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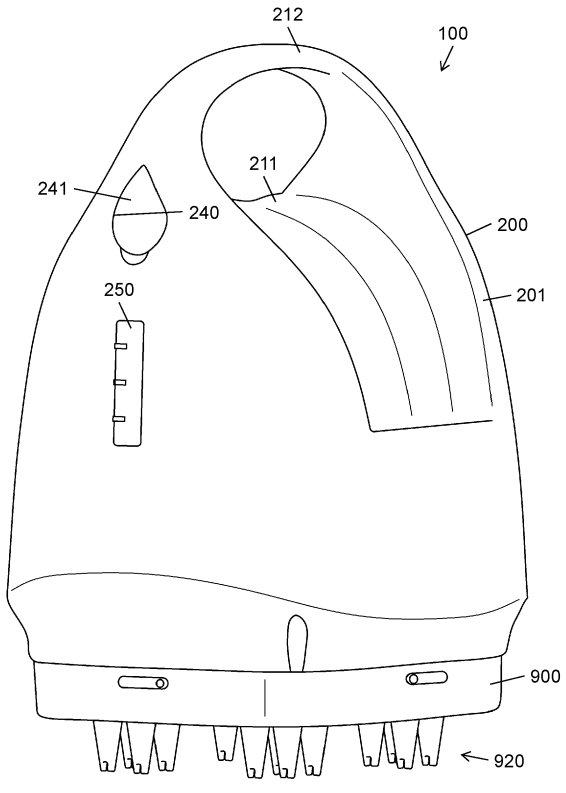
(54) **SCALP CARE DEVICE**

(57) Scalp care device (100) includes housing (200), reservoir (400) that is provided inside housing (200) to store a scalp care agent, and a supply unit that supplies the scalp care agent from reservoir (400) to an outside of housing (200) by electric power. Housing (200) includes discharge port (930) from which the scalp care agent is discharged.

FIG. 1



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Description

BACKGROUND

1. Technical Field

[0001] The present disclosure relates to a scalp care device.

2. Description of the Related Art

[0002] PTL 1 discloses a sesame oil massage device that drips a predetermined amount of heated sesame oil to forehead of a user in a state where the user faces upward. This sesame oil massage device includes a pillow that supports back of a head, an oil collector that receives dripped sesame oil, a heating device that heats the sesame oil, a pump that sends heated sesame oil, and a nozzle that is provided above the pillow and through which the heated sesame oil sent by the pump is dripped.

Citation List

Patent Literature

[0003]

PTL 1: Unexamined Japanese Patent Publication No. 11-221261
PTL 2: Unexamined Japanese Patent Publication No. 2012-61176

SUMMARY

[0004] Incidentally, in the sesame oil massage device (scalp care device) described in PTL 1, it is desired to satisfactorily supply the sesame oil (scalp care agent) to scalp.

[0005] The present disclosure has been made in view of the above circumstances, and an object of the present disclosure is to provide a scalp care device capable of satisfactorily supplying a scalp care agent to scalp.

[0006] A scalp care device according to the present disclosure includes a housing, a reservoir that is provided inside the housing to store a scalp care agent, and a supply unit that supplies the scalp care agent from the reservoir to an outside of the housing by electric power. The housing includes a discharge port from which the scalp care agent is discharged.

[0007] The scalp care device of the present disclosure can satisfactorily supply the scalp care agent to the scalp.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1 is a perspective view of a scalp care device according to an exemplary embodiment as viewed from one direction;
Fig. 2 is a front view of the scalp care device according to the exemplary embodiment as viewed from one direction;
Fig. 3 is a front view of the scalp care device according to the exemplary embodiment as viewed from another direction;
Fig. 4 is a sectional view of the scalp care device according to the exemplary embodiment taken along line A-A of Fig. 3;
Fig. 5 is a sectional view of the scalp care device according to the exemplary embodiment taken along line B-B of Fig. 2;
Fig. 6 is a perspective view illustrating a supply unit and a reservoir of the scalp care device according to the exemplary embodiment;
Fig. 7A is an explanatory diagram of a first tank of the scalp care device according to the exemplary embodiment;
Fig. 7B is an explanatory diagram of the first tank of the scalp care device according to the exemplary embodiment;
Fig. 7C is an explanatory diagram of the first tank of the scalp care device according to the exemplary embodiment;
Fig. 8A is a perspective view of a first main body of a second tank according to the exemplary embodiment;
Fig. 8B is a perspective view of a lid of the second tank according to the exemplary embodiment;
Fig. 9 is a perspective view of the second tank of the scalp care device according to the exemplary embodiment as viewed from one direction;
Fig. 10 is a sectional view of the second tank of the scalp care device according to the exemplary embodiment;
Fig. 11 is an explanatory diagram for describing an operation of a pressure valve of the scalp care device according to the exemplary embodiment;
Fig. 12 is an explanatory diagram for describing an operation of a heating unit of the scalp care device according to the exemplary embodiment;
Fig. 13 is a perspective view of the heating unit of the scalp care device and a second main body of the second tank according to the exemplary embodiment;
Fig. 14 is a plan view of a head part of the scalp care device according to the exemplary embodiment; and
Fig. 15 is an exploded front view illustrating a housing of the scalp care device according to the exemplary embodiment.

DETAILED DESCRIPTIONS

[0009] Hereinafter, an exemplary embodiment will be described in detail with reference to the drawings. However, unnecessarily detailed description may be omitted.

For example, detailed descriptions of already well-known matters and redundant descriptions of substantially identical configurations may be omitted. This is to avoid unnecessary redundancy in the following description and to facilitate understanding by those skilled in the art.

[0010] Note that, the accompanying drawings and the following description are provided for those skilled in the art to fully understand the present disclosure, and are not intended to limit the subject matter described in the claims in any way.

[0011] In addition, in the following description, when a user performs scalp care by using a scalp care device, an up-down direction is defined by using a side of the scalp care device coming into contact with the scalp to be cared as a lower side (bottom portion side) and a side farthest from the scalp to be cared as an upper side (top portion side). Note that, a positional relationship between components to be described below may be appropriately changed.

[0012] In addition, the "user" of the present disclosure includes a person who cares for his or her own scalp by using the scalp care device, a person who cares for the scalp of another person by using the scalp care device, and a person who cares for the scalp by using the scalp care device used by another person. In the following exemplary embodiment, a case where the person who cares for his or her own scalp by using the scalp care device is a user of the scalp care device will be illustrated. Note that, in the following description, the scalp of the user may be simply referred to as "scalp".

(Exemplary embodiment)

[0013] Hereinafter, an exemplary embodiment will be described with reference to Figs. 1 to 15. Scalp care device 100 of the present exemplary embodiment includes housing 200 (see Fig. 1), control circuit 310 (see Fig. 4), battery 320 (see Fig. 5), reservoir 400 (see Fig. 4), pump 510 (see Fig. 4) as a supply unit, motor 610 as a drive unit, and heater 710 (see Fig. 10) as a heating unit.

[1-1-1. Housing]

[0014] Fig. 1 is a perspective view of scalp care device 100 according to the present exemplary embodiment as viewed from one direction. As illustrated in Fig. 1, scalp care device 100 includes housing 200. Housing 200 is a hollow housing made of a material such as plastic.

[0015] Housing 200 has main body 201. Main body 201 is formed in a hollow box shape. Main body 201 accommodates reservoir 400 (see Fig. 4) to be described later.

[0016] A part of a peripheral surface of main body 201 of housing 200 is grip 211. More specifically, grip 211 of the present exemplary embodiment is formed at a top of main body 201. Grip 211 is formed in a shape that is easily gripped by the user. In addition, housing 200 has arch portion 212. In housing 200, arch portion 212 is provided to straddle the top of main body 201, and a portion between arch portion 212 and grip 211 is an insertion portion. The user can operate scalp care device 100 by passing a hand through the insertion portion and holding grip 211. At this time, arch portion 212 is at a position where the arch portion can be locked to the back of the hand of the user, and prevents scalp care device 100 from falling off from the hand. Note that, the user can operate scalp care device 100 by gripping arch portion 212, but can more stably operate scalp care device 100 by gripping grip 211.

[0017] In addition, housing 200 has pouring port 240 that is a hole for the user to pour a scalp care agent into scalp care device 100. Pouring port 240 is provided on a peripheral surface of main body 201 of housing 200 other than grip 211. Pouring port 240 is connected to first tank inlet port 411 (see Fig. 4) of first tank 410 (see Fig. 4) to be described later. In addition, housing 200 has sealing plug 241 detachably attached to pouring port 240. Sealing plug 241 is provided in pouring port 240.

[0018] In addition, housing 200 has window 250 made of a transparent material. Window 250 is provided below pouring port 240. Accordingly, the user can visually confirm the amount of the scalp care agent stored in first tank 410 from an outside of scalp care device 100.

[0019] Fig. 2 is a front view of scalp care device 100 according to the present exemplary embodiment as viewed from one direction. As illustrated in Fig. 2, housing 200 has charging port 260. Charging port 260 is provided on the peripheral surface of main body 201 of housing 200 other than the grip. Charging port 260 is connected to battery 320 (see Fig. 5) provided within housing 200. For example, the user inserts a charging cable connected to a commercial power supply into charging port 260, and thus, battery 320 is charged.

[0020] Fig. 3 is a front view of scalp care device 100 according to the present exemplary embodiment as viewed from another direction. As illustrated in Fig. 3, housing 200 includes operation unit 220 including a plurality of switches and display unit 230 including a plurality of lamps. Operation unit 220 and display unit 230 are provided on a peripheral surface of main body 201 of housing 200 opposite to pouring port 240. Operation unit 220 includes power supply switch 221, supply switch 222, and massage switch 223. Display unit 230 includes suppliable lamp 231 and battery lamp 232.

[0021] Power supply switch 221 is a switch that activates scalp care device 100. Power supply switch 221 is, for example, a rocker switch capable of performing electrical connection and disconnection with respect to control circuit 310 to be described later by the user alternately pressing both ends of power supply switch 221. When power supply switch 221 is switched on, heater 710 (see Fig. 5) as the heating unit starts heating, and suppliable lamp 231 and battery lamp 232 are turned on in a predetermined color. When power supply switch 221 is switched off, a massage operation and heating of the scalp care agent to be described later are stopped, and

suppliable lamp 231 and battery lamp 232 are turned off. However, a case where scalp care device 100 is connected to a power supply is not limited to such a case, and battery lamp 232 to be described later is in a state of being turned on in a predetermined color.

[0022] Supply switch 222 is, for example, a press button switch, and is a switch that starts the supply of the scalp care agent by operating pump 510 (see Fig. 4) as the supply unit to be described later. Supply switch 222 is preferably provided at a position where the user presses the supply switch in a state of gripping grip 211. When the user presses supply switch 222 in a state where power supply switch 221 is turned on, pump 510 operates once and then stops. Accordingly, the scalp care agent is supplied to the scalp of the user. Note that, when a temperature of the scalp care agent does not reach a predetermined range, even though supply switch 222 is pressed, pump 510 may not operate. In addition, when supply switch 222 is pressed once, pump 510 may continuously operate until supply switch 222 is pressed next, or pump 510 may continuously operate while supply switch 222 is continuously pressed.

[0023] Massage switch 223 is, for example, a press button switch, and switches between on and off of the massage operation. As illustrated in Fig. 3, massage switch 223 is disposed to be aligned with supply switch 222 in an up-down direction. Similarly to supply switch 222, massage switch 223 is preferably provided at a position where the user can press massage switch 223 in a state of gripping grip 211. When the user presses massage switch 223 in a state where power supply switch 221 is turned on, massage elements 920a to 920d (see Fig. 13) as a massage unit to be described later starts the massage operation. Thereafter, when the user presses massage switch 223 again, massage elements 920a to 920d stop the massage operation.

[0024] Suppliable lamp 231 indicates whether or not the scalp care agent is in a state of being suppliable. For example, suppliable lamp 231 is turned on in a red emission color when the temperature of the scalp care agent is lower than a temperature in the predetermined range, and is turned on in a green emission color when the temperature of the scalp care agent is the temperature in the predetermined range. The predetermined range is, for example, a range of 45°C or more to less than 50°C. Further, when scalp care device 100 is in an error state, suppliable lamp 231 may be turned on in a blue emission color. The error state is, for example, a case where the temperature of the scalp care agent is an abnormal temperature (for example, in a case where the temperature is less than 0°C or 70°C or more) or a case where the temperature of the scalp care agent cannot be detected. Note that, when the scalp care agent within first tank 410 becomes empty, suppliable lamp 231 may display the fact that the first tank is empty by being turned on in a color different from the above color or being turned on and off.

[0025] Battery lamp 232 indicates a charging state of scalp care device 100. For example, battery lamp 232 is turned on and off in a red emission color in a case where the scalp care device is charged in a state where the remaining amount of battery 320 is smaller than a predetermined value, is turned on and off in a red emission color in a case where the scalp care device is charged in a state where the remaining capacity of battery 320 is larger than the predetermined value, and is turned on and off in a green emission color in a case where the charging of battery 320 is completed. That is, battery lamp 232 of the present exemplary embodiment performs three-stage display in accordance with the remaining amount of battery 320. Note that, the emission color, the turning-on and -off, or turning-on state, the number, and the stage of suppliable lamp 231 and battery lamp 232 are not limited to the above examples, and may be appropriately changed.

[0026] Housing 200 of the present exemplary embodiment includes head part 900. Details of head part 900 will be described in the second of "[1-1-6. Head part]".

[0027] Control circuit 310 and motor 610 as the drive unit are provided inside housing 200. Control circuit 310 is electrically connected to motor 610, pump 510, heater 710, and the like, and controls motor 610, pump 510, heater 710, and the like when power supply switch 221 is turned on.

[1-1-2. Supply unit]

[0028] Fig. 4 is a sectional view taken along line A-A of scalp care device 100 according to the exemplary embodiment (see Fig. 3 for line A-A). As illustrated in Fig. 4, pump 510 as the supply unit is provided inside housing 200.

[0029] Fig. 6 is a perspective view illustrating the supply unit and reservoir 400 to be described later inside housing 200. The scalp care agent is discharged to an outside of scalp care device 100 through a flow path in order of pouring port 240 (see Fig. 4) of housing 200 (see Fig. 4), first tank 410, first hose 420, pump 510, second hose 430, second tank 440, and discharge port 930 (see, for example, Fig. 4). Note that, the configuration and order of the flow path of the scalp care agent are not limited thereto, and may be appropriately changed.

[0030] Pump 510 supplies the scalp care agent from reservoir 400 to an outside of housing 200 by electric power. Pump 510 is, for example, a peristaltic pump, but is not limited thereto. Pump 510 is controlled by control circuit 310. Pump 510 operates once when the user presses supply switch 222 in a state where power supply switch 221 is turned on. In one operation, pump 510 draws a predetermined amount of scalp care agent from first tank 410 to pump 510 via first hose 420, sends the scalp care agent to second tank 440 via second hose 430, and discharges the scalp care agent stored within second tank 440 to the outside of housing 200 in a form of pressing out the scalp care agent in a case where the scalp care agent is already stored in second tank 440.

The predetermined amount is, for example, 1 mL. Note that, in a case where the scalp care agent is not stored within second tank 440, pump 510 may supply the scalp care agent to the outside of housing 200 by the user pressing supply switch 222 twice. In addition, pump 510 may operate once when power supply switch 221 is switched on.

[1-1-3. Reservoir]

[0031] As illustrated in Fig. 4, reservoir 400 for storing the scalp care agent is provided inside housing 200. Reservoir 400 includes first tank 410 and second tank 440.

[0032] First tank 410 is called main tank, and stores the scalp care agent flowing in from pouring port 240. First tank 410 can store up to a first amount of scalp care agent. The first amount is, for example, 20 mL. The first amount may not be 20 mL, but desirably exceeds an average amount of scalp care agent used by the user in one scalp care.

[0033] Figs. 7A to 7C are explanatory diagrams of first tank 410 according to the present exemplary embodiment. As illustrated in Figs. 7A to 7C, first tank 410 includes main body 414 and lid 415. Main body 414 stores the scalp care agent. A side surface of main body 414 has scale 416 for allowing the user to confirm the amount of the scalp care agent within first tank 410. First tank 410 is disposed within housing 200 such that scale 416 matches window 250 of housing 200. In other words, first tank 410 is disposed within housing 200 such that scale 416 and window 250 face each other. Lid 415 of first tank 410 has first tank inlet port 411 through which the scalp care agent poured from pouring port 240 flows into first tank 410. First tank inlet port 411 is provided in lid 415 of first tank 410.

[0034] In addition, as illustrated in Figs. 7A to 7C, first tank 410 has tube portion 412 extending from an inside to an outside of first tank 410. Tube portion 412 includes fixed end portion 412a connected to first hose 420, free end portion 412b positioned closer to a bottom side of main body 414 than fixed end portion 412a, and intermediate portion 412d. Fixed end portion 412a is fixed to lid 415 of first tank 410. More specifically, fixed end portion 412a is fixed to lid 415 to be also fixed to main body 414. In addition, weight 412c is attached to free end portion 412b. Weight 412c is, for example, a metal weight. Free end portion 412b is swingable within main body 414 according to gravity (see Figs. 7A to 7C). Note that, it is not essential that weight 412c is attached to free end portion 412b. Tube portion 412 is desirably a tube made of, for example, an elastic member such as plastic or rubber, but is not limited thereto. Since free end portion 412b is configured to be swingable within main body 414, free end portion 412b is positioned at a lowermost portion within main body 414 regardless of an angle at which the user holds scalp care device 100. Thus, when the scalp care agent is stored within first tank 410, free end portion 412b is easily immersed in the scalp care agent. That is, according to scalp care device 100 of the present exemplary embodiment, it is possible to reduce the occurrence of a situation where the scalp care agent cannot be supplied even though the scalp care agent is within first tank 410. In addition, intermediate portion 412d has a plug that closes a gap between lid 415 of first tank 410 and tube portion 412, and prevents the scalp care agent from leaking.

[0035] Second tank 440 is called a sub-tank or an in-line tank connected in series to first tank 410. Second tank 440 is connected to first tank 410 and stores a second amount of scalp care agent smaller than the first amount. The second amount is, for example, 1 mL, but is not limited thereto. Second tank 440 of the present exemplary embodiment is disposed below first tank 410 within housing 200. More specifically, second tank 440 is disposed to be positioned at a lower end within housing 200.

[0036] Fig. 8A is a perspective view of first main body 450 of second tank 440. Fig. 8B is a perspective view of lid 460 of second tank 440. In addition, Fig. 9 is a perspective view of second tank 440 as viewed from one direction. Fig. 10 is a sectional view of second tank 440. Fig. 13 is a perspective view of heater 710 as the heating unit and second main body 470 of second tank 440. As illustrated in Figs. 8A, 8B, 9, and 13, second tank 440 includes first main body 450 (see Fig. 8A), lid 460 (see Fig. 8B), and second main body 470 (see Fig. 13).

[0037] A material of first main body 450 is, for example, nylon. First main body 450 has four fixing holes 451 (see Fig. 8A). Lid 460 has four fixing holes 461 (see Fig. 8B). Second main body 470 has four fixing holes 471 (see Fig. 13). First main body 450, second main body 470, and lid 460 are fixed to housing 200 by screws passing through fixing holes 451, fixing holes 461, and fixing holes 471.

[0038] As illustrated in Fig. 8A, first main body 450 includes bottom portion 4501, side wall portion 4502, and four protruding pieces 4503. Bottom portion 4501 is formed in a disk shape. Side wall portion 4502 is formed in a cylindrical shape. Side wall portion 4502 protrudes upward from an outer edge of bottom portion 4501. Four protruding pieces 4503 protrude outward from an outer peripheral surface of side wall portion 4502. Four protruding pieces 4503 are formed at equal intervals in a circumferential direction of side wall portion 4502. Fixing hole 451 described above is formed in each of four protruding pieces 4503.

[0039] In addition, at a center of bottom portion 4501, four through-holes 458 (only two are illustrated in the example of Fig. 8A) penetrating bottom portion 4501 in a thickness direction of bottom portion 4501 are formed. Four through-holes 458 are aligned at equal intervals in an arc shape.

[0040] In addition, first main body 450 further includes pressure valve 456. Pressure valve 456 is formed at the center of bottom portion 4501 and at a center of a region where four through-holes 458 are formed. A material of

pressure valve 456 is, for example, a soft resin such as plastic, but may be metal. Fig. 11 is an explanatory diagram for describing an operation of pressure valve 456. When the amount of the scalp care agent stored in second tank 440 is less than or equal to 1 mL, as illustrated in Fig. 11, pressure valve 456 closes four through-holes 458 below bottom portion 4501 (lower side of Fig. 11). In other words, pressure valve 456 closes the flow path of the scalp care agent to discharge portion 457. Pressure valve 456 closes four through-holes 458, and thus, it is possible to reduce a possibility that the scalp care agent flows out of second tank 440 through discharge portion 457.

[0041] In addition, pressure valve 456 is displaced downward when the pressure applied to pressure valve 456 exceeds a predetermined value (see an arrow in Fig. 11). When pressure valve 456 is displaced downward, the scalp care agent accumulated inside second tube portion 454 to be described later moves to nozzle portion 452 to be described later through four through-holes 458. Here, for example, it is assumed that the predetermined value of the pressure is a pressure for 1 mL of the scalp care agent.

[0042] More specifically, when pump 510 operates once in a state where 1 mL of the scalp care agent is accumulated in second tank 440, 1 mL of the scalp care agent is sent from first tank 410 to second tank 440, and the pressure applied to pressure valve 456 exceeds the predetermined value. Then, pressure valve 456 is displaced downward, and thus, the scalp care agent flows into nozzle portion 452 through four through-holes 458. 1 mL of the scalp care agent is pressed out from discharge portion 457. That is, pressure valve 456 retains the scalp care agent within second tank 440 until a pressure by the scalp care agent sent from first tank 410 is applied. Accordingly, the scalp care agent does not come out of discharge portion 457 until a predetermined amount of scalp care agent is sent into second tank 440 by pump 510. Thus, it is possible to reduce a possibility that the scalp care agent unintentionally leaks from scalp care device 100. Note that, a configuration for reducing the possibility that the scalp care agent leaks is not limited to pressure valve 456, and may be, for example, an electromagnetic valve. That is, second tank 440 may include an electromagnetic valve instead of pressure valve 456.

[0043] In addition, the amount of scalp care agent sent out by pump 510 in one operation and the amount of the scalp care agent retainable by pressure valve 456 are desirably the same (for example, 1 mL). Accordingly, the amount of scalp care agent supplied to the scalp by pressing supply switch 222 once becomes constant. Therefore, the user can supply approximately the same amount of scalp care agent to the scalp each time.

[0044] In addition, as illustrated in Fig. 11, first main body 450 further includes nozzle portion 452. Nozzle portion 452 is formed in a cylindrical shape. Nozzle portion 452 protrudes downward from the center of bottom portion 4501. In a case where nozzle portion 452 is viewed from below, four through-holes 458 are positioned inside an inner periphery of nozzle portion 452. In addition, O-ring 455 for preventing the leakage of the scalp care agent is provided on an outer periphery of nozzle portion 452.

[0045] In addition, nozzle portion 452 includes discharge portion 457. Discharge portion 457 is provided at a center of a lowermost portion of nozzle portion 452. Discharge portion 457 is an outlet port of the scalp care agent in second tank 440. Discharge portion 457 is a through-hole of which an opening area decreases toward the lower side.

[0046] As illustrated in Fig. 10, second main body 470 is disposed to be fitted in a space formed by bottom portion 4501 and side wall portion 4502 of first main body 450. Second main body 470 stores the scalp care agent stored in second tank 440. Second main body 470 is preferably made of a material having relatively high thermal conductivity. Second main body 470 of the present exemplary embodiment is made of aluminum. Since second main body 470 is made of a material having relatively high thermal conductivity such as aluminum, heat transferred from heater 710 can be effectively transferred to the scalp care agent. Note that, second main body 470 is preferably made of a material that is relatively less likely to rust.

[0047] As illustrated in Fig. 13, second main body 470 includes bottom portion 473, side wall portion 472, four protruding pieces 475, and second tube portion 454. Second tube portion 454 is formed in a cylindrical shape of which an axial direction is along an up-down direction. Bottom portion 473 is formed in an annular shape. Bottom portion 473 protrudes outward from a lower end over the entire circumference of an outer periphery of second tube portion 454. Side wall portion 472 is formed in a cylindrical shape. Side wall portion 472 protrudes upward from an outer edge of bottom portion 473. Four protruding pieces 475 protrude outward from an outer peripheral surface of side wall portion 472. Four protruding pieces 475 are formed at equal intervals in a circumferential direction of side wall portion 472. Fixing hole 471 described above is formed in each of four protruding pieces 475.

[0048] As illustrated in Fig. 8B, lid 460 has base portion 4601, four protruding pieces 4602 (only three are illustrated in Fig. 8B), and first tube portion 453. Base portion 4601 is formed in a disk shape. Four protruding pieces 4602 protrude outward from an edge of base portion 4601. Four protruding pieces 4602 are formed at equal intervals in a circumferential direction of base portion 4601. Fixing hole 461 described above is formed in each of four protruding pieces 4602. First tube portion 453 is formed in a bent cylindrical shape. Second hose 430 is connected to first tube portion 453. First tube portion 453 includes first portion 4531 and second portion 4532. First portion 4531 and second portion 4532 are integrally formed. First portion 4531 is fixed to base portion 4601 to penetrate base portion 4601 in an up-down direction.

An axial direction of first portion 4531 is along the up-down direction. Second portion 4532 is continuous with an upper end of first portion 4531 and protrudes obliquely upward from an upper end of first portion 4531.

[0049] As illustrated in Fig. 10, second tank 440 has first tube portion 453 for causing the scalp care agent to flow into second tank 440, and second tube portion 454 for allowing the scalp care agent to be discharged from an inside to an outside of second tank 440. More specifically, first tube portion 453 is formed integrally with lid 460 of the second tank, and is a flow path for transferring the scalp care agent from second hose 430 to the inside of second tank 440. First tube portion 453 is a tube or the like made of synthetic resin or the like. Second tube portion 454 is formed in a cylindrical shape by using a hard resin or the like, and is erected substantially at a center of second tank 440.

[0050] In a state where scalp care device 100 is placed on a horizontal plane such that discharge port 930 (see Fig. 5) faces the horizontal plane, as illustrated in Fig. 10, opening portion 4541 on an upstream side of second tube portion 454 in the flow path of the scalp care agent is positioned above opening portion 4533 on a downstream side of first tube portion 453 in the flow path of the scalp care agent. Accordingly, the scalp care agent flowing into second tank 440 from first tube portion 453 flows into second tube portion 454 only after a water level thereof reaches opening portion 4541 on the upstream side of second tube portion 454. In a portion where the scalp care agent newly flowing in from first tank 410 and the scalp care agent heated within second tank 440 are mixed, the temperature of the scalp care agent decreases. However, according to scalp care device 100 of the present exemplary embodiment, since the mixed scalp care agent is not immediately discharged, the scalp care agent having an appropriate temperature can be supplied to the scalp of the user. Note that, the opening portion on the downstream side of second tube portion 454 is connected to discharge portion 457 through nozzle portion 452.

[1-1-4. Heating unit]

[0051] Scalp care device 100 includes heater 710 as the heating unit illustrated in Fig. 12 inside housing 200. Heater 710 is controlled by control circuit 310. Heater 710 is, for example, a silicon heater. Heater 710 heats second tank 440. Heater 710 is formed in a flexible plate shape. As illustrated in Fig. 13, heater 710 of the present exemplary embodiment is bent to match a shape of second main body 470 of second tank 440, and disposed to cover an outer wall of second main body 470. In other words, heater 710 as the heating unit is disposed to surround second main body 470. In addition, at least a part of heater 710 comes into contact with second main body 470. Accordingly, the heat of heater 710 is conducted to the entire outer wall of second main body 470 (see arrows in Fig. 12). At this time, since a material of second main body 470 is made of a material having relatively high thermal conductivity, the scalp care agent within second main body 470 can be quickly heated.

[0052] Heater 710 heats the second amount (1 mL) of scalp care agent within second main body 470 by heating second main body 470 of second tank 440. Accordingly, a time until the scalp care agent reaches a desired temperature, that is, a heating time is shortened as compared with a case where the first amount of scalp care agent is heated. In the present exemplary embodiment, only second tank 440 is heated, and first tank 410 is not heated. Accordingly, electric power required for heating first tank 410 can be saved. Note that, heater 710 may heat both first tank 410 and second tank 440. First tank 410 is heated, and thus, it is possible to reduce solidification of the scalp care agent within first tank 410.

[0053] The second amount is desirably the same as the amount of scalp care agent sent out by pump 510 in one operation and the amount of scalp care agent retainable by pressure valve 456. For example, when both the amount of scalp care agent sent out by pump 510 in one operation and the amount of scalp care agent retainable by pressure valve 456 are 1 mL and the second amount is less than 1 mL, the unheated scalp care agent and the heated scalp care agent are supplied to the scalp in a mixed state. In addition, when both the amount of scalp care agent sent out by pump 510 in one operation and the amount of scalp care agent retainable by pressure valve 456 are 1 mL, and the second amount is more than 1 mL, heating efficiency in second tank 440 is poor. Therefore, the second amount is equalized to 1 mL, The scalp care agent can be heated without excess or deficiency.

[0054] Since scalp care device 100 includes heater 710 as the heating unit, the heated scalp care agent can be supplied to the scalp of the user. Thus, scalp care device 100 can supply the scalp care agent in a state suitable for user's needs.

[1-1-5. Temperature detection unit]

[0055] In addition, as illustrated in Fig. 10, temperature detection unit 720 is provided in second tank 440. Specifically, temperature detection unit 720 includes first thermistor 721 that detects the temperature of the scalp care agent within second tank 440, and second thermistor 722 that detects a temperature of second tank 440. First thermistor 721 is fixed to lid 460 of second tank 440, penetrates lid 460 of second tank 440, and is provided such that a temperature-sensitive portion that senses a temperature is immersed in the scalp care agent stored within second tank 440. Second thermistor 722 is provided on the outer wall of second main body 470 and senses a temperature of second main body 470. Note that, temperature detection unit 720 may include only first thermistor 721 or only second thermistor 722.

[0056] Control circuit 310 controls heating of heater 710 by using at least one of the temperature of the scalp

care agent detected by temperature detection unit 720 and the temperature of second main body 470 of second tank 440. Accordingly, the scalp care agent within second tank 440 is maintained at an appropriate temperature. The appropriate temperature is, for example, 40 degrees or more and less than 60 degrees, but more preferably 45 degrees or more and less than 50 degrees.

[0057] In addition, control circuit 310 controls the color of suppliable lamp 231 by using at least one of the temperature of the scalp care agent detected by temperature detection unit 720 and the temperature of second main body 470 of second tank 440, and indicates a state of the scalp care agent to the user.

[1-1-6. Head part]

[0058] As described above, housing 200 includes head part 900. As illustrated in Figs. 2 and 3, head part 900 is provided below housing 200. Fig. 14 is a plan view of the head part according to the exemplary embodiment. As illustrated in Fig. 14, head part 900 is formed in a quadrangular shape in plan view. Head part 900 is an attachment detachably attached to main body 201 (see Fig. 15). Note that, head part 900 may be fixed in a state of not being detachably attached to main body 201. In addition, head part 900 and housing 200 may have different configurations.

[0059] Head part 900 has discharge port 930 from which the scalp care agent is discharged. Discharge port 930 is provided at a center of head part 900. Discharge port 930 is positioned at a center of principal surface 901 facing the scalp in head part 900 when the user uses scalp care device 100. That is, discharge port 930 is positioned at the center of principal surface 901 facing the scalp in head part 900 when the scalp care agent is supplied to the scalp of the user, that is, when the scalp care agent is discharged from discharge port 930. In other words, discharge port 930 is positioned at the center of head part 900 to be surrounded by massage elements 920a to 920d. Accordingly, the user can reliably supply the scalp care agent to a desired portion of the scalp. In addition, the user does not need to confirm where discharge port 930 is whenever the scalp care agent is supplied. Note that, principal surface 901 of the present exemplary embodiment is also a principal surface of housing 200.

[0060] Discharge port 930 of the present exemplary embodiment is closer to second tank 440 than first tank 410 in the flow path of the scalp care agent. In addition, discharge port 930 is positioned near second tank 440. More specifically, discharge port 930 is positioned near discharge portion 457 which is an outlet port of the scalp care agent in second tank 440. The term "near" as used in the present disclosure means that a distance between two members is, for example, less than or equal to 1 cm. The scalp care agent coming out of discharge portion 457 is discharged from discharge port 930 without using a flow path having a constant length, such as a hose. Accordingly, it is possible to reduce cooling of the heated scalp care agent before being supplied to the scalp. Note that, discharge portion 457 and discharge port 930 may be connected via a flow path of about several cm, or discharge portion 457 may be exposed to head part 900 and may also be used as discharge port 930.

[0061] Head part 900 includes massage unit 920. Massage unit 920 performs the massage operation on the scalp of the user. Massage unit 920 includes four massage elements 920a to 920d. Massage element 920a includes base portion 921a and four massage protrusions 922a extending downward from a lower surface of base portion 921a. Massage protrusion 922a includes, for example, a flexible member such as an elastomer, and is formed in a conical shape. Three small protrusions 923a are formed at a distal end of massage protrusion 922a. In Fig. 14, three small protrusions 923a are collectively represented by one circle. Massage elements 920b to 920d also have configurations similar to the configuration of massage element 920a. Note that, the numbers of massage elements, massage protrusions, and small protrusions are not limited thereto, and may be appropriately changed, but are desirably any numbers as long as pinching kneading, twisting kneading, and rubbing kneading to be described later can be performed.

[0062] The massage operation performed by massage elements 920a to 920d of massage unit 920 includes a revolving motion. Hereinafter, the massage operation by massage elements 920a to 920d will be described in detail.

[0063] When massage switch 223 is pressed by the user, control circuit 310 drives motor 610 as the drive unit. A driving force of motor 610 is transmitted to massage elements 920a to 920d via gears or the like, and massage elements 920a to 920d operate to revolve around predetermined axes. That is, motor 610 as the drive unit causes massage unit 920 to perform the massage operation.

[0064] Hereinafter, a positional relationship between massage element 920a and massage element 920b in Fig. 14 is referred to as a front-rear direction, and a positional relationship between massage element 920a and massage element 920c in Fig. 14 is referred to as a left-right direction. In addition, in Fig. 14, a depth direction of a paper surface is referred to as an up-down direction.

[0065] Both massage element 920a and massage element 920b adjacent in the front-rear direction revolve counterclockwise around predetermined axes (or virtual axes), and revolve with a phase shift of 180 degrees from each other. Note that, the predetermined axes are along the up-down direction. In addition, massage element 920c and massage element 920d revolve clockwise around predetermined axes and revolve with a phase shift of 180 degrees from each other. In addition, massage element 920a and massage element 920c adjacent to each other in the left-right direction revolve to be line-symmetric with respect to perpendicular bisector L of head part 900 in plan view. Similarly, massage element

920b and massage element 920d adjacent in the left-right direction revolve around to be line-symmetric with respect to perpendicular bisector L.

[0066] In a case where attention is paid to the relationship between massage element 920a and massage element 920b, when massage element 920a and massage element 920b are rotated by 180 degrees from a position farthest from each other in the front-rear direction, the massage elements are in a state of being closest to each other in the front-rear direction, and perform a revolving operation around an output shaft to pass each other from the farthest position. Accordingly, massage element 920a and massage element 920b are in a state of being closest to each other, and thus, it is possible to perform pinching kneading that pinches the scalp of the user and to perform twisting kneading that gives a twisting motion to the scalp by an operation of passing each other. Massage elements 920c and 920d also perform pinching kneading and twisting kneading similar to massage element 920a and 920b.

[0067] In addition, in a case where attention is paid to the relationship between massage element 920a and massage element 920c, when massage element 920a and massage element 920b are rotated by 90 degrees from a position farthest from each other in the front-rear direction, massage element 920a and massage element 920c are in a state of being closest to each other in the left-right direction, and thereafter, perform a revolving operation in a direction approaching massage element 920b or 920d. Accordingly, massage element 920a and massage element 920c are in a state of being closest to each other, and thus, it is possible to perform pinching kneading by pinching the scalp and to perform rubbing kneading that moves the scalp pinched between massage element 920a and massage element 920c to massage element 920b and 920d side which is a rotation direction thereof. Massage elements 920b and 920d also perform pinching kneading and rubbing kneading similar to massage elements 920a and 920c.

[0068] More specifically, for example, the operation described above can be realized by the configuration described in PTL 2 by the present applicant.

[0069] As described above, when massage protrusions 922a to 922d of massage elements 920a to 920d that perform the pinching kneading, the twisting kneading, and the rubbing kneading are brought into contact with the scalp of the user, since different types of movements can be given to the scalp, the scalp can be effectively cared.

[0070] Note that, scalp care device 100 may be capable of changing head part 900 having massage elements 920a to 920d that perform the revolving motion to another head part 900 having the massage elements that perform a reciprocating motion. At this time, the user can replace head part 900 as necessary to use a desired massage operation.

[1-2. Operation]

[0071] A basic operation of scalp care device 100 in a case where the massage using scalp care device 100 is performed after the heated scalp care agent is supplied to the scalp of the user in the use of scalp care device 100 will be described. Note that, it is assumed that scalp care device 100 has been charged and first tank 410 and second tank 440 are filled with the scalp care agent.

[0072] When the user turns on power supply switch 221, suppliable lamp 231 is turned on in the red emission color, and heater 710 starts heating the scalp care agent within second tank 440. When the temperature of the scalp care agent reaches the temperature within the predetermined range, suppliable lamp 231 is turned on in the green emission color. When the user confirms that suppliable lamp 231 is turned on in green, the user presses supply switch 222 in a state where discharge port 930 faces the scalp of the user. Accordingly, pump 510 operates, the scalp care agent is pressed out from first tank 410 to second tank 440, and 1 mL of the scalp care agent already heated with in second tank 440 is discharged from discharge port 930 and is supplied to the scalp. When the supply of the scalp care agent is completed, suppliable lamp 231 is turned on in the red emission color and starts heating the scalp care agent to be supplied to the scalp next.

[0073] In a case where the user further supplies the scalp care agent to the scalp, the heating of the scalp care agent within second tank 440 is finished, and the user waits for suppliable lamp 231 to be turned on in the green emission color again. When the user confirms that suppliable lamp 231 is turned on in the green emission color, the user again presses supply switch 222 to supply the scalp care agent to the scalp. The user repeats a series of operations for supplying the scalp care agent to the scalp as necessary.

[0074] Subsequently, the user presses massage switch 223 in a state where massage elements 920a to 920d are brought into contact with the scalp, and thus, massage elements 920a to 920d performs the massage operation on the scalp. The user can supply the scalp care agent to the scalp by pressing supply switch 222 even while massage elements 920a to 920d perform the massage operation. The massage by massage unit 920 is finished by the user pressing massage switch 223 or turning off power supply switch 221. Note that, when a predetermined time elapses after massage switch 223 is pressed, scalp care device 100 may automatically stop the massage operation. Accordingly, it is possible to reduce the burden on the scalp caused by stimulating the scalp for a long time.

[0075] At the same time as or after the scalp care agent is supplied to the scalp, the scalp care agent spreads to the scalp by massage elements 920a to 920d performing the revolving motion. Thus, the scalp care agent can be easily applied to a wide range of the scalp, and the scalp can be more effectively massaged.

[0076] Note that, the scalp care agent is, for example, oil. Oil is used as a scalp care agent, and an effect of reducing dryness of the scalp and hair can be expected. However, the scalp care agent is not limited to the oil, and may be any agent that exhibits any useful effect on the scalp. The scalp care agent may be a hair growth agent, a hairdressing agent, or the like. In addition, the heated oil is supplied to the scalp, and thus, the user can obtain, for example, a relaxation effect. Further, the massage operation is performed after the heated oil is supplied to the scalp, and thus, various effects on the scalp and hair such as an increase in strength of hair, a reduction in dandruff, a reduction in curly hair, a reduction in split ends, and an increase in blood flow of the scalp can be expected.

[0077] In addition, according to scalp care device 100, since the user can supply the scalp care agent to the scalp by electric power, the scalp care agent can be satisfactorily supplied to the scalp. For example, scalp care device 100 can reduce labor of the user and can easily supply the scalp care agent to the scalp.

[0078] In addition, according to scalp care device 100, the user does not need to directly apply the scalp care agent to the scalp by hand. Thus, the user can directly apply the scalp care agent from scalp care device 100 to the scalp without staining the hand.

[0079] In addition, according to scalp care device 100, the user can perform the supply of the scalp care agent to the scalp and the massage of the scalp by one scalp care device 100. Thus, the convenience of scalp care device 100 is improved. More specifically, the user does not need to change the device between providing the scalp care agent to the scalp and performing the massage operation, and thus, it is convenient for the user.

[0080] Note that, when the user uses scalp care device 100, scalp care device 100 does not necessarily need to perform both the supply of the scalp care agent and the massage operation, and can appropriately perform a desired operation of the user. For example, when the user desires to perform only the massage operation, the user may turn on power supply switch 221 and then may press massage switch 223 to immediately start the massage operation. In addition, in a case where the user desires to supply only the scalp care agent, the user may not press massage switch 223 and scalp care device 100 may not perform the massage operation.

[1-3. Effects and the like]

[0081] As described above, in the present exemplary embodiment, scalp care device 100 includes housing 200, reservoir 400 that is provided inside housing 200 to store the scalp care agent, and the supply unit that supplies the scalp care agent from reservoir 400 to the outside of housing 200 by electric power. Housing 200 includes discharge port 930 from which the scalp care agent is discharged.

[0082] Accordingly, the scalp care agent is supplied to the scalp by electric power. Thus, the scalp care agent can be satisfactorily supplied to the scalp. In addition, the convenience of the user can be improved.

[0083] In addition, as in the present exemplary embodiment, housing 200 may include massage unit 920 that performs the massage operation on the scalp of the user, and motor 610 as the drive unit that causes massage unit 920 to perform the massage operation.

[0084] Accordingly, the supply of the scalp care agent to the scalp and the massage of the scalp can be performed by one scalp care device 100. Thus, the convenience of scalp care device 100 is improved.

[0085] In addition, as in the present exemplary embodiment, massage unit 920 may include massage elements 920a to 920d, and the massage operation may include the revolving motion by massage elements 920a to 920d.

[0086] Accordingly, the scalp care agent spreads to the scalp. Thus, the scalp care agent can be easily applied to a wide range of the scalp, and the scalp can be more effectively massaged.

[0087] In addition, as in the present exemplary embodiment, scalp care device 100 may further include heater 710 as the heating unit that heats the scalp care agent.

[0088] Accordingly, it is possible to supply the heated scalp care agent to the scalp. Thus, scalp care device 100 can supply the scalp care agent in a state suitable for user's needs.

[0089] In addition, as in the present exemplary embodiment, heater 710 as the heating unit may be disposed to surround reservoir 400, and at least a part of heater 710 as the heating unit may come into contact with reservoir 400.

[0090] Accordingly, the heat of heater 710 is conducted to the entire outer wall of reservoir 400. Thus, the scalp care agent within reservoir 400 can be quickly heated.

[0091] In addition, as in the present exemplary embodiment, reservoir 400 may include first tank 410 capable of storing the first amount of scalp care agent, and second tank 440 connected to first tank 410 to store the second amount of scalp care agent, and heater 710 as the heating unit may heat second tank 440.

[0092] Accordingly, heater 710 as the heating unit heats the second amount of scalp care agent. Thus, the heating time is shortened as compared with a case where the reservoir 400 is heated.

[0093] In addition, as in the present exemplary embodiment, the second amount may be smaller than the first amount.

[0094] Accordingly, heater 710 as the heating unit heats the second amount of scalp care agent. Thus, the heating time is further shortened as compared with a case where the reservoir 400 is heated or a case where first tank 410 is heated.

[0095] In addition, as in the present exemplary embodiment, discharge port 930 may be closer to second tank 440 than first tank 410 in the flow path of the scalp care agent.

[0096] Accordingly, a distance until the scalp care

agent is supplied to the scalp is shortened. Thus, the heated scalp care agent can be prevented from being cooled before being supplied to the scalp.

[0097] In addition, as in the present exemplary embodiment, second tank 440 may include first tube portion 453 that causes the scalp care agent to flow into second tank 440 and second tube portion 454 that causes the scalp care agent to be discharged to the outside of second tank 440, and in a state where scalp care device 100 is placed on the horizontal plane such that discharge port 930 faces the horizontal plane, opening portion 4541 on the upstream side of second tube portion 454 in a flow path of the scalp care agent may be positioned above opening portion 4533 on the downstream side of first tube portion 453 in the flow path of the scalp care agent.

[0098] Accordingly, the scalp care agent flowing out from first tube portion 453 into second tank 440 flows into second tube portion 454 only after the water level thereof reaches opening portion 4541 on the upstream side of second tube portion 454. Thus, it is possible to reduce the discharging of the scalp care agent of which the temperature is reduced due to the mixing of the scalp care agent newly flowing in from first tank 410 and the scalp care agent heated within second tank 440.

[0099] In addition, as in the present exemplary embodiment, reservoir 400 may include first tank 410, first tank 410 may include main body 414 that stores the scalp care agent and tube portion 412 extending from the inside to the outside of main body 414, tube portion 412 may include fixed end portion 412a and free end portion 412b positioned closer to the bottom side of main body 414 than fixed end portion 412a, fixed end portion 412a may be fixed to main body 414, and free end portion 412b may be swingable in main body 414 according to gravity.

[0100] Accordingly, free end portion 412b is positioned at the lowermost portion within main body 414 regardless of the angle at which the user holds scalp care device 100. Thus, when the scalp care agent is stored within first tank 410, free end portion 412b is easily immersed in the scalp care agent, and it is possible to prevent a state where the scalp care agent cannot be supplied to the scalp even though the scalp care agent is within the first tank.

[0101] In addition, as in the present exemplary embodiment, reservoir 400 may include discharge portion 457 which is the outlet port of the scalp care agent in reservoir 400, and pressure valve 456 which closes the flow path of the scalp care agent to discharge portion 457, and pressure valve 456 may discharge the scalp care agent from discharge portion 457 when the pressure applied to pressure valve 456 exceeds the predetermined value.

[0102] Accordingly, the scalp care agent does not come out of discharge portion 457 until the predetermined amount of scalp care agent is sent into second tank 440 by pump 510. Thus, it is possible to prevent unnecessary scalp care agent from leaking from scalp care device 100.

[0103] In addition, as in the present exemplary embodiment, discharge port 930 may be positioned at the center of principal surface 901 facing the scalp in housing 200 when the scalp care agent is discharged from discharge port 930.

[0104] Accordingly, the user can reliably supply the scalp care agent to a desired portion of the scalp.

[0105] In addition, as in the present exemplary embodiment, housing 200 may have pouring port 240 into which the scalp care agent is poured.

[0106] Accordingly, the type and amount of the scalp care agent input within scalp care device 100 are not limited. Thus, the user can pour a desired amount of desired scalp care agent into scalp care device 100.

(Other exemplary embodiments)

[0107] As described above, the above exemplary embodiment has been described as an example of the technology disclosed in the present application. However, the technology in the present disclosure is not limited to the above exemplary embodiment, and can also be applied to exemplary embodiments in which change, substitution, addition, omission, and the like are made.

[0108] Thus, other exemplary embodiments will be described below.

[0109] In the above exemplary embodiment, scalp care device 100 includes massage unit 920 and motor 610 as the drive unit. Since scalp care device 100 may be a device capable of supplying the scalp care agent to the scalp, the scalp care device may not include massage unit 920 and the drive unit. That is, scalp care device 100 may be a device intended only for supplying the scalp care agent to the scalp.

[0110] In the above exemplary embodiment, when power supply switch 221 is switched on, heater 710 as the heating unit starts heating. A switch for starting heating the heater may be separately provided in scalp care device 100. In this case, even though power supply switch 221 is turned on, heater 710 does not start heating, and the user can select whether or not to heat the scalp care agent according to user's mood.

[0111] In the above exemplary embodiment, heater 710 is controlled by control circuit 310. Scalp care device 100 may have a function of allowing the user to select the temperature of the scalp care agent. At this time, control circuit 310 controls heater 710 such that the temperature of the scalp care agent within second tank 440 becomes a temperature selected by the user.

[0112] In the above exemplary embodiment, massage switch 223 switches between on and off of the massage operation. Massage switch 223 may further have a function of adjusting a revolving speed of massage elements 920a to 920d. For example, after about three levels of speed are prepared, the speed of massage elements 920a to 920d may be switched such as low speed, medium speed, high speed, off, low speed, ⋯ whenever massage switch 223 is pressed. In addition, a switch for

speed adjustment may be provided separately from the switch for switching between on and off of massage.

[0113] In the above exemplary embodiment, scalp care device 100 includes display unit 230 for indicating a state of the scalp care agent and a state of battery 320 to the user. Since scalp care device 100 may indicate the state to the user, characters and the like may be displayed on a liquid crystal screen instead of the lamp.

[0114] In the above exemplary embodiment, one discharge port 930 is formed at the center of head part 900. Discharge port 930 may be provided at the center of each of four massage elements 920a to 920d. That is, scalp care device 100 may have a plurality of (four) discharge ports 930. For example, discharge port 930 provided in massage element 920a is provided to be surrounded by four massage protrusions 922a.

(Appendix)

[0115] The above description of the exemplary embodiment discloses the following technologies.

[0116] (Technology 1) A scalp care device includes a housing, a reservoir that is provided inside the housing to store a scalp care agent, and a supply unit that supplies the scalp care agent from the reservoir to an outside of the housing by electric power, in which the housing includes a discharge port from which the scalp care agent is discharged.

[0117] (Technology 2) In the scalp care device according to Technology 1, the housing includes a massage unit that performs a massage operation on scalp, and the scalp care device further includes a drive unit that causes the massage unit to perform the massage operation.

[0118] (Technology 3) In the scalp care device according to Technology 2, the massage unit includes a massage element, and the massage operation includes a revolving motion by the massage elements.

[0119] (Technology 4) The scalp care device according to any one of Technologies 1 to 3 further includes a heating unit that heats the scalp care agent.

[0120] (Technology 5) In the scalp care device according to Technology 4, the heating unit is disposed to surround the reservoir, and at least a part of the heating unit comes into contact with the reservoir.

[0121] (Technology 6) In the scalp care device according to Technology 4 or 5, the reservoir includes a first tank configured to store a first amount of the scalp care agent, and a second tank that is connected to the first tank to store a second amount of the scalp care agent, and the heating unit heats the second tank.

[0122] (Technology 7) In the scalp care device according to Technology 6, the second amount is smaller than the first amount.

[0123] (Technology 8) In the scalp care device according to Technology 6 or 7, the discharge port is closer to the second tank than the first tank in a flow path of the scalp care agent.

[0124] (Technology 9) In the scalp care device according to any one of Technologies 6 to 8, the second tank includes a first tube portion that causes the scalp care agent to flow into the second tank, and a second tube portion that causes the scalp care agent to be discharged to an outside of the second tank, and an opening portion on an upstream side of the second tube portion in a flow path of the scalp care agent is positioned above an opening on a downstream side of the first tube portion in the flow path in a state where the scalp care device is placed on a horizontal plane and the discharge port faces the horizontal plane.

[0125] (Technology 10) In the scalp care device according to any one of Technologies 1 to 9, the reservoir includes a tank, the tank includes a main body that stores the scalp care agent, and a tube portion that extends from an inside to an outside of the main body, the tube portion includes a fixed end portion, and a free end portion positioned closer to a bottom side of the main body than the fixed end portion, the fixed end portion is fixed to the main body, and the free end portion is swingable within the main body according to gravity.

[0126] (Technology 11) In the scalp care device according to any one of Technologies 1 to 10, the reservoir includes a discharge portion that is an outlet port of the scalp care agent in the reservoir, and a pressure valve that closes a flow path of the scalp care agent to the discharge portion, and the pressure valve discharges the scalp care agent from the discharge portion when a pressure applied to the pressure valve exceeds a predetermined value.

[0127] (Technology 12) In the scalp care device according to any one of Technologies 1 to 11, the discharge port is positioned at a center of a face facing scalp in the housing when the scalp care agent is supplied to the scalp.

[0128] (Technology 13) In the scalp care device according to any one of Technologies 1 to 12, the housing includes a pouring port from which the scalp care agent is poured.

Claims

1. A scalp care device comprising:

a housing;
a reservoir that is provided inside the housing to store a scalp care agent; and
a supply unit that supplies the scalp care agent from the reservoir to an outside of the housing by electric power,
wherein the housing includes a discharge port from which the scalp care agent is discharged.

2. The scalp care device according to Claim 1, wherein

the housing includes a massage unit that performs a massage operation on scalp, and

the scalp care device further includes a drive unit that causes the massage unit to perform the massage operation.

3. The scalp care device according to Claim 2, wherein

the massage unit includes a massage element, and
the massage operation includes a revolving motion by the massage elements.

4. The scalp care device according to Claim 1, further comprising a heating unit that heats the scalp care agent.

5. The scalp care device according to Claim 4, wherein

the heating unit is disposed to surround the reservoir, and
at least a part of the heating unit comes into contact with the reservoir.

6. The scalp care device according to Claim 4, wherein

the reservoir includes

a first tank configured to store a first amount of the scalp care agent, and
a second tank that is connected to the first tank to store a second amount of the scalp care agent, and

the heating unit heats the second tank.

7. The scalp care device according to Claim 6, wherein the second amount is smaller than the first amount.

8. The scalp care device according to Claim 6, wherein the discharge port is closer to the second tank than the first tank in a flow path of the scalp care agent.

9. The scalp care device according to Claim 6, wherein

the second tank includes

a first tube portion that causes the scalp care agent to flow into the second tank, and
a second tube portion that causes the scalp care agent to be discharged to an outside of the second tank, and

an opening portion on an upstream side of the second tube portion in a flow path of the scalp care agent is positioned above an opening on a downstream side of the first tube portion in the flow path in a state where the scalp care device is placed on a horizontal plane and the discharge port faces the horizontal plane.

10. The scalp care device according to any one of Claims 1 to 5, wherein

the reservoir includes a tank,
the tank includes

a main body that stores the scalp care agent, and
a tube portion that extends from an inside to an outside of the main body,

the tube portion includes a fixed end portion, and a free end portion positioned closer to a bottom side of the main body than the fixed end portion,
the fixed end portion is fixed to the main body, and
the free end portion is swingable within the main body according to gravity.

11. The scalp care device according to any one of Claims 1 to 9, wherein

the reservoir includes

a discharge portion that is an outlet port of the scalp care agent in the reservoir, and
a pressure valve that closes a flow path of the scalp care agent to the discharge portion, and

the pressure valve discharges the scalp care agent from the discharge portion when a pressure applied to the pressure valve exceeds a predetermined value.

12. The scalp care device according to any one of Claims 1 to 9, wherein the discharge port is positioned at a center of a face facing scalp in the housing when the scalp care agent is supplied to the scalp.

13. The scalp care device according to any one of Claims 1 to 9, wherein the housing includes a pouring port from which the scalp care agent is poured.

FIG. 1

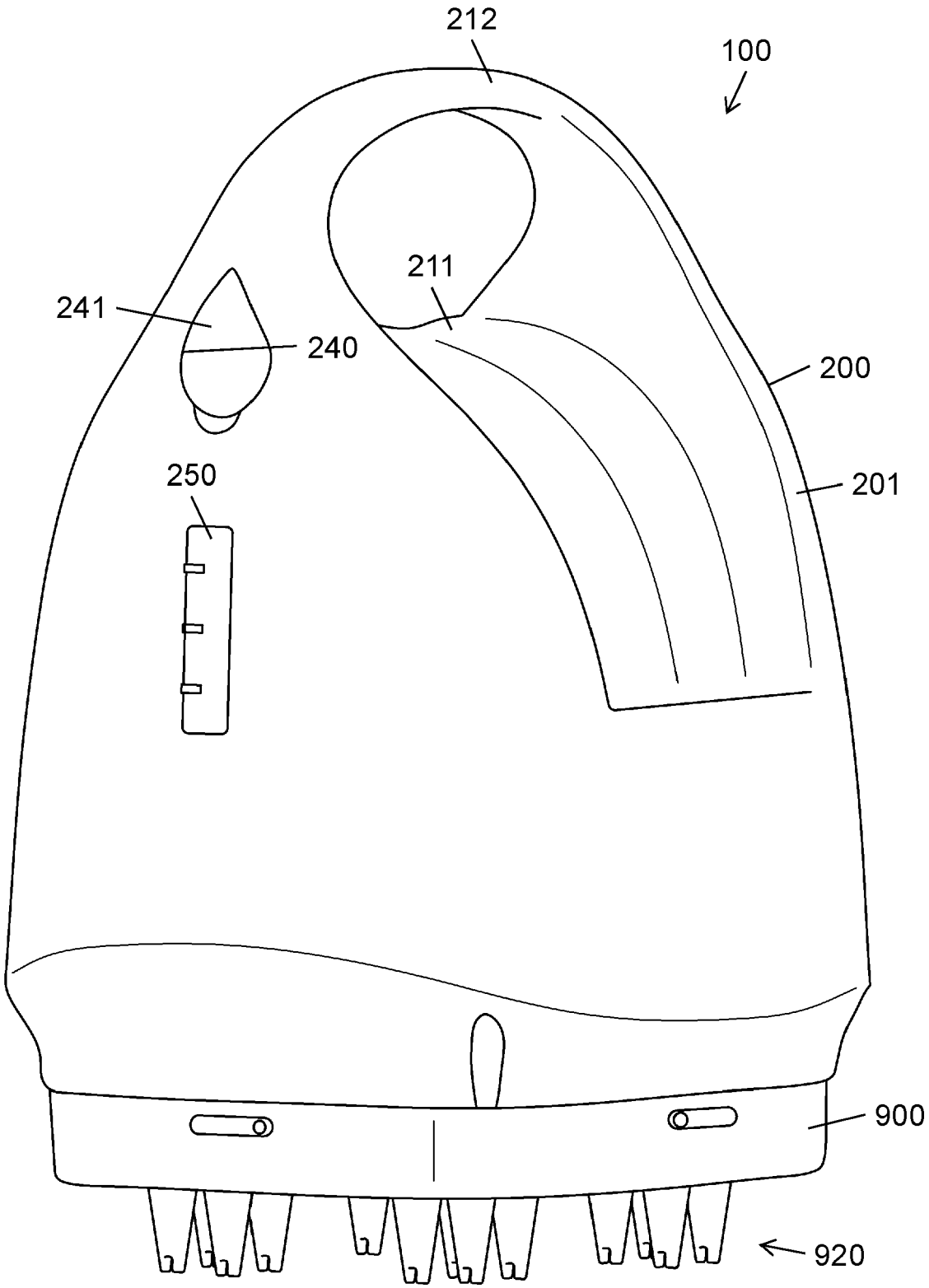


FIG. 2

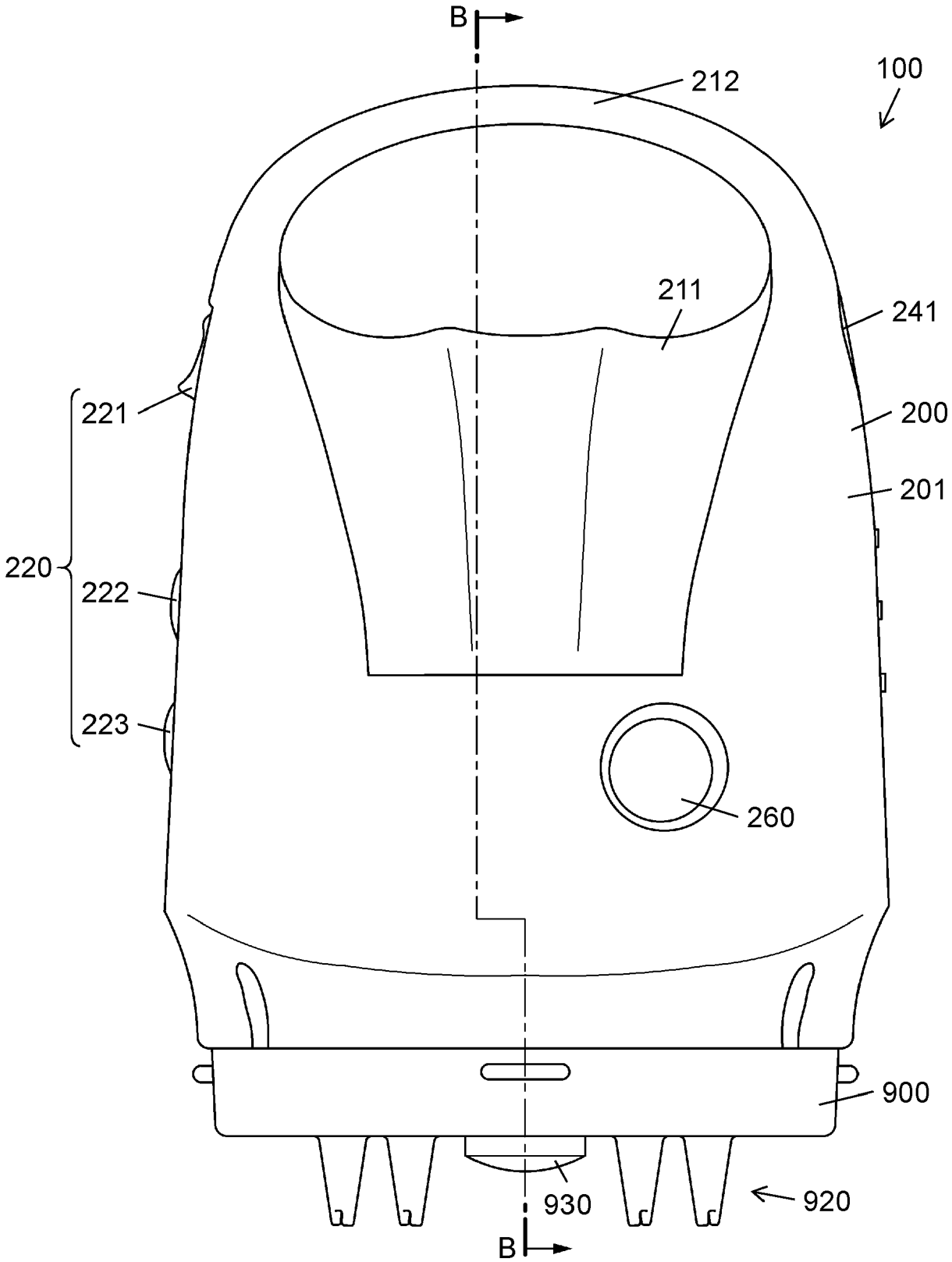


FIG. 3

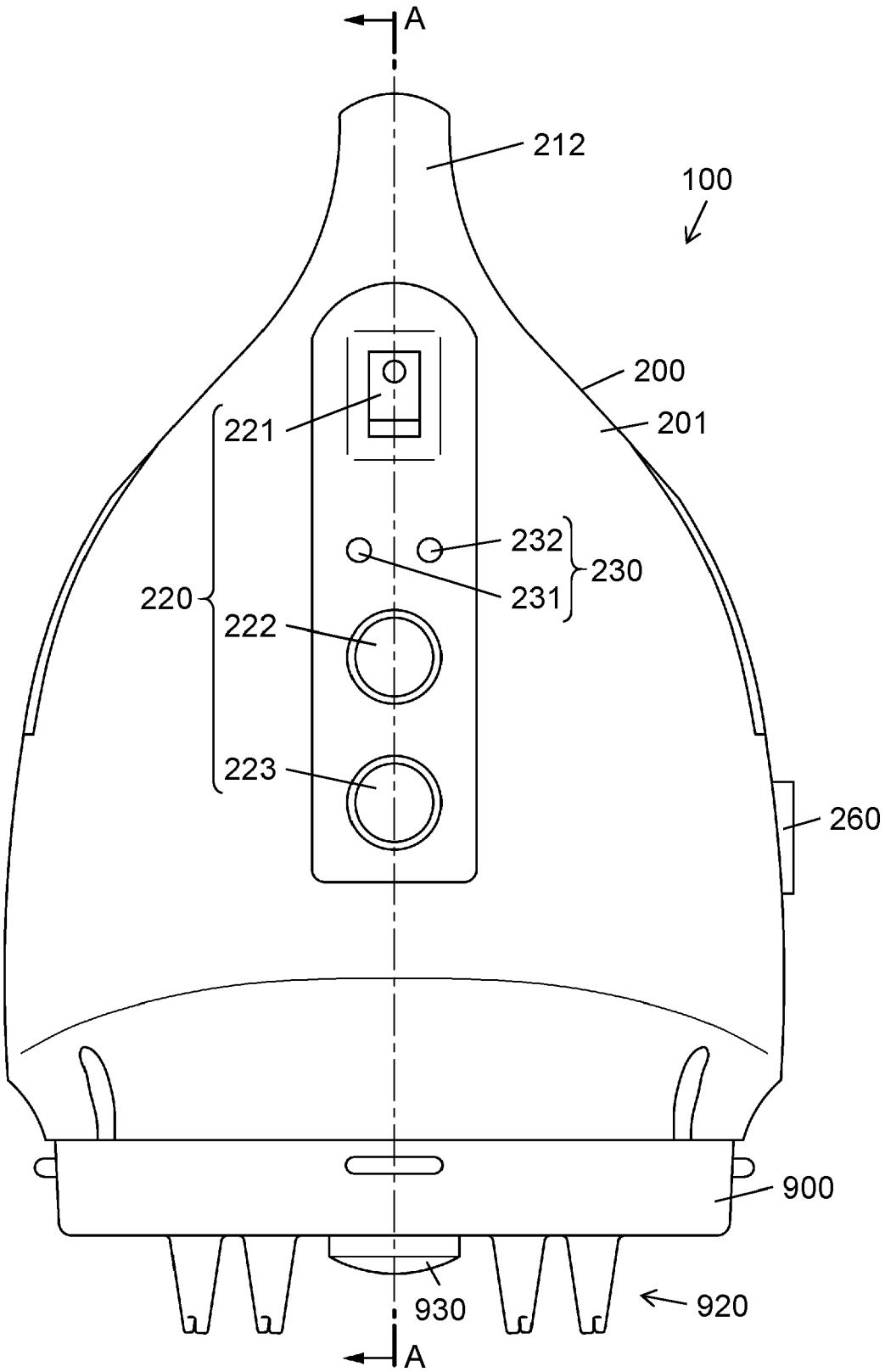
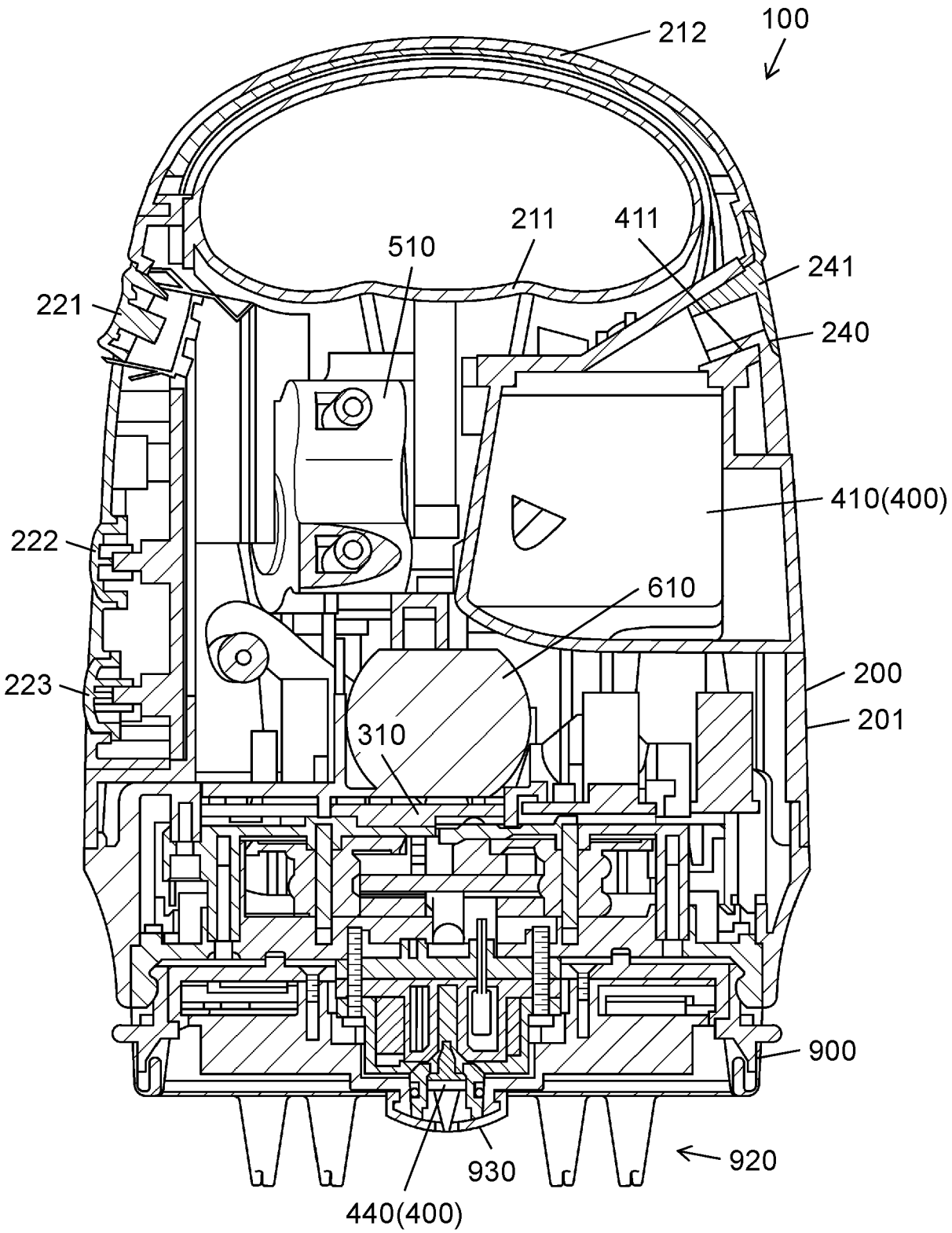


FIG. 4


100
212
211
411
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241
240
221
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222
610
223
200
201
310
900
920
930
440(400)

FIG. 5

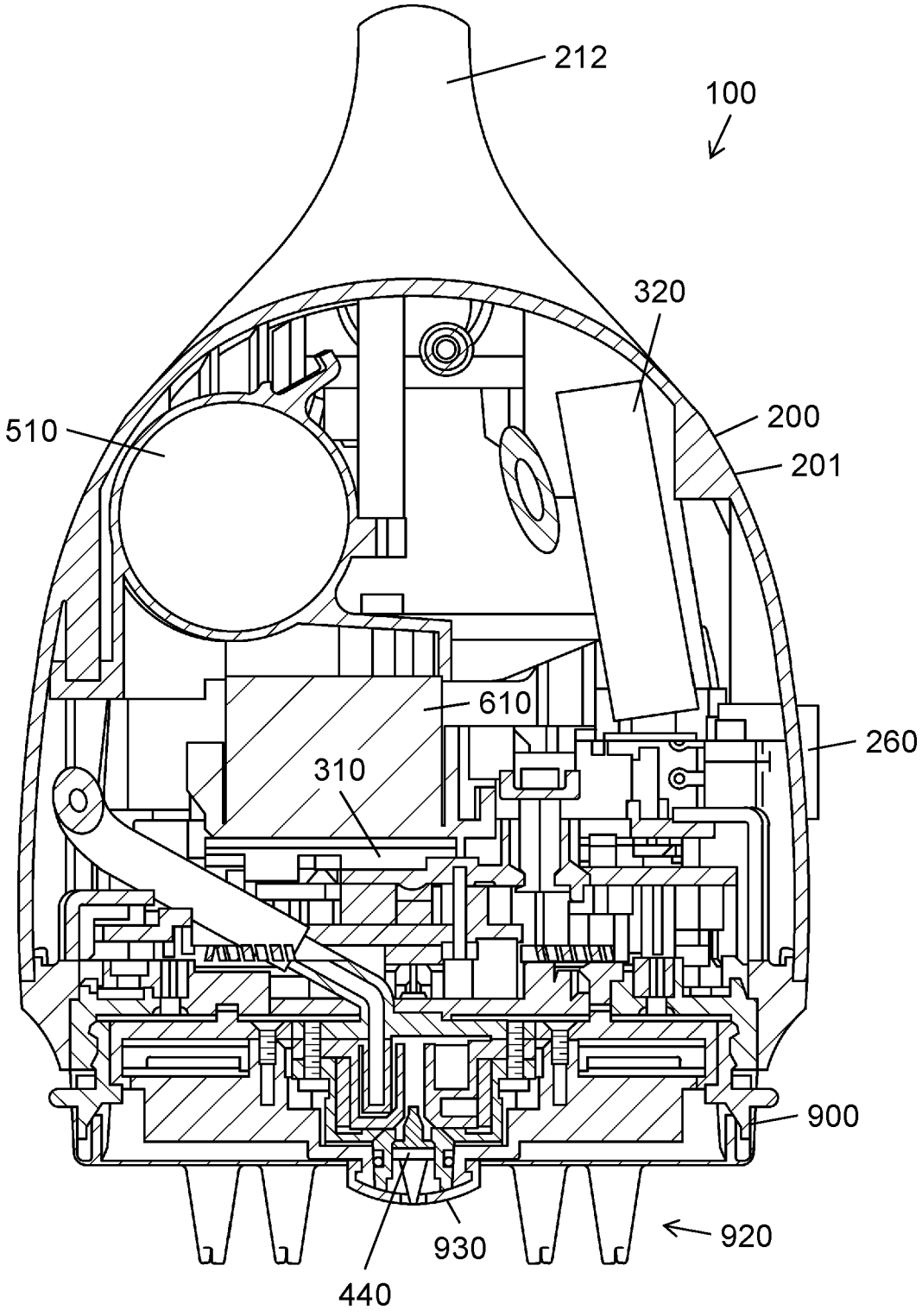


FIG. 6

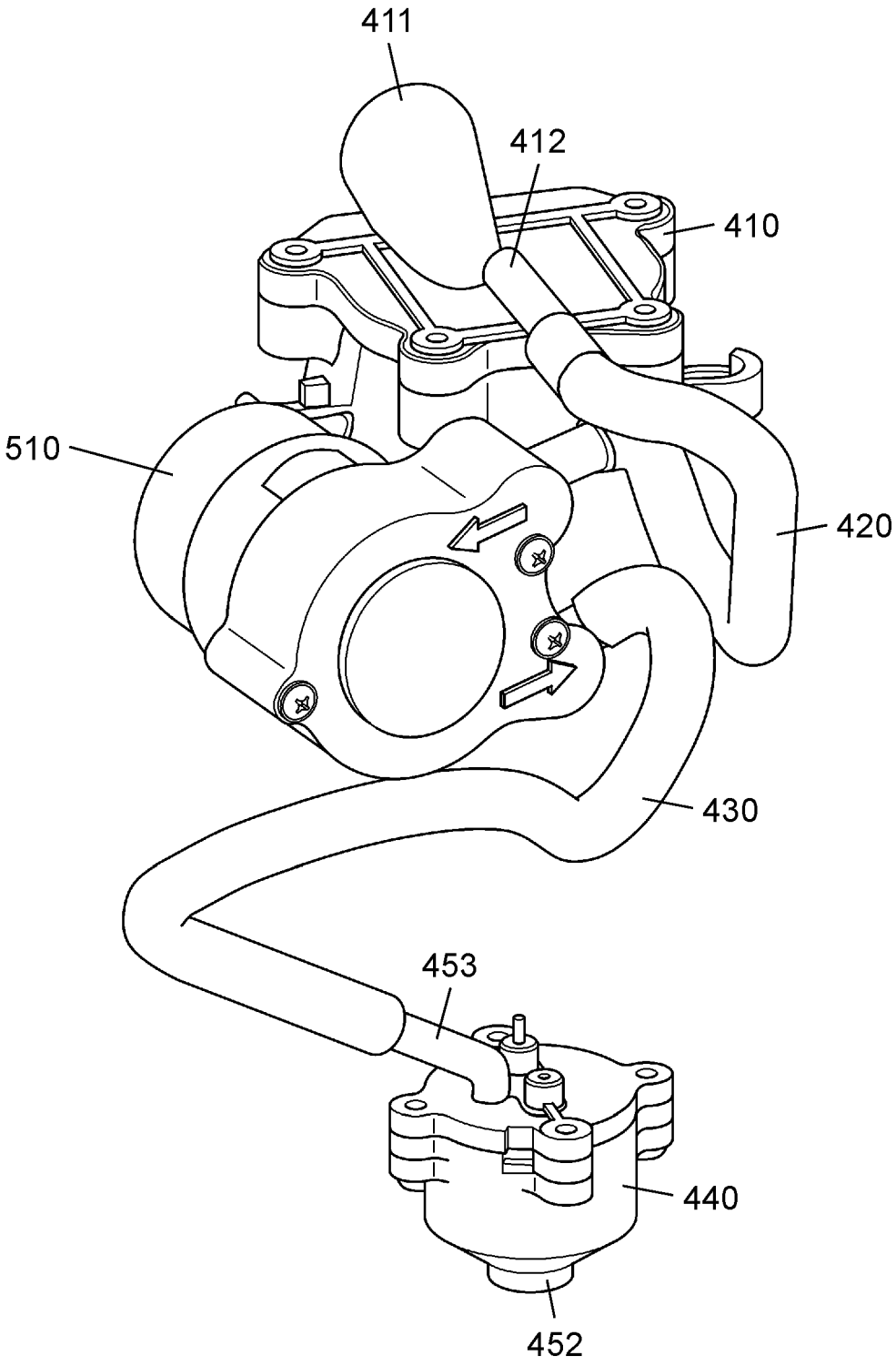


FIG. 7C

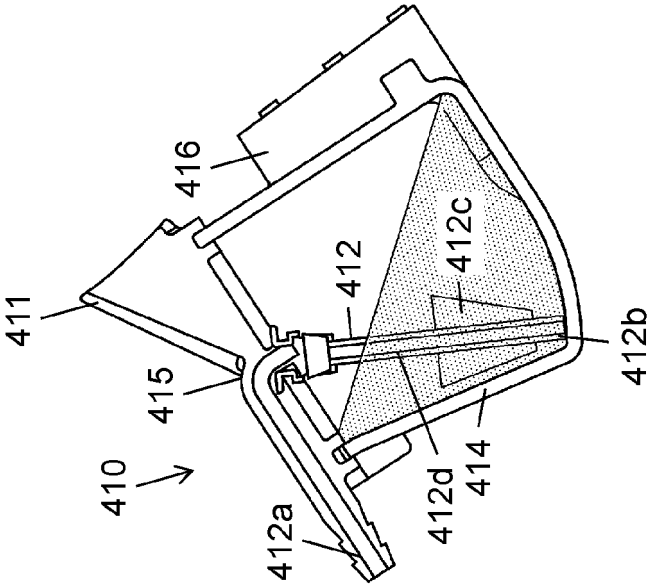


FIG. 7B

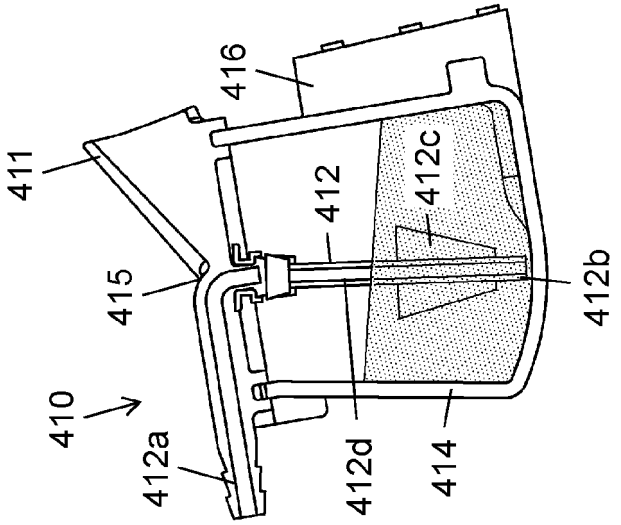


FIG. 7A

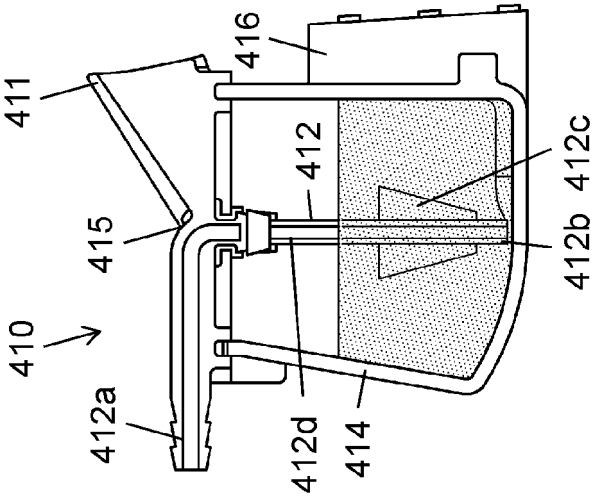
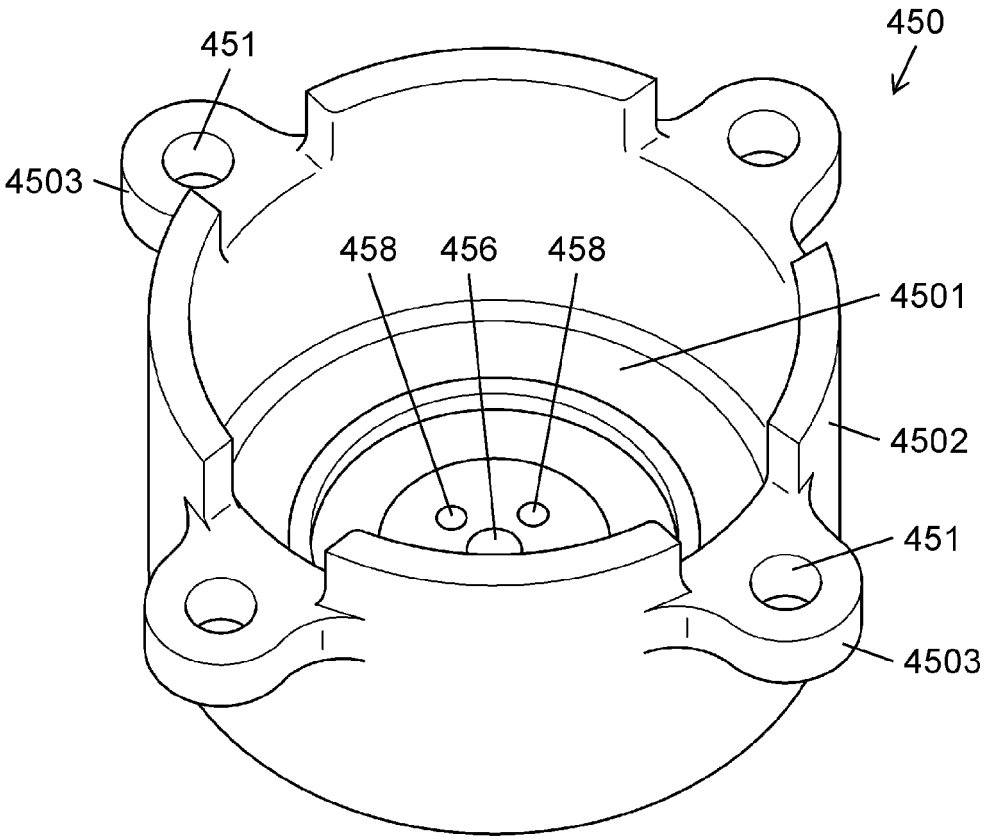


FIG. 8A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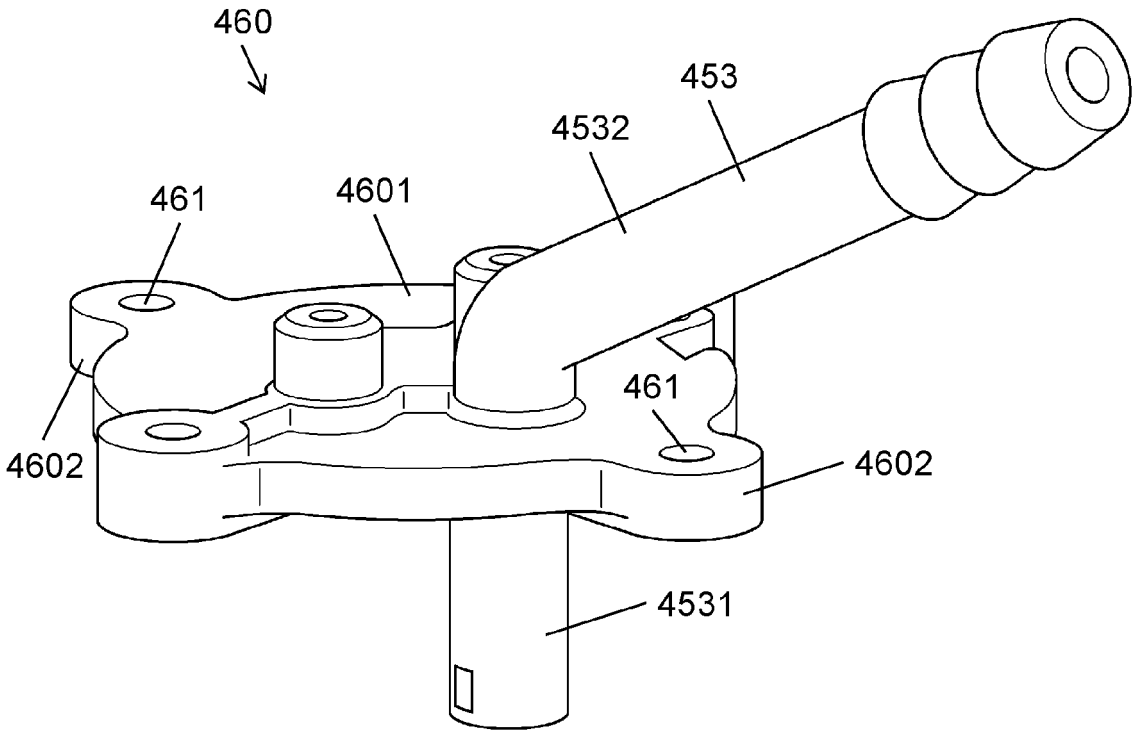
451
4503

FIG. 8B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4602
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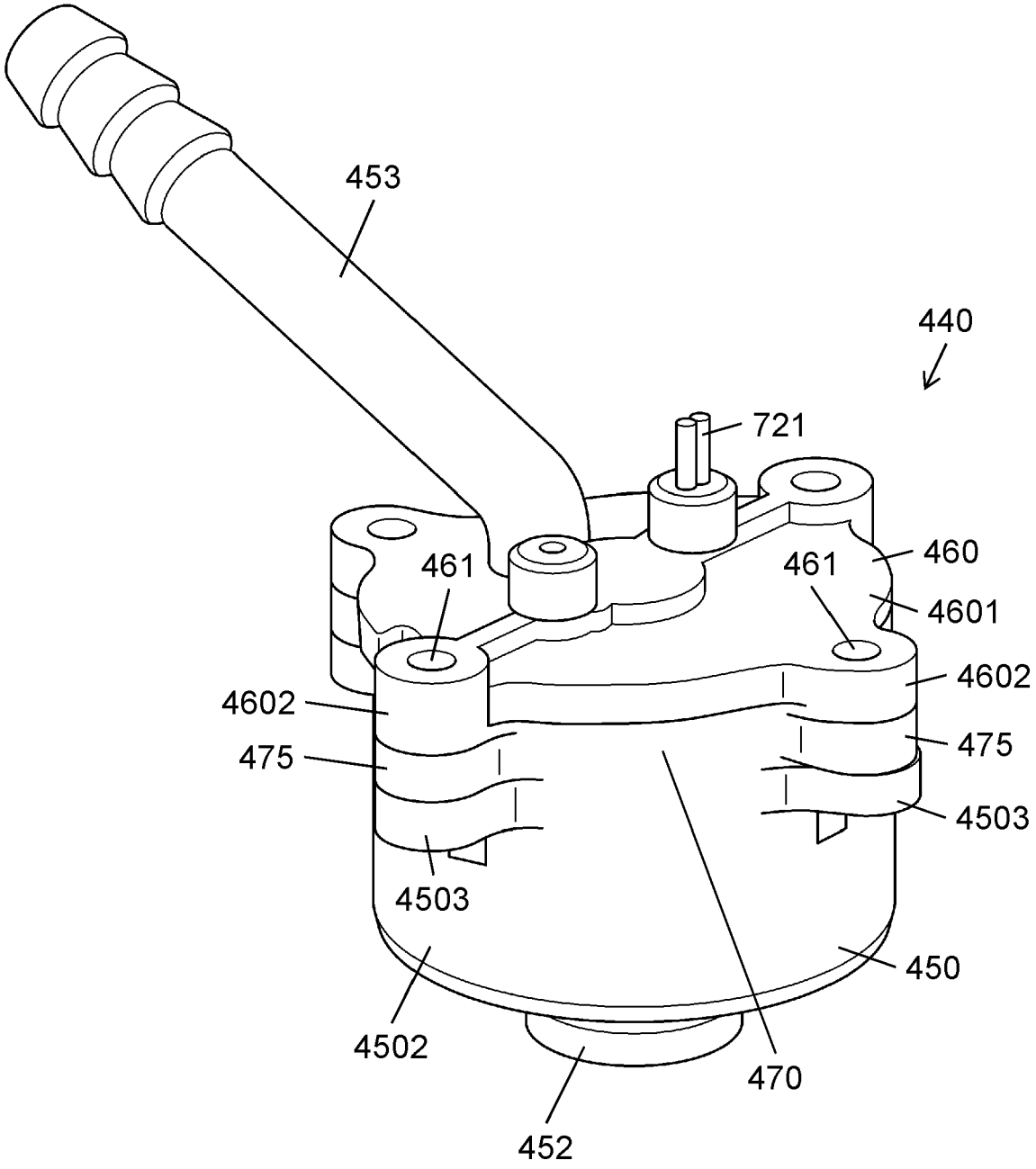
FIG. 9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4602
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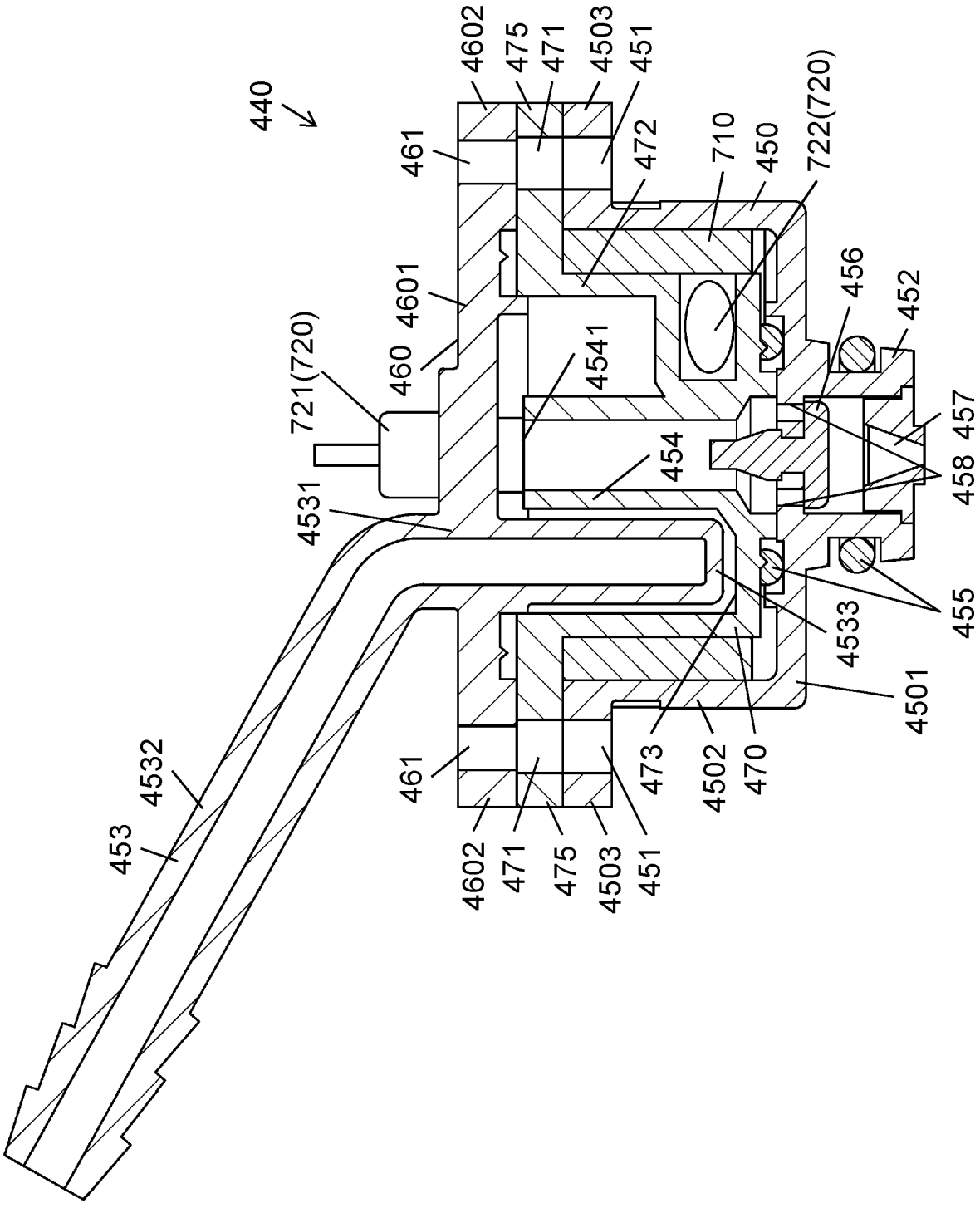
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721(720)
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458 457
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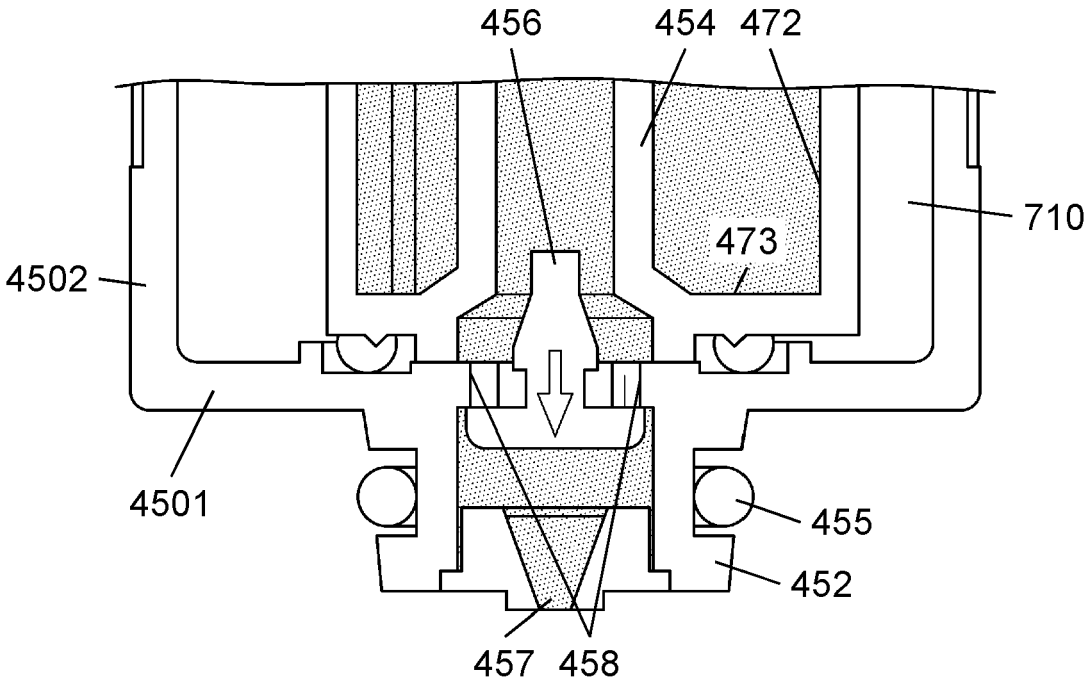
4503
451

FIG. 10

FIG. 11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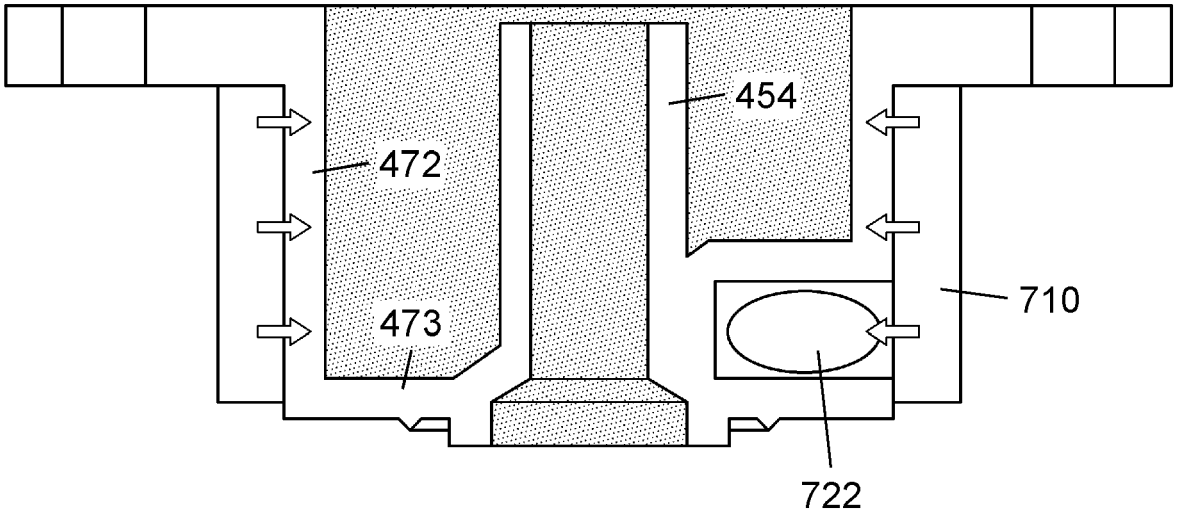
458

FIG. 12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710
473
722

FIG. 13

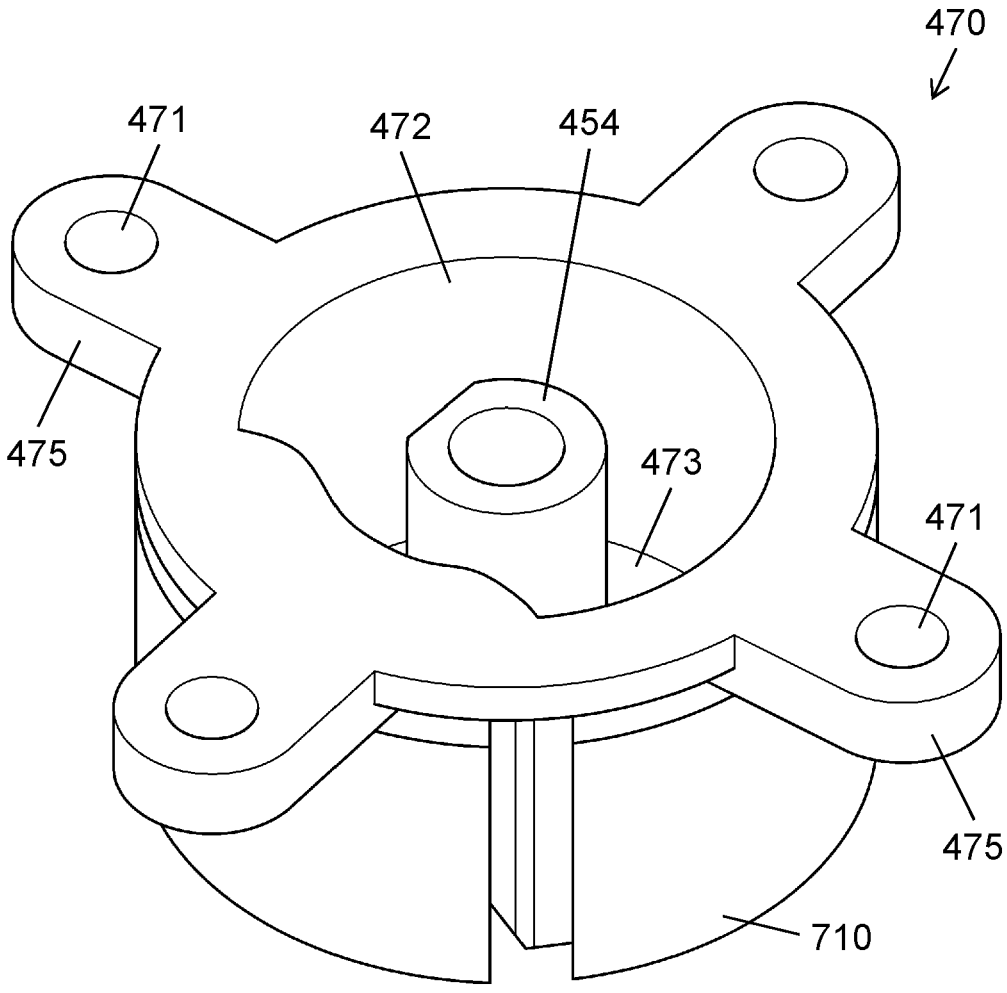
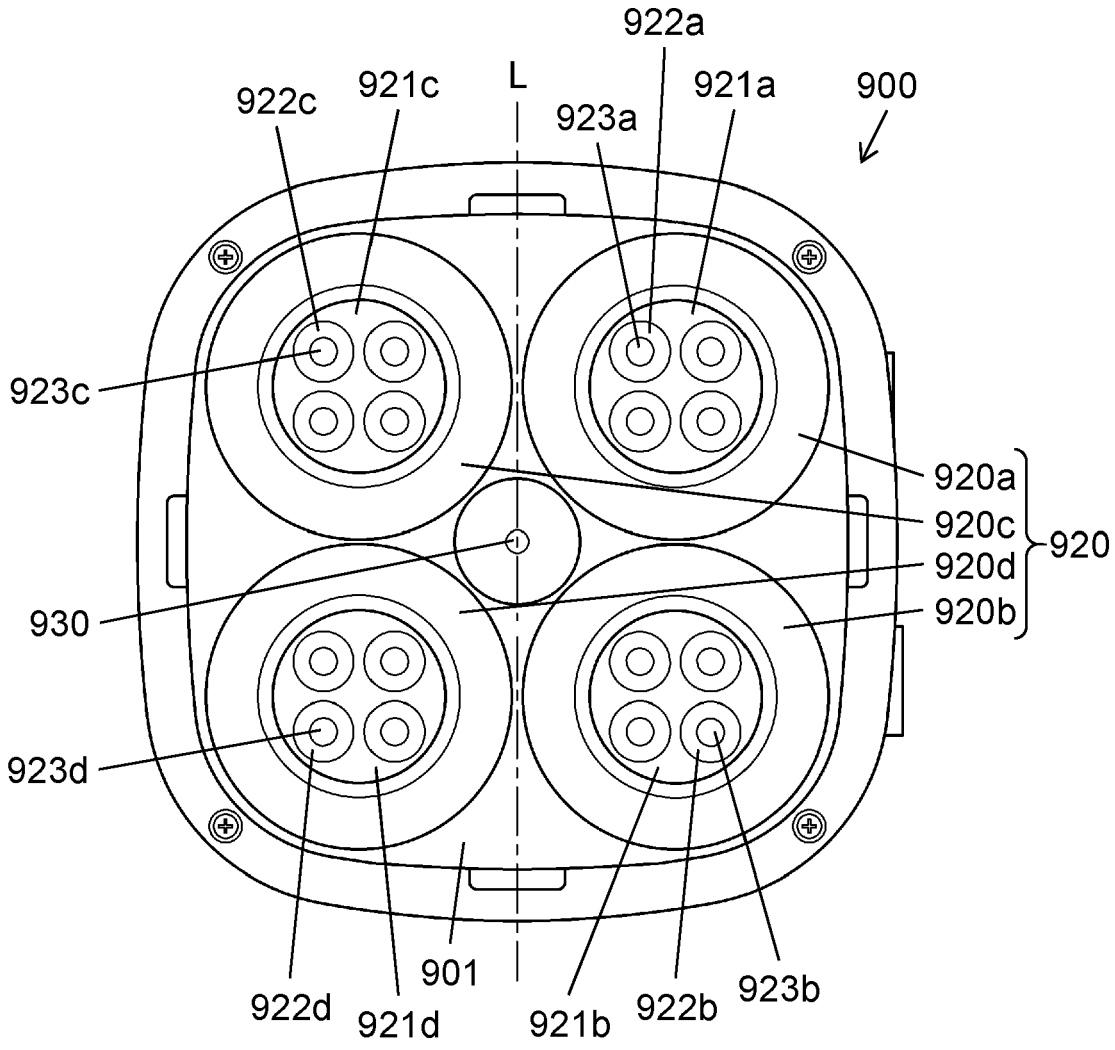


FIG. 14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921d
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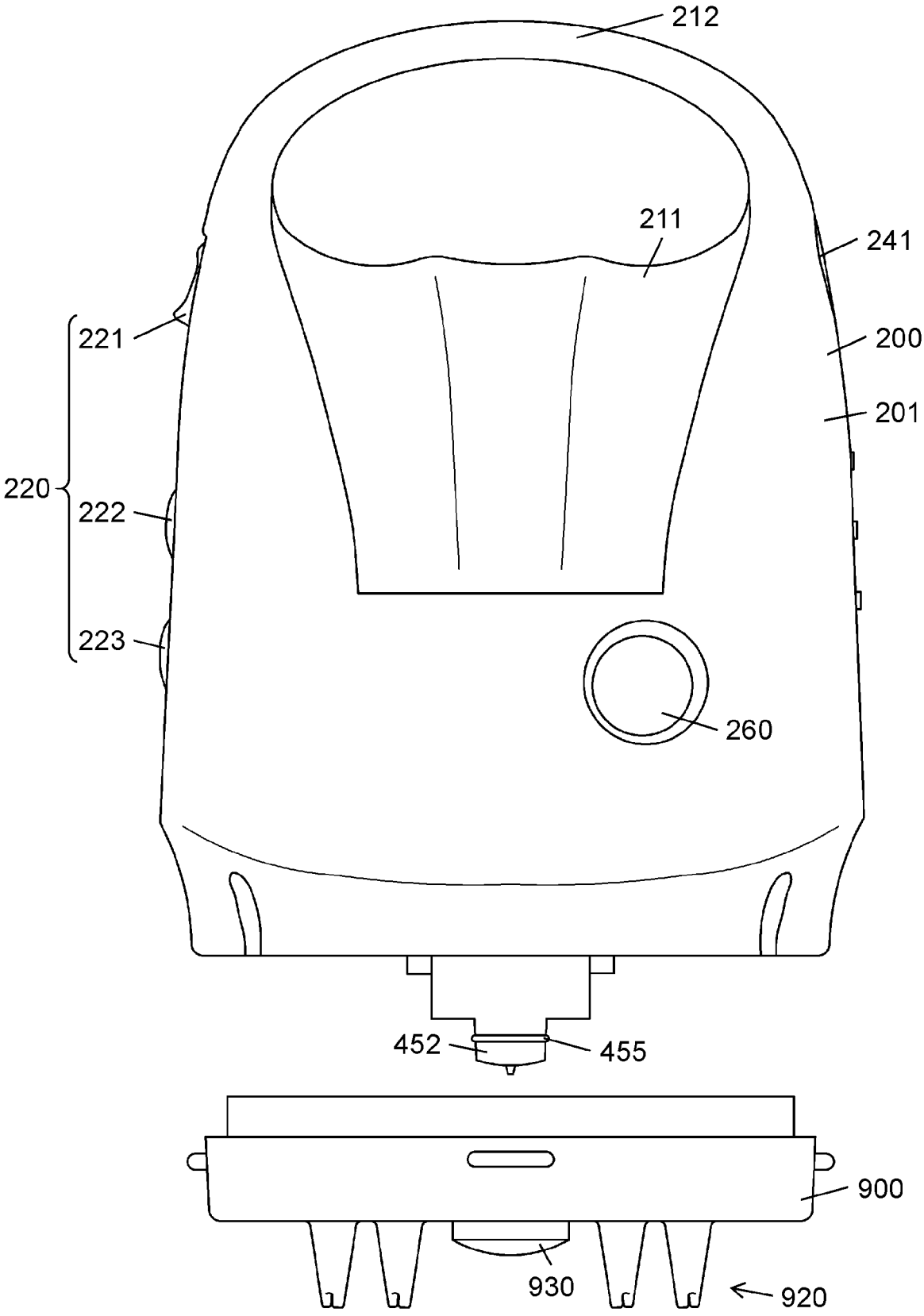
921b
922b
923b

FIG. 15



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EUROPEAN SEARCH REPORT

Application Number
EP 24 16 9637

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2018/325328 A1 (WRIGHT ERROL [US]) 15 November 2018 (2018-11-15) * paragraphs [0016] - [0024], [0026] - [0030]; figure 5 *	1-3, 11-13 4-10	INV. A46B11/00 A46B13/04 A61H7/00
X A	WO 2015/137592 A1 (GM HOLDINGS CORP [KR]) 17 September 2015 (2015-09-17) * paragraphs [0027] - [0089]; figures 1-8 *	1-3 4-13	
X A	US 2016/015150 A1 (CASASANTA III VINCENZO [US]) 21 January 2016 (2016-01-21) * paragraphs [0028] - [0035], [0037], [0039], [0041] - [0047], [0049] - [0050] *	1 2-13	
X A	US 2 261 385 A (ANTHONY KAMINSKY ET AL) 4 November 1941 (1941-11-04) * figures 1-5; pages 1-3 *	1-5,12, 13 6-11	
X A	US 2016/331106 A1 (KHORMAEI IRANPOUR [US]) 17 November 2016 (2016-11-17) * paragraphs [0036], [0038] - [0041], [0044] - [0045], [0048] - [0056], [0062] - [0063]; figures 1, 4, 8, 18 *	1-4,6-9 5,10-13	TECHNICAL FIELDS SEARCHED (IPC) A61H A61F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 October 2024	Teissier, Sara

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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Application Number
EP 24 16 9637

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 24 16 9637

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 2, 3, 11-13(completely); 1(partially)

Directed to a scalp care device comprising a massage unit that performs a massage operation on scalp, and the scalp care device further includes a drive unit that causes the massage unit to perform the massage operation.

---

2. claims: 4-9(completely); 1(partially)

Directed to a scalp care device comprising a heating unit that heats the scalp care agent.

---

3. claims: 10(completely); 1(partially)

Directed to a scalp care device wherein the reservoir includes a tank, the tank includes a main body that stores the scalp care agent, and a tube portion that extends from an inside to an outside of the main body, the tube portion includes a fixed end portion, and a free end portion positioned closer to a bottom side of the main body than the fixed end portion, the fixed end portion is fixed to the main body, and the free end portion is swingable within the main body according to gravity.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 16 9637

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23-10-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018325328 A1	15-11-2018	NONE	
WO 2015137592 A1	17-09-2015	KR 101419505 B1	14-07-2014
		WO 2015137592 A1	17-09-2015
US 2016015150 A1	21-01-2016	CN 106535698 A	22-03-2017
		EP 3169184 A1	24-05-2017
		JP 6545250 B2	17-07-2019
		JP 2017529120 A	05-10-2017
		KR 20170027794 A	10-03-2017
		KR 20180121699 A	07-11-2018
		US 2016015150 A1	21-01-2016
		WO 2016010607 A1	21-01-2016
US 2261385 A	04-11-1941	NONE	
US 2016331106 A1	17-11-2016	US 2016331106 A1	17-11-2016
		WO 2016182625 A1	17-11-2016

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Patent documents cited in the description

- JP 11221261 A **[0003]**
- JP 2012061176 A **[0003]**