(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 458 171 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **24174148.7**

(22) Date of filing: **03.05.2024**

(51) International Patent Classification (IPC):
A24F 40/10 *(2020.01)* ***A24F 40/30*** *(2020.01)*
A24F 40/40 *(2020.01)* *A24F 40/42* *(2020.01)*

(52) Cooperative Patent Classification (CPC):
A24F 40/40; A24F 40/10; A24F 40/30; A24F 40/42

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

(30) Priority: **04.05.2023 US 202318143438**

(71) Applicant: **Next Level Ventures LLC**
Seattle, Washington 98121 (US)

(72) Inventor: **HWANG, Steven**
Seattle, 98121 (US)

(74) Representative: **Dentons UK and Middle East LLP**
One Fleet Place
London EC4M 7WS (GB)

(54) **COMBINABLE AND ORIENTABLE VAPORIZING DEVICES**

(57) A vaporizing device (100) includes a center post (45), a cartridge (40) with a hollow interior to receive the center post (45) and an oil, a connectable to the cartridge (40), and a mouthpiece (30) connectable to a proximal end (47) of the center post (45) and a proximal end (42) of the cartridge (40). The mouthpiece (30) may include a body (31) having a substantially planar face and a curved face opposite the substantially planar face, where the curved face tapers to meet the substantially planar face at a proximal end (32) of the body (31), and the curved face together with the substantially planar face form a vapor outlet (38). A cut-away (34) defined in a distal edge of the body (31) of the mouthpiece (30) may be complementary to an extension (14) of an external housing (10) of the vaporizing device (100). The mouthpiece (30) also includes an internal vapor pathway (39) defined within the body (31), the internal vapor pathway (39) being offset from the center post (45).

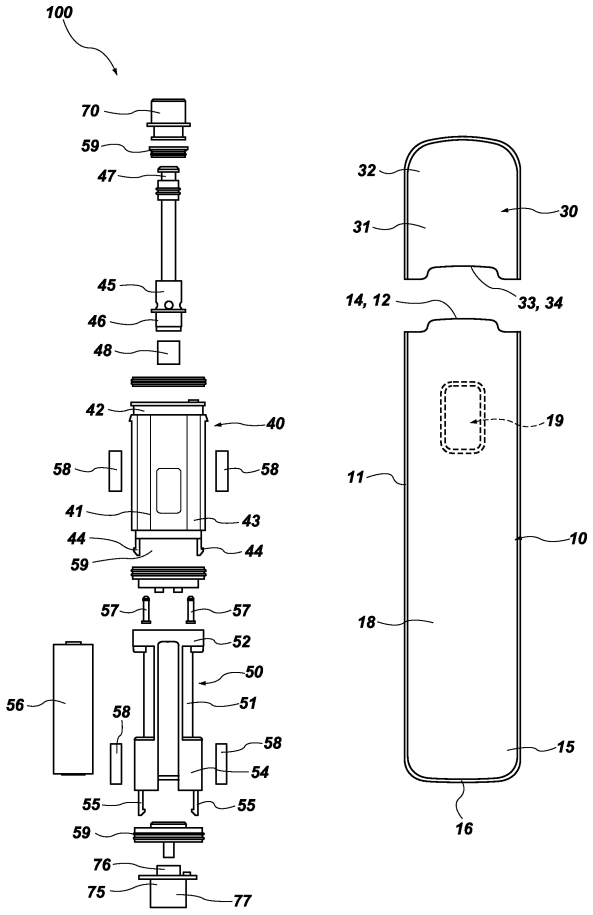

FIG. 3

EP 4 458 171 A1

Description

FIELD OF THE INVENTION

[0001] This invention relates generally to the field of vaporizing devices, and more particularly, to combinable and orientable (e.g., reversible) vaporizing devices.

BACKGROUND

[0002] Various vaporizing devices, including electronic cigarettes (E-Cigarettes), vaporizing devices, and electronic vaporizers, can be used to create vapor to inhale different materials. Electronic vaporizing devices typically include an atomizer, a power source, a liquid or oil to be vaporized (e.g., tobacco, an aerosol source, a flavor source, etc. or some combination thereof), and a mouthpiece. The power source (e.g., batteries) is often rechargeable from a wall outlet or charging port (e.g., USB, USB-C ports, etc.). The batteries power the atomizer, which in turn heats the oil to its vaporizing point, releasing inhalable vapors through the mouthpiece.

[0003] E-Cigarettes are marketed as a low-cost alternative to cigarette smoking and as having reduced harmful effects. As such, oils used in E-Cigarettes typically include nicotine, either alone or in combination with other substances, such as cannabinoids. In many vaping device, the oil is included in a pre-filled cartridge requiring replacement when empty. In other E-Cigarettes (e.g., oil vaporizers) the oil or liquid (e.g., e-juice or e-liquid) is contained in a pre-filled reservoir. When using pre-filled cartridges or reservoirs, concentrations of substances in the oil are typically fixed. Some vaping devices are designed to be disposable and are not re-fillable.

[0004] Many conventional E-cigarettes or vaporizing devices are constructed from cheap components, which can easily break during use and/or assembly of the vaporizing devices. Further, complicated vaporizing devices can be difficult to assemble, resulting in higher rates of defects in the manufacturing process. Additionally, poor manufacturing can result in exposed wiring of the vaporizing devices, increasing the hazard in using the vaporizing devices. Poor manufacturing can also result in bad soldering of electrical connections, resulting in vaporizing devices that do not work and/or clog quickly, due to insufficient heating and vaporization of the oil or liquid contained in the cartridge.

SUMMARY OF DISCLOSURE

[0005] The present disclosure addresses these and other problems associated with vaporizing devices. In some configurations, disclosed vaporizing devices include a center post having a central lumen extending between a distal end and a proximal end of the center post, and a cartridge having a hollow interior for receiving the center post and an oil to be vaporized. The cartridge may additionally include at least one pair of magnets embedded within opposing sides of the cartridge.

[0006] The vaporizing devices can further include a sled connectable to the cartridge, where the sled is for receiving a plurality of operating components, and a mouthpiece connectable to the proximal end of the center post and a proximal end of the cartridge.

[0007] In some configurations, the mouthpiece includes a body having a substantially planar face and a curved face opposite the substantially planar face, where the curved face tapers to meet the substantially planar face at a proximal end. A vapor outlet may be formed at the proximal end of the mouthpiece, where the curved face tapers to meet the substantially planar face.

[0008] In some configurations, the mouthpiece also includes a cut-away defined in a distal edge or end of the body of the mouthpiece, where the cut-away can be complementary to an extension of an external housing of the vaporizing device. The mouthpiece may additionally include an internal vapor pathway defined within the body of the mouthpiece. In some configurations, the internal vapor pathway is laterally offset from the central lumen of the center post, such that vapor produced from the oil travels proximally through the central lumen of the center post, offset through the internal vapor pathway, and out of the vapor outlet at the proximal end of the mouthpiece to be inhaled by a user.

[0009] In some configurations, disclosed vaporizing devices include an external housing having a proximal end and a distal end with a body extending therebetween. In some configurations, the proximal end of the external housing includes an extension. The vaporizing devices further include a mouthpiece connectable to the external housing, with a distal edge of the mouthpiece including a cut-away matching the extension of the proximal end of the external housing. In other configurations, the mouthpiece includes the extension and the external housing includes the cut-away matching the extension of the mouthpiece.

[0010] The external housing includes a body having a substantially planar face and a curved face opposite the substantially planar face. When the external housing is connected to the mouthpiece, the substantially planar face of the external housing is co-planar with the substantially planar face of the mouthpiece.

[0011] The distal end of the external housing can include an inner edge and a pair of feet, where the inner edge together with the pair of feet form a tripod allowing the vaporizing device to be vertically oriented with the tripod resting on or against a surface (e.g., a table).

[0012] Also disclosed are sleds to be used with disclosed vaporizing devices and for holding various operating or other components. In some configurations, disclosed sleds include a body defining a compartment to receive a battery, a distal end of the body comprising protrusions for mating with a base and a proximal end of the body comprising indentations for mating with distal prongs of a cartridge of the vaporizing device. The sled may additionally include at least one pair of magnets em-

bedded within opposing sides of the body, and at least one pair of electrodes disposed within opposing sides of the body. In some configurations, the at least one pair of electrodes provide power from the battery to an atomizer of the vaporizing device.

[0013] In some configurations, a vaping system includes a first vaporizing device having a first external housing and a first mouthpiece attachable to the first external housing, where the first external housing includes a first substantially planar face. The vaping system also includes a second vaporizing device having a second external housing and a second mouthpiece attachable to the second external housing, where the second external housing includes a second substantially planar face. In some configurations, the second substantially planar face of the second vaporizing device is magnetically attachable to the first substantially planar face of the first vaporizing device in a plurality of configurations, and the first vaporizing device has a footprint that matches a footprint of the second vaporizing device.

[0014] Also disclosed are methods of manufacturing vaporizing devices. In some embodiments, disclosed methods can include selecting a core of a mold, the core comprising a front side and a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of the mold opening and closing. The methods can also include selecting a cavity of the mold, the cavity comprising a front side and a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of the mold opening and closing. In some embodiments, the methods further include inserting the core into the cavity, forming a space between the core and the cavity, injecting a material into the space between the core and the cavity, and allowing the material to cool and solidify. The material can then be ejected from the mold.

[0015] In some embodiments, disclosed methods include selecting a core, the core comprising a front side and a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of a mold opening and closing. The methods may also include selecting a cavity including a first portion with a front side and a second portion with a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of the mold opening and closing. In some embodiments, the methods further include inserting the core into the cavity, forming a space between the core and the cavity, injecting a material into the space between the core and the cavity, and allowing the material to cool and solidify. The methods can also include removing the first portion of the cavity vertically from the core and removing the second portion of the cavity laterally from the core.

[0016] In some configurations, a vaping system includes a first vaping device having a first mouthpiece and a second vaping device having a second mouthpiece. The system may additionally include a connector connecting the first vaping device and the second vaping device in multiple configurations. A first configuration may allow the first vaping device to be connected to the second vaping device such that the first mouthpiece is adjacent to the second mouthpiece to allow a user to simultaneously draw from the first vaping device and the second vaping device. A second configuration may allow the first vaping device to be connected to the second vaping device such that the first mouthpiece is not adjacent to the second mouthpiece to allow the user to draw from the first vaping device and the second vaping device separately.

[0017] In some configurations, the connector is integral to a body of the first vaping device, and/or a body of the second vaping device. In one embodiment, the body of the first vaping device includes a substantially flat side in connection with a magnet (i.e., the connector), and the body of the second vaping device includes a substantially flat side in connection with a magnet (i.e., the connector). In the first configuration, the substantially flat side of the first vaping device is magnetically connected to the substantially flat side of the second vaping device.

[0018] According to another aspect, the first configuration allows a user to simultaneously draw from the first vaping device and the second vaping device because a first, proximal end of the first vaping device is connected to the first, proximal end of the second vaping device. The second configuration allows the user to draw from the first vaping device and the second vaping device separately, because the first, proximal end of the first vaping device is connected to a second, distal end of the second vaping device.

[0019] According to yet another aspect, a vaping system can include a vaporizing device having a body extending between a first end and a second end, the first end having a mouthpiece. In some configurations, the body has a substantially planar side having a magnet for attaching the substantially planar side of the body to another surface.

[0020] The system can also include a second vaporizing device having a body extending between a first end and a second end. The magnet for attaching the substantially planar side of the body of the vaporizing device to another surface includes a magnet for attaching the substantially planar side of the body to the second vaporizing device in multiple configurations. The magnet can have a first configuration allowing the vaporizing device including a first mouthpiece to be connected to the second vaporizing device including a second mouthpiece such that the first mouthpiece is adjacent to the second mouthpiece, allowing a user to simultaneously draw from the vaporizing device and the second vaporizing device. The magnet can have a second configuration allowing the vaporizing device to be connected to the second vaporizing device such that the first mouthpiece is not adjacent to the second mouthpiece, allowing the user to draw from the vaporizing device and the second vaporizing device separately.

BRIEF DESCRIPTION OF DRAWINGS

[0021] The drawings are illustrative and not limiting of the scope of the invention which is defined by the appended claims. Not every element of the disclosure can be clearly displayed in a single drawing, and as such not every drawing shows each element of the disclosure. The components in the drawings are not necessarily to scale relative to each other. Like reference numerals designate corresponding parts throughout the several views.

FIG. 1A is a perspective view of a vaporizing device according to the present disclosure, and FIG. 1B is a perspective view of the vaporizing device of FIG. 1A with an external housing removed.

FIG. 2A is a top view and FIG. 2B is a bottom view of the vaporizing device of FIGS. 1A and 1B.

FIG. 3 is an exploded view of a vaporizing device according to the present disclosure.

FIG. 4 is another top view of a vaporizing device according to the present disclosure.

FIG. 5 is a side view of the proximal end of a vaporizing device.

FIG. 6 is a top view of the proximal end of a vaporizing device.

FIG. 7 is a side view of the distal end of a vaporizing device.

FIG. 8 is a close-up top view of the distal end of a vaporizing device.

FIG. 9 is partial cut-away side view of the proximal end of a vaping system according to the present disclosure.

FIG. 10A is a perspective view and FIG. 10B is an end view of the distal end of the vaping system of FIG. 9.

FIGS. 11A-11C are side views of the vaping system of FIG. 9 in various combined configurations and orientations.

FIGS. 12A-12C illustrate various dimensions for vaporizing devices, according to the present disclosure.

FIG. 13 illustrates a perspective, cross-section view of a mold that is used according to one aspect of the disclosure.

FIG. 14 illustrates a perspective, cross-sectional view of a mold that is used according to yet another aspect of the disclosure.

FIGS. 15 and 16 are flowcharts of example methods of forming the mouthpiece of a vaping device, according to aspects of the present disclosure.

DETAILED DESCRIPTION

[0022] Users of vaporizing devices can customize their vaping experience in a variety of ways. Users can create custom pre-vapor formulations, use different vaporizing devices for vaporizing different liquids or oils (e.g., pre-vapor formulations), use vaporizing devices implementing different vaporizing techniques (conduction or convection), etc. Even with such vaporizing option variety, users continue to search for additional vaporizing device customization techniques and increasingly customized vaping experiences. However, some components of electronic vaporizing devices are not configurable and/or interchangeable with other electronic vaporizing devices. In fact, companies often create proprietary device components, proprietary pre-vapor formulations, etc. to lock users into their brand(s).

[0023] The present disclosure provides for combinable and orientable vaporizing devices. In this description and the following claims, "vaping devices" or "vaporizing devices" are defined to include any device (including vaporizers and E-cigarettes) configured to energize an atomizer (e.g., a heating element) to create heat and use the created heat (e.g., through conduction or convection) to transform a liquid or oil (e.g., pre-vapor formulation) into an inhalable vapor. Liquids or oils are defined to include e-juice, e-liquid, oils, tobacco, cannabis oils, dry herbs, botanical herbs, etc. A vaping device can also be a cartridge and not necessarily be capable of being vaped without connection to one or more of a battery, a heating element, an atomizer, a mouthpiece, etc.

[0024] FIG. 1A is a perspective view of a vaporizing device 100 according to the present disclosure. FIG. 1B is a perspective view of the vaporizing device 100 of FIG. 1A with an external housing 10 removed. In some configurations, the vaporizing device 100 includes an external housing 10 and a mouthpiece 30 connectable, attachable, or otherwise engageable with a proximal end 12 of the external housing 10. The external housing 10 includes a body 11 having a proximal end 12 and a distal end 15. The body 11 has a curved face 18 extending between the proximal and distal ends 12, 15, and a planar or substantially planar face 17 opposite the curved face 18.

[0025] The proximal end 12 of the external housing 10 includes an extension 14 at an edge of the proximal end 12. In some configurations, the extension 14 is a continuous extension of the proximal end 12 of the external housing 10. The extension 14 is sized and shaped to correspond, engage, or otherwise mate with a cut-away 34 of the mouthpiece 30. Specifically, the mouthpiece 30 includes a distal end or edge 33 which defines the cut-away 34, where the cut-away 34 is sized and shaped to match, correspond to, or mate with the extension 14. In other configurations, this engagement may be reversed such that the mouthpiece includes an extension and the proximal end 12 of the external housing 10 includes a cut-away.

[0026] Similar to the body 11 of the external housing 10, the mouthpiece 30 includes a body 31 having a curved face 36 and a planar or substantially planar face 35 opposite the curved face 36. In some configurations, the curved face 36 includes a lower portion 37a and an upper, tapered portion 37 that tapers to meet the planar face 35 at a proximal end 32 of the mouthpiece 30. In

some configurations, the tapered portion 37 may be biased. In some configurations, a proximal end 32 of the mouthpiece 30 defines a vapor outlet 38. In some configurations, the tapered portion 37 together with the planar face 35 defines the vapor outlet 38 at the proximal end 32.

[0027] In some configurations, the external housing 10 houses or otherwise receives a sled 50 and/or a cartridge 40. In some configurations, the sled 50 houses, receives, or otherwise carries a plurality of operating components for the vaporizing device 100. As illustrated in FIG. 1B, the sled 50 includes a body 51 with a proximal end 52 and a distal end 54. The body 51 may receive, or define a compartment to receive, a battery 56 or other power source for providing power (e.g., an electrical current) to an atomizer of the vaporizing device 100. The body 51 may also receive and/or contain one or more magnets 58. For example, two magnets 58 may be embedded (e.g., symmetrically or asymmetrically) within opposing sides of the body 51. In some configurations, the magnets 58 are for removably attaching the vaporizing device 100 to another vaporizing device 100. In other configurations, additional or fewer magnets can be embedded into the sled body 51.

[0028] In some configurations, the sled 50 also includes protrusions or prongs 55 extending from the distal end 54 for engaging with a base (see base 75 of FIGS. 3 and 10A-10B). The proximal end 52 may include or define indentations (not illustrated) to receive and/or engage with prongs 44 of the cartridge 40. In some configurations, the proximal end 52 receives a seal or gasket 59 to secure the cartridge 40 to the sled 50. Likewise, the distal end 54 of the sled 50 may receive a seal or gasket 59 to secure the sled 50 to, for example, a base. In some configurations, the gaskets 59 secure the cartridge 40 and/or the sled 50 within the body 11 of the external housing 10. In other configurations, the cartridge may be formed integrally to the tank rather than formed separately and attached to the tank.

[0029] The cartridge 40 may include or define a hollow interior (not illustrated) to receive, for example, liquid or oil to be vaporized by an atomizer (see atomizer 48 of FIG. 3). The hollow interior of the cartridge 40 may also receive a center post 45. In some configurations, the cartridge 40 includes a body 41 that may define the hollow interior, with the body 41 having a proximal end 42 and a distal end 43. In some configurations, the body 41 of the cartridge 40 receives or contains one or more magnets 58. The magnets 58 may be embedded within opposing sides of the body 41 of the cartridge 40 and may be for removably attaching the vaporizing device 100 to another vaporizing device 100.

[0030] The mouthpiece 30 may be connectable to a proximal end 47 of the center post 45. In some configurations, the mouthpiece 30 is connectable to the proximal end 47 of the center post 45 through a snap or locking sheath 70. U.S. Patent Application Nos. 18/092,722, entitled, "SHORT-CIRCUIT AND LEAK PROOF VAPORIZING DEVICES AND METHODS OF USE OR MANUFACTURE THEREOF," filed on January 3, 2023, and 17/967,054, entitled "MOUTHPIECE CONNECTORS FOR ELECTRONIC VAPING SYSTEMS AND METHODS OF MANUFACTURE," filed on October 17, 2022, contain examples of a snap or locking sheath 70 that may be used with the vaporizing device 100 of the present disclosure, the contents of both applications incorporated by reference herein. U.S. Provisional Patent Application Nos. 63/448,917, entitled, "CENTRAL LUMEN OF A VAPORIZING DEVICE HAVING A PLURALITY OF THROUGH-HOLES," filed on February 28, 2023, and 63/479,958, entitled, "VAPORIZING DEVICES WITH SATURATION CHARACTERISTICS," filed on January 13, 2023, contain examples of a center post 45 that may be used with the vaporizing devices 100 of the present disclosure, the contents of both applications incorporated by reference herein.

[0031] In some configurations, a cap can be provided for covering the mouthpiece 30. The cap may cover at least a portion of the body 11 and the mouthpiece 30.

[0032] FIG. 2A is a top view and FIG. 2B is a bottom view of the vaporizing device 100 of FIGS. 1A and 1B. The vaporizing device 100 includes the external housing 10 and the mouthpiece 30, and has a proximal end 102 and a distal end 104. The external housing 10 includes a body 11 having a curved front face 18 and a flat or planar back face 17 opposite the curved face 18. The mouthpiece 30 includes a body 31 having a curved front face 36, a tapered portion 37, and a planar back face 35. In some configurations, the planar back face 17 of the external housing 10 is co-planar or substantially co-planar with the planar back face 35 of the mouthpiece 30. As such, the back face of the device may form a substantially planar face, allowing the back face of the device to be connectable to another flat surface, or to another vaping device. The substantially planar face of the back face of the device also reduces any air gaps between two devices connected, as described in more detail below. The footprint of the device 100 (mouthpiece 30 connected to the body 11 of the external housing 10) may have a longitudinal plane of symmetry, such that the footprint of the device is identical whether the device has the mouthpiece facing upwardly or downwardly..

[0033] The planar back face 17 of the body 11 of the external housing 10 may include or define an indentation or window 19. In some configurations, the window 19 allows a user of the vaporizing device 100 to orient the vaporizing device 100 without looking at the device 100. Specifically, a user may feel or tactilely manipulate the window 19 to determine an orientation or configuration for the vaporizing device 100. In some configurations, the window 19 may permit a user to view a level of oil contained within the cartridge 40. The shape of the vaporizing device 100, with the substantially planar face, can also be used to orient the vaporizing device 100.

[0034] In some configurations, the body 11 of the external housing 10 is a cuboid or rectangular shape. For

example, the body 11 may have parallel opposing sides, giving rise to the footprint of the body 11. As before, the external housing 10 contains or otherwise houses the cartridge 40 and the sled 50. In some configurations, the body 31 of the mouthpiece 30 is a cuboid or rectangular shape.

[0035] In some configurations, the proximal end 12 of the body 11 of the external housing 10 mates with the distal end 33 of the mouthpiece 30. Specifically, the distal end 33 of the mouthpiece 30 is flush or substantially flush with the proximal end 12 of the body 11, such that the vaporizing device 100 has "zero draft," discussed in more detail below. The proximal end 12 of the body 11 includes an extension 14 that tightly mates and/or engages with the cut-away 34 of the distal end 33 of the mouthpiece 30.

[0036] In some configurations, the cut-away 34 includes two (2) cut-aways 34 disposed symmetrically about the mouthpiece 30. That is, in some configurations, the curved front face 36 includes or defines a cut-away 34 and the planar back face 35 includes or defines a cut-away 34. Concomitantly, in some configurations, the extension 14 includes two (2) extensions 14 disposed symmetrically about the body 11 of the external housing 10. That is, in some configurations, the curved front face 18 includes an extension 14 and the planar back face 17 includes an extension 14. In such configurations, both extensions 14 mate tightly with both cut-aways 34 to provide a tight fit and/or seal between the mouthpiece 30 and the body 11 of the external housing 10.

[0037] The distal end 15 of the body 11 of the external housing 10 includes a curved bottom edge 16. In some configurations, the curved bottom 16 is continuous with the curved front face 18. In some configurations, the curved bottom 16 is not continuous with the planar face 17 and forms an edge 22 where the curved bottom 16 meets the planar face 17 (see FIGS. 7 and 10A-10B).

[0038] The external housing 10, the cartridge 40, and/or the sled 50 may receive, house, or otherwise contain one or more magnets 58. In some configurations, the vaporizing device 100 includes four (4) magnets 58. In some configurations, two magnets 58 may be disposed near the proximal end 12 and two magnets 58 may be disposed near the distal end 15 of the body 11 of the external housing 10. In some configurations, two magnets 58 may be attached to opposing sides of the sled 50 and two magnets 58 may be attached to opposing sides of the cartridge 40. The magnets 58 may be for removably attaching a first vaporizing device 100 to a second vaporizing device 100 in a plurality of configurations. In some configurations, the magnets 58 are disposed about the vaporizing device 100 according to polarity, such that at least two pairs of North/South magnets 58 are aligned with each other (see FIG. 4).

[0039] FIG. 3 is an exploded view of a vaporizing device according to the present disclosure. As before, in some configurations, the vaporizing device 100 includes the external housing 10 and the mouthpiece 30 connectable, attachable, or otherwise engageable with a proximal end 12 of the external housing 10. The external housing 10 includes the body 11 having a proximal end 12 and a distal end 15. The proximal end 12 of the external housing 10 includes the extension 14 at an edge of the proximal end 12. In some configurations, the extension 14 is a continuous extension of the proximal end 12 of the external housing 10. The extension 14 is sized and shaped to correspond, engage, or otherwise mate with a cut-away 34 of the mouthpiece 30. Specifically, the mouthpiece 30 includes the distal end or edge 33 which defines the cut-away 34, where the cut-away 34 is sized and shaped to match or mate with the extension 14. That is, the extension 14 and cut-away 34 are complementary to each other.

[0040] In some configurations, the external housing 10 houses or otherwise receives a sled 50 and a cartridge 40. As before, the sled 50 includes a body 51 with a proximal end 52 and a distal end 54. The body 51 may receive a battery 56 or other power source for providing power (e.g., an electrical current) to an atomizer 48 of the vaporizing device 100. For example, in some configurations, the body 51 of the sled 50 also receives or contains one or more electrodes 57 (e.g., an anode and a cathode). The battery 56 may provide power or electrical current to the one or more electrodes 57 to, thereby, power the atomizer 48.

[0041] The body 51 may also receive and/or contain one or more magnets 58. For example, two magnets 58 may be symmetrically embedded within opposing sides of the body 51. In some configurations, the magnets 58 are for removably attaching the vaporizing device 100 to another vaporizing device 100. In some configurations, the magnets 58 may allow the vaporizing device 100 to be attached to another magnetic surface, such as a fridge.

[0042] The sled 50 may also include protrusions or prongs 55 extending from the distal end 54 of the body 51 for engaging with a base 75. In some configurations, a proximal end 76 of the base 75 includes one or more indentations (not illustrated) to receive and engage the prongs 55 of the sled 50. The sled 50 and base 75 may be connected in any other suitable manner, or may be formed integrally. The base 75 may also have a distal end 77, which, in some configurations, may define a port, such as a charging port (see port 78 of FIGS. 10A-10B). The distal end 77 may include a USB connector, a printed circuit board, and/or a microphone to trigger activation of the core. The proximal end 52 of the sled 50 may include or define indentations (not illustrated) to receive and/or engage with prongs 44 of the cartridge 40. The sled 50 and cartridge 40 may be connected in any other suitable manner, or may be formed integrally. In some configurations, the proximal end 52 receives a gasket 59 to secure and seal the cartridge 40 to the sled 50. Likewise, the distal end 54 of the sled 50 may receive a gasket 59 to secure the sled 50 to, for example, the base 75. In some configurations, the gaskets 59 secure the cartridge 40 and/or the sled 50 within the body 11 of the external

housing 10.

[0043] The cartridge 40 may include or define a hollow interior (not illustrated) to receive, for example, liquid or oil to be vaporized by the atomizer 48. The hollow interior of the cartridge 40 may also receive a center post 45. In some configurations, the cartridge 40 includes a body 41 that may define the hollow interior, with the body 41 having a proximal end 42 and a distal end 43. In some configurations, the body 41 of the cartridge 40 receives or contains one or more magnets 58. For example, the magnets 58 may be embedded within opposing sides of the body 41 of the cartridge 40 and may be for removably attaching the vaporizing device 100 to another vaporizing device 100. Additionally, and/or alternatively, the magnets 58 may attach the vaporizing device 100 to a magnetic surface, such as a fridge, table, etc.

[0044] The center post 45 may have a distal end 46 and a proximal end 47. In some configurations, the proximal end 47 includes a plurality of ridges of flanges to engage with or receive a gasket 59. In some configurations, the plurality of ridges at the proximal end 47 of the center post 45 engage or receive a snap or locking sheath 70. In some configurations, the locking sheath 70 facilitates a connection between the mouthpiece 30 and the proximal end 47 of the center post 45. In some configurations, the locking sheath 70 facilitates a connection between the mouthpiece 30 and the proximal end 42 of the cartridge 40. In some configurations, a gasket 59 is received by the proximal end 47 of the center post 45 and the locking sheath 70 is received by the gasket 59. In some configurations, a gasket 59 is received by the proximal end 47 of the center post 45 and the locking sheath 70 is disposed on or abuts the gasket 59.

[0045] In some configurations, the locking sheath 70 provides a one-way press-fit connection of the mouthpiece 30 to the proximal end 47 of the center post 45. Such a one-way press-fit connection may (i) ensure the mouthpiece 30 cannot be removed from the vaporizing device 200 and (ii) serve as a child-lock or tamper-proof lock. In some configurations, additional gaskets 59 may be included to securely fit the mouthpiece 30 to the center post 45, the cartridge 40, and/or the external housing 10.

[0046] The distal end 46 of the center post 45 may define a cavity (not illustrated) to house or otherwise receive the atomizer 48. U.S. Provisional Patent Application No. 63/443,906, entitled, "CERAMIC VAPING CORE WITH SURFACE TREATMENT," filed on February 7, 2023, provides examples of atomizers 48 that may be used in conjunction with the vaporizing devices 100, the entire contents of which are herein incorporated by reference. The body 51 of the sled 50 may house, receive, and/or contain one or more electrodes 57, and may house, receive, and/or contain the one or more electrodes 57 such that the one or more electrodes 57 are in electrical communication with the atomizer 48. In some configurations, the electrical communication may be established due to a size (e.g., length) and shape of the one or more electrodes 57. In some configurations, the electrical communication may be established due to a size (e.g., length) and shape of the distal end 46 of the center post 45.

[0047] In some configurations, the one or more electrodes 57 are disposed near the proximal end 52 of the sled 50 and the atomizer 48 is disposed in the distal end 46 of the center post 45, where the distal end 46 of the center post 45 may be in proximity to the proximal end 52 of the sled 50. In some configurations, the atomizer 48 includes wires or other means of electrical connection to the one or more electrodes 57. In such configurations, any wiring to facilitate an electrical connection between the atomizer 48 and the one or more electrodes 57 is entirely contained within the body 51 of the sled 50, such that there is no exposed wiring of the vaporizing device 100. The wiring connections can all be formed on the sled 50, and then the sled 50 can be inserted into the body 11. This can reduce manufacturing errors and faults due to wiring.

[0048] FIG. 4 is another top view of a vaporizing device 100 according to the present disclosure. Illustrated in FIG. 4 is one embodiment of a disposition of the magnets 58 throughout the vaporizing device 100. Specifically, a first pair of magnets 58a may be disposed near the proximal end 12 of the external housing 10 (such as on opposing sides of the cartridge). Such placement may correspond to the proximal end 42 of the body 41 of the cartridge 40. A second pair of magnets 58b may be disposed near the distal end 15 of the external housing 10. Such placement may correspond to the distal end 54 of the body 51 of the sled 50. Each pair of magnets 58a, 58b includes a positive magnet (e.g., a south pole) and a negative magnet (e.g., a north pole). In some configurations, such as illustrated in FIG. 4, the first pair of magnets 58a is disposed in a first configuration that is opposite the second pair of magnets 58b, which are disposed in a second configuration. In some configurations, the first configuration may be the same as the second configuration. In other configurations, more or fewer magnets can be used.

[0049] In some configurations, the vaporizing device 100 is removably attachable to another, second vaporizing device 100. In some configurations, the vaporizing device 100 is magnetically attachable to another, second vaporizing device 100. The second vaporizing device 100 may be substantially identical to the first vaporizing device 100 (e.g., including an external housing 10, a mouthpiece 30, etc.). For example, each pair of magnets 58a, 58b in the first vaporizing device 100 can attract or magnetically couple to a first and second pair of magnets 58a, 58b of a second vaporizing device 100. The pairs of magnets 58a, 58b of the second vaporizing device 100 also include a positive magnet (e.g., a south pole) and a negative magnet (e.g., a north pole). The configuration of the positive and negative magnets 58 of the second vaporizing device 100 can be opposite to the configuration of the positive and negative magnets 58 of the first vaporizing device 100, such that the second vaporizing device

100 can magnetically attach to the first vaporizing device 100. As discussed more fully below, a planar face 17 of the second vaporizing device 100 attaches to the planar face 17 of the first vaporizing device 100.

[0050] In some configurations, the vaporizing device 100 is substantially cuboid or rectangular. In some configurations, a length of the vaporizing device 100 ranges from about 100 mm to about 110 mm, such as 102, 103, 103.5, 104, 104.5, 105, 107, 109 mm or a length within a range defined by any two of the foregoing values. In some configurations, a width of the vaporizing device 100 ranges from about 15 mm to about 25 mm, such as 16, 18, 20, 20.4, 20,5, 22, 22.5, 23 mm, or a width within a range defined by any two of the foregoing values. In some configurations, a depth of the vaporizing device 100 (i.e., a distance between the curved front face 18 and the planar back face 17) ranges from about 10 mm to 15 mm, such as 12, 12.5, 13, 13.5, 14 mm or a depth within a range defined by any two of the foregoing values.

[0051] FIG. 5 is a side view and FIG. 6 is a top view of the proximal end 102 of the vaporizing device 100. The proximal end 102 of the vaporizing device 100 generally includes the mouthpiece 30 and the proximal end 12 of the body 11 of the external housing 10. As before, the proximal end 12 of the body 11 includes the extension 14 that matches, complements, and/or mates with the cut-away 34 of the distal end 33 of the mouthpiece 30.

[0052] As clearly visible in FIG. 5, the body 31 of the mouthpiece 30 joins the body 11 of the external housing 10. Specifically, the body 31 joins the body 11 at substantially a 90° angle (e.g., an angle ranging from 85° to 95°); that is, the mouthpiece joins the body 11 to create a substantially 90° angle where the two pieces are joined together. This is, in part, due to the co-planar nature and relationship of the planar back face 35 of the mouthpiece 30 and the planar back face 7 of the body 11. Additionally, the distal end 33 of the mouthpiece 30 is substantially square or rectangular, matching a substantially square or rectangular shape of the proximal end 12 of the body 11 of the external housing 10. Thus, the mouthpiece 30 and the body 11 both include right-angled or substantially right-angled portions where the mouthpiece 30 adjoins the body 11. This ensures a tight fit between the mouthpiece 30 and the body 11.

[0053] The proximal end 32 of the mouthpiece 30 includes a vapor outlet 38. In some configurations, the vapor outlet 38 may be positioned towards a first edge of the mouthpiece, such as closer to the back planar face 35 than the curved front face 36.

[0054] As clearly visible in FIG. 6, the mouthpiece 30 attaches or connects to the proximal end 12 of the body 11. In some configurations, the mouthpiece 30 attaches to the body 11 such that the curved face 36 of the mouthpiece 30 is flush or substantially flush with the curved face 18 of the body 11 of the external housing 10. The proximal end 12 of the body 11 and the distal end 33 of the mouthpiece 30 are tightly fit together all along a perimeter of the proximal end 12 and the distal end 33. In some configurations, the extension 14 "clicks in" to the cut-away 34, or is otherwise press-fit or interference fit.

[0055] The engagement of the extension 14 and the cut-away 34 facilitates proper alignment of the mouthpiece 30 and the external housing 10 when capping the vaporizing device 100 with the mouthpiece 30. Additionally, engagement of the extension 14 and the cut-away 34 reduces off-centered pressures from being applied to the center post 45 during capping of the vaporizing device 100 with the mouthpiece 30. If off-center pressure is applied to the center post 45 during capping, the center post 45 may be pushed out of alignment within the cartridge 40 and/or the external housing 10 of the vaporizing device 100. This can result in a blocked vapor flow pathway or a user receiving insufficient hits from the vaporizing device 100. Additionally, if off-center pressure is applied to the center post 45, the center post 45 may be bent or broken, rendering the entire vaporizing device 100 unfit for use.

[0056] The tight-fitting nature of the mouthpiece 30 and the proximal end 12 of the body 11 ensures that the vaporizing device 100 has a substantially planar back surface. That is, the mouthpiece 30 and the body 11 are co-planar. This co-planar connection ensures a substantially planar back surface of the vaporizing device 100, to allow the vaporizing device to be connected to a second vaporizing device with a tight seal between the two devices. This tight fit between the two vaping devices ensures that little or no air is drawn from between the two devices when they are vaped together or at the same time. This seal beneficially ensures that air flows through the vaporizing device 100 only in desired pathways (such as through a central lumen of the center post 45). This seal also beneficially ensures that users of the vaporizing device 100 get a full or proper hit of vapor produced by the vaporizing device 100. This is because the tight seal prevents outside air from entering a vapor flow path and diluting the hit received by the user.

[0057] FIG. 7 is a side view and FIG. 8 is a close-up top view of the distal end 104 of a vaporizing device 100. Specifically, FIGS. 7-8 illustrate a tripod 20 formed at or integrated into the distal end 15 of the external housing 10 (corresponding to the distal end 104 of the vaporizing device 100). In some configurations, the tripod 20 includes feet 21 (only one foot 21 is seen in the side view of FIG. 7; FIG. 8 shows two feet 21) and an inner edge 22. The feet 21 and inner edge 22 extend distally from the curved bottom 16 to form the tripod 20. The tripod 20 allows the vaporizing device 100 to be set vertically on a surface (e.g., a table), such that the tripod 20 rests against the surface. A line L in FIGS. 7-8 approximate a surface, illustrating that the curved bottom 16 does not rest against the line L.

[0058] That is, only the elements of the tripod 20 (e.g., the feet 21 and inner edge 22) rest against the line L (or surface). The tripod 20 allows the vaporizing device 100 to be vertically oriented and stable on the surface. Specifically, the tripod 20 imparts greater stability to a verti-

cally oriented vaporizing device 100 than would a purely flat bottom. This is because the configuration of the tripod 20 can balance the center of gravity of the vaporizing device 100 by having three points of contact against a surface (e.g., two feet 21 and the inner edge 22). Allowing the device to have a vertical orientation can ensure that the atomizer remains saturated, that no oil flows out, reduce dry hits, and improve the quality of the vaping user experience.

[0059] In some configurations, a length or height of each foot 21 ranges from about 0.4 mm to about 1 mm, such as 0.5, 0.6, 0.7, 0.8, 0.9 mm or a length/height within a range defined by any two of the foregoing values. In some configurations, a distance between the feet 21 ranges from about 8 mm to about 10 mm, such as 8.5, 9, 9.4, 9.5, 9.7 mm or a distance within a range defined by any two of the foregoing values. In some configurations, a distance between the inner edge 22 and the feet 21 ranges from about 6 mm to about 9 mm, such as 6.5, 7, 7.5, 7.9, 8, 8.5 mm or a distance within a range defined by any two of the foregoing values.

[0060] In FIG. 8, the base 75, in phantom, can be seen housed within the distal end 104 of the vaporizing device 100. The distal end 77 of the base 75 may be flush with the curved bottom 16 of the distal end 15 of the external housing 10 and, like the curved bottom 16, form no part of the tripod 20.

[0061] FIG. 9 is partially cut-away side view of a proximal end 202 of a vaping system 200 according to the present disclosure. The mouthpiece 30 and body 31 have been cut-away on the second vaporizing device 208 to clearly show internal structures. The vaping system 200 includes a first vaporizing device 206 and a second vaporizing device 208 attached, connected, or otherwise joined to the first vaporizing device 206. In some configurations, the first vaporizing device 206 is identical or substantially identical to the second vaporizing device 208. In some configurations, the first vaporizing device 206 is a mirror image of or substantially a mirror image of the second vaporizing device 208. The first and/or second vaporizing devices 206, 208 may be the vaporizing device 100 of FIGS. 1A-8 (i.e., the first and/or second vaporizing devices 206, 208 may each be the vaporizing device 100 of FIGS. 1A-8).

[0062] Specifically, the first vaporizing device 206, like the vaporizing device 100, includes an external housing 10 having a body 11 with a proximal end 12 and a distal end 15. The first vaporizing device 206 also includes a mouthpiece 30 attachable or connectable to the proximal end 12 of the body 11. For example, the mouthpiece 30 may include a body 31 that defines a cut-away 34 in a distal end 33 of the mouthpiece 30. The cut-away 34 may correspond to an extension 14 of the proximal end 12 of the body 11 of the external housing 10. The body 11 of the external housing 10 has a curved front face 18 and a planar back face 17 (not illustrated) opposite the curved front face 18. The second vaporizing device 208 may be identical to and include all the elements of the first vaporizing device 206.

[0063] As such, in the vaping system 200 of FIG. 9, the planar back face 17 of the first vaporizing device 206 abuts and/or interfaces with the planar back face 17 of the second vaporizing device 208. Additionally, the planar back face 35 of the first vaporizing device 206 abuts and/or interfaces with the planar back face 35 of the second vaporizing device 208. As the devices 206, 208 are adjoined, neither the planar back face 17 nor the planar back face 35 are visible. As before, the planar back face 17 of the external housing 10 is co-planar or substantially co-planar with the planar back face 35 of the mouthpiece 30, for each of the first and second vaporizing devices 206, 208. Thus, when the first and second vaporizing devices 206, 208 are joined together, there are no gaps (or substantially no gaps) between the bodies 11 and the mouthpieces 30 of each device 206, 208. In some configurations, the bodies 11 of the external housings 10 for each of the first and second vaporizing devices 206, 208 may include beveled or rounded edges, to increase an ergonomic feel of the devices 206, 208. Such rounded edges may be extensions or continuous with the curved front faces 18. However, the connection between the planar back faces 17 of the first and second vaporizing devices 206, 208 may be flush, or substantially flush, with no gaps between the planar back faces 17.

[0064] The first and second vaporizing devices 206, 208 may be attachable to each other via one or more magnets (e.g., magnets 58) disposed throughout the bodies 11 of the external housings 10 of each of the first and second vaporizing devices 206, 208. The magnets 58 may be disposed, contained, or embedded in a sled and/or a cartridge of the devices 206, 208. For example, as discussed with respect to FIG. 4, each of the first and second vaporizing devices 206, 208 may includes two pairs of magnets 58a, 58b. The polarity of each pair of magnets 58a, 58b in the first and second vaporizing devices 206, 208 may be oriented such that the pairs of magnets 58a, 58b of the first vaporizing device 206 magnetically attract and/or attach to the pairs of magnets 58a, 58b of the second vaporizing device 208. This may be true even if the first and second vaporizing devices 206, 208 are substantially identical. That is, the polarity of each pair of magnets may be arranged such that the two vaping devices connect to each other without requiring a first type of device with a first polarity and a second type of device with a second type of polarity (i.e. an "A" device and a "B" device). In some configurations, the strength of the magnets 58 tightly holds or connects the first vaporizing device 206 to the second vaporizing device 208.

[0065] In some configurations, the first vaporizing device 206 includes a first mouthpiece 30 with a vapor outlet 38 positioned towards a first edge of the first mouthpiece 30. The second vaporizing device 208 may include a second mouthpiece 30 with a vapor outlet 38 positioned towards a first edge of the second mouthpiece 30. The first vaporizing device 206 and the second vaporizing device 208 have a first configuration with the vapor outlet 38 of

the first mouthpiece 30 and the vapor outlet 38 of the second mouthpiece 30 spaced apart by a first distance, and a second configuration with the vapor outlet 38 of the first mouthpiece 30 and the vapor outlet 38 of the second mouthpiece 30 spaced apart by a second distance, wherein the first distance is less than the second distance (see FIGS. 11A-11C). The first configuration allows a user to vape from the first and second vaporizing devices 206, 208 simultaneously and the second configuration allows the user to separately vape from the first and second vaporizing devices 206, 208.

[0066] FIG. 9 also illustrates an internal vapor pathway 39 for each vaporizing device 206, 208. In some configurations, the internal vapor pathway 39 is defined by or within the mouthpiece 30. In some configurations, the internal vapor pathway 39 is offset from a central lumen (not illustrated) of the center post 45. In some configurations, the mouthpiece 30 is biased or includes a biased portion. In some configurations, the biased portion corresponds to the tapered portion 37, which is angled away from the curved face 36 and towards the planar back face 35 of the mouthpiece 30. In some configurations, the tapered portion 37 is biased or angled at approximately 20° to approximately 70 such as 35°, 40°, 45°, 50°, 55°, or an angle within a range defined by any two of the foregoing values. In some configurations, the curved front face 36 is biased or angled towards the planar back face 35 at approximately 0.7°, such as 0.3°, 0.5°, 0.6°, 0.8°, 1.0°, or an angle within a range defined by any two of the foregoing values. In some configurations, the planar back face 35 has no bias, or a bias of 0°. In some configurations, the angle or bias of the curved face 36 and/or the angle or bias of the tapered portion 37 influences or determines how offset the internal vapor pathway 39 is from the central lumen of the center post 45.

[0067] When operating a vaporizing device 100 (e.g., the first and/or second vaporizing devices 206, 208), produced vapor travels proximally through a central lumen of the center post 45 and out the vapor outlet 38 of the mouthpiece 30. As the internal vapor pathway 39 is offset (e.g., laterally offset) from the central lumen of the center post 45, produced vapor may collide with an interior of the tapered portion 37 before traveling out the vapor outlet 38. Such collision may cause (i) the vapor to cool before it reaches the user, (ii) larger particles within the vapor to be blocked from exiting the vapor outlet 38, and/or (iii) an increased flavor profile for the user. By cooling the vapor and reducing the number of larger particles being inhaled by the user, the user may experience a smoother and more pleasant hit.

[0068] Additionally, the internal vapor pathway 39 being offset from the central lumen of the center post 45 prevents a user from having a straight line of sight from the vapor outlet 38 to the center post 45. A straight line of sight from the vapor outlet 38 to the center post 45 may be aesthetically displeasing (i.e., unsightly). Additionally, an offset internal vapor pathway 39 can prevent debris (such as pocket lint) from entering the central lumen of the center post 45. In some configurations, the vapor outlets 38 of the first and second vaporizing devices 206, 208 form a joint vapor outlet when the first and second vaporizing device 206, 208 are adjoined.

[0069] FIG. 10A is a perspective view and FIG. 10B is an end view of the distal end 204 of the vaping system 200 of FIG. 9. The vaping system 200 includes the first vaporizing device 206 and the second vaporizing device 208. As before, each vaporizing device 206, 208 includes an external housing 10 having a body 11 with a proximal end 12 and a distal end 15. As in FIG. 7, the distal end 15 of each vaporizing device 206, 208 includes a tripod 20. The tripod 20 includes or is formed from a pair of feet 21 and an inner edge 22.

[0070] As illustrated, the inner edges 22 of each device 206, 208 are disposed near each other when the devices 206, 208 are joined together. In some configurations, the inner edges 22 of each device 206, 208 abut each other due to the planarity of the back faces 17 of each device 206, 208. The feet 21 are of the same length, such that the feet 21 together with the inner edge 22 form the tripod 20. The curved bottom 16 of each device 206, 208 does not form part of the tripod 20. The tripod 20 allows the vaporizing device 100 to be set vertically on a surface (e.g., a table), such that the tripod 20 rests stably against the surface.

[0071] The distal end 15 of each device 206, 208 houses or receives a base 75. In some configurations, the base 75 is received by a distal end 54 of a sled 50 (see FIGS. 1A- 3), where the sled 50 is received, housed, or otherwise contained within the external housing 10. A distal end 77 of the base 75 may include or define a charging port 78. In some configurations, the curved bottom 16 defines a void that aligns with the charging port 78. The charging port 78 may allow for charging the vaporizing device 206, 208 (or a battery 56 of the device 206, 208). In some configurations, the charging port 78 is a USB, USB-C, micro-USB, or lighting port 78.

[0072] In some configurations, the distal end 15 and/or the curved bottom 16 of each device 206, 208 further defines an air hole 79. The air hole 79 may be disposed between the charging port 78 and the curved face 18 of the body 11 of the external housing 10. The air hole 79 may facilitate a flow of air, and/or a flow of vapor, through the vaporizing device 100. In some configurations, a user may plug or otherwise cover the air hole 79 to moderate the flow of air and/or a type of hit inhaled by the user. For example, the user may cover the air hole 79 to "choke" the vaporizing device 100 and inhale a stronger hit than when the air hole 79 is uncovered. Similarly, a user can blow through this air hole to unclog the device if any clogs occur.

[0073] FIGS. 11A-11C are side views of the vaping system 200 of FIG. 9 in various combined configurations and orientations. As outlined above, a first vaporizing device 206 is attachable to a second vaporizing device 208 via planar back faces 17 and 35 of each device 206, 208 (see FIGS. 2A-2B and 9). Each vaporizing device 206,

208 is a standalone device, similar to the vaporizing device 100. The first and second vaporizing devices 206, 208 may be magnetically attached to each other. Due to the alignment and disposition of the magnets 58 throughout the devices 206, 208, the devices 206, 208 may be joined or attached together in a variety of configurations.

[0074] Specifically, as illustrated in FIG. 11A, the devices 206, 208 may be joined or attached together in a first configuration 200a, where the mouthpieces 30a and external housings 10a are substantially and symmetrically aligned with each other. That is, in the first configuration 200a, the mouthpieces 30a are adjacent each other and are each oriented toward the proximal end 202 of the vaping system 200a. Additionally, the distal ends of the external housings 10a are aligned such that the vaping system 200a can be vertically oriented on a surface through the tripods at the distal ends of the external housings 10a (see FIGS. 7-8). In the first configuration 200a, a user may inhale produced vapor from both mouthpieces 30a simultaneously. In the first configuration 200a, the mouthpieces 30a may form a joint vapor outlet.

[0075] In some configurations, vapor from the first vaporizing device 206 and vapor from the second vaporizing device 208 mix when the user vapes from the first and second vaporizing devices 206, 208 in the first configuration 200a. In other examples, the vapor outlet of the first mouthpiece and the vapor outlet of the second mouthpiece form a unitary vapor outlet in the first configuration 200a.

[0076] As illustrated in FIG. 11B, the devices 206, 208 may be joined or attached together in a second configuration 200b, where the mouthpieces 30b are not adjacent each other and point in opposite directions from each other. That is, one mouthpiece 30b is oriented toward the proximal end 202 of the system 200 and the other mouthpiece 30b is oriented towards the distal end 204 of the system 200. In the second configuration 200b, the external housings 10b may be substantially aligned with each other, while the mouthpieces 30b are not aligned with each other. In the second configuration 200b, a user may inhale produced vapor from one or the other mouthpiece 30a but may not inhale produced vapor from both mouthpieces 30a simultaneously.

[0077] As illustrated in FIG. 11C, the devices 206, 208 may be joined or attached together in a third configuration 200c, where the two devices 206, 208 are predominantly aligned but vertically offset from each other. That is, in the third configuration 200c, the mouthpieces 30c are each oriented toward the proximal end 202 of the vaping system 200c but the vapor outlets of the mouthpieces 30c are not aligned with each other. Additionally, the external housings 10c are predominantly aligned with each other but the distal ends of the external housings 10c are offset from each other. As such, a user can inhale vapors from the first vaporizing device 206 and the second vaporizing device 208 separately. Alternatively, a user can inhale vapors from both vaping devices, with the first vaporizing device 206 being more dominant than the second vaporizing device 206. Separate vapor inhalation, from among multiple readily available inhalation sources in a common carrier, provides an additional technique for customized vaping experiences. Such customized experiences can include things such as flavor mixing, flavor canceling (for example, for medical users who don't like a flavor of a particular medical strain), etc.

[0078] In general, vaporizing devices (e.g., 206 and 208) can be of the same, similar, or different form factors and can be mixed, matched, and/or oriented in accordance with user desires to customize the user's vaping experience. For example, different types of vaporizers can be included in a side-by-side arrangement. One vaporizer can be an oil-based vaporizer and the other vaporizer can be herb-based vaporizer, both vaporizes can be oil-based vaporizers, etc. In aspect, one vaping device is a vaporizer and the other vaping device is an e- cigarette. In other examples, the vaping devices 206 and 208 are identical in form factor but contain different flavors of pre-vapor formulation so a user can mix and match the flavors to customize their vaping experience. Other examples of vaporizing devices are described in U.S. Patent Application No. 17/884,378, entitled, "COMBINABLE AND ORIENTABLE VAPING DEVICES," filed on August 9, 2022, the entire contents of which are herein incorporated by reference. FIGS. 12A-12C illustrate various dimensions of disclosed vaporizing devices 100.

[0079] FIGs. 13-14 illustrates perspective, cross-sectional views of different molds that can be used to form a mouthpiece 30. For example, FIG. 13 shows a mold that comprises a male mold or core 80 and a female mold or cavity 82. The mouthpiece 30 is injection molded by flowing plastic into the space between the male mold/core 80 and female mold/cavity 82. The female mold 82 forms the outer wall of the mouthpiece 30, while the male mold 80 forms internal features of the mouthpiece 30 (such as the diverted air flow pathway 39 of FIG. 9).

[0080] In one method, the injection molded plastic is inserted from the top or proximal end of the mold, corresponding to the top or proximal end of the mouthpiece 30 (e.g., proximal end 32). That is, the injector pin(s) inject into the mold from approximately the top or proximal end of the mouthpiece 30. A convex portion 83 at the female mold 82 forms a concave portion at the corresponding proximal end of the mouthpiece 30. This concave portion 85 at the proximal end of mouthpiece 30 ensures that any excess plastic ("flash," "spew," or "burrs") left from the injection molding process, such as material that flows outside the intended flow channels and into the space at the injector pin, does not extend outwardly past the proximal end of the mouthpiece 30. That is, at least a portion of the proximal end of the mouthpiece 30 has a concave portion 85 to ensure that excess plastic does not extend outwardly past the proximal end of the mouthpiece 30. This improves the feel of the mouthpiece 30 for a user and reduces the chance of excess plastic extending past

the proximal end of the mouthpiece 30 and causing any discomfort or unpleasant mouth feel for a user. That is, the proximal end of the mouthpiece 30 may be substantially smooth.

[0081] FIG. 14 shows another mold that can be used to form a mouthpiece. In this configuration the female portion of the mouthpiece is formed of two portions, a front or first portion 82a that has draft or bias, and a back portion 82b that has no draft. The back portion 82b of the female mold forms the substantially planar back face 35 of the mouthpiece 30. A piece or part with zero draft can cause issues when removing the mouthpiece 30 from the mold. Typically draft is provided to ease the part from the mold and ensure the part is not damaged during removal from the mold. Because of the zero draft at the planar back face 35 of the mouthpiece 30, the female mold can be formed in two pieces 82a, 82b, to allow the back portion 82b with zero draft to be removed laterally, and the front portion 82a with draft to be removed vertically.

[0082] FIG. 15 is a flowchart of a method of forming the mouthpiece of a vaping device. In some configurations, the method 300 includes providing a mold, at 305. In some configurations, the mold includes a first half (a cavity or female mold 82) and a second half (a core or male mold 80), where the first half/cavity of the mold may receive the second half/core of the mold. The female portion or cavity 82 of the mold may define a curvature of the outer face of a body (e.g., body 31) of the mouthpiece. The core 80 of the mold may define internal components or compartments of the mouthpiece. For example, the core 80 of the mold may define an internal vapor pathway (e.g., internal vapor pathway 39) and ensure placement of the internal vapor pathway within the mouthpiece. Specifically, the core of the mold may place the internal vapor pathway such that, when the mouthpiece is connected to a center post (e.g., center post 45), the internal vapor pathway is offset from a proximal end of the center post.

[0083] According to one configuration, the cavity 82 of the mold is formed with zero or nearly zero draft on the back face of the cavity. Typically, in considering how the injection molded mouthpiece will be removed from the mold, a draft is formed in the mold to reduce part damage during removal. Draft reduces the risk of damage during removal, and is typically important on both the core and the cavity sides of the mold because the injection molded mouthpiece must be removed from both parts. A zero-draft angle on the back side (which coincides with the substantially planar face 35 of the mouthpiece 30) means that the walls of the mouthpiece will be parallel to the direction of the mold opening and closing, rather than slightly tapered. This design choice can create potential challenges during the ejection or removal phase, as it increases the risk of the part sticking in the mold.

[0084] To achieve an injection molded mouthpiece with zero draft on the back planar face 35 (i.e., a 90, or nearly 90-degree angle between the base of the mouthpiece and the planar face 35, refer to FIG. 5 above), an additional degree of draft can be added to the front side of the mold. This allows the mouthpiece to be removed from the mold without damage to the mouthpiece. Additionally, this method of injection molding the mouthpiece places the part line (the line where the two halves of the injection mold meet) at the base of the mouthpiece 30. Because the base of the mouthpiece 30 mates with the top of the body 11, the part line is not visible or barely visible, improving the aesthetics of the device and reducing the visible part lines. The mold also includes sufficient ejection mechanisms, like ejector pins or air ejection systems, to facilitate the removal of the mouthpiece after molding.

[0085] In other configurations, to achieve zero draft and removal of the mouthpiece from the mold without damage to the mouthpiece, the cavity 82 of the mold may be formed of two portions, a front portion 82a and a back portion 82b. The step of removing the mouthpiece from the mold can be done by vertically removing the front portion 82a and laterally removing the back portion 82b (see FIG. 14).

[0086] The mold can be fabricated using materials like steel or aluminum, typically through a process like CNC machining, EDM (electrical discharge machining), or 3D printing. The material for molding the mouthpiece can be any suitable material, such as a plastic resin like polypropylene (PP), polyethylene (PE), or thermoplastic elastomers (TPE). The material should have suitable properties for the intended use of the mouthpiece, such as flexibility, strength, and chemical resistance. The chosen material (such as a plastic resin) is prepared by drying and preheating it to remove moisture, which can cause defects in the final mouthpiece. The material is then loaded into the injection molding machine's hopper.

[0087] The method 300 may also include injecting plastic or another material into the mold, at 310. For example, the mouthpiece may be constructed from acrylics, plastics, thermoplastics, medical-grade plastics, or another suitable material for an injection molding process. The method 300 may further include removing the mouthpiece from the mold, at 315. Removal of the cavity can be either in one step or two; for example, the first portion 82a with draft can be removed vertically, and the second portion 82b with zero draft can be removed laterally.

[0088] During the injection molding process, the injection molding machine heats the plastic resin to a molten state and injects it under high pressure into the mouthpiece mold cavity (310 in FIG. 15). The mold is then clamped shut, allowing the material to fill the cavity and conform to the shape of the mouthpiece, including the zero draft back side. After filling, the mold is cooled to allow the material to solidify and take the shape of the mouthpiece (315 in FIG. 15). This step ensures the dimensions of the mouthpiece and zero draft angle are maintained.

[0089] After the mouthpiece is cooled and solidified, the mold is opened, and the part is ejected using the ejection mechanisms designed into the mold (320 in FIG.

13). Due to the zero draft angle, extra care must be taken to ensure the part is ejected without damage or sticking. After the mouthpiece is removed from the mold, any excess material, such as flash or sprue, is trimmed off. The part may also undergo additional processes such as surface finishing, depending on the desired final finish of the mouthpiece.

[0090] In some configurations, the method 300 can be accomplished without additional action or actuation of the tool. In a conventional process, a tool may be required to cut various features into the mouthpiece (e.g., the internal vapor pathway). In contrast, method 300 simply requires a tool to inject plastics or materials into the mold and then remove the formed mouthpiece from the mold; no additional action of the tool is necessary. This simplifies the manufacturing process, both making the process quicker and resulting in fewer defects due to improper actions of the tool.

[0091] FIG. 16 illustrates a flowchart of another method 400 of forming a mouthpiece for a vaporizing device. Similar to the method 300, in some embodiments, the method 400 includes providing a mold, at 405, and injecting a material into the mold, at 410. As with method 300, the material for molding the mouthpiece can be any suitable material, such as a plastic resin like polypropylene (PP), polyethylene (PE), or thermoplastic elastomers (TPE). The material should have suitable properties for the intended use of the mouthpiece, such as flexibility, strength, and chemical resistance. The chosen material (such as a plastic resin) is prepared by drying and preheating it to remove moisture, which can cause defects in the final mouthpiece. The material is then loaded into the injection molding machine's hopper.

[0092] In some embodiments, the mold includes a first half (a cavity or female mold 82) and a second half (a core or male mold 80), where the first half/cavity of the mold may receive the second half/core of the mold. The female portion or cavity 82 of the mold may define a curvature of the outer face of a body (e.g., body 31) of the mouthpiece. The core 80 of the mold may define internal components or compartments of the mouthpiece. For example, the core 80 of the mold may define an internal vapor pathway (e.g., internal vapor pathway 39) and ensure placement of the internal vapor pathway within the mouthpiece. Specifically, the core of the mold may place the internal vapor pathway such that, when the mouthpiece is connected to a center post (e.g., center post 45), the internal vapor pathway is offset from a proximal end of the center post.

[0093] In some embodiments, the first half/cavity 82 of the mold may be formed of two portions, a front portion 82a and a back portion 82b. In some embodiments, the back portion 82b of the cavity of the mold forms the substantially planar back face 35 of the mouthpiece 30. That is, the back portion 82b forms the portion of the mouthpiece 30 that has zero draft. A piece or part with zero draft can cause issues when removing the mouthpiece 30 from the mold. Typically, draft is provided to ease the part from the mold and ensure the part is not damaged during removal from the mold. Because of the zero draft at the planar back face 35 of the mouthpiece 30, the cavity 82 of the mold can be formed in two pieces 82a, 82b, to allow the back portion 82b with zero draft to be removed laterally, and the front portion 82a with draft to be removed vertically.

[0094] The method 400 may also include vertically removing the front portion 82a of the cavity of the mold, at 415. As before, the front portion 82a of the cavity of the mold may include a degree of draft, allowing the mouthpiece to be removed from the mold without damage to the mouthpiece. The method 400 may also include laterally removing the back portion 82b of the cavity of the mold, at 420. As the back portion 82b imparts the zero draft quality to the mouthpiece 30, lateral removal of the back portion 82b of the mold allows the formed and molded mouthpiece 30 to be gently removed from the mold, without damaging the formed and molded mouthpiece.

[0095] In some configurations, the method 400 can be accomplished without additional action or actuation of a tool. In a conventional process, a tool may be required to cut various features into the mouthpiece (e.g., the internal vapor pathway). In contrast, method 400 simply requires a tool to inject plastics or materials into the mold and then remove the formed mouthpiece from the mold; no additional action of the tool is necessary. This simplifies the manufacturing process, both making the process quicker and resulting in fewer defects due to improper actions of the tool.

Embodiments

[0096]

Embodiment 1. A vaporizing device comprising: a center post having a central lumen extending between a distal end and a proximal end of the center post; a cartridge having a hollow interior for receiving the center post and an oil to be vaporized; a sled connectable to the cartridge and receiving a plurality of operating components; and a mouthpiece connectable to the proximal end of the center post and a proximal end of the cartridge, the mouthpiece comprising: a body having a substantially planar face and a curved face opposite the substantially planar face, the curved face tapering to meet the substantially planar face at a proximal end of the body and a vapor outlet at the proximal end of the body, a cut-away defined in a distal edge of the body of the mouthpiece, the cut-away complementary to an extension of an external housing of the vaporizing device, and an internal vapor pathway defined within the body, the internal vapor pathway being offset from the central lumen of the center post, such that vapor produced from the oil to be vaporized travels proximally through the central lumen of the center post, offset through the internal vapor pathway of the mouth-

piece, and out of the vapor outlet of the mouthpiece to be inhaled by a user.

Embodiment 2. The vaporizing device of Embodiment 1, wherein the cartridge and the sled are received by the external housing and the mouthpiece is connectable to a proximal end of the external housing.

Embodiment 3. The vaporizing device of either Embodiment 1 or Embodiment 2, wherein the angle between the body of the mouthpiece joining the external housing and the substantially planar face of the mouthpiece is substantially a 90° angle.

Embodiment 4. The vaporizing device of Embodiment 1, Embodiment 2, or Embodiment 3, wherein the external housing has a distal end comprising an inner edge and a pair of feet, the inner edge together with the pair of feet forming a tripod allowing the vaporizing device to be vertically oriented with the tripod resting against a surface.

Embodiment 5. The vaporizing device of any one of Embodiments 1 through 4, wherein the external housing of the vaporizing device comprises a body having a substantially planar back surface and a curved front surface, the substantially planar back surface being coplanar with the substantially planar face of the body of the mouthpiece.

Embodiment 6. The vaporizing device of any one of Embodiments 1 through 5, wherein the sled comprises indentations for mating with prongs of the cartridge.

Embodiment 7. The vaporizing device of any one of Embodiments 1 through 6, wherein the vapor produced from the oil to be vaporized cools as it travels through the internal vapor pathway of the mouthpiece.

Embodiment 8. The vaporizing device of any one of Embodiments 1 through 7, wherein the internal vapor pathway of the mouthpiece prevents (i) a line of sight from the vapor outlet to the center post and (ii) debris from entering the center post through the vapor outlet.

Embodiment 9. The vaporizing device of any one of Embodiments 1 through 8, further comprising a second vaporizing device attachable to the external housing of the vaporizing device via magnets embedded in the sled of the vaporizing device and magnets embedded in a sled of the second vaporizing device.

Embodiment 10. The vaporizing device of any one of Embodiments 1 through 9, further comprising an atomizer received within the distal end of the center post.

Embodiment 11. The vaporizing device of Embodiment 10, wherein the atomizer is powered by one or more of the plurality of operating components housed within the sled.

Embodiment 12. A vaporizing device comprising: an external housing having a body extending between a proximal end and a distal end; a cartridge having a hollow interior for receiving a center post and an oil to be vaporized; a sled connectable to the cartridge and receiving a plurality of operating components; and a mouthpiece connectable to a proximal end of the center post and a proximal end of the cartridge, the mouthpiece comprising: a body having a substantially planar face and a curved face opposite the substantially planar face, a cut-away defined in a distal edge of the body, the cut-away complementary to an extension of the proximal end of the external housing, and an internal vapor pathway defined within the body.

Embodiment 13. The vaporizing device of Embodiment 12, wherein the internal vapor pathway of the mouthpiece is offset from a central lumen of the center post, such that vapor produced from the oil to be vaporized travels proximally through the central lumen of the center post, offset through the internal vapor pathway of the mouthpiece, and out of a vapor outlet of the mouthpiece to be inhaled by a user.

Embodiment 14. The vaporizing device of either Embodiment 12 or Embodiment 13, wherein the cartridge and the sled are received by the external housing.

Embodiment 15. The vaporizing device of any one of Embodiments 12, Embodiment 13, or Embodiment 14, wherein the angle between the body of the mouthpiece joining the external housing and the substantially planar face of the mouthpiece is substantially a 90° angle.

Embodiment 16. The vaporizing device of any one of Embodiments 12 through 15, wherein the body of the external housing comprises a substantially planar back surface and a curved front surface opposite the substantially planar back surface, the substantially planar face being coplanar with the substantially planar face of the body of the mouthpiece.

Embodiment 17. The vaporizing device of Embodiment 16, wherein an angle between the body of the mouthpiece joining the external housing and the substantially planar face of the mouthpiece is substantially a 90° angle.

Embodiment 18. The vaporizing device of any one of Embodiments 12 through 16, wherein the sled comprises: a body defining a compartment to receive a battery, a distal end of the body comprising protrusions for mating with a base and a proximal end of the body comprising indentations for mating with distal prongs of the cartridge; at least one pair of magnets embedded within opposing sides of the body; and at least one pair of electrodes disposed within opposing sides of the body, the at least one pair of electrodes for providing power from the battery to an atomizer of the vaporizing device.

Embodiment 19. The vaporizing device of any one of Embodiments 12 through 16 or Embodiment 18, wherein the sled and the cartridge are integral.

Embodiment 20. The vaporizing device of any one of Embodiments 12 through 16 or Embodiments 18 to 19, further comprising an atomizer housed within a distal end of the center post.

Embodiment 21. A vaporizing device comprising: an external housing having a proximal end and a distal end with a body extending therebetween, the proximal end including an extension, and the distal end comprising an inner edge and a pair of feet, the inner edge together with the pair of feet forming a tripod allowing the vaporizing device to be vertically oriented with the tripod resting against a surface; and a mouthpiece connectable to the external housing, a distal edge of the mouthpiece including a cut-away matching the extension of the proximal end of the external housing.

Embodiment 22. The vaporizing device of Embodiment 21, wherein the body of the external housing comprises a front face and a back face opposite the front face, the back face being substantially planar and comprising an indentation for tactilely ascertaining an orientation of the vaporizing device.

Embodiment 23. The vaporizing device of Embodiment 22, wherein the indentation comprises a window for viewing a level of oil to be vaporized contained within a cartridge.

Embodiment 24. The vaporizing device of either Embodiment 21 or Embodiment 22, further comprising a cartridge and a sled housed by the body of the external housing.

Embodiment 25. The vaporizing device of Embodiment 24, wherein the cartridge comprises a hollow interior for receiving a center post and an oil to be vaporized.

Embodiment 26. The vaporizing device of either Embodiment 24 or Embodiment 25, wherein the sled comprises: a body defining a compartment to receive a battery, a distal end of the body comprising protrusions for mating with a base and a proximal end of the body comprising indentations for mating with distal prongs of the cartridge; at least one pair of magnets embedded within opposing sides of the body; and at least one pair of electrodes disposed within opposing sides of the body, the at least one pair of electrodes for providing power from the battery to an atomizer of the vaporizing device.

Embodiment 27. The vaporizing device of any one of Embodiments 24 to 26, wherein the cartridge is integral with the sled.

Embodiment 28. The vaporizing device of any one of Embodiments 21, 22, or 24, wherein the body of the external housing comprises a front face, a back face, and parallel sides extending between the front face and the back face such that a footprint of the front face and a footprint of the back face are symmetrical.

Embodiment 29. The vaporizing device of any one of Embodiments 21, 22, 24, or 28, further comprising a second vaporizing device, the second vaporizing device comprising: a second external housing having a proximal end and a distal end with a body extending therebetween, the proximal end including an extension, and the distal end comprising an inner edge and a pair of feet, the inner edge together with the pair of feet forming a tripod allowing the second vaporizing device to be vertically oriented with the tripod resting on a surface; and a second mouthpiece connectable to the second external housing, a distal edge of the second mouthpiece including a cut-away matching the extension of the proximal end of the second external housing, wherein the body of the second external housing is attachable to the body of the external housing via magnets embedded in the body of the second external housing and magnets embedded in the body of the external housing.

Embodiment 30. The vaporizing device of any one of Embodiments 21, 22, 24, or 28 to 29, further comprising a center post having a central lumen extending between a distal end and a proximal end of the center post, the center post housed within the external housing.

Embodiment 31. The vaporizing device of Embodiment 30, wherein the mouthpiece is connectable to the proximal end of the center post.

Embodiment 32. The vaporizing device of any one of Embodiments 21, 22, 24, or 28 to 30, wherein the mouthpiece comprises a body having a substantially planar face and a curved face opposite the substantially planar face, the curved face tapering to meet the substantially planar face at a proximal end of the body and forming a vapor outlet at the proximal end of the body.

Embodiment 33. A vaporizing device comprising: an external housing having a proximal end and a distal end with a body extending therebetween, with the proximal end including an extension, and the distal end comprising an inner edge and a pair of feet, the inner edge together with the pair of feet forming a tripod allowing the vaporizing device to be vertically oriented with the tripod resting against a surface.

Embodiment 34. The vaporizing device of Embodiment 33, further comprising a mouthpiece connectable to the proximal end of the external housing.

Embodiment 35. The vaporizing device of Embodiment 34, wherein a distal edge of the mouthpiece defines a cut-away matching the extension of the proximal end of the external housing.

Embodiment 36. The vaporizing device of either Embodiment 33 or Embodiment 34, further comprising a second vaporizing device, the second vaporizing device comprising: a second external housing having a proximal end and a distal end with a body extending therebetween, with the proximal end including an extension, and the distal end comprising an inner edge and a pair of feet, the inner edge together with the pair of feet forming a tripod allowing the second vaporizing device to be vertically oriented with

the tripod resting on a surface.

Embodiment 37. The vaporizing device of Embodiment 36, wherein the body of the second external housing is magnetically attachable to the body of the external housing.

Embodiment 38. The vaporizing device of either Embodiment 36 or Embodiment 37, wherein the body of the second external housing comprises a front face and a back face opposite the front face, the back face being substantially planar and comprising an indentation for tactilely ascertaining an orientation of the vaporizing device.

Embodiment 39. The vaporizing device of any one of Embodiments 36 to 38, further comprising a second mouthpiece connectable to the proximal end of the second external housing, a distal edge of the second mouthpiece defining a cut-away corresponding to the extension of the proximal end of the second external housing.

Embodiment 40. The vaporizing device of any one of Embodiments 33 to 36, wherein the body of the external housing comprises a front face and a back face opposite the front face, the back face being substantially planar and comprising an indentation for tactilely ascertaining an orientation of the vaporizing device.

Embodiment 41. A sled for a vaporizing device, the sled comprising: a body defining a compartment to receive a battery, a distal end of the body comprising protrusions for mating with a base and a proximal end of the body comprising indentations for mating with distal prongs of a cartridge of the vaporizing device; at least one pair of magnets embedded within opposing sides of the body; and at least one pair of electrodes disposed within opposing sides of the body, the at least one pair of electrodes for providing power from the battery to an atomizer of the vaporizing device.

Embodiment 42. The sled of Embodiment 41, wherein the at least one pair of electrodes are disposed within opposing sides of the body such that no wiring or electrical connections are exposed/external to the body.

Embodiment 43. The sled of Embodiment 41 or Embodiment 42, wherein the sled mates with the cartridge through a press-fit connection.

Embodiment 44. The sled of any one of Embodiments 41 to 43, wherein the distal prongs of the cartridge snap into the indentations of the sled.

Embodiment 45. The sled of any one of Embodiments 41 to 44, wherein the sled and the cartridge are received by an external housing of the vaporizing device.

Embodiment 46. The sled of any one of Embodiments 41 to 45, wherein the sled and the cartridge are integral.

Embodiment 47. The sled of Embodiment 46, wherein a second pair of magnets are embedded within opposing sides of a body of the cartridge.

Embodiment 48. The sled of any one of Embodiments 41 to 46, wherein the cartridge receives a center post and the atomizer is received within a distal end of the center post.

Embodiment 49. The sled of any one of Embodiments 41 to 46 or 48, wherein a second pair of magnets are embedded within a body of the cartridge.

Embodiment 50. A vaporizing device comprising: a sled comprising: a body, a distal end of the body comprising protrusions for mating with a base and a proximal end of the body comprising indentations for mating with distal prongs of a cartridge of the vaporizing device; at least one pair of magnets embedded within opposing sides of the body; and at least one pair of electrodes disposed within opposing sides of the body, the at least one pair of electrodes for providing power to an atomizer of the vaporizing device.

Embodiment 51. The vaporizing device of Embodiment 50, wherein the sled mates with the cartridge through a press-fit connection.

Embodiment 52. The vaporizing device of Embodiment 50 or 51, wherein the distal prongs of the cartridge snap into the indentations of the sled.

Embodiment 53. The vaporizing device of any one of Embodiments 50 to 52, further comprising an external housing having a body extending between a proximal end and a distal end.

Embodiment 54. The vaporizing device of Embodiment 53, wherein the sled and the cartridge are housed within the body of the external housing.

Embodiment 55. The vaporizing device of Embodiment 53 or 54, further comprising a mouthpiece connectable to the proximal end of the body.

Embodiment 56. The vaporizing device of any one of Embodiments 50 to 53, wherein the cartridge comprises a hollow interior for receiving a center post and an oil to be vaporized.

Embodiment 57. The vaporizing device of Embodiment 56, wherein the atomizer is housed within a distal end of the center post.

Embodiment 58. The vaporizing device of Embodiment 56 or 57, further comprising a mouthpiece connectable to a proximal end of the center post.

Embodiment 59. The vaporizing device of Embodiment 56, 57, or 58, wherein the cartridge comprises an acrylic material and the center post comprises a metallic material.

Embodiment 60. The vaporizing device of any one of Embodiments 50 to 53 or 56, wherein the at least one pair of electrodes are disposed within opposing sides of the body of the sled such that no wiring or electrical connections are exposed/external to the body.

Embodiment 61. A mouthpiece for use with a vaporizing device, the mouthpiece comprising: a body having a substantially planar face and a curved face opposite the substantially planar face, the curved face

tapering to meet the substantially planar face at a proximal end of the body and forming a vapor outlet at the proximal end of the body; a cut-away defined in a distal edge of the body of the mouthpiece, the cut-away for aligning the mouthpiece onto a vaping device body during capping; and an internal vapor pathway defined within the body, the internal vapor pathway being offset from a central lumen of a center post, such that vapor produced from an oil to be vaporized travels proximally through the central lumen of the center post, offset through the internal vapor pathway of the mouthpiece, and out of the vapor outlet of the mouthpiece to be inhaled by a user, wherein the substantially planar face and the distal end of the mouthpiece form a substantially 90-degree angle such that there is zero draft along the substantially planar face.

Embodiment 62. The mouthpiece of Embodiment 61, wherein the proximal end of the body of the mouthpiece is concave at the vapor outlet.

Embodiment 63. A method of manufacturing a mouthpiece for a vaping device, the method comprising: selecting a core of a mold, the core comprising a front side and a back side, the back side having zero draft angle such that a back wall of the mouthpiece will be parallel to the direction of the mold opening and closing; selecting a cavity of the mold, the cavity comprising a front side and a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of the mold opening and closing; inserting the core into the cavity, forming a space between the core and the cavity; injecting a material into the space between the core and the cavity; allowing the material to cool and solidify; and ejecting the material from the mold.

Embodiment 64. The method of Embodiment 63, wherein the cavity has a proximal end and a distal end, and wherein the step of injecting the material into the space between the core and the cavity comprises injecting material at the proximal end.

Embodiment 65. The method of Embodiment 63 or 64, wherein the front side and the back side of the cavity are separable portions of the cavity.

Embodiment 66. The method of Embodiment 65, wherein the front side of the cavity is removable vertically from the mold and the back side of the cavity is removably laterally from the mold.

Embodiment 67. The method of any one of Embodiments 63 to 65, further comprising clamping the cavity and the core of the mold shut, allowing the injected material to fill the cavity.

Embodiment 68. The method of any one of Embodiments 63 to 65 or 67, wherein the front side of the cavity is formed with a degree of draft.

Embodiment 69. The method of any one of Embodiments 63 to 65 or 67 to 68, wherein the core of the mold defines one or more internal compartments of the mouthpiece.

Embodiment 70. The method of Embodiment 69, wherein the one or more internal compartments comprises an internal vapor pathway.

Embodiment 71. The method of any one of Embodiments 63 to 65 or 67 to 69, wherein the cavity of the mold further comprises a convex portion at a proximal end of the cavity, the convex portion forming a concave portion at a corresponding proximal end of the mouthpiece.

Embodiment 72. The method of Embodiment 71, wherein the concave portion at the proximal end of the mouthpiece is substantially smooth, with no excess material.

Embodiment 73. A method of manufacturing a mouthpiece for a vaping device, the method comprising: selecting a core, the core comprising a front side and a back side, the back side having zero draft angle such that a back wall of the mouthpiece will be parallel to the direction of a mold opening and closing; selecting a cavity, the cavity comprising a first portion with a front side and a second portion with a back side, the back side having zero draft angle such that the back wall of the mouthpiece will be parallel to the direction of the mold opening and closing; inserting the core into the cavity, forming a space between the core and the cavity; injecting a material into the space between the core and the cavity; allowing the material to cool and solidify; and removing the first portion of the cavity vertically from the core and removing the second portion of the cavity laterally from the core.

Embodiment 74. The method of Embodiment 73, further comprising clamping the cavity and the core of the mold shut, allowing the injected material to fill the cavity.

Embodiment 75. The method of Embodiment 73 or 74, wherein the front side of the first portion of the cavity is formed with a degree of draft.

Embodiment 76. The method of any one of Embodiments 73 to 75, wherein the core of the mold defines one or more internal compartments of the mouthpiece.

Embodiment 77. The method of Embodiment 76, wherein the one or more internal compartments comprises an internal vapor pathway.

Embodiment 78. The method of any one of Embodiments 73 to 76, wherein injecting a material into the space between the core and the cavity comprises injecting the material into a proximal end of the cavity.

Embodiment 79. The method of any one of Embodiments 73 to 76 or 78, wherein the cavity of the mold further comprises a convex portion at a proximal end of the cavity, the convex portion forming a concave portion at a corresponding proximal end of the mouthpiece.

Embodiment 80. The method of any one of Embodiments 73 to 76 or 78 to 79, wherein the concave

portion at the proximal end of the mouthpiece is substantially smooth, with no excess material.

[0097] While particular configurations have been illustrated and described herein, it should be understood that various other changes and modifications may be made without departing from the spirit and scope of the claimed subject matter. Moreover, although various aspects of the claimed subject matter have been described herein, such aspects need not be utilized in combination.

[0098] Unless otherwise indicated, all numbers expressing measurements and quantities used in the specification and claims are to be understood as being modified in all instances by the term "about." Accordingly, unless indicated to the contrary, the numerical parameters set forth in the specification and attached claims are approximations that may vary depending upon the desired properties sought to be obtained by the configurations of the present disclosure. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should at least be construed in light of the number of reported significant digits and by applying ordinary rounding techniques. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of the present disclosure are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical value, however, inherently contains certain errors necessarily resulting from the standard deviation found in their respective testing measurements. In one embodiment, the terms "about," "approximately," and "substantially" refer to numerical parameters within 10% of the indicated range.

[0099] The terms "a," "an," "the," and similar referents used in the context of describing the configurations of the present disclosure (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. Recitation of ranges of values herein is merely intended to serve as a shorthand method of referring individually to each separate value falling within the range. Unless otherwise indicated herein, each individual value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein is intended merely to better illuminate the configurations of the present disclosure and does not pose a limitation on the scope of the present disclosure. No language in the specification should be construed as indicating any non-claimed element essential to the practice of the configurations of the present disclosure.

[0100] Groupings of alternative elements or configurations disclosed herein are not to be construed as limitations. Each group member may be referred to and claimed individually or in any combination with other members of the group or other elements found herein. It is anticipated that one or more members of a group may be included in, or deleted from, a group for reasons of convenience and/or patentability. When any such inclusion or deletion occurs, the specification is deemed to contain the group as modified thus fulfilling the written description of all Markush groups used in the appended claims.

[0101] Specific configurations disclosed herein may be further limited in the claims using consisting of or consisting essentially of language. Various aspects discussed in one drawing may be present and/or used in conjunction with the embodiment shown in another drawing, and each element shown in multiple drawings may be discussed only once. All statements herein reciting principles, aspects, and configurations of the invention, as well as specific examples thereof, are intended to encompass equivalents thereof. The described features, structures, or characteristics of configurations of the invention may be combined in any suitable manner in one or more configurations.

[0102] As used in this specification and the appended claims, singular forms such as "a," "an," and "the" may include the plural unless the context clearly dictates otherwise. Thus, for example, reference to "a vapor outlet" may include one or more vapor outlets, and reference to "the vaping device" may include reference to one or more vaping devices.

[0103] As used herein, the term "substantially" refers to the complete or nearly complete extent or degree of an action, characteristic, property, state, structure, item, or result to function as indicated. For example, a void that is "substantially" open may be either completely open or nearly completely open. As used herein the term "generally" refers to something that is more of the designated adjective than not, or the converse if used in the negative. As used herein, a plurality of items, structural elements, compositional elements, and/or materials may be presented in a common list for convenience. However, these lists should be construed as though each member of the list is individually identified as a separate and unique member. Additionally, the word "connected" and "coupled" is used throughout for clarity of the description and can include either a direct connection or an indirect connection.

[0104] Although the foregoing disclosure provides many specifics, these should not be construed as limiting the scope of any of the ensuing claims. Other configurations and configurations may be devised which do not depart from the scopes of the claims. Features from different configurations and configurations may be employed separately or in combination. Accordingly, all additions, deletions and modifications to the disclosed subject matter that fall within the scopes of the claims are to be embraced thereby. The scope of each claim is indicated and limited only by its plain language and the full scope of available legal equivalents to its elements.

Claims

1. A vaporizing device (100) comprising:

a center post (45) having a central lumen extending between a distal end (46) and a proximal end (47) of the center post (45);
a cartridge (40) having a hollow interior for receiving the center post (45) and an oil to be vaporized;
a sled (50) connectable to the cartridge (40) and receiving a plurality of operating components; and
a mouthpiece (30) connectable to the proximal end (47) of the center post (45) and a proximal end (42) of the cartridge (40), the mouthpiece (30) comprising:

a body (31) having a substantially planar face (35) and a curved face (36) opposite the substantially planar face (35),
the curved face (36) tapering to meet the substantially planar face (35) at a proximal end (32) of the body (31) and a vapor outlet (38) at the proximal end (32) of the body (31),
a cut-away (34) defined in a distal edge (33) of the body (31) of the mouthpiece (30), the cut-away (34) complementary to an extension (14) of an external housing (10) of the vaporizing device (100), and
an internal vapor pathway (39) defined within the body (31),

the internal vapor pathway (39) being offset from the central lumen of the center post (45), such that vapor produced from the oil to be vaporized travels proximally through the central lumen of the center post (45), offset through the internal vapor pathway (39) of the mouthpiece (30), and out of the vapor outlet (38) of the mouthpiece (30) to be inhaled by a user.

2. The vaporizing device (100) of claim 1, wherein the cartridge (40) and the sled (50) are received by the external housing (10) and the mouthpiece (30) is connectable to a proximal end (12) of the external housing (10).

3. The vaporizing device (100) of either claim 1 or claim 2, wherein the external housing (10) has a distal end (15) comprising an inner edge (22) and a pair of feet (21), the inner edge (22) together with the pair of feet (21) forming a tripod (20) allowing the vaporizing device (100) to be vertically oriented with the tripod (20) resting against a surface.

4. The vaporizing device (100) of any one of claims 1 through 3, wherein the external housing (10) of the vaporizing device (100) comprises a body (11) having a substantially planar back surface (17) and a curved front surface (18), the substantially planar back surface (17) being coplanar with the substantially planar face (35) of the body (31) of the mouthpiece (30).

5. The vaporizing device (100) of any one of claims 1 through 4, wherein the internal vapor pathway (39) of the mouthpiece (30) is offset from a central lumen of the center post (45), such that vapor produced from the oil to be vaporized travels proximally through the central lumen of the center post (45), offset through the internal vapor pathway (39) of the mouthpiece (30), and out of a vapor outlet (38) of the mouthpiece (30) to be inhaled by a user.

6. The vaporizing device (100) of any one of claims 1 through 5, wherein the sled (50) comprises:

a body (51) defining a compartment to receive a battery (56), a distal end (54) of the body (51) comprising protrusions (55) for mating with a base (75) and a proximal end (52) of the body (51) comprising indentations for mating with distal prongs (44) of the cartridge (40);
at least one pair of magnets (58) embedded within opposing sides of the body (51); and
at least one pair of electrodes (57) disposed within opposing sides of the body (51), the at least one pair of electrodes (57) for providing power from the battery (56) to an atomizer (48) of the vaporizing device (100).

7. The vaporizing device (100) of any one of claims 1 through 6, wherein the vapor produced from the oil to be vaporized cools as it travels through the internal vapor pathway (39) of the mouthpiece (30).

8. The vaporizing device (100) of any one of claims 1 through 7, wherein the body (11) of the external housing (10) comprises a front face (18) and a back face (17) opposite the front face (18), the back face (17) being substantially planar and comprising an indentation (19) for tactilely ascertaining an orientation of the vaporizing device (100).

9. The vaporizing device (100) of any one of claims 1 through 8, wherein the internal vapor pathway (39) of the mouthpiece (30) prevents (i) a line of sight from the vapor outlet (38) to the center post (45) and (ii) debris from entering the center post (45) through the vapor outlet (38).

10. The vaporizing device (100) of any one of claims 1 through 9, further comprising an atomizer (48) received within the distal end (46) of the center post

(45).

11. The vaporizing device (100) of any claim 10, wherein the atomizer (48) is powered by one or more of the plurality of operating components housed within the sled (50).

12. The vaporizing device (100) of any one of claims 1 through 10, further comprising a second vaporizing device (208), the second vaporizing device (208) comprising:

a second external housing (10) having a proximal end (12) and a distal end (15) with a body (11) extending therebetween, with the proximal end (12) including an extension (14); and
the distal end (15) comprising an inner edge (22) and a pair of feet (21), the inner edge (22) together with the pair of feet (21) forming a tripod (20) allowing the second vaporizing device (208) to be vertically oriented with the tripod (20) resting on a surface.

13. The vaporizing device (100) of claim 12, wherein each of the body (11) of the external housing (10) of the vaporizing device (100) and the body (11) of the second external housing (10) of the second vaporizing device (208) comprises one or more pairs of magnets (58a) with a position and a polarity to magnetically attach the body (11) of the second external housing (10) to the body (11) of the external housing (10), when the vaporizing device (100) and the second vaporizing device (208) are substantially identical.

14. The vaporizing device (100) of either claim 12 or claim 13, wherein the body (11) of the second external housing (10) comprises a front face (18) and a back face (17) opposite the front face (18), the back face (17) being substantially planar and comprising an indentation (19) for tactilely ascertaining an orientation of the vaporizing device (100).

15. The vaporizing device (100) of any one of claims 6 through 9 or 12 through 14, wherein the at least one pair of electrodes (57) are disposed within opposing sides of the sled body (51) such that no wiring or electrical connections are exposed/external to the body (51).

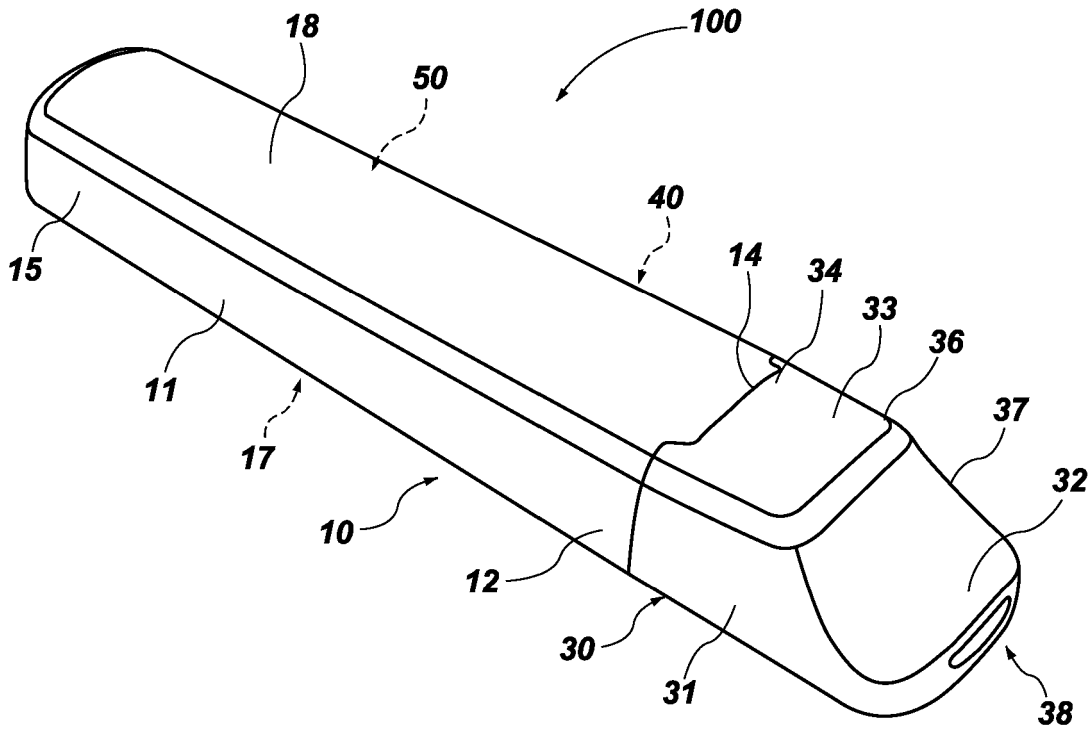
18
100
50
40
15
14
34
33
36
11
37
17
32
10
12
30
31
38

FIG. 1A

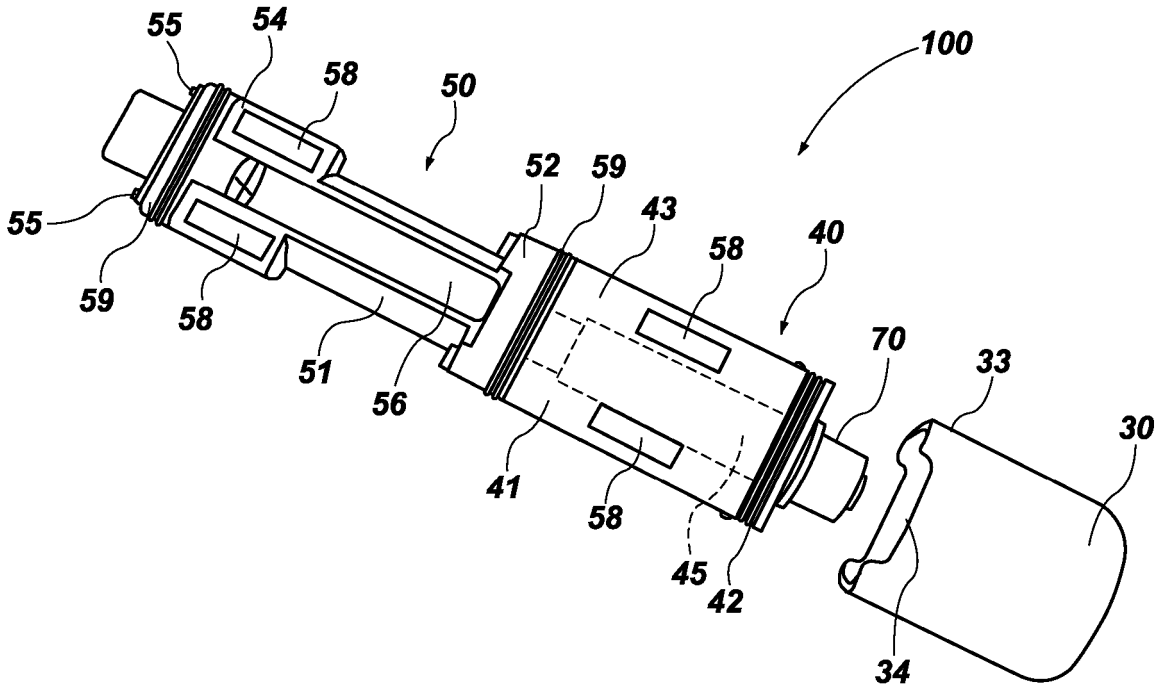
55
54
58
50
100
52
59
43
55
58
40
59
58
70
33
51
56
30
41
58
45
42
34

FIG. 1B

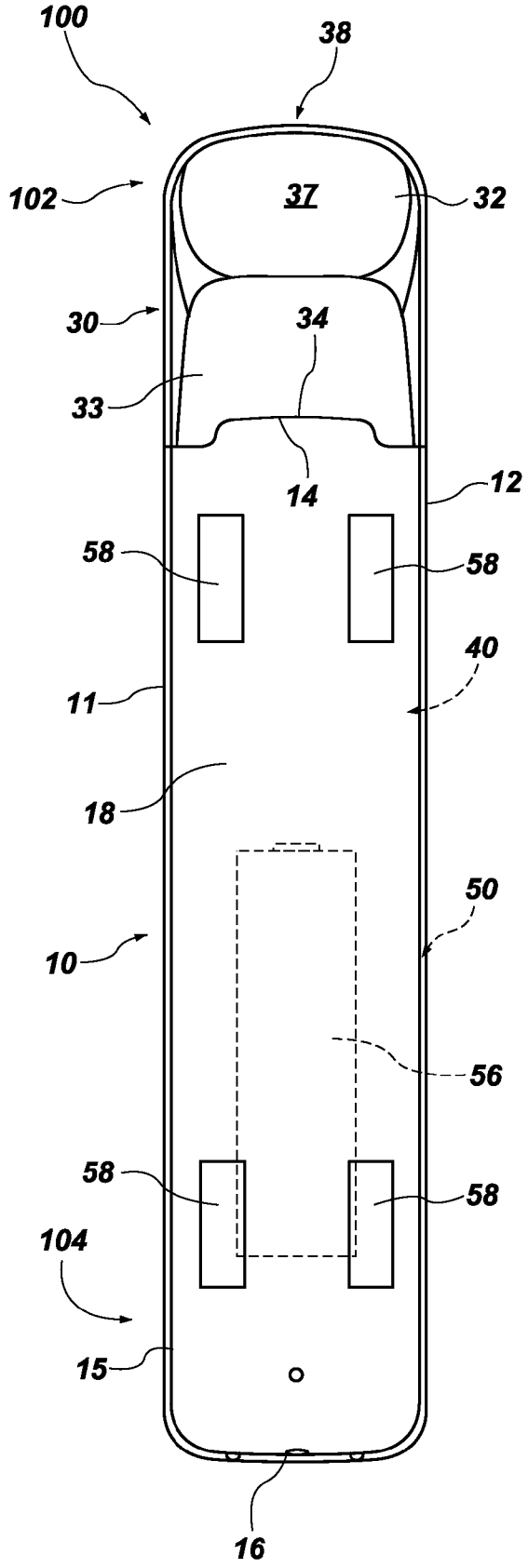
100
38
102
37
32
30
34
33
14
12
58
58
40
11
18
50
10
56
58
58
104
15
16

FIG. 2A

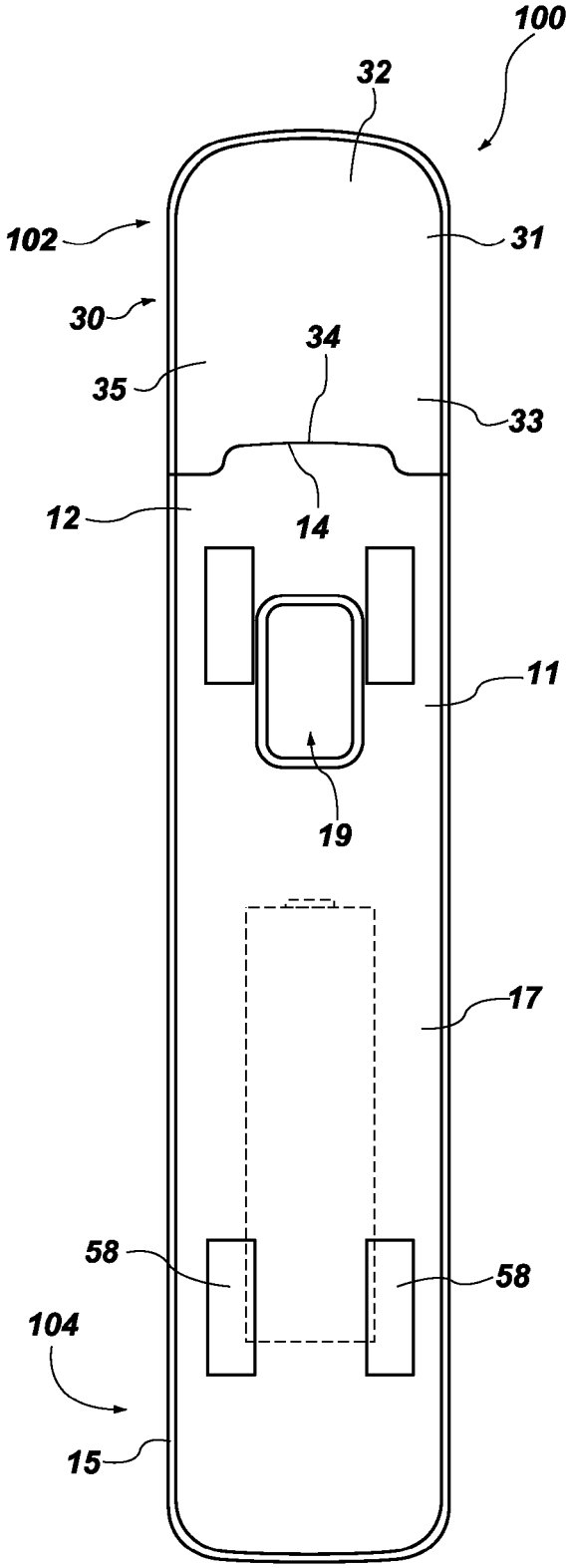
100
32
102
31
30
34
35
33
12
14
11
19
17
58
58
104
15

FIG. 2B

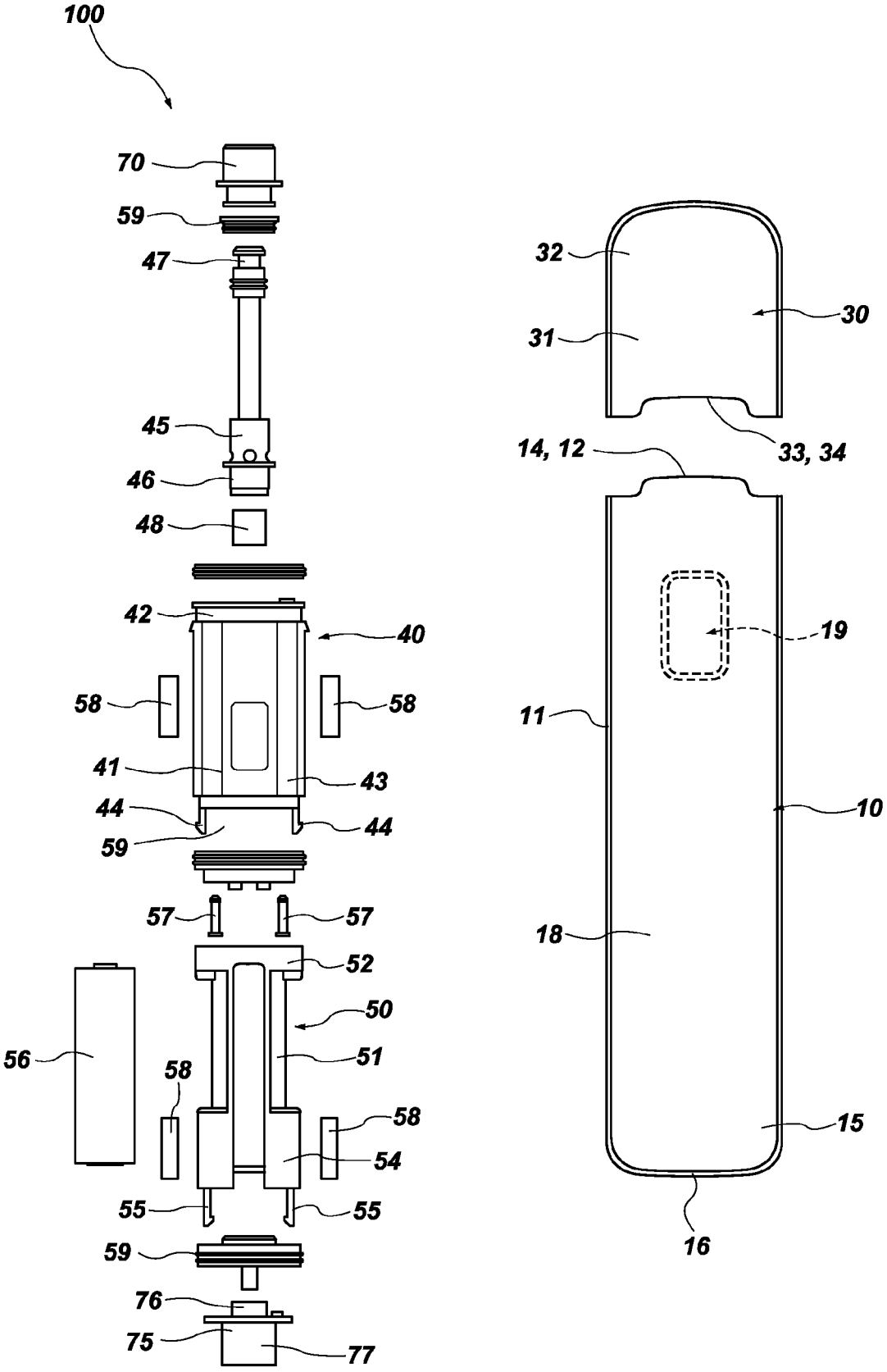
100
70
59
47
45
46
48
42
40
58
58
41
43
44
44
59
57
57
52
50
56
58
51
58
54
55
55
59
76
75
77
32
30
31
33, 34
14, 12
19
11
10
18
15
16

FIG. 3

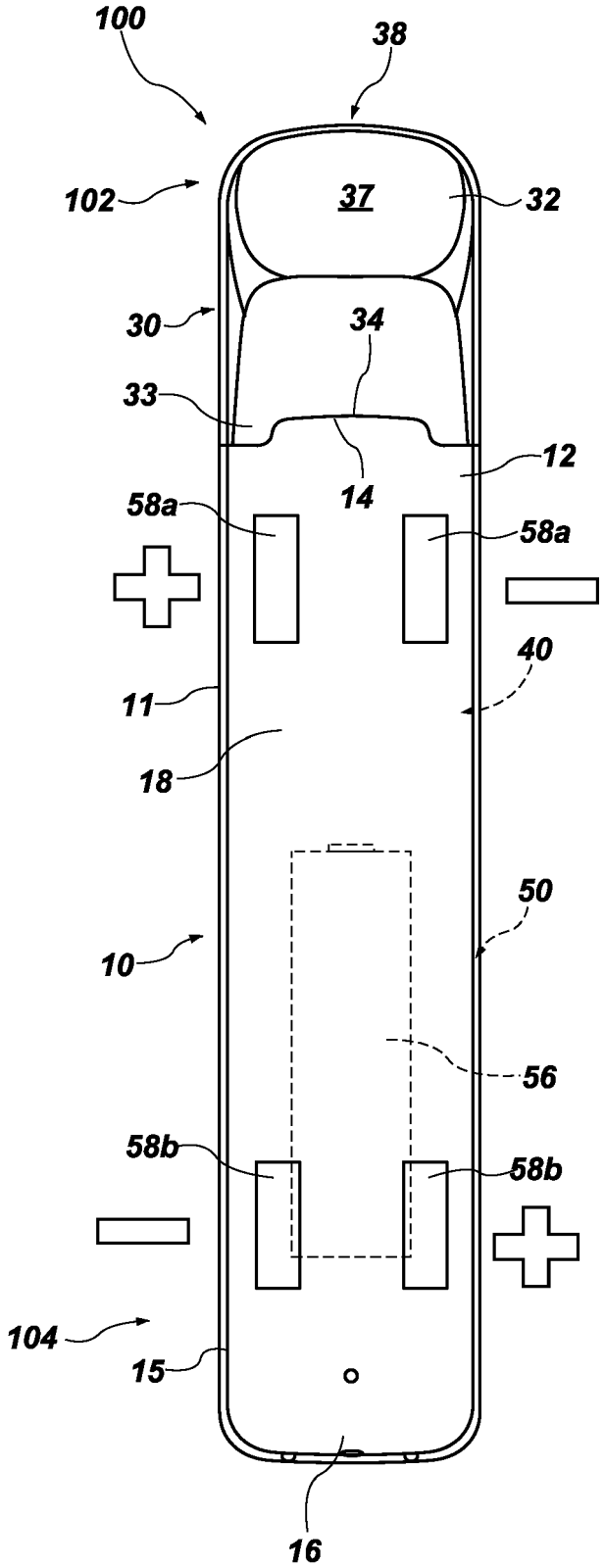
100
38
102
37
32
30
34
33
12
14
58a
58a
40
11
18
50
10
56
58b
58b
104
15
16

FIG. 4

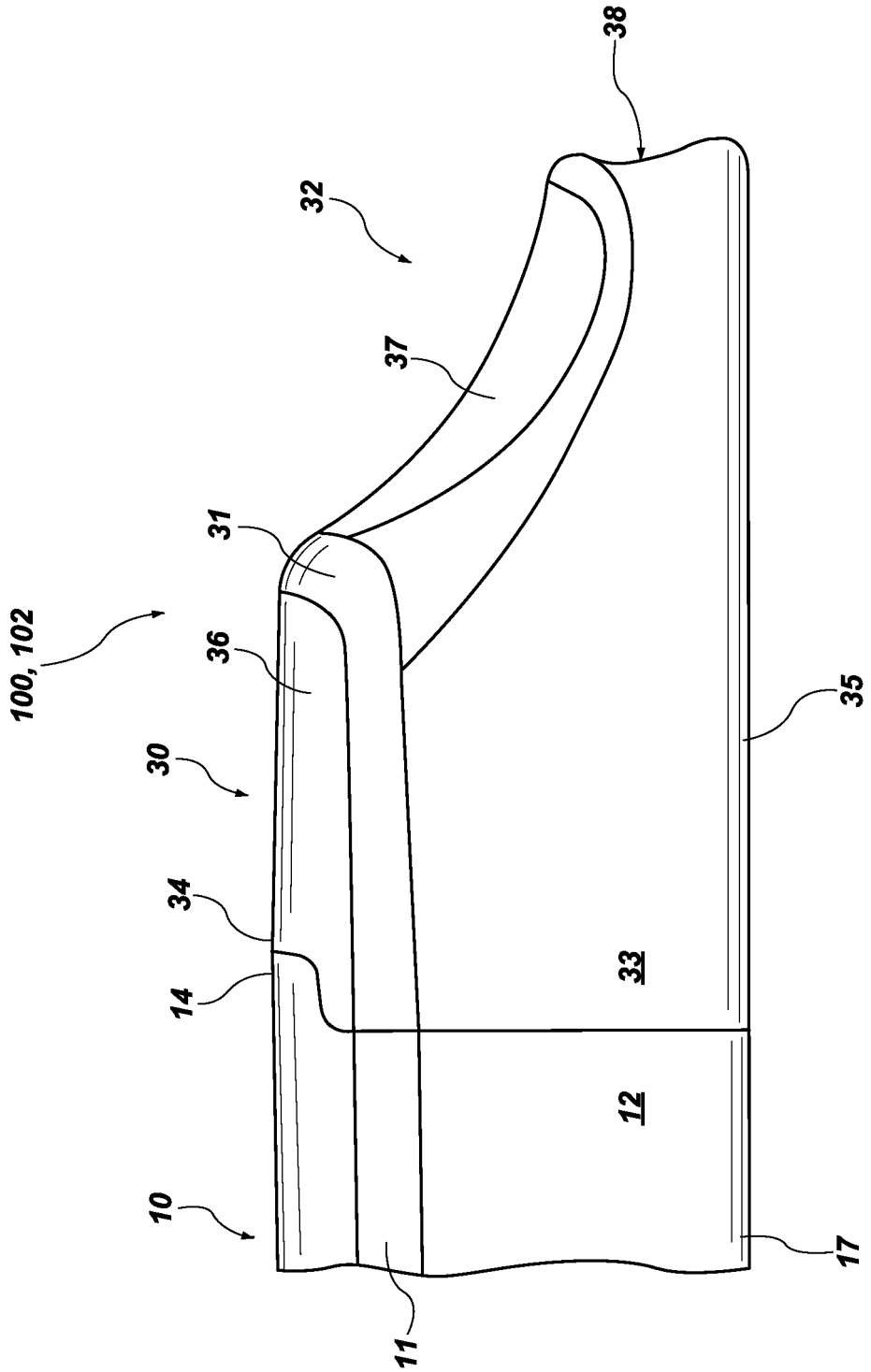

FIG. 5

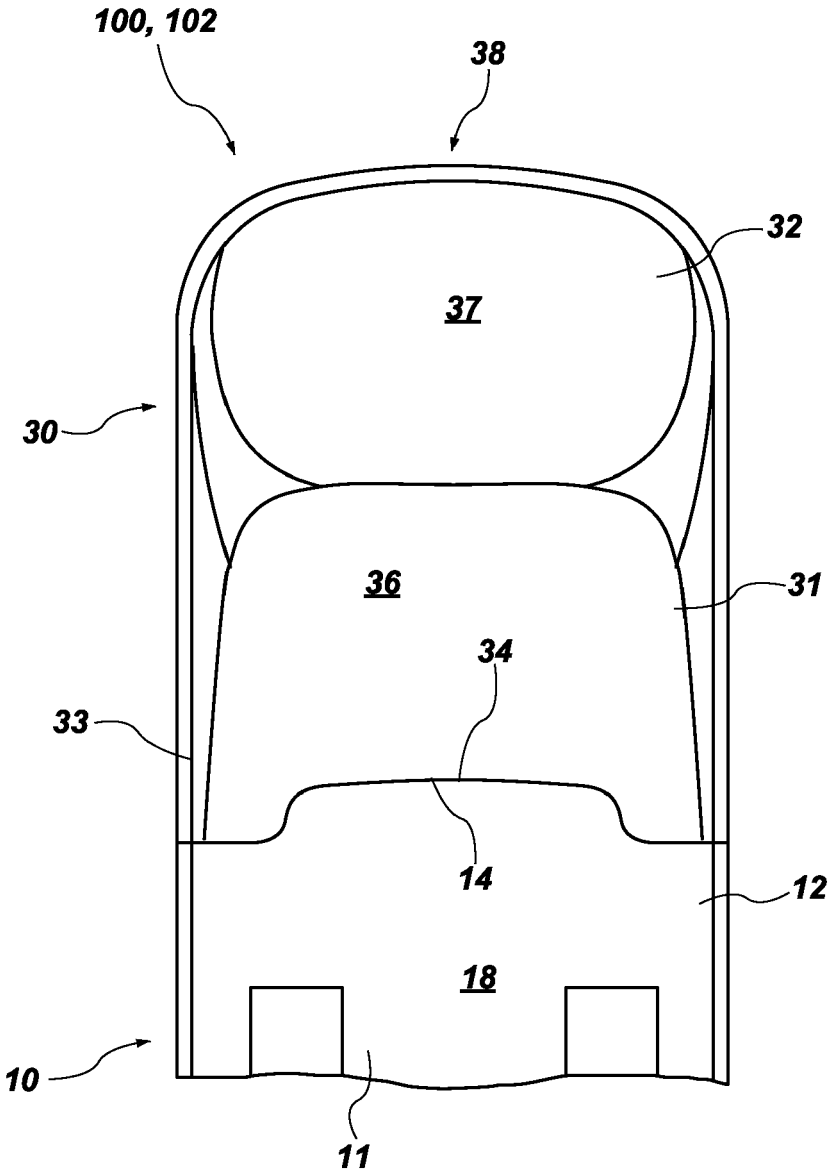

FIG. 6

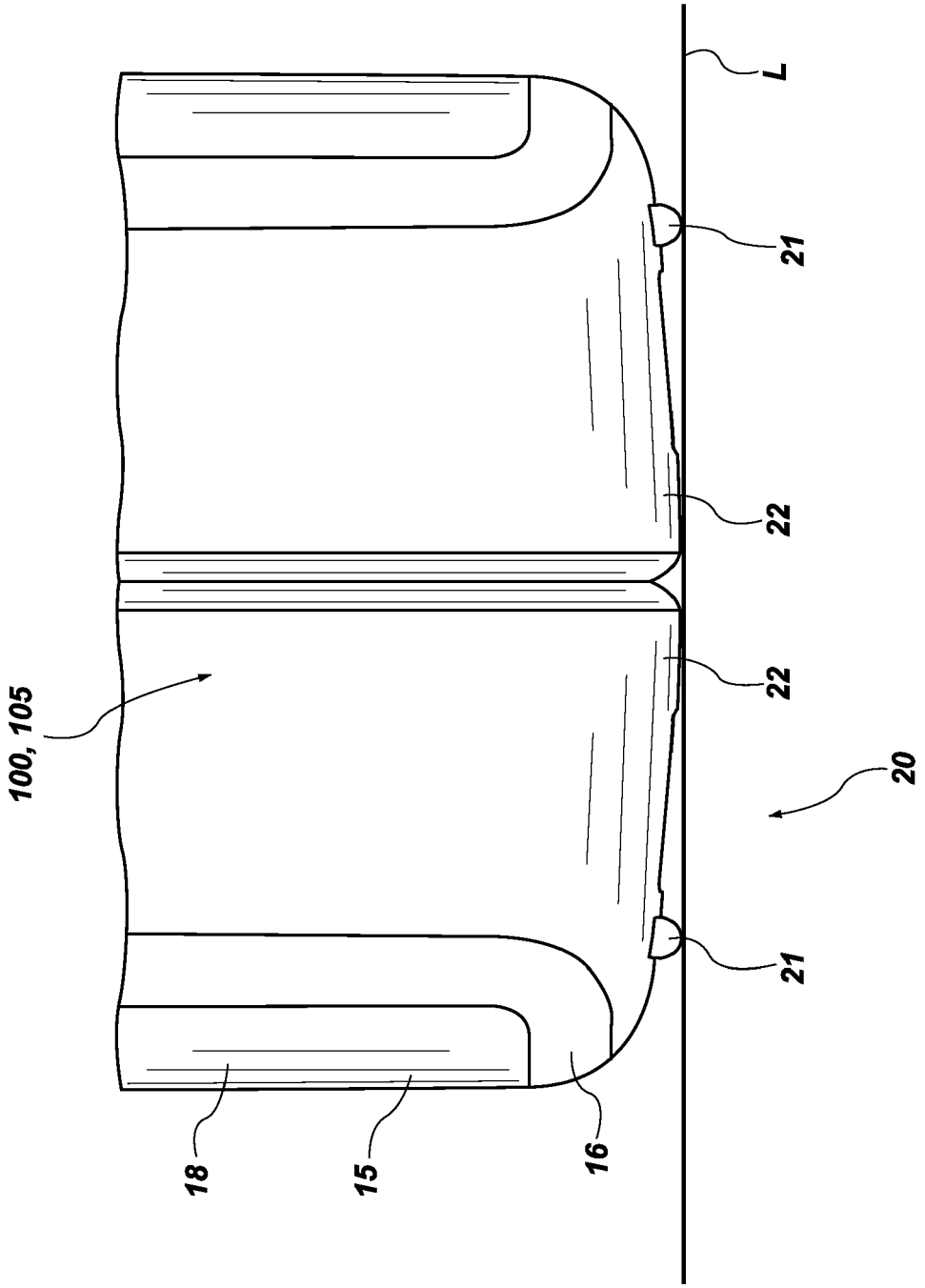

FIG. 7

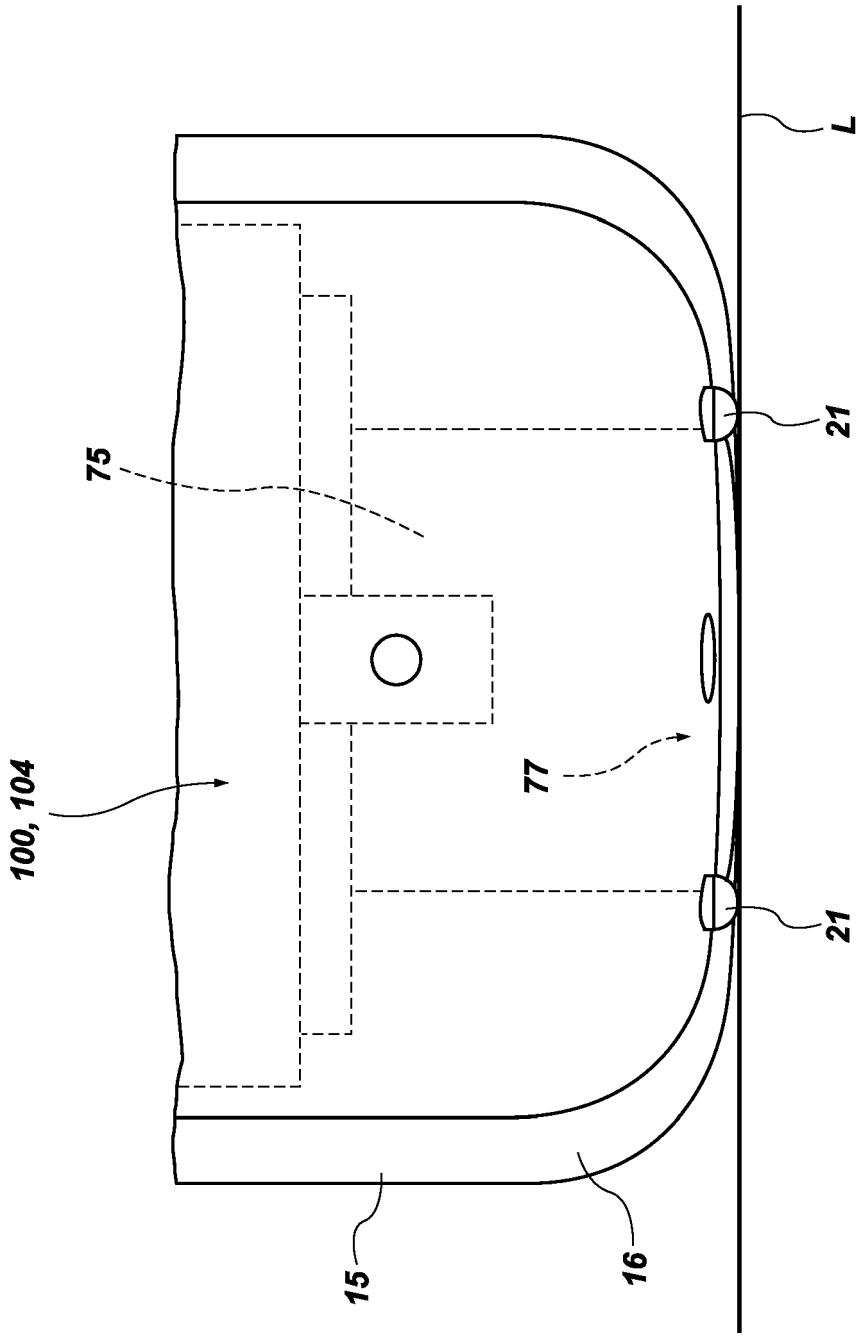

FIG. 8

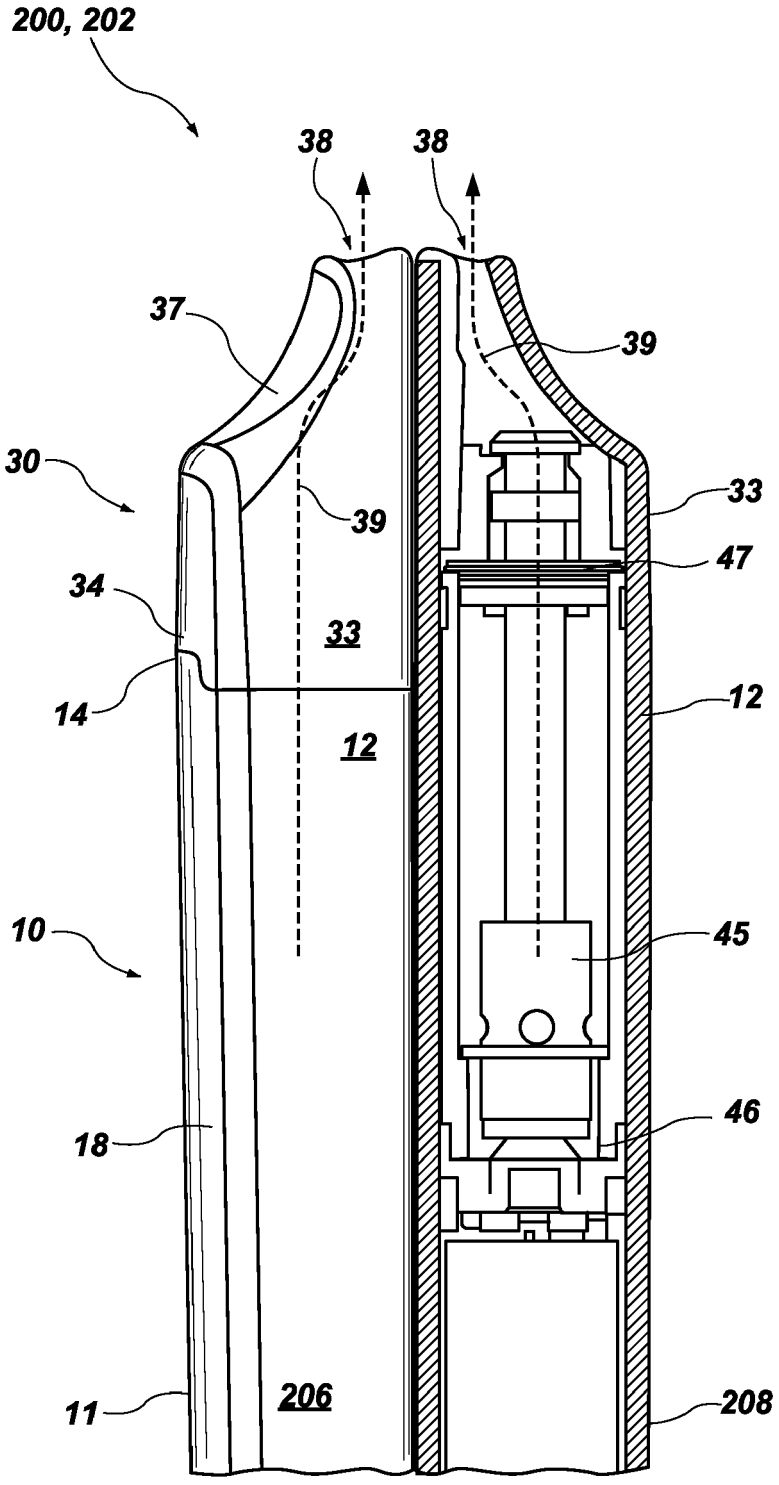

FIG. 9

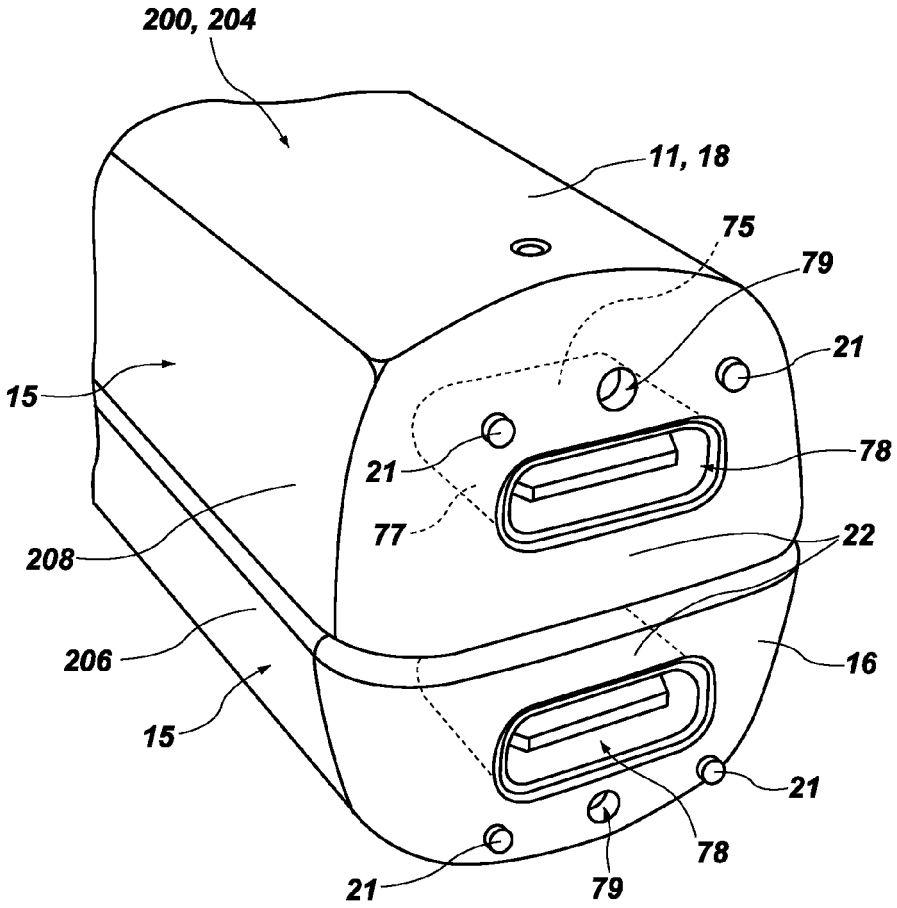

FIG. 10A

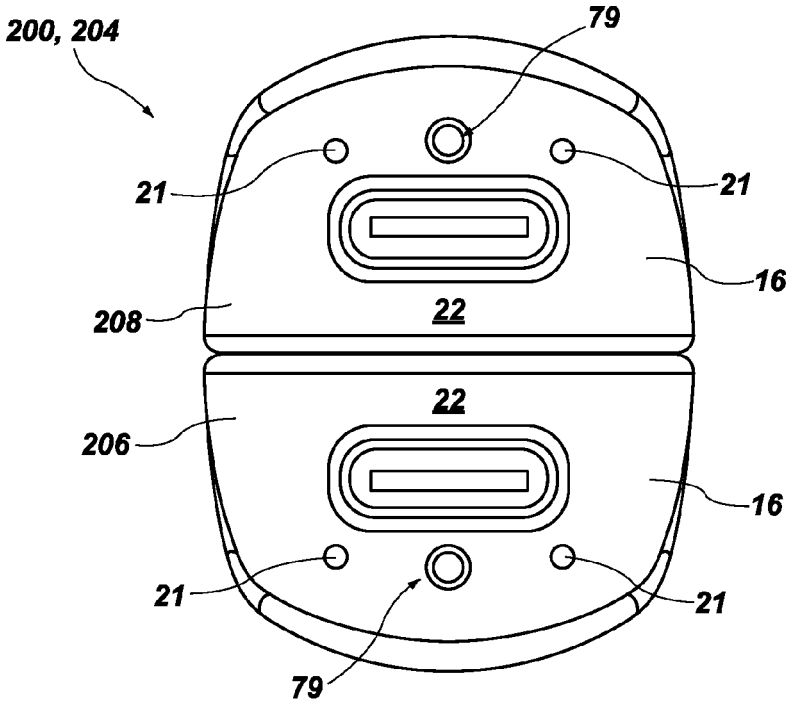

FIG. 10B

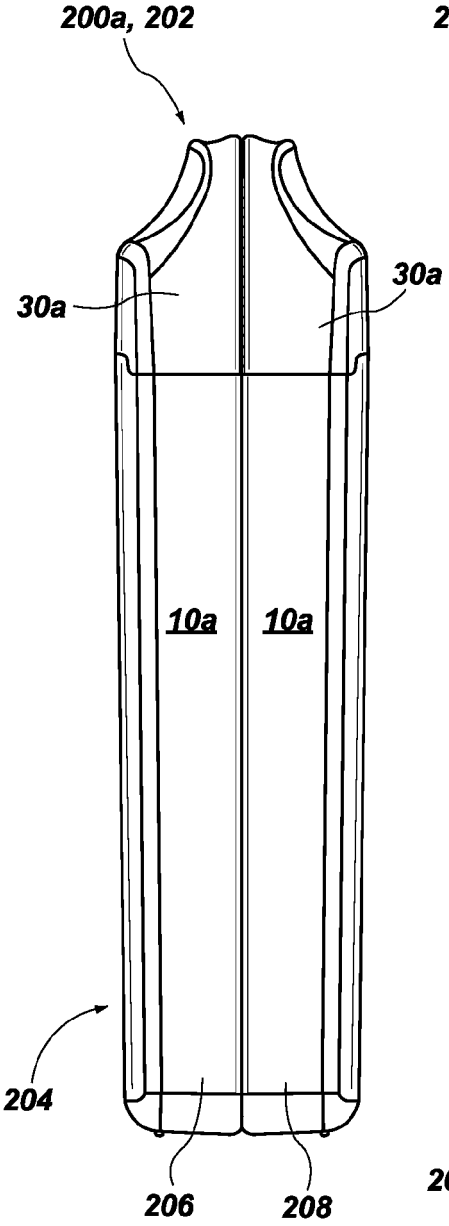

FIG. 11A

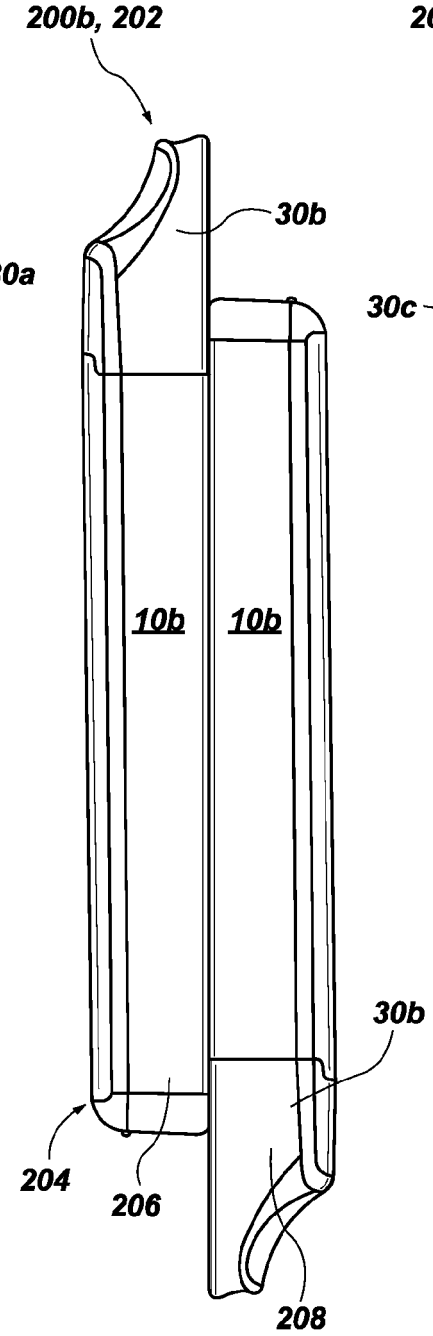

FIG. 11B

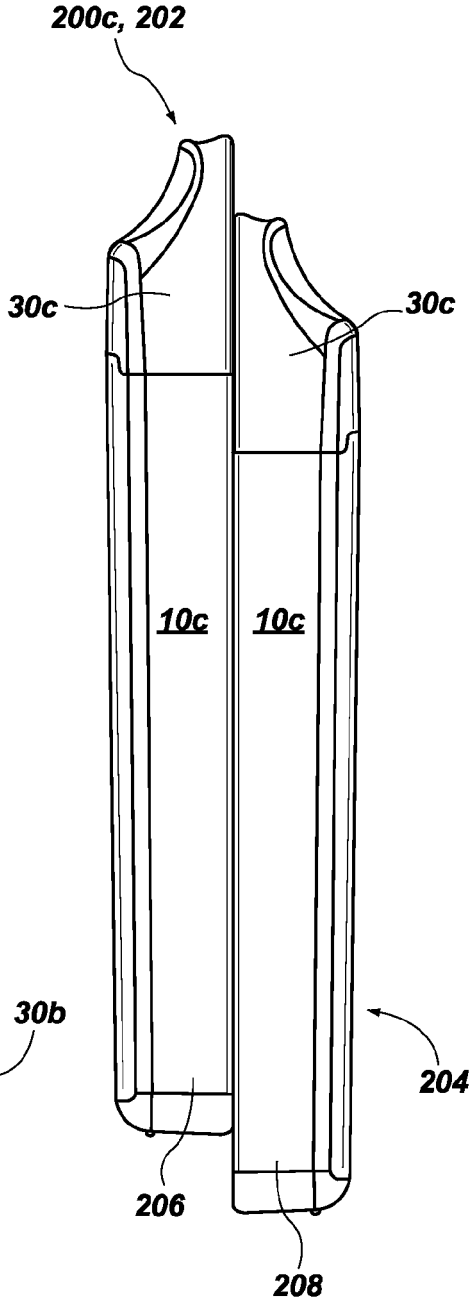

FIG. 11C

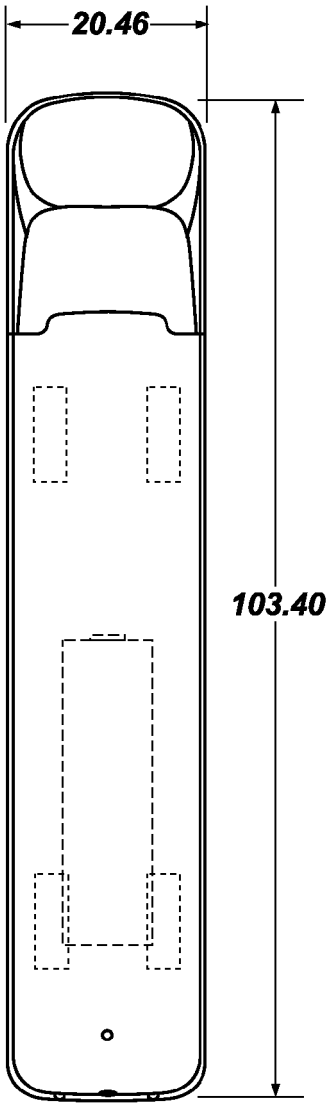

FIG. 12A

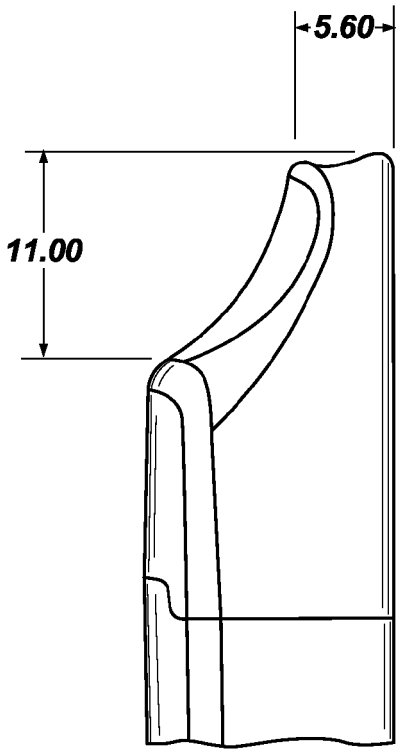

FIG. 12B

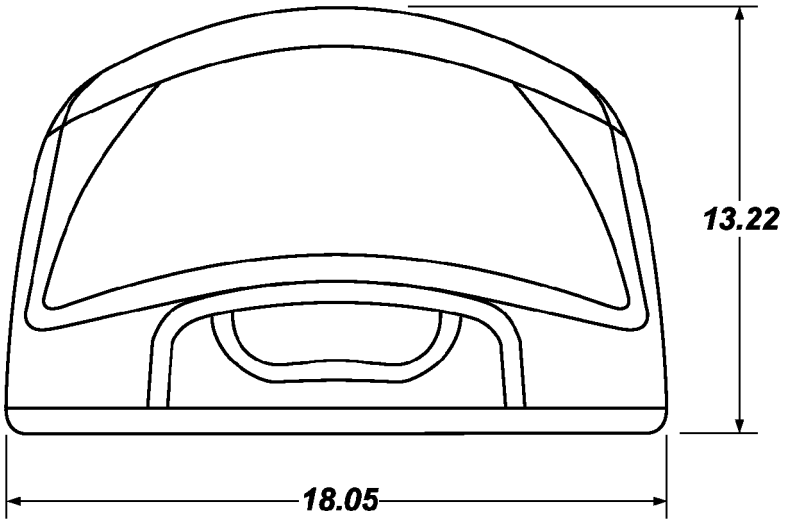

FIG. 12C

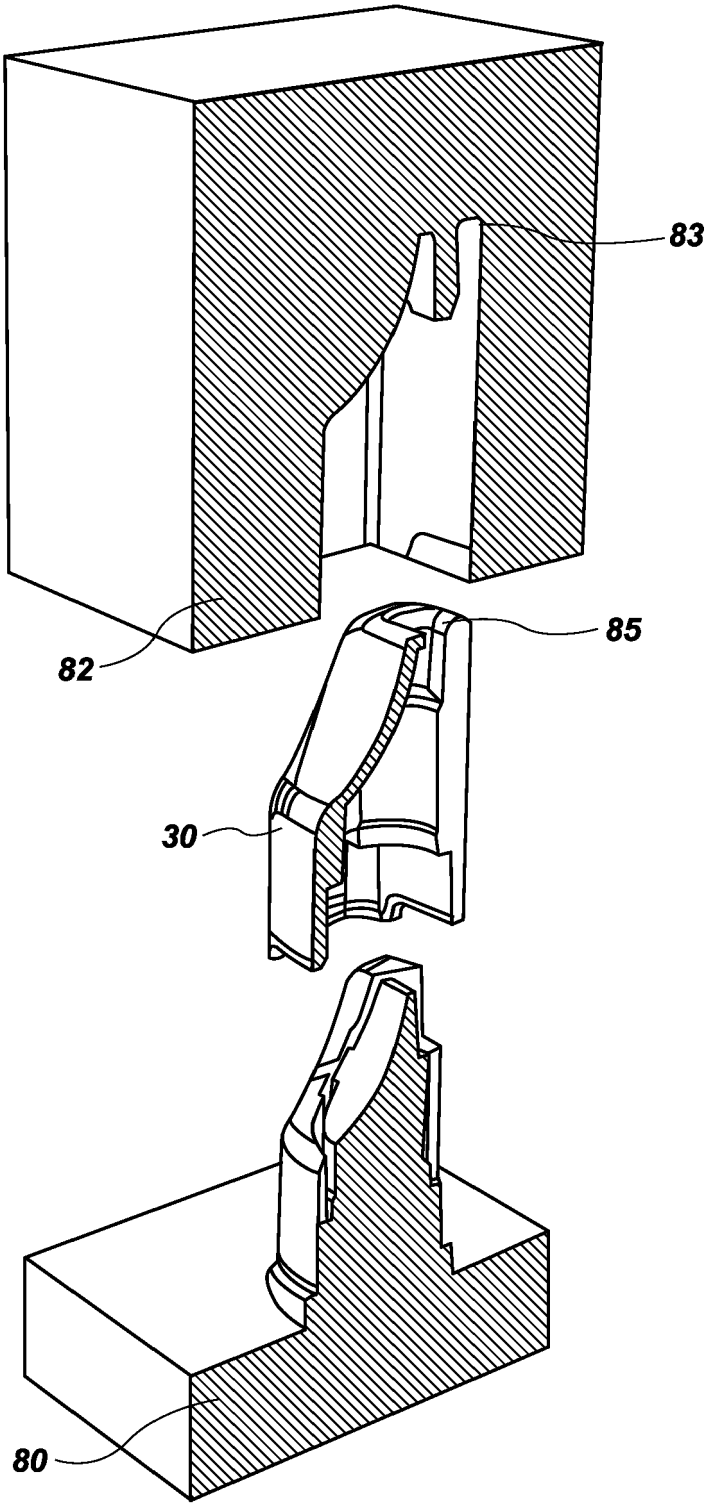

FIG. 13

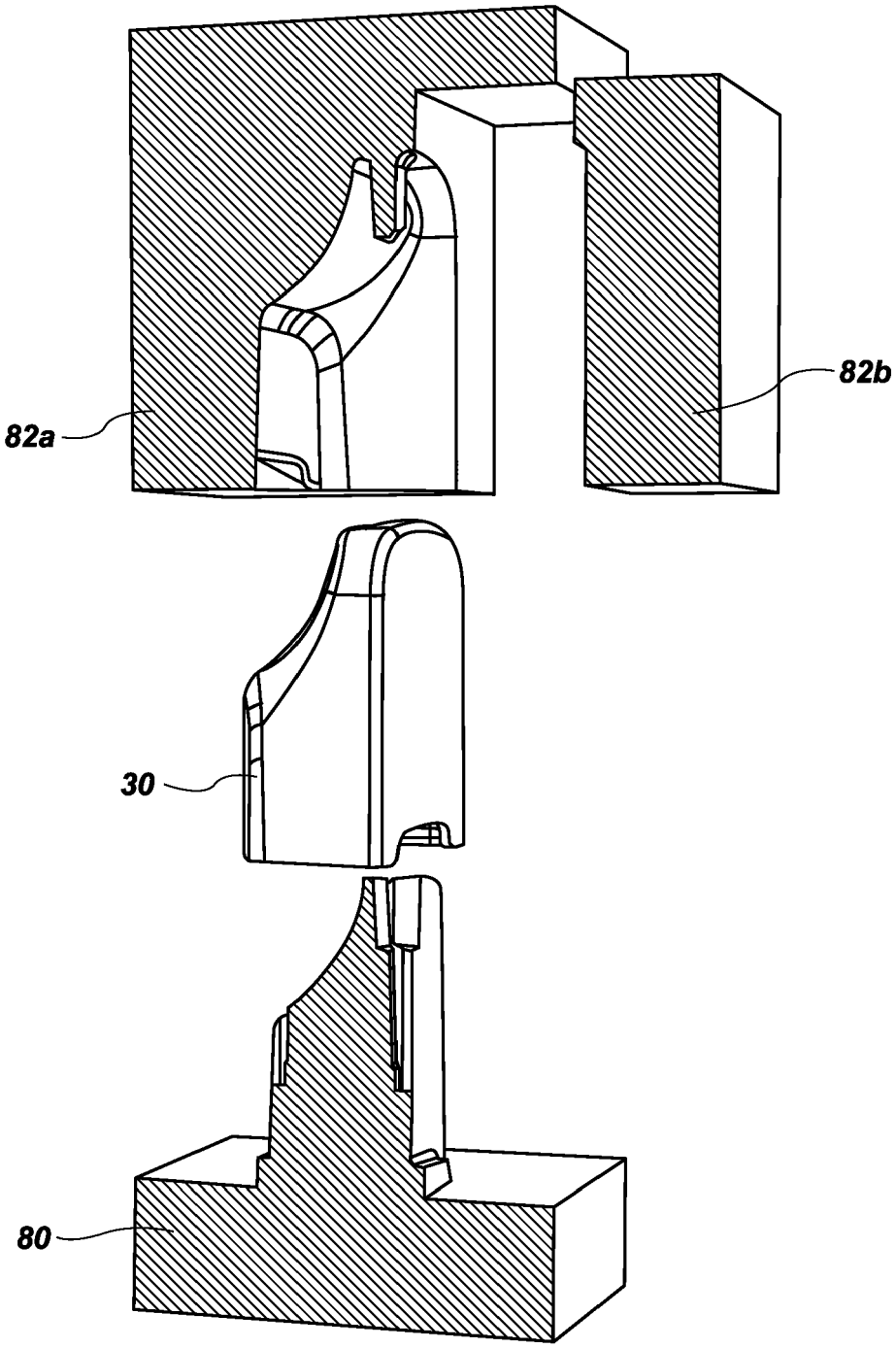

FIG. 14

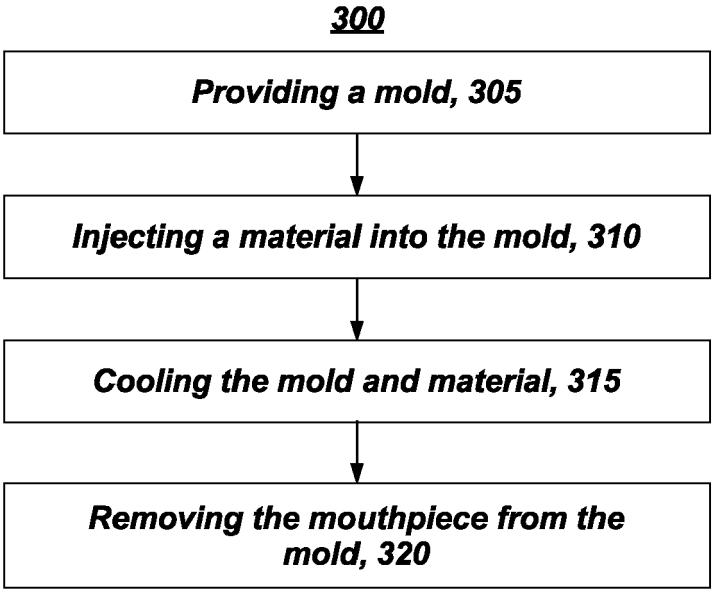
300
Providing a mold, 305
Injecting a material into the mold, 310
Cooling the mold and material, 315
Removing the mouthpiece from the mold, 320

FIG. 15

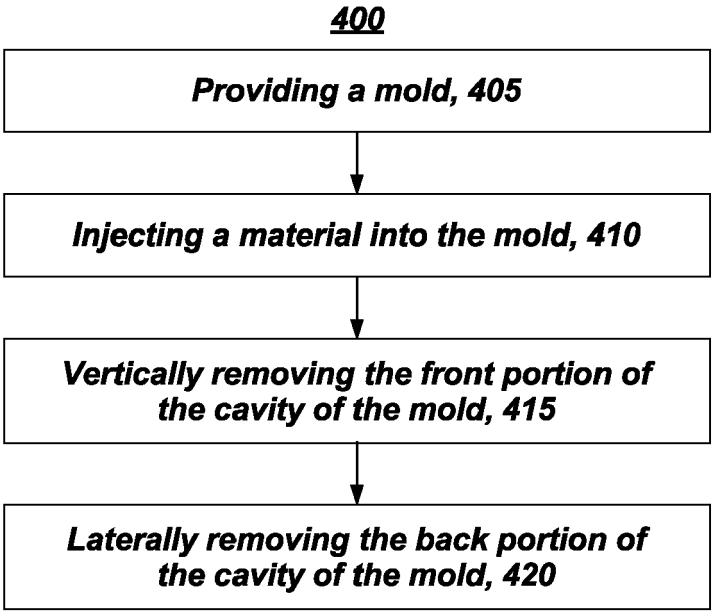
400
Providing a mold, 405
Injecting a material into the mold, 410
Vertically removing the front portion of the cavity of the mold, 415
Laterally removing the back portion of the cavity of the mold, 420

FIG. 16

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 24 17 4148

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2019/232086 A1 (PAX LABS INC [US]) 5 December 2019 (2019-12-05) * paragraphs [0134], [0243], [0262], [0263], [0293], [0295], [0321]; figures 1A,4B,13,20A,33E *	1-15	INV. A24F40/10 A24F40/30 A24F40/40 ADD. A24F40/42
A	US 2021/219608 A1 (CARLBERG DAVID [US] ET AL) 22 July 2021 (2021-07-22) * paragraphs [0132], [0229], [0235], [0250], [0268]; figures 1A,14,15A,22A *	1-15	
A	US 2021/084989 A1 (JOHNSON MYA [US]) 25 March 2021 (2021-03-25) * paragraphs [0079], [0080], [0086], [0087], [0102]; figures 1,2A,13,14,19,31 *	1-15	
A	EP 4 133 952 A1 (BOTTON DAVID [US]) 15 February 2023 (2023-02-15) * paragraphs [0015], [0022], [0059]; figures 6A,8A *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 September 2024	Ettlinger, Mark

CATEGORY OF CITED DOCUMENTS

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

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

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 17 4148

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-09-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2019232086 A1	05-12-2019	AU 2019279893 A1	17-12-2020
		CA 3100749 A1	05-12-2019
		CN 112351697 A	09-02-2021
		EP 3801091 A1	14-04-2021
		IL 278980 A	31-01-2021
		TW 202011840 A	01-04-2020
		US 2019364957 A1	05-12-2019
		US 2019364968 A1	05-12-2019
		US 2019364969 A1	05-12-2019
		US 2019369127 A1	05-12-2019
		US 2019373679 A1	05-12-2019
		US 2024000134 A1	04-01-2024
		US 2024000135 A1	04-01-2024
		US 2024057659 A1	22-02-2024
		US 2024090564 A1	21-03-2024
		WO 2019232086 A1	05-12-2019
US 2021219608 A1	22-07-2021	CA 3162544 A1	01-07-2021
		CN 115413243 A	29-11-2022
		US 2021219608 A1	22-07-2021
		WO 2021133851 A1	01-07-2021
US 2021084989 A1	25-03-2021	NONE	
EP 4133952 A1	15-02-2023	CN 116390662 A	04-07-2023
		EP 4133952 A1	15-02-2023
		US 11259566 B1	01-03-2022
		WO 2023018761 A1	16-02-2023

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 09272223 **[0030]**
- US 17967054 **[0030]**
- US 63448917 **[0030]**
- US 63479958 **[0030]**
- US 63443906 **[0046]**
- US 88437822 **[0078]**