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(54) **ELECTRONIC CIGARETTE ASSEMBLY**

(57) An electronic cigarette assembly (20) provides improved addition of liquid into a liquid storage cavity of the electronic cigarette assembly, without requiring disassembly of the electronic cigarette assembly. The electronic cigarette assembly includes a mouthpiece assembly (200) having a passage (2124) extending therethrough, and a main body assembly (100) including a liquid storage cavity (1111) having an opening, and a heating assembly (116) disposed within the liquid storage cavity. Liquid enters the heating assembly from the liquid storage cavity. A sealing member (212) is disposed between the mouthpiece assembly and the main body assembly. The electronic cigarette assembly is configured for liquid to be added to the liquid storage cavity through the passage and the sealing member without requiring disassembly of the electronic cigarette assembly.

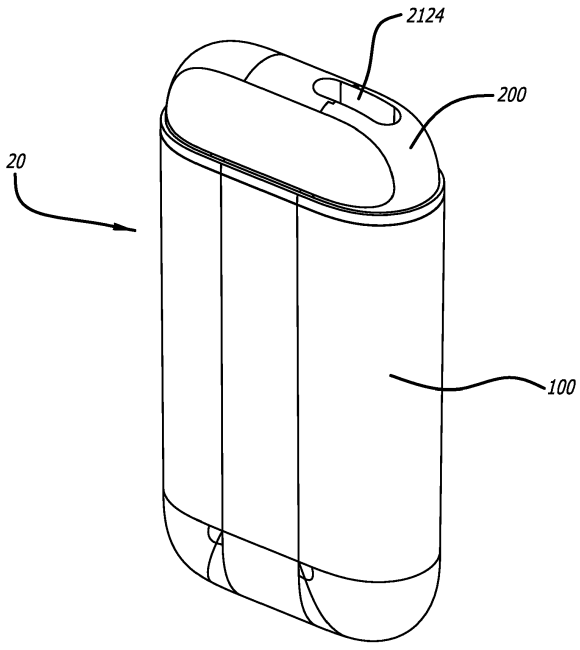

FIG. 1

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Description

Technical Field

[0001] The present disclosure generally relates to atomization and vaporizing devices, and more particularly, to an electronic cigarette device.

Background

[0002] Electronic cigarette (also known as "E-cigarette"), or vaping, devices can be used to deliver nicotine, cannabis (THC, CBD), flavorings, chemicals, and other substances. These devices are known by many different names and come in many shapes, sizes and device types. These devices may also be referred to as "E-cigs", "Vapes", "Vape pens," "dab pens," "dab rigs," "Tanks," "Mods," "Pod-Mods," and the like. Use of e-cigarette, or vaping, products is sometimes referred to as "vaping."

[0003] Typically, a conventional e-cigarette device or electronic cigarette device includes several basic components: a cartridge (also referred to as a reservoir or pod), a heating element or heating device (also referred to as an atomizer), a power source (e.g., a battery), and a mouthpiece. The cartridge (or reservoir or pod) can hold various substances. The cartridge may be pre-loaded with these substances, and sold with or separate from the rest of the e-cigarette device. One particular substance is a liquid solution (sometimes referred to as "e-liquid" or "e-juice"). In one particular example, the liquid solution may contain varying amounts of nicotine, cannabis (THC, CBD), flavorings, and/or other chemicals. In many e-cigarettes, puffing activates the battery-powered heating element, which vaporizes the liquid in the cartridge. The user then inhales the resulting aerosol or vapor (called vaping) via the mouthpiece.

[0004] Some conventional e-cigarette devices may not use a cartridge to hold the liquid solution. Instead, these e-cigarette devices include a reservoir built-into the device for containing the liquid solution, and into which the liquid solution can be filled. In order to reduce the chance that the liquid solution will leak from the electronic cigarette device prior to sale, the electronic cigarette device is not filled with the liquid solution at the time of manufacture. Instead, the electronic cigarette device and the liquid solution are transported independent of each other to where the electronic cigarette device and the liquid solution are to be delivered. Another reason for not filling the electronic cigarette device with the liquid solution at the time of manufacture is to reduce the opportunity for the liquid solution to become contaminated during transportation. After the electronic cigarette device and the e-liquid are transported to a destination (e.g., a retail store, a local dealer (or even a user who has purchased the electronic cigarette device and the e-liquid from the local dealer) may fill the e-liquid into the electronic cigarette device by themself. Likewise, a user who has purchased the electronic cigarette device and the e-liquid from the local dealer may fill the e-liquid into the electronic cigarette device by themself. However, due to the construction of the electronic cigarette device, filling the electronic cigarette device with the e-liquid may require the use of a needle, and it may be difficult for a dealer who is not equipped with an e-liquid filing needle device (or a user who is not equipped with an e-liquid filing needle) to implement fast and accurate filling of e-liquid. Furthermore, the construction of the electronic cigarette device may require the electronic cigarette to be at least partially disassembled in order to perform the e-liquid filling with the needle, and this can involve cumbersome disassembly procedures involving numerous components that are required to be re-assembled in order to use the electronic cigarette; a process that can be subject to human error and far from "fool proof". Another convention way is to not use a filling needle but to directly pour the e-liquid into the electronic cigarette device. However, again, the construction of the electronic cigarette device may require the electronic cigarette device to be at least partially disassembled in order to perform the e-liquid filling without the needle, and this can involve cumbersome disassembly procedures involving numerous components that are required to be re-assembled after the e-liquid is filled in order to use the electronic cigarette, and the e-liquid can be easy to spill during the re-assembly; again a process that can be subject to human error and far from "fool proof'.

[0005] Accordingly, there is a need for an improved electronic cigarette. There is a further need for an improved electronic cigarette that provides improved e-liquid filling. There is an additional need for an improved electronic cigarette that provides simplified construction for disassembly/re-assembly of the device during a process of filling the electronic cigarette with e-liquid. There is a further need for an improved electronic cigarette that is easier to manufacture, assemble, disassemble, adjust, and maintain. The present invention satisfies these needs and provides other related advantages.

Summary of the Invention

[0006] The present invention provides an improved electronic cigarette device. The present invention provides an electronic cigarette device that provides improved e-liquid filling. The present invention provides an improved electronic cigarette that provides simplified construction for disassembly/re-assembly of the device during a process of filling the electronic cigarette with e-liquid. The present invention provides an improved electronic cigarette device that is easier to manufacture, assemble, adjust, and maintain. The present invention satisfies these needs and provides other related advantages.

[0007] In accordance with a first embodiment of the present invention, an electronic cigarette assembly configured for improved filling with a liquid without requiring disassembly of the electronic cigarette assembly, in-

cludes a mouthpiece assembly including a passage extending therethrough; and a main body assembly. The main body assembly includes a liquid storage cavity having an opening, and a heating assembly disposed within the liquid storage cavity, wherein liquid enters the heating assembly from the liquid storage cavity. A sealing member is disposed between the mouthpiece assembly and the main body assembly, wherein the electronic cigarette assembly is configured for liquid to be added to the liquid storage cavity through the passage and the sealing member without requiring disassembly of the electronic cigarette assembly.

[0008] In furtherance of the first embodiment of the present invention, the sealing member includes a self-sealing port extending therethrough; wherein the passage and the self-sealing port are configured to be generally aligned with at least a portion of the opening of the liquid storage cavity, wherein the passage and the self-sealing port are configured as a filling channel, and wherein a needle portion of a filling device may pass through the self-sealing port for adding liquid into the liquid storage cavity.

[0009] In still furtherance of the first embodiment of the present invention, the sealing member includes at least two self-sealing ports extending therethrough, and wherein the passage and the at least two self-sealing ports are configured to be aligned with at least a portion of the opening of the liquid storage cavity, with the passage and the at least two self-sealing ports configured as a filling channel, wherein a needle portion of a filling device may pass through one of the at least two self-sealing ports for adding liquid into the liquid storage cavity.

[0010] In additional furtherance of the first embodiment of the present invention, the heating assembly includes a guide extending at least partially into the passage of the mouthpiece assembly; wherein the sealing member includes an aperture through which the guide extends from the main body assembly into the mouthpiece assembly.

[0011] In accordance with a second embodiment of the present invention, an electronic cigarette assembly configured for improved filling with a liquid, includes a mouthpiece assembly including a passage extending therethrough; and a main body assembly. The main body assembly includes a liquid storage cavity having an opening, and a heating assembly disposed within the liquid storage cavity, wherein liquid enters the heating assembly from the liquid storage cavity. A sealing member is disposed between the mouthpiece and the main body, wherein the main body assembly and mouthpiece assembly are configured to removably engage each other, and wherein disengagement of the mouthpiece assembly from the main body assembly exposes the opening of the liquid storage cavity for direct addition of liquid into the liquid storage cavity.

[0012] In furtherance of the second embodiment of the present invention, the mouthpiece assembly includes the sealing member; and wherein disengagement of the mouthpiece assembly from the main body assembly automatically removes the sealing member from over the liquid storage cavity.

[0013] In additional furtherance of the second embodiment of the present invention, the sealing member includes a self-sealing port extending therethrough; wherein the passage and the self-sealing port are configured to be generally aligned with at least a portion of the opening of the liquid storage cavity, wherein the passage and the self-sealing port are configured as a filling channel, and wherein the self-sealing port is configured such that a needle portion of a filling device may pass through the self-sealing port for adding liquid into the liquid storage cavity.

[0014] This brief summary has been provided so that the nature of the invention may be understood quickly. Additional aspects and advantages of the present invention will be given in part in the following more detailed description, taken in conjunction with the accompanying drawings, which can become apparent from the following description, which illustrate, by way of example, the principles of the invention or be understood through practice of the present invention. Any drawings contained herein constitute a part of this specification and include exemplary embodiments of the present invention and illustrate various objects and features thereof.

Description of the Figures

[0015] The various present embodiments now will be discussed in detail with an emphasis on highlighting the advantageous features with reference to the drawings of various embodiments. The illustrated embodiments are intended to illustrate, but not to limit the invention. These drawings include the following figures, in which like numerals indicate like parts: The above and/or additional aspects and advantages of the present invention will be apparent and easily understood from the descriptions of the embodiments with reference to the following drawings, wherein:

FIGURE 1 illustrates a perspective view of an electronic cigarette assembly according to an embodiment of the present invention;

FIGURE 2 illustrates an exploded view of the electronic cigarette assembly of FIG. 1;

FIGURE 3 illustrates another exploded view of the electronic cigarette assembly of FIG. 1;

FIGURE 4 illustrates an exploded view of an e-liquid cup holder of the electronic cigarette assembly of FIG. 1;

FIGURE 5 illustrates a cross-sectional view of an upper sealing member of the e-liquid cup holder seen

in FIG. 4;

FIGURE 6 illustrates an exploded view of an mouthpiece fixing base and an atomizer housing of the electronic cigarette assembly of FIG. 1 illustrating snap-fit structure configured for engaging the mouthpiece fixing base with the atomizer housing;

FIGURE 7 illustrates an exploded cross-sectional view of the electronic cigarette assembly of FIG. 1;

FIGURE 8 illustrates a cross-sectional view of the electronic cigarette assembly of FIG. 1;

FIGURE 9 illustrates a rear perspective view of an e-liquid cup holder assembly of the electronic cigarette assembly of FIG. 1;

FIGURE 10 illustrates another exploded view of the electronic cigarette assembly of FIG. 1;

FIGURE 11 illustrates a rear perspective view of a main body assembly of the electronic cigarette assembly of FIG. 1, with an upper sealing member shown lifted away from the main body assembly (the arrows indicating movement of air), with a generally rectangular cutaway in the atomizer housing through which portions of air guide grooves are visible;

FIGURE 12 illustrates a rear left exploded perspective view of the e-liquid cup holder of the electronic cigarette assembly of FIG. 1, showing air moving through a second air passage of the e-liquid cup holder in the direction of the arrows;

FIGURE 13 illustrates a rear right exploded perspective view of the e-liquid cup holder of the electronic cigarette assembly of FIG. 1, showing air moving through first and second air passages of the e-liquid cup holder in the direction of the arrows;

FIGURE 14 illustrates an exploded view of an electronic cigarette assembly according to another embodiment of the present invention;

FIGURE 15 illustrates a cross-sectional exploded view of the electronic cigarette assembly of FIG. 14;

FIGURE 16 illustrates a cross-sectional view of the electronic cigarette assembly of FIG. 14; and

FIGURE 17 illustrates a cross-sectional view of an upper sealing member of the electronic cigarette assembly of FIG. 14.

Detailed Description

[0016] The following description is provided to enable any person skilled in the art to make and use the invention and sets forth the best modes contemplated by the inventor of carrying out his invention. Various modifications, however, will remain readily apparent to those skilled in the art, since the general principles of the present invention have been defined herein specifically to provide an electronic cigarette assembly. The following detailed description describes the present embodiments, with reference to the accompanying drawings. In the drawings, reference numbers label elements of the present embodiments. These reference numbers are reproduced below in connection with the discussion of the corresponding drawing features. It is to be understood that the figures and descriptions of the present invention have been simplified to illustrate elements that are relevant for a clear understanding of the present invention, while eliminating, for the purpose of clarity, many other elements found in electronic cigarette assemblies. Those of ordinary skill in the pertinent arts may recognize that other elements and/or steps are desirable and/or required in implementing the present invention. However, because such elements and steps are well known in the art, and because they do not facilitate a better understanding of the present invention, a discussion of such elements and steps is not provided herein. The disclosure herein is directed to all such variations and modifications to such elements and methods known to those skilled in the pertinent arts.

[0017] Embodiments of the present invention are described in detail hereinafter, and illustrations of the embodiments are shown in the drawings, wherein identical or similar reference numerals denote identical or similar elements or elements having the same or similar functions. The embodiments described hereinafter with reference to the drawings are exemplary and only intended to explain the present invention, and cannot be understood as limiting the present invention.

[0018] With reference to FIGS. 1-17, embodiments of the present invention provide for an improved electronic cigarette. According to an embodiment of the present invention, as shown in FIGS. 1-13, an electronic cigarette device 20 includes an atomizer main body 100 and a mouthpiece main body (or mouthpiece assembly) 200. The atomizer main body 100 includes an atomizer housing 101, an e-liquid cup holder 110, and an atomizer protective sleeve 120. The e-liquid cup holder 110 includes a holder housing (or enclosure or support) 111, a battery assembly 113, a lower fixing base 114, a terminal 115 , a heating assembly or atomizing core 116, and a lower sealing member 117. The lower fixing base 114 is a circuit board that acts as a mount for various components including, without limitation, the atomizing core 116 and the battery assembly 113, . The atomizing core 116 is connected to the battery assembly 113 through the fixing base 114 to form a circuit. The charging terminal 115 is used for charging the battery assembly 113. The charging terminal 115 is riveted on the lower fixing base 114 through a lead. The lower sealing member 117 is used

to support other elements and functions to locate the position tolerance of other elements. The lower sealing member 117 includes a wire hole, and a pin of the atomizing core 116 passes through the wire hole. The lower sealing member 117 further includes an air hole to make the air flow pass through the microphone when entering the electronic cigarette device 20 from outside of the electronic cigarette device 20. The holder housing (or enclosure) 111 of the e-liquid cup holder 110 is further provided with an e-liquid storage pipe 121 (which partially defines the e-liquid storage cavity 1111) and a battery compartment 123 (in which the battery 113 is disposed). The holder housing 111 is mounted on the lower fixing base 114. The atomizer protective sleeve 120 may be made from various materials including, without limitation, plastic (e.g., thermoplastic, thermoelastic, thermosetting, etc.), silicone, and the like. The atomizer protective sleeve 120 (or portions thereof) can be transparent, translucent, or opaque.

[0019] The e-liquid cup holder 110 includes an e-liquid storage cavity 1111 defined by the lower sealing member 117, the lower fixing base 114, the e-liquid storage pipe 121, and the holder housing 111. As mentioned above, the "e-liquid" or "e-juice" is a liquid solution that may contain varying amounts of various substances (alone or in combination) that can include, without limitation, nicotine, cannabis (e.g., THC, CBD), flavorings, and/or other chemicals. The e-liquid storage cavity 1111 is designed such that e-liquid (or e-liquid storage cotton 112) is disposed within the e-liquid storage cavity 1111. The e-liquid storage cavity 1111 is open at a top end so as to allow e-liquid storage cotton 112 to be disposed within the e-liquid storage cavity 1111. Depending on design requirements, storage capacity of the e-liquid storage cavity 1111 can be configured, as required (e.g., 0.5 ml, 1 ml, 2 ml, etc.). The e-liquid storage cotton 112 disposed within the e-liquid storage cavity 1111 will absorb e-liquid subsequently introduced into the e-liquid storage cavity 1111. It is optional for the e-liquid storage cotton 112 to be disposed within the e-liquid storage cavity 1111. When the e-liquid storage cotton 112 is present in the e-liquid storage cavity 1111, there is an added benefit of reducing leakage of the e-liquid from the e-liquid storage cavity 1111. In the alternative, the e-liquid can be directly introduced into the e-liquid storage cavity 1111 without the storage cotton 112 being present in the e-liquid storage cavity 1111. When the e-liquid storage cotton 112 is not present in the e-liquid storage cavity 1111, the e-liquid storage cavity 1111 will have the capacity to hold a larger amount of e-liquid since there is no e-liquid storage cotton 112 taking up space within the e-liquid storage cavity 1111. The atomizing core 116 is generally disposed within in the e-liquid storage cavity 1111. The e-liquid gets introduced into the atomizing core 116 from the e-liquid storage cavity 1111 through the e-liquid inlet hole or e-liquid guide hole 1163 into the interior of the atomizing core 116. The e-liquid flows obliquely from the bottom of the e-liquid storage cavity 1111 to the e-liquid guide hole 1163, then enters the atomizing core 116 from the e-liquid guide hole 1163, where the ceramic core heats and atomizes the e-liquid. The upper fixing base 210 is arranged at the other end of the e-liquid storage pipe 121. The atomizing core 116 is arranged on the lower sealing member 117 and provided with a hollow smoke guide tube 1161 in the direction of the mouthpiece main body 200. The smoke guide tube 1161 provides a path for vaporized e-liquid to travel to the mouthpiece main body 200 for inhalation by a user. An atomizing channel us formed in the smoke guide tube 1161. The smoke guide tube 1161 is provided 'ith porous ceramics. The porous ceramics are hollow. The inner wall of the porous ceramics is embedded with an electric heating element. The electric heating element is connected to the lower fixing base 114 through a hole on the lower sealing member 117. The lower sealing member 117 is provided with a microphone 1151 that functions as an air flow sensor. The microphone i1151 is disposed between the lower fixing base 114 and the lower sealing member 117. Air holes 1145 are arranged around the microphone 1151, and the air holes 1145 are in communication with the atomizing channel. When a user smokes from the mouthpiece main body 200, an air pressure is generated, and the air flow sensor (i.e., the microphone 1151) senses the air pressure difference which, in turn, activates the electric heating element within the atomizing core 116 and generates heat. The electric heating element heats and vaporizes e-liquid within the atomizing core 116 to form an aerosol. The aerosol and gas (i.e., air) are sucked together through the smoke guide tube 1161 towards and through the mouthpiece main body 200 to be inhaled by the user. A seal ring 1164 is sleeved around the lower sealing member 117 to prevent the e-liquid from leaking out from the edge and corroding the circuit board.

[0020] The housing 111 of the e-liquid cup holder 110 can include a window sized and shaped such that various components (e.g., atomizing core 116, smoke guide tube 1161) and the interior of the e-liquid storage cavity 1111 are visible to a user. Likewise, atomizer housing 101 can also include a window or aperture 150 sized and shaped so as to allow the various components visible through the window of the housing 111 of the e-liquid cup holder 110 to be seen by a user when the housing 111 is covered by the atomizer housing 101. The atomizer housing 101 may be made from various materials including, without limitation, plastic (e.g., thermoplastic, thermoelastic), and the like. The atomizer housing 101 (or portions thereof) can be transparent, translucent, or opaque. The housing 111 of the e-liquid cup holder 110 may be made from various materials including, without limitation, plastic (e.g., thermoplastic, thermoelastic), and the like. The housing 111 (or portions thereof) of the e-liquid cup holder 110 can be transparent, translucent, or opaque.

[0021] The e-liquid cup holder 110 is further provided with a support column 1112 which functions to position the mouthpiece main body 200 (and provide additional strength to resist over-tension and bending). The support

column 1112 extends through an aperture 1113 of the upper sealing member 212, and at least partially extends into a bore or guide 1114 of the upper fixing base 210 sized and shaped to receive the support column 1112. A lower portion of the aperture 1113 of the upper sealing member 212 is sized and shaped to receive the support column 1112 while an upper portion of the aperture 1113 is size and shaped to receive the bore or guide 1114 of the upper fixing base 210. The extension of the support column 1112 through the aperture 1113 and into the bore or guide 1114 assists in alignment and positioning of the smoke guide tube 1161 and the support column 1112 with the mouthpiece protective sleeve 220 and the mouthpiece fixing base 211.

[0022] As shown in FIGS. 9-13, a main or first air passage is defined by an air guide hole 1166 in the lower fixing base 114 (configured for allowing gas (e.g., air) to pass to an air intake of the atomizing core 116), and into the interior of the atomizing core 116, and a corresponding air guide hole 1171 the lower sealing member 117 (configured for allowing air to pass to the atomizing core 116). An air guide groove 50 is arranged on a side surface of the e-liquid cup holder 110 and extends from the side surface to an end surface. In order to prevent thick e-liquid in an e-liquid tank of the main or first air passage from being blocked due to not working for a long time, a microphone or second air passage is provided (providing double air passages). The outside of the holder housing 111 is provided with a strip-shaped groove formed by two parallel bars 52, 53 protruded from an outer surface of the holder housing 111 with the space between the two bars 52,53 forming the strip-shaped groove that is part of the air guide groove 50, which extends longitudinal along the outer wall of the holder housing 111. In FIG. 11, the atomizer housing 101 includes a generally rectangular cutaway (for illustration purposes only) through which portions of the air guide grooves 50, 54 are visible. The lower fixing base 114 is provided with a first air hole 1145, the lower sealing member 117 is provided with a second air hole 1175, and the upper surface of the holder housing 111 is provided with a third air hole 1115. The third air hole 115 connects the strip shaped air guide groove 50 with another air guide groove 54 disposed on a top surface of the holder housing 111. The first air hole 1145, the second air hole 1175, the strip-shaped air guide groove 50, the third air hole 1115, and the air guide groove 54 are in communication to form the second air passage. As seen in FIG. 12, the air flow flows in the direction of the arrows from the first air hole 1145 through the second air hole 1175, the strip-shaped groove 50, the third air hole 1115 and the air guide groove 54 into and through the mouthpiece main body 200 to the user's mouth. The strip-shaped groove 1011 is served to allow air flowing from the microphone 1151. The air enters from the bottom, flows through the microphone1151, and then passes through the strip shaped air guide groove 50, the third air hole 1115, and the air guide groove 54, and then drives the flow of vapor or smoke to the mouthpiece main body 200, and where the vapor or smoke is then inhaled by users. When the first air passage is blocked, the air flow sensor (i.e., microphone 1151) can still be triggered through the second air passage to activate the electric heating element of the atomizing core 116. When the condensed e-liquid in the heated smoke passage is evaporated, the smoke passage restores the function of the first air passage, mainly to solve the problem that the air flow sensor (i.e., microphone 1151) cannot be activated after the first air passage is blocked. A silicone ring 1152 provides elastic engagement of the air flow sensor (i.e., microphone 1151) with the lower sealing member 117. First and second fasteners 1174 engage the lower fixing base (or circuit board) 114 to the lower sealing member 117. The first fastener 1174 passes through aperture 1176 in the lower fixing base (or circuit board) 114 to engage a first bore 1172 of the lower sealing member 117, and the second fastener 1174 passes through aperture 1177 in the lower fixing base (or circuit board) 114 to engage a second bore 1173 of the lower sealing member 117. Electrode base 1165 are used for conducting electricity. Each electrode base 1165 is electrically connected to a wire or conductive line (not shown for clarity) and then electrically connected to the lower fixing member (or circuit board) 114 through the wire. The heating core 1162 is electrically connected with the electrode base 1165 through the wire (i.e., conductive line). The heating core 1162 may come in various forms including, without limitation, a heating coil. The conductive line may be connected with the conductive metal by various means including, without limitation, welding. Electrode base 1165 presses the wire (i.e., conductive line), and then they are connected with each other electrically through the wire.

[0023] The mouthpiece main body (or mouthpiece assembly) 200 includes an upper fixing base 210, and an upper sealing member 212. A mouthpiece protective sleeve 220 is sleeved onto the periphery of the mouthpiece main body 200. The mouthpiece protective sleeve serves to seal the opening of the mouthpiece main body 200 to reduce/prevent foreign material from entering. The upper fixing base 210 includes a mouthpiece fixing base 211. The mouthpiece fixing base 211 engages the mouthpiece protective sleeve 220.The upper sealing member 212 provides a general seal between the upper fixing base 210 and the main body 100. The upper sealing member 212 may be made from various materials including, without limitation, silicone, plastic, and the like. The upper sealing member 212 is provided with at least one (1) blind hole or e-liquid filling port 2121 configured for providing access to the e-liquid storage cavity 1111 for filling the e-liquid storage cavity 1111 with e-liquid (not shown for clarity). Two (2) e-liquid filling ports 2121 are shown in this particular embodiment but the electronic cigarette assembly 20 can include any desired number of e-liquid filling ports 2121. Each e-liquid filling port 2121 includes an e-liquid sealing member 2122 to seal the e-liquid filling port 2121. The e-liquid sealing member 2122

is of one-piece construction with the upper sealing member 212. The e-liquid sealing member (or thin film membrane) 2122 can be punctured to fill the e-liquid into the e-liquid storage cavity 1111. As seen in FIG. 5 and 7, the upper surface of the upper sealing member 212 is provided with a first e-liquid filing port 2121 that serves as a guide for the e-liquid injection needle (when a needle is used to add e-liquid to the e-liquid storage cavity 1111). As previously stated, the e-liquid sealing member 2122 (e.g., a thin film membrane) forms a bottom wall of the first e-liquid filling port 2121. The thickness of the thin film membrane 2122 is about one millimeters to about five millimeters (1mm-5mm). Preferably, the thickness of the thin film is about two millimeters to about three millimeters (2mm-3mm). During injection of e-liquid, the injection needle is inserted into through thin film membrane 2122 for e-liquid injection into the e-liquid storage cavity 1111. When the injection needle is pulled out, the thin film membrane 2122 will return to its original state for sealing, and the e-liquid will not leak out through the thin film membrane 2122 from the e-liquid storage cavity 1111. The e-liquid sealing member or thin film membrane 2122 can be made from various materials including, without limitation, a colloid (that can be restored to its original state), silica gel, latex, rubber, resin, or the like that can be restored to its original shape. The puncture in the thin film membrane 2122 closes sufficiently to the point where e-liquid can't backfill into the mouthpiece fixing base 211 from the e-liquid storage cavity 1111. In this manner, the e-liquid filling ports 2121 are self-sealing ports.

[0024] The upper sealing member 212 is provided on one side of the mouthpiece main body 200 (i.e., the side facing the atomizer main body 100). An upper portion of the upper sealing member 212 is at least partially disposed within the upper fixing base 211. The mouthpiece main body 200 includes an e-liquid filling channel or passage 2124 defining a path to the e-liquid filling ports 2121. The mouthpiece fixing base 211 includes a recess portion 2125. The mouthpiece protective sleeve 220 includes an outer guide portion 2126 (e.g., in the form of an outer tubular neck) and an inner guide portion 2127 (e.g., in the form of an inner tubular neck) that are generally disposed within the recess portion 2125 of the mouthpiece fixing base 211 when the upper fixing base 211 engages the mouthpiece protective sleeve 220. The outer and inner guide portions 2126, 2127 may be generally concentric. The outer guide portion 2126 forms a portion of the e-liquid filling channel 2124. The smoke guide tube 1161 of the atomizing core 116 extends through an aperture 2120 of the upper sealing member 212 (the aperture 2120 being disposed between the two (2) e-liquid filling ports 2121 in this particular embodiment), and at least partially extends into the inner guide portion 2127 of the mouthpiece protective sleeve 220 (thereby also extending at least partially into the passage 2124 such that vaporized liquid or smoke passes from the smoke guide tube 1161 into the passage 2124 for subsequent inhalation by the user). The bottom portion of the recess 2125 includes an aperture 2102 and two (2) e-liquid filling ports 2104 (with the aperture 2102 disposed between the e-liquid filing ports 2104 in this particular embodiment) with the smoke guide tube 1161 of the atomizing core 116 extending through the aperture 2102. The two (2) e-liquid filling ports 2104 of the upper fixing base 210 are generally aligned with the two (2) e-liquid filling ports 2121 of the upper sealing member 212. The extension of the smoke guide tube 1161 through the apertures 2120, 2102, and into the inner guide portion 2127 assists in alignment and positioning of the smoke guide tube 1161 with the mouthpiece protective sleeve 220 and the mouthpiece fixing base 211. The smoke guide tube 1161 and the support column 1112 are respectively arranged at two ends, so as to improve the stability of the electronic cigarette 20.

[0025] As set forth above, the top of the upper sealing member 212 is provided with two (2) e-liquid filling ports 2121 in communication with the e-liquid storage cavity 1111. As shown in FIGS. 5 and 14, an e-liquid sealing member or thin film membrane 2122 is mounted in each e-liquid filling port 2121 to seal the e-liquid filling port 2121. As shown in FIG. 6, the upper sealing member 212 is fixed on the e-liquid cup holder 110 by the mouthpiece main body 200. The mouthpiece main body 200 is removably mounted and connected to the e-liquid cup holder 110 by means of a snap-fit structure 2123, such that the e-liquid can be directly filled into the e-liquid storage cavity 1111 after the mouthpiece main body 200 and the upper sealing member 212 are removed. In the alternative, various other fastening mechanisms can be used including, without limitation, press-fit engagement, clips, magnets embedded at both ends for connection, etc. In another alternative, the main body 100 and the mouthpiece main body 200 are fixed to each other or otherwise permanently engaged with each other.

[0026] In the alternative, the mouthpiece main body 200 can be integrally formed with the upper sealing member 212. In this particular embodiment, the top of the mouthpiece main body 200 is provided with at least one e-liquid filling port 2121 in communication with the e-liquid storage cavity 1111, and an e-liquid sealing member 2122 is mounted in each e-liquid filling port 2121 to seal the e-liquid filling port 2121. While the e-liquid sealing member (or thin film membrane) 2122 can be punctured to fill the e-liquid into the e-liquid storage cavity 1111 when the mouthpiece main body 200 engages the main body 100, but when the mouthpiece main body 200 is removed from engagement with the main body 100, the upper sealing member 212 is also removed from engagement with the main body 100 for direct filling of the e-liquid storage cavity 1111 with the e-liquid.

[0027] As set forth above, the mouthpiece main body (or mouthpiece assembly) 200 includes a mouthpiece protective sleeve 220, a mouthpiece fixing base 211, and the upper sealing member 212. As seen in FIG. 6, the upper sealing member 212 is sized and shaped so as to be received within an inner cavity at the bottom of the upper fixing base 210. The upper fixing base 210 secures

the upper sealing member 212 over an opening of the e-liquid storage cavity 1111 by a fastening mechanism 2123 (e.g., snap-fit structures) that provides for engaging the mouthpiece fixing base 211 with an atomizer housing 101. The upper sealing member 212 and the opening of the e-liquid storage cavity 1111 can be separated by removing the upper fixing base 210 from engagement (e.g., snap-fit engagement) with the atomizer housing 101.

[0028] In the alternative, the mouthpiece main body (or mouthpiece assembly) 200 may include just the mouthpiece protective sleeve 220 and the mouthpiece fixing base 211. The upper fixing member 210 is provided with at least one e-liquid filling port 2104 and the sealing member 212 is provided with at least one e-liquid filling port 2121 (where the at least one e-liquid filling ports 2104, 2121 are generally configured (e.g., at least partially aligned) such that a syringe needle or similar device may pass through the ports 2104, 2121 for injection of the e-liquid into the e-liquid storage cavity 1111

[0029] After the upper fixing base 210 (and the mouthpiece fixing base 211 by extension) is detached from the atomizer housing 101, the upper sealing member 212 can be removed, such that the e-liquid storage cavity 1111 can be exposed for direct filling of e-liquid after the upper sealing member 212 is removed.

[0030] As seen in FIG. 8, an outer wall of the atomizing core 116 is provided with an e-liquid guide hole 1163 configured for allowing e-liquid to pass into the interior of the atomizing core 116 for atomization of the e-liquid. The atomizing core 116 is internally provided with a heating core 1162 for heating the e-liquid that passed through the e-liquid guide hole 1163 into the interior of the atomizing core 116. The atomizing core 116 is fixed to the lower fixing base 114, the lower fixing base 114 is provided with an air guide hole 1166 configured for allowing gas (e.g., air) to pass to an air intake of the atomizing core 116, and into the interior of the atomizing core 116. Likewise, the lower sealing member 117 has a corresponding air guide hole 1171 for allowing air to pass to the atomizing core 116. The smoke guide tube 1161 allows vaporized e-liquid and gas (e.g., air) to pass from the interior of the atomizing core 116 to the mouthpiece main body 200 for inhalation by a user.

[0031] According to another embodiment of the present invention, as shown in FIGS. 14-17, an electronic cigarette device 30 is similar in operation and structure to the electronic cigarette device 20 of FIGS. 1-13, with one particular difference being there is only one e-liquid filling port 2121 provided in the upper sealing member 212. The electronic cigarette device 30 includes an atomizer main body 100 and a mouthpiece main body (or mouthpiece assembly) 200. However, the mouthpiece protective sleeve 220, upper sealing member 212, upper fixing base 210, and mouthpiece fixing base 211 of the electronic cigarette 30 have a different shape and/or structure than the corresponding components of the electronic cigarette 20. The e-liquid sealing member 2122 is a part of the upper sealing member 212 (that is, it is of single-piece construction with the upper sealing member 212. In the alternative, the e-liquid sealing member 2122 may be a separate component inserted into the e-liquid filling port 2121. In FIG. 17, the e-liquid filling port includes an upper portion 2130 above the sealing member 2122, and a lower portion 2129 below the sealing member 2122. As shown, the sealing member 2122 is made of the same material as the rest of the upper sealing member 212. Depending on design requirements, storage capacity of the e-liquid storage cavity 1111 can be configured, as required (e.g., 0.5 ml, 1 ml, 2 ml, etc.).

[0032] There are at least two (2) approaches or methods for filling the electronic cigarette assembly 20, 30 with e-liquid. In a first method, the thin film of the e-liquid sealing member 2122 can be punctured by a needle of a filling device (e.g., injection syringe having a needle) so as to fill the e-liquid. In a second method, the mouthpiece main body 200 is removable from engagement with the main body 100], and the e-liquid is then directly filled into the e-liquid storage cavity 1111. In the embodiments described herein, the method for filling the electronic cigarette assembly with e-liquid can be freely selected (e.g., either by using an e-liquid filling needle (e.g., a syringe needle) passing through the thin film of the e-liquid sealing member 2122 disposed within the e-liquid filling port 2121 of the upper sealing member 212 to fill the e-liquid storage cavity 1111 with e-liquid, or by directly filling the e-liquid into the open e-liquid storage cavity 1111). No matter which e-liquid filling method is used, it is easy for removal and mounting, and the component to be removed and mounted is simply the mouthpiece main body 200 so as to improve "fool-proof' e-liquid filling, and also improve user experience.

[0033] As set forth above, the first approach to filling involves the thin film of the e-liquid sealing member 2122 being punctured by using an injection syringe or other needle device to at least partially fill the e-liquid storage cavity 1111 with the e-liquid, without having to disengage the mouthpiece main body 200 from the main body 100. A user inserts an end of the needle of the injection syringe (or other needle device) through the e-liquid filling channel 2124 towards the e-liquid storage cavity 1111. The end of the needle passes through the outer guide portion 2126 of the mouthpiece protective sleeve 220, through one of the filling ports 2104 of the upper fixing base 210, and through one of the filling ports 2121 of the upper sealing member 212 into the e-liquid storage cavity 1111. As set forth above, the e-liquid storage cavity 1111 is sealed by the upper sealing member 212. E-liquid sealing members 2121 are disposed within the filling ports 2121 of the upper sealing member 212, and each e-liquid sealing member 2121 is provided with a thin film punctured by the needle as the needle passes through the upper sealing member 212 to the e-liquid storage cavity 1111. The e-liquid filling needle directly extends from the mouthpiece protective sleeve 220 through the e-liquid sealing member 2121 so as to fill the e-liquid storage cavity 1111 with e-liquid. Once the e-liquid storage cavity

1111 has been filled (or filled to a desired amount, or the e-liquid emptied from the syringe, etc.), the needle is withdrawn from the electronic cigarette assembly 20, 30.

[0034] An advantage of the first approach is that the e-liquid storage cavity 1111 can be filled with e-liquid without having to remove the mouthpiece main body 200 from the main body 100. As set forth above, the upper sealing member 212 is fixed to one side of the mouthpiece main body 200, while the other side of the mouthpiece main body 200 includes the mouthpiece protective sleeve 220 which has a mouthpiece opening that also serves as an opening on one end of the e-liquid filling channel 2124. The mouthpiece main body 200 is mounted at one end of the atomizer housing 101 of the atomizer main body 100, and covers the opening to the e-liquid storage cavity 1111, where the upper sealing member 212 thereby seals the e-liquid storage cavity 1111. As discussed, the upper sealing member 212 is provided with e-liquid sealing member 2121 having the thin film. The general alignment of the mouthpiece opening with the various ports 2104, 2121 (and the thin film of the e-liquid sealing members 2121) allows the e-liquid filling needle to directly extend from the mouthpiece opening to puncture the thin film of the e-liquid sealing members 2121so as to fill the e-liquid storage cavity 1111 with e-liquid, without additionally removing and mounting the mouthpiece main body 200 for filling e-liquid.

[0035] As set forth above, the second approach to filling involves the mouthpiece main body 200 being removed from engagement with the main body 100, The user starts with the mouthpiece main body 200 engaged with the main body 100, with the upper sealing member 212 sealing the e-liquid storage cavity 1111. The mouthpiece main body (or mouthpiece assembly) 200 may be a mouthpiece protective sleeve 220, a mouthpiece fixing base 211, and the upper sealing member 212, or the mouthpiece main body (or mouthpiece assembly) 200 may include just the mouthpiece protective sleeve 220 and the mouthpiece fixing base 211. When the mouthpiece main body 200 includes the mouthpiece protective sleeve 220, the mouthpiece fixing base 211, and the upper sealing member 212, the upper sealing member 212 comes away with the rest of the mouthpiece main body 200 when the mouthpiece main body 200 is disengaged from the main body 100, especially when the upper sealing member 212 is integrally formed with the mouthpiece main body 200. In the alternative, when the mouthpiece main body includes just the mouthpiece protective sleeve 220 and the mouthpiece fixing base 211, the upper sealing member 212 may remain in place over the e-liquid storage cavity 1111 when the mouthpiece main body 200 is disengaged from the main body 100, and needs to be separately removed. As the upper fixing base 210 secured the upper sealing member 212 over the opening of the e-liquid storage cavity 1111, the upper sealing member 212 can be simply lifted away from the main body 100, exposing the opening of the e-liquid storage cavity 1111. The upper sealing member 212 remaining in place after the mouthpiece main body 200 is removed can be a safety feature to prevent accidental spillage of any remaining e-liquid in the e-liquid storage cavity 1111. After the user removes the upper sealing member 212 from over the e-liquid storage cavity 1111, a desired amount of e-liquid can then be directly poured into the e-liquid storage cavity 1111 by the user, without an e-liquid filling needle. A pre-measured amount of e-liquid may be poured into the e-liquid storage cavity 1111, or e-liquid may be poured into the e-liquid storage cavity 1111 until the e-liquid storage cavity 1111 is filled, as desired (e.g., at least partially filled, fully filled, etc.).

[0036] An advantage of the second approach is that, when the upper sealing member 212 is fixed to the mouthpiece main body 200, e-liquid can also be filled directly into the e-liquid storage cavity 1111 in an open manner (i.e., allowing the e-liquid to be directly filled into the e-liquid storage cavity 1111 without an e-liquid filling needle). Once the desired amount of e-liquid is in the e-liquid storage cavity 1111, then the mouthpiece main body 200 is mounted over the open end of the e-liquid storage cavity 1111, and re-engaged with the main body 100 (with the upper sealing member 212 thereby sealing the e-liquid storage cavity 1111).

[0037] A user is able to freely select which e-liquid filling approach the user wishes to take (i.e., either using an e-liquid filling needle to fill the e-liquid storage cavity 1111 with e-liquid, or directly pouring the e-liquid into the open end of the e-liquid storage cavity 1111 by disengaging the mouthpiece main body 200 from the main body 100 (thereby exposing the open end of the e-liquid storage cavity 1111). No matter which e-liquid filling approach is used, it is easy dis-engage and re-engage the mouthpiece main body 200 with the main body 100. The only component that needs to be removed from the electronic cigarette assembly 20, 30 and then replaced on the electronic cigarette assembly 20, 30 is the mouthpiece main body 200, thereby providing virtually "fool-proof' e-liquid filling and improving the user experience by reducing the amount of disassembly and reassembly during the filling process.

[0038] In addition, the claimed invention is not limited in size and may be constructed in various sizes in which the same or similar principles of operation as described above would apply. Furthermore, the figures (and various components shown therein) of the specification are not to be construed as drawn to scale.

[0039] The terminology used herein is for the purpose of describing particular example embodiments only and is not intended to be limiting. Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps, but not the exclusion of any other element, integer or step, or group of elements, integers or steps. In other words, unless explicitly stated to the contrary, embodiments "comprising" or "having" an element or a plurality of elements having a particular

property can include additional elements not having that property. In other words, the terms "comprises," "comprising," "including," and "having," are inclusive and therefore specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. In other words, the use of "including," "comprising," "having," "containing," "involving," and variations thereof, is meant to encompass the items listed thereafter and additional items. Further, references to "one embodiment" or "one implementation" are not intended to be interpreted as excluding the existence of additional embodiments or implementations that also incorporate the recited features. The term "exemplary" is intended to mean "an example of".

[0040] As used herein, the singular forms "a", "an" and "the" may be intended to include the plural forms as well, unless the context clearly indicates otherwise. In other words, an element or step recited in the singular and preceded by the word "a" or "an" should be understood as not necessarily excluding the plural of the elements or steps. Further, references to "one embodiment" or "one implementation" are not intended to be interpreted as excluding the existence of additional embodiments or implementations that also incorporate the recited features. Thus, when introducing elements of aspects of the disclosure or the examples thereof, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. In other words, the indefinite articles "a", "an", "the", and "said" as used in the specification and in the claims, unless clearly indicated to the contrary, should be understood to mean "at least one." The use of the expression "at least" or "at least one" suggests the use of one or more elements or ingredients or quantities, as the use may be in the embodiment of the disclosure to achieve one or more of the desired objects or results.

[0041] The numerical values mentioned for the various physical parameters, dimensions or quantities are only approximations and it is envisaged that the values higher/lower than the numerical values assigned to the parameters, dimensions or quantities fall within the scope of the disclosure, unless there is a statement in the specification specific to the contrary. Any range or value given herein can be extended or altered without losing the effect sought, as will be apparent to the skilled person.

[0042] When an element or layer is referred to as being "on", "engaged to", "connected to" or "coupled to" another element or layer, it may be directly on, engaged, connected or coupled to the other element or layer, or intervening elements or layers may be present. In contrast, when an element is referred to as being "directly on," "directly engaged to", "directly connected to" or "directly coupled to" another element or layer, there may be no intervening elements or layers present. Other words used to describe the relationship between elements should be interpreted in a like fashion (e.g., "between" versus "directly between," "adjacent" versus "directly adjacent," etc.). As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0043] In the description of the present invention, several means one or more, a plurality of means more than two, greater than, less than, more than, and the like are understood as not including this number, while above, below, within, and the like are understood as including this number. If there are the descriptions of first and second, it is only for the purpose of distinguishing technical features, and should not be understood as indicating or implying relative importance, implicitly indicating the number of the indicated technical features or implicitly indicating the order of the indicated technical features.

[0044] In the description of the present invention, it should be noted that the terms "installation", "connected" and "connection" if any shall be understood in a broad sense unless otherwise specified and defined. For example, they may be fixed connection, removable connection or integrated connection; may be mechanical connection or electrical connection; and may be direct connection, or indirect connection through an intermediate medium, and connection inside two elements. The specific meanings of the above terms in the present invention can be understood in a specific case by those of ordinary skills in the art.

[0045] While various spatial and directional terms, such as "up", "down", "front", "rear", "left", "right", "vertical", "horizontal", "top", "bottom", "inside", "outside", "upper," "lower," and the like are used to describe embodiments and implementations of the present disclosure, it is understood that such terms are merely used with respect to the orientations shown in the drawings. The orientations can be inverted, rotated, or otherwise changed, such that a top side becomes a bottom side if the structure is flipped 180 degrees, becomes a left side or a right side if the structure is pivoted 90°, and the like. In other words, spatially relative terms, such as "inner," "outer," "beneath", "below", "above", "lateral", "longitudinal" and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. Spatially relative terms may be intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as "below" or "beneath" other elements or features would then be oriented "above" the other elements or features. Thus, the example term "below" can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0046] In the description of the present invention, it should be understood that the orientation or position relationship indicated by the terms is based on the orien-

tation or position relationship shown in the accompanying drawings, it is only for the convenience of description of the present invention and simplification of the description, and it is not to indicate or imply that the indicated device or element must have a specific orientation, and be constructed and operated in a specific orientation. Therefore, the terms shall not be understood as limiting the present invention.

[0047] As used herein, a structure, limitation, or element that is "configured to" perform a task or operation is particularly structurally formed, constructed, or adapted in a manner corresponding to the task or operation. For purposes of clarity and the avoidance of doubt, an object that is merely capable of being modified to perform the task or operation is not "configured to" perform the task or operation as used herein.

[0048] Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

[0049] It will be understood that the benefits and advantages described above can relate to one embodiment or can relate to several embodiments. The embodiments are not limited to those that solve any or all of the stated problems or those that have any or all of the stated benefits and advantages. It will further be understood that reference to 'an' item refers to one or more of those items.

[0050] The order of execution or performance of the operations in examples of the disclosure illustrated and described herein is not essential, unless otherwise specified. That is, the operations can be performed in any order, unless otherwise specified, and examples of the disclosure can include additional or fewer operations than those disclosed herein. For example, it is contemplated that executing or performing a particular operation before, contemporaneously with, or after another operation (e.g., different steps, etc.) is within the scope of aspects and implementations of the disclosure. In other words, the method steps, processes, and operations described herein are not to be construed as necessarily requiring their performance in the particular order discussed or illustrated, unless specifically identified as an order of performance. It is also to be understood that additional or alternative steps may be employed.

[0051] The phrase "one or more of the following: A, B, and C" means "at least one of A and/or at least one of B and/or at least one of C." The phrase "and/or", as used in the specification and in the claims, should be understood to mean "either or both" of the elements so conjoined, i.e., elements that are conjunctively present in some cases and disjunctively present in other cases. Multiple elements listed with "and/or" should be construed in the same fashion, i.e., "one or more" of the elements so conjoined. Other elements may optionally be present other than the elements specifically identified by the "and/or" clause, whether related or unrelated to those elements specifically identified. Thus, as a non-limiting example, a reference to "A and/or B", when used in conjunction with open-ended language such as "comprising" can refer, in one embodiment, to A only (optionally including elements other than B); in another embodiment, to B only (optionally including elements other than A); in yet another embodiment, to both A and B (optionally including other elements); etc.

[0052] As used in the specification and in the claims, "or" should be understood to have the same meaning as "and/or" as defined above. For example, when separating items in a list, "or" or "and/or" shall be interpreted as being inclusive, i.e., the inclusion of at least one, but also including more than one, of a number or list of elements, and, optionally, additional unlisted items. Only terms clearly indicated to the contrary, such as "only one of or "exactly one of," or, when used in the claims, "consisting of," will refer to the inclusion of exactly one element of a number or list of elements. In general, the term "or" as used shall only be interpreted as indicating exclusive alternatives (i.e., "one or the other but not both") when preceded by terms of exclusivity, such as "either," "one of "only one of or "exactly one of." "Consisting essentially of," when used in the claims, shall have its ordinary meaning as used in the field of patent law.

[0053] As briefly discussed above, as used in the specification and in the claims, the phrase "at least one," in reference to a list of one or more elements, should be understood to mean at least one element selected from any one or more of the elements in the list of elements, but not necessarily including at least one of each and every element specifically listed within the list of elements and not excluding any combinations of elements in the list of elements. This definition also allows that elements may optionally be present other than the elements specifically identified within the list of elements to which the phrase "at least one" refers, whether related or unrelated to those elements specifically identified. Thus, as a non-limiting example, "at least one of A and B" (or, equivalently, "at least one of A or B," or, equivalently "at least one of A and/or B") can refer, in one embodiment, to at least one, optionally including more than one, A, with no B present (and optionally including elements other than B); in another embodiment, to at least one, optionally including more than one, B, with no A present (and optionally including elements other than A); in yet another embodiment, to at least one, optionally including more than one, A, and at least one, optionally including more than one, B (and optionally including other elements); etc.

[0054] Use of ordinal terms such as "first," "second," "third," etc., in the claims to modify a claim element does not by itself connote any priority, precedence, or order of one claim element over another or the temporal order in which acts of a method are performed. Ordinal terms are used merely as labels to distinguish one claim ele-

ment having a certain name from another element having a same name (but for use of the ordinal term), to distinguish the claim elements.

[0055] Having described aspects of the disclosure in detail, it will be apparent that modifications and variations are possible without departing from the scope of aspects of the disclosure as defined in the appended claims. As various changes could be made in the above constructions, products, and methods without departing from the scope of aspects of the disclosure, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

[0056] It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments (and/or aspects thereof) can be used in combination with each other. In addition, many modifications can be made to adapt a particular situation or material to the teachings of the various embodiments of the disclosure without departing from their scope. While the dimensions and types of materials described herein are intended to define the parameters of the various embodiments of the disclosure, the embodiments are by no means limiting and are example embodiments. Many other embodiments will be apparent to those of ordinary skill in the art upon reviewing the above description. The scope of the various embodiments of the disclosure should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein." Moreover, the terms "first," "second," and "third," etc. are used merely as labels, and are not intended to impose numerical requirements on their objects. Further, the limitations of the following claims are not written in means-plus-function format and are not intended to be interpreted based on 35 U.S.C. § 112(f), unless and until such claim limitations expressly use the phrase "means for" followed by a statement of function void of further structure.

[0057] This written description uses examples to disclose the various embodiments of the disclosure, including the best mode, and also to enable any person of ordinary skill in the art to practice the various embodiments of the disclosure, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the various embodiments of the disclosure is defined by the claims, and can include other examples that occur to those persons of ordinary skill in the art. Such other examples are intended to be within the scope of the claims if the examples have structural elements that do not differ from the literal language of the claims, or if the examples include equivalent structural elements with insubstantial differences from the literal language of the claims.

[0058] The above description presents the best mode contemplated for carrying out the present invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains to make and use this invention. This invention is, however, susceptible to modifications and alternate constructions from that discussed above that are fully equivalent. Moreover, features described in connection with one embodiment of the invention may be used in conjunction with other embodiments, even if not explicitly stated above. Consequently, this invention is not limited to the particular embodiments disclosed. On the contrary, this invention covers all modifications and alternate constructions coming within the spirit and scope of the invention as generally expressed by the following claims, which particularly point out and distinctly claim the subject matter of the invention.

[0059] The following claims are thus to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted and also what essentially incorporates the essential idea of the invention. Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiment can be configured without departing from the scope of the invention. The illustrated embodiment has been set forth only for the purposes of example and that should not be taken as limiting the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

[0060] Various technical features of the above embodiments may be combined randomly, and in order to simplify the description, possible combinations of various technical features in the above embodiments are not all described. However, as long as the combinations of these technical features have no contradiction, the combinations of these technical features should be considered as falling into the scope recorded by the specification.

[0061] The present disclosure provides an electronic cigarette assembly which provides improved addition of liquid into a liquid storage cavity of the electronic cigarette assembly, without requiring disassembly of the electronic cigarette assembly. The electronic cigarette assembly includes a mouthpiece assembly having a passage extending therethrough, and a main body assembly including a liquid storage cavity having an opening, and a heating assembly disposed within the liquid storage cavity. Liquid enters the heating assembly from the liquid storage cavity. A sealing member is disposed between the mouthpiece assembly and the main body assembly. The electronic cigarette assembly is configured for liquid to be added to the liquid storage cavity through the passage and the sealing member without requiring disassembly of the electronic cigarette assembly.

[0062] Although the embodiments of the present invention have been shown and described, those of ordi-

nary skills in the art may understand that various changes, modifications, substitutions and variations may be made to these embodiments without departing from the principle and purpose of the present invention, and the scope of the present invention is defined by the claims and their equivalents.

[0063] The following claims are thus to be understood to include what is specifically illustrated and described above, what is conceptually equivalent, what can be obviously substituted and also what incorporates the essential idea of the invention. Those skilled in the art will appreciate that various adaptations and modifications of the just-described preferred embodiment can be configured without departing from the scope of the invention. The illustrated embodiment has been set forth only for the purposes of example and that should not be taken as limiting the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

Claims

1. An electronic cigarette assembly configured for improved filling with a liquid without requiring disassembly of the electronic cigarette assembly, comprising:

   a mouthpiece assembly including a passage extending therethrough;
   a main body assembly including a liquid storage cavity having an opening, and a heating assembly disposed within the liquid storage cavity, wherein liquid enters the heating assembly from the liquid storage cavity; and
   a sealing member disposed between the mouthpiece assembly and the main body assembly, wherein the electronic cigarette assembly is configured for liquid to be added to the liquid storage cavity through the passage and the sealing member without requiring disassembly of the electronic cigarette assembly.

2. The electronic cigarette assembly of Claim 1, wherein the sealing member includes a self-sealing port extending therethrough; wherein the passage and the self-sealing port are configured to be generally aligned with at least a portion of the opening of the liquid storage cavity, wherein the passage and the self-sealing port are configured as a filling channel, and wherein a needle portion of a filling device may pass through the self-sealing port for adding liquid into the liquid storage cavity.

3. The electronic cigarette assembly of any one of the preceding Claims, wherein the sealing member includes at least two self-sealing ports extending therethrough, and wherein the passage and the at least two self-sealing ports are configured to be aligned with at least a portion of the opening of the liquid storage cavity, with the passage and the at least two self-sealing ports configured as a filling channel, wherein a needle portion of a filling device may pass through one of the at least two self-sealing ports for adding liquid into the liquid storage cavity.

4. The electronic cigarette assembly of any one of the preceding Claims, wherein the heating assembly includes a guide extending at least partially into the passage of the mouthpiece assembly; and wherein the sealing member includes an aperture through which the guide extends from the main body assembly into the mouthpiece assembly.

5. An electronic cigarette assembly configured for improved filling with a liquid, comprising:

   a mouthpiece assembly including a passage extending therethrough;
   a main body assembly including a liquid storage cavity having an opening, and a heating assembly disposed within the liquid storage cavity, wherein liquid enters the heating assembly from the liquid storage cavity; and
   a sealing member disposed between the mouthpiece and the main body, wherein the main body assembly and mouthpiece assembly are configured to removably engage each other, and wherein disengagement of the mouthpiece assembly from the main body assembly exposes the opening of the liquid storage cavity for direct addition of liquid into the liquid storage cavity..

6. The electronic cigarette assembly of Claim 5, wherein the mouthpiece assembly includes the sealing member; and wherein disengagement of the mouthpiece assembly from the main body assembly automatically removes the sealing member from over the liquid storage cavity.

7. The electronic cigarette assembly of Claim 5 or 6, wherein the sealing member includes a self-sealing port extending therethrough; wherein the passage and the self-sealing port are configured to be generally aligned with at least a portion of the opening of the liquid storage cavity, wherein the passage and the self-sealing port are configured as a filling channel, and wherein the self-sealing port is configured such that a needle portion of a filling device may pass through the self-sealing port for adding liquid into the liquid storage cavity.

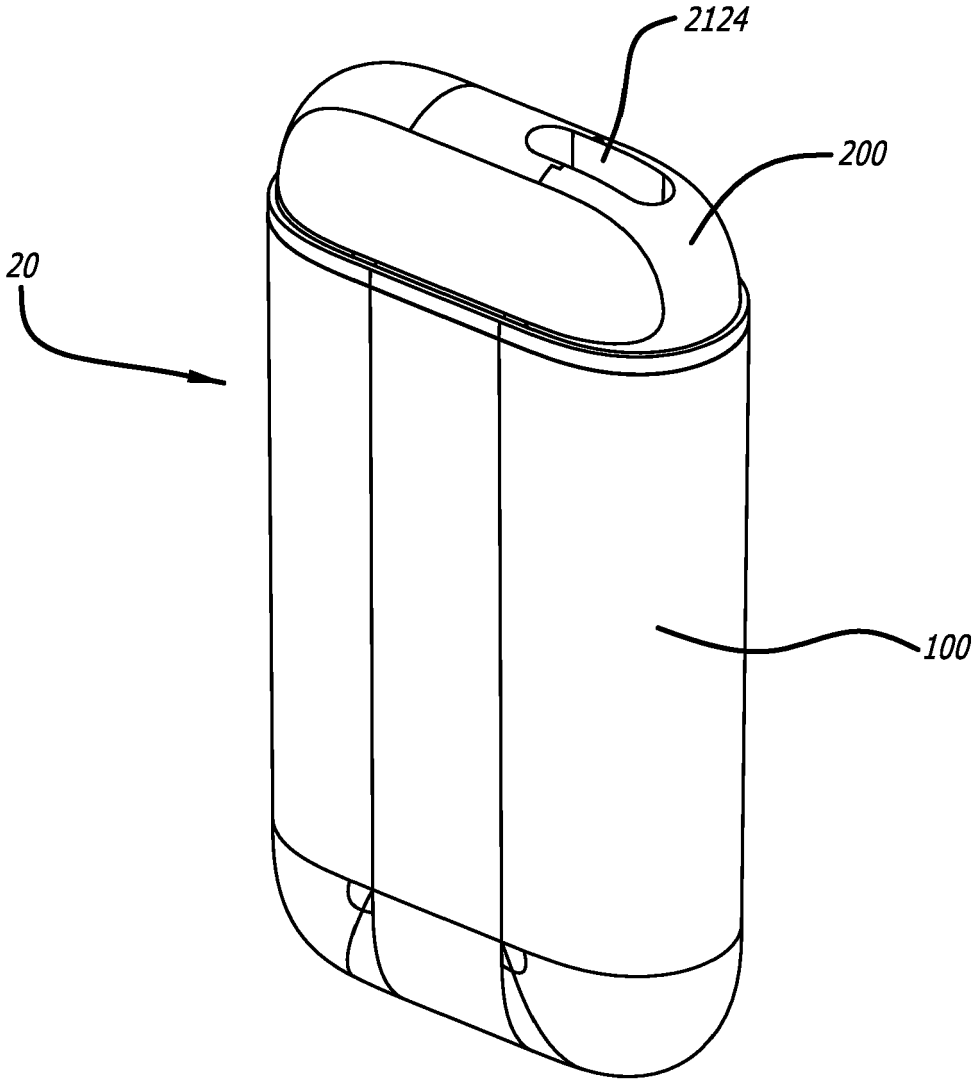

FIG. 1

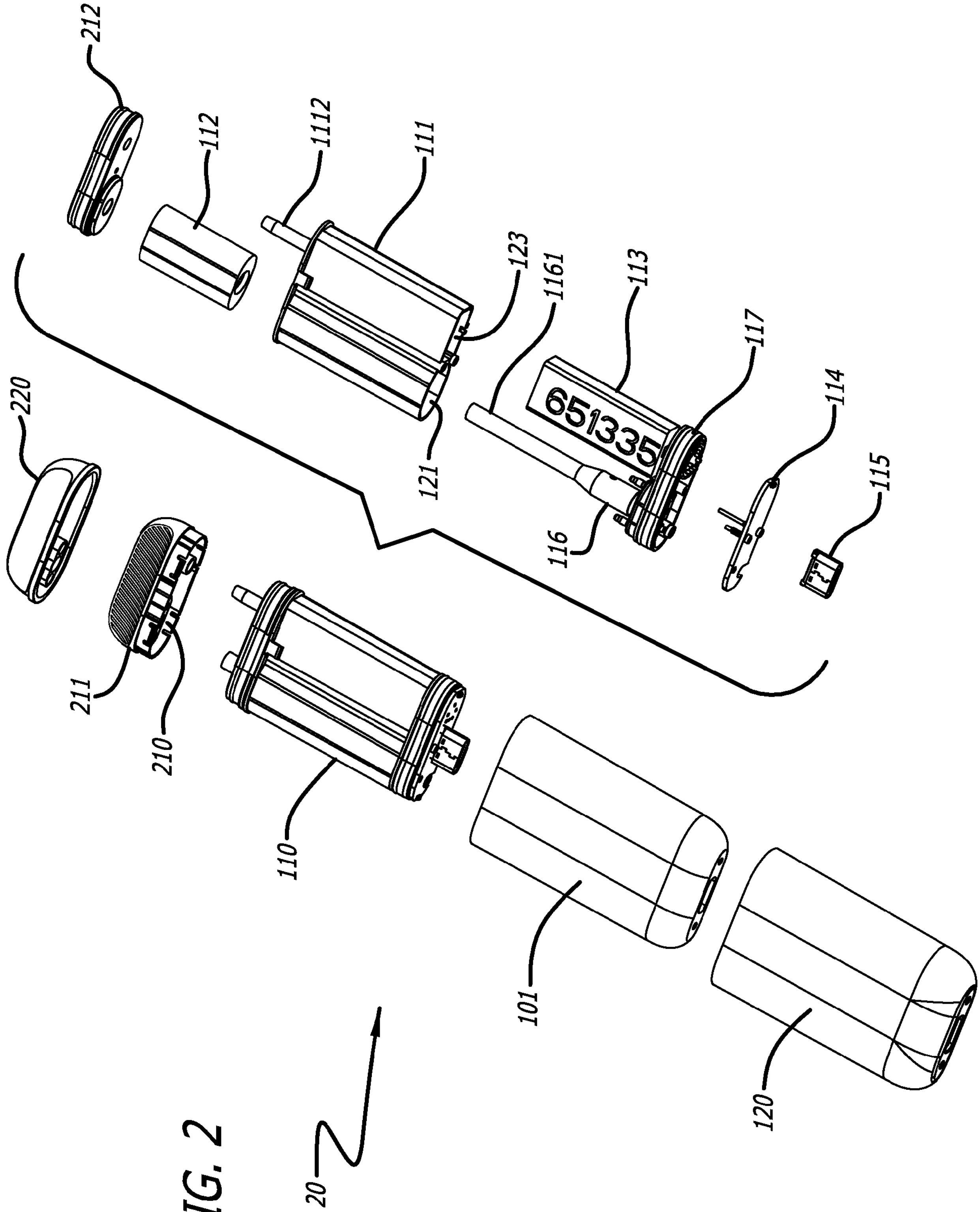
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FIG. 2

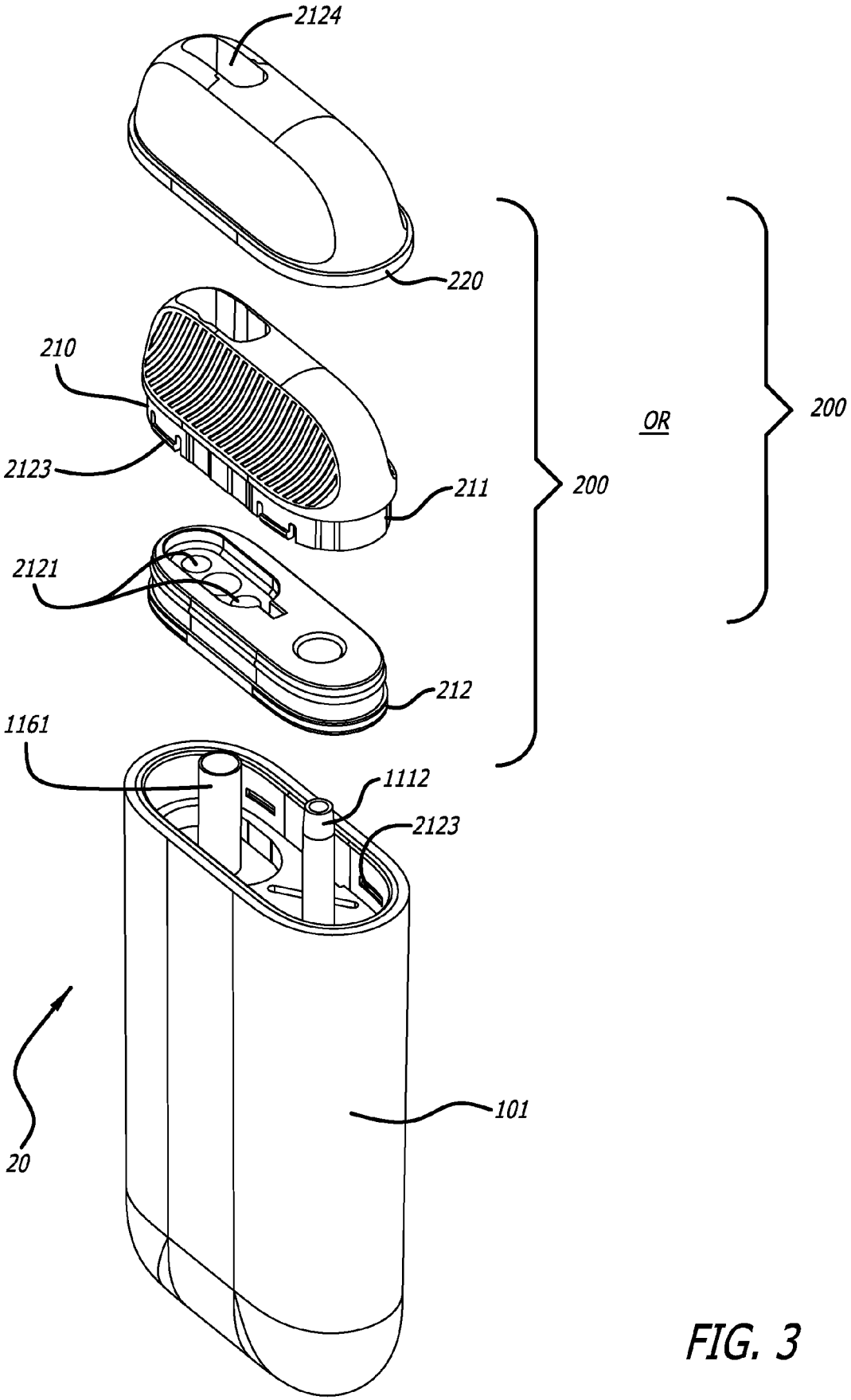
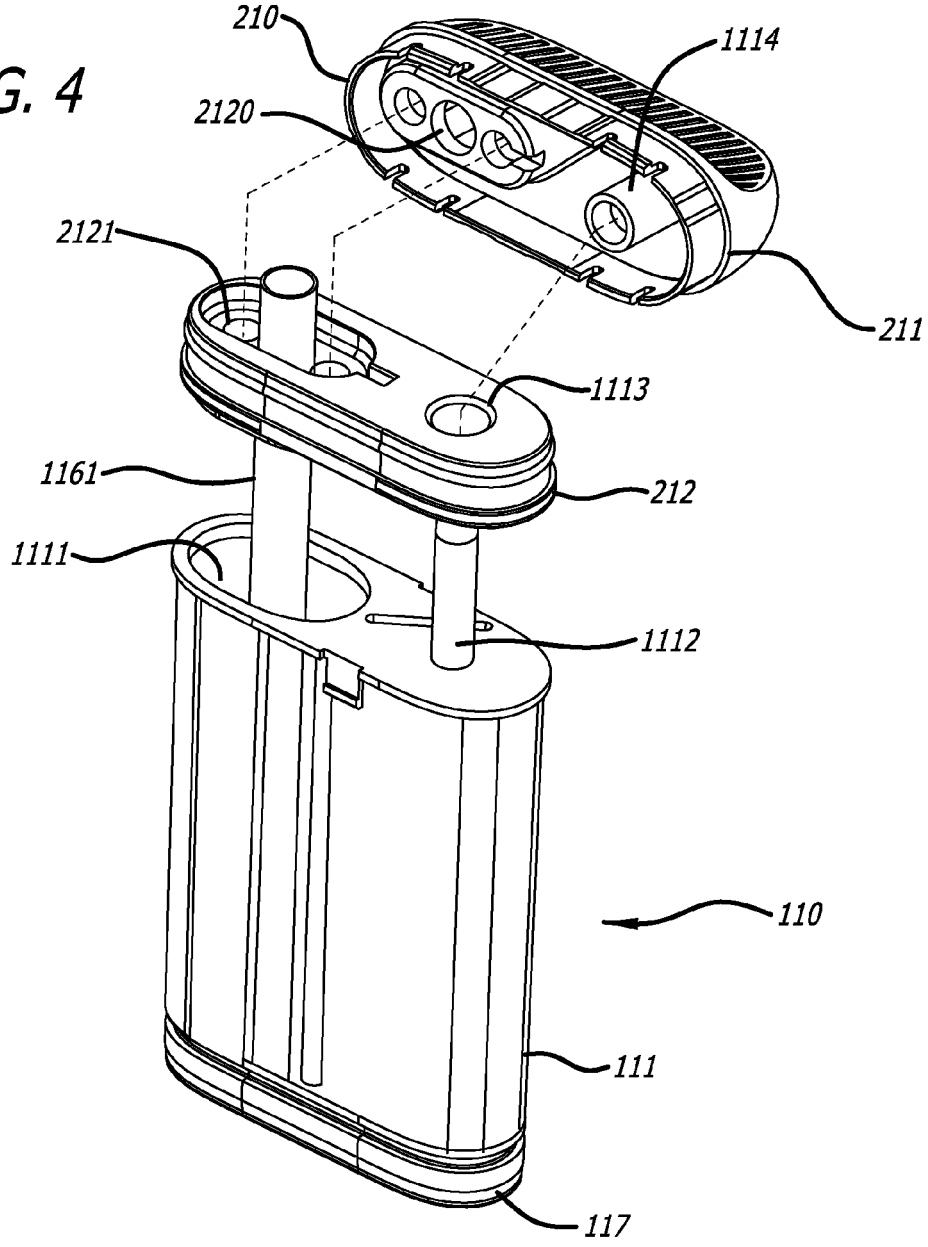


FIG. 3

FIG. 4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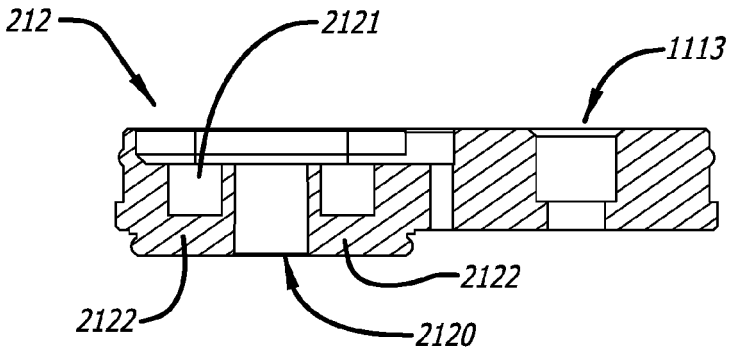
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FIG. 5

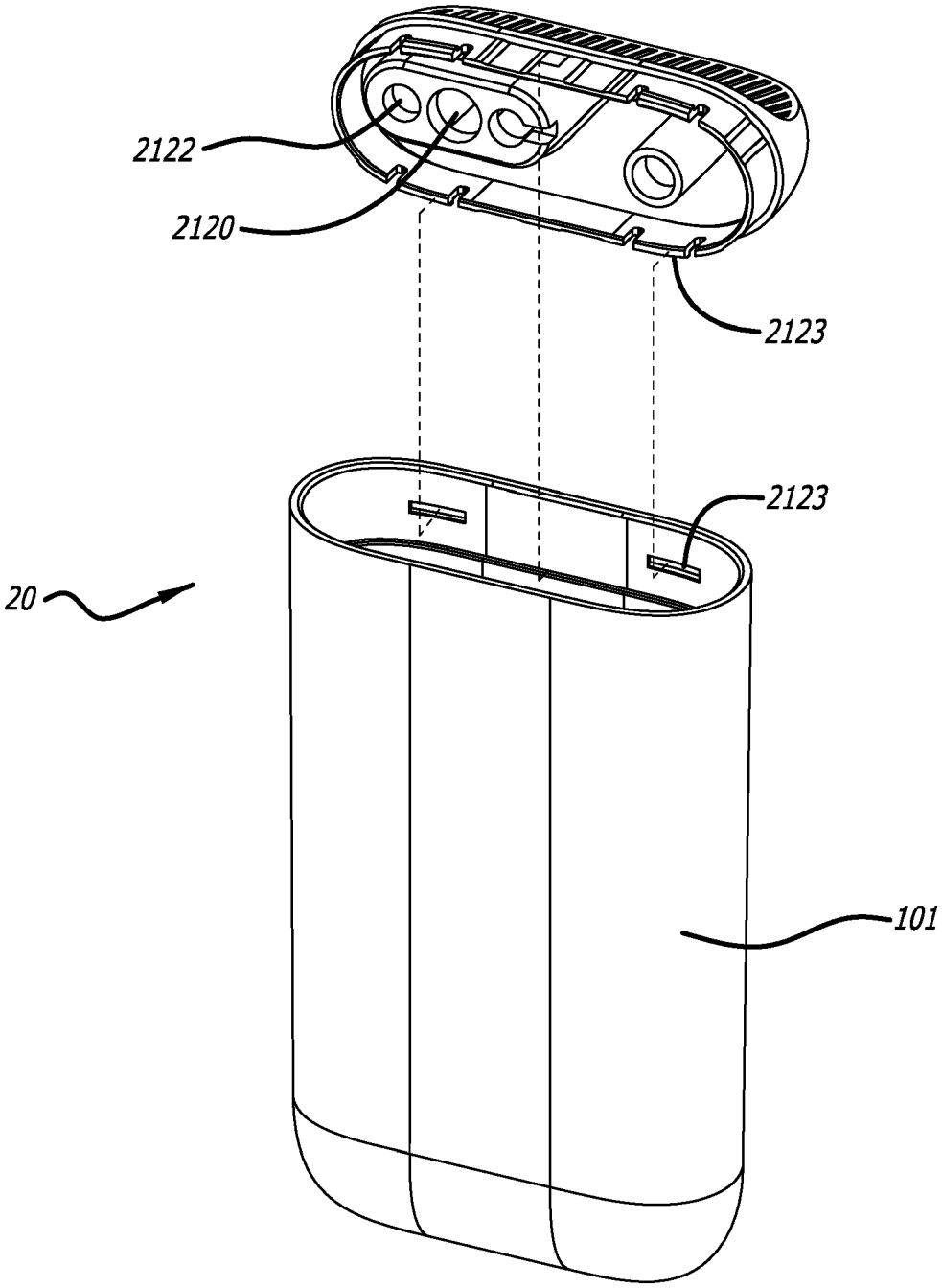

FIG. 6

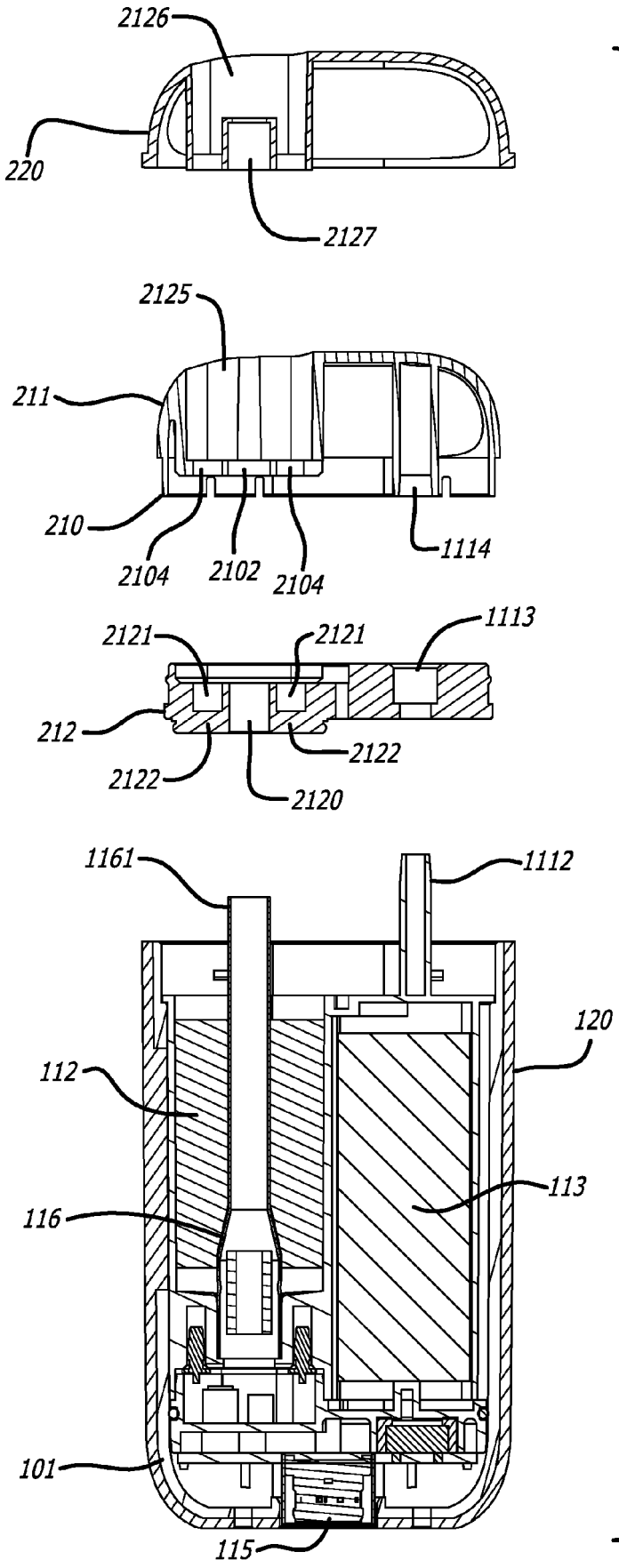
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FIG. 7

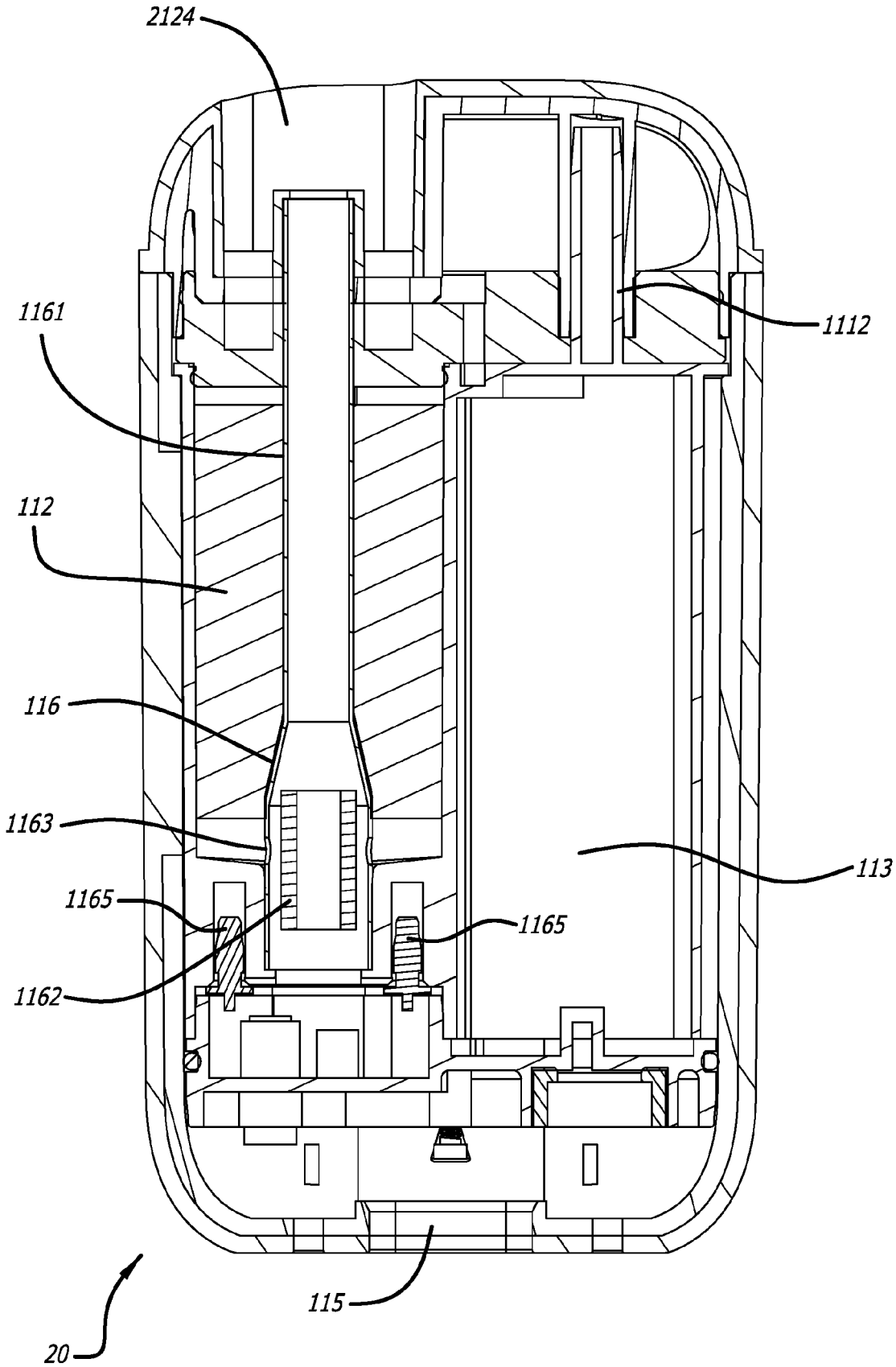

FIG. 8

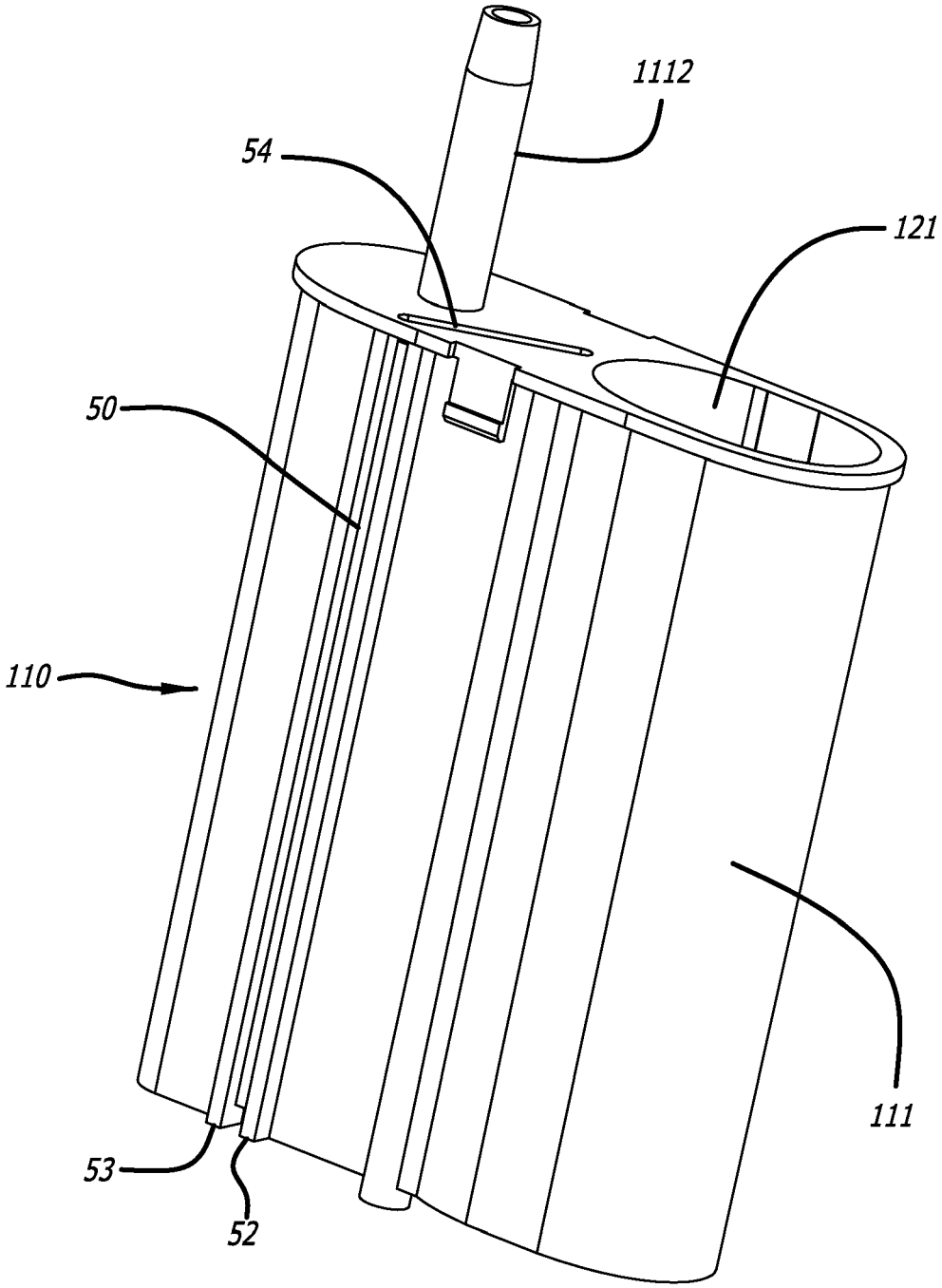

FIG. 9

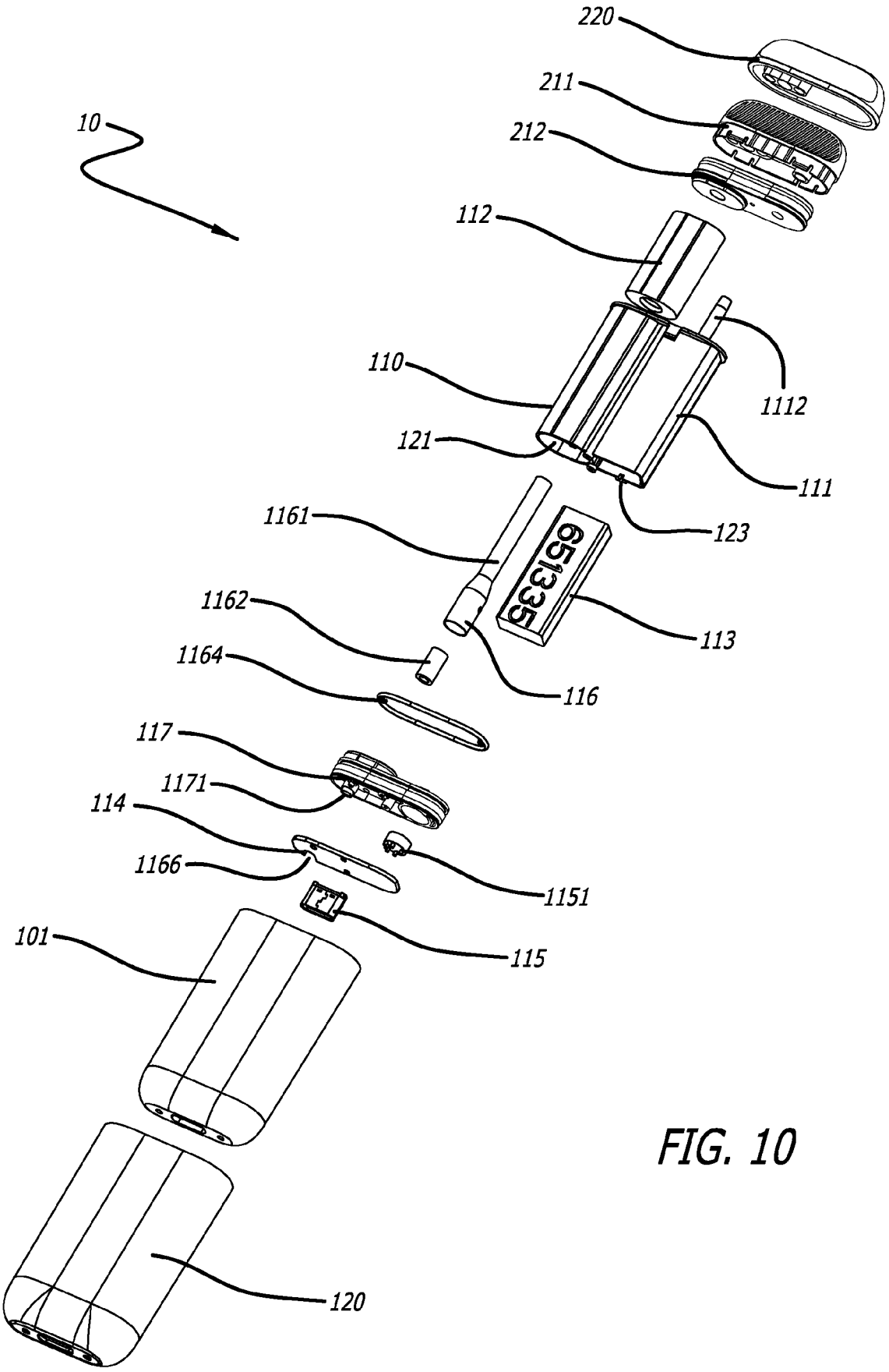
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FIG. 10

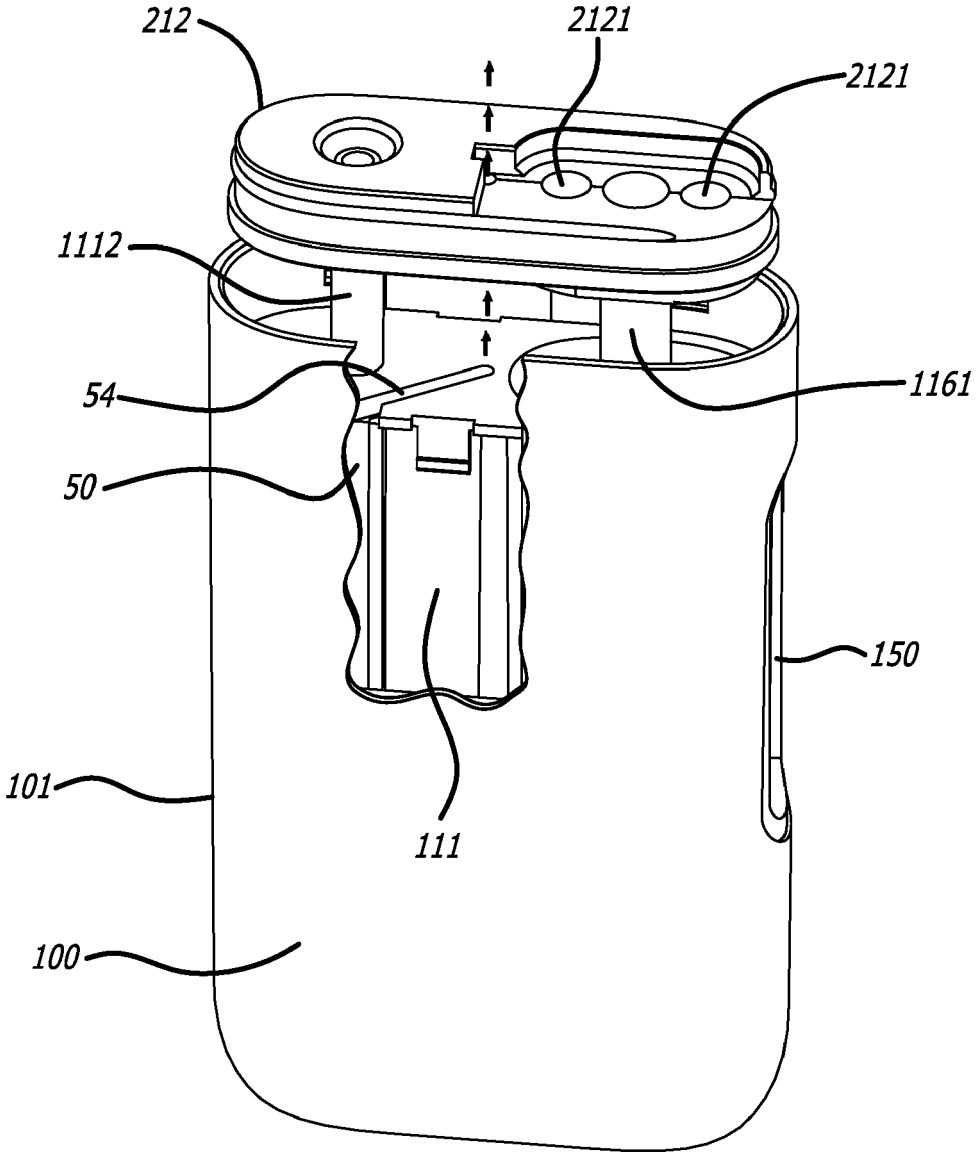

FIG. 11

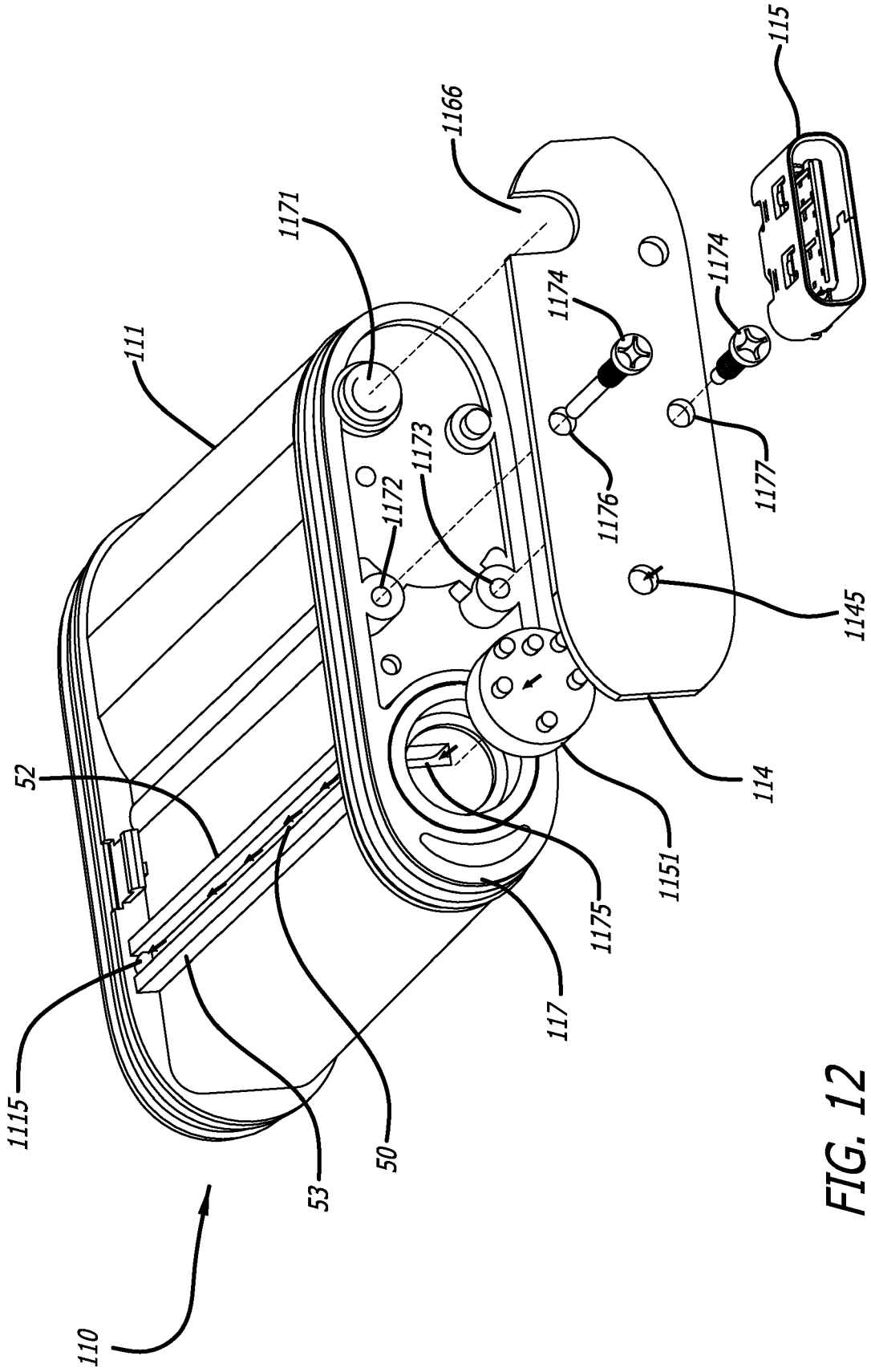
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FIG. 12

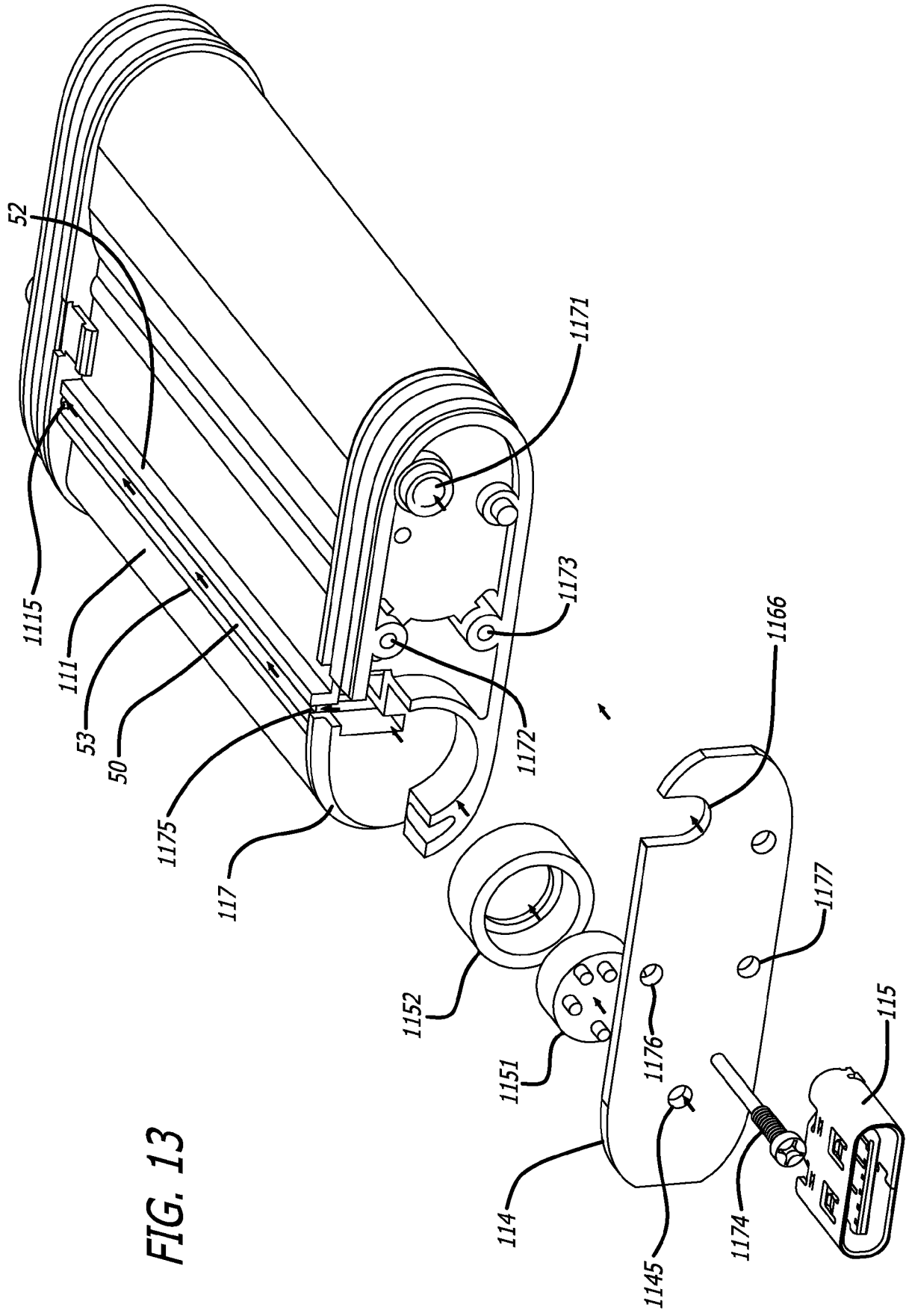
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FIG. 13

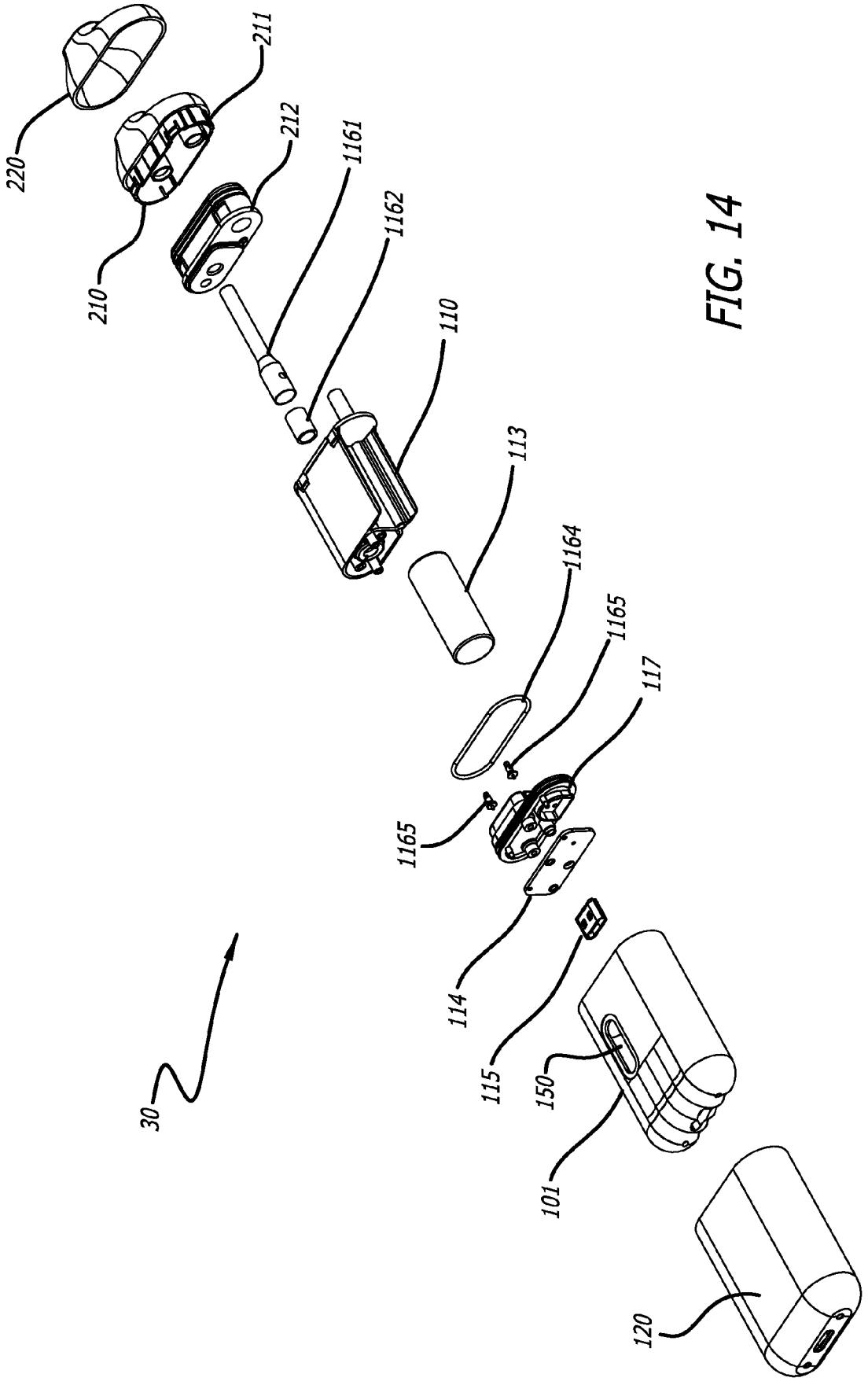
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FIG. 14

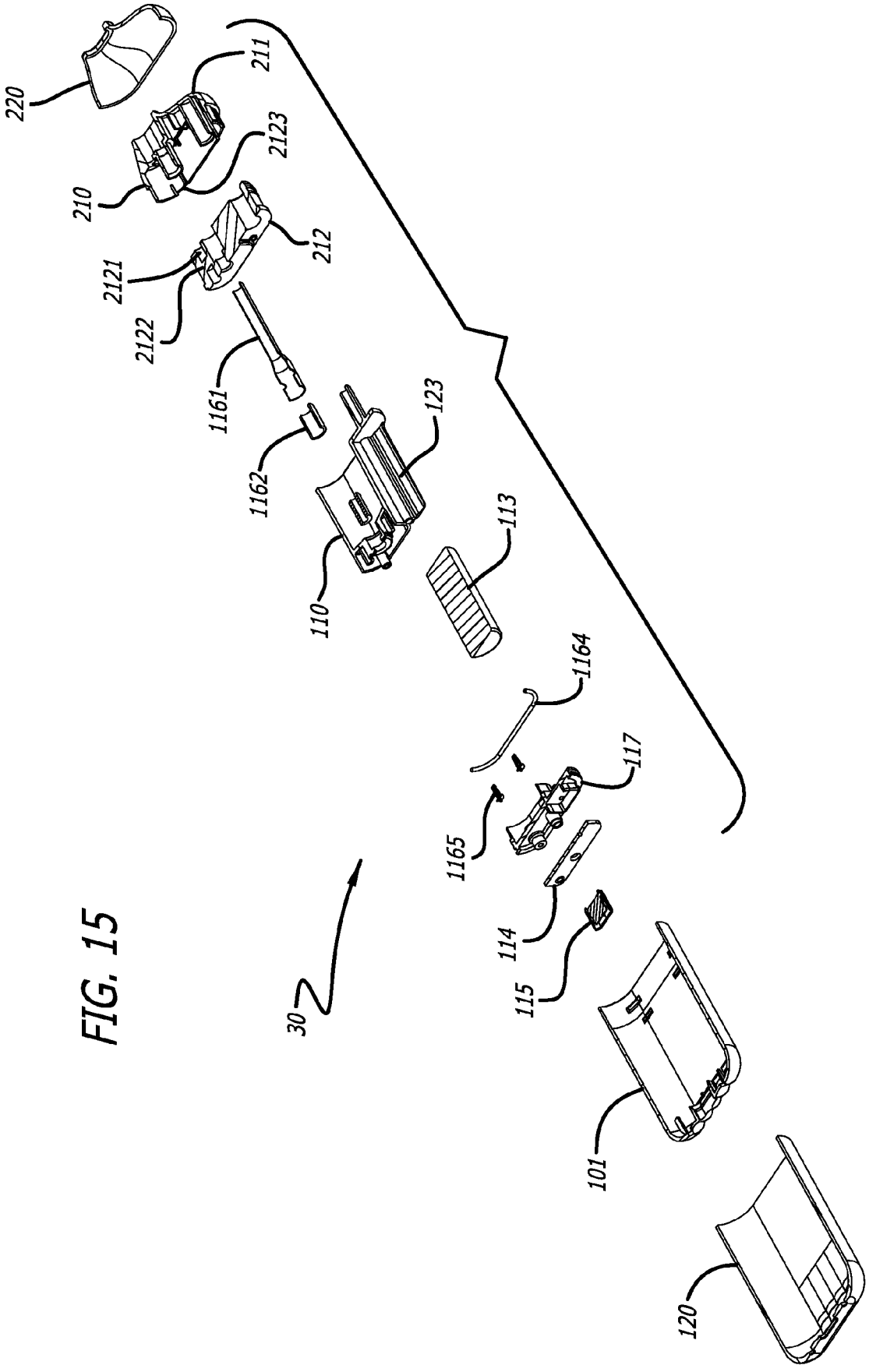
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FIG. 15

FIG. 16

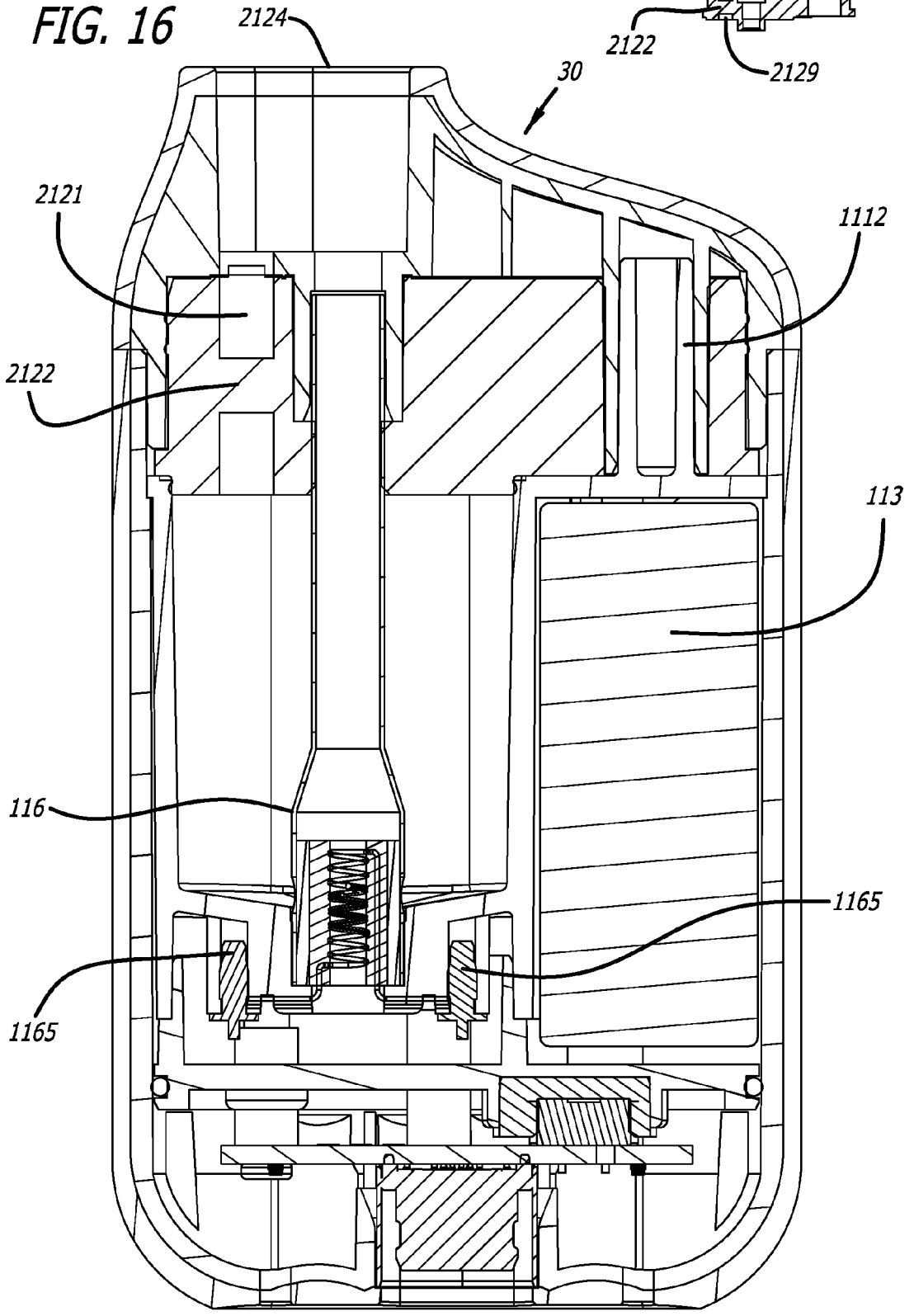
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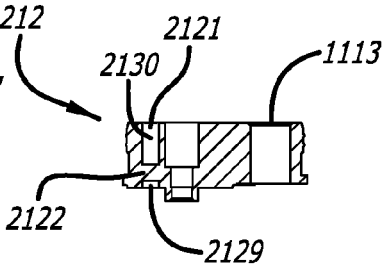
FIG. 17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EUROPEAN SEARCH REPORT

Application Number
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A	* paragraph [0098] - paragraph [0099]; figures 2,3,7 *	6	ADD. A24F40/10
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 March 2024	Sodtke, Christof

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