into the head case 111(③).

[0105] As shown in the enlarged view of FIG. 5, a part 1316a of the rib guide 1316 is formed on the head frame 112, and the remaining part 1316b may be formed on the board frame 131. When the head frame 112 and the board frame 131 are fastened together, the parts of the

rib guide 1316 formed on both components are connected to form the single rib guide 1316. As shown in FIG. 5, the rib guide 1316 is wider at the front end than at the rear end, allowing the coupling rib 1116 to enter the rib guide 1316 even if the coupling rib 1116 is slightly misaligned.

[0106] The head assembly 114 has a smaller diameter at the front, and the coupling rib 1116 is positioned adjacent to the rear of the head case 111. Therefore, the rib guide 1316 may be formed in the middle part of the head assembly 114.

[0107] The rib guide 1316 is a groove formed to prevent the head assembly 114 from catching on the coupling rib 1116 when inserted forward, and thus the depth of the rib guide 1316 is determined according to the protrusion height of the coupling rib 1116. Therefore, since the diameter of the head assembly 114 increases towards the rear, conversely, the depth of the rib guide 1316 may also increase towards the rear.

[0108] A laterally extended rib groove 1317 may be positioned at the rear end of the rib guide 1316. The head assembly 114 may be rotated (⊙) to allow the coupling rib 1116 to be inserted into the rib groove 1317 when the coupling rib reaches the rear end of the rib guide 1316.

[0109] When the coupling rib 1116 is inserted into the rib groove 1317, the handle connection portion 1115 and the handle fastening hole 1125 of the head frame 112 may be aligned. To prevent the head assembly 114 from rotating in the reverse direction and detaching from the head case 111, the handle frame 122 may be inserted into the handle connection portion 1115 and the handle fastening hole 1125.

[0110] FIG. 8 is a cross-sectional view illustrating a connection part between the head portion 101 and the handle portion 102 of the hair dryer 100 according to an embodiment of the present disclosure. A cylindrical upper frame 123 of the handle frame 122 is inserted into the handle connection portion 1115.

[0111] The upper frame 123 may include a first upper end 1231 have a size corresponding to the handle connection portion 1115 and a second upper end 1232 have a size corresponding to the handle fastening hole 1125. Since the size of the handle connection portion 1115 is larger than the size of the handle fastening hole 1125, the size of the first upper end 1231 is larger than the size of the second upper end 1232.

[0112] When the upper frame 123 is inserted into the handle fastening hole 1125, the head assembly 114 is incapable of rotating. Thus, unless the upper frame 123 is removed from both the handle connection portion 1115 and the handle fastening hole 1125, the head assembly 114 may be fixed to the correct position.

[0113] The first upper end 1231 of the upper frame 123 is cylindrical. However, the second upper end 1232 may include a straight section 1232a as shown in FIG. 8. The handle fastening hole 1125 also has a shape corresponding to the straight section 1232a of the second upper end 1232, and thus the handle fastening hole 1125 may

include a straight section.

[0114] Since the second upper end 1232 including the straight section 1232a is incapable of rotating within the handle fastening hole 1125, the direction may be aligned when the second upper end 1232 is coupled to the head portion 101 of the upper frame 123.

[0115] The upper frame 123 may be fastened to a head screw boss located in the handle connection portion 1115 of the head case 111 with a screw. Based on this configuration, which overlaps in different directions, the head assembly 114 may be fixed to the head case 111.

[0116] After or before the upper frame 123 is fixed to the handle connection portion 1115, electronic components and power cables located in the handle portion 102 need to be connected to the head board 132 of the board module 130 through the handle connection portion 1115.

[0117] Therefore, a connector to which the cables of components inside the head portion 101 are connected may be placed on the upper side of the board module 130, and a connector 133b to which cables extended from the handle frame 122 are connected may be placed on the lower side of the board module 130.

[0118] The cables extending from the handle frame 122 may be connected to the board module 130 at a lower position than cables extending from the heater module 150. After the head assembly 114 is assembled with the head case 111, it may be easier to connect the cables from the handle frame 122 to the head board 132.

[0119] Hereinabove, the method of fastening the head assembly 114, head frame 112, and handle frame 122 has been described. It is possible to achieve convenient assembly and provide unified exterior design by minimizing the number of screws and avoiding the use of screws exposed to the outside.

[0120] Hereinafter, individual components included in the head assembly 114 will be described. First, the board module 130 will be discussed with reference to FIGS. 9 to 12.

[0121] FIG. 9 is a cross-sectional view showing the board module 130 of the hair dryer 100 according to an embodiment of the present disclosure, and FIG. 10 is an exploded perspective view showing the board module 130 of the hair dryer 100 according to one embodiment of the present disclosure.

[0122] The board module 130 includes the plurality of head boards 1321, 1322, and 1323 arranged in a layered structure. The board module 130 may include the display 135 or the touch display 135 with touch functionality on the outer rear side thereof to show the status of the hair dryer 100 (such as air intensity, temperature, mode, etc.).

[0123] In this embodiment, the plurality of head boards 132 form three layers, which are referred to as the first head board 1321, the second head board 1322, and the third head board 1323, in order from the rear.

[0124] The functions of the three head boards 1321, 1322, and 1323 may vary depending on the design. In this embodiment, the first head board 1321 is located at the rearmost position. The first head board 1321 may control

the display 135 adjacent thereto and include the wireless communication module 134a. The second head board 1322 may control the air motor 171 and the heater module 150, while the third head board 1323 may convert and supply power from the power connection cable 192 to each component appropriately.

[0125] In the present disclosure, the board module 130 has multiple layers, and thus the board frame 131 may also be composed of a plurality of pieces 1311, 1312, and 1313 to facilitate the assembly of each layer. The first board frame 1311 may include the display 135 positioned at the rear and the first head board 1321 positioned at the front, and the second board frame 1312 may include the second head board 1322 and the third head board 1323 positioned within the second board frame 1312.

[0126] To prevent air from leaking to the rear of the head portion 101, the rear sealing ring 137 is included. However, due to the strong force of air forcibly introduced by the air motor 171, the rear display 135 may be damaged by the high pressure.

[0127] To address these issues, the middle board frame 1313 may be additionally provided between the first board frame 1311 and the second board frame 1312. The middle board frame 1313 may protect the display 135, which is positioned at the rear of the first board frame 1311, while preventing air from leaking to the rear.

[0128] By placing heating elements on the second head board 1322 and the third head board 1323, which are located in front of the middle board frame 1313, heat may be dissipated by the air drawn from the handle portion 102. An integrated circuit (IC) that controls the display 135 may be placed adjacent to the display 135 on the first head board 1321, which is positioned at the rear of the middle board frame 1313. The first head board 1321, which is positioned at the rear of the middle board frame 1313, may have an integrated circuit (IC) that controls the display 135 placed adjacent to the display 135. The wireless communication module 134a may be provided to avoid interference with other components.

[0129] The assembly sequence of the board module 130 is as follows. The first head board 1321 is mounted onto the first board frame 1311. After assembling the middle board frame 1313, the second board frame 1312 having the second head board 1322 and the third head board 1323 mounted thereon may be fastened to the middle board frame 1313.

[0130] To fasten the head board 132 and the board frame 131 as well as the middle board frame 1313 and the first board frame 1311, screws may be used. Thereafter, the middle board frame 1313 and the second board frame 1312 may be fastened using a hook mechanism.

[0131] FIG. 10 illustrates the first head board 1321 mounted on the middle board frame 1313 and the first board frame 1311 of the board module 130.

[0132] The height of the middle board frame 1313 may vary depending on the components mounted on the first head board 1321 and the second head board 1322. Components with greater heights mounted on the first

head board 1321 and the second head board 1322 may be arranged such that the components do not overlap with each other.

[0133] Accordingly, the middle board frame 1313 may not be flat and have uneven surfaces depending on the arrangement of the components. Since the middle board frame 1313 is attached to the front of the first head board 1321, a part where the protruding component 134a of the first head board 1321 is located may have a forward-protruding shape 1313a.

[0134] In particular, since the wireless communication module 134a mounted on the first head board 1321 is large, the wireless communication module 134a is placed in the center. The remaining components are arranged around the periphery. Thus, the middle board frame 1313 may have a shape with protrusions 1313a as shown in FIG. 10.

[0135] The rear sealing ring 137 located on the outer peripheral surface of the board frame 131 may be positioned on the outer peripheral surface of the middle board frame 1313 as shown in FIG. 10. The middle board frame 1313 may have a groove on the outer peripheral surface thereof to accommodate the rear sealing ring 137.

[0136] A board connector 138 is required for an electrical connection between the first head board 1321 and the second head board 1322. The board connector 138 may pass through the middle board frame 1313 to connect the first head board 1321 and the second head board 1322.

[0137] To allow the board connector 138 to pass through the middle board frame 1313, the middle board frame 1313 may include a connection hole 1312b. However, since air may leak through the connection hole 1312b, a wire cap 136 may be inserted into the connection hole 1312b to seal the connection hole 1312b.

[0138] FIG. 11 is a cross-sectional view showing the wire cap 136 and the board connector 138 of the hair dryer 100 according to an embodiment of the present disclosure, and FIG. 12 is a perspective view of the wire cap 136 of the hair dryer 100 according to an embodiment of the present disclosure. The wire cap 136 is made of an elastic material, which allows the wire cap 136 to adhere closely to adjacent members and prevents the passage of air.

[0139] A pair of wire caps 136 shown in FIG. 10 differ only in size but have the same basic configuration. The wire cap 136 is inserted into the connection hole 1312b of the middle board frame 1313. A cap body 1362 located inside the connection hole 1312b and having a wire hole 1365 formed in the center and a first locking portion 1363 and a second locking portion 1364 that extend from the cap body 1362 and are located on one side and the other side of the middle substrate, respectively may be included. The first locking portion 1363 and the second locking portion 1364 are larger than the connection hole 1312b, ensuring that the wire cap 136 is fixed to the connection hole 1312b without being separated from the connection hole 1312b.

[0140] The wire cap 136 is inserted from one side to the other side, and the second locking portion 1364 may include an inclined surface with a triangular cross-section to facilitate easy insertion of the wire cap 136 into the connection hole 1312b.

[0141] The board connector 138 consists of a pair of connectors 1381 that are inserted into a socket 133 and a wire 1382 that connects the pair of connectors 1381. As the wire 1382, a flat wire with multiple wires arranged in one direction may be used. The wire hole 1365 may be elongated in one direction according to the shape of the wire 1382.

[0142] The internal space of the hair dryer 100 is limited, and thus the connector 1381 may partially overlap with the wire cap 136 as shown in FIG. 11. To prevent interference between the connector 1381 and the wire cap 136, one side of the wire hole 1365 of the wire cap 136 may have a width corresponding to the wire 1382, while the other side may be widened with a step 1367.

[0143] As described above, in the hair dryer 100 according to an aspect of the present disclosure, the head boards 132 stacked in multiple layers may be efficiently arranged within a limited space. The hair dryer 100 may include the middle board frame 1313, rear sealing ring 137, and wire cap 136 to prevent air from leaking to the rear.

[0144] Hereinafter, the heater module 150 located in front of the board module 130 will be described with reference to FIGS. 13 to 21.

[0145] FIG. 13 is a rear perspective view showing the heater module 150 of the hair dryer 100 according to an embodiment of the present disclosure, and FIG. 14 is a rear view thereof. The heater module 150 of the present disclosure has a cylindrical shape because the discharge hole 1122 of the air discharge guide 112a has a ring shape.

[0146] The heater module 150 of the present disclosure includes the cylindrical heater core 151 and the cylindrical outer insulation housing 152, which is positioned apart from the outer surface of the heater core 151 by a predetermined distance. A space between the heater core 151 and the outer insulation housing 152 forms a flow path with a ring-shaped cross-section. The heating coil 156 may be wound in a spiral shape around the outer surface of the cylindrical heater core 151, which may increase the temperature of air passing through the flow path.

[0147] To prevent heat from being transferred inward and place electronic components such as the ionizer 158 inside the heater core 151, the inner insulation housing 1512 may be provided around the heater core 151. The heating coil 156 may be positioned between the inner insulation housing 1512 and the outer insulation housing 152 such that heat remains within the flow path, thereby improving the efficiency of the heater module 150.

[0148] The outer insulation housing 152 and the inner insulation housing 1512 may be made of non-electrically conductive and low thermal conductivity insulating ma-

terials. For example, mica may be used. Due to the material characteristics of mica, it is difficult to implement fine irregularities. Therefore, the outer insulation housing 152 and the inner insulation housing 1512 may be designed as cylindrical members with smooth surfaces without irregularities.

[0149] The heating coil 156, which provides heat to air, may be configured in a spring shape twisted into a spiral or in a serpentine shape to maximize contact with air over a wide area. While the spring-shaped coil may extend the length of the heating coil 156, the serpentine shape provides a large contact area with air.

[0150] As shown in FIG. 14, the heating coil 156 may be staked in two layers. The outer coil 1561 located on the outside and the inner coil 1562 located on the inside may be included. To prevent the heating coils 156 from touching each other, which could cause a short circuit, malfunction, or fire, the support walls 153 and 154 arranged radially may be provided to maintain a spaced-apart state. As shown in FIG. 14, the support walls 153 and 154 extend radially to partition the donut-shaped flow path along the circumference.

[0151] FIG. 15 is a diagram showing the support walls 153 and 154 of the heater module 150 of the hair dryer 100 according to an embodiment of the present disclosure. The support walls 153 and 154 may be made of an insulating material, such as mica, to prevent current from flowing between the heating coils 156.

[0152] The support walls 153 and 154 may include coil seating portions 1535 and 1545 where the heating coil 156 is placed at the outer ends. The coil seating portions 1535 and 1545 may have a toothed shape.

[0153] The support walls may be configured in two sets with different heights according to the heating coil 156 stacked in two layers. The first support wall 153 supporting the outer coil 1561 and the second support wall 154 supporting the inner coil 1562, where the heating coil 156 is stacked in two layers, may be included.

[0154] 8 first support walls 153 and 8 second support walls 154 may be arranged. Although the number of support walls may be adjusted. For balance, the number of first support walls 153 and the number of second support walls 154 may be the same, and the first support walls 153 and second support walls 154 may be alternately arranged. FIG. 15(a) illustrates the first support wall 153, and FIG. 15(b) illustrates the second support wall 154.

[0155] The first support wall 153 supporting the outer coil 1561 may have a longer length in the radial direction. The outer coil 1561 may include a first coil seating portion 1535 at the outer end, where the outer coil 1561 is placed, and a coil groove 1534 at the inner end to allow the inner coil 1562 to pass through.

[0156] A protruding part of the inner coil 1562 bent in an S-shape may be seated in a second coil seating portion 1545 of the second support wall 154, and a part of the inner coil 1562 facing inward passes through the coil groove 1534 of the first support wall 153.

[0157] The first support wall 153 may include coupling portions 1532 on both sides that are inserted into and fixed to grooves formed in the heater core 151 and a step 1533 corresponding to the inner insulation housing 1512 wound around the outer surface of the heater core 151.

The coil groove 1534 extends further inward from the step 1533, which is in contact with the inner insulation housing 1512, allowing the inner coil 1562 to pass between the coil groove 1534 and the inner insulation housing 1512.

[0158] As shown in FIG. 14, the support walls partition the flow path of the heater module 150, which may disrupt the smooth circulation of air and cause temperature differences in the air passing through the heater module 150.

[0159] To prevent such an issue, an air circulation hole 1535 may be included as shown in FIG. 15(a). The air circulation hole 1535 may be elongated in the front-back direction and may be divided into two parts to maintain the rigidity of the support wall 153.

[0160] The second support wall 154 is smaller in size, and thus the air circulation hole 1535 may be omitted or made smaller, as shown in FIG. 15(b). The air circulation hole 1535 formed in the first support wall 153 may be located between the first coil seating portion 1535 and the coil groove 1534.

[0161] A plurality of first support walls 153 have the first coil seating portion 1535, the coil groove 1534, and the air circulation hole 1535. The plurality of first support walls 153 are of the same height, but some of the first support walls 153 may have slightly different shapes.

[0162] For example, some of the first support walls 153 may have a partially different shape to accommodate components such as a terminal 155, a fuse 1566, a bimetal 1565, and the outer insulation housing 152. The following components may be included in some of the first support walls 153 but may not be included in other first support walls 153.

[0163] The first support wall 153 may include a terminal fixing hole 1537 to fix the heater terminal 155, fuse 1566, bimetal 1565, and so on at the rear. A fixing rivet 1563 may be inserted into the terminal fixing hole 1537 to fix a terminal. The fixing rivet 1563 is made of a conductive material and may electrically connect the bimetal 1565 and fuse 1566, the fuse 1566 and heater terminal 155, and the heater terminal 155 and heating coil 156.

[0164] The first support wall 153 may include a stopper protrusion 1538 at the rear to guide the position of the outer insulation housing 152. Referring to FIG. 13, four first support walls 153 may include the stopper protrusion 1538.

[0165] Since the terminal fixing hole 1537, where the fixing rivet 1563 is positioned, also has a protruding structure, the stopper protrusion 1538 may be formed in the first support wall 153 that includes the terminal fixing hole 1537.

[0166] To accommodate the bimetal 1565 or fuse 1566, a component seating groove 1539 that extends forward from the rear end of the first support wall 153 may

be further included as shown in FIG. 13.

[0167] FIG. 15(b) illustrates the second support wall 154. The second support wall 154 includes the second coil seating portion 1545 at the outer end, and a coupling portion 1542 coupled to the heater core 151 as well as a step 1543 that is in contact with the inner insulation housing 1512 may be formed at the inner end thereof.

[0168] Referring to FIG. 14, the first support wall 153 supports the outer coil 1561. In addition, the first support wall 153 determines the spacing between the outer insulation housing 152 and the inner insulation housing 1512. However, the second support wall 154 is not contact with the outer insulation housing 152.

[0169] Therefore, to ensure that the air supplied to the discharge flow path 1123 is discharged without splitting, the second support wall 154 may form a curved air cutout 1547 at the front edge, corresponding to a curved portion 1124 of the discharge flow path 1123 located in the air discharge guide 112a of the head frame 112.

[0170] As shown in FIG. 16, the second support wall 154 may not include the air cutout 1547 to accommodate other components. The air cutout may be formed in the first support wall 153.

[0171] FIGS. 16 to 20 are diagrams illustrating a process of assembling the heater module 150 of the hair dryer 100 according to an embodiment of the present disclosure. Hereinafter, the assembly method and detailed configuration of the heater module 150 will be described with reference to FIGS. 16 to 20.

[0172] FIG. 16 illustrates a state in which the heater core 151, the inner insulation housing 1512 that surrounds the outer circumference of the heater core 151, and the second support wall 154 are assembled. The heater core 151 is a cylindrical member where the rear thereof is fixed and the front thereof is detachable, thereby allowing components such as the ionizer 158 to be placed inside the heater core 151.

[0173] To measure the temperature of the discharged air, the heater module 150 may include a temperature sensor 159 at the front. Wires for connecting the temperature sensor 159 located at the front of the heater module 150 to the board module 130 located at the rear of the heater module 150 may pass through the inside of the heater core 151.

[0174] The heater core 151 has coupling grooves 1513 formed at the front and rear ends where the coupling portions of the support walls 153 and 154 are inserted, and the inner insulation housing 1512 may be positioned between the coupling grooves 1513.

[0175] As shown in FIG. 16, the second support wall 154 may be arranged radially at equal intervals.

[0176] FIG. 17 illustrates a state in which the inner coil 1562 is wound around the second coil seating portion 1545 of the second support wall 154. The inner coil 1562 has an S-shaped serpentine form. An outwardly protruding part of the inner coil 1562 may be positioned on the second coil seating portion 1545. The inner coil 1562 is wound in a spiral from the rear to the front. The inner coil

1562 may be arranged one by one in the notches of the second coil seating portion 1545 such that one adjacent inner coils 1562 are not in contact with each other.

[0177] FIG. 18 illustrates a state in which the first support wall 153 is assembled. The first support wall 153 may be placed between second support walls 154, and the inner coil 1562 may be positioned in the coil groove 1534 of the first support wall 153.

[0178] The air circulation hole 1535 formed in the first support wall 153 are designed to be similar in height to the second support wall 154, allowing air to circulate circumferentially between the inner coil 1562 and the outer coil 1561, which will be described later.

[0179] As shown in FIG. 19, the outer coil 1561 is wound around the first coil seating portion 1535 of the first support wall 153. The outer coil 1561 is connected at the front end of the inner coil 1562 and spirally wound towards the rear. Since the outer coil 1561 is supported by the first support wall 153, the outer coil 1561 and the inner coil 1562 are not in contact with each other as illustrated in FIG. 14.

[0180] As shown in FIG. 20, the outer insulation housing 152 may be inserted into the front of the heater module 150, where the outer coil 1561 is wound, thereby completing the assembly of the heater module 150.

[0181] The ends of the inner coil 1562 and the outer coil 1561 are located at the rear of the heater module 150. As shown in FIG. 13, may heater terminal 155 may be provided at the rear of the heater module 150. The heater terminal 155 may be fixed to the first support wall 153, which is an insulating member, as described above. The inner coil 1562 and the outer coil 1561 may each be connected to different heater terminals 155.

[0182] To cut off power in case of overheating of the heating coil 156, the bimetal 1555 and the fuse 1556 may be included and interposed between the heating coil 156 and the heater terminal 155. In this embodiment, the bimetal 1555 and the fuse 1556 may be located between the outer coil 1561 and the heater terminal 155 as shown in FIG. 13.

[0183] Since the bimetal 1555 returns to the original shape thereof when the temperature drops, the bimetal 1555 may operate at temperatures above a predetermined level. On the other hand, since the fuse 1556 is not restored once the fuse 1556 blows, the fuse 1556 may be configured to operate (disconnect) at a higher temperature than the bimetal 1555.

[0184] FIG. 21 illustrates the heater terminal 155 and the heater connector 195 of the hair dryer 100 according to an embodiment of the present disclosure.

[0185] The heating coil 156 may include the heater terminal 155 at the end. As shown in FIG. 13, the heater terminal 155 is located at the rear of the heater module 150 and may be connected to the heater connector 195 extending from the head board 132.

[0186] To facilitate the assembly of the heater terminal 155 and to minimize the size of the heater terminal 155, the heater terminal 155 is implemented in the form of a

metal pin with a terminal hole 1553. The heater connector 195 may include a pair of fastening rails 1952 into which the sides of the heater terminal 155 are inserted to accommodate the heater terminal 155. The heater connector 195 may also include a hook 1953 inserted into the terminal hole 1553 of the heater terminal 155 to prevent the breakaway of the heater terminal 155.

[0187] The heater terminal 155 may further include a terminal protrusion 1552 to guide the insertion range of the heater connector 195. Based on the simple configuration of the heater terminal 155 and the heater connector 195, the heater module 150 and the board module 130 may be electrically connected.

[0188] As shown in FIG. 13, a terminal 1583 may be provided at the rear of the heater module 150 for the connection between the ionizer 158 and the board module 130.

[0189] As described above, the hair dryer 100 of the present disclosure may allow the head portion 101 to be fastened based on an overlapping structure without screws exposed to the outside.

[0190] In addition, the hair dryer 100 of the present disclosure may prevent air leakage by placing the sealing ring and the middle board frame 1313 in the head portion 101.

[0191] Further, the hair dryer 100 of the present disclosure may efficiently arrange the head board, which is stacked in multiple layers, within a limited space.

[0192] Additionally, the hair dryer 100 of the present disclosure may allow air to circulate effectively within the heater module 150, thereby ensuring that air is discharged at a uniform temperature and intensity.

[0193] Although a specific embodiment of the present disclosure has been illustrated and described above, those of ordinary skill in the art to which the present disclosure pertains will appreciate that various modifications are possible within the limits without departing from the technical spirit of the present disclosure provided by the following claims.

Claims

1. A hair dryer comprising:

a cylindrical case; and
a heater module housed inside the case, the heater module comprising:

a cylindrical heater core;
a plurality of support walls radially arranged around an outer circumference of the heater core, each comprising a coil seating portion formed at an outer end; and
a heating coil in contact with the coil seating portion and spirally wound around an outside of the heater core,
wherein the support wall comprises an air

circulation hole.

2. The hair dryer of claim 1, wherein the support walls comprise a plurality of first support walls, each comprising a first coil seating portion formed at an outer end and a coil groove formed at an inner end, wherein the coil comprises:

an outer coil in contact with the first coil seating portion and spirally wound around the outside of the heater core; and
an inner coil passing through the coil groove and the heater core and positioned between the outer coil and the heater core.

3. The hair dryer of claim 2, further comprising a plurality of second support walls arranged between the plurality of first support walls, each having a shorter radial length than the first support wall,

wherein each of the plurality of second support walls comprises a second coil seating portion at an outer end, and
wherein the inner coil is seated in the second coil seating portion.

4. The hair dryer of claim 3, comprising a head frame comprising an air discharge guide at a front,

wherein the air discharge guide has a curved surface narrowing towards the front,
wherein the heater module is housed inside the head frame, and
wherein the second support wall comprises an air cutout formed at a front outer edge and having a shape corresponding to the curved surface of the air discharge guide.

5. The hair dryer of claim 3, wherein the air circulation hole is formed in the first support wall, and wherein the second coil seating portion of the second support wall and the heater module are positioned at a same distance from a center.

6. The hair dryer of claim 2, wherein the air circulation hole is positioned between the coil groove and the first coil seating portion of the first support wall.

7. The hair dryer of claim 1, wherein the air circulation hole extends in a direction parallel to an axial direction of the heater core.

8. The hair dryer of claim 1, wherein the coil seating portion has a serrated shape.

9. The hair dryer of claim 1, comprising a cylindrical outer insulation housing surrounding an outer circumference of the support wall, and

wherein the support wall comprises a stopper protrusion positioned on one axial side.

- 10.** The hair dryer of claim 1, wherein the heater core comprises:

wall fixing grooves positioned both axial ends;
and
a cylindrical inner insulation housing positioned between the wall fixing grooves.

- 11.** The hair dryer of claim 1, further comprising an ionizer positioned inside the heater core and configured to generate negative ions.

- 12.** The hair dryer of claim 1, comprising:

a temperature sensor fixed to a front end of the support wall; and
a sensor wire connected to the temperature sensor, passing through the heater core, and extending to a rear end of the heater core.

- 13.** The hair dryer of claim 1, wherein the heating coil is connected to at least one of a bimetal or a fuse.

- 14.** The hair dryer of claim 1, comprising:

a head board positioned inside the case;
a heater terminal connected to an end of the heating coil, the heater terminal comprising a terminal hole; and
a heater connector extending from the head board, wherein the heater terminal is inserted into the heater connector,
wherein the heater connector comprises:

a pair of fastening rails into which sides of the heater terminal are inserted; and
a hook positioned between the pair of fastening rails and inserted into the terminal hole.

- 15.** The hair dryer of claim 1, wherein the case comprises a cylindrical head case having open front and rear ends, wherein the head case comprises a handle connection portion formed at a bottom, wherein the hair dryer comprises:

a head assembly comprising the heater module and a handle fastening hole formed at a position corresponding to the handle connection portion, wherein the head assembly is inserted from a rear of the head case to a front of the head case; and
a handle frame fastening the head assembly inside the head case, wherein an upper end of the handle frame is inserted into the handle

connection portion and the handle fastening hole.

wherein the handle fastening hole comprises a straight section, and
wherein the upper end of the handle frame comprises a straight section corresponding to the straight section of the handle fastening hole.

- 16.** The hair dryer of claim 15, comprising:

a coupling rib formed inside the head case;
a rib guide formed on the head assembly at a position corresponding to the coupling rib; and
a rib groove formed at an end of the rib guide in a circumferential direction,
wherein the coupling rib is configured to move along the rib guide to be fastened in the rib groove such that the head case and the head assembly are fixed,
wherein based on that the coupling rib is inserted into the coupling groove, the handle connection portion and the fastening hole are overlapped.

- 17.** The hair dryer of claim 15, wherein the head assembly comprises:

a head frame comprising a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and
a board module positioned at a rear of the heater module and fastened to the head frame,
wherein the handle fastening hole is positioned between the heater module and the board module.

- 18.** The hair dryer of claim 1, wherein the case comprises a cylindrical head case having open front and rear ends,

wherein the hair dryer comprises a head assembly comprising the heater module, wherein the head assembly is inserted from a rear of the head case to a front of the head case,
wherein the head assembly comprises:

a head frame comprising a discharge flow path for discharging air at a front, wherein the heater module is housed in the head frame; and
a board module positioned at a rear of the heater module and fastened to the head frame,
wherein the board module comprises:

a first head board;
a second head board positioned at a front of the first head board;

a middle board frame positioned between the first head board and the second head board;
 an elastic wire cap inserted into a connection hole of the middle board frame, the elastic wire cap comprising a wire hole; and
 a connector wire passing through the wire cap and connecting the first head board and the second head board.

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19. The hair dryer of claim 18, wherein the wire cap comprises:

a cap body positioned around an inner circumference of the connection hole, wherein the wire hole is formed in a center of the cap body;
 a first locking portion extending from the cap body and positioned on a first side of the middle board frame; and
 a second locking portion extending from the cap body and positioned on a second side of the middle board frame.
 wherein the second locking portion comprises an inclined surface.

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20. The hair dryer of claim 19, comprising a cutout extending from the wire hole to a side of the wire cap.

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FIG. 1

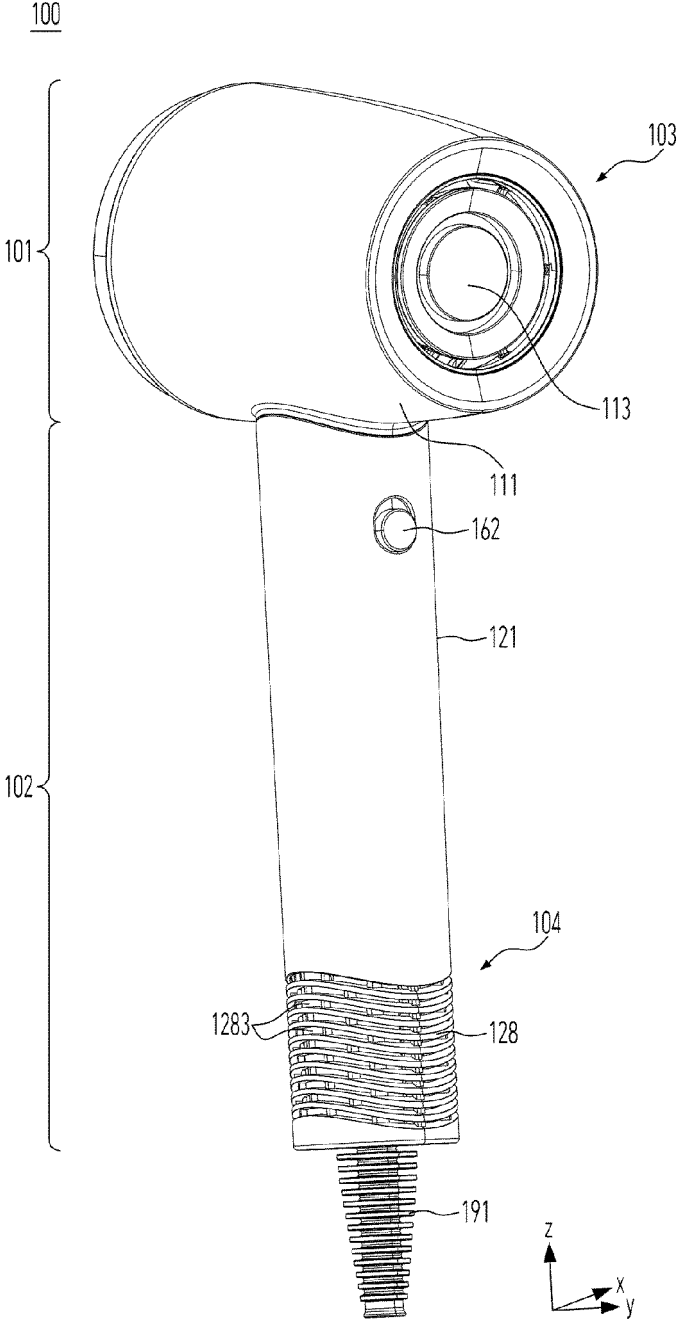


FIG. 2

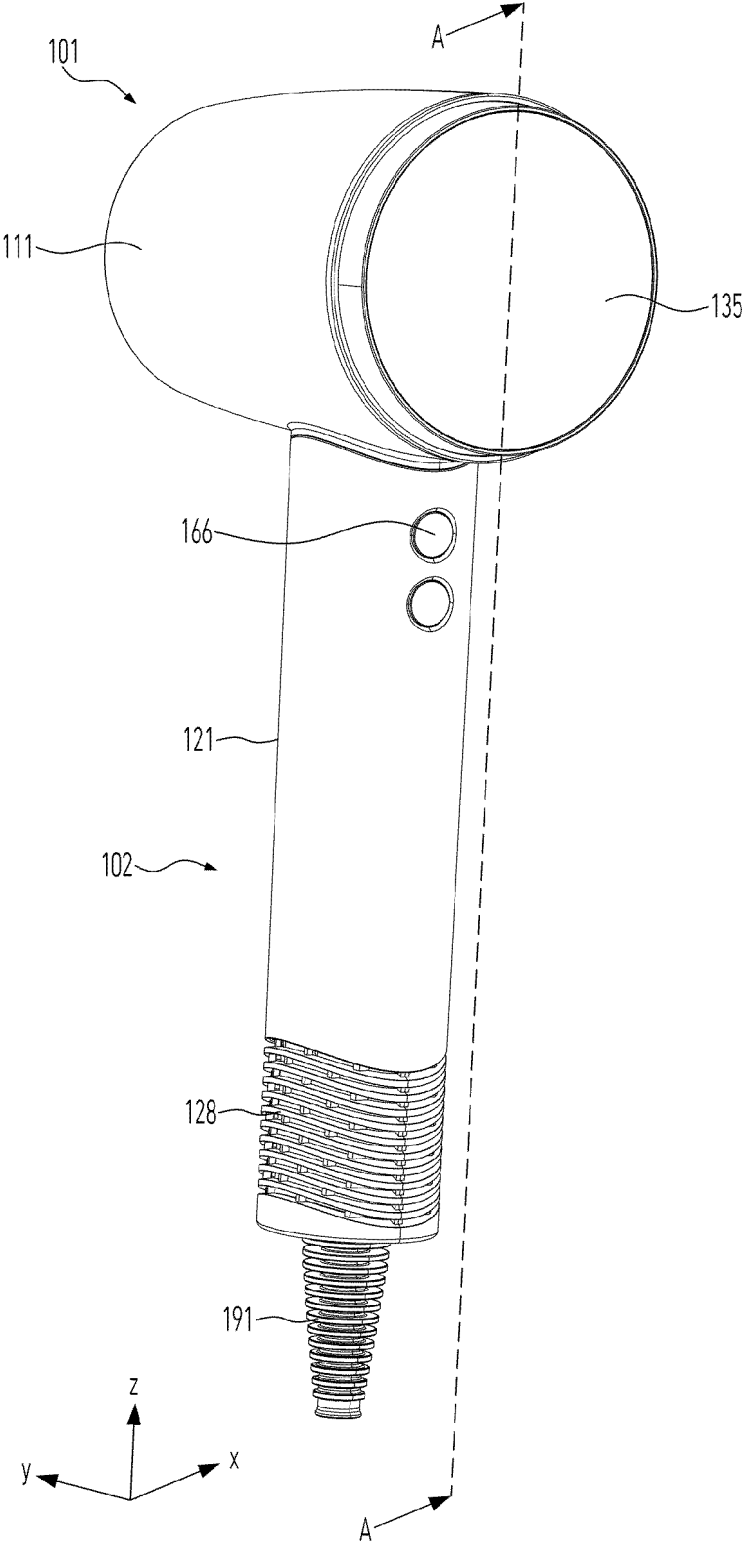


FIG. 3

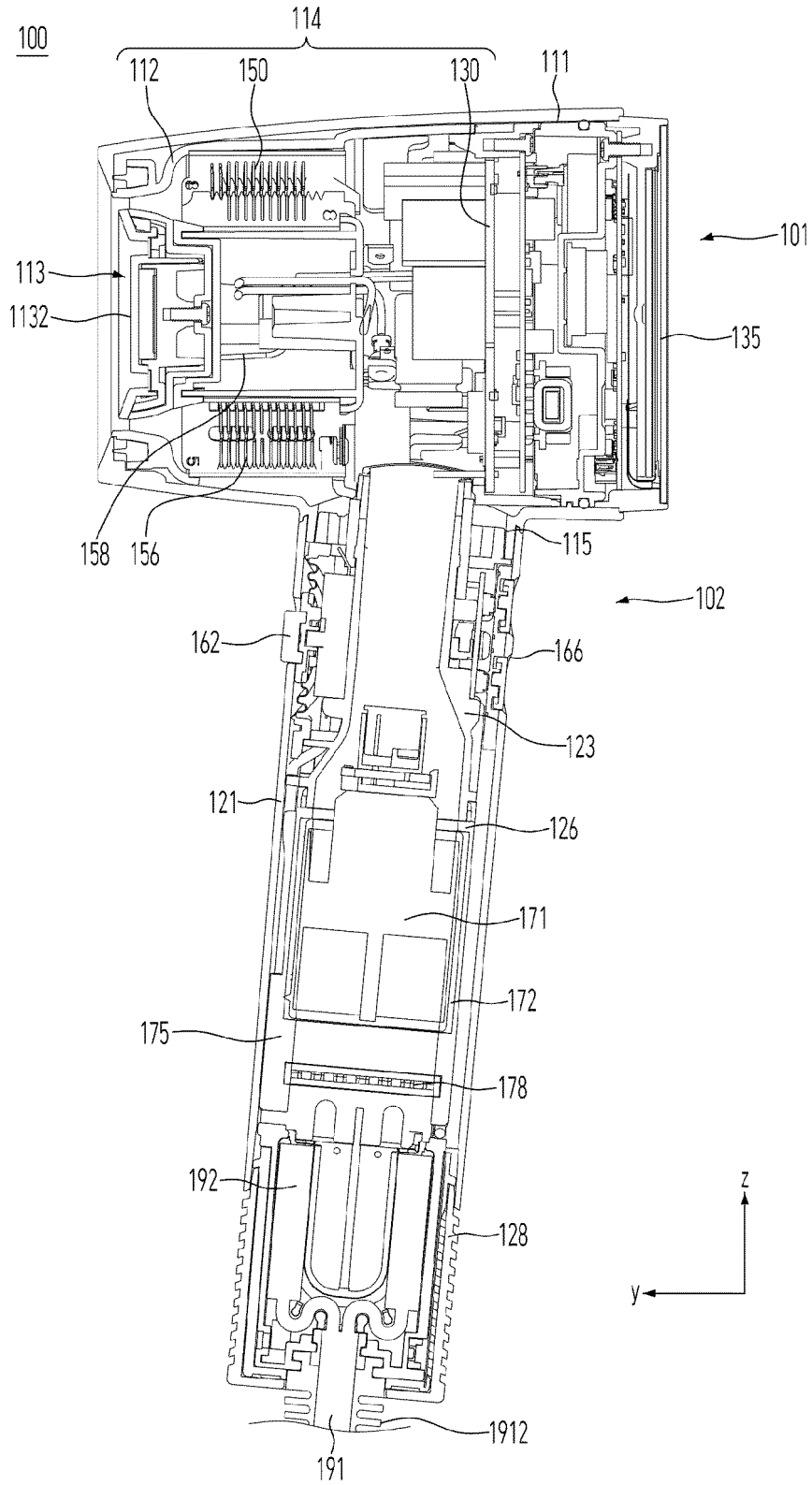


FIG. 4

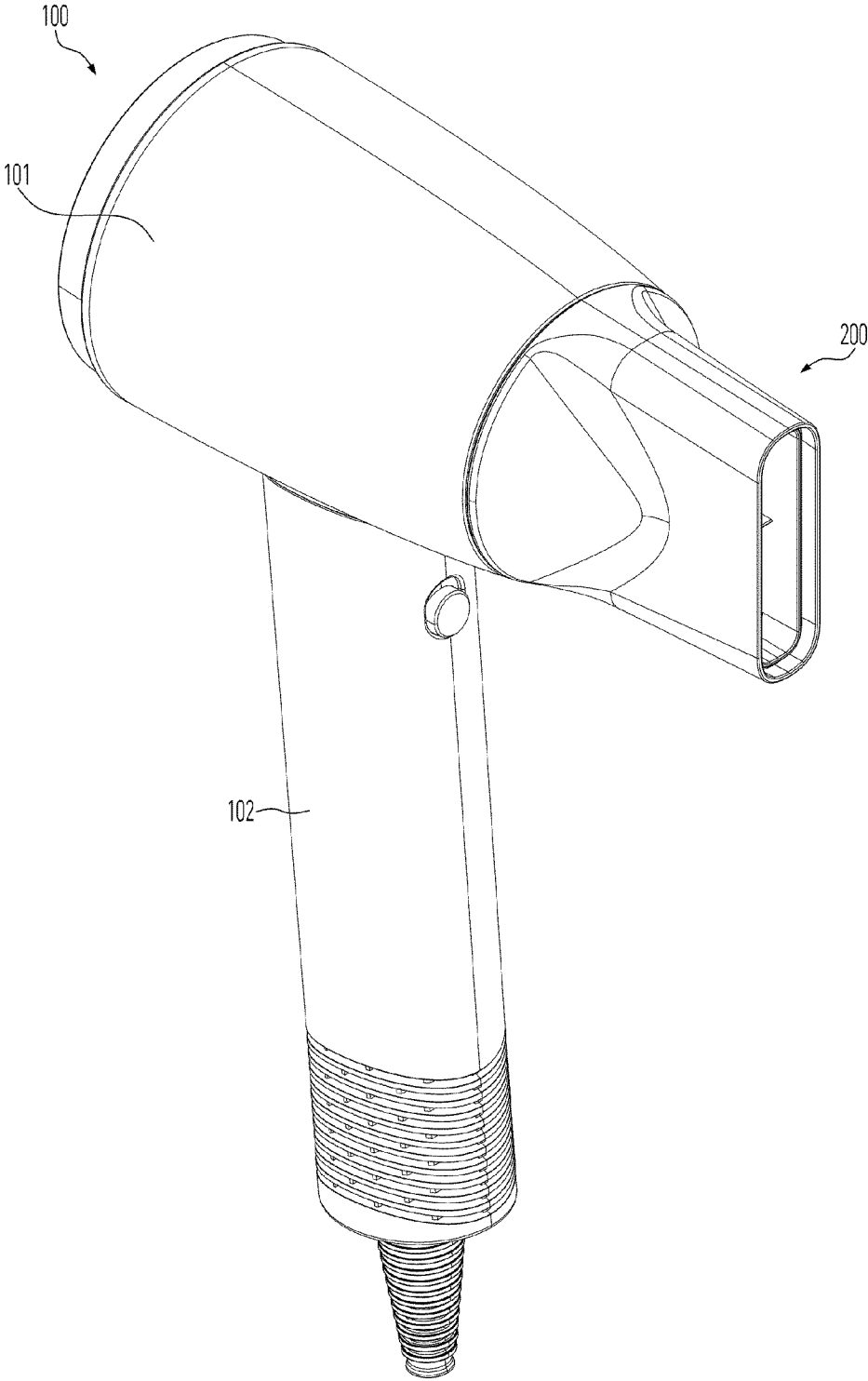


FIG. 5

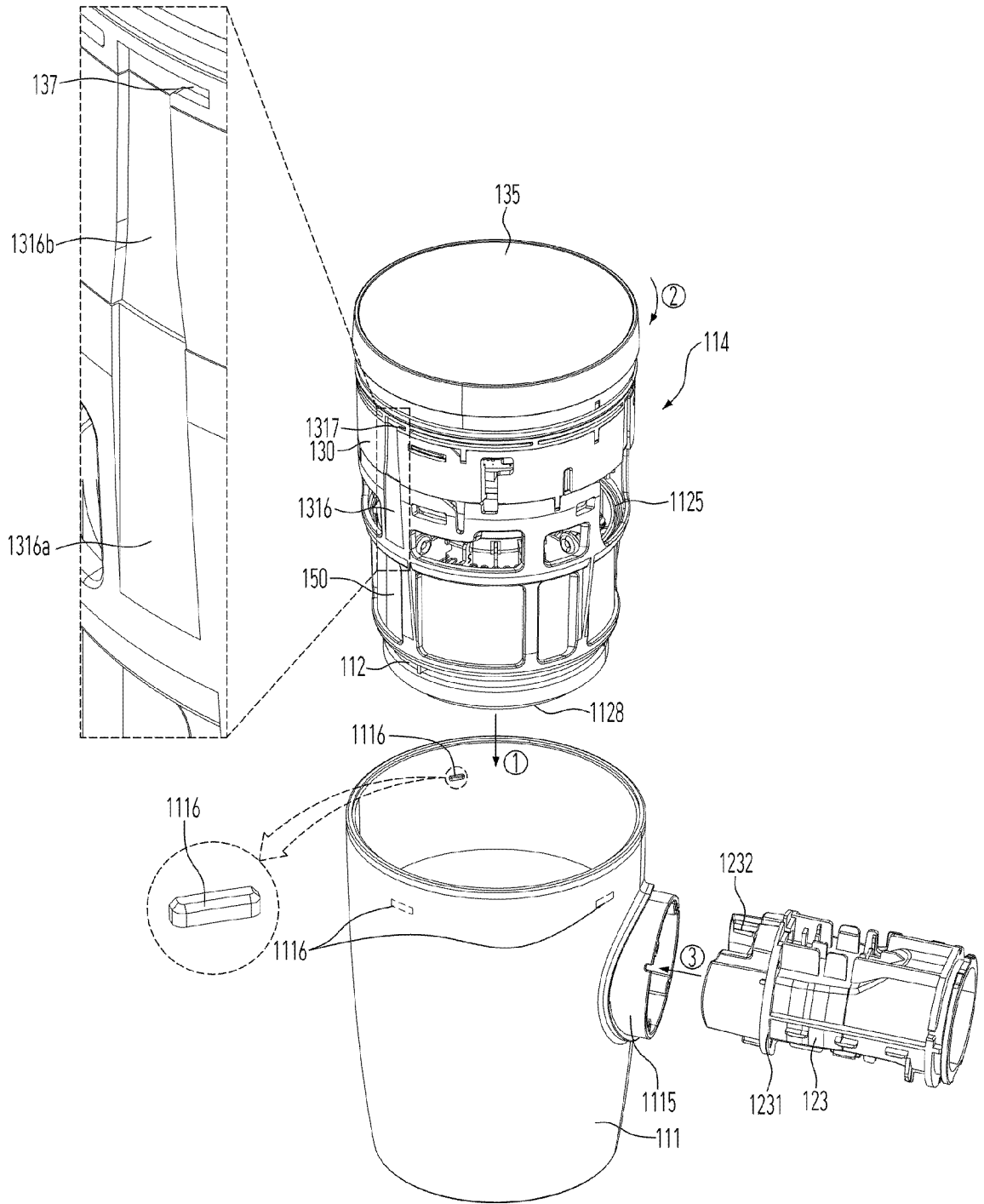


FIG. 6

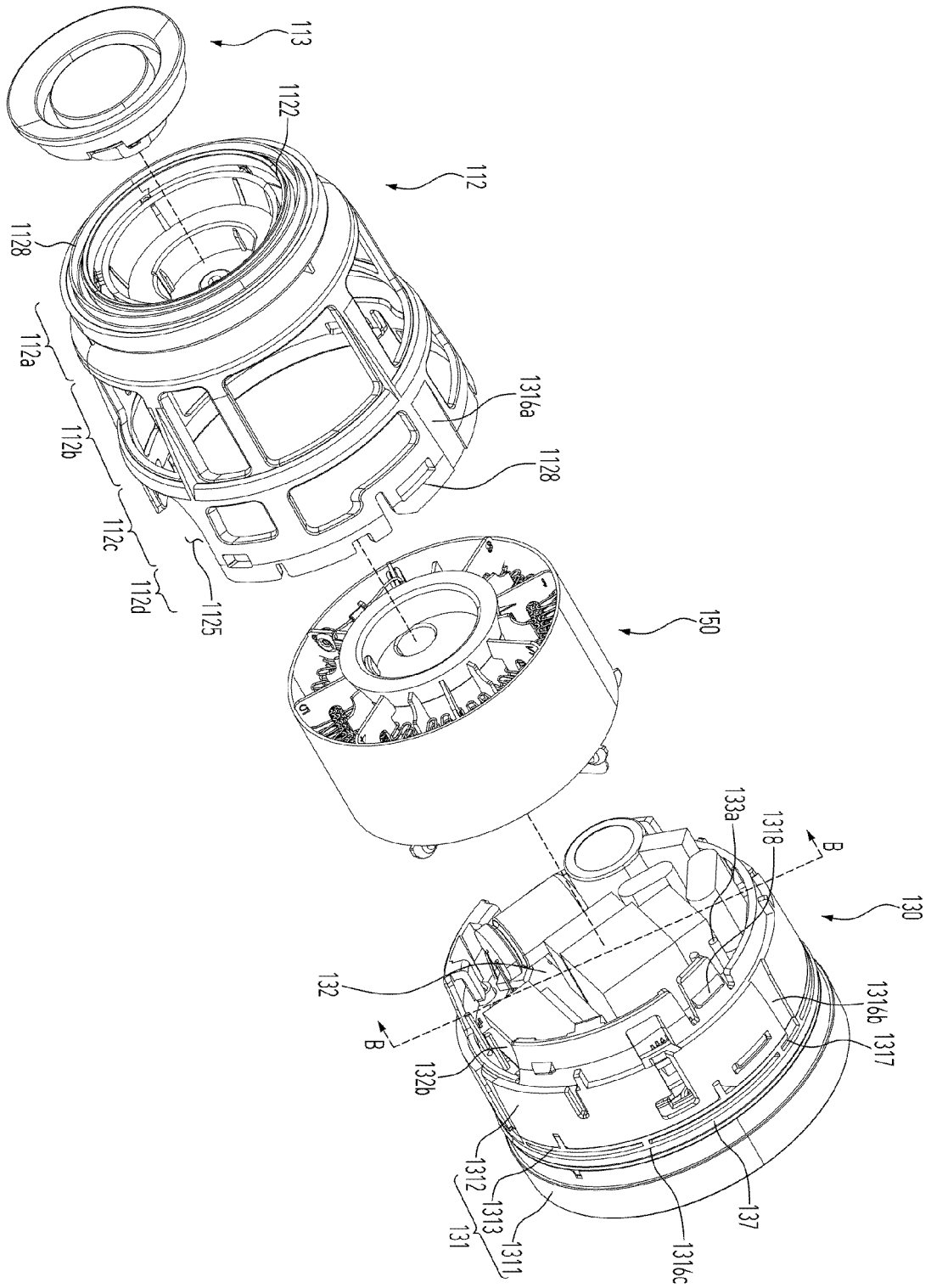


FIG. 7

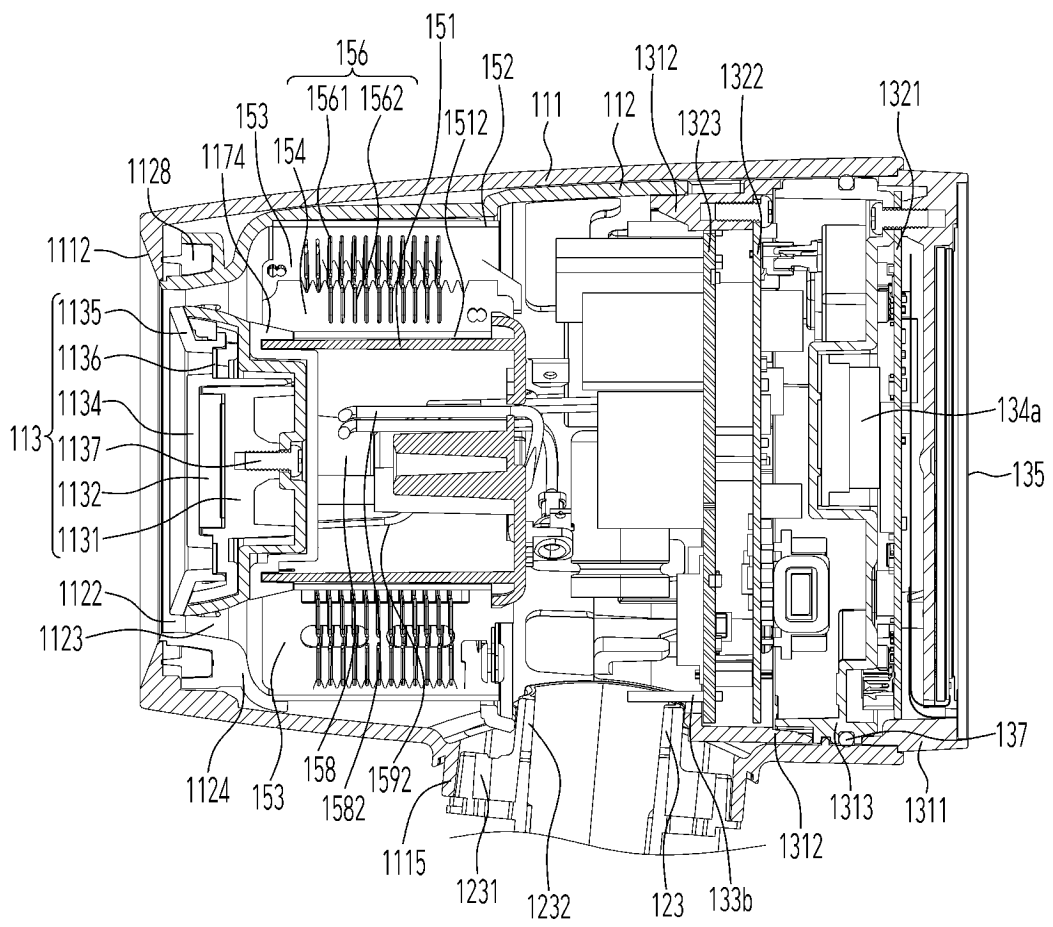


FIG. 8

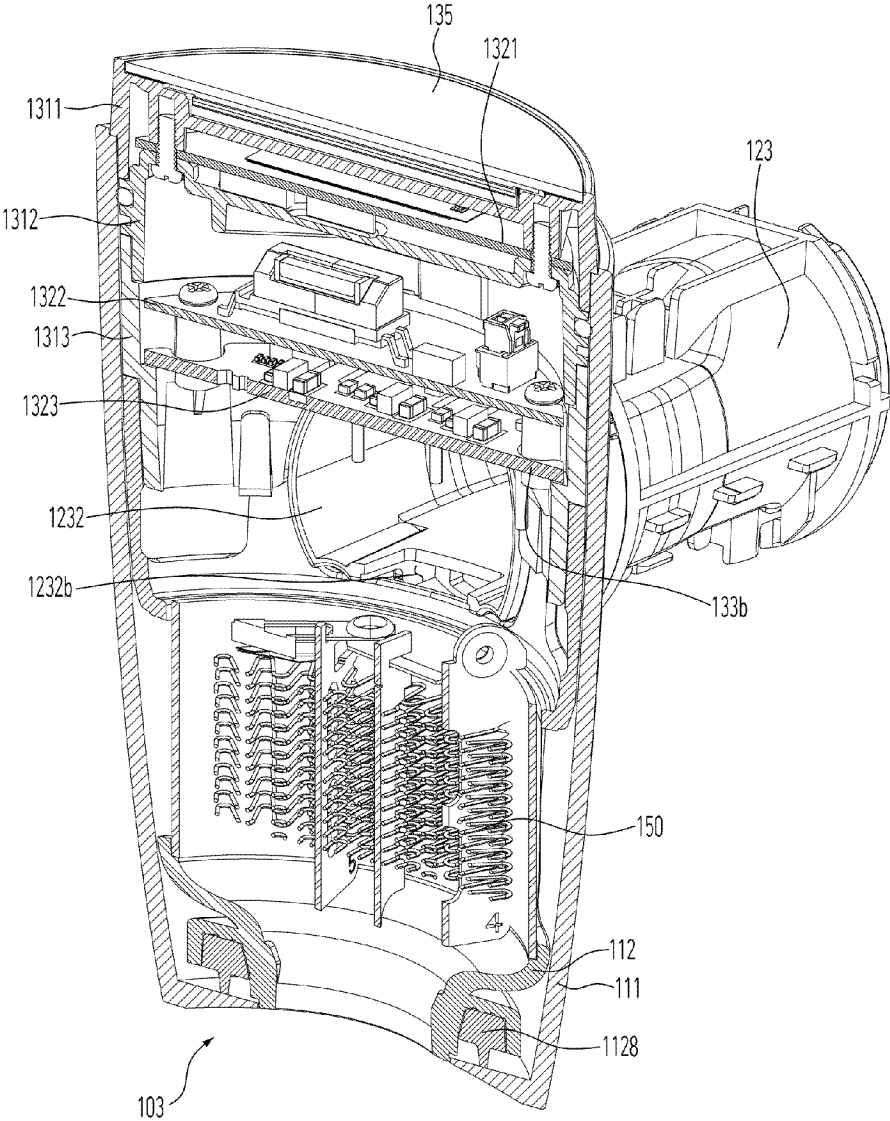


FIG. 9

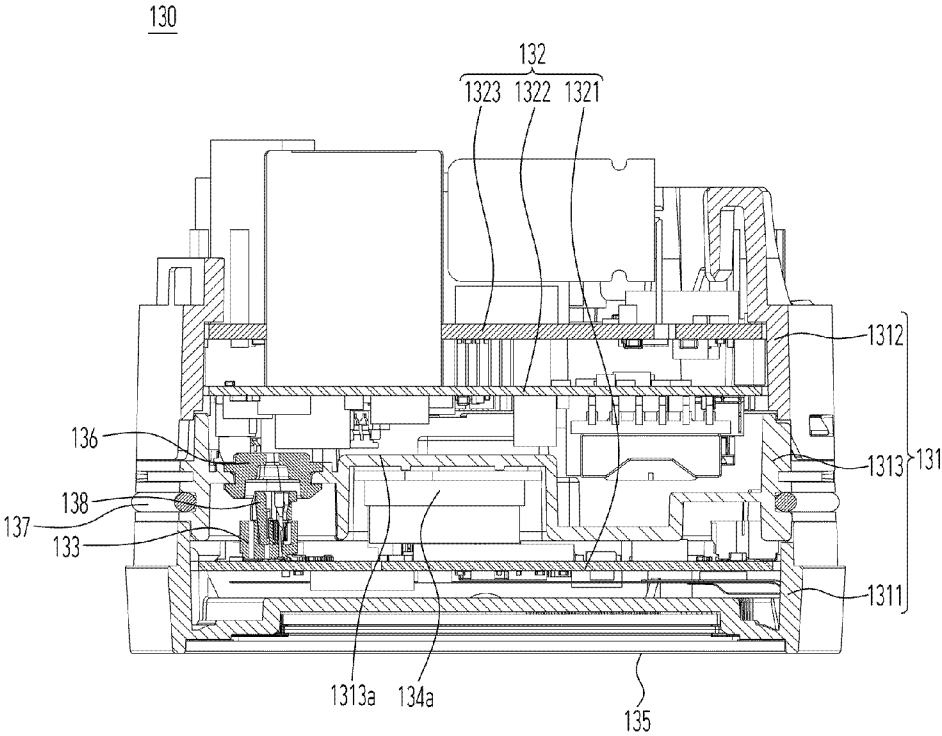


FIG. 10

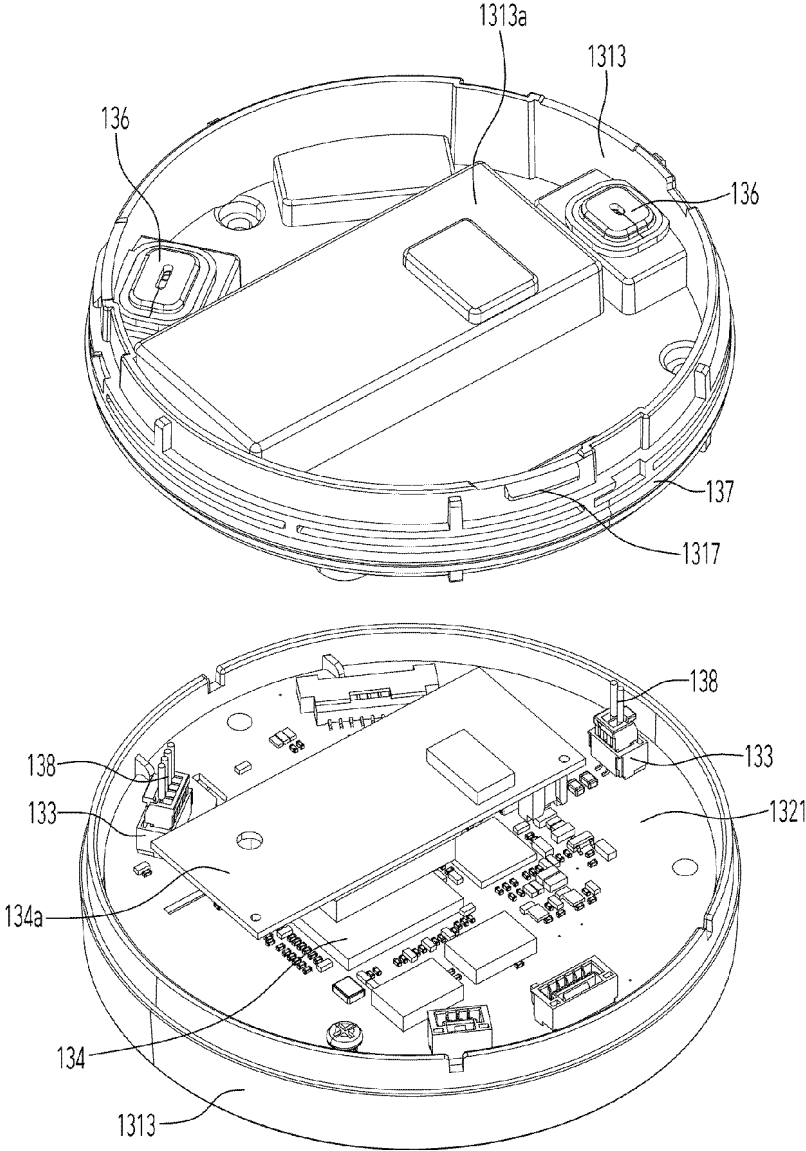


FIG. 11

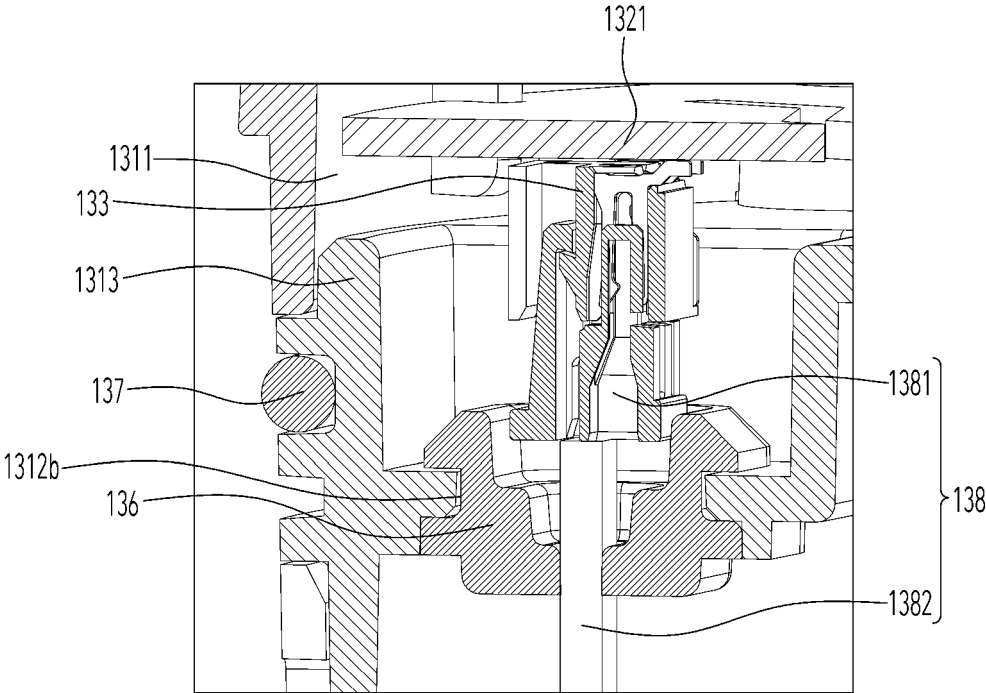
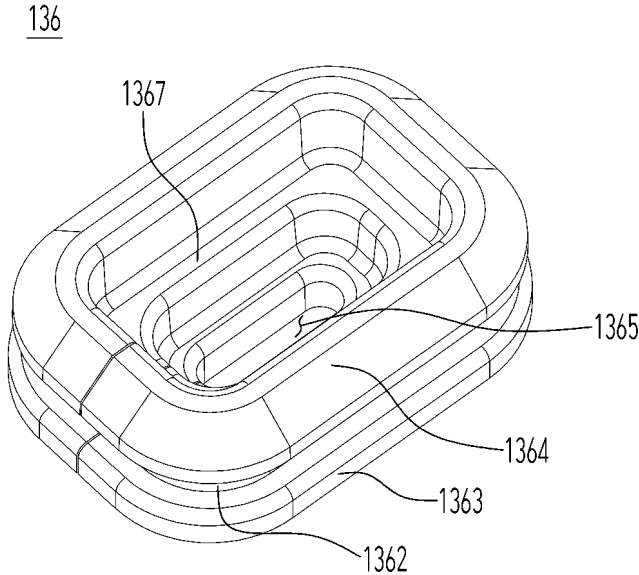
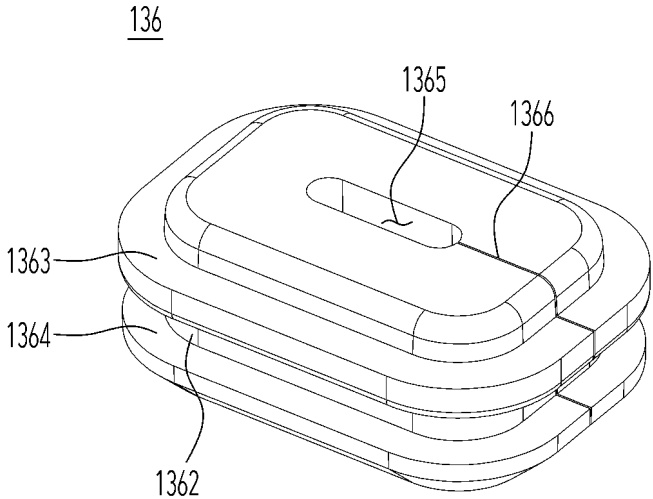


FIG. 12



(a)



(b)

FIG. 13

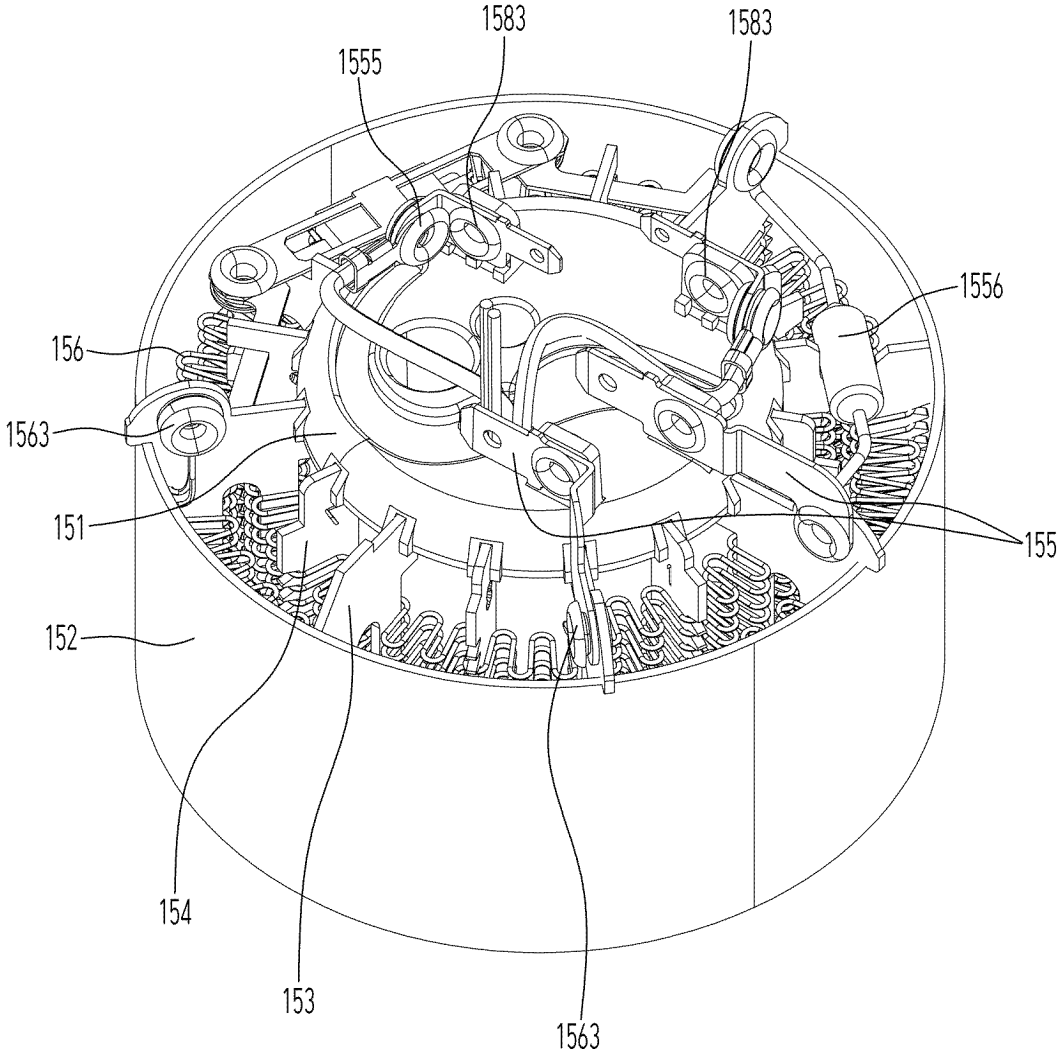


FIG. 14

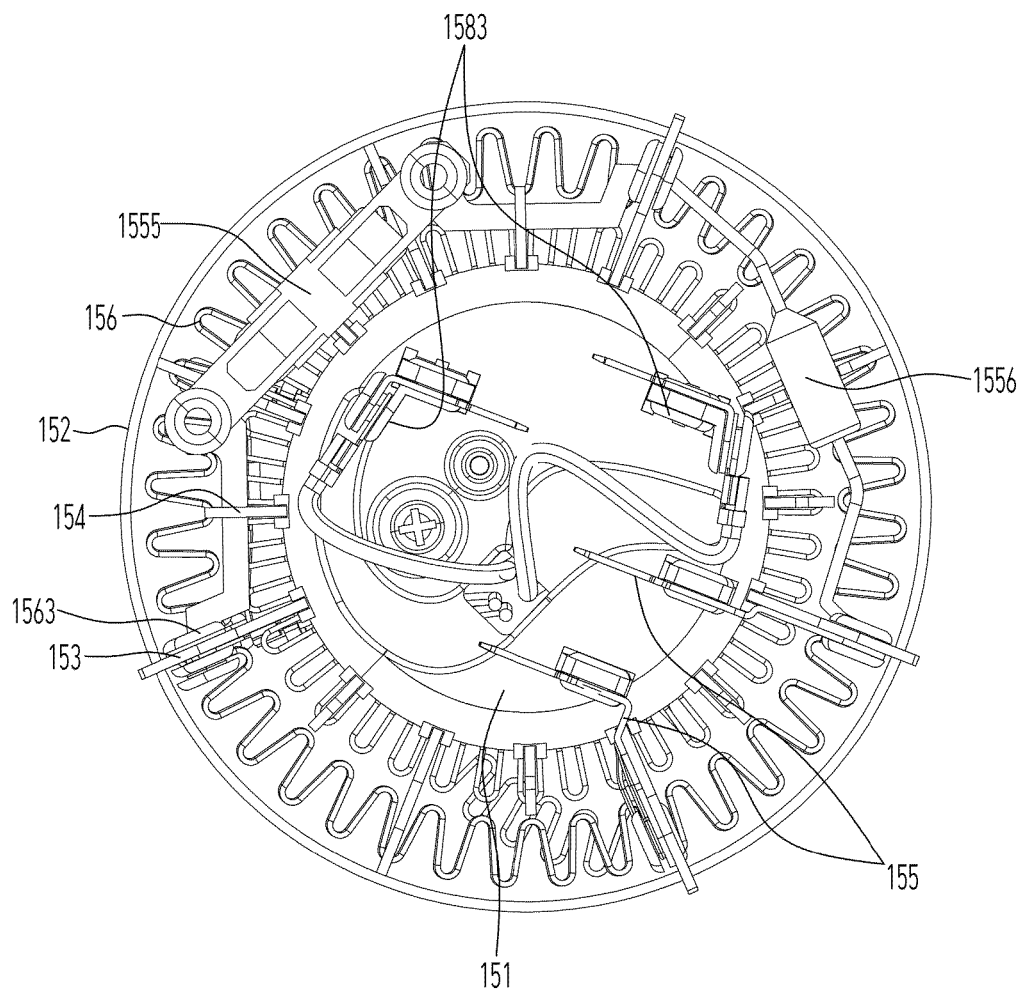


FIG. 15

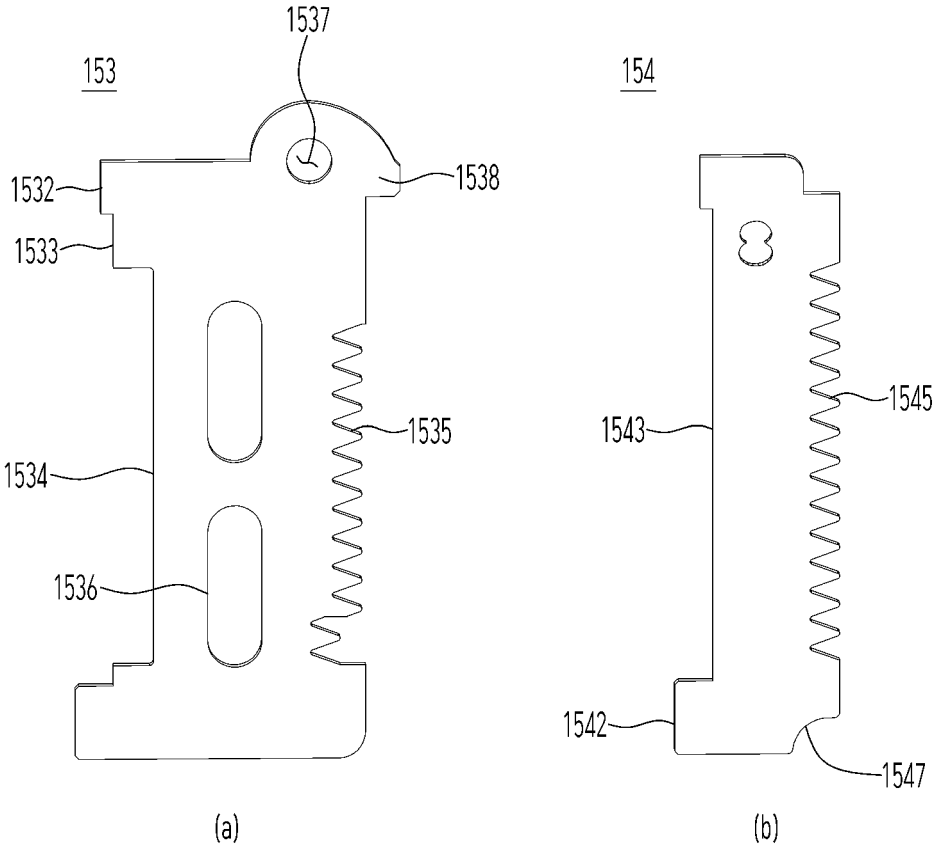


FIG. 16

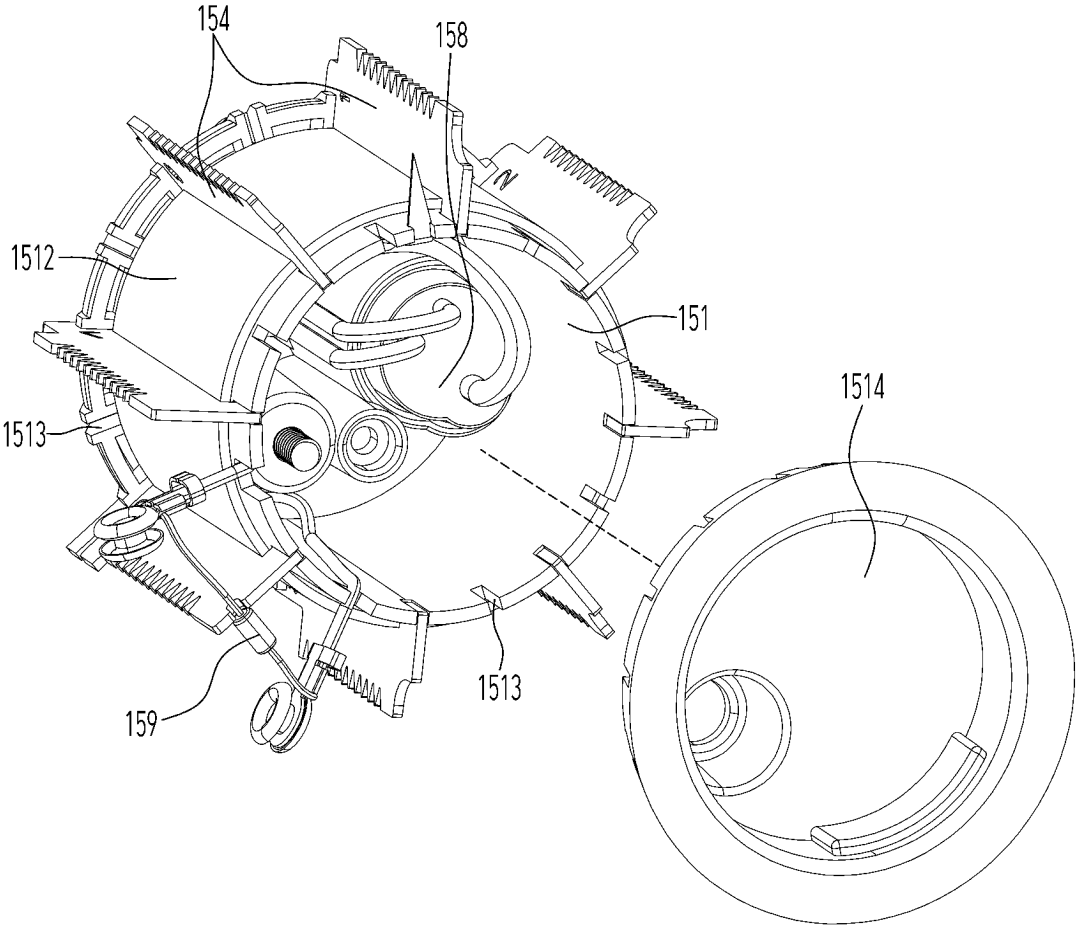


FIG. 17

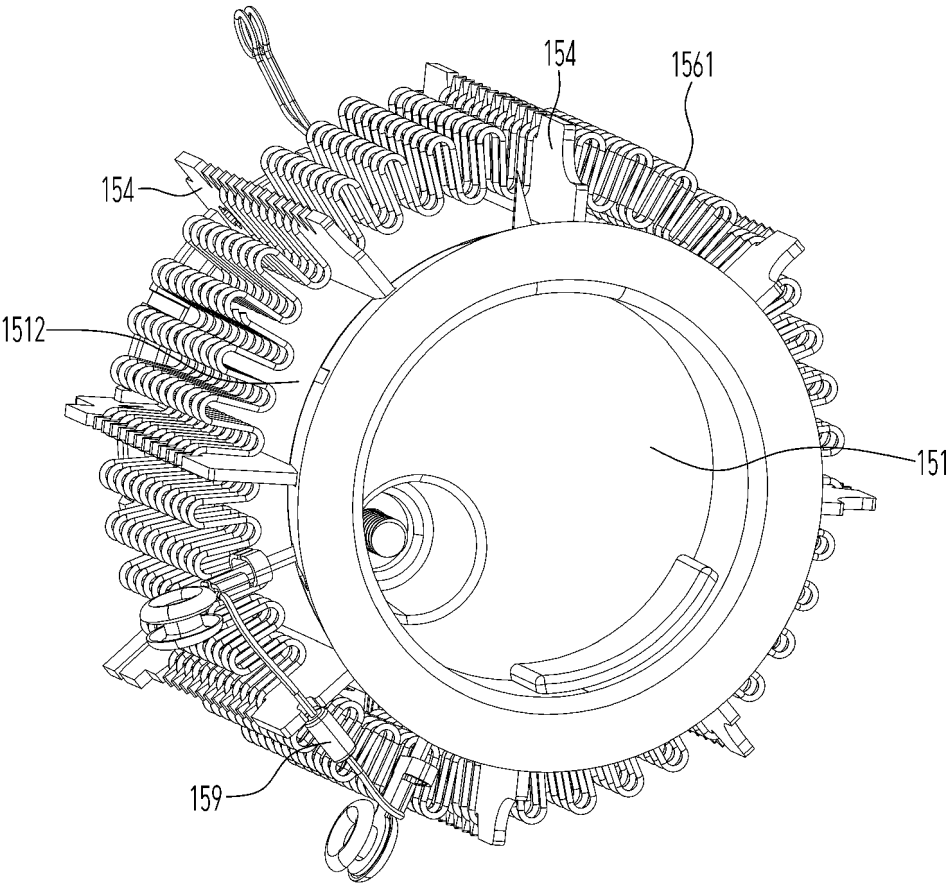


FIG. 18

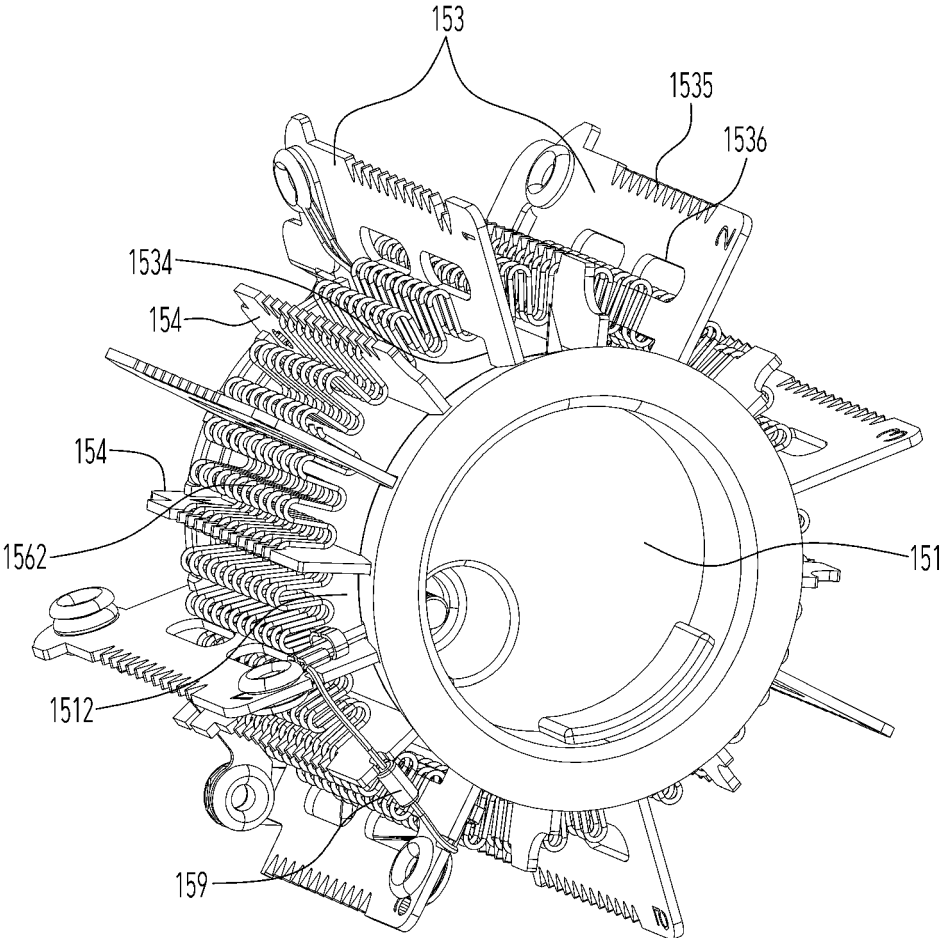


FIG. 19

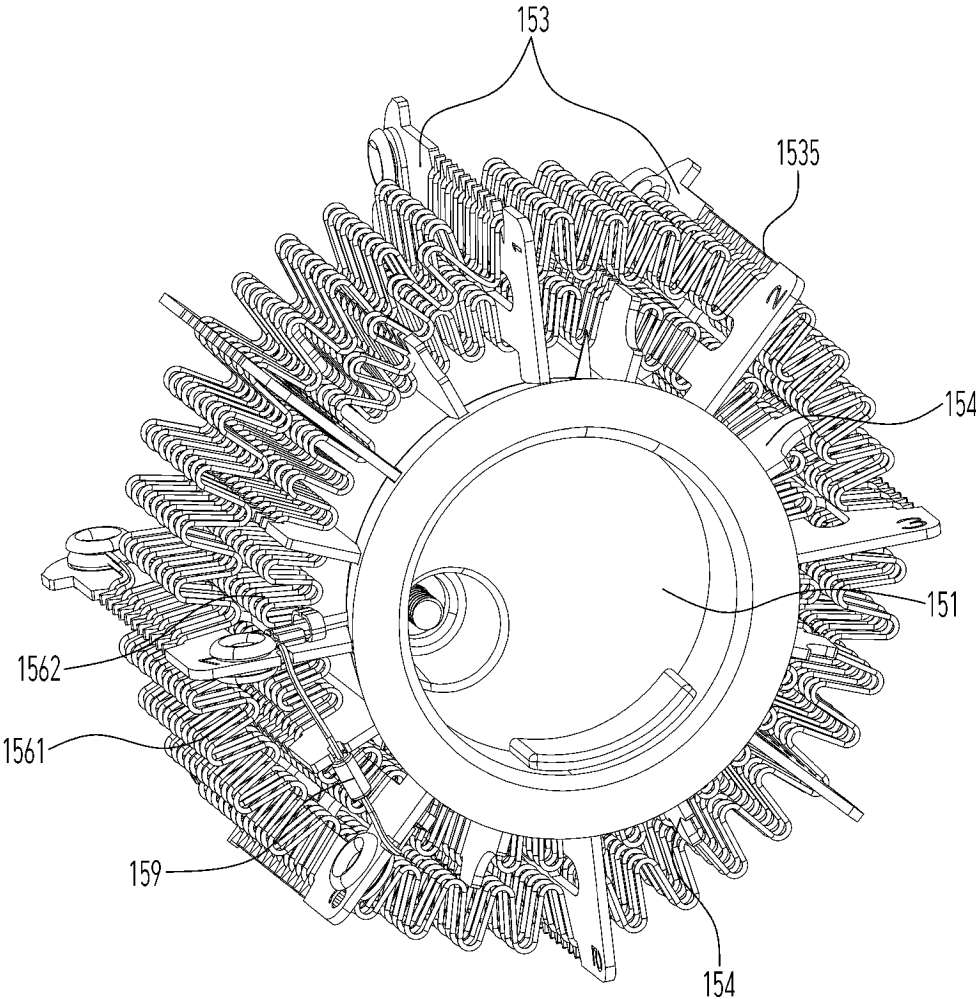


FIG. 20

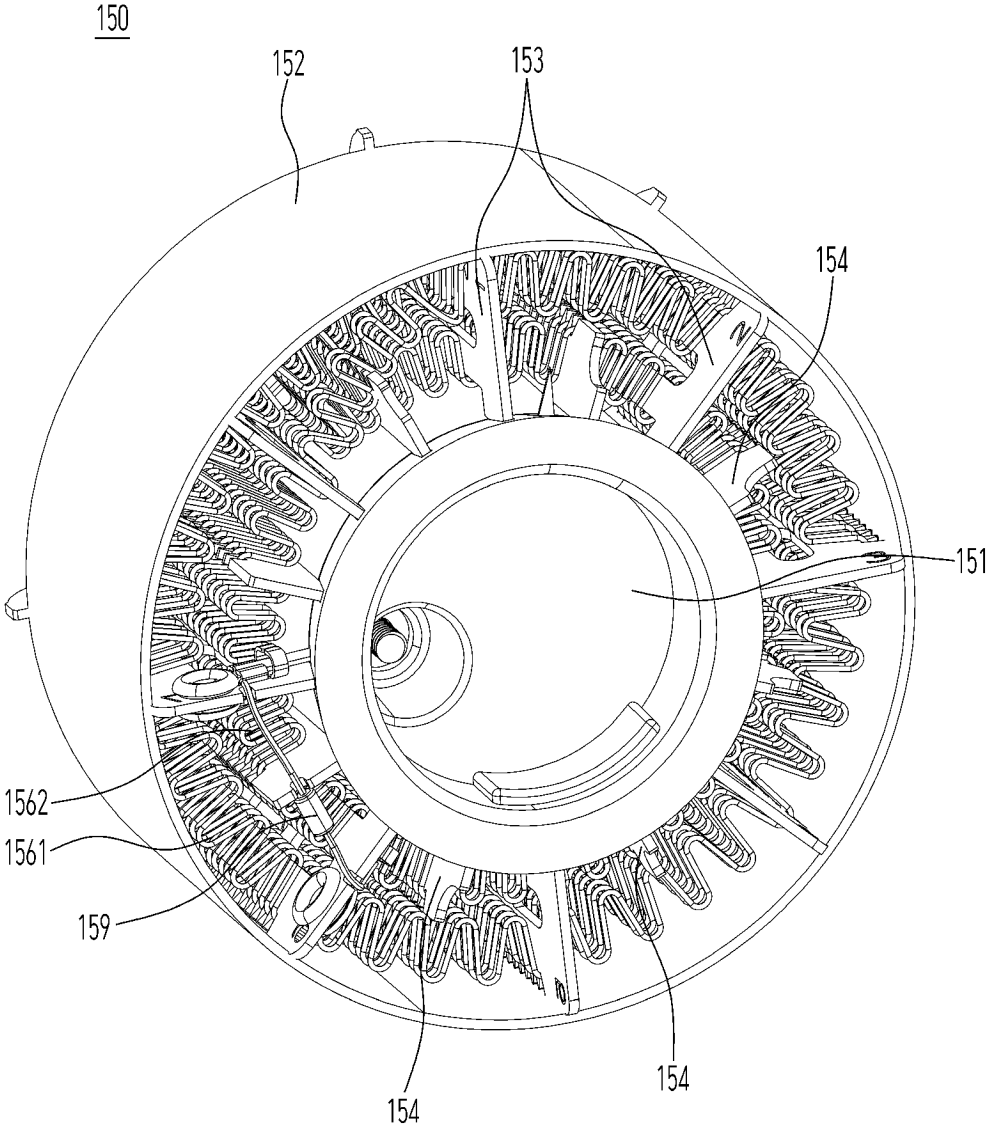
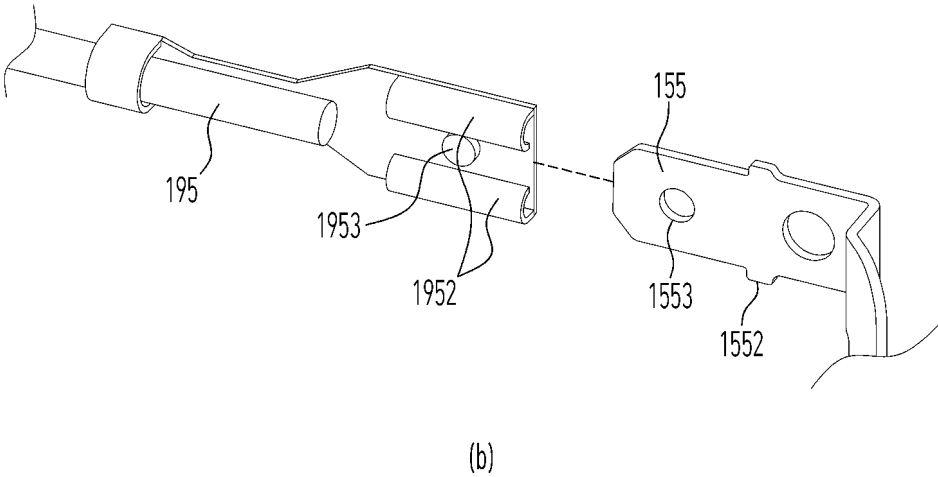
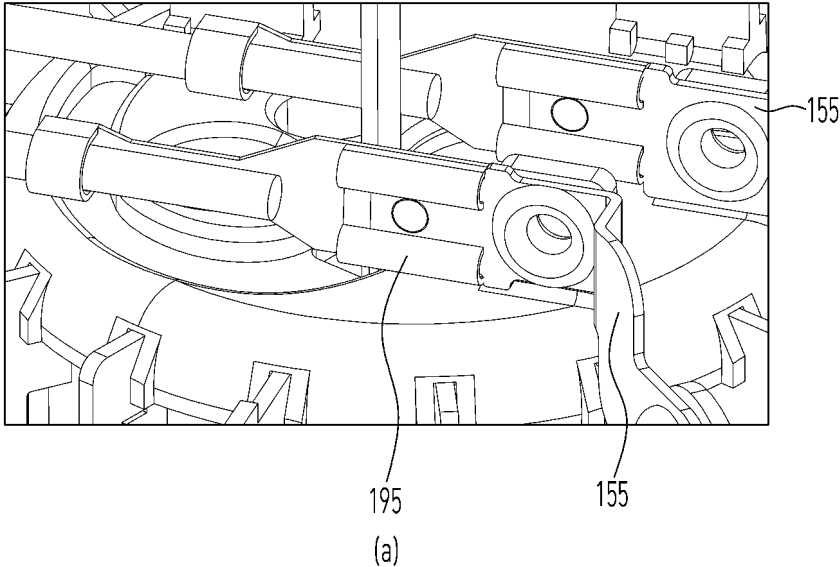


FIG. 21



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/019753

A. CLASSIFICATION OF SUBJECT MATTER
A45D 20/12(2006.01);

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)
A45D 20/12(2006.01); A45D 20/10(2006.01); A61N 1/04(2006.01); F24H 3/04(2006.01); F24H 9/18(2006.01); H01H 19/14(2006.01); H01R 13/115(2006.01); H01R 4/64(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: 헤어 드라이어(hair dryer), 모듈(module), 와이어(wire)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 2017-077472 A (DYSON TECHNOLOGY LTD.) 27 April 2017 (2017-04-27) See paragraphs [0018]-[0032]; and figures 2-4.	1-3,5-15,17 4,16,18-20
Y	CN 111520906 A (CHASE TECHNOLOGY (SHANGHAI) CO., LTD.) 11 August 2020 (2020-08-11) See paragraphs [0031]-[0038]; and figures 2-4.	1-3,5-15,17
Y	KR 10-2018-0072754 A (DYSON TECHNOLOGY LIMITED) 29 June 2018 (2018-06-29) See paragraph [0039].	11
Y	JP 09-082384 A (SUMITOMO WIRING SYST. LTD.) 28 March 1997 (1997-03-28) See paragraph [0005].	14
Y	JP 3242092 U9 (DONGGUAN XINLUN MACHINERY EQUIPMENT CO., LTD.) 26 May 2023 (2023-05-26) See figure 2.	15,17

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

* Special categories of cited documents:
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 "D" document cited by the applicant in the international application
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 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 "O" document referring to an oral disclosure, use, exhibition or other means
 "P" document published prior to the international filing date but later than the priority date claimed
 "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
 "&" document member of the same patent family

Date of the actual completion of the international search: **20 March 2024**
 Date of mailing of the international search report: **20 March 2024**

Name and mailing address of the ISA/KR: **Korean Intellectual Property Office, Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208**
 Authorized officer:
 Facsimile No. **+82-42-481-8578**
 Telephone No.:

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/019753

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	KR 10-2022-0107414 A (LG ELECTRONICS INC.) 02 August 2022 (2022-08-02) See entire document.	1-20
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/019753

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KR 10-2022-0107414 A	02 August 2022	None	

KR 10-2020-0033172 A	27 March 2020	None	
