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CA 2963466 A1 2016/04/07

(21) **2 963 466**

(12) **DEMANDE DE BREVET CANADIEN**
CANADIAN PATENT APPLICATION

(13) **A1**

(86) Date de dépôt PCT/PCT Filing Date: 2015/10/02
(87) Date publication PCT/PCT Publication Date: 2016/04/07
(85) Entrée phase nationale/National Entry: 2017/03/31
(86) N° demande PCT/PCT Application No.: US 2015/053836
(87) N° publication PCT/PCT Publication No.: 2016/054580
(30) Priorité/Priority: 2014/10/02 (US62/059,095)

(51) Cl.Int./Int.Cl. A24F 47/00 (2006.01)

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(54) Titre : CIGARETTE ELECTRONIQUE A RESERVOIR JETABLE, PROCEDE DE FABRICATION ET PROCEDE
D'UTILISATION
(54) Title: DISPOSABLE TANK ELECTRONIC CIGARETTE, METHOD OF MANUFACTURE AND METHOD OF USE

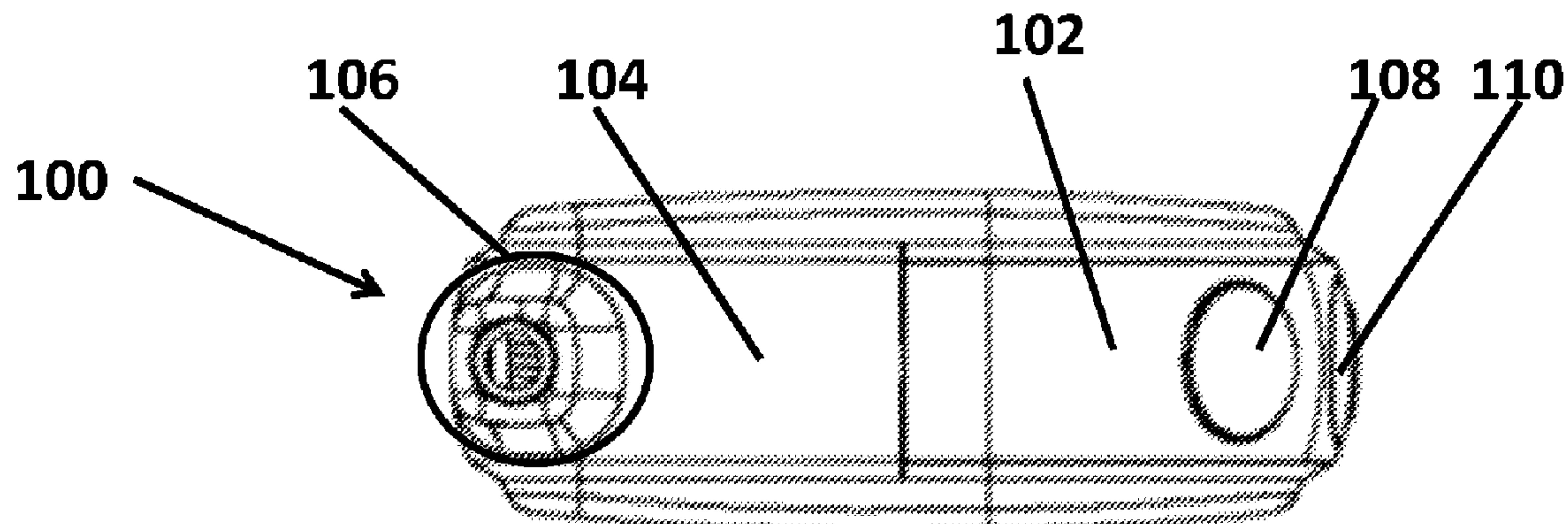
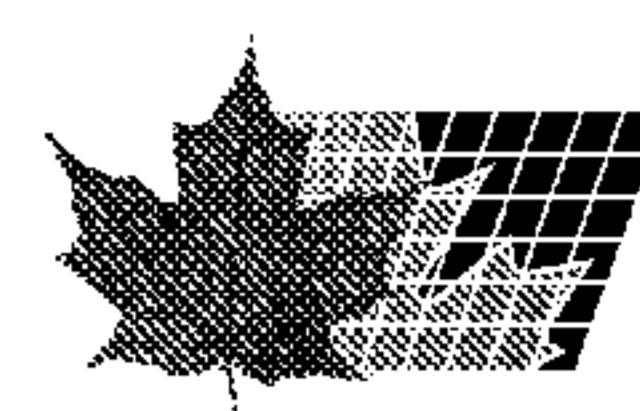


FIGURE 1A

(57) Abrégé/Abstract:

An electronic cigarette device having a disposable tank are described. The disposable tank may have a sealed liquid chamber, an atomizer element and a tank well. An electronic cigarette device, comprising: a housing having a power source; a disposable tank



(57) Abrégé(suite)/Abstract(continued):

capable of holding an electronic cigarette liquid; the housing having a tank receptacle into which the disposable tank is removable attachable; and a connection mechanism that is part of the disposable tank and the tank receptacle that securely connects the disposable tank to the tank receptacle and provides power from the housing to the disposable tank.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(10) International Publication Number

WO 2016/054580 A1

(43) International Publication Date
7 April 2016 (07.04.2016)

(51) International Patent Classification:
A24F 47/00 (2006.01)

(21) International Application Number:
PCT/US2015/053836

(22) International Filing Date:
2 October 2015 (02.10.2015)

(25) Filing Language:
English

(26) Publication Language:
English

(30) Priority Data:
62/059,095 2 October 2014 (02.10.2014) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: DISPOSABLE TANK ELECTRONIC CIGARETTE, METHOD OF MANUFACTURE AND METHOD OF USE

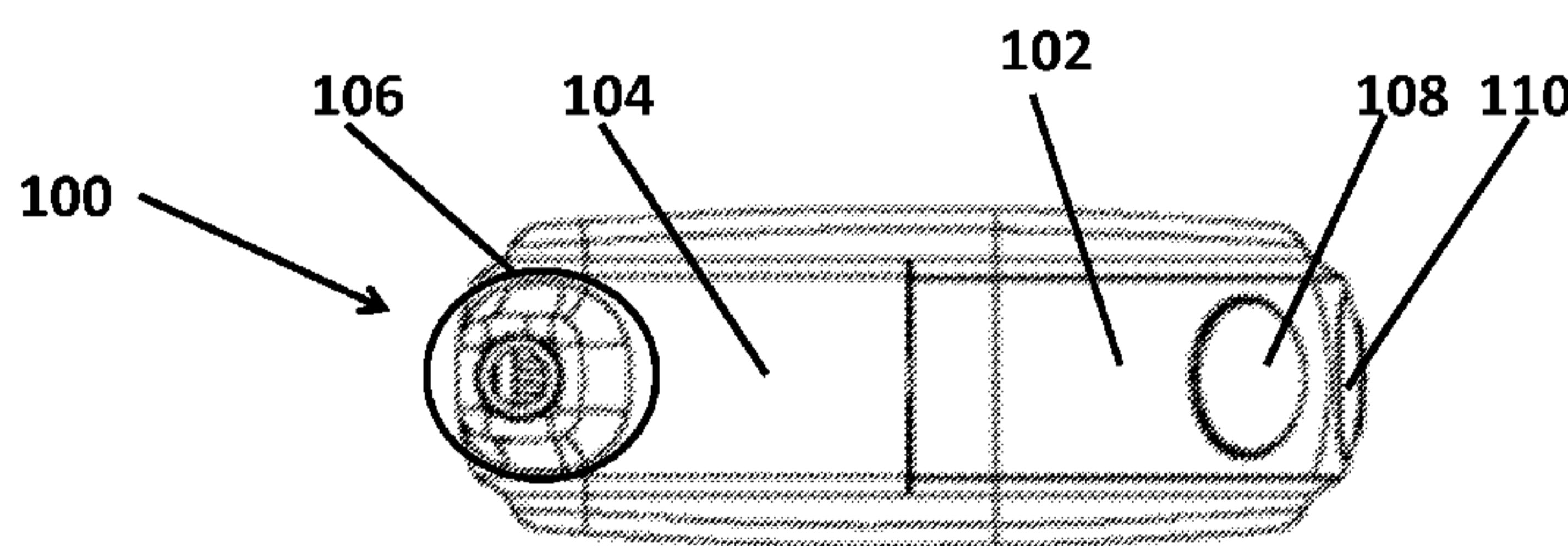


FIGURE 1A

(57) Abstract: An electronic cigarette device having a disposable tank are described. The disposable tank may have a sealed liquid chamber, an atomizer element and a tank well. An electronic cigarette device, comprising: a housing having a power source; a disposable tank capable of holding an electronic cigarette liquid; the housing having a tank receptacle into which the disposable tank is removable attachable; and a connection mechanism that is part of the disposable tank and the tank receptacle that securely connects the disposable tank to the tank receptacle and provides power from the housing to the disposable tank.

DISPOSABLE TANK ELECTRONIC CIGARETTE, METHOD OF MANUFACTURE AND
METHOD OF USE

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Alexander Basile
Alan Crawford

Priority Claim/Related Application

5 This application claims the benefit under 35 USC 119e and priority under 35 USC 120 to U.S. Provisional Patent Application Serial No. 62/059,095, filed October 2, 2014 and entitled “Disposable Tank Electronic Cigarette, Method Of Manufacture And Method Of Use”, the entirety of which is incorporated by reference.

Field

10 The disclosure relates generally to an electronic cigarette and more specifically to an electronic cigarette having a disposable tank.

Background

Recently, electronic cigarettes have become popular as it provides an alternative to tobacco and cigar smoking. An electronic cigarette is a device that contains liquid containing 15 nicotine that is then vaporized by the electronic cigarette to allow the user to have the sensation of smoking in public places and receive the nicotine buzz without the other harmful side effects of smoking a regular cigarette or cigar.

Most electronic cigarettes sold today have a tank that the user must manually refill the liquid in the tank. The liquid for the electronic cigarette is commonly known as eLiquid and 20 contains nicotine and may also contain other ingredients including flavoring and the like. The manual filling of the liquid into the tank is messy and puts the user in contact with the messy/sticky, nicotine-containing eLiquid. While the eLiquid is not toxic as the normal level of exposure, a user must go undergo this manually refilling process frequently to use what is known as a top “open-tank” system. This manually refilling process invariably leaves residue on the 25 fingers of the user and in the various tanks and battery systems that are part of the open-tank systems.

With these open-tank systems, the replacement of the atomizers (wicks and coils) when they burn out (about once per week) is complicated and requires practice or the assistance of a specialist. Further, for open-tank systems that have a tubular design (“tubular device designs”), the tubular device designs are clumsy, roll off of surfaces they are placed on and are not easily 5 pocketable.

Most of these open-tank systems use an industry standard 510 connection to connect the tank containing the liquid to the mouthpiece. The standard 510 connection is a weak-point for attachment of tanks to the battery units. Furthermore, attaching the tank by screwing the tank onto the rest of the device is not the most efficient attachment method and the connection is 10 easily broken if a user has a device in their pocket and sits on it, for example. In addition, this connection may leak liquid which can cause a significant mess such as when the electronic cigarette is stored in a bag during airline travel or when the electronic cigarette is being carried by the user.

In addition, the swapping of flavors of the eLiquid for open tank systems is difficult. 15 Specifically, since a tank can only hold one flavored liquid at a time, a user must have several costly tanks to swap flavors or the user must dump out the old liquid, wash and clean the tank and then re-fill it. This means that being able to use various flavored eLiquid in an open-tank system is either costly or messy and time-consuming.

Some systems use a custom bottle that attaches to the bottom of the battery unit in order 20 to avoid exposure by the user to the eLiquid. However, while this design makes it easier to swap flavors, these systems still require the user to manually replace atomizers.

Brief Description of the Drawings

Figures 1A-1G are a top view, perspective left side back view, left side view, plan back view, right side view, perspective right side back view and a bottom view, respectively, of an 25 embodiment of a disposable tank electronic cigarette;

Figure 2 is an exploded assembly diagram of the disposable tank electronic cigarette;

Figure 3 illustrates more details of the disposable tank of the disposable tank electronic cigarette;

Figure 4 illustrates more details of a bottom portion of the disposable tank and the tank connector on the electronic cigarette;

Figures 5A-5C illustrate a perspective view of the disposable tank being installed in the housing;

5 Figures 6A- 6C illustrate a side view of the disposable tank being installed in the housing;

Figures 7A-7C illustrate more details of the disposable tank being installed in the housing;

Figures 8 and 9 illustrate a method for inserting a disposable tank onto the electronic cigarette and a method for removing a disposable tank from the electronic cigarette, respectively;

10 Figure 10 illustrates a mechanism for sealing and unsealing the disposable tank;

Figures 11A-11E illustrate more details of the intermediate portion of the disposable tank;

Figures 12 and 13 illustrate more details of the intermediate portion of the disposable tank with the atomizer portion; and

Figure 14 illustrates details of the connection between the housing and disposable tank;

15 Figures 15A and 15B show a side view and a cutaway view of the disposable tank electronic cigarette showing the airflow;

Figure 16 illustrates another example of the tank body 210;

Figure 17 illustrates more details of the atomizer element; and

Figures 18A and 18B illustrate of the assembly of the atomizer element, the wick and the 20 heater portion of the device.

Detailed Description of One or More Embodiments

The disclosure is particularly applicable to an electronic cigarette device having a disposable tank with the design set forth below and it is in this context that the disclosure will be described. It will be appreciated, however, that the device, method for manufacture and method 25 of use has greater utility since the device may have other configurations that are within the scope of the disclosure, other methods for operations that are within the scope of the disclosure and the

like so that the embodiments described below are merely illustrative of the teachings of the disclosure.

The electronic cigarette device may have one or more atomizers (e.g., wicks and heating element) built into a disposable tank with the eLiquid completely sealed out of the reach of the user that is a much more effective solution than anything currently available.

Figures 1A-1G are a top view, perspective left side back view, left side view, plan back view, right side view, perspective right side back view and a bottom view, respectively, of an embodiment of a disposable tank electronic cigarette device 100. The device 100 may have a housing 102 that is made of an appropriate material like plastic or metal. The housing may house various components of the device 100 and may be, for example, the size that is smaller than a deck of cards. A disposable tank 104 may be removable attached to the housing. The disposable tank 104 may be made of the same material as the housing. The disposable tank 104 may store eLiquid that is vaporized by the device 100 as described below. The disposable tank 104 may be discarded when there the eLiquid within the tank 104 is exhausted or the user wants to change the type of eLiquid being vaporized. As described below in more detail, the tank may include the atomizing elements. Furthermore, the tank may have various different shapes and configurations. For the embodiment shown in Figures 1A-1G, the tank may have a hollow rectangular shape so that it can fit into the housing 102 and hold the eLiquid.

The disposable tank 104 may be a closed tank system in which the eLiquid is stored in a separate compartment from the housing 102 until the disposable tank 104 is connected to the housing 102 that includes the other components of the device 100. The closed tank system means that the eLiquid stays separate from the heating element of the device 100 during transport. Furthermore, when the disposable tank 104 is removed from the housing 102, the disposable tank 104 reseals itself so that the liquid does not leak.

The tank 104 may have a mouthpiece portion 106 that may be located at various locations on the tank. In the embodiment shown in Figures 1A-1G, the mouthpiece is located adjacent a side of the tank. The housing 102 may have a user interface device 108, such as a button, that permits the user to turn on or off the device 100. In addition, the user interface device 108 may be depressed/activated to cause the atomizer element to activate and vaporize some of the

eLiquid so that the user can inhale/suck in the vaporized eLiquid through the mouthpiece portion 106. The user interface device 108, in the embodiment shown in Figures 1A-1G may be located on top of the housing as shown in Figures 1A, 1E and 1F, but the user interface device 108 may also be located on other parts of the housing.

5 In one embodiment, the user interface device 108 may be used to turn on the device, such as by depressing the user interface device 108 three times in rapid succession. The device 100 can also be turned off by using the same 3-press sequence. After the device is in the “on” mode, a single press of the user interface device 108 may place the device 100 in a “fire” mode which means power will be transmitted through the 2 metal “posts” on the device in contact with the
10 metal coil on the disposable tank when the tank is installed. This power to the coil is what will cause that element to heat up and thus vaporize the liquid being wicked from the tank. The release of the user interface device 108 may immediately stop current flow and stop vaporization.

The device 100 may also have a display screen 110 that may display various data about the device 100. For example, in one embodiment, the display 110 may display the current
15 wattage of the power being applied to the atomizer to vaporize the eLiquid and the battery power remaining for the device 100. The display 110, in the embodiment shown in Figures 1A-1G may be located on a side of the housing as shown in Figures 1E and 1F, but the display 110 may also be located on other parts of the housing. The housing may also have a set of controls 112, such as buttons, that allow the user to adjust the power level of the device. The set of controls 112, when
20 activated, send a signal to the device’s software to regulate how much power flows to the tank’s coil next time the main button is pressed to fire the device 100. Each press either up or down sets a new upper limit to the wattage. A user will set the wattage level based on personal preference as each setting potentially change the flavor experience when using the device 100.
The set of controls 112, in the embodiment shown in Figures 1A-1G may be located on a side of
25 the housing as shown in Figures 1E and 1F, but the set of controls 112 may also be located on other parts of the housing.

Figure 2 is an exploded assembly diagram of the disposable tank electronic cigarette 100. As shown, the housing 102 may further comprise a first outside portion 200, a middle portion 202 and a second outside portion 204 that fit together to form the housing 102 that has a tank

receptacle 209 once the housing is assembled for the disposable tank. The tank receptacle 209 may be opposite the display 110 and may receive a user-inserted disposable tank. The disposable tank 104 may be secured into place by a tank spring on one side and held on the bottom and other side by the tank connector. The tank connector also contains metal posts that pass through it and 5 connect to the atomizer coil when the tank is inserted by the user.

The second outside portion may have one or more detents 205 that mate with the first outside portion 200 to connect the first outside portion 200, the middle portion 202 and the second outside portion 204. As shown in Figure 2, the assembled housing 102 may further have 10 a battery 206 that provides power to the device 100 and a circuit board 208 that contains the electronics and wiring to provide power to each component, such as the atomizer element, the user interface features and the display and control each of these components. The circuit board 208 may, for example, have at least one microprocessor or microcontroller, memory and software that is stored in the memory and executed by the processor to manage the operations of the circuits in the device 100.

15 Figure 3 illustrates more details of the disposable tank of the disposable tank electronic cigarette. As shown in Figures 2 and 3, the disposable tank 104 may further comprise a tank body 210 that has the mouthpiece 106 and contains an eLiquid. The disposable tank 104 may further comprise an intermediate portion 212, the atomizer element 214 (that may include a heater element and a wick element as described below in more detail) and a tank well portion 216 20 into which the atomizer element 214 is secured. The intermediate portion 212 may be made of silicone. The intermediate portion 212, the atomizer portion 214 and the lower portion 216 are connected together. The intermediate portion 212, the atomizer portion 214 and the tank well portion 216 ensure that the eLiquid does not leak from the tank, houses the atomizer portion 214 and routes and permits the eLiquid to come into contact with the atomizer portion 214 to 25 vaporize the eLiquid. The eLiquid is released from the disposable tank 104 and can be vaporized when the disposable tank 104 is inserted into the housing 102, for example. The intermediate portion 212, the atomizer portion 214 and the tank well portion 216 may also provide a receptacle if any eLiquid leaks. In some embodiments, the tank 104 (and its parts) may be pre-assembled, pre-filled with eLiquid and sealed before coming in contact with the user. In one

embodiment, the choice of tank body materials and atomizer components may be chosen assuming that the disposable tank will be discarded after about 24 hours of use for a normal user.

The tank body 210 may be made of a plastic polycarbonate-like material designed to hold various formulas of liquid safely while prevent leaking or cracking of the tank. The intermediate portion 212 that seals the atomizer portion 214, the tank body 210 and the tank well 216 to each other may be made of silicone. The intermediate portion 212 may also contain a groove which holds the atomizer element 214.

Returning to Figure 2 and as shown in Figure 4, the housing 102 may further comprise one or more metal posts 220 and a bottom portion 222 into which the one or more posts 220 are connected. The housing may also have a metal strip 224 that is electrically connected to the one or more posts 220. The one or more metal posts 220, the bottom portion 222 and the strip 224 may be secured to the housing. The strip 224 may have an elbow region 225 (biased by a spring force of the metal away from the wall of the housing 102) that sits against the housing when installed in the housing 102 and provides a snap fitting connection between the housing 102 and the disposable tank 104. The elbow region 225 is not shown in Figure 4. For example, as shown in Figure 4, the assembled regions 212-216 may have one or more shoulder regions 400 into which the elbow region 225 may snap when the disposable tank 104 is installed in the housing.

As further shown in Figure 4, the bottom portion 222 may hold a set of upper posts 402 (on an upper side of the bottom portion 222) that make contact with the atomizer element 214 (and provide electrical energy when activated) when the disposable tank 104 (that includes the atomizer element 214) is installed in the housing. The bottom portion 222 may further comprise a positive terminal 404 and a negative terminal 406 on a bottom side of the bottom portion 222 that connect to the power source in the housing 102 and thus provides the connection from the power source to the set of upper posts 402.

As shown in Figure 2, the middle/central portion 202 may be made of plastic or metal and may act as the element to which various other elements of the housing are connected. To facilitate this, the central portion 202 may have an interior rack to which the other internal components are attached. For example, the interior rack may hold the power source, such as a battery, circuit boards and inductive charging receiver coil that allows the power source to be

recharged using well known inductive coupling charging. On an interior-side of the device 100, there may be the display 110 that may be an OLED display screen that may show the device current status and display the state of the various user-customizable settings. The display 110 may be viewed through the display lens on the side of the device. The first and second outside 5 portion 200, 204 may be side-panels that are both decorative and practical. The outside portions may help seal the device 100 from mild exposure to debris and the elements. In addition, the user can replace these panels with various aftermarket designs to suit their tastes.

The device 100 may be assembled in different manners that are within the scope of the disclosure. For example, the process to assemble the housing may include: a) internal rack is 10 screwed into outer frame; b) circuit boards and buttons are inserted into the device and attached to the internal rack; c) display lens is inserted on the inside-side of the device and the display is placed inside the lens; d) battery is inserted onto the rack and connected to the circuit boards; e) inductive charging coil is attached to the charging circuits and the battery; f) tank connector with metal posts, and tank spring are screwed into the device frame; and g) metal posts are wired to 15 the circuit boards for power. For example, the process of assembling the disposable tank 104 may include: a) atomizer element 214 may be fit into groves molded in the intermediate portion 212; b) the tank body 210, the intermediate portion 212 and the tank well 216 may be sandwiched together creating a water-tight seal; c) the tank may be permanently sealed around its outer edges using sonic welding. In some embodiments, the bottom of the tank well 216 may 20 have an absorbent material to catch any excess fluid that may accidentally escape the bottom of the intermediate portion 212. This absorbent material may be cut such that the shape will not interfere with the pressure the Tank Connector creates when the User attaches the into the device.

Figures 5A-5C illustrate a perspective view of the disposable tank 104 being installed in the housing 102 and Figures 6A- 6C illustrate a side view of the disposable tank 104 being 25 installed in the housing 102. Figures 7A-7C illustrate more details of the disposable tank 104 being installed in the housing 103. As shown in Figures 5A-6C, a disposable tank is being installed into the housing 102. In Figure 6A, the one or more metal posts 220, the bottom portion 222 and the strip 224 are installed into the housing 102 and secured to the housing as shown in Figure 6B. As shown in Figure 7B, the housing 102 may have a shoulder region 700 that helps

to retain the disposable tank 104 in the housing. As shown in Figure 7C in detail C and detail D, when the disposable tank 104 is installed in the housing 102, the shoulder region 700 interfaces with a portion of the disposable tank 104 and the spring biased elbow region 225 of the strip 224 may interface with the one or more shoulder regions 400 of the housing 102 to create a friction fit 5 to hold the disposable tank 104 in the housing 102. However, the friction fit may be overcome by a user applying force to remove the disposable tank 104.

Figures 8 and 9 illustrate a method 800 for inserting a disposable tank onto the electronic cigarette and a method 900 for removing a disposable tank from the electronic cigarette, respectively. As shown in Figure 8, the method 800 for inserting the disposable tank may 10 include a user obtaining a disposable tank and removing any packaging (802.) The user may then place the disposable tank into the tank receptacle of the housing (804). For example, the user may hook a bottom side corner of the tank on the shoulder region 700 and snaps the disposable tank into place. Alternatively, the user can drop the disposable tank straight onto the tank connector (the one or more metal posts 220, the bottom portion 222 and the strip 224 are 15 installed into the housing 102) and snaps the disposable tank into place. In each case, the disposable tank 104 may be held in place by the appropriate level of force from the elbow 225 and the tank connector. Once the tank is inserted, pressure from the tank connector on the intermediate portion may start the flow of liquid into the atomizing chamber (806.)

As shown in Figure 9, the method 900 may include a user applying a lateral force to the 20 disposable tank (902) away from the housing. As a result of the force (that overcomes the force from the elbow 225 and the tank connector), the disposable tank may be released (904.) When the disposable tank is released, the intermediate portion may return to its neutral position stopping the wicking of liquid into the vaporization chamber so that the removed tank is sealed 25 (906.) The user can then discard the tank and replace the tank with a new disposable tank.

Figure 10 illustrates a mechanism for sealing and unsealing the disposable tank 104 that has the mouthpiece 106. When the disposable tank 104 is installed in the housing, a post portion 1000 of the intermediate portion 212 is pushed up by a raised portion of the bottom portion 222 as shown which allows the liquid in the tank to flow down and wet the wick of the atomizer 214.

Similarly, when the tank is detached from the housing 102, the post portion 100 returns to its closed position so that the tank is sealed.

As shown in Figure 10, the tank well 216 may have a pooling reservoir and overflow tank 1002. In one embodiment, the pooling reservoir 1002 may be at the bottom left directly opposite the mouthpiece to hold any excess liquid that was wicked from the other side of the tank, but not vaporized. This space prevents fluid from flowing into other areas of the tank or out through the air hole and in contact with the user. Since the tank is disposable, it is only designed to hold any excess that may accumulate from a normal 24-hour use.

Figures 11A-11E illustrate more details of the intermediate portion 212 of the disposable tank. The intermediate portion 212 may have the terminals 406, 408 on the underside, the post portion 1000 and a groove 1002. Before a disposable tank 104 is attached to the housing 102, the components of the tank create a positive seal to prevent liquid from leaving the upper tank before it is inserted into the housing 102. The design of the tank's silicone part is such that as the tank is attached to the housing, it displaces the silicone inside the tank (by pressing on the post portion 1000) enough to start the liquid flow into the lower tank area containing the atomizing element 214. The pressure from the main device on the silicone of the inserted tank also causes the silicone to expand to create a secondary seal at the bottom of the tank to prevent liquid from flowing from the bottom of the tank into the main device.

The tank can be removed from the housing at any time, for example when a user wishes to switch to a tank with a different flavored liquid. Immediate upon removal of the tank, the inner silicone part returns to its previous sealed position creating a seal for the liquid once again. The result is that liquid will only flow when the tank is fully inserted into a suitable base unit and not when the tank is separated as in during shipment or after a partially used tank is manually removed.

Figures 12 and 13 illustrate more details of the intermediate portion 212 of the disposable tank with the atomizer portion 214. The atomizer portion 214 may have a wick element 1200 that may be U-shaped. The atomizer portion 214 may also have a heating element 1202 that may be located, for example, at the middle of the U-shaped wick. In one embodiment, the heating element 1202 may further comprise a coil portion 1204 that vaporizes the eLiquid, a first

electrode 1206 and a second electrode 1208 at each end of the coil portion. As shown in Figure 13, when the atomizer portion 214 is placed into the intermediate portion 212, each electrode 1206, 1208 electrically connects to the terminals 406, 408. The terminals 406, 408 are electrically connected to the power source so that the atomizer portion 214 is also directly connected to the power source. In one embodiment, the wick 1200 may be made of silica, cotton or a ceramic material. Each electrode/wire 1206, 1208 and the coil portion 1204 may be made of nickel-chromium or other conductive metal. In another embodiment, the wick element 1200 and the heating element 1202 may be both made of a ceramic material that both wicks and heats the eLiquid. Figure 14 illustrates details of the connection between the housing 102 and disposable tank 104 when the disposable tank 104 is installed in the housing 102.

Figures 15A and 15B show a side view and a cutaway view of the disposable tank electronic cigarette showing the airflow. As shown, air for the device may enter an air input, travel downwards and interact with the wick element 1200 and the coil 1204 that generate the vaporized liquid that is inhaled by the user through the mouthpiece portion 106. The airflow shown in Figures 15A and 15B reduces the likelihood of condensation in the system.

Figure 16 illustrates another example of the tank body 210. The disposable tank 104 may further comprise a tank body 210 that has the mouthpiece 106 and contains an eLiquid. The disposable tank 104 may further comprise an intermediate portion 212, the atomizer element 213 (that may include a heater element and a wick element as described below in more detail) and a tank well portion 216 into which the atomizer element 214 is secured. The intermediate portion 212 may be made of silicone. The intermediate portion 212, the atomizer portion 214 and the lower portion 216 are connected together. The intermediate portion 212, the atomizer portion 214 and the tank well portion 216 ensure that the eLiquid does not leak from the tank, houses the atomizer portion 213 and routes and permits the eLiquid to come into contact with the atomizer portion 213 to vaporize the eLiquid. The eLiquid is released from the disposable tank 104 and can be vaporized when the disposable tank 104 is inserted into the housing 102, for example. The intermediate portion 212, the atomizer portion 213 and the tank well portion 216 may also provide a receptacle if any eLiquid leaks. In some embodiments, the tank 104 (and its parts) may be pre-assembled, pre-filled with eLiquid and sealed before coming in contact with the user. In

one embodiment, the choice of tank body materials and atomizer components may be chosen assuming that the disposable tank will be discarded after about 24 hours of use for a normal user.

The tank body 210 may be made of a plastic polycarbonate-like material designed to hold various formulas of liquid safely while prevent leaking or cracking of the tank. The intermediate portion 212 that seals the atomizer portion 213, the tank body 210 and the tank well 216 to each other may be made of silicone. The intermediate portion 212 may also contain a groove which holds the atomizer element 213.

Figures 17 and 18A-18B illustrates the assembly of the atomizer unit including the wick element 102 and the coil element 104. As shown in Figure 15B, the elements form an intergrated component that partially guides the liquid to be vaporized, retains the coil 214 and retains the coil adjacent to the heater element 212.

The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit the disclosure to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the disclosure and its practical applications, to thereby enable others skilled in the art to best utilize the disclosure and various embodiments with various modifications as are suited to the particular use contemplated.

While the foregoing has been with reference to a particular embodiment of the disclosure, it will be appreciated by those skilled in the art that changes in this embodiment may be made without departing from the principles and spirit of the disclosure, the scope of which is defined by the appended claims.

Claims:

1. An electronic cigarette device, comprising:
 - a housing having a power source;
 - a disposable tank capable of holding an electronic cigarette liquid;
 - the housing having a tank receptacle into which the disposable tank is removable

5 attachable; and

 - a connection mechanism that is part of the disposable tank and the tank receptacle that securely connects the disposable tank to the tank receptacle and provides power from the housing to the disposable tank.
2. The device of claim 1, wherein the disposable tank further comprises a heater element connected to a power source in the housing that is capable of vaporizing the electronic cigarette liquid when the disposable tank is attached to the housing.
- 10 3. The device of claim 1, wherein the disposable tank is a closed tank.
4. The device of claim 1, wherein the disposable tank has a mouthpiece through which the vaporized electronic cigarette liquid exits the device.
- 15 5. The device of claim 2, wherein the heater element further comprises a wick element and a heater element so that the wick is wetted by the electronic cigarette liquid and the wetted wick element is heated by the heater element to vaporize the electronic cigarette liquid.
6. The device of claim 5, wherein the heater element is a coil.
7. The device of claim 6, wherein the coil is a sub-ohm coil.
- 20 8. The device of claim 7, wherein the heater element further comprises a first and second electrode at each side of the coil wherein the first and second electrodes electrically connect the coil to the power source.
9. The device of claim 1, wherein the connection mechanism further comprises an attachment mechanism that retains the disposable tank in the housing.

10. The device of claim 9, wherein the disposable tank has an attachment mechanism that mates with the attachment mechanism of the housing.

11. The device of claim 10, wherein the housing attachment mechanism is a biased strip and the tank attachment mechanism is one or more shoulders wherein the one or more shoulders interact with the biased strip to retain the disposable tank in the housing.

5 12. The device of claim 1, wherein the disposable tank has a sealing mechanism that seals the liquid in the disposable tank when the disposable tank is not coupled to the housing.

10 13. The device of claim 12, wherein the sealing mechanism releases the liquid from the disposable tank into a region abutting the heating element when the disposable tank is coupled to the housing.

14. The device of claim 2, wherein the power source is a battery.

15. The device of claim 2, wherein the power source further comprises an inductive charging element.

16. The device of claim 1, wherein the disposable tank has an airflow mechanism.

15 17. A method, comprising:

inserting a disposable tank into a housing;

releasing a liquid in the disposable tank into the housing when the disposable tank is inserted into the housing; and

vaporizing, using a heater element in the housing, the liquid released into the housing.

20 18. The method of claim 17 further comprising removing the disposable tank from the housing and inserting a new disposable tank into the housing.

19. The method of claim 18, wherein removing the disposable tank further comprises automatically sealing the disposable tank to prevent leakage of any liquid remaining in the disposable tank.

-15-

20. The method of claim 17, wherein vaporizing the liquid further comprises wetting a wick using the liquid and heating the wetted wick using a heating element to vaporize the liquid.

5 21. The method of claim 17 further comprising retaining, by an attachment mechanism, the disposable tank in the housing and providing power from the housing to the disposable tank.

22. The method of claim 21, wherein retaining the disposable tank further comprises mating an attachment mechanism in the disposable tank with the attachment mechanism in the housing to retain the disposable tank in the housing.

10 23. A closed tank apparatus for use with an electronic cigarette, the apparatus comprising:

a disposable tank that is configured to hold a liquid to be vaporized by the electronic cigarette;

15 the disposable tank sealing the liquid to be vaporized by the electronic cigarette so that the liquid cannot interact with a heating element of an electronic cigarette until the disposable tank is coupled to the electronic cigarette; and

the disposable tank being resealable when the disposable tank is disconnected from the electronic cigarette.

24. The apparatus of claim 23, wherein the disposable tank is a closed tank.

20 25. The apparatus of claim 23, wherein the disposable tank has an attachment mechanism that mates with an attachment mechanism of a housing of the electronic cigarette.

26. The apparatus of claim 25, wherein the attachment mechanism is one or more shoulders wherein the one or more shoulders interact with a biased strip of the housing to retain the disposable tank in the housing.

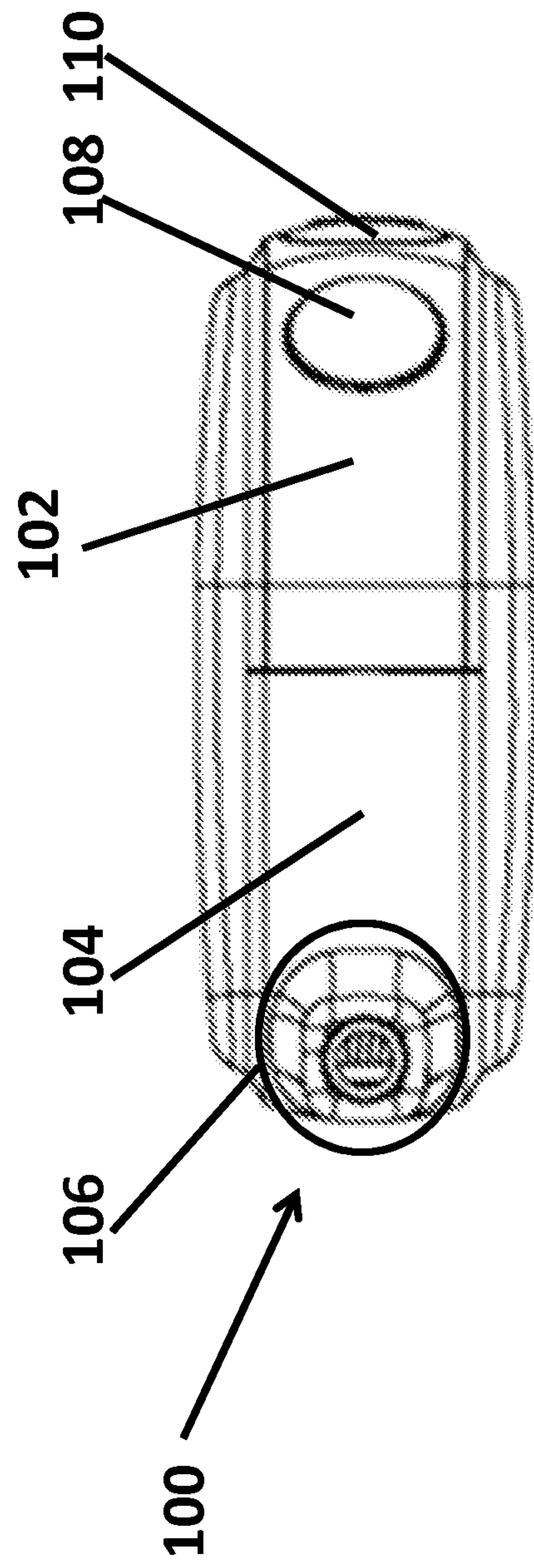


FIGURE 1A

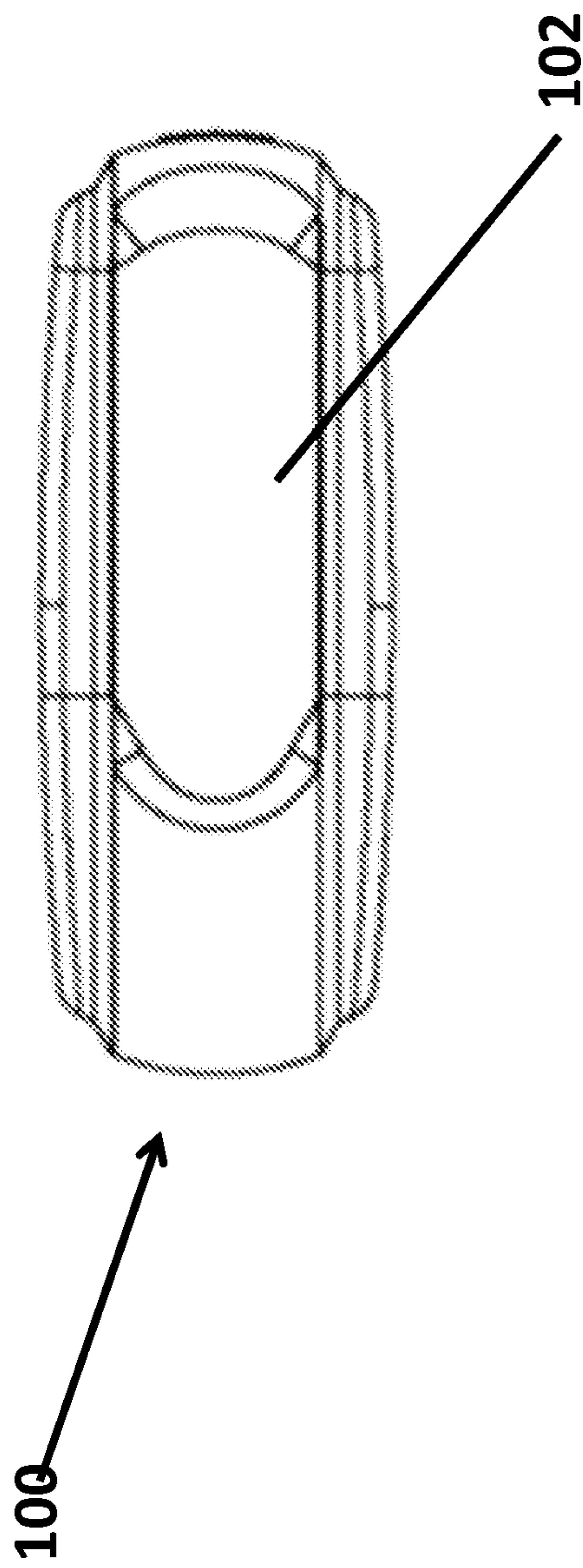


FIGURE 1G

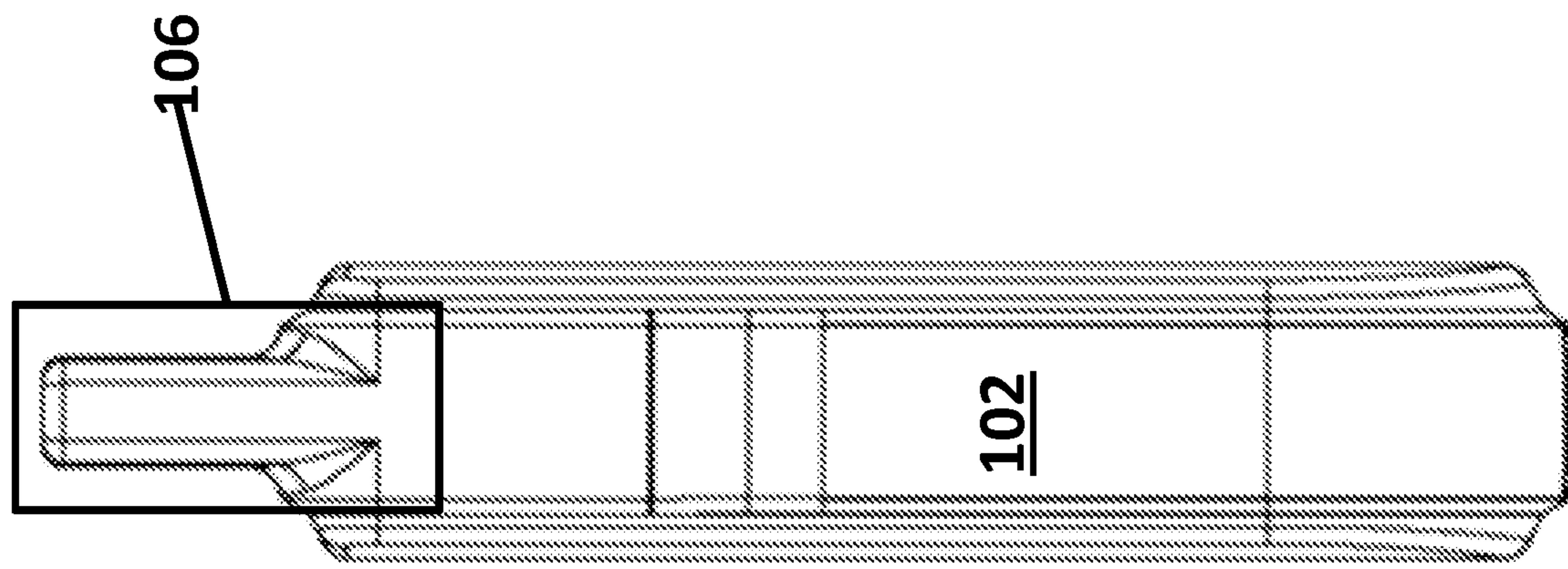


FIGURE 1C

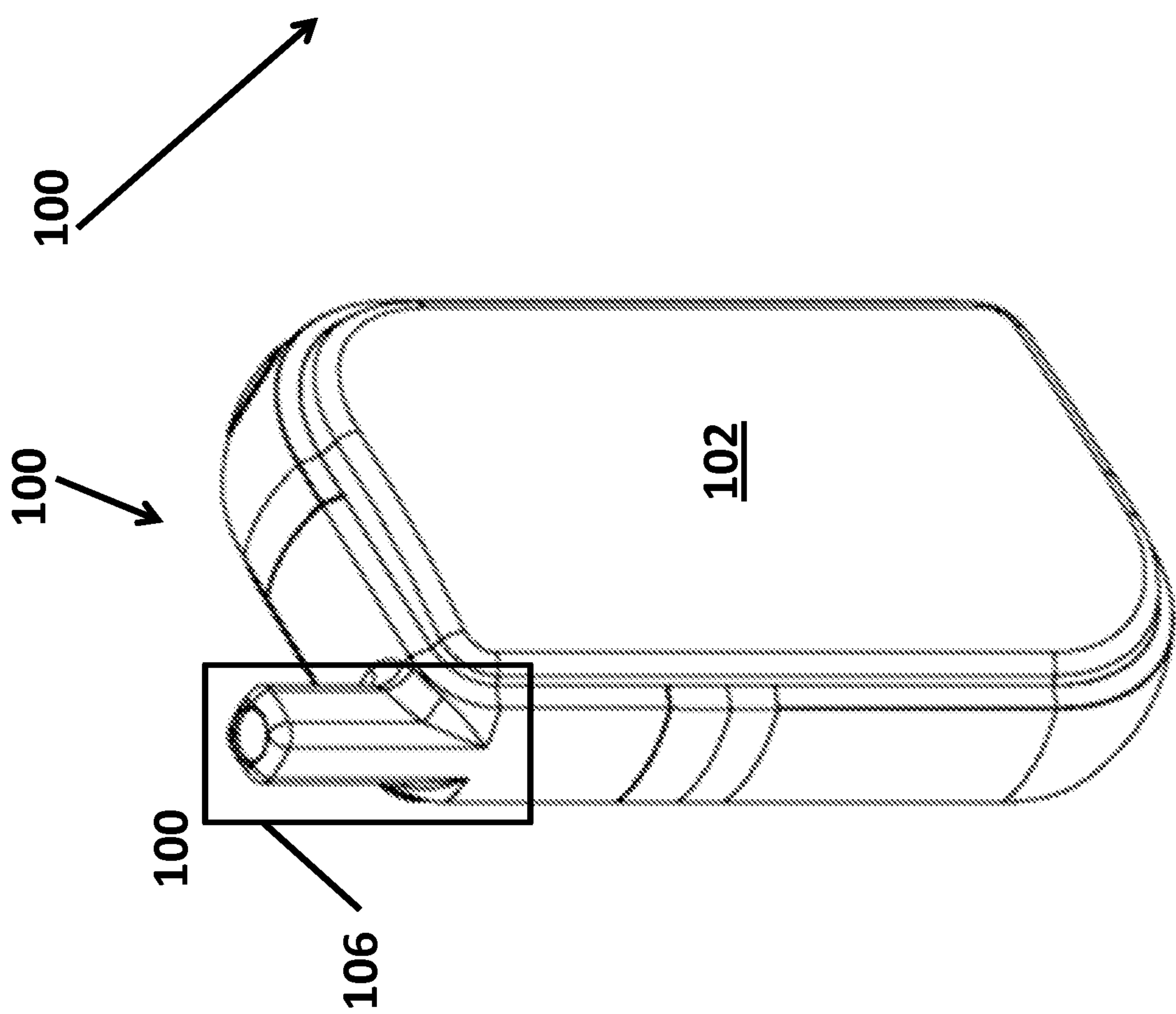
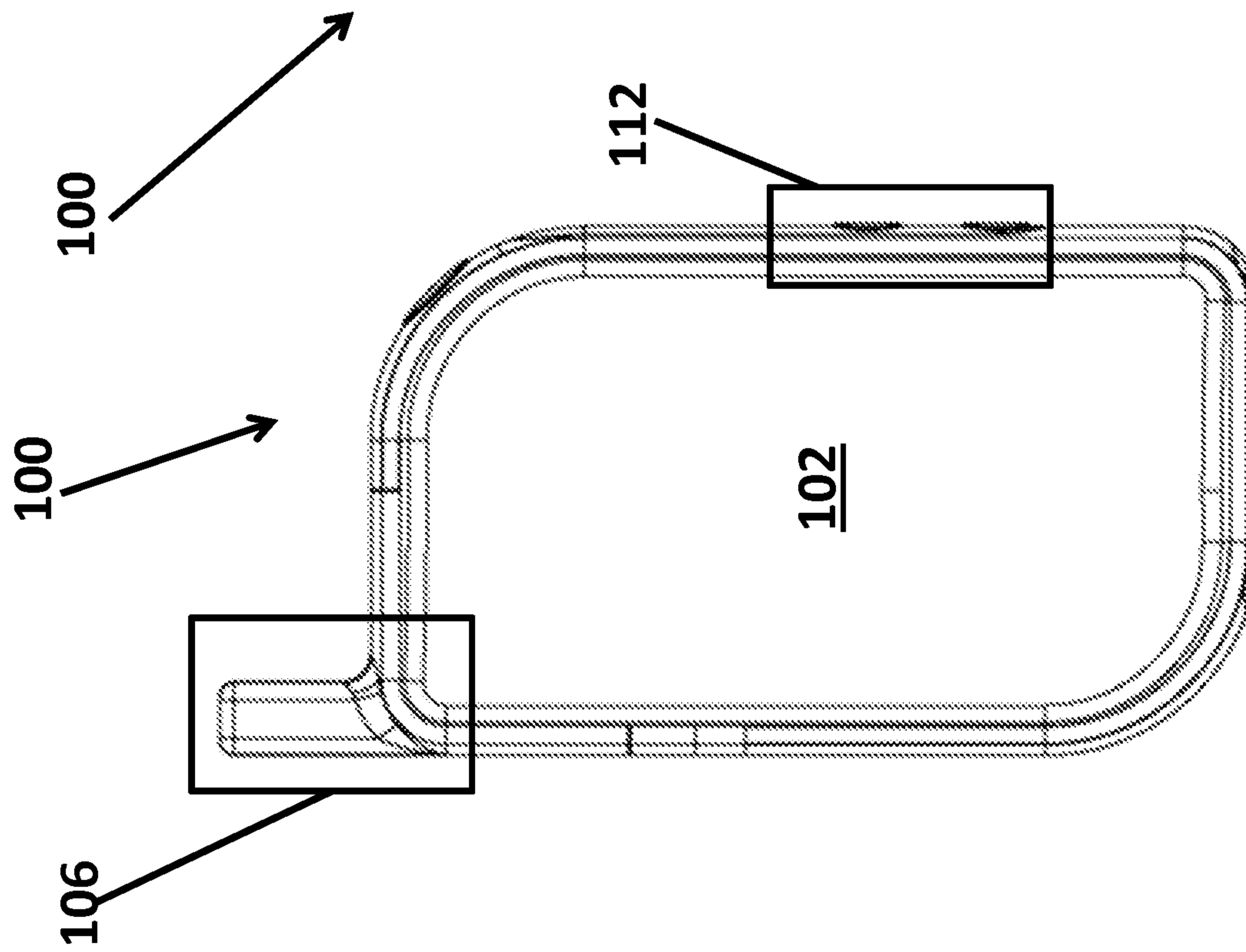
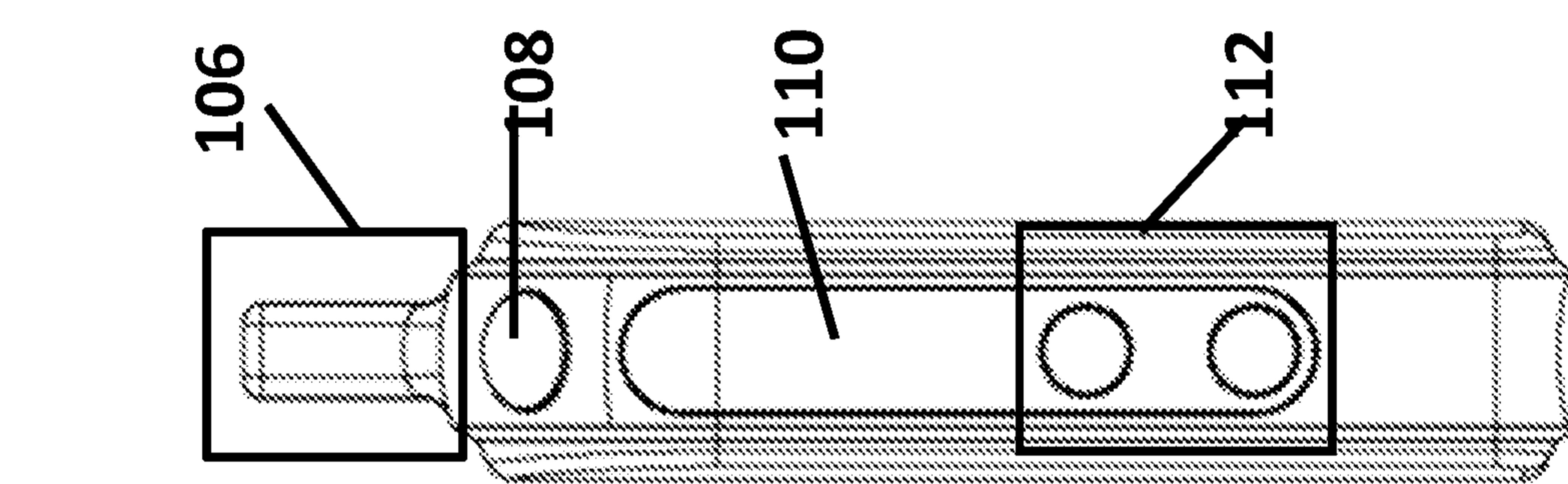
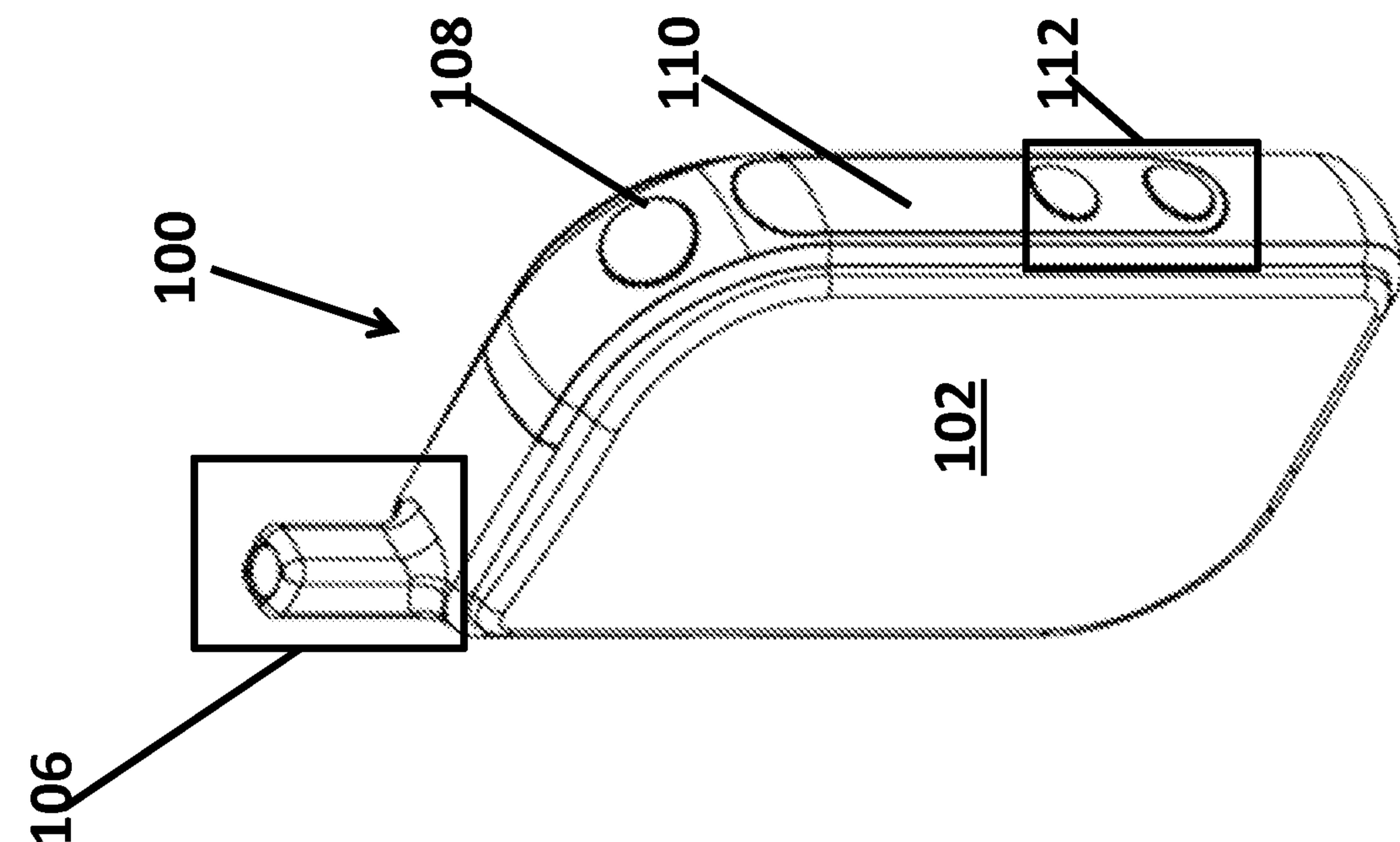


FIGURE 1B



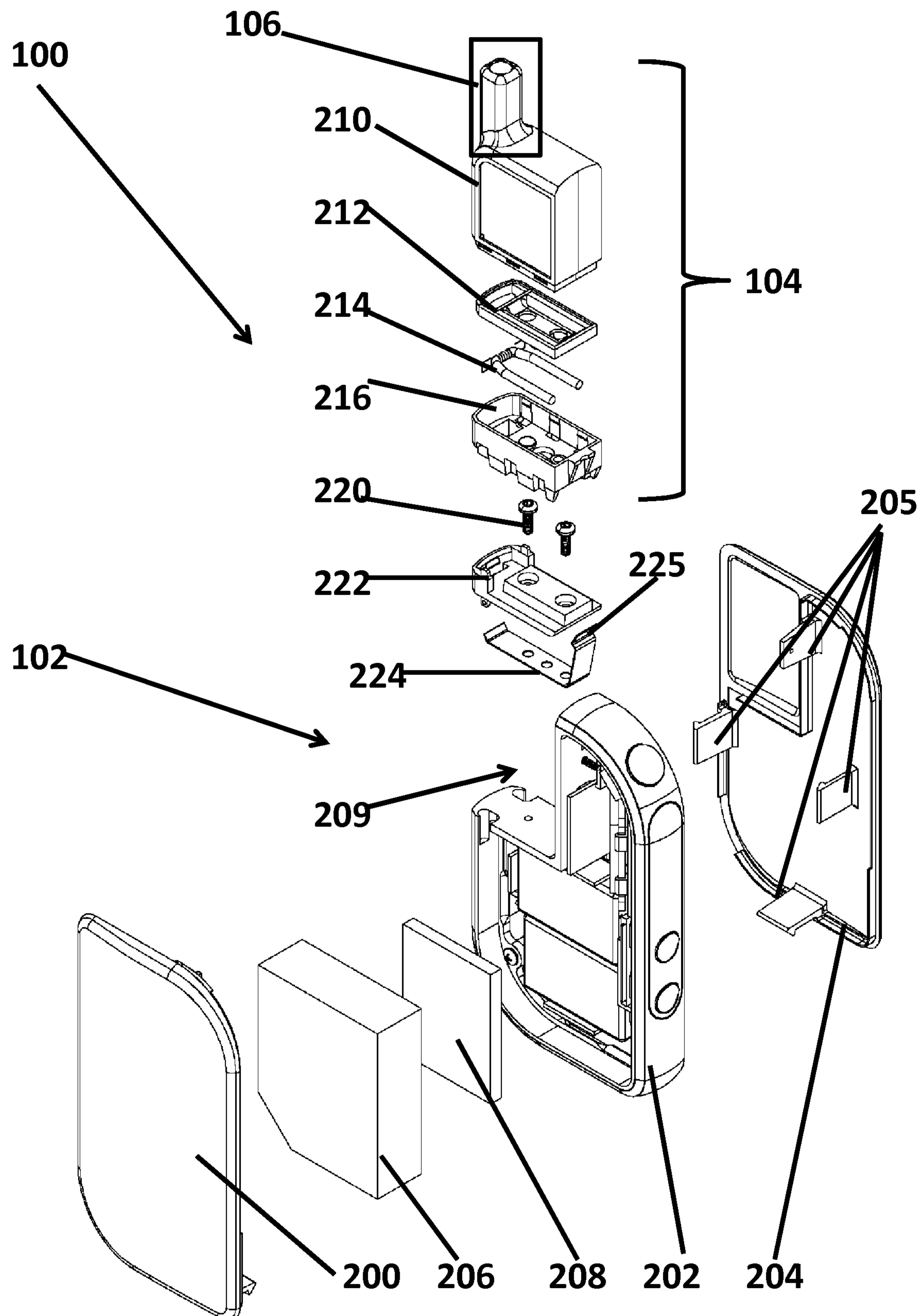
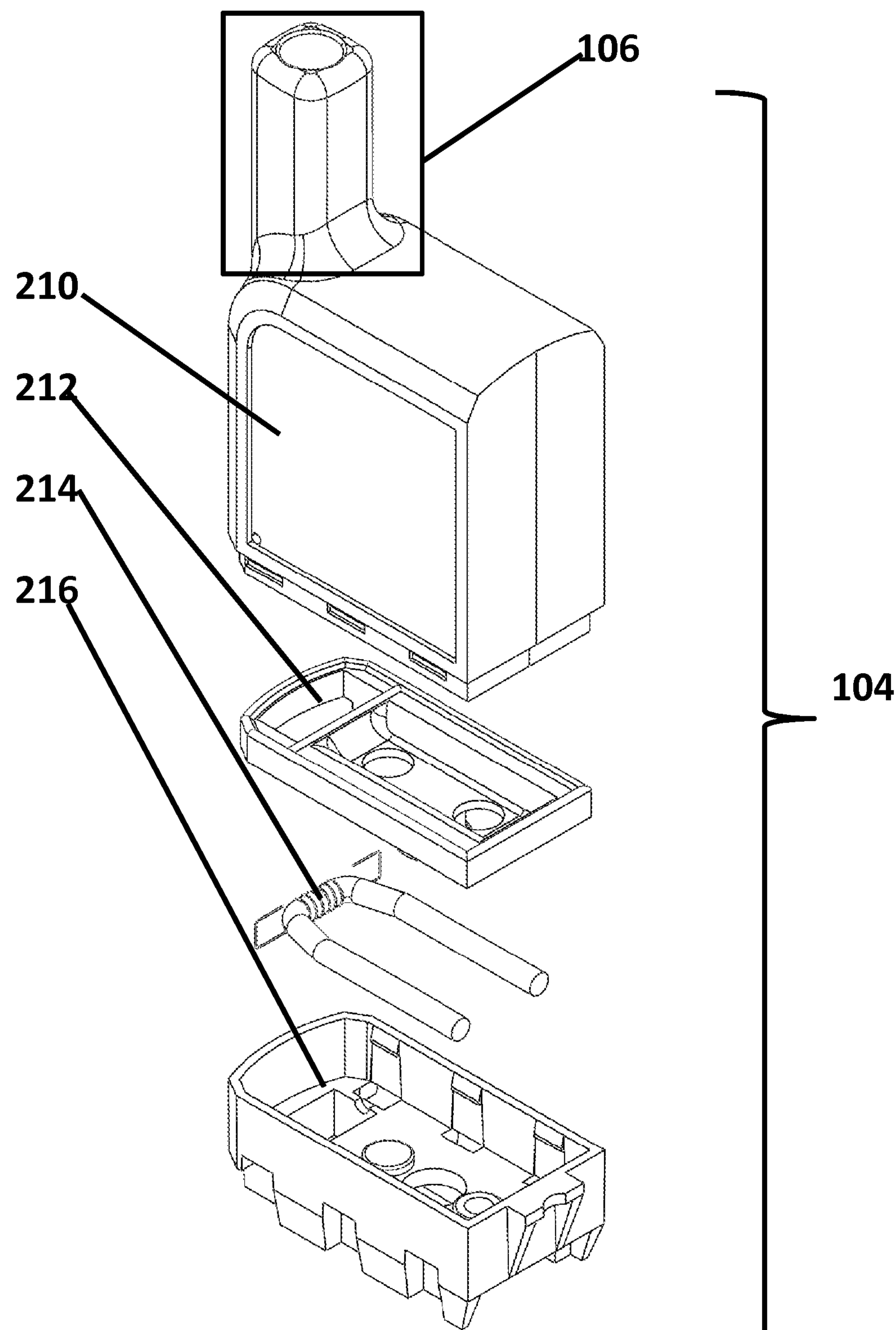
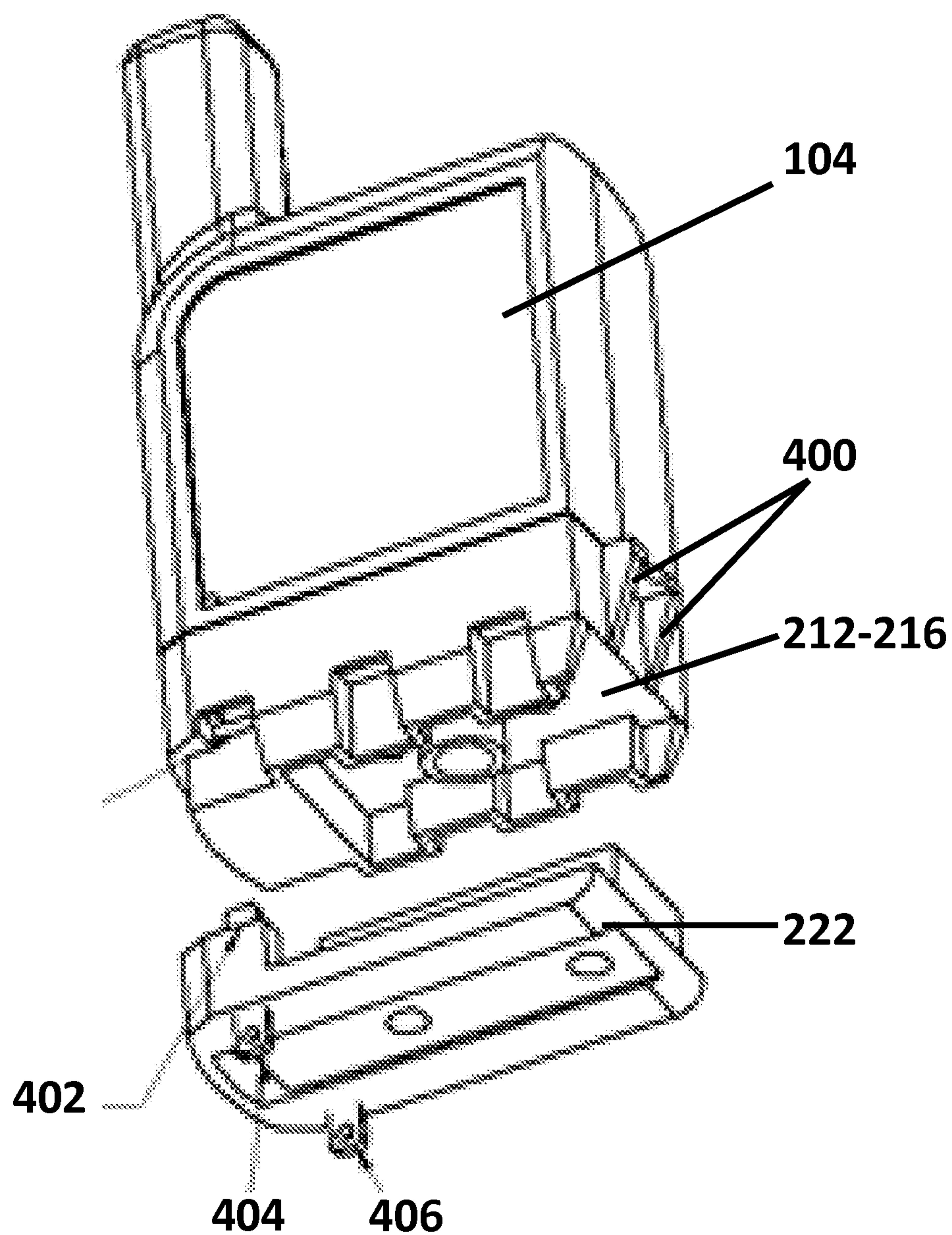
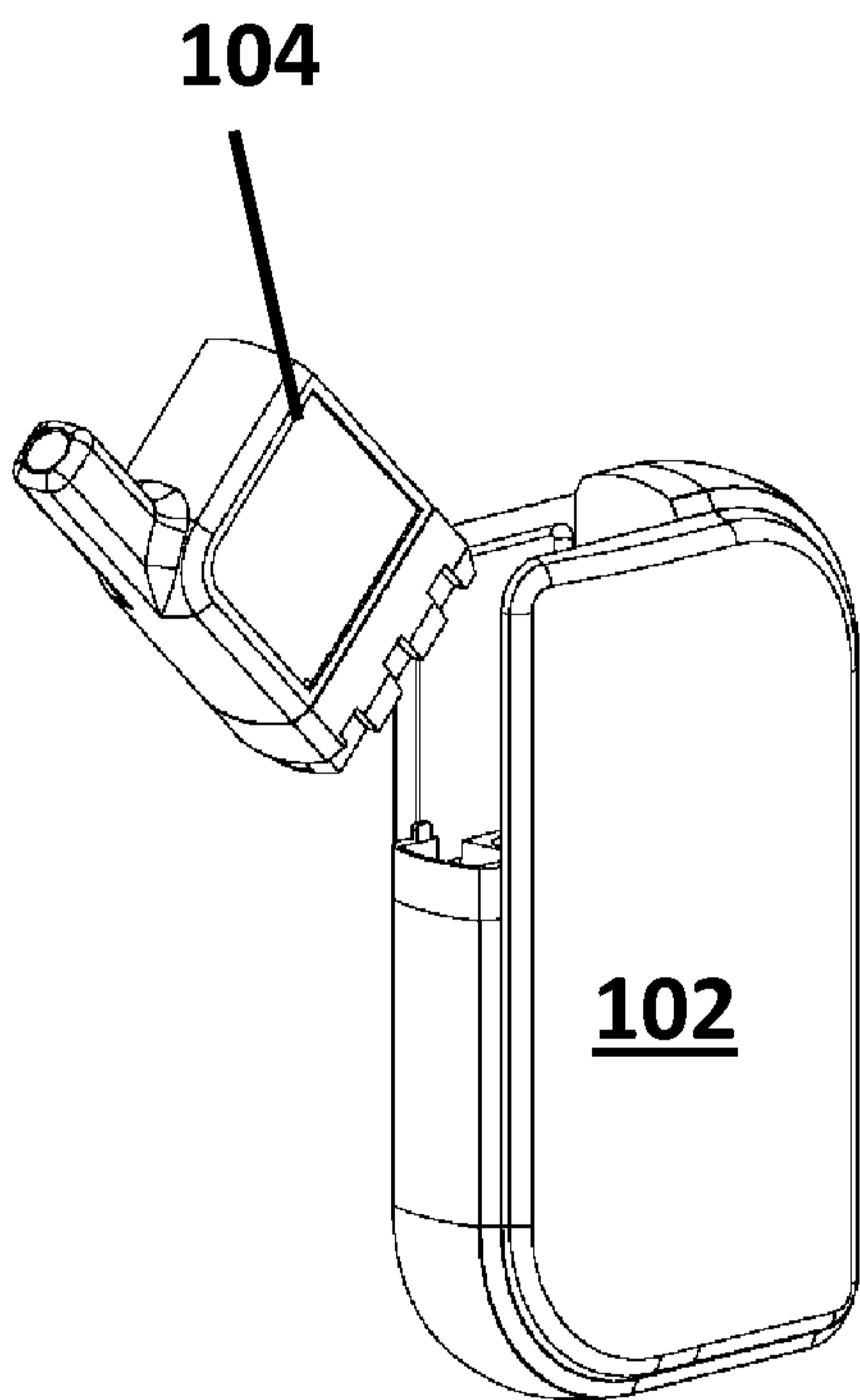
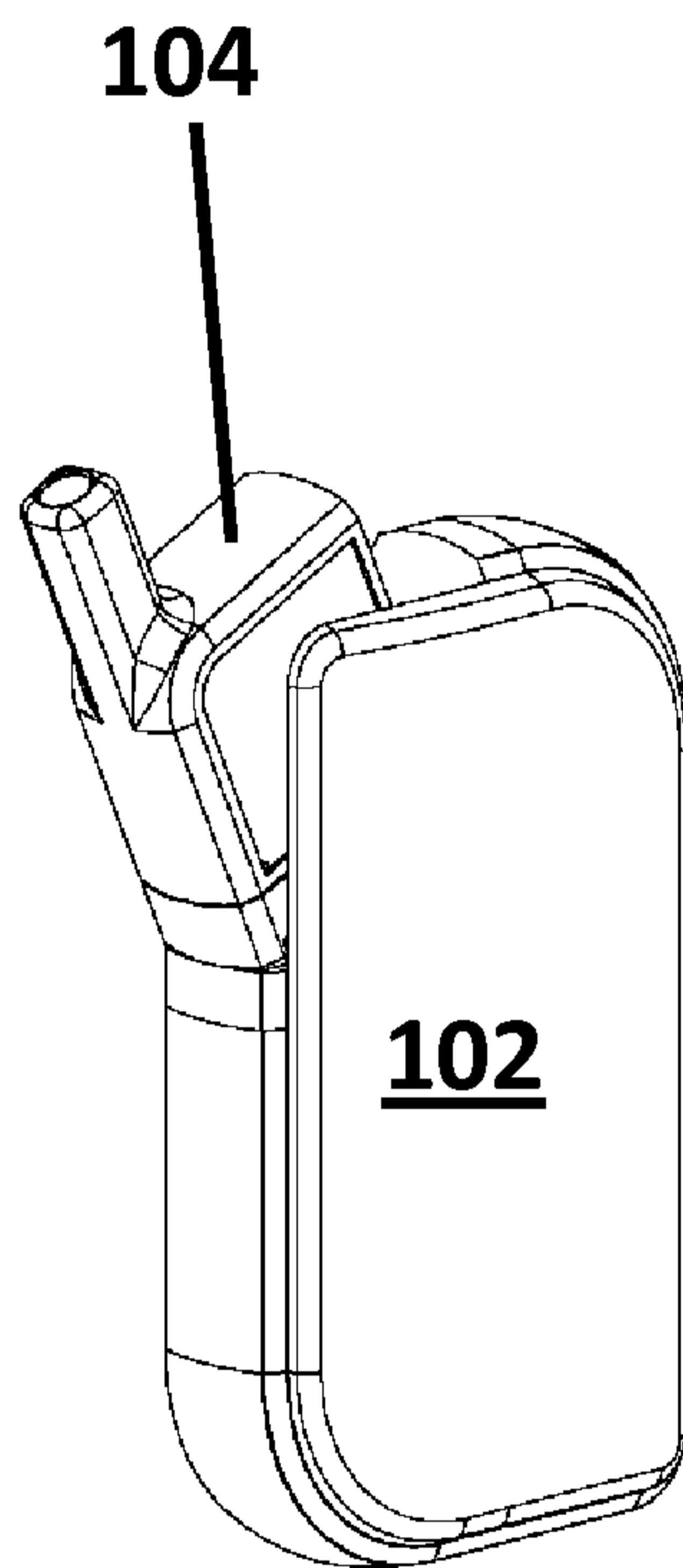
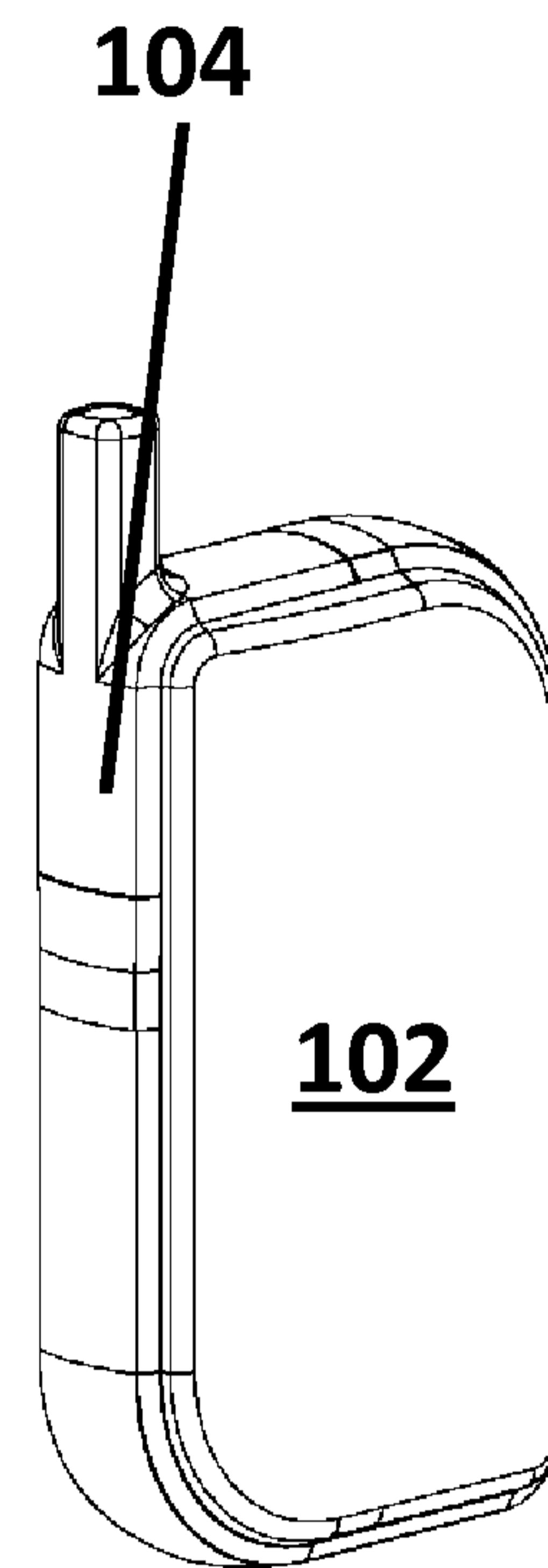


FIGURE 2

**FIGURE 3**

**FIGURE 4**

**FIGURE 5A****FIGURE 5B****FIGURE 5C**

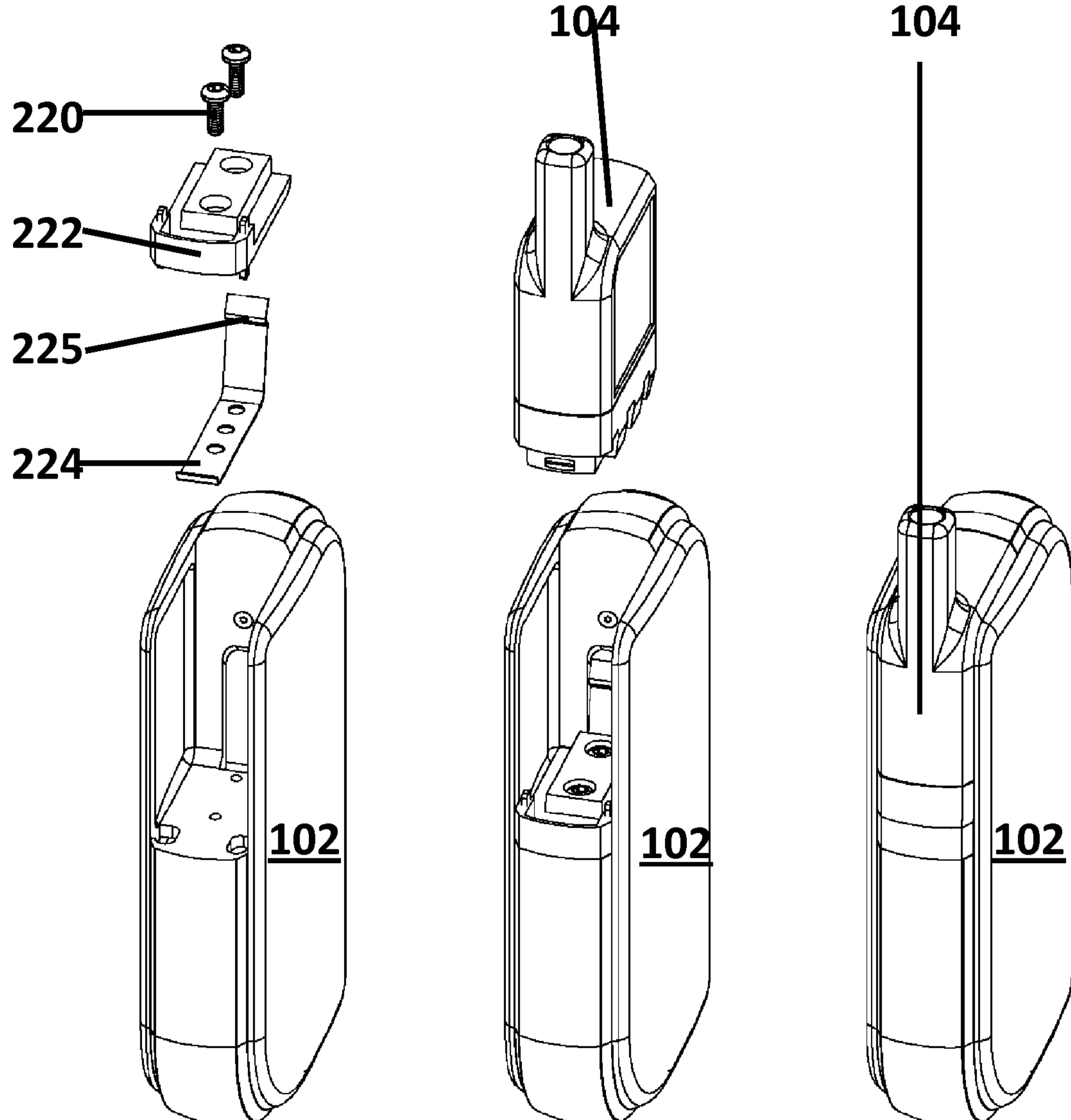


FIGURE 6A

FIGURE 6B

FIGURE 6C

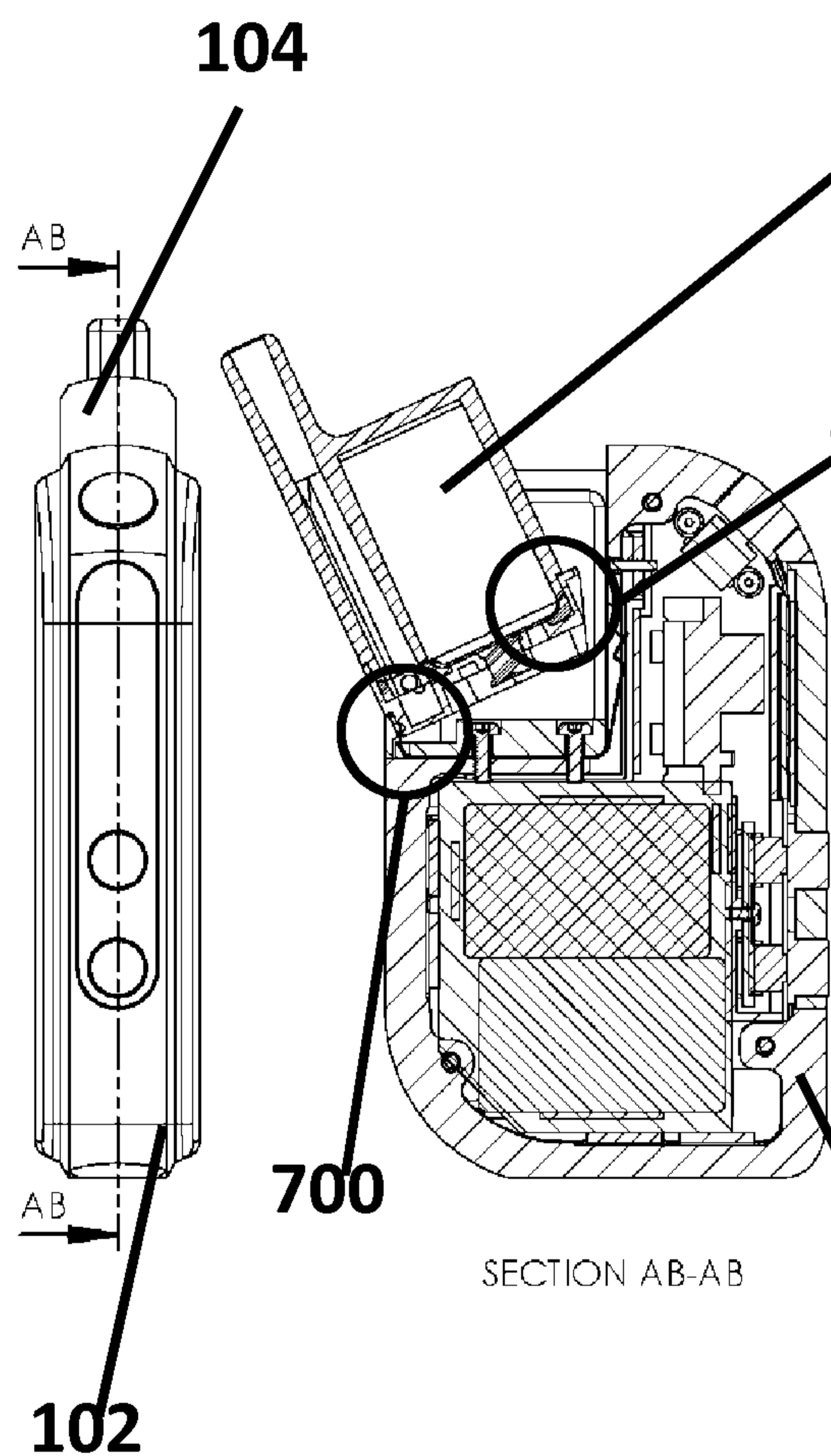


FIGURE 7B

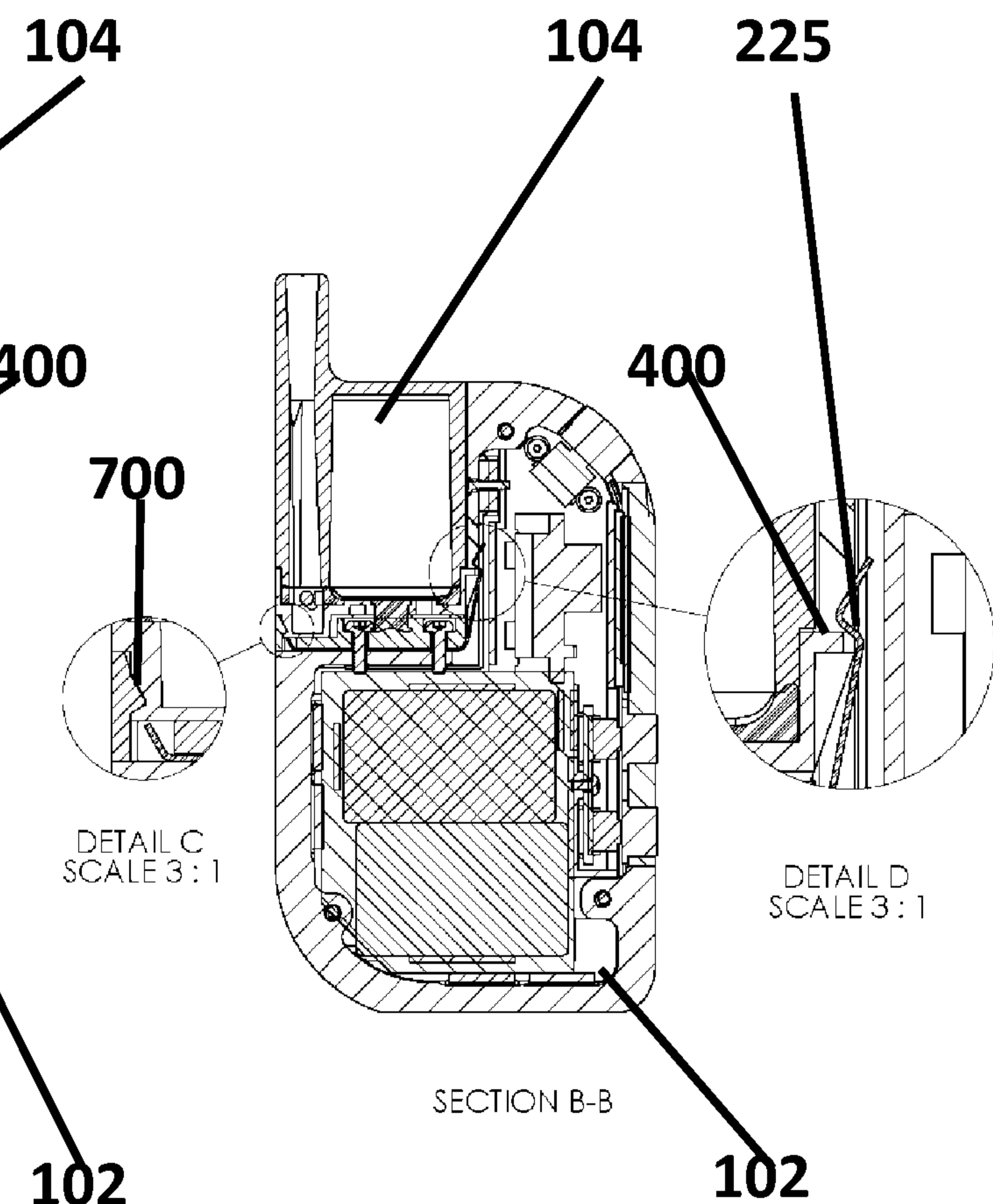
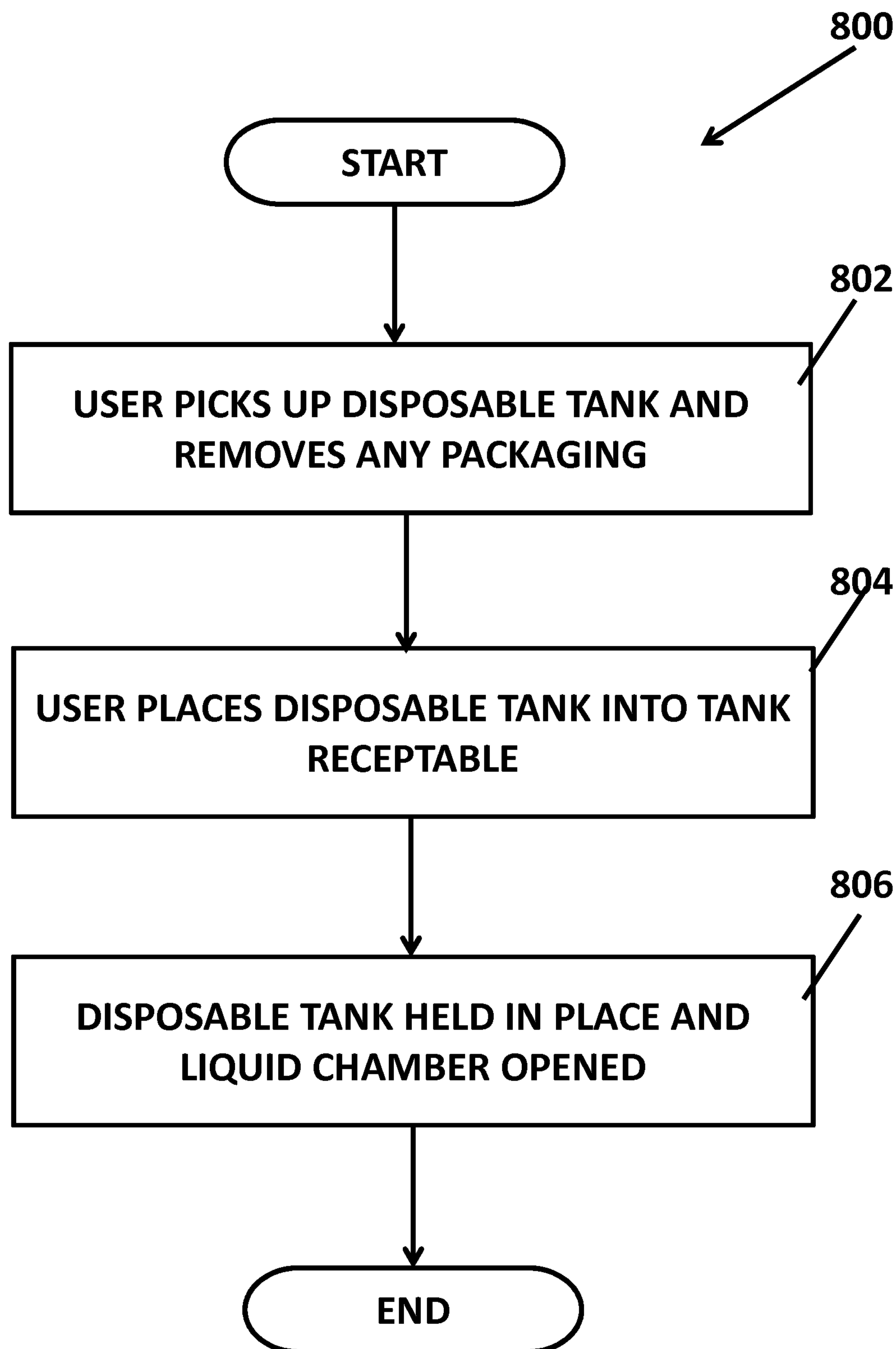


FIGURE 7C

**FIGURE 8**

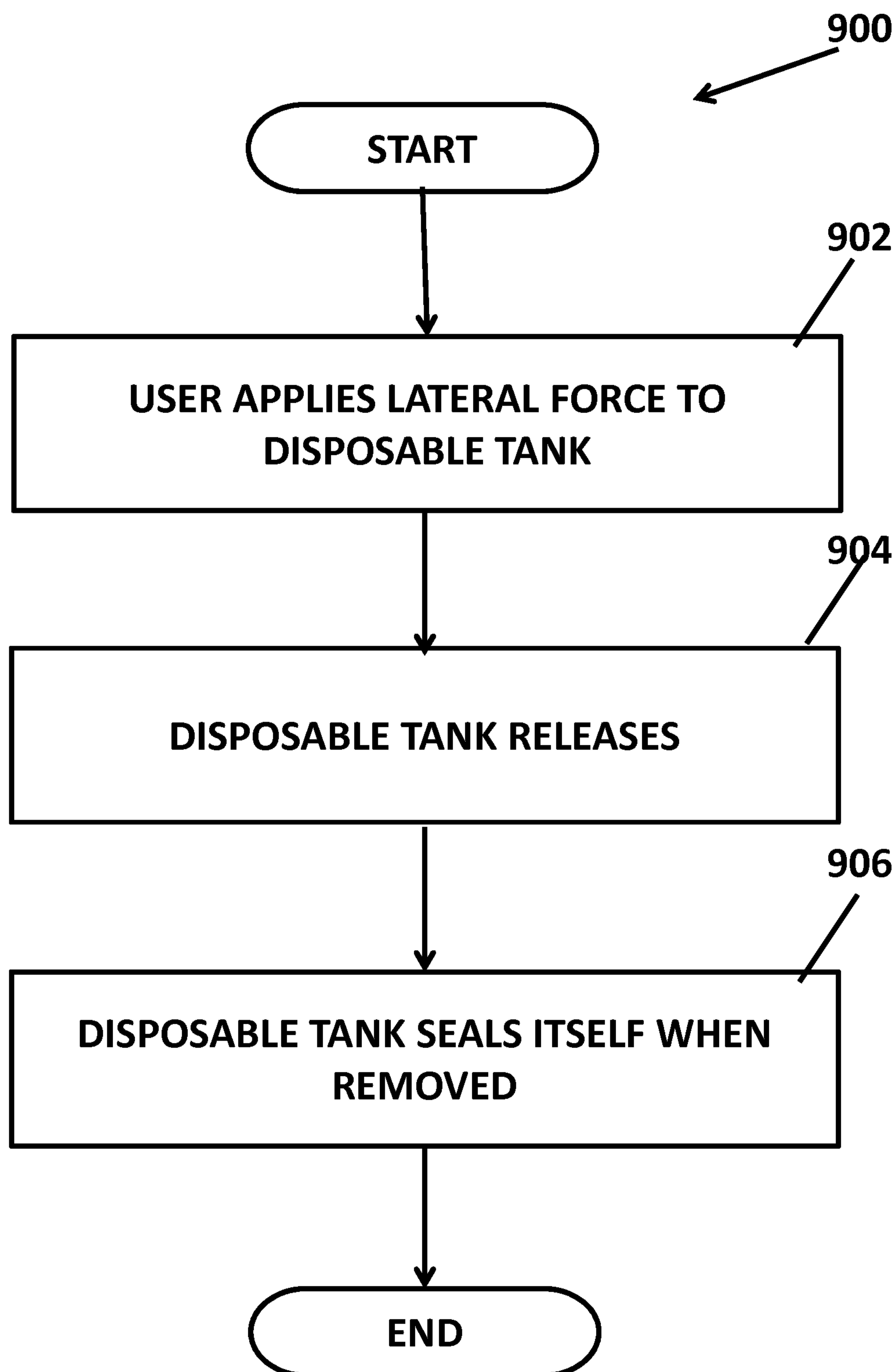
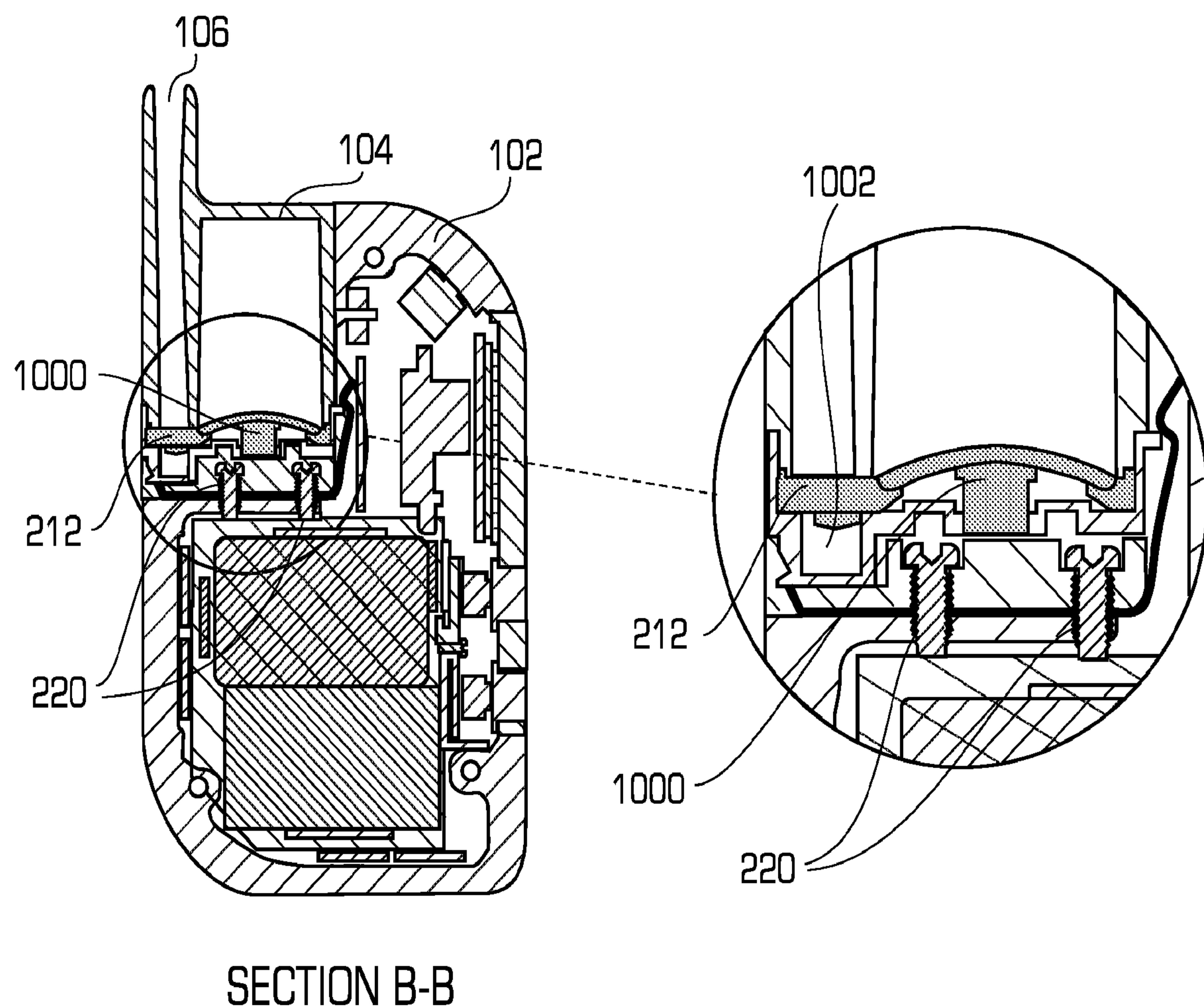
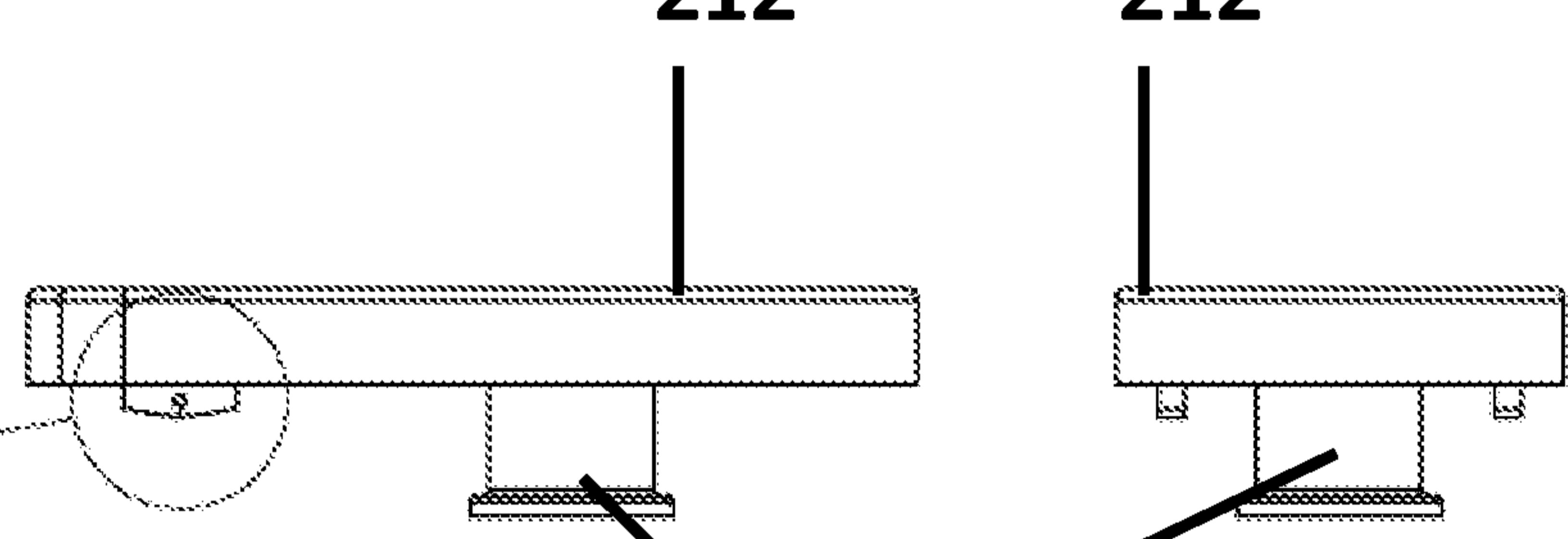
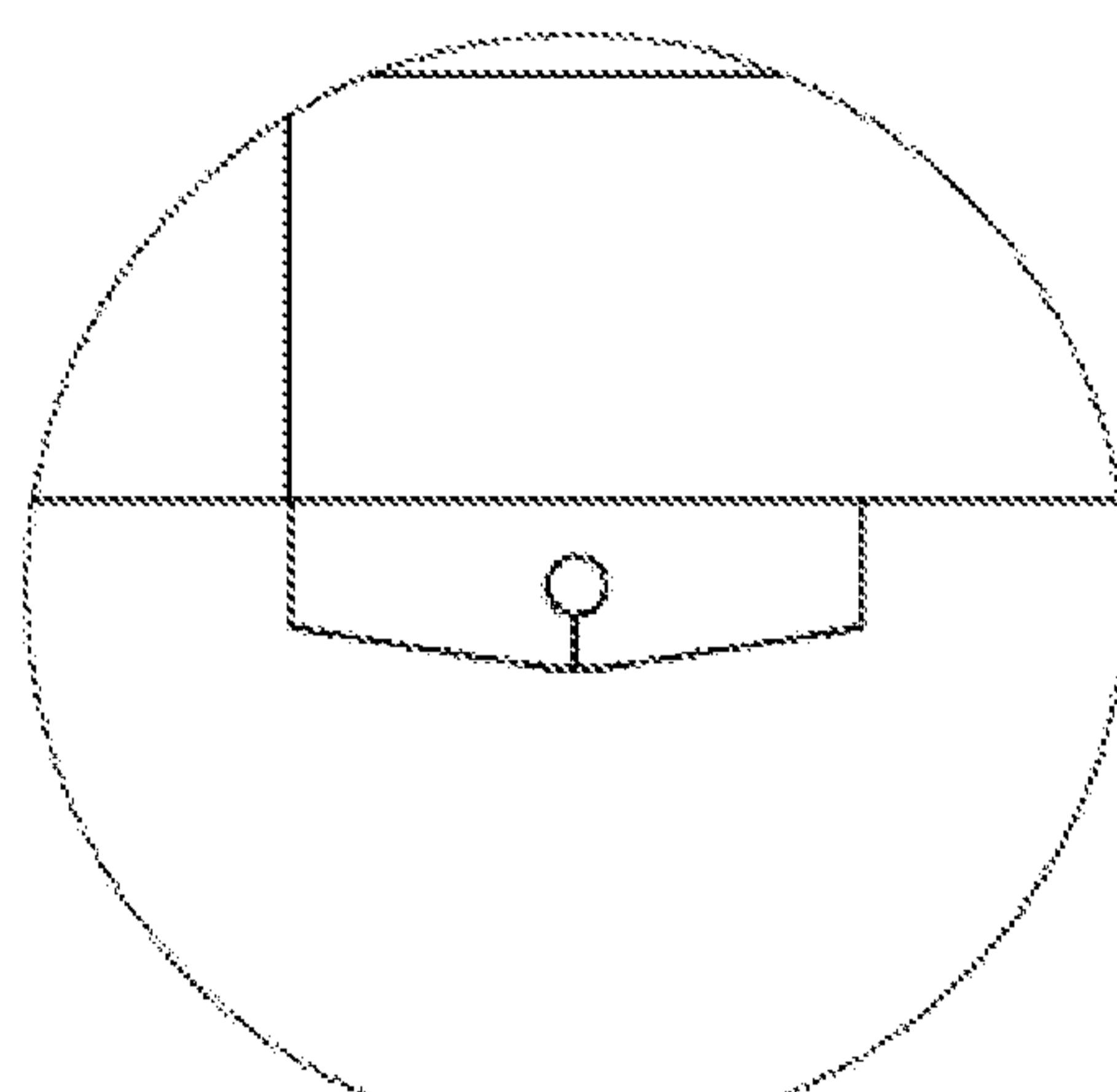
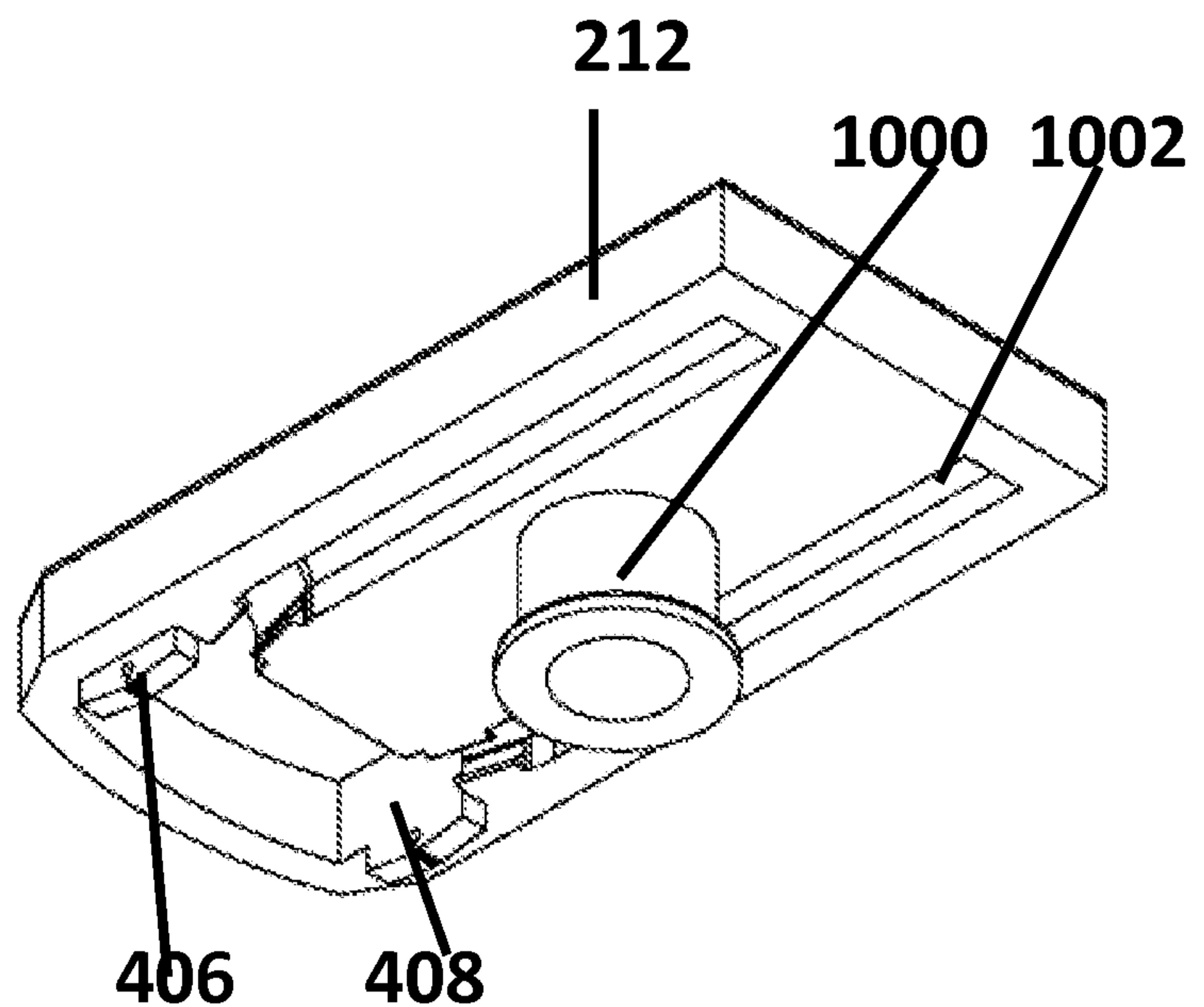
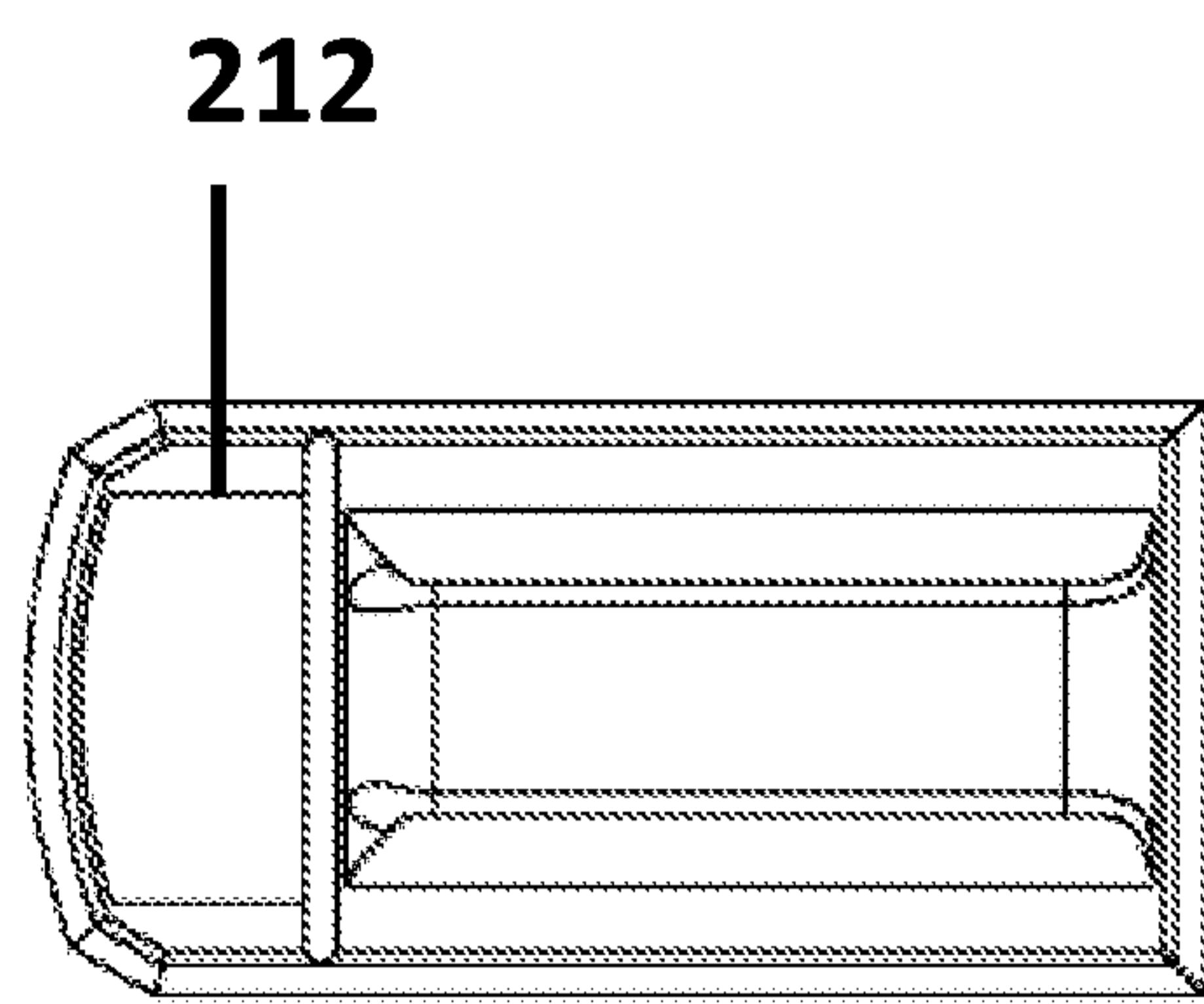
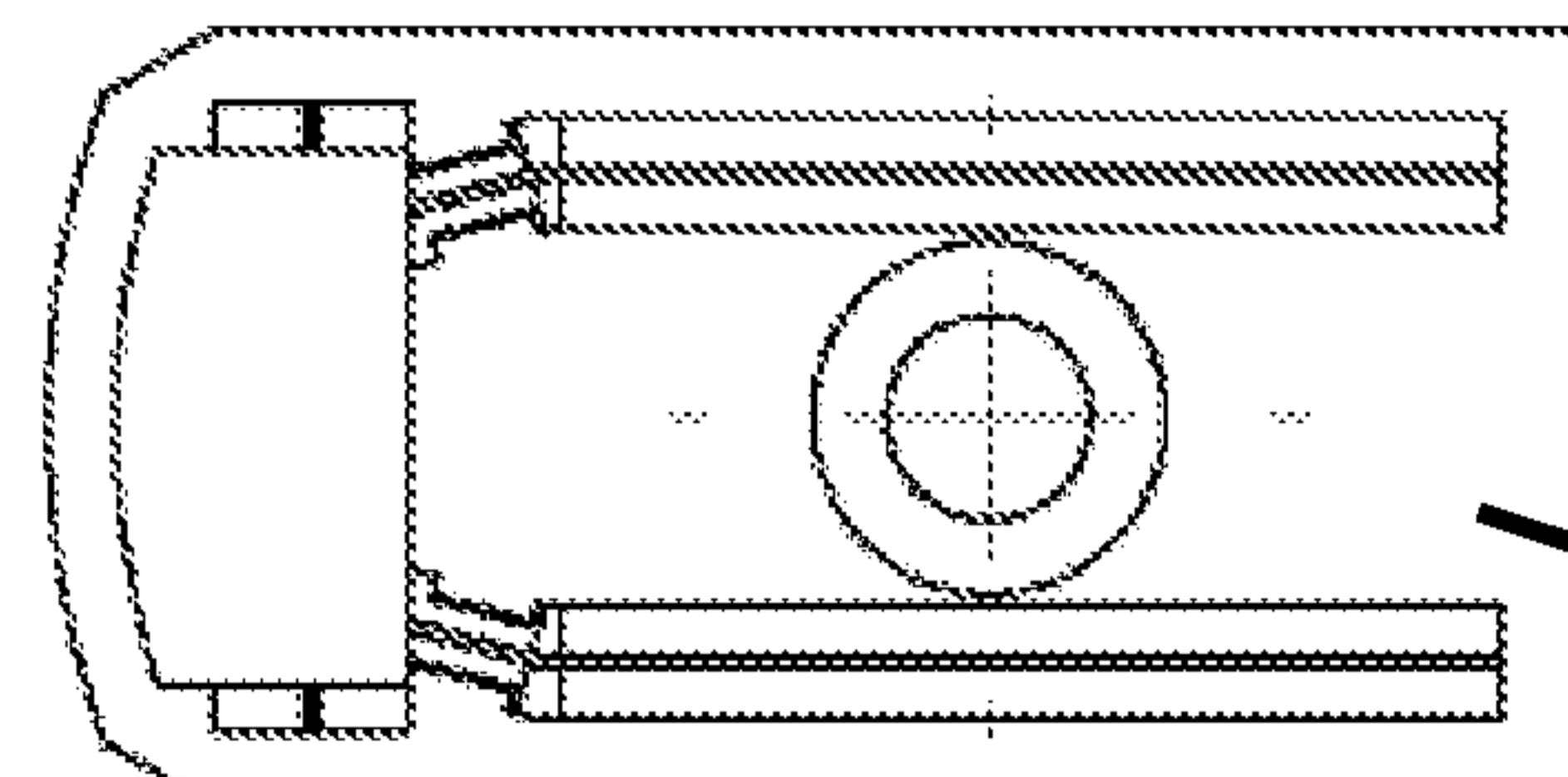


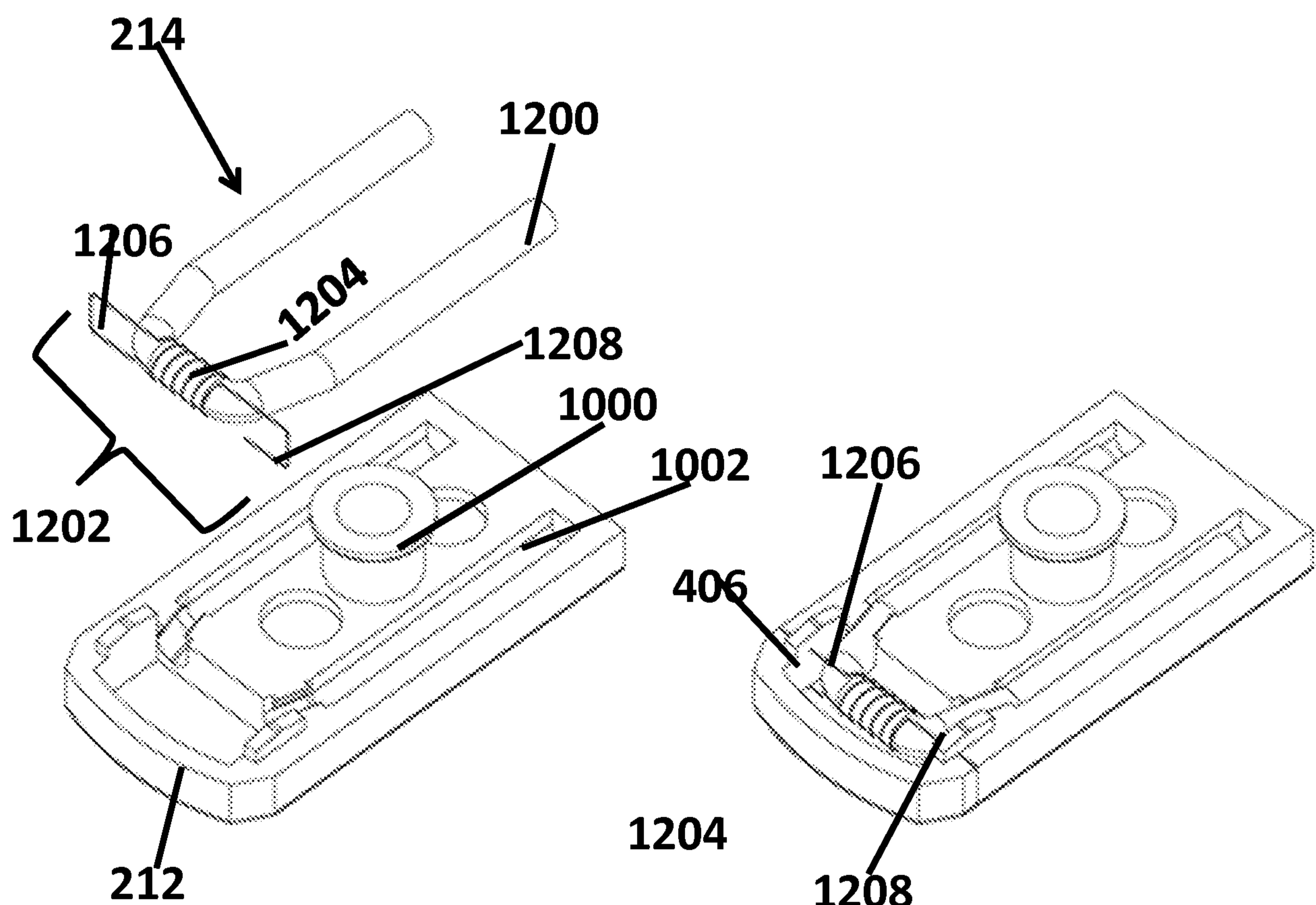
FIGURE 9

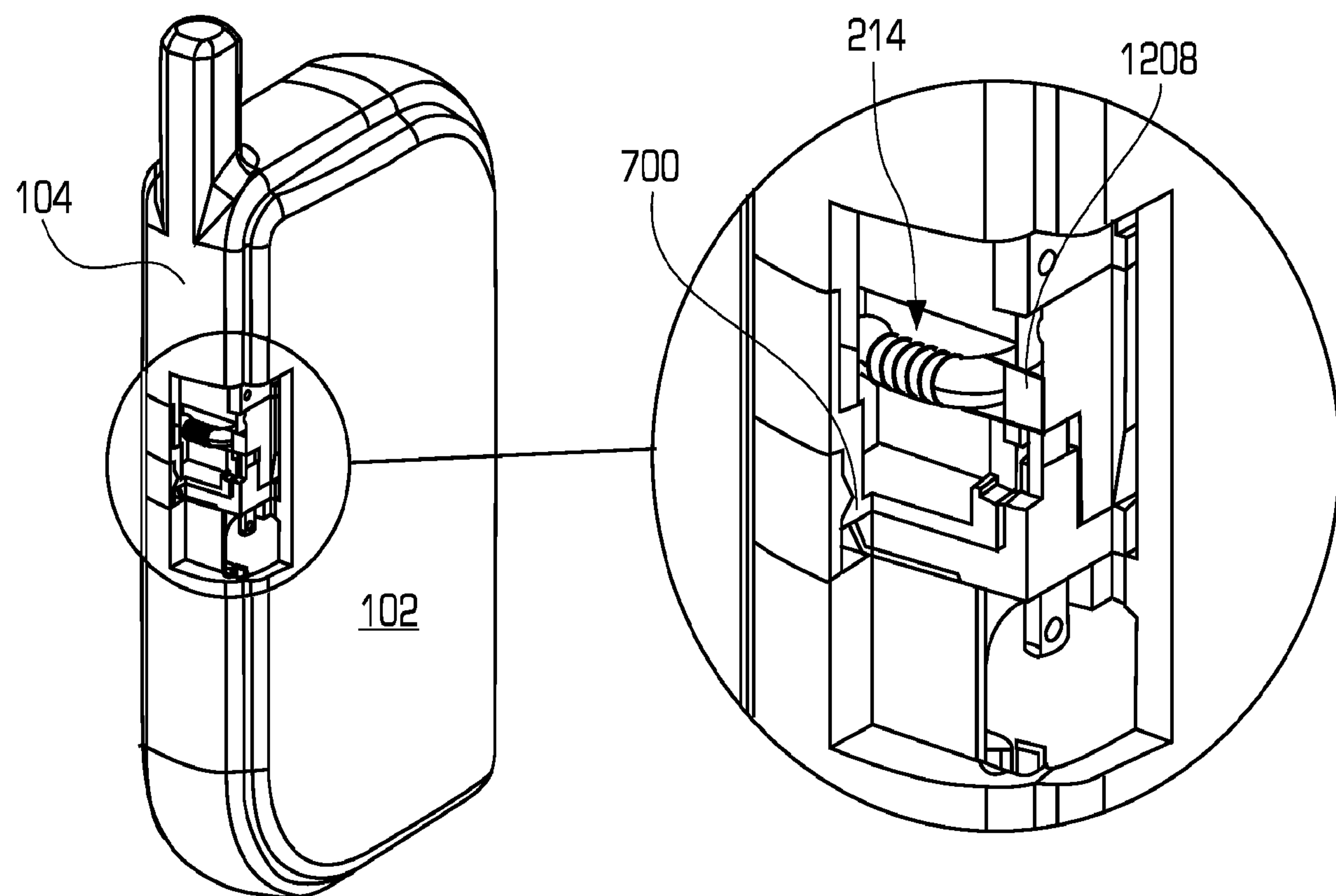
**FIGURE 10**



DETAIL A
SCALE 8:1



**FIGURE 12****FIGURE 13**

**FIGURE 14**

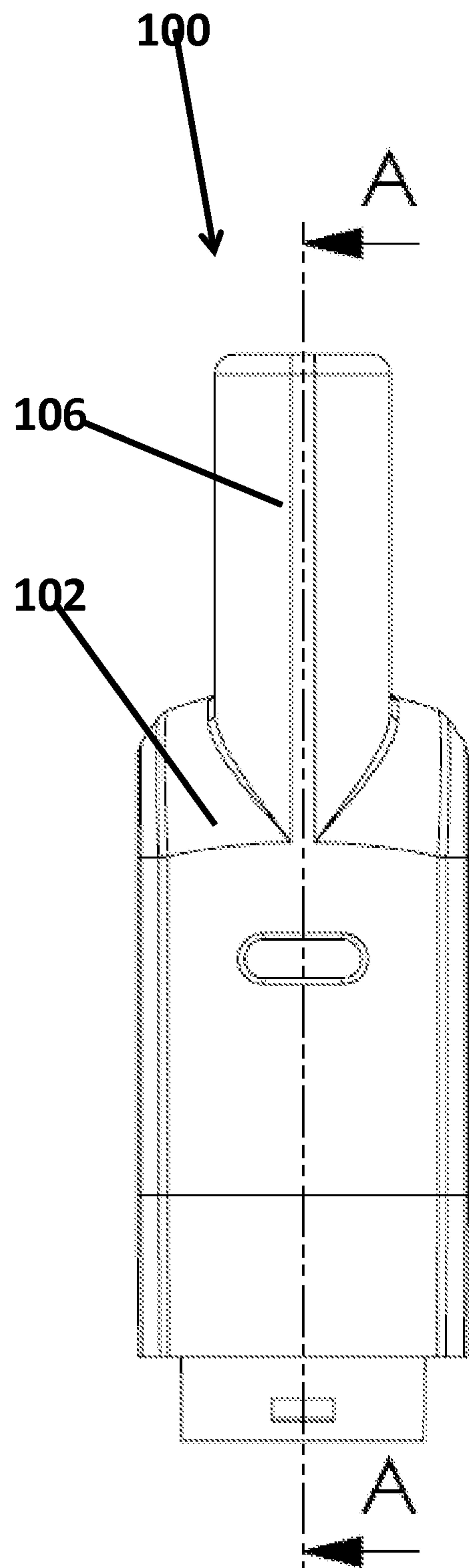
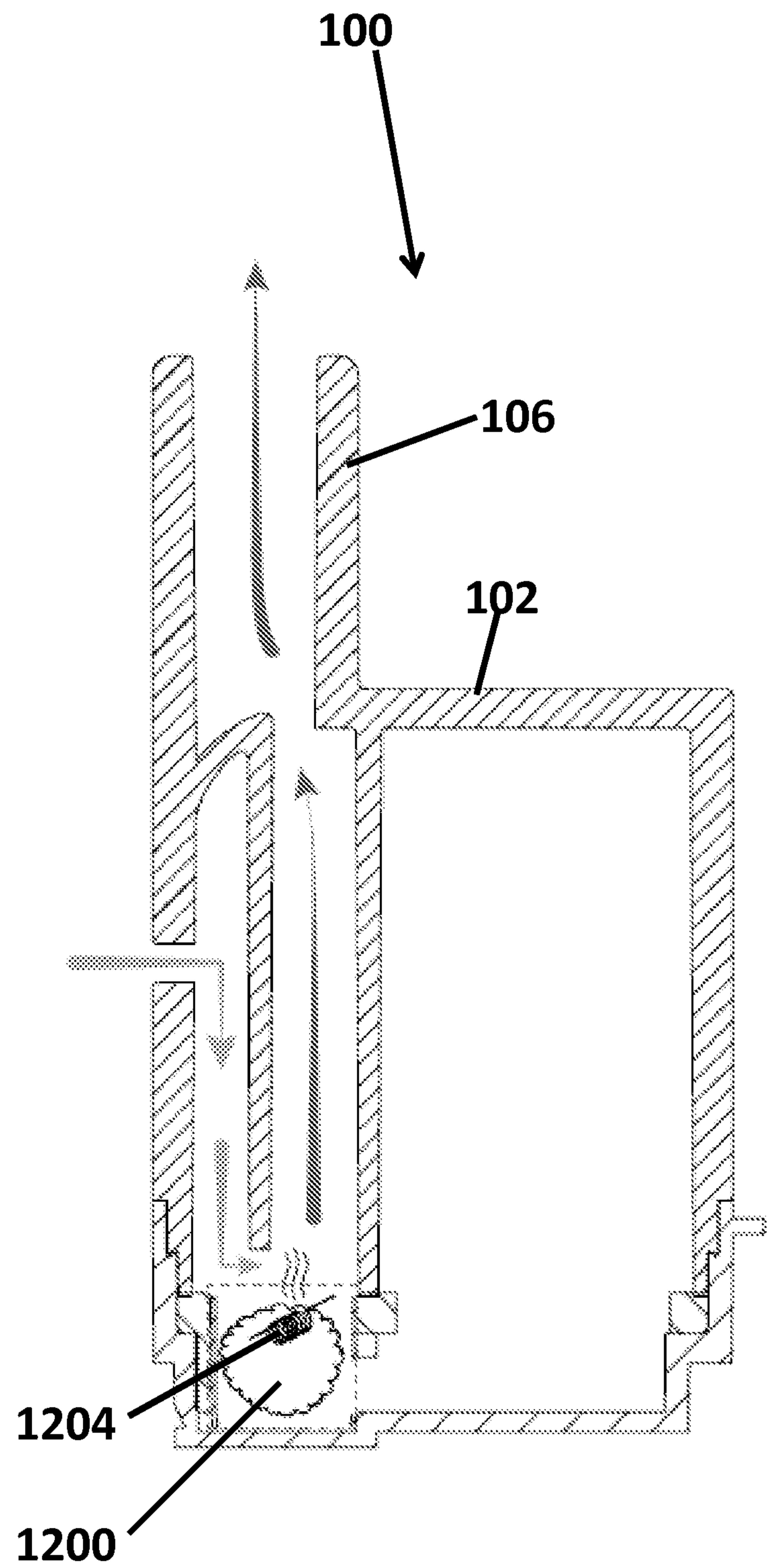


FIGURE 15A



SECTION A-A

FIGURE 15B

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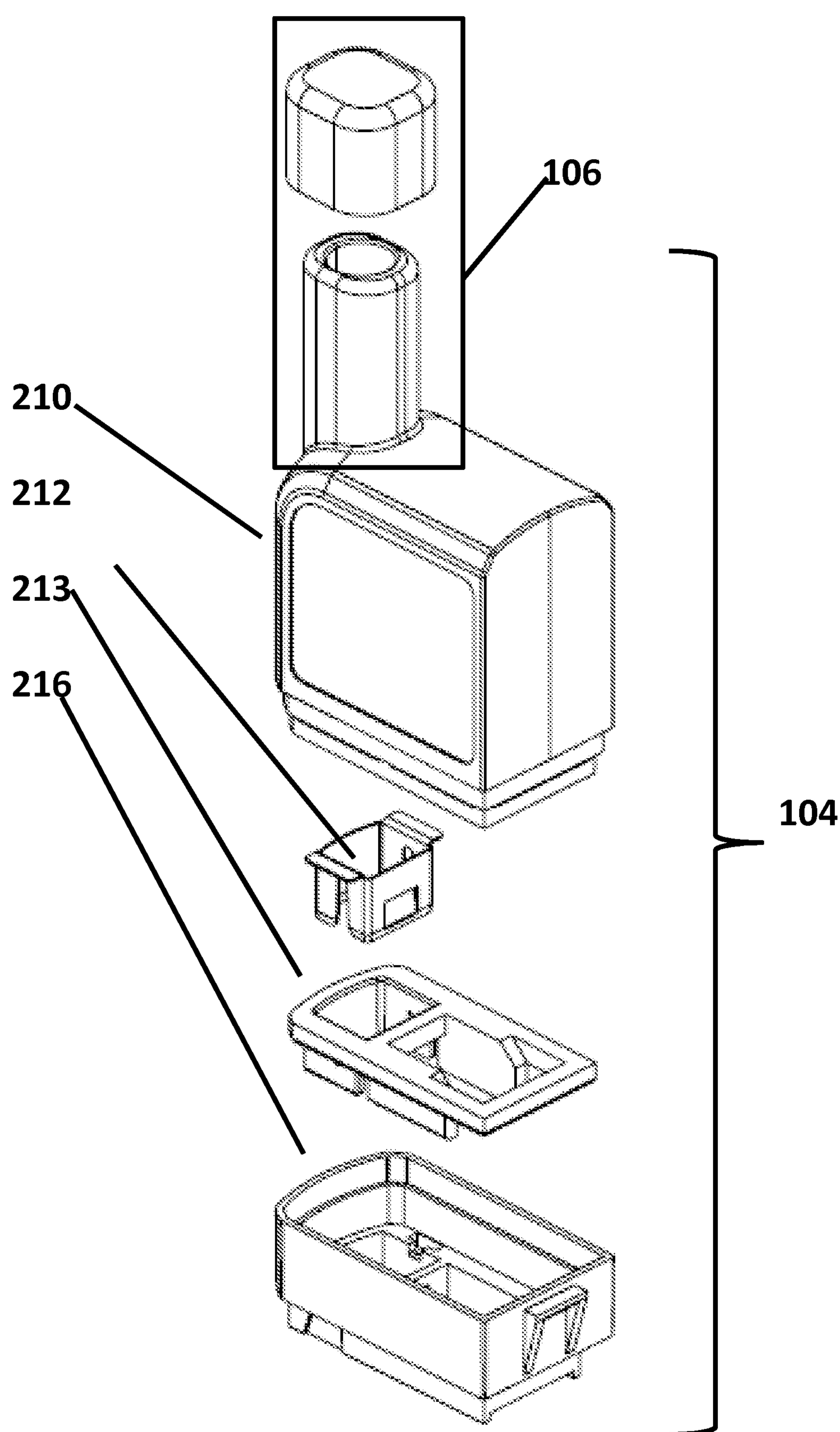
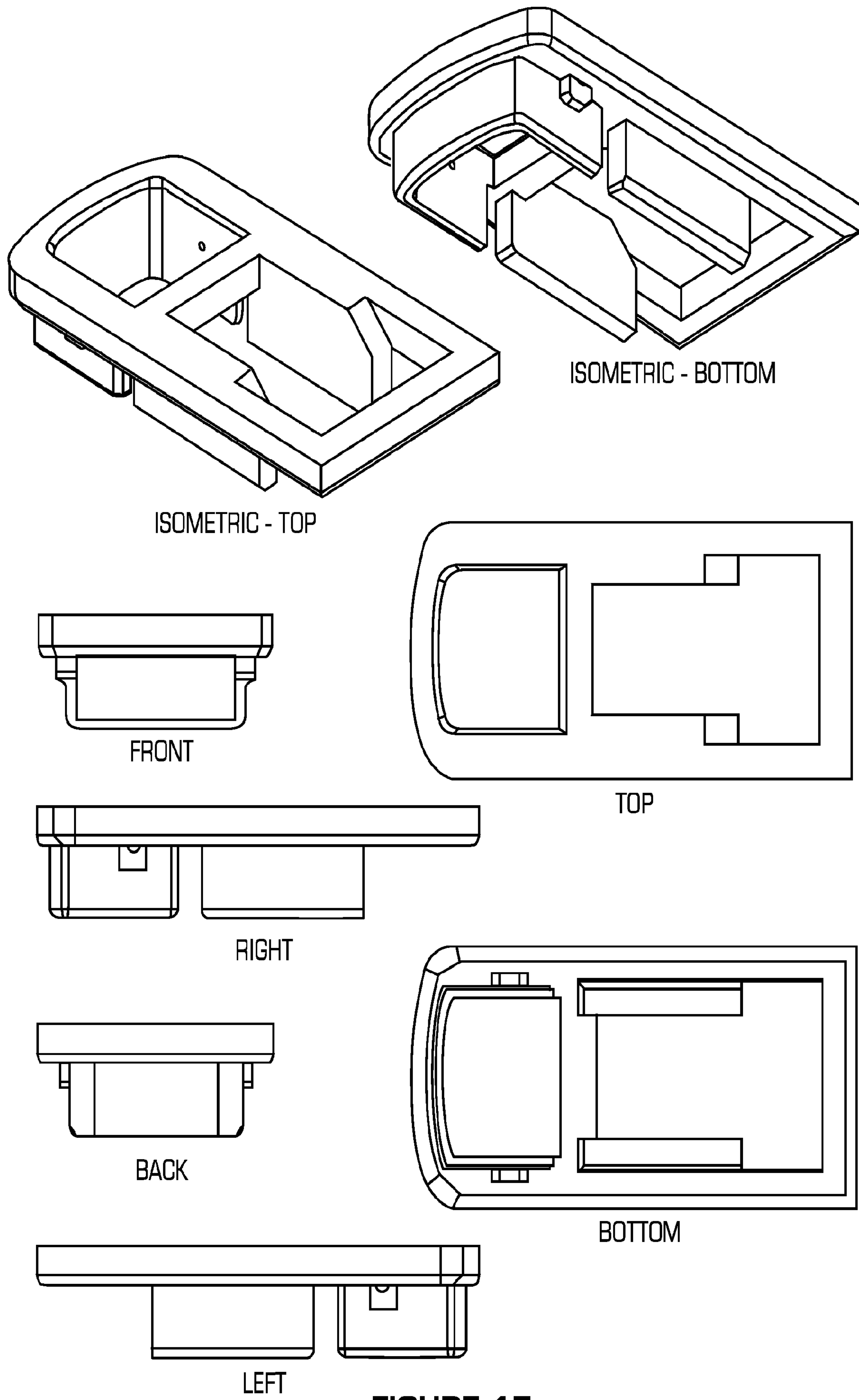
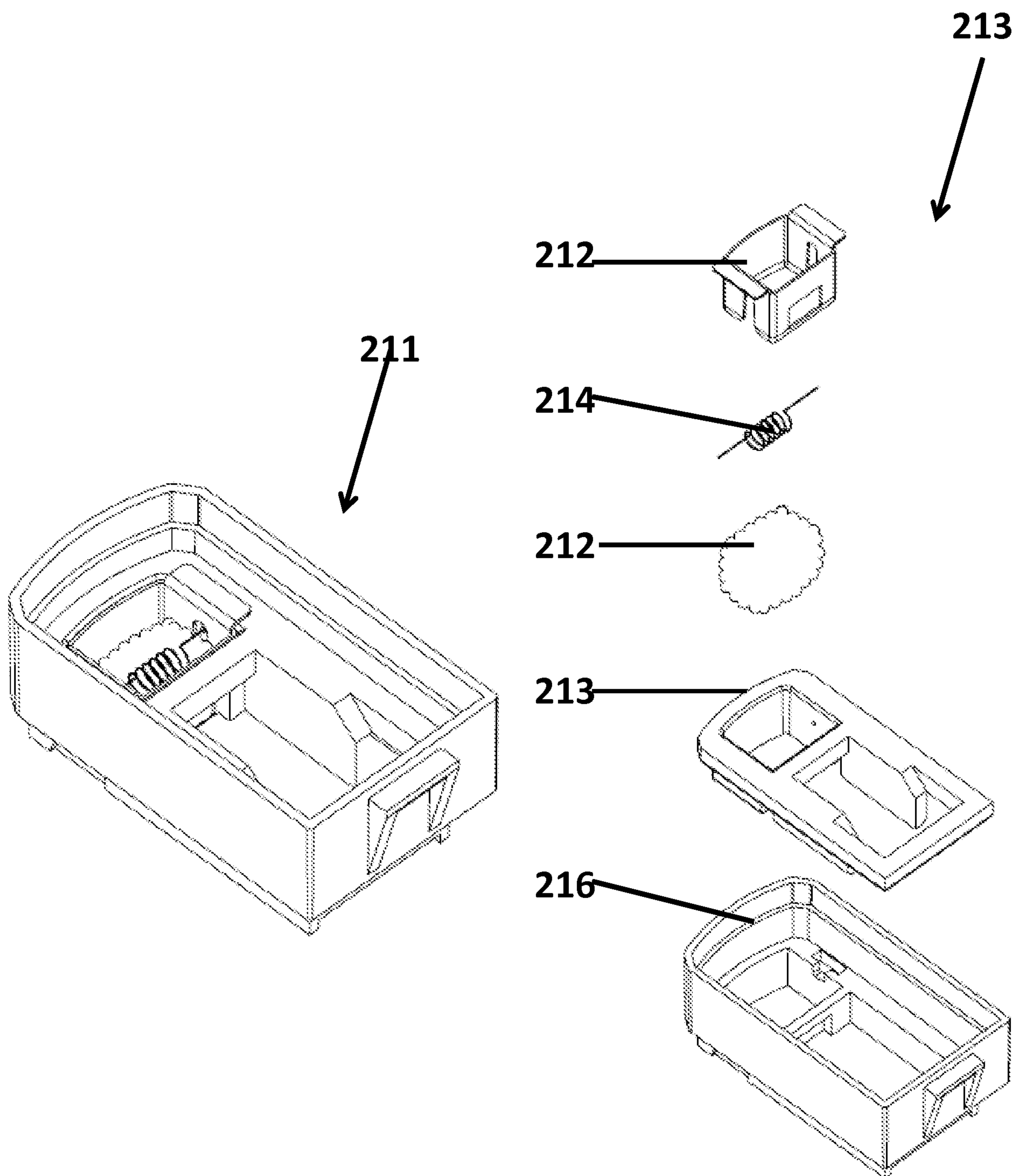


FIGURE 16

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**FIGURE 17**

**FIGURE 18A****FIGURE 18B**

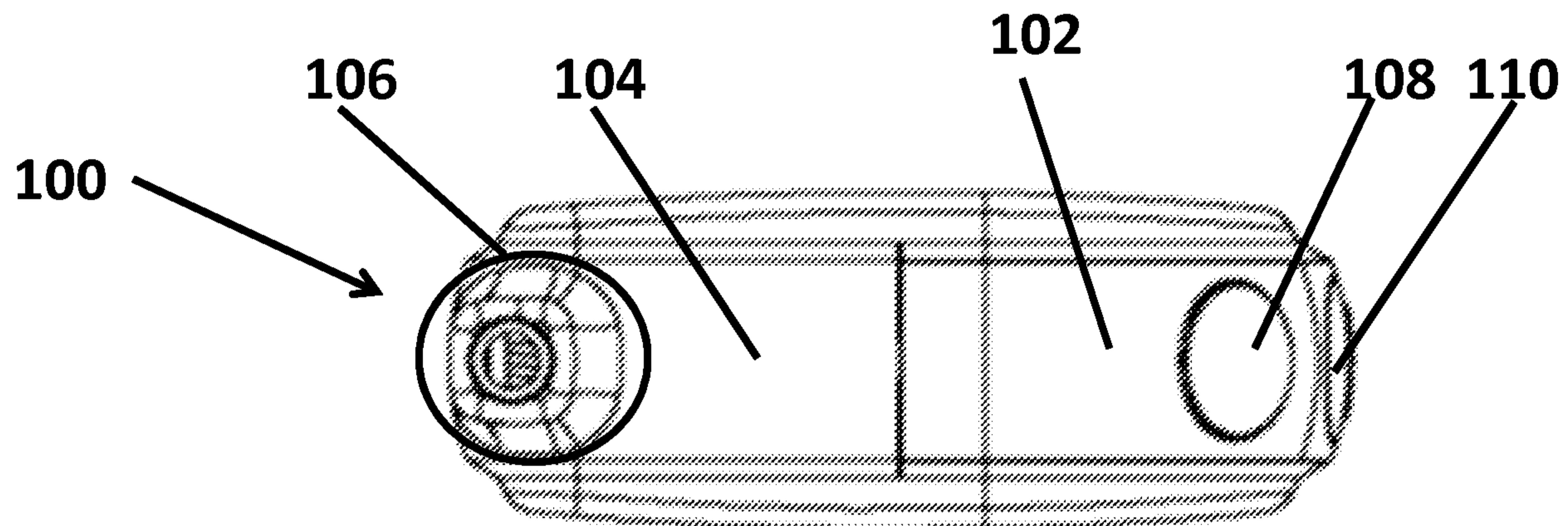


FIGURE 1A