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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
3 November 2016 (03.11.2016)

WIPO | PCT

(10) International Publication Number
WO 2016/172802 A1

(51) International Patent Classification:
A24F 47/00 (2006.01) *A61M 15/06* (2006.01)

(21) International Application Number:
PCT/CA2016/050504

(22) International Filing Date:
29 April 2016 (29.04.2016)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/154,692 29 April 2015 (29.04.2015) US

(71) Applicant: **PODA TECHNOLOGIES LTD.** [CA/CA]; Suite 1980, 1075 West Georgia Street, Vancouver, British Columbia V6E 3C9 (CA).

(72) Inventors: **SELBY, Ryan Daniel**; 232 East 43rd Avenue, Vancouver, British Columbia V5W 1T2 (CA). **KARKHAIRAN-KHOUZANI, Ryan**; 4596 Windsor Street, Vancouver, British Columbia V5V 4P7 (CA).

(74) Agent: **PALMER IP INC.**; PALMER IP INC., Box 32, Suite 950, 609 West Hastings Street, Vancouver, British Columbia V6B 4W4 (CA).

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

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

[Continued on next page]

(54) Title: VAPORIZER APPARATUS, DEVICE, AND METHODS

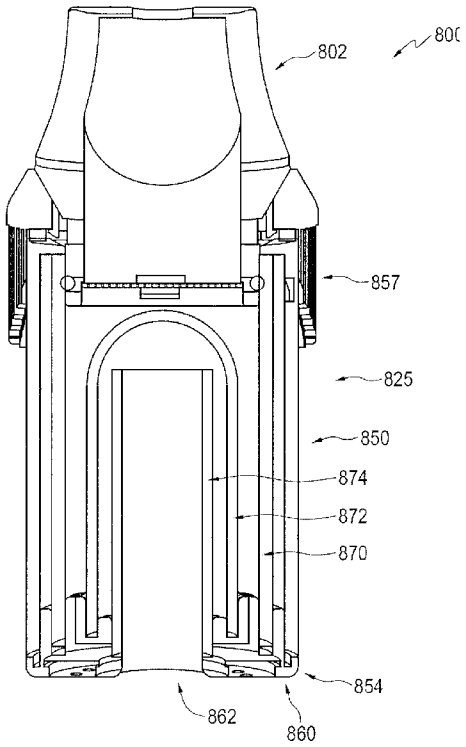

FIG. 13D

(57) Abstract: A vaporizer cartridge includes a base, inner and outer substantially concentric walls extending from the base and defining a vaporization chamber between the outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through the base within a perimeter of the inner wall adapted for receiving a heating element inserted into the heating receptacle opening, wherein a top edge of the outer wall forms an open top rim adapted for coupling to a mouthpiece. The vaporizer cartridge may also have a mouthpiece with a top opening, a central open bore, and a bottom opening sealably coupled to the open top rim. A vaporizer apparatus having a heating component and a vaporizer cartridge is provided, as is a method of making a vaporizer cartridge and a method of vaporizing a consumable substance.

WO 2016/172802 A1

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to the identity of the inventor (Rule 4.17(i))*

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

— *of inventorship (Rule 4.17(iv))*

Published:

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

VAPORIZER APPARATUS, DEVICE, AND METHODS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is related and claims priority to US Provisional Patent Application Serial No. 62/154,692 filed April 29, 2015 and entitled "Vaporizer Apparatus, Device and Methods", which is hereby incorporated herein by reference in its entirety for all purposes.

TECHNICAL FIELD

The present disclosure relates generally to vaporizers. More particularly, the present disclosure relates to cartridges for vaporizers. Even more particularly, the present disclosure relates to cartridges for removable attachment to heating components of vaporizers.

BACKGROUND

Vaporization is a process that involves converting liquids or solids to a gas or vapor without combustion. When a solid is converted to gas or vapor, that phenomenon is called sublimation. When a liquid is converted to gas or vapor, that phenomenon is called evaporation. Collectively, sublimation and evaporation are referred to as vaporizing, vaporization, and the like, interchangeably, throughout this disclosure.

In the related art, a vaporizer is a device used to vaporize active ingredients of a consumable substance for the purpose of inhalation. Consumable substances include medicated waxes, e-liquids (such as glycol based vaporizable liquids commonly used in "e-cigarette" or "vaping" apparatus), medicated oils, and herbs, including plant materials (typically dried plant materials), such as cannabis, tobacco, eucalyptus, shisha, blends of plant materials, and other vaporizable substances. Generally, a vaporizer heats the consumable substance until the active ingredients of the consumable substance are released, or vaporized, typically by reaching the boiling point of the consumable substance.

Related art vaporizers may be advantageous to conventional techniques for consuming substances, such as smoking or combustion. It is generally known that smoking substances causes damage to a user's respiratory system and may delivery carcinogens as well as other harmful substances associated with the combustion or partial combustion of a consumable substance into a user's body. Vaporizers which typically operate at temperatures below the combustion point of the consumable substance may desirably reduce the amount of smoke emitted and the amount of smoke consumed by the user.

Current related art vaporizers are traditionally large, stationary devices that are difficult to transport. For example, consider the Volcano® vaporizer apparatus that is produced by Storz and Bickel®. The Volcano® vaporizer has a relatively heavy base that requires an electrical outlet and vapor bag to collect the vapors. This

configuration requires users to remain at home and near an electrical outlet to operate the related art vaporizer. Some portable vaporizers have also been developed, such as the "Portable Hand-Held Vaporizer Heating Assembly" disclosed in US Patent No. 8,739,786. These portable vaporizers generally utilize a convection-based heating method which is slow to heat and suffers from decreased efficiency after continued use. As such, a need exists for a vaporizer apparatus that addresses the foregoing problems of the related art.

SUMMARY

The present disclosure involves a vaporizer cartridge and vaporizer apparatus that addresses some of the problems experienced in the related art. In accordance with an embodiment of the present disclosure, a vaporizer cartridge is provided. The vaporizer cartridge comprises a base, inner and outer substantially concentric walls extending from the base and defining a vaporization chamber between said outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through the base within a perimeter of the inner wall adapted for receiving a heating element inserted into the heating receptacle opening, where a top edge of the outer wall forms an open top rim adapted for coupling to a mouthpiece.

In a particular embodiment, the vaporizer cartridge additionally comprises a mouthpiece comprising a top opening, a central open bore, and a bottom opening sealably coupled to the open top rim of the cartridge. In another embodiment, the vaporizer cartridge additionally comprises at least one seal situated between the bottom opening of the mouthpiece and the open top rim of said cartridge. In a further embodiment, the mouthpiece is releasably coupled to the open top rim of the cartridge. In yet a further embodiment, the mouthpiece is lockably coupled to thed open top rim of the cartridge, such as by one or more mechanical locking members. In another embodiment, the base of the vaporizer cartridge additionally comprises at least one air aperture adapted to admit air into the vaporization chamber. And in a further embodiment, the vaporizer cartridge additionally comprises a guard layer surrounding at least a portion of the outer wall, where the guard layer is adapted to at least partially thermally insulate a user grasping the guard layer from the outer wall. In another embodiment, the vaporizer cartridge additionally comprises at least one electronically readable memory device attached to the cartridge, such as at least one of: a printed addressable memory device, a thin film printed memory device, a radio frequency identification device, a barcode and a magnetic memory device. In a further embodiment, the vaporizer cartridge additionally comprises at least one vaporizable material contained in the vaporization chamber, such as a consumable substance comprising at least one of: herbal, tobacco, cannabis, and glycol-based liquid vaporizable materials.

In accordance with another embodiment of the present disclosure, a vaporizer apparatus is provided. In one such embodiment, the vaporizer apparatus comprises a vaporizer cartridge comprising a base, inner and

outer substantially concentric walls extending from the base and defining a vaporization chamber between said outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through the base within a perimeter of the inner wall adapted for receiving a heating element inserted into the heating receptacle opening, where a top edge of the outer wall forms an open top rim adapted for coupling to a mouthpiece. The vaporizer apparatus also comprises a heating component comprising a heating element extending from a top surface thereof and circuitry adapted to control heating of the heating element, where the heating element is inserted into the heating receptacle opening in the base of the vaporizer cartridge, and the vaporizer cartridge is coupled to the top surface of the heating component.

In another embodiment, the vaporizer cartridge of the vaporizer apparatus additionally comprises a mouthpiece comprising a top opening, a central open bore, and a bottom opening, sealably coupled to the open top rim of the cartridge. In a further embodiment, the vaporizer apparatus circuitry comprises a battery and a power switch adapted for activation by a user, and/or the heating component is adapted for handheld use by a user. In yet a further embodiment, the vaporizer cartridge additionally comprises at least one electronically readable memory device attached to the cartridge, and the heating component additionally comprises at least one electronic memory device reader adapted to interface with the electronically readable memory device attached to the cartridge.

In accordance with another embodiment of the present disclosure, a method of making a vaporizer cartridge is provided. In one such embodiment, the method comprises:

providing a base, inner and outer substantially concentric walls extending from the base and defining a vaporization chamber between the outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through the base within a perimeter of the inner wall adapted for receiving a heating element inserted into the heating receptacle opening, wherein a top edge of the outer wall forms an open top rim adapted for coupling to a mouthpiece;

filling at least a portion of said vaporization chamber with at least one vaporizable substance; and

sealably coupling a mouthpiece comprising a top opening, a central open bore, and a bottom opening to the open top rim of the cartridge.

In accordance with yet a further embodiment of the present disclosure, a method of vaporizing a consumable substance is provided. In one such embodiment, the method comprises:

providing a vaporizer cartridge comprising a base, inner and outer substantially concentric walls extending from the base and defining a vaporization chamber between the outer and inner walls and containing at least one vaporizable consumable substance, and a heating receptacle opening extending through the base within a perimeter of the inner wall adapted for receiving a heating element inserted into the heating receptacle opening, wherein a top edge of the outer wall forms an open top rim sealably coupled to a mouthpiece;

providing a heating component comprising a heating element extending from a top surface thereof and circuitry adapted to control heating of the heating element;

coupling the vaporizer cartridge to the heating component such that the heating element is inserted into the heating receptacle opening in the base of the vaporizer cartridge; and

activating the heating component to heat the heating element and vaporize the at least one consumable substance.

In yet further embodiments in accordance with the present disclosure, a vaporizer apparatus has a portable non-combustion vaporizer device for generating vapors, wherein the vaporizer device comprises: a heating component and a vaporizer cartridge. The heating component comprises a heating element substantially perpendicularly extending therefrom and into the vaporizer cartridge. In an embodiment of the present disclosure, the cartridge is removably attachable in relation to the heating component. In an embodiment of the present disclosure, the device further comprises a collar for facilitating removably attaching the cartridge to the heating component.

In another embodiment of the present disclosure, the cartridge is adapted to store and vaporize at least one consumable substance. The cartridge comprises a mouth piece and a storage chamber. The storage chamber comprises a dome, a tube, or a heating element receptacle, for receiving a heating element, such as a heating component. In some embodiments of the present disclosure, the storage chamber comprises an air permeable base. In some embodiments of the present disclosure, the storage chamber comprises a thermally conductive material for facilitating distributing heat throughout the at least one consumable substance. In some embodiments, the mouthpiece and the storage chamber are removably attachable in relation to one another.

In some embodiments of the present disclosure, the cartridge comprises at least one pre-filled consumable substance. In some embodiments of the present disclosure, the at least one consumable substance comprises tobacco. In some embodiments of the present disclosure, the at least one consumable substance comprises at least one of herbal materials, tobacco, cannabis materials and e-juice or glycol based liquid materials.

In another embodiment of the present disclosure, the mouth piece comprises a vapor-permeable base and a conically-shaped outer surface. In some embodiments of the present disclosure, the vapor-permeable base comprises a non-vapor-permeable material having one or more apertures. In some embodiments of the present disclosure, the mouth piece comprises a vapor-permeable liner.

In an embodiment of the present disclosure, a method of fabricating a portable non-combustion vaporizer device for generating vapors comprises providing a heating component and providing a cartridge. The heating component providing comprises providing a heating element substantially perpendicularly extending therefrom and into the cartridge. In an embodiment of the present disclosure, the cartridge providing comprises providing

the cartridge as removably attachable in relation to the heating component. In an embodiment of the present disclosure, the method of fabricating the portable non-combustion vaporizer device further comprises providing a collar for facilitating removably attaching the cartridge to the heating component.

In an embodiment of the present disclosure, a method of generating vapors by way of a portable non-combustion vaporizer device comprises providing the vaporizer device, the device providing comprising providing a heating component and providing a cartridge. The heating component providing comprises providing a heating element substantially perpendicularly extending therefrom and into the cartridge. In an embodiment of the present disclosure, the cartridge providing comprises providing the cartridge as removably attachable in relation to the heating component. The cartridge providing comprises loading cartridge, wherein loading the cartridge comprises loading at least one consumable substance. In an embodiment of the present disclosure, the method of providing the portable non-combustion vaporizer device further comprises providing a collar for facilitating removably attaching the cartridge to the heating component. The method of generating vapors further comprises coupling the cartridge with the heating component by way of the collar. The method of generating vapors further comprises providing a mouthpiece and coupling the mouthpiece with the collar. The method of generating vapors further comprises powering the heating component, thereby applying heat to the at least one consumable substance disposed in the cartridge.

Advantages of the present disclosure will become apparent when considering the drawings in conjunction with the below Detailed Description.

BRIEF DESCRIPTION OF THE DRAWING

The above, and other, aspects, features, and advantages of several embodiments of the present disclosure will be more apparent from the following Detailed Description as presented in conjunction with the following several figures of the Drawing.

The apparatus and methods of the present disclosure will now be described with reference to the several accompanying figures of the Drawing, as follows.

FIG. 1A is a diagram illustrating a front elevation perspective view of a vaporizer, in accordance with an embodiment of the present disclosure.

FIG. 1B is a diagram illustrating a cut-away front elevation perspective view of a vaporizer, in accordance with a further embodiment of the present disclosure.

FIG. 2A is a diagram illustrating a front elevation perspective view of a heating component, in accordance with an embodiment of the present disclosure.

FIG. 2B is a diagram illustrating a front elevation perspective view of the heating component, as shown in FIG. 2A, with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 2C is a diagram illustrating a cut-away front elevation perspective view of a heating component for a vaporizer, as shown in FIG. 2A, in accordance with a further embodiment of the present disclosure.

FIG. 3 is a diagram illustrating a front elevation perspective view of a collar, in accordance with an embodiment of the present disclosure.

FIG. 4A is a diagram illustrating a front elevation perspective view of a cartridge, with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 4B is a diagram illustrating an exploded front elevation perspective view of the cartridge, as shown in FIG. 4A, with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 4C is a diagram illustrating a cut-away front elevation perspective view of a cartridge, in accordance with a further embodiment of the present disclosure.

FIG. 5 is a diagram illustrating a front elevation perspective view of a vaporizer device, in accordance with an embodiment of the present disclosure.

FIG. 6A is a diagram illustrating a front elevation perspective view of a circuitry component, in accordance with an embodiment of the present disclosure.

FIG. 6B is a diagram illustrating a front elevation perspective view of the circuitry component, as shown in FIG. 6A, with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 7 is a diagram illustrating a cut-away front elevation perspective view of a protective adapter, in accordance with an embodiment of the present disclosure.

FIG. 8 is a diagram illustrating a front elevation perspective view of an adapter and heating element, in accordance with an embodiment of the present disclosure.

FIG. 9A is a diagram illustrating a top view of an adapter, in accordance with an embodiment of the present disclosure.

FIG. 9B is a diagram illustrating a front elevation perspective view of the adapter, as shown in FIG. 9A, in accordance with an embodiment of the present disclosure.

FIG. 9C is a diagram illustrating a cut-away front elevation perspective view of the adapter, as shown in FIG. 9A, in accordance with an embodiment of the present disclosure.

FIG. 10 is a diagram illustrating a front view of a heating element, in accordance with an embodiment of the present disclosure.

FIG. 11A is a diagram illustrating a front elevation perspective view of a protective shell, in accordance with an embodiment of the present disclosure.

FIG. 11B is a diagram illustrating a cut-away front view of the protective shell, as shown in FIG. 11A, in accordance with an embodiment of the present disclosure.

FIG. 12A is a diagram illustrating a cut-away front elevation perspective view of a cartridge, in accordance with an embodiment of the present disclosure.

FIG. 12B is a diagram illustrating an exploded cut-away front elevation perspective view of the cartridge, as shown in FIG. 12A, in accordance with an embodiment of the present disclosure.

FIG. 13A, is a diagram illustrating a cut-away front elevation perspective view of a vaporization chamber, in accordance with an embodiment of the present disclosure.

FIG. 13B is a diagram illustrating a cut-away front elevation perspective view of the vaporization chamber, as shown in FIG. 13A, with the outer ring removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 13C is a diagram illustrating a cut-away front elevation perspective view of the vaporization chamber, as shown in FIG. 13A, with the outer ring and middle heating receptacle removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 13D is a diagram illustrating a cut-away front elevation perspective view of a cartridge including an internal vaporization chamber, in accordance with a further embodiment of the present disclosure.

FIG. 14 is a diagram illustrating a top perspective view of a protective shell, in accordance with an embodiment of the present disclosure.

FIG. 15A is a diagram illustrating a cut-away front elevation perspective view of a vaporization chamber, in accordance with an embodiment of the present disclosure.

FIG. 15B is a diagram illustrating a cut-away front elevation perspective view of the vaporization chamber, as shown in FIG. 15A, with the outer ring removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 15C is a diagram illustrating a cut-away front elevation perspective cross-section view of the vaporization chamber, as shown in FIG. 15A, with the outer ring and middle heating receptacle removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

FIG. 16 is a diagram illustrating a top perspective view of a protective shell, in accordance with an embodiment of the present disclosure.

FIG. 17A is a diagram illustrating a cut-away front perspective view of a mouthpiece, in accordance with an embodiment of the present disclosure.

FIG. 17B is a diagram illustrating in a front perspective view of the mouthpiece, as shown in FIG. 17A, in accordance with an embodiment of the present disclosure.

FIG. 18 is a flowchart illustrating a method of fabricating a portable non-combustion vaporizer device for generating vapors, in accordance with an embodiment of the present disclosure.

FIG. 19 is a flowchart illustrating a method of generating vapors by way of a portable non-combustion vaporizer device, in accordance with an embodiment of the present disclosure.

Corresponding reference characters indicate corresponding components throughout the several figures of the Drawing. Elements in the several figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be emphasized relative to other elements for facilitating understanding of the various presently disclosed embodiments. Also, common, but well-understood, elements that are useful or necessary in commercially feasible embodiment are often not depicted in order to facilitate a less obstructed view of these various embodiments of the present disclosure.

DETAILED DESCRIPTION

The following description is not to be taken in a limiting sense, but is made merely for the purpose of describing the general principles of exemplary embodiments. The scope of the disclosure should be determined with reference to the Claims. Reference throughout this specification to “one embodiment,” “an embodiment,” or similar language denotes that a particular, feature, structure, or characteristic, described in connection with the embodiment, is included in at least one embodiment of the present disclosure. Thus, appearances of the phrases “in one embodiment,” “in an embodiment,” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

Further, the described features, structures, or characteristics of the present disclosure may be combined in any suitable manner in one or more embodiments. In the Detailed Description numerous specific details are provided for a thorough understanding of embodiments of the disclosure. One skilled in the relevant art will recognize, however, that the embodiments of the present disclosure can be practiced without one or more of the specific details, or with other methods, components, materials, and so forth, and still remain encompassed by the present disclosure. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the present disclosure.

Referring to FIG. 1A, this diagram illustrates, in a front elevation perspective view, a vaporizer device **2**, such as would be included in a vaporizer apparatus, in accordance with an embodiment of the present disclosure.

The vaporizer **2** comprises a heating component **100**, a protective collar **200**, and a cartridge **300**. In some embodiments, the protective collar **200** retains the cartridge **300** against a portion of the heating component **100**, such as to enable heating of a vaporizable substance held within a vaporization chamber within the cartridge **300**, to produce a vapor which is inhalable or consumable by a user. The heating component **100** is adapted to couple with the protective collar **200**; and the protective collar **200** is adapted to couple with the cartridge **300**.

Referring now to FIG. 1B, this diagram illustrates, in a cut-away front elevation perspective view, a vaporizer device **9**, such as would be included in a vaporizer apparatus, in accordance with a further embodiment of the present disclosure. The vaporizer **9** comprises a heating component base or handle **150**, a heating element **250**, and a cartridge **390** adapted for fitting within an open top collar or flange **151** of heating component base **150**. In some embodiments, the top collar or flange **151** of heating component base **150** retains the cartridge **390** against a portion of the heating component **150**, such as against an internal heating element **250** for example, such as to enable heating of a vaporizable substance held within a vaporization chamber within the cartridge **390**, and to produce a vapor which is inhalable or consumable by a user. The top collar or flange **151** of heating component base **150** is adapted to couple with the cartridge **390**. In some embodiments, heating component base **150** may desirably be adapted for handheld use by a user and may be configured in a shape suitable for holding in one or both hands of the user, such as by grasping the outside cylindrical surface of the heating component base **150**.

Referring to FIG. 2A, this diagram illustrates, in a front elevation perspective view, a heating component **100**, in accordance with an embodiment of the present disclosure. The heating component **100** comprises a case **102**, a heating element **104**, circuitry **108** (as shown in FIG. 2B), and a power switch **110**. The heating element **104** is coupled with the circuitry **108**, such as by electrical connection. Circuitry **108**, operated by the power switch **110**, controls the amount of electrical current that is provided to the heating element **104**, which in one embodiment may comprise one or more electrical filaments which may be resistively heated by the passage of electrical current therethrough. In some embodiments, the power switch **110** enables controlling (adjusting), e.g., by a user, the amount of current that is provided to the heating element **104**, such as to control or adjust the temperature or heat produced by the heating element 104, and which may desirably control the extent or amount of vaporization of a vaporizable substance held within a connected cartridge when attached to the heating component **100**. In one such embodiment, the power switch **110** may comprises one of a digital switch and an analog switch. In one embodiment, the heating element **104** is set to a temperature of approximately 450°F when activated. In other embodiments, the heating element **104** may emit heat comprising a temperature ranging from approximately 300°F to approximately 500°F when activated. The power switch **110** is coupled with a power source (not shown), such as a battery, an uninterrupted power supply, and a power outlet, such as for connection to mains electrical power for operation when plugged in to "the grid" for example.

Still referring to FIG. 2A, the heating element **104** may comprise any suitable heat-emitting device, such as that which converts electricity into heat through the process of resistive or joule heating. In some embodiments, the heating element **104** may comprise at least one of a nichrome (nickel-chromium alloy) or tungsten heating element, a resistance wire, an etched foil, a radiative heating element, a conductive grid or mesh heating element, and the like. In some embodiments, the heating element **104** may be encased in a thermally conductive material, such as glass, plastic, metal ceramic, and the like. In a particular embodiment, the heating element **104** may comprise a heat-emitting filament that is encased in glass, such as a light bulb.

Referring to FIG. 2B, this diagram illustrates, in a front elevation perspective view, the heating component **100**, as shown in FIG. 2A, with an outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure. The heating component **100** comprises an outer case **102**, a heating element **104**, circuitry **108**, and a switch **110**. The heating component **100** further comprises a top **114** and a bottom **116**. The top **114** of the case **102** comprises an aperture **117** for receiving the heating element **104**. In this embodiment of the present disclosure, the aperture **117** is substantially centrally located in relation to the top **114**. In some embodiments of the present disclosure, the aperture **117** is located in a non-central position, that is, the aperture **117** may be located closer to one side of the top **114**.

Still referring to FIG. 2B, in a particular illustrative embodiment, the heating element **104** comprises a light bulb that is insertable in relation to the aperture **117** of the case **102** and is configured to electrically couple with the circuitry **108**. The heating element **104** extends from the top **114** of the case **102**. The heating element **104** extends substantially perpendicularly from the top **114** of the case **102**. In some embodiments, a plurality of apertures **117** are disposable in relation to the top **114** and are configured to receive a plurality of heating elements **104**. Other configurations of the aperture **117** in relation to the top **114** of the case **102** are possible and encompassed by the present disclosure. In some embodiments of the present disclosure, the case **102** comprises an air conduit **121**. In other embodiments, a portion of case **102** comprises an air conduit **121**. In yet other embodiments of the present disclosure, a tube or channel (not shown) is insertable within the case **102** to act as the air conduit **121**.

Still referring to FIG. 2B, the top **114** comprises at least one air aperture **119** that facilitates air flow therethrough, e.g., air flow from the top **114** of the case **102** into, and out of, the air conduit **121**. The case **102** further comprises at least one additional air aperture **112** that facilitates air flow through sides of the case **102** into, and out of, the air conduit **121**. Accordingly, air may flow through the case **102** by entering the at least one air aperture **112** through the air conduit **121** and exiting the at least one air aperture **119**. In some embodiments of the present disclosure, the at least one air aperture **112** may be located in relation to other portions of the case **102**, such as the bottom **116** of the case **102**, wherein the air conduit **121** connects the at least one air aperture **112** to the at least one air aperture **119** disposed in relation to the top **114**.

Still referring to FIG. 2B, in some embodiments of the present disclosure, the at least one air aperture **112** may not be required, such as in an embodiment wherein a plurality of air gaps (not shown) are disposable in relation to the case **102** which also facilitate sufficient air flow to enter the air conduit **121**. In some embodiments of the present disclosure, the case **102** comprises at least one air permeable material. In some embodiments of the present disclosure, the top **114** comprises an air-permeable material, such as at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric, such as cotton or polyester. In these embodiments of the present disclosure, the at least one air aperture **119** may not be required, whereby the air-permeable material facilitates air to flow from the air conduit **121**.

Still referring to FIG. 2B, in one embodiment, the case **102** comprises a recessed surface **118** disposed relative to the body of the case **102** for facilitating removable coupling, such as with a collar **200** or a cartridge 300, for example. The recessed surface **118** extends from an edge of the top **114** of the case **102** to a ridge **120** (also see FIG. 2A). An outer portion of the recessed surface **118**, having substantially constant outer dimension(s), is configured, e.g., sized, to removably couple with an inner portion of a bore **210**, having inner dimension(s), in the collar **200** (see FIG. 3). The inner dimension(s) of bore **210** approximate the substantially constant outer dimension(s) of the recessed surface **118** for a distance corresponding to the axial length of the recessed surface **118**, wherein the substantially constant outer dimension(s) of the recessed surface **118** comprises a range that is equal to, or less than, e.g., slightly less than, that of the bore **210**. In some embodiments of the present disclosure, the substantially constant outer dimension(s) of the recessed surface **118** comprises a range that is less than, e.g., slightly less than, approximately 0.01 mm to approximately 3 mm, e.g., corresponding to approximately 1/256 inch to approximately 1/8 inch of the dimension of bore **210**.

Referring now to FIG. 2C, this diagram illustrates, in a cut-away front elevation perspective view, a heating component base or handle **150**, comprising a heating element **250**, in accordance with another embodiment of the present disclosure. The heating component base **150** comprises an outer case **152**, a heating element **250**, circuitry **158**, and a switch operable by a user (not shown). The heating component base **150** further comprises a top **164** and a bottom **166**. The top **164** of the case **152** comprises an aperture **167** for receiving the heating element **250**. In this embodiment of the present disclosure, the aperture **167** is substantially centrally located in relation to the top **164**. In some embodiments of the present disclosure, the aperture **167** may alternatively be located in a non-central position, that is, the aperture **167** may be located closer to one side of the top **164**.

Still referring to FIG. 2C, the heating element **250** is operably coupled with the circuitry **158**, such as by electrical connection. Circuitry **158**, operated by one or more signal from a user, such as operation of a power switch (not shown) for example, controls the amount of electrical current that is provided to the heating element **250**, which in one embodiment may comprise one or more electrical filaments which may be resistively heated

by the passage of electrical current therethrough. In some embodiments, the operation of the heating component base **150** enables controlling (adjusting), e.g., by a user, the amount of current that is provided to the heating element **250**, such as to control or adjust the temperature or heat produced by the heating element **250**, and which may desirably control the extent or amount of vaporization of a vaporizable substance held within a connected cartridge when attached to the heating component **150**. In one such embodiment, similar to as shown in the embodiment depicted in FIG. 2A, a user-operable power switch may comprises one of a digital switch and an analog switch. In one such embodiment, the heating element **250** may be set to a temperature of approximately 450° F when activated. In other embodiments, the heating element **250** may emit heat comprising a temperature ranging from approximately 300° F to approximately 500° F when activated. In one embodiment, the circuitry **158** may comprise a power source (not shown), such as a battery, an uninterrupted power supply, and a power outlet, such as for connection to mains electrical power for operation when plugged in to "the grid" for example. In one such embodiment, similar to as shown in FIG. 2A, the heating element **250** may comprise any suitable heat-emitting device, such as that which converts electricity into heat through the process of resistive or joule heating. In some embodiments, the heating element **250** may comprise at least one of a nichrome (nickel-chromium alloy) or tungsten heating element, a resistance wire, an etched foil, a radiative heating element, a conductive grid or mesh heating element, and the like. In some embodiments, the heating element **250** may be encased in a thermally conductive material, such as glass, plastic, metal ceramic, and the like. In a particular embodiment, the heating element **150** may comprise a heat-emitting filament that is encased in a substantially cylindrical glass surface, such as a light bulb, or other protective glass heat conductive shield, for example.

Still referring to FIG. 2C, in a particular illustrative embodiment, the heating element **250** is insertable in relation to the aperture **167** of the case **152** and is configured to electrically couple with the circuitry **158** such as to provide for electrically powered heating operation of the heating element **250.** In such a case, the heating element **250** extends from the top **164** of the case **152**. Substantially similar to the embodiment as shown in FIG. 2A, in some embodiments of the present disclosure, heating element **250** may be alternately located and configured, and may comprise more than one heating element component (not shown). In one embodiment, the case **152** may comprise an air conduit (not shown). In another embodiment, the case **152** may comprise a plurality of air gaps (not shown) which may facilitate sufficient air flow to enter the case 152 such that air may exit from one or more air conduits **171** which may be disposed in or near the top **164** of the case **152**, such as to allow for air to enter into the base of a cartridge (not shown) engaged with the top **164** of the case **152** during use, for example. In some embodiments of the present disclosure, the case **152** comprises at least one air permeable material. In some embodiments of the present disclosure, the top **164** comprises an air-permeable material, such as at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric,

such as cotton or polyester, such as may provide for allowing air flow into and/or out of a cartridge (not shown) engaged with the heating component base **150** during use.

Still referring to FIG. 2C, in one embodiment, the case **152** comprises a recessed surface **168** disposed relative to the body of the case **152** for facilitating removable coupling, such as with a collar **200** or a cartridge **390**, for example. The recessed surface **168** extends from an edge of the top **164** of the case **152** to a ridge **170**. An outer portion of the recessed surface **168**, having substantially constant outer dimension(s), may desirably be configured, e.g., sized, to removably couple with an inner portion of a bore **210** of a collar **200** (see FIG. 3), or alternatively to removably couple with an inner portion of a bore of a cartridge **390**, or further alternatively to allow coupling with a top collar or flange **151** of heating component base **150**, such as to retain a cartridge **390** against a portion of the heating component **150**, such as against an internal heating element **250** for example.

Referring now to FIG. 3, this diagram illustrates, in a front elevation perspective view, a collar **200**, in accordance with an embodiment of the present disclosure. The collar **200** is substantially tubular and comprises an inner surface **202**, an outer surface **204**, a top **206**, and a bottom **208**. The inner surface **202** defines a bore **210**. The bore **210** extends from the top **206** of the collar **200** to the bottom **208** of collar **200**. The bore **210** is sized to receive a cartridge **300**. In some embodiments, the cartridge **300** is adapted to slidably insert into the bore **210** of the collar **200** from the bottom **208**.

Still referring to FIG. 3, in one embodiment, the collar **200** is connectable in relation to the case **102**. In one embodiment, the bottom **208** of the collar **200** is disposed over the top **114** of the case **102**. In this embodiment, a proximal end of the bottom **208** abuts the ridge **120** of the case **102**, while a portion of the inner surface **202** is adjacent the recessed surface **118**. The collar **200** is further configured to removably couple with the heating component **100** (or the case **102**). The collar **200** protects the heating element **104** from physical damage when the collar **200** is coupled with the heating component **100**. The collar **200** also protects a user from heat emitted from the heating element **104** when the heating element **104** is activated. In some embodiments, the collar **200**, through thermal conduction, facilitates reducing the temperature of vapors produced in a vaporization chamber within the cartridge 300 (see FIG. 4A, 4B and 4C), e.g., vapors of at least one consumable substance held within the cartridge 300.

Still referring to FIG. 3 and referring back to FIGS. 2A and 2B, in one embodiment, to removably couple the collar **200** with the case **102**, at least one structure for attachment (not shown) may be used. In one embodiment, at least one seal (not shown), such as a sealable gasket, an O-ring, a washer, and the like, is disposable in relation to the recessed surface **118** (FIGS. 2A and 2B). In this embodiment of the present disclosure, the recessed surface **118** comprises at least one seal-seat (not shown), such as an O-ring receptacle, sized to receive the at least one seal, such as an O-ring (not shown). When the collar **200** is attached to the case **102**, the at least one seal is disposable between the collar **200** and the case **102**, and facilitates frictionally

coupling the collar **200** with the case **102**. The collar **200** is removable from the case **102** by way of applying a sufficient axial force thereto. In other embodiments of the present disclosure, other various suitable connection techniques, such as a pressure-fit,an interference-fit, a snap fit and a magnet-retained releasable fit are employable for facilitating removably coupling the collar **200** with the case **102**.

Still referring to FIG. 3 and referring back to FIGS.s 2A and 2B, in some embodiments of the present disclosure, the collar **200** may be removably coupled with the case **102** such as by way of complementary threads (not shown) respectively located on the recessed surface **118** and the inner surface **202**. In some embodiments of the present disclosure, complementary magnets (not shown) are insertable into the collar **200** and the case **102**. In some embodiments of the present disclosure, a complementary latch-and-anchor system (not shown) may be used for coupling the case **102** with the collar **200**. The collar **200** further comprises a flange or lip **212** located at the top **206** of the collar **200**. The lip **212** has an inner dimension(s) that is less than the inner dimension(s) of the bore **210** and less than the maximum outer dimension(s) of the cartridge **300**. The lip **212** inner dimension(s) being smaller than the bore **210** inner dimension(s) is, thereby, adapted to retain the cartridge **300** within the bore **210** of the collar **200** when the cartridge **300** is inserted through the bottom **208**.

Still referring to FIG. 3 and referring to back to FIG. 1, the collar **200** is configured to couple with the case **102**, either with or without the cartridge **300** being inserted through the bore **210**. In embodiments of the present disclosure, wherein a cartridge **300** is disposed in the collar **200**, the collar **200** substantially rigidly retains, e.g., holds, cartridge **300** between the lip **212** and the top **114** of the case **102**. In one embodiment, the collar **200** desirably comprises at least one opening or window **214** for facilitating viewing cartridge **300** and/or the heating element **104**. The window **214** permits a user to view the vaporization process and/or the light emitted from the heating element **104**, if any. In a further alternative embodiment, such as for use with the heating component base **150** illustrated in FIGs. 1B and 2C, the heating component base **150** may comprise an integrated top collar or flange **151** of heating component base **150** which is operable to retain the cartridge **390** against a portion of the heating component **150**, such as against an internal heating element **250** for example.

Referring to FIG. 4A, this diagram illustrates a front elevation perspective view of a cartridge **300**, with an outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure. The cartridge **300** comprises a mouthpiece **302** and a vaporization chamber **350**. In some embodiments of the present disclosure, the cartridge **300** further comprises at least one seal **340**, such as a sealable gasket, an O-ring, a washer, and a tamper seal **380**, and the like.

Referring to FIG. 4B, this diagram illustrates, in an exploded front elevation perspective view, the cartridge **300**, as shown in FIG. 4A, with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure. The mouthpiece **302** comprises a top **304**, a bottom **306**, an inner surface **307**, and an outer surface **308**. As shown in FIG. 4B, the

inner surface **307** comprises a shape having a reducing dimension along its longitudinal axis, such as a conical, or funnel, shape, thereby forming a funnel-shaped bore **320** along such longitudinal axis. The inner surface **307** is further defined by a surface of a vapor-permeable base **314** opposing the top **304**. The bore **320** comprises a top opening **318** located at the top **304**. Although the bore **320** is shown as being substantially circular by example only, it may comprise any cross-sectional shape having a vapor-permeable base **314** and a top opening **318**. The top opening **318** is narrower in relation to the bottom **306**.

Referring to FIG. 4C, this diagram illustrates, in a cut-away front elevation perspective view, a cartridge or pod **700** according to a further embodiment of the present disclosure. In one such embodiment, cartridge or pod **700** comprises a mouthpiece **702** comprising a top **704**, a top opening **718**, and a bottom **706**, and a vaporization chamber **750** comprising a top **754** and bottom **756**, and inside surface **757** and outside surface **758**. In some embodiments of the present disclosure, the cartridge **700** further comprises at least one seal **740**, such as a sealable gasket, an O-ring, a washer, and a tamper seal, or the like.

Referring to FIGs. 4B and 4C, the top opening **318** comprises a shape and size to comfortably insert into a user's mouth. In one such embodiment, the top opening **318, 718** of cartridge **300, 700** may comprise at least one of a substantially circular or oval cross-sectional shape, for example. In other embodiments, the top opening **318, 718** may be shown as being circular by example only and may comprise any suitable cross-sectional shape, such as a circle, half circle, polygon, moon-shaped, and the like. In some embodiments of the present disclosure, the cross-sectional area of opening **318, 718** comprises a range of approximately 0.75 cm^2 to approximately 20 cm^2. In other embodiments of the present disclosure, the cross-sectional area of top opening **318, 718** comprises a range of approximately 1.75 cm^2 to approximately 7 cm^2. In some embodiments of the present disclosure, the mouthpiece **302, 702** is adapted to couple with at least one feature, such as other mouthpieces, hoses, tubes, whips, conduits, adapters, and the like, e.g., by way of configuring the opening **318, 718**. In some embodiments of the present disclosure, the mouthpiece **302, 702** comprises a plurality of openings (not shown) to allow concurrent use, e.g. by a plurality of users.

Still referring to FIGs. 4B and 4C, the base **314, 714** of the mouthpiece 302, 702 of cartridge 300, 700 prevents herbs and other consumable substances from entering, e.g., accidentally, the bore **320, 720**. In one embodiment, the mouthpiece **302, 702** may comprise a single vapor-impermeable material. That is, the mouthpiece **302, 702** and the base **314, 714** may comprise a single material and/or may be integrally formed. In a particular embodiment of the present disclosure, the base **314, 714** comprises at least one aperture **316, 716**. The at least one aperture **316, 716** allows the passage of vapor, located outside the mouthpiece **302, 702**, such as from the vaporization chamber **350, 750**, to enter the bore **320, 720** of mouthpiece **302**, **702**, and then to exit the opening **318, 718**.

Still referring to FIGs. 4B and 4C, in some embodiments of the present disclosure, the base **314, 714** may comprise a material distinct from the remaining portions of mouthpiece **302, 702**. In these embodiments of the present disclosure, the base **314, 714** may comprise at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric, such as cotton or polyester. In some embodiments of the present disclosure, the base **314, 714** may comprise a liner (not shown). The liner may be attached to a top surface or a bottom surface of the base **314, 714**. The liner may comprise at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric, such as cotton or polyester.

Still referring to FIGs. 4B and 4C, in some embodiments of the present disclosure, the mouthpiece **302, 702** may desirably be disposable and replaceable, e.g., such as when permeability of the vapor-permeability base **314, 714** decreases due to a buildup of vaporization residue, when refilling of vaporization chamber 350, 750 is required, or to avoid transfer of taste or smell of a consumable substance to another incompatible substance. In some embodiments of the present disclosure, the mouthpiece **302, 702** may comprise at least one of glass, ceramic, plastic, metal, and any other suitable material. In some embodiments, the mouthpiece **302, 702** comprises a recyclable material. In an embodiment of the present disclosure, the mouthpiece **302, 702** comprises an outer surface **308, 708**, the outer surface **308, 708** comprising an upper surface **309, 709** and a recessed surface **310, 710**. The upper surface **309, 709** is the portion of the outer surface **308, 708** extending from the opening **318, 718** to the ridge **311, 711**. The recessed surface **310, 710** is defined as a portion of the outer surface **308, 708** extending from the ridge **311, 711** to the edge of the base **314, 714**.

Still referring to FIGs. 4B and 4C, the upper surface **309, 709** optionally comprises gradually reducing cross-section dimension(s), with a maximum dimension located approximately at the ridge **311, 711** and a minimum dimension located approximately at the top opening **318, 718**. Reiterating, in one embodiment, the mouthpiece **302** of the cartridge **300** is insertable into the bore **210** of the collar **200** for removable coupling with the heating component 100. In one such embodiment of the present disclosure, the outer surface **308** is sized to facilitate insertion of the mouthpiece **302** into the bore **210**. Accordingly, the maximum outer dimension(s) of the outer surface **308** of the mouthpiece **302** comprises a range that approximates that of the inner dimension(s) of the bore **210**. The mouthpiece **302** is retained within the bore **210** of the collar **200** by the lip **212**.

In another embodiment, the dimension of the outer surface **758** of cartridge **700** may desirably be sized to facilitate insertion into a top flange or retaining ring **151** of a heating component base **150**, such as to provide for removable and interchangeable use of a heating component base **150** with one or more cartridges **700**, such as may comprise one or more desired consumable substance, for example. Similarly, in another such embodiment, the dimension of the vaporization chamber **750** at its top ridge **711**, and the mouthpiece **702** at its maximum dimension near ridge **711** may desirably be sized to facilitate insertion of the mouthpiece **702** into the bore of vaporization chamber **750**, such as after filling of the chamber **750** with a consumable substance in which

case the mouthpiece **702** may be lockably or releaseably coupled to the chamber **750** to allow for one-time filling or re-filling of the chamber **750** respectively. In an alternative embodiment, mouthpiece **702** may be releaseably coupled to the vaporization chamber **750** such as to allow for replacement of the mouthpiece **702** for use with multiple users, or for vaporization of multiple different consumable substances, such as to reduce contamination or transfer of flavors of residue from one user to another or from use with one consumable substance to another, for example.

Referring to FIG. 4B and referring back to FIG. 3, in an embodiment of the present disclosure, the top **304** of the mouth piece **302** is insertable through the bottom **208** of the collar **200**. As the mouthpiece **302** reaches the top **206** of the collar **200**, a portion of the mouthpiece **302**, such as the outer surface **308**, extends beyond the lip **212**. In some embodiments, the mouthpiece **302** does not entirely exit the bore **210** of the collar **200**. At least a portion of the outer surface **308** of the mouthpiece **302** abuts and is retained by the lip **212** of the collar **200**. In some embodiments, the inner dimension(s) of the lip **212** are approximately equal to that of the outer dimension(s) of the mouthpiece **302** at the top opening **318**. In those embodiments of the present disclosure, the mouthpiece **302** is entirely retainable within the collar **200**.

Still referring to FIG. 4B and FIG. 4C, the mouthpiece **302, 702** is configured to couple with the vaporization chamber **350, 750**. In an embodiment of the present disclosure, the outer dimension(s) of the recessed surface **310, 710** comprise a range that is approximately equal to, or less than, the inner dimension(s) of a bore **352, 752** of the vaporization chamber **350**, such as a vaporization chamber **350, 750** suitable to contain at least one vaporizable consumable substance (such as but not limited to including one or more of liquid, herbal, dried plant, tobacco, or cannabis substances, for example) , wherein the mouthpiece **302, 702** is insertable into the bore **352, 752** of the chamber **350, 750**. When the bottom **306, 706** of the mouthpiece **302, 702** is inserted into the bore **352, 752** of the chamber **350, 750**, the ridge **311, 711** of the mouthpiece **302, 702** may desirably abut a top **354 754** edge of the chamber **350, 750**. In one embodiment, the mouthpiece 702 may lockably couple with the chamber **750**, such as by engagement of one or more locking clips, catches, snaps or other suitable lockably engageable retaining means 715.

Still referring to FIG. 4B and FIG. 4C, in some embodiments of the present disclosure, the mouthpiece **302, 702** may be removably coupled with the chamber **350, 750**. In some embodiments of the present disclosure, wherein the mouthpiece **302, 702** is coupled with the chamber **350, 750**, a seal is formed between the mouthpiece **302, 702** and the chamber **350, 750**. In an embodiment of the present disclosure, the recessed surface **310, 710** comprises at least one seal receptacle **312**, e.g., at least one O-ring receptacle, that is sized to receive at least one seal **340, 740**, such as an O-ring. The at least one seal **340, 740** may typically be disposed around a recessed surface (such as surface **309**) in the at least one seal receptacle **312**.

Still referring to FIG. 4B and FIG. 4C, when the mouthpiece **302, 702** is inserted into the chamber **350, 750**, the recessed surface **310, 710** is adjacent an inner surface of the chamber **350, 750**; and the at least one seal **340, 740** may be positioned between the adjacent surfaces of the mouthpiece **302, 702** and the chamber **350, 750**, thereby forming a vapor seal, and/or in some embodiments thereby frictionally engaging the mouthpiece **302, 702** with the chamber **350, 750**. In one embodiment, the mouthpiece **302, 702** may be removable from the chamber **350, 750** by exerting a sufficient axial force thereto, and/or by disengaging one or more mechanical locking catches or snaps, such as catches 715, for example. In other embodiments of the present disclosure, various other techniques, such as a pressure-fit technique and an interference-fit technique, are employable for removably coupling the mouthpiece **302, 702** to the chamber **350, 750**.

Still referring to FIG. 4B and FIG. 4C, and referring back to FIG. 4A, in some embodiments of the present disclosure, the mouthpiece **302, 702** may be substantially permanently or permanently attached to, lockably coupled to, or integrally formed with, the chamber **350, 750**. In certain such embodiments of the present disclosure, an adhesive, such as at least one of a polymer, a glue, any chemical bonding agent, and any mechanical bonding agent, is applicable between the recessed surface **310, 710** and the chamber **350, 750** for bonding the mouthpiece **302, 702** with the chamber **350, 750**, or a suitable mechanical locking means such as one or more locking clips, catches, snaps or the like (such as catches 715 for example) may be used to substantially lockingly couple mouthpiece **302, 702** with chamber **350, 750.** In some embodiments of the present disclosure, an outer seal **380** may be employed to substantially permanently couple the chamber **350** with the mouthpiece **302**. In a particular embodiment of the present disclosure, an outer seal **380** may comprises at least one of an adhesive foil, an adhesive paper, an adhesive plastic, and other suitable material. In some embodiments, an outer seal **380** may comprise at least one of branding information, product warnings, tamper resistant indicators, and other security features. In some embodiments, an outer seal **380** may comprise a barcode, a printable electronic memory device, a radio-frequency identification (RFID) device or other suitable readable memory device or label which may comprise stored information transmittable to circuitry **108**. Information may include, but is not limited to, at least one of vaporization temperature, product information, security verification, authentication verification, expiry date, and other relevant information. In another embodiment, a further seal may be placed over the top or tip **304, 704** of the cartridge **300, 700**, such as to prevent contamination or tampering or to ensure hygienic storage of the mouthpiece 302, 702 of the cartridge **300, 700** until opened by a user, for example.

In another embodiment, a readable electronic label or chip memory device (not shown), such as a printable thin film memory device (such as Thin Film printable memory devices available from the Xerox™ Corporation, for example), or an RFID (radio frequency identification) device or the like, containing information regarding the at least one consumable substance that is predisposed in the chamber **350, 750**, may be attached

to an outer surface of the cartridge **300, 700**, such as to a surface of the vaporization chamber **350, 750** and/or the mouthpiece **302, 702**, for example. In one such embodiment, the circuitry **108, 158** comprises a compatible electronic memory reader such as a thin film memory reader or RFID reader or the like, for retrieving the information emitted by the memory device comprised in or attached to the cartridge **300, 700** and setting the heating element **104, 154** temperature or other operational settings or variables to the desired temperature or setting, such as to provide desired operation or vaporization characteristics for a particular consumable substance.

Still referring to FIG. 4B and FIG. 4C, the chamber **350, 750** comprises a base **356, 756** and a shell **355, 755**. The base **356, 756** is disposable in relation to the shell **355, 755**, thereby leaving an opposing open top **354, 754**. The shell **355, 755** has an inner surface **357, 757** and outer surfaces **358, 758**. The inner surface **357, 757** of the shell **355, 755** defines a portion of the bore **352, 752** extending from a top opening **354, 754** to the base **356, 756**. The bore **352, 752** is sized to accommodate or store at least one consumable substance, e.g. herbal materials, tobacco, liquid and/or cannabis materials, for vaporization. The base **356, 756** is configured to receive the heating element **104, 154**. The base **356, 756** comprises a heating receptacle **360, 760**, such as a vaulted internal portion or a domed internal portion, which comprise an inner substantially cylindrical surface of the chamber **350, 750**, and define a substantially annular portion of chamber **350, 750** between the inner surface **357, 757** of the shell **355, 755**, and the heating receptacle surface **360, 760**. The heating receptacle **360, 760** extends a length **L** (not shown in FIG. 4C), toward the opening **354, 754**, the length **L** comprising a range that is approximately equal to, or greater than, the portion of the heating element **104, 154** extending perpendicularly from the top **114** of heating component **100**. When the chamber **350, 750** is disposed over the heating element **104, 154**, the heating receptacle **360, 760** surrounds the top and side portions of the heating element **104, 154**. In some embodiments of the present disclosure, the surface of the heating receptacle **360, 760** abuts the heating element **104, 154**.

Still referring to FIG. 4B and FIG. 4C, in various embodiments of the present disclosure, when the heating element **104, 154** is operating, heat may be transferred through the heating receptacle **360, 760** by at least one of conduction and radiation. The heating receptacle **360, 760** transfers heat to the at least one consumable substance disposed in the bore **352, 752** by at least one of further conduction and further radiation. In some embodiments of the present disclosure, the heating receptacle **360, 760** transfers heat to the base **356, 756** by at least conduction. In some of these embodiments of the present disclosure, the base **356, 756** transfers heat to the shell **355, 755** by at least conduction. In various embodiments of the present disclosure, heat is transferable towards the at least one consumable substance by at least one of the heating receptacle **360, 760**, the base **356, 756**, and the shell **355, 755**.

Still referring to FIG. 4B and FIG. 4C, the base **356, 756** comprises at least one aperture **362, 762**. The aperture **362, 762** facilitates air flow into the bore **352, 752**, e.g., to "carburate" the at least one consumable substance. In one such embodiment, the heat transfer from the heating element **104, 154** to the consumable substance may further also optionally comprise convection such as by transfer of air heated by the heating element **104, 154** into the bore **352, 752** to additionally provide heat for the purposes of vaporization of the comsumable substance. In some embodiments, the base **356, 756** comprises a material that is distinct from the remaining portion of the chamber **350, 750**. In certain such embodiments of the present disclosure, the base **356, 756** may comprise at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric, such as cotton or polyester. In some alternative embodiments of the present disclosure, the base **356, 756** may comprise a liner (not shown), the liner comprising at least one of a mesh, a woven material, an interlaced material, and a vapor-permeable fabric, such as cotton or polyester.

Still referring to FIG. 4B and FIG. 4C, and also referring back to FIG. 4A, in an embodiment of the present disclosure, the cartridge **300, 700** comprises a disposable cartridge (which may also be referred to as a pod), wherein the cartridge **300, 700** further comprises a mouthpiece **302, 702**, a chamber **350, 750**, and at least one consumable substance, and wherein the at least one consumable substance is predisposed or pre-filled in the bore **352, 752** of the chamber **350, 750**. The mouthpiece **302, 702** is then substantially permanently, sealably, attached to the chamber **350, 750** via at least one of a seal **340, 740**, such as a sealable gasket, an O-ring, a washer, a locking or snap-locking mechanical closure, catch or clip (such as catch **715**), and a tamper seal **380**, and the like, optionally also in conjunction with an adhesive (not shown), such as at least one of a polymer, a glue, any chemical bonding agent, and any mechanical bonding agent. In one such embodiment, a vendor of pre-filled cartridges or pods **300, 700** may thereby pre-fill and seal a consumable substance in the bore **352, 752** of the chamber **350, 750** which may be securely retained therein safe from tampering for delivery to a consumer, such as for providing assurance of quality or safety from a known vendor or other source, for example.

Still referring to FIG. 4B and referring back to FIGS. 1A and 2B, in some embodiments of the present disclosure, the case **102** and the chamber **350**, together, form a complementary key-and-notch system to align (register) the aperture **362** with the air aperture **119**, located on the top **114** of the case **102**. In an embodiment of the present disclosure, a protrusion (not shown), or a key, extends perpendicularly from the top **114**. A corresponding notch (not shown) is disposable in relation to the base **356**, wherein the base **356** abuts the top **114** of the case **102** only when the key and notch of the key-and-notch system (not shown) are engaged.

Still referring to FIG. 4B and FIG. 4C, and also referring back to FIGS. 1A, 1B and 2B, in some embodiments of the present disclosure, the at least one consumable substance in the cartridge **300, 700** comprises a desired, or an optimum, vaporizing temperature, wherein the at least one consumable substance is predisposed. The cartridge **300, 700** further comprises a feature (not shown) for communicating with the circuitry

108, 158 to control the temperature of the heating element **104, 154**. For example, the communicating feature may comprise a readable electronic label or chip memory device, such as a printable thin film memory device (such as Thin Film printable memory devices available from the Xerox™ Corporation, for example), or an RFID (radio frequency identification) device or the like, containing information regarding the at least one consumable substance that is predisposed in the chamber **350, 750**. In one embodiment, the circuitry **108, 158** comprises a compatible electronic memory reader such as a thin film memory reader or RFID reader or the like, for retrieving the information emitted by the memory device comprised in or attached to the cartridge **300, 700** and setting the heating element **104, 154** temperature or other operational settings or variablesto the desired temperature or setting, such as to provide desired operation or vaporization characteristics for a particular consumable substance. In a further embodiment, the communicating feature may additionally comprise other wired and wireless communication features, such as Bluetooth® or other radio communication capability, a barcode scanning capability, and the like. In a further embodiment, circuitry **108, 158** may further comprise communication features to allow for communication with one or more other electronic devices, such as a mobile phone or computer and the like, such as for providing information regarding a consumable substance in a particular cartridge or pod **300, 700**, or details regarding users, consumption, quantities remaining, usage tracking and/or vaporizer device operation or troubleshooting, for example.

Still referring to FIG. 4B and referring back to FIG. 1A, in an embodiment of the present disclosure, a vaporizer device **2** comprises a cartridge **300** and a heating component **100**, wherein the cartridge **300** comprises a disposable cartridge or pod. The vaporizer device **2** further comprises a protective collar **200**. The cartridge **300** is inserted into the collar **200**, such that a lip **212** of collar **200** abuts an outer surface **308** of the cartridge **300**. The collar **200**, along with the cartridge **300**, is removably attachable to the case **102** of the heating component **100**. For example, the heating element **104** is inserted into the heating receptacle **360** of the cartridge **300**, while a recessed surface **118** of the case **102** is inserted into a bore **210** of the collar **200**.

Still referring to FIG. 4B and FIG. 4C, and also referring back to FIG. 1A and FIG. 1B, in an embodiment of the present disclosure, when a user operates a vaporizer device **2, 9**, the circuitry **108, 158** within the heating component **100, 150** provides current from a battery (not shown) to the heating element **104, 154** in a time range that is nearly (approximately) instantaneous in reaching a desired, or an optimum, vaporizing temperature. In some embodiments of the present disclosure, the time period comprises a range of less than approximately 5 seconds. In some embodiments of the present disclosure, the time period comprises a range of less than approximately 30 seconds. When the heating element **104, 154** emits heat, the heat is transferred via at least one of conduction, convection, and radiation to the cartridge **300, 700** through at least the heating receptacle **360, 760**, and/or the cartridge base **356, 756**. In one embodiment, circuitry **108, 158** and heating element **104, 154** may comprise a dual-power heating element system, where one or more heating element **104, 154** may be

powered at multiple power levels, such as a high power level and a low power level, for example. In one such embodiment, the circuitry **108, 158** may comprise a first high power heating circuit, operable to provide a first high power level to the one or more heating element **104, 154**, such as may be desirable to enable rapid heating of the consumable substance in cartridge **300, 700** to a desired vaporization temperature, for example. In such an embodiment, the circuitry **108, 158** may also comprise a second lower power heating circuit, operable to provide a second lower power level to the one or more heating element **104, 154**, such as may be desirable to enable maintenance of a desired vaporization temperature of the consumable substance while consuming less power than the first high power level, for example. In an exemplary such embodiment, a first high power level may comprise about 45-80 W, and more particularly about 60 W, for example, and a second lower power level may comprise about 10-20 W and more particularly about 15W, for example. In such a manner, in one embodiment, a dual-power heating element system may desirably allow for both rapid initial heating of a consumable substance, and more power efficient maintenance of a desired vaporization temperature after it is initially reached, as may be beneficial in particular for mobile battery powered embodiments of the present disclosure which may desirably be configured to provide enhanced battery life from a limited battery power storage capacity, for example.

Still referring to FIG. 4B and FIG. 4C, and also referring back to FIG. 1A and FIG. 1B, in some embodiments of the present disclosure, the heating receptacle **360, 760** of the cartridge **300, 700** may desirably radiate and conduct heat to the at least one consumable substance such as for heating the substance to a desired vaporization temperature. In some embodiments of the present disclosure, the chamber **350, 750** comprises a thermally conductive material, wherein the entire chamber **350, 750** conducts and radiates heat to the at least one consumable substance. When the at least one consumable substance reaches a desired temperature, or an optimum, vaporizing temperature, active ingredients of the at least one consumable substance boil and vaporize. Suction is applied, e.g., via a user placing his/her mouth on the mouthpiece **302, 702**, thereby inducing a negative pressure, or at least a partial vacuum, within the bore **320, 720** of the mouthpiece **302, 702**. The negative pressure, in turn, facilitates movement of the vapor collected in the chamber **350, 750** to the user's mouth.

Referring to FIG. 5, this diagram illustrates, in a front elevation perspective view, a vaporizer device **4**, such as would be included in a vaporizer apparatus, in accordance with an embodiment of the present disclosure. The vaporizer device **4** comprises a heating component **400**, a protective adapter **500**, and a cartridge **600**. The protective adapter **500** is configured to couple with both the heating component **400** and the cartridge **600**.

Referring to FIG. 6A, this diagram illustrates, in a front elevation perspective view, the circuitry component **400**, as shown in FIG. 5, in accordance with an embodiment of the present disclosure. The circuitry component **400** comprises a case **402**, an adapter receptacle **404**, and a power source (not shown), such as a

battery, circuitry **408** (as shown in FIG. 6B), and a power switch **410**. The circuitry component **400** is similar to the heating component **100**; however, in this embodiment, the circuitry component **400** comprises an adapter receptacle **404**, rather than an aperture **117**, for receiving the heating element **104**. In some embodiments, the adapter receptacle **404** of the circuitry component **400** is sized for receiving a heating element **104**.

Referring to FIG. 6B, this diagram illustrates, in a front elevation perspective view, the circuitry component **400**, as shown in FIG. 6A, with the outer surface shown as transparent for further understanding of internal components, in accordance with an embodiment of the present disclosure. The case **402** is similar to the case **102**, a power button **410** is similar to the power button **110**; and circuitry **408** is similar to circuitry **108**, as shown in FIG. 1. In some embodiments, the circuitry component **400** comprises a power source (not shown), such as a battery component. The circuitry component **400** comprises a power source, such as batteries, e.g., rechargeable batteries (such as any known rechargeable battery type including but not limited to lithium, lithium-ion, lithium-polymer, nickel metal hydride, nickel-cadmium batteries, and the like), single use batteries such as alkaline, lithium or other suitable battery types, such as known rechargeable and non-rechargeable batteries operable for handheld heating devices such as e-cigarette batteries, vaporizer batteries, and the like.

Still referring to FIG. 6B, the adapter receptacle **404** is configured to receive an adapter **500** (FIG. 7). The adapter **500** comprises a connector portion **518** that is insertable into the adapter receptacle **404** and is configured to electrically couple with circuitry 408. In some embodiments, the adapter receptacle **404** is sized as a "510" connector. In other embodiments, the adapter receptacle **404** is sized to accommodate at least one connector type, such as a "401" type, a "510" type, a "901" type, an "E9" type, and a "4081" type, and the like. In some embodiments, the adapter receptacle **404** is fixably attachable to the adapter **500**. In some embodiments, the adapter **500** is fixably attached to the adapter receptacle **404** by complementary threads.

Referring to FIG. 7, this diagram illustrates, in a cut-away front elevation perspective view, an adapter **500**, such as a protective adapter, in accordance with an embodiment of the present disclosure. The protective adapter **500** comprises a protective shell **502**, a heating element **104, 154**, and an adapter **510**. The shell **502** has an inner surface **503** and an outer surface **505**. The inner surface **503** of the shell **505** defines a portion of a bore **508** extending from a top opening **507** to a bottom opening **509**. The bore **508** is sized to accommodate or store at least one consumable substance, e.g., herbal, tobacco, e-liquid (such as glycol based liquid) materials, and the like, for vaporization.

Still referring to FIG. 7, the protective adapter **500** is shown here engaged with an adapter **510** (FIG. 8), wherein the adapter **510** comprises a top **511**. The adapter **510** is configured to receive an exemplary heating element **104, 154**. The adapter **510** comprises a heating receptacle **560**, such as a vaulted portion or a domed portion. The heating receptacle **560** extends a length **L**, toward the top opening **507**, the length **L** comprising a

range that is approximately equal to, or greater than, the portion of the heating element **104, 154** extending perpendicularly from the top **511**.

Still referring to FIG. 7, when the protective adapter **500** is disposed over the heating element **104, 154**, the heating receptacle **560** surrounds the top and side portions of the heating element **104, 154**. In some embodiments of the present disclosure, the surface of the heating receptacle **560** abuts the heating element **104, 154**. The shell **502** comprises a lower portion **550** having threads **506** for engaging complementary threads **516** of the adapter **510** (FIG. 8).

Referring to FIG. 8, this diagram illustrates, in a front elevation perspective view, an adapter **510**, having a heating element **104, 154** disposed therethrough, in accordance with an embodiment of the present disclosure. The adapter **510** comprises a top **511** and a bottom **513**. The adapter **510** is configured to receive the heating element **104, 154**. The adapter **510** comprises a heating receptacle **560**, such as a vaulted portion or a domed portion. The heating receptacle **560** extends a length **L**, toward the top opening **507**, the length **L** comprising a range that is approximately equal to, or greater than, the portion of the heating element **104, 154** extending perpendicularly from the top **511**. The top **511** comprises at least one channel **512** and at least one magnet **514**. The adapter **510** comprises threads **516** for engaging complementary threads **506** of shell **502**.

Referring to FIGS. 9A, this diagram illustrates, in a top view, an adapter **510**, in accordance with an embodiment of the present disclosure. The adapter **510** comprises a substantially disk-shape, having a top **511** and a bottom **513** (See also FIGS. 9B and 9C). The top **511** comprises at least one channel **512,** at least one magnet **514**, and an aperture **517** for accommodating a heating element **104, 154**. The adapter **510** is configured to receive the heating element **104, 154**. The adapter **510** comprises a heating receptacle **560**, such as a vaulted portion or a domed portion. The heating receptacle **560** extends a length **L**, toward the top opening **507**, the length **L** comprising a range that is approximately equal to, or greater than, the portion of a heating element **104, 154** extending perpendicularly from the top **511**.

Referring to FIG. 9B, this diagram illustrates, in a front elevation perspective view, the adapter **510**, as shown in FIG. 9A, in accordance with an embodiment of the present disclosure. The adapter **510** is disposable in relation to a circuitry component **400**. In one embodiment, the adapter **510** comprises a connector portion **518** extending perpendicularly from the bottom **513** of the adapter **510**. The connector portion **518** is complementarily sized to an adapter receptacle **404** (As shown in FIGS. 6A and 6B). In this embodiment, the connector portion **518** is sized for compatibility with at least one of connector type of a “401” type, a “510” type, a “901” type, an “E9” type, and a “4081” type, and the like.

Still referring to FIG. 9B, in this embodiment, when the adapter **510** is disposed in the circuitry component **400**, the adapter **510** and circuitry component **400** are electrically connected. The top **511** of the adapter **510** comprises an aperture **517** for receiving ae heating element **104, 154**. In this embodiment of the present

disclosure, the aperture **517** is positioned at a central position in relation to the top **511**. In some embodiments of the present disclosure, the aperture **517** is disposed in a non-central region, e.g., the aperture **517** is proximally disposable in relation to one side of top **511**.

Referring to FIG. 9C, this diagram illustrates, in a cut-away front elevation perspective view, the adapter of **510**, as shown in FIG. 9A, in accordance with an embodiment of the present disclosure. The bottom **513** abuts the top **402t** of the case **402** when the connector portion **518** is electrically coupled with the adapter receptacle **404**. In an embodiment, the connector portion **518** and the adapter receptacle **404** comprise complementary threaded portions for facilitating both an electrical coupling and a physical coupling. The adapter **510**, having an outer edge, comprises at least one air channel **512** extending radially inward from the outer edge toward the aperture **517**. In some embodiments, the at least one air channel **512** extends from the outer edge of the adapter **510** to the outer edge of the aperture **517**.

Still referring to FIG. 9C and referring back to FIGS. 9A, 9B, and 5, the adapter **510** is configured to removably attach to a cartridge **600**. In some embodiments, the adapter **510** comprises at least one magnet **514**. The at least one magnet **514** is molded or affixed in relation to the top **511** of the adapter **510**. In some embodiments, the at least one magnet **514** is disposed between the at least two air channels **512**. In some embodiments, the adapter **510** comprises a magnetic material.

Referring to FIG. 10 and referring back to FIG. 2, this diagram illustrates, in a front view, a heating element **104, 154**, in accordance with an embodiment of the present disclosure. The heating element **104, 154** comprises any heat-emitting device capable of converting electricity into heat, e.g., through the process of resistive or joule heating. In some embodiments, the heating element **104, 154** comprises at least one of a nichrome wire, a resistance wire, an etched foil, a radiative heating element, and the like. In some embodiments, the heating element **104, 154** is encased or encapsulated in housing **560'**, wherein the housing **560'** comprises a thermally conductive material, yet electrically insulative material, such as glass, a polymer, a non-electrically conducting polymer, a plastic, a ceramic, a composite material, non-electrically conducting composite material, and the like.

Still referring to FIG. 10 and referring back to FIG. 2, in an embodiment, the heating element **104, 154** comprises a heat-emitting filament encased or encapsulated in a housing **560'**, wherein the housing **560'** comprises a glass material, such as in a light bulb heating element configuration **104A**, by example only. The heating element **104, 154** further comprises a connector portion **105** configured to electrically couple with the apertures **117**, **517** (FIG. 2B). In some embodiments, the connector portion **105** and the apertures **117**, **517** comprise a plurality of electrically conductive threads **105a** to facilitate electrically coupling, wherein the plurality of electrically conductive threads **105a** comprises at least one material, such as a metal and an alloy.

Still referring to FIG. 10 and referring back FIG. 8, the exemplary light bulb configuration **104A** is insertable into the aperture **517** of the adapter **510**. Heating element **104, 154** extends from the top **511** of the adapter **510**. The heating element **104, 154** extends substantially perpendicularly from the top **511** of adapter **510**. In some embodiments, a plurality of apertures **517** is disposed in relation to the top **511** for receiving a plurality of heating elements **104, 154**, such as embodied in light bulb configurations **104A**. Other configurations of the plurality of apertures **517** are possible and encompassed by the present disclosure.

Referring to FIG. 11A and referring back to FIG. 5, this diagram illustrates, in a front elevation perspective view, a protective shell **502**, in accordance with an embodiment of the present disclosure. The protective shell **502** comprises a substantially tubular configuration, by example only, having an inner surface **503** (see FIG. 11B), an outer surface **505**, a top **507**, and a bottom **509**. The inner surface **503** defines a bore **508** that extends from the top **507** of the shell **502** to the bottom **509** of shell **502**. The bore **508** is sized to receive a cartridge **600** (FIG. 5). In some embodiments, the cartridge **600** is adapted to slidably insert into the bore **508** of shell **502** from the top **507**.

Referring to FIG. 11B, this diagram illustrates, in a front elevation cut-away view, the protective shell **502**, as shown in FIG. 11A, in accordance with an embodiment of the present disclosure. The shell **502** comprises at least one ridge **506** protruding from the inner surface **503** of the shell **502** along the bottom **509**. In this embodiment, when the bottom **509** of the shell **502** is coupled with the adapter **510**, at least one seal **516**, such as an O-ring, rests below, or between, the at least one ridge **506**. The at least one ridge **506** provides frictional forces, whereby an axial force is required to remove the shell **502** from the adapter **510**, whereby inadvertent removal of the shell **502** from the adapter **510** is minimized.

Still referring to FIG. 11B and referring back to FIGS. 7 and 11A, the shell **502** is disposable in relation to the adapter **510**. In an embodiment, the bottom **509** of the shell **502** is disposed over the top **511** of adapter **510**. In an embodiment, the shell **502** is configured to removably couple with the adapter **510**, wherein at least one structure for attachment may be used. In an embodiment, at least one seal, such as a sealable gasket, an O-ring, and the like, is disposable in relation to the outer surface **516** of the adapter **510**. In some embodiments, the outer surface **516** comprises at least one receptacle (not shown), such as an O-ring seat, sized to receive the at least one seal, such as an O-ring. When the bottom **509** of the shell **502** is attached to the adapter **510**, the at least one seal is disposed between the shell **502** and the adapter **510**, thereby frictionally holding or retaining the shell **502** in relation to the case **102**. The shell **502** is removable from the adapter **510** by way of a sufficient applied axial force.

Still referring to FIG. 11B and referring back to FIG. 7, in some embodiments of the present disclosure, the shell **502** is removably attachable to the adapter **510** by way of complementary threads respectively located on the outer surface **516** of the adapter **510** and the inner surface **506** of the shell **502**. In some embodiments

of the present disclosure, complementary magnets (not shown) are respectively insertable into the adapter **510** and the shell **502**. In some embodiments of the present disclosure, a complementary latch-and-anchor system (not shown) may be used for coupling the shell **502** with the adapter **510**. In some embodiments of the present disclosure, the shell **502** is permanently attached to the adapter **510**. In these embodiments of the present disclosure, an adhesive, such as at least one of a polymer, a glue, any chemical bonding agent, and any mechanical bonding agent, is applicable between the outer surface **516** of the adapter **510** and the inner surface **506** of the shell **502** to bond the shell **502** together with the adapter **510**.

Still referring to FIG. 11B and referring back to FIGS. 11A and 7, in some embodiments, the shell **502** comprises at least one aperture **504**, such as through-aperture, disposed between the outer surface **505** and the inner surface **503**. When the shell **502** is attached to the adapter **510**, the aperture **504** facilitates ventilation, e.g., the transfer of air from outside the shell **502** to the inside the shell **502**, and vice versa. In some embodiments, when the shell **502** is attached to the adapter **510**, the aperture **504** is aligned with the channel **512** of the adapter **510** (see FIG. 7). In this embodiment, the channel **512** acts as an air conduit when the bore **508** contains a physical object, such as a cartridge **600**. In this embodiment, the channel **512** and the aperture **504**, at least, facilitates the transfer of air from outside shell **502** to an area proximal the heating element **104**.

Referring to FIG. 12A and referring back to FIG. 5, this diagram illustrates, in a cut-away front elevation perspective view, a cartridge **600**, in accordance with an embodiment of the present disclosure. In some embodiments of the present disclosure, the at least one consumable substance disposed in the cartridge **600** comprises a desired or optimum vaporizing temperature. The cartridge **600** further comprises a feature (not shown) for communicating with circuitry **408** to control the temperature of heating element **104**. For example, the communicating feature may comprises an electronically readable memory storage device, such as a printed memory label, an RFID device, or other suitable memory device, which may contain information regarding the at least one consumable substance predisposed in the chamber **673**. The circuitry **408** may comprise a compatible memory reading device, such as a printed memory label reader, or RFID reader for retrieving the information emitted by the memory device of the cartridge **600** and desirably may further be operable to set the heating element **104, 154** temperature to the desired temperature (set-point). In some embodiments, the communicating feature may additionally comprise one or more wired and/or wireless communication features, such as Bluetooth®, barcode scanning, and the like. In a further embodiment, circuitry **408** may further comprise communication features to allow for communication with one or more other electronic devices, such as a mobile phone or computer and the like, such as for providing information regarding a consumable substance in a particular cartridge or pod **600**, or details regarding users, consumption, quantities remaining, usage tracking and/or vaporizer device operation or troubleshooting, for example.

Referring to FIG. 12B and referring back to FIG. 5, this diagram illustrates, in an exploded cut-away front elevation perspective view, the cartridge **600**, as shown in FIG. 12A, comprising a mouthpiece **602** and a vaporization chamber **650**. In an embodiment of the present disclosure, a vaporizer device **4** comprises a disposable cartridge **600**, an adapter **500**, and a heating component **400**. In one such embodiment, the adapter **500** is attachable to the heating component **400** through complementary threaded portions. A disposable cartridge **600** is insertable into the adapter **500**, and removably retained by complementary magnets **514** and a retaining member **680**, the retaining member comprising at least one material, such as a metal and an alloy.

Referring to FIG. 12B and referring back to FIGS. 12A and 5, in one embodiment of the present disclosure, when a user operates a vaporizer device **4**, the circuitry **408** within the heating component **400** provides current from a power source, such as a battery (not shown) to the heating element **104, 154** in a time period that is nearly (approximately) instantaneous in reaching a desired temperature. In some embodiments of the present disclosure, the time period comprises a range of less than approximately 5 seconds. In some embodiments of the present disclosure, the time period comprises a range of less than approximately 30 seconds. When the heating element **104, 154** emits heat, the heat is transferred via at least one of conduction, convection, and radiation to the cartridge **600**. When the at least one consumable substance reaches a desired temperature, the active ingredients of the at least one consumable substance boil and vaporize. Suction is applied, e.g., via a user placing his/her mouth on the mouthpiece **602**, thereby inducing a negative pressure or at least a partial vacuum within the bore **620** of the mouthpiece **602**. The negative pressure, in turn, facilitates movement of the vapor collected in chamber **650** to the user's mouth. In one embodiment, similar to as described above in relation to FIG. 4A and 4B, circuitry **408** and heating element **104, 154** may comprise a dual-power heating element system, where one or more heating element **104, 154** may be powered at multiple power levels, such as a high power level and a low power level, for example.

Referring to FIGS. 12A and 12B and referring back to FIG. 5, in some embodiments of the present disclosure, circuitry **108**, **408** may communicate via Bluetooth® or other communication techniques, e.g., wireless techniques, to an electronic device for providing information. Information may include cartridge information, usage information, battery information, and the like. In some embodiments of the present disclosure, the vaporizer device **2, 9** or **4** comprises a non-portable vaporizer (not shown). The non-portable vaporizer comprises a plurality of multiple heating components for receiving multiple cartridges, wherein multiple users may share a single vaporizer device **2, 9** or **4**, having a plurality of distinct cartridges **300, 700**, **600** attached. In some embodiments of the present disclosure, the vaporizer device **2, 9** or **4** comprises a wired battery connection for use with an electrical outlet on mains or grid electrical power.

Referring to FIG. 13A, this diagram illustrates, in a cut-away front elevation perspective view, a vaporization chamber **650**, in accordance with an embodiment of the present disclosure. The chamber **650**

comprises a protective shell **652**, an outer wall or ring **670**, an inner wall or ring **672**, and a heating receptacle wall or ring **674**. In one embodiment, one or more of the outer wall or ring **670**, the inner wall or ring **672**, and the heating receptacle wall or ring **674** comprise a suitably heat conductive material such as glass, ceramic, metal, polymer or composite that are suitable to conduct heat by conduction and/or radiation from a heating element (not shown) inserted into the heating receptacle wall or ring **670**, such as for heating a consumable substance contained in the vaporization chamber **650** between the outer and inner walls or rings **670**, **672**. The shell **652** comprises a base portion **654** and a guard portion **656**. The base portion **654** has a top surface **658**, and bottom surface **660**. The base portion **654** is configured to receive a heating element, such as exemplary heating element **104, 154**. In an embodiment, the base portion **654** is substantially disk-shaped and has an aperture **662** extending from the bottom surface **660** to the top surface **658**. The aperture **662** is sized to receive heating element **104**. That is, a proximal end of the heating element **104** may be inserted through the aperture **662**. In one embodiment, at least one portion of the protective shell **652**, base portion **654** and guard portion **656** may desirably comprise a suitable heat resistant and preferably also a suitably heat insulating material such as plastic, glass, polymer, composite or the like, as may be suitable to desirably provide for reducing a temperature of the outer surface of protective shell **652** as may be desired for allowing manual removal or manipulation of the vaporization chamber **650** by a user during and/or following heating. In one such embodiment, the protective shell **652** may desirably reduce the risk of burning to a user handling the vaporization chamber **650** during or following heating, so as to allow for manual removal, exchange or adjustment of the vaporization chamber **650** in a vaporizing device **2**, **4**, **9**, for example.

Referring to FIG. 13B, this diagram illustrates, in a cut-away front elevation perspective view, the chamber **650**, as shown in FIG. 13A, with the outer ring **670** removed with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure. The chamber **650** comprises a protective shell **652**, an outer ring **670**, a heating receptacle ring **672**, and an inner ring **674**. The shell **652** comprises a base portion **654** and a guard portion **656**. The base portion **654** has a top surface **658**, and bottom surface **660**. The base portion **654** is configured to receive a heating element such as exemplary heating element **104, 154**. In an embodiment, the base portion **654** is substantially disk-shaped and has an aperture **662** extending from the bottom surface **660** to the top surface **658**. The aperture **662** is sized to receive heating element **104**. That is, a proximal end of a heating element **104, 154** may be inserted through the aperture **662**.

Referring to FIG. 13C, this diagram illustrates, in a cut-away front elevation perspective view, the chamber **650**, as shown in FIG. 13A, with the outer ring **670** and middle heating receptacle **672** removed with the outer surface shown as transparent for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure. The chamber **650** comprises a protective shell **652**, an outer ring

670, a heating receptacle ring **672**, and an inner ring **674**. The shell **652** comprises a base portion **654** and a guard portion **656**. The base portion **654** has a top surface **658**, and bottom surface **660**. The base portion **654** is configured to receive heating element **104**. In an embodiment, the base portion **654** is substantially disk-shaped and has an aperture **662** extending from the bottom surface **660** to the top surface **658**. The aperture **662** is sized to receive a heating element, such as exemplary heating element **104, 154**. That is, a proximal end of a heating element **104, 154** may be inserted through the aperture **662**.

Referring to FIG. 13D, this diagram illustrates, in a cut-away front elevation perspective view, a vaporization cartridge **800**, comprising a vaporization chamber **850**, and a mouthpiece **802**, in accordance with an embodiment of the present disclosure. Similar to as described above in reference to FIG. 13A, 13B and 13C, the vaporization chamber **850** of cartridge **800** comprises a protective shell **852**, an outer wall or ring **870**, an inner wall or ring **872**, and a heating receptacle wall or ring **874**. In one embodiment, one or more of the outer wall or ring **870**, the inner wall or ring **872**, and the heating receptacle wall or ring **874** comprise a suitably heat conductive material such as glass, ceramic, metal, polymer or composite that are suitable to conduct heat by conduction and/or radiation from a heating element (not shown) inserted into the heating receptacle wall or ring **870**, such as for heating a consumable substance contained in the vaporization chamber **850** between the outer and inner walls or rings **870**, **872**. The protective shell **852** comprises a base portion **854,** a guard portion **856**, and an upper rim portion **857**. The base portion **854** has a top surface **858**, and bottom surface **860**. The base portion **854** is configured to receive a heating element, such as exemplary heating element **104, 154**. In an embodiment, the base portion **854** may be substantially disk-shaped and has an aperture **862** extending from the bottom surface **860** to the top surface **858**. The aperture **862** is sized to receive an exemplary heating element **104, 154**. That is, a proximal end of a heating element **104, 154** may be inserted through the aperture **862**. In one embodiment, at least one portion of the protective shell **852**, base portion **854,** guard portion **856**, and upper rim portion **857**, may desirably comprise a suitable heat resistant and preferably also a suitably heat insulating material such as plastic, glass, polymer, composite or the like, as may be suitable to desirably provide for reducing a temperature of the outer surface of protective shell **852** as may be desired for allowing manual removal or manipulation of the vaporization chamber **850** by a user during and/or following heating. In one such embodiment, the protective shell **852** may desirably reduce the risk of burning to a user handling the vaporization chamber **850** during or following heating, so as to allow for manual removal, exchange or adjustment of the vaporization chamber **850** in a vaporizing device **2**, **4**, **9**, for example.

Referring to FIG. 14, and also to FIGs. 13A, 13B, 13C and 13D, this diagram illustrates, in a top perspective view, an exemplary protective shell **652** having a base portion **654** and guard portion **656**, in accordance with an embodiment of the disclosure. The base portion **654** comprises a first wall or ring channel **664**, a second wall or ring channel **666**, and a lip or ridge **668** (See also FIGS. 13A-13D). The first wall or ring

channel **664** is the outer most g channel relative to the second wall or ring channel **666** and the ridge **668**. The first wall or ring channel **664** is configured to receive a first outer wall or ring **670**. In one embodiment, the first outer ring **670** may be insertable from a top opening **657** of the guard **656**. The second wall or ring channel **666** is located between the first ring channel **664** and the ridge **668**. The second ring channel **666** is configured to receive a heating receptacle, such as exemplary heating receptacle **674**. In one embodiment, the heating receptacle **674** may be insertable from a top opening **657** of the guard **652**. In one embodiment, the ridge **668** forms an aperture **662** sized to receive a heating element, such as exemplary heating element **104, 154**, and the ridge **668** may be configured to receive a second wall or ring **674**.

Still referring to FIG. 14 and referring back to FIGS. 13A–13D, in some embodiments, the first channel **664**, the second ring channel **666** and the ridge **668** are configured to retain a first wall or ring **670, 870**, a second wall or ring **672, 872** and a heating receptacle **674, 874**. In some embodiments, the second ring channel **666** and the ridge **668** are sized to abut and frictionally hold or retain each of a first wall or ring **670, 870**, a second wall or ring **672, 872**, and a heating receptacle **674, 874**. In some embodiments, an adhesive, such as at least one of a polymer, glue, any chemical bonding agent, and any mechanical bonding agent may be disposed along the channels **664**, **666** and the ridge **668** to facilitate retention.

Still referring to FIG. 14 and referring back to FIGS. 13A–13C, the base portion **654** further comprises at least one radial channel **676**, the radial channel extending from the outer edge of ridge **668** to the first wall or ring channel **664**. In one embodiment, the first wall or ring channel **664** and the second wall or ring channel **666**, may be positioned at a different depth relative to the proximal end **660** of the base portion **654**. In an embodiment, the first wall or ring channel **664** may be located in the approximately same axial plane as the radial channel **676**, where the axial plane is in relation to the shell **652**. In one such embodiment, the second wall or ring channel **666** may be located on an elevated axial plane as compared to the radial channel **676**. Accordingly, when a first wall or ring **670, 870**, a second wall or ring **672, 872**, and a heating receptacle **674, 874** are inserted onto or into their respective positions, an air pathway may desirably be formed from the aperture **662**, up the inside surface of the second wall or ring **674**, to the inside surface of the heating receptacle **674**, then down through the at least one radial channel **676** below the heating receptacle **674**, and then inside the first wall or ring **670** (FIG. 13A). In some embodiments, the channel **676** may comprise an air-permeable material to prevent physical materials from travelling into the aperture **662** stored in the chamber **650**. In a further embodiment, second wall or ring **672** and/or second channel **666** may further comprise one or more radial ribs or connecting spacers (not shown) extending between at least a portion of heating receptacle **674** and second wall or ring **672**, which may comprise a suitably heat conductive material, such that heating receptacle **672**, **872** may additionally transfer heat to second wall or ring **672**, **872** at laest in part by conduction, such as to heat a consumable material held within chamber **650**, **850**, for example.

Referring to FIG. 15A, this diagram illustrates, in a cut-away front elevation perspective view, a vaporization chamber **650-1**, in accordance with an embodiment of the present disclosure. The chamber **650-1** comprises a protective shell **652**, an outer wall or ring **670**, and a heating receptacle **674**.

Referring to FIG. 15B, this diagram illustrates, in a cut-away front elevation perspective view, the chamber **650-1**, as shown in FIG. 15A, with the outer wall or ring **670** removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

Referring to FIG. 15C, this diagram illustrates, in a cut-away front elevation perspective view, the chamber **650-1**, as shown in FIG. 15A, with the outer wall or ring **670** and the middle heating receptacle **674** removed for furthering understanding of any internal components, in accordance with an embodiment of the present disclosure.

Referring to FIG. 16, this diagram illustrates, in a top perspective view, a protective shell **652-1,** having a base portion **654-1** and guard portion **656**, in accordance with an embodiment of the disclosure. Still referring to FIG. 16 and referring back to FIGS. 15A–15C, the shell **652-1** comprises a base portion **654-1** and a guard portion **656**. The base portion **654-1** has a top surface **658-1** and a bottom surface **660-1**. The base portion **654-1** is configured to receive the heating element **104**. In one embodiment, the base portion **654-1** comprises a substantially disk shape, having an aperture **662-1** extending from the bottom surface **660-1** through to the top surface **658-1**. The aperture **662-1** is sized to receive a heating element, such as exemplary heating element **104, 154**. That is, a proximal end of a heating element **104, 154** may be inserted through aperture **662-1**. In some embodiments, the base portion **654-1** comprises a ridge **668-1**. In this embodiment, the ridge **668-1** defines the outer dimensions of the aperture **662-1**, the aperture **662-1** sized to receive a heating element **104, 154**.

Still referring to FIG. 16 and referring back to FIGS. 15A–15C, the base portion **654-1** comprises a ring channel **664-1**, and a ridge **668-1** on a top surface **658-1**. The ring channel **664-1** is configured to receive a first outer wall or ring **670**. In one such embodiment, the first outer wall or ring **670** may be insertable from a top opening of guard **656**. The ridge **668-1** is configured to retain a heating receptacle **674** that in one embodiment may be insertable from a top opening of the guard **652-1**. The base portion 654-1 further comprises at least one radial channel **676-1**, the radial channel extending from the aperture **662-1** to the ring channel **664-1**. In some embodiments, the ring channel **664-1** and the ridge **668-1** may be positioned at different depths relative to one another and relative to the proximal end **660-1** of the base portion **654-1**.

Still referring to FIG. 16 and referring back to FIGS. 15A–15C, in an embodiment, the ring channel **664-1** may be located in approximately the same axial plane as the radial channel **676-1**, where the axial plane parallel is in relation to end **660-1**. In this embodiment, the ridge **668-1** is located on an elevated axial plane in relation to the radial channel **676-1**. Accordingly, when the first wall or ring **670**, and the heating receptacle **674**, are inserted onto or into their respective positions, an air pathway is formed from the aperture **662-1**, through the

at least one radial channel **676** below heating receptacle **674**, and toward the inside of the first ring **670** (as shown in Figure 15A). When the first ring **670** and the heating receptacle **674** are inserted into the shell **652**, a storage chamber or bore **673** is formed for receiving and storing at least one consumable substance for vaporization. In some embodiments, the channel **676-1** comprises air permeable material to prevent physical materials from travelling into the aperture **662** from the chamber **650**. For the remainder of this disclosure, elements denoted with reference numerals having "-1" may be denoted with or without "-1", those elements referred to interchangeably, unless otherwise expressly stated.

Still referring to FIG. 16 and referring back to FIGS. 13A–13D and 15A–15C, the base portion **654** further comprises a channel **678** configured to receive at least one magnetic object (not shown). In some embodiments, the channel **678** is disposed on a bottom **660** of the base portion **654**. In some embodiments, the channel **678** and a magnetic object each comprise a complementary ring-shaped magnetic element, and a magnetic object may be sized for insertion and fixed attachment to the channel **678**. In other embodiments, the bottom **660** of the base portion **654** may comprise at least one complementary aperture and a magnet (not shown), the magnet sized for insertion and fixed attachment to the at least one complementary aperture.

Still referring to FIG. 16 and referring back to FIGS. 13A–13C and 15A–15C, in some embodiments, a magnetic object (not shown) may be permanently attached to the channel **678** or the at least one complementary aperture. In these embodiments, an adhesive, such as at least one of a polymer, glue, any chemical bonding agent, and any mechanical bonding agent is applicable between a magnetic object and the channel **678** to the bond the magnetic object together with the base portion **654** of chamber **650**. In some embodiments, the base portion **654** may comprise magnetic objects (not shown). In some embodiments, the magnetic objects may be injection-molded into the base portion **654**. An inner surface of the ring **670**, an outer surface of heating receptacle **674**, and a portion of the top surface **658** of the base portion **654** defines a bore **673** extending from a top opening **657** to the base **654** (as shown in Figures 13A and 15A). The bore **673** is sized to receive and store consumable substances, e.g., herbal materials, tobacco, vaporizable liquids, cannabis materials, and the like, for vaporization.

Still referring to FIG. 16 and referring back to FIGS. 13A–13D and 15A–15C, the chamber **650** is configured to receive a heating element, such as exemplary heating element **104, 154**. Reiterating, the chamber **650** comprises a heating receptacle **672**. The heating receptacle **672** extends a length **L**, toward an opening **657**, the length **L** comprising a range that is approximately equal to or greater than the portion of a heating element **104, 154** extending perpendicularly from top **511** of adapter **510**. When the chamber **650** is placed over the heating element **104, 154**, the heating receptacle **672** surrounds the top and side portions of the heating element **104, 154**. In some embodiments of the present disclosure, the surface of heating receptacle **672** may

abut heating element **104**. In some embodiments of the present disclosure, the surface of the second ring **674** abuts the heating element **104**.

Still referring to FIG. 16 and referring back to FIGS. 13A–13D and 15A–15C, in various embodiments of the present disclosure, when a heating element **104, 154** is operating, heat may be transferred through the heating receptacle **674** and the second wall or ring **672** by at least one of conduction and radiation. The heating receptacle **672** and the second wall or ring **672** transfers the heat to the at least one consumable substance in the bore **673** by at least one of further conduction and further radiation. In some embodiments of the present disclosure, the heating receptacle **674** transfers heat to the base **652** by at least conduction. In some of these embodiments of the present disclosure, the base **652** transfers heat to the first wall or ring **670** by at least conduction. In various embodiments of the present disclosure, heat is transferable towards the at least one consumable substance by at least one of the heating receptacle **674**, the base **652**, and the first wall or ring **670**.

Still referring to FIG. 16 and referring back to FIGS. 13A–13D and 15A–15C, the at least one consumable substance disposed in the bore **673** may desirably be vaporized through at least convection heating. As disclosed elsewhere in this disclosure, air may desirably enter through the aperture **662**, travel up the inside surface of the second wall or ring **672**, and down the outside surface of the second wall or ring **672** before entering the bore **673**. In this embodiment, when the heating element **104, 154** is operating, air is heated while moving along the surface of the second wall or ring **672**. Accordingly, the heated air, upon entering the bore **673**, causes convective heating of the at least one consumable substance disposed within the bore **673**.

Still referring to FIG. 16 and referring back to FIGS. 13A–13D and 15A–15C, in one embodiment, the shell **652** may comprise a reflective material for reflecting heat that is emitted from the heating element **104** back toward the at least one consumable substance stored within the bore **673**. In some embodiments, the shell **652** may comprise an internal portion for reflecting heat and an external portion comprising a desirably low thermal conductivity material for protecting a user from the heat emitted by the heating element **104, 154**. In some embodiments, the low thermal conductivity material comprises a thermal conductivity in a range of less than approximately 1 W/mK. In some embodiments, the low thermal conductivity material comprises a thermal conductivity in a range of less than approximately 10 W/mK.

Referring to FIG. 17A, this diagram illustrates, in a cut-away front perspective view, a mouthpiece **602**, in accordance with an embodiment of the present disclosure. The mouth piece **602** has a top **604**, a bottom **606**, an inner surface **607**, and an outer surface **608**. The inner surface **607** comprises a bore **620** having a substantially conical, or a funnel, shape along a vertical axis. The inner surface **607** is further defined by the surface of a vapor-permeable base **614** facing top **604**. The bore **620** has a narrow top opening **618** located at the top **604**. The bore **620** comprises a substantially circular shape, by example only. The bore **620** may, generally, be any 3-dimensional geometric space having a vapor-permeable base and an opening. In some

embodiments, the bore **620** comprises at least one air path winding throughout bore **620** that increases the travelling distance for air or vapor to enter the bore **620** and the exit top opening **618**. The increased travel distance allows additional time for the vapor to cool as the vapor enters the bore **620** and exits the opening **618**. In some embodiments, a plurality of air paths **621** intertwine in a double helix formation, thereby increasing the travelling distance for air to travel within mouthpiece **602**.

Referring to FIG. 17B, this diagram illustrates, in front perspective view the mouthpiece **602**, as shown in FIG. 17A, in accordance with an embodiment of the present disclosure. The top opening **618** is circularly shape and sized to comfortably insert into a user's mouth. The top opening **618** comprises a circular shape by example only. The top opening **618** comprises any two-dimensional closed shape, such as a circle, half circle, polygon, moon-shaped, and the like. In some embodiments of the present disclosure, the surface area of opening **618** comprises a range from approximately 0.75 cm^2 to approximately 20 cm^2. In other embodiments of the present disclosure, the surface area of the opening **618** comprises a range from approximately 1.75 cm^2 to approximately 7 cm^2. In some embodiments of the present disclosure, the opening **618** is adapted to couple with at least one of mouth pieces, hoses, tubes, whips, conduits, adapters, and the like.

Still referring to FIGS. 17A and Figure 17B, in some embodiments of the present disclosure, the mouthpiece **602** comprises at least one of glass, ceramic, plastic, metal, and other suitable material. In some embodiments, the mouthpiece **602** comprises a recyclable material. In an embodiment of the present disclosure, the outer surface **608** of the mouthpiece **602** comprises an upper surface **609** and a recessed surface **610**. The upper surface **609** is the portion of the outer surface **608** extending from opening **618** to ridge **611**. A recessed surface is the portion of the outer surface **608** extending from the ridge **611** to the edge of the base **614**.

Still referring to FIGS. 17A and Figure 17B and referring back to FIGS. 12A and 12B, a separator or vapor-permeable base **614** prevents herbs and other consumable substances from entering the bore **620** of mouthpiece **620** (as shown in Figure 12A). In some embodiments of the present disclosure, the separator or vapor-permeable base **614** comprises a material distinct from the remaining portions of mouthpiece **602**. In these embodiments of the present disclosure, the separator or vapor-permeable base **614** comprises at least one of a mesh material, an interlaced material, and a vapor-permeable fabric, such cotton or polyester. The separator is sized to at least cover the internal bore **673** of first ring **670**. In some embodiments, the mouthpiece **602** comprises a separator or vapor-permeable base **614**. In some embodiments, the mouthpiece **602** further comprises a separator receptacle **605** configured to receive a separator or vapor-permeable base **614**. In this embodiment, a portion of the proximal outer ends of the separator or vapor-permeable base **614** are insertable into the separator receptacle **605**.

Still referring to FIGS. 17A and Figure 17B and referring back to FIGS. 12A and 12B, the mouthpiece **602** is configured to couple with the chamber **650**. In an embodiment of the present disclosure, the outer

dimension of the recessed surface **610** comprises a range that is approximately equal to, or less than, the inner dimension of the guard **652**, wherein the mouthpiece **602** is insertable into the guard **652** of the chamber **650**. When the bottom end **606** of the mouthpiece **602** is inserted into the guard **652** of the chamber **650**, the ridge **611** of the mouthpiece **602** abuts the top edge of the guard **652**.

Still referring to FIGS. 17A and Figure 17B and referring back to FIGS. 12A and 12B, in some embodiments of the present disclosure, the mouthpiece **602** is removably attachable to the chamber **650**. In some embodiments of the present disclosure, when mouthpiece **602** is attached to the chamber **650**, a seal is formed between the mouthpiece **602** and the chamber **650**. In an embodiment of the present disclosure, the recessed surface **610** comprises at least one seal receptacle **612** sized to receive at least one seal, such as an O-ring. The at least one seal is disposable relative to the at least one seal receptacle **612**. When the mouthpiece **602** is inserted into the chamber **650**, the recessed surface **610** is adjacent an inner surface of the guard **652**; and a seal is positioned between the adjacent surfaces of the mouthpiece **602** and the chamber **650**, thereby forming a vapor seal, and further frictionally engaging the mouth piece **602** with the chamber **650**. The mouthpiece **602** is removable from the chamber **650** by exerting a sufficient axial force. In other embodiments of the present disclosure, other various pressure-fit or interference-fit techniques may be employed to removably attach the mouthpiece **602** to the chamber **650**. In some embodiments, the recessed surface **610** and the top portion **657** of the guard **652** comprise complementary threads for attaching the mouthpiece **602** to the chamber **650**.

Still referring to FIGS. 17A and Figure 17B and referring back to FIGS. 12A and 12B, in an embodiment of the present disclosure, a cartridge **600** is provided, the cartridge **600** comprising a disposable cartridge, wherein cartridge **600** further comprises a mouthpiece **602**, a chamber **650**, and at least one consumable substance, wherein the at least one consumable substance is predisposed in the bore **673** of the chamber **650**. A separator or vapor-permeable base **614** is placed between the bore **673** and the bore **620**, thereby preventing the at least one consumable substance from entering bore **620**. In some embodiments, the mouthpiece **602** is then permanently sealably attached to the chamber **650** via at least one seal, such as an O-ring, a tamper seal, an adhesive, such as at least one of a polymer, glue, any chemical bonding agent, and any mechanical bonding agent. In some embodiments, mouthpiece **602** is removably attached to the chamber **650** via complementary threaded portions.

Still referring to FIGS. 17A and Figure 17B and referring back to FIGS. 12A and 12B, in some embodiments of the present disclosure, the disposable cartridge **600** further comprises vapor seals. In these embodiments, vapor seals may be place over the top **618** of the mouthpiece **602** and the aperture **662** of the chamber **650**. The vapor seals maintain the freshness of the at least one consumable substances that is pre-disposed in the bore **673** of the chamber **650** for an extended time by preventing oxidation. In some

embodiments, the disposable cartridge **600** further comprises inert gases for delaying oxidation of the at least one consumable substance stored within the chamber **650**.

Referring to FIG. 18, this flowchart illustrates a method **M1** of fabricating a portable non-combustion vaporizer device **2**, **4** for generating vapors, the method **M1** comprising: providing a heating component **100**, as indicated by block **1801**; and providing a cartridge **300**, as indicated by block **1802**, in accordance with an embodiment of the present disclosure. The heating component providing **1801** comprises providing the heating element **100** as substantially perpendicularly extending therefrom and into the cartridge **300**. In an embodiment of the present disclosure, the cartridge providing **1802** comprises providing the cartridge **300** as removably attachable in relation to the heating component **100**. In an embodiment of the present disclosure, the method **M1** of fabricating the portable non-combustion vaporizer device **2**, **4** further comprises providing a collar **200** for facilitating removably attaching the cartridge **300** to the heating component **100**, as indicated by block **1803**.

Referring to FIG. 19, this flowchart illustrates a method **M2** of generating vapors by way of a portable non-combustion vaporizer device **2**, **4**, the method **M2** comprising providing the vaporizer device **2**, **4**, **9** as indicated by block **1901**, the device providing **1901** comprising: providing a heating component **100, 150**, as indicated by block **1902**; and providing a cartridge **300, 700**, as indicated by block **1903**, in accordance with an embodiment of the present disclosure. The heating component **100, 150** providing **1901** comprises providing the heating element **100, 150** as substantially perpendicularly extending therefrom and into the cartridge **300, 700**. In an embodiment of the present disclosure, the cartridge providing **1903** comprises providing the cartridge **300, 700** as removably attachable in relation to the heating component **100, 150**. The cartridge **300, 700** providing **1903** comprises loading the cartridge **300, 700**, as indicated by block **1904**, wherein loading **1904** the cartridge **300, 700** comprises loading at least one consumable substance (not shown).

Still referring to FIG. 19, in an embodiment of the present disclosure, providing **1901** the portable non-combustion vaporizer device **2**, **4** further comprises providing a collar **200** for facilitating removably attaching the cartridge **300** to the heating component **100**, as indicated by block **1905**. The method **M2** of generating vapors further comprises coupling the cartridge **300** with the heating component **100** by way of the collar **200**, as indicated by block **1906**. The method **M2** of generating vapors further comprises providing a mouthpiece **302**, as indicated by block **1907**; and coupling the mouthpiece **302** with the collar 200, as indicated by block **1908**. The method **M2** of generating vapors further comprises powering the heating component **100**, thereby applying heat to the at least one consumable substance disposed in the cartridge **300**, and thereby vaporizing the at least one consumable substance, as indicated by block **1909**.

Information as herein shown and described in detail is fully capable of attaining the above-described object of the present disclosure, the presently preferred embodiment of the present disclosure, and is, thus, representative of the subject matter which is broadly contemplated by the present disclosure. The scope of the

present disclosure fully encompasses other embodiments which may become obvious to those skilled in the art, and is to be limited accordingly, by nothing other than the appended claims, wherein any reference to an element being made in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more." All structural and functional equivalents to the elements of the above-described preferred embodiment and additional embodiments as regarded by those of ordinary skill in the art are hereby expressly incorporated by reference and are intended to be encompassed by the present claims.

Moreover, no requirement exists for a system or method to address each and every problem sought to be resolved by the present disclosure, for such to be encompassed by the present claims. Furthermore, no element, component, or method step in the present disclosure is intended to be dedicated to the public regardless of whether the element, component, or method step is explicitly recited in the claims. However, that various changes and modifications in form, material, work-piece, and fabrication material detail may be made, without departing from the spirit and scope of the present disclosure, as set forth in the appended claims, as may be apparent to those of ordinary skill in the art, are also encompassed by the present disclosure.

The exemplary embodiments herein described are not intended to be exhaustive or to limit the scope of the disclosure to the precise forms disclosed. They are chosen and described to explain the principles of the disclosure and its application and practical use to allow others skilled in the art to comprehend its teachings.

As will be apparent to those skilled in the art in light of the foregoing disclosure, many alterations and modifications are possible in the practice of this disclosure without departing from the scope thereof.

CLAIMS

What is claimed is:

1. A vaporizer cartridge comprising a base, inner and outer substantially concentric walls extending from said base and defining a vaporization chamber between said outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through said base within a perimeter of said inner wall adapted for receiving a heating element inserted into said heating receptacle opening, wherein a top edge of said outer wall forms an open top rim adapted for coupling to a mouthpiece.

2. The vaporizer cartridge according to claim 1 additionally comprising a mouthpiece comprising a top opening, a central open bore, and a bottom opening sealably coupled to said open top rim of said cartridge.

3. The vaporizer cartridge according to claim 2 additionally comprising at least one seal situated between said bottom opening of said mouthpiece and said open top rim of said cartridge.

4. The vaporizer cartridge according to claim 2 wherein said mouthpiece is releasably coupled to said open top rim of said cartridge.

5. The vaporizer cartridge according to claim 2 wherein said mouthpiece is lockably coupled to said open top rim of said cartridge.

6. The vaporizer cartridge according to claim 5 wherein said mouthpiece additionally comprises one or more mechanical locking members adapted to lockingly couple said mouthpiece to said open top rim of said cartridge.

7. The vaporizer cartridge according to claim 2 additionally comprising at least one seal adapted to removably seal said top opening of said mouthpiece.

8. The vaporizer cartridge according to claim 1 wherein said base additionally comprises at least one air aperture adapted to admit air into said vaporization chamber.

9. The vaporizer cartridge according to claim 1 additionally comprising a guard layer surrounding at least a portion of said outer wall, wherein said guard layer is adapted to at least partially thermally insulate a user grasping said guard layer from said outer wall.

10. The vaporizer cartridge according to claim 1, additionally comprising a heating receptacle wall extending from said heating receptacle opening and disposed substantially concentrically within said inner wall, wherein said heating receptacle wall is adapted for receiving a heating element inserted into said heating receptacle through said heating receptacle opening in said base.

11. The vaporizer cartridge according to claim 10, wherein at least one of said outer wall, said inner wall and said heating receptacle wall comprise at least one thermally conductive material selected from the list comprising: glass, metal, polymer, ceramic and composite materials.

12. The vaporizer cartridge according to claim 1, additionally comprising at least one electronically readable memory device attached to said cartridge.

13. The vaporizer cartridge according to claim 12, wherein said at least one electronically readable memory device comprises at least one of: a printed addressable memory device, a thin film printed memory device, a radio frequency identification device, a barcode and a magnetic memory device.

14. The vaporizer cartridge according to claim 1 additionally comprising at least one vaporizable material contained in said vaporization chamber.

15. The vaporizer cartridge according to claim 14, wherein said at least one vaporizable substance comprises a consumable substance comprising at least one of: herbal, tobacco, cannabis, and glycol-based liquid materials.

16. A vaporizer apparatus comprising a vaporizer cartridge according to claim 1, and a heating component comprising a heating element extending from a top surface thereof and circuitry adapted to control heating of said heating element, wherein said heating element is inserted into the heating receptacle opening in the base of said vaporizer cartridge and said vaporizer cartridge is coupled to said top surface of said heating component.

17. The vaporizer apparatus according to claim 16, wherein said vaporizer cartridge additionally comprises a mouthpiece comprising a top opening, a central open bore, and a bottom opening sealably coupled to said open top rim of said cartridge.

18. The vaporizer apparatus according to claim 16, wherein said circuitry comprises a battery and a power switch adapted for activation by a user.

19. The vaporizer apparatus according to claim 16, wherein said heating component is adapted for handheld use by a user.

20. The vaporizer apparatus according to claim 16, wherein said vaporizer cartridge additionally comprises at least one electronically readable memory device attached to said cartridge, and wherein said heating component additionally comprises at least one electronic memory device reader adapted to interface with said electronically readable memory device attached to said cartridge.

21. The vaporizer apparatus according to claim 16, wherein said vaporizer cartridge is removably coupled to said heating component and is adapted for manual removal and replacement by a user.

22. A method of making a vaporizer cartridge, comprising:

providing a base, inner and outer substantially concentric walls extending from said base and defining a vaporization chamber between said outer and inner walls adapted for containing at least one vaporizable substance, and a heating receptacle opening extending through said base within a perimeter of said inner wall

adapted for receiving a heating element inserted into said heating receptacle opening, wherein a top edge of said outer wall forms an open top rim adapted for coupling to a mouthpiece

filling at least a portion of said vaporization chamber with at least one vaporizable substance; and

sealably coupling a mouthpiece comprising a top opening, a central open bore, and a bottom opening to said open top rim of said cartridge.

23. The method of making a vaporizer cartridge according to claim 23, additionally comprising attaching at least one electronically readable memory device to the vaporizer cartridge.

24. The method of making a vaporizer cartridge according to claim 23, additionally comprising lockingly coupling said mouthpiece to said open top rim of said cartridge.

25. A method of vaporizing a consumable substance, comprising:

providing a vaporizer cartridge comprising a base, inner and outer substantially concentric walls extending from said base and defining a vaporization chamber between said outer and inner walls and containing at least one vaporizable consumable substance, and a heating receptacle opening extending through said base within a perimeter of said inner wall adapted for receiving a heating element inserted into said heating receptacle opening, wherein a top edge of said outer wall forms an open top rim sealably coupled to a mouthpiece;

providing a heating component comprising a heating element extending from a top surface thereof and circuitry adapted to control heating of said heating element;

coupling said vaporizer cartridge to said heating element such that said heating element is inserted into the heating receptacle opening in the base of said vaporizer cartridge; and

activating said heating component to heat said heating element and vaporize said at least one consumable substance.

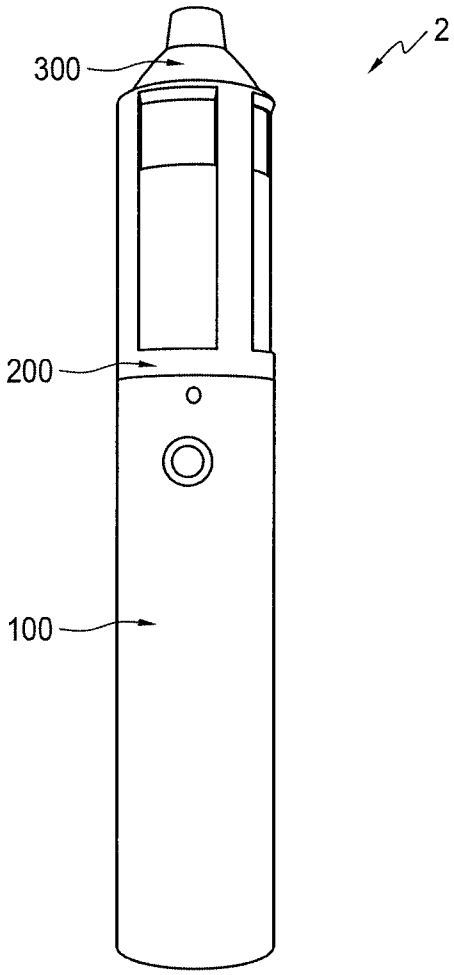

FIG. 1A

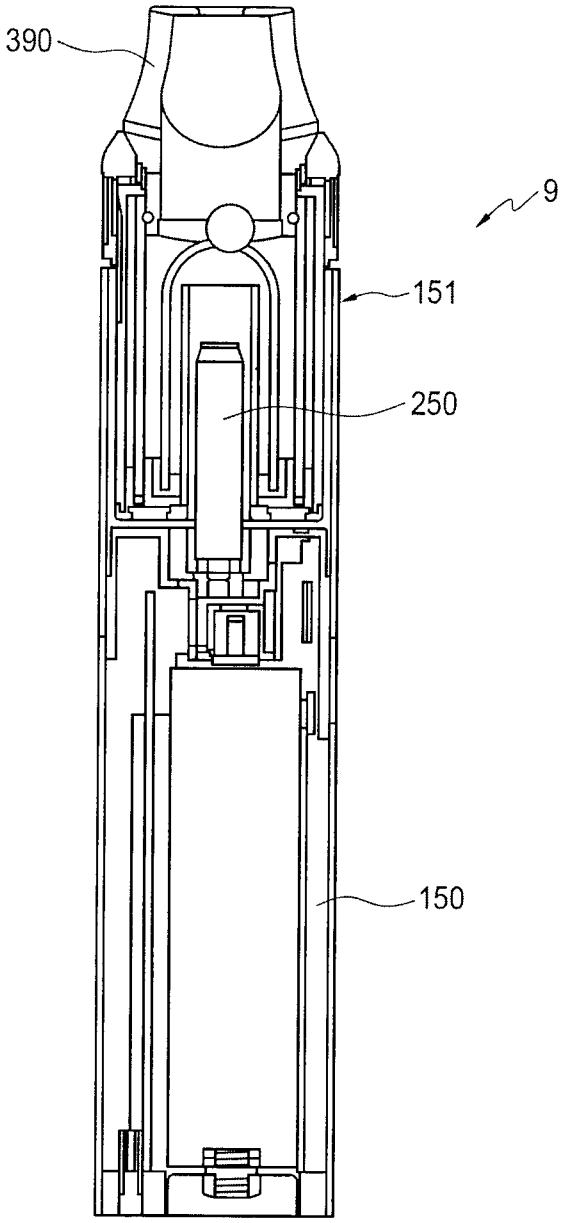

FIG. 1B

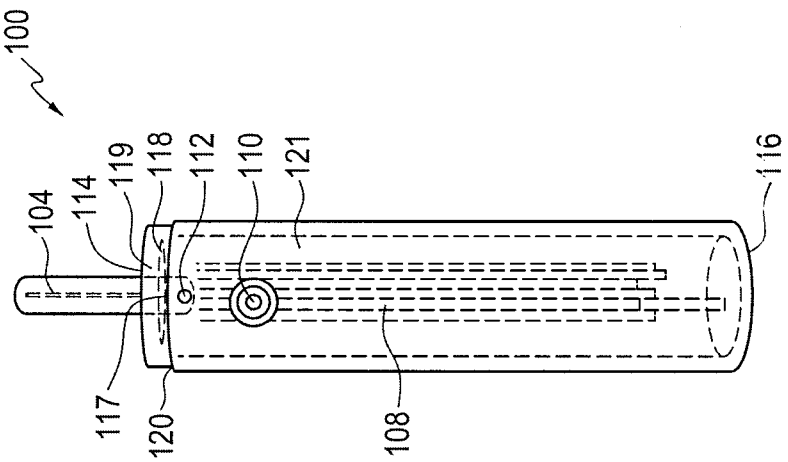
100
104
114
119
118
112
110
121
116
117
120
108

FIG. 2B

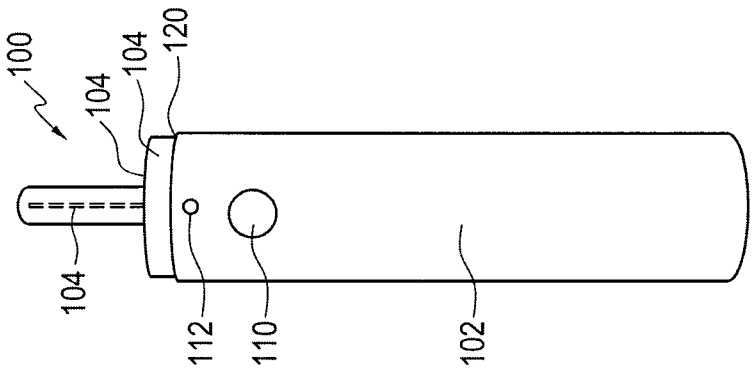
100
104
104
120
104
112
110
102

FIG. 2A

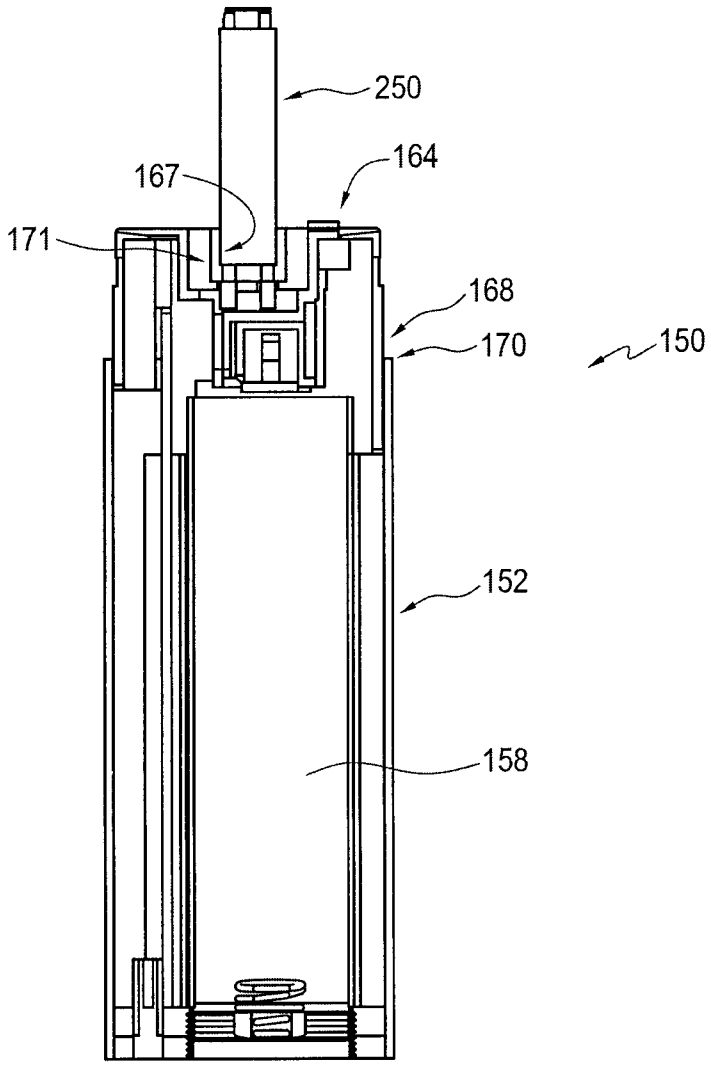

FIG. 2C

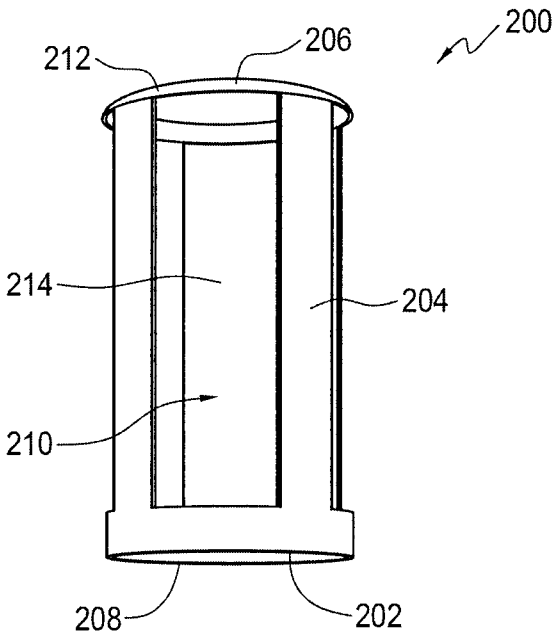

FIG. 3

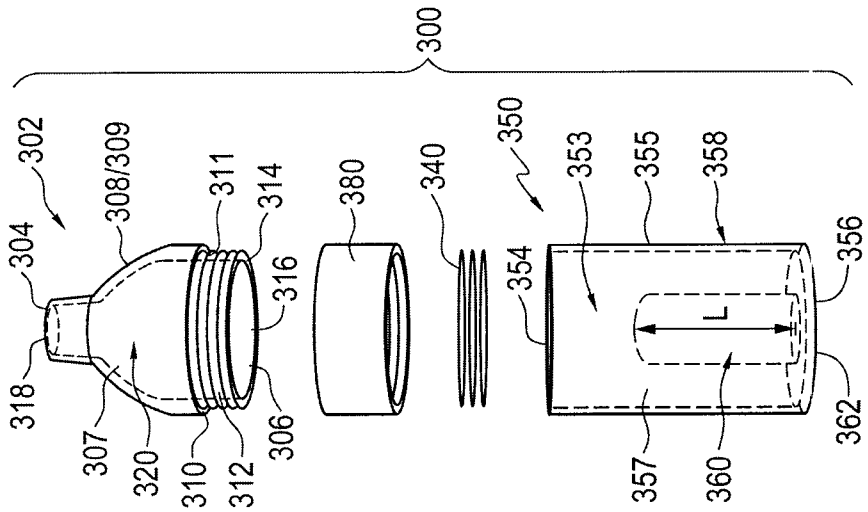
300
302
304
308/309
311
314
316
318
307
320
310
312
306
380
340
350
353
355
358
356
354
L
357
360
362

FIG. 4B

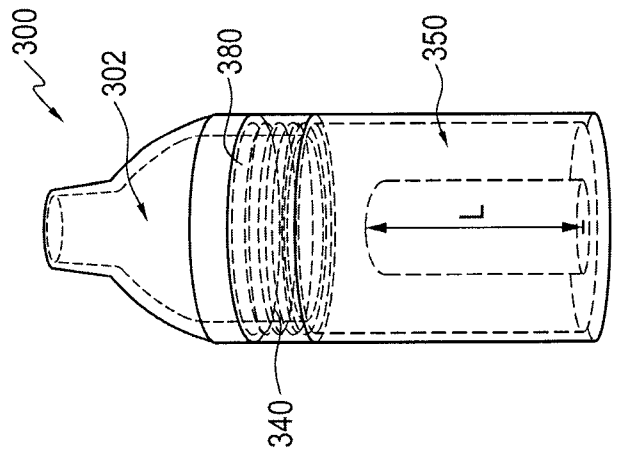
300
302
380
350
L
340

FIG. 4A

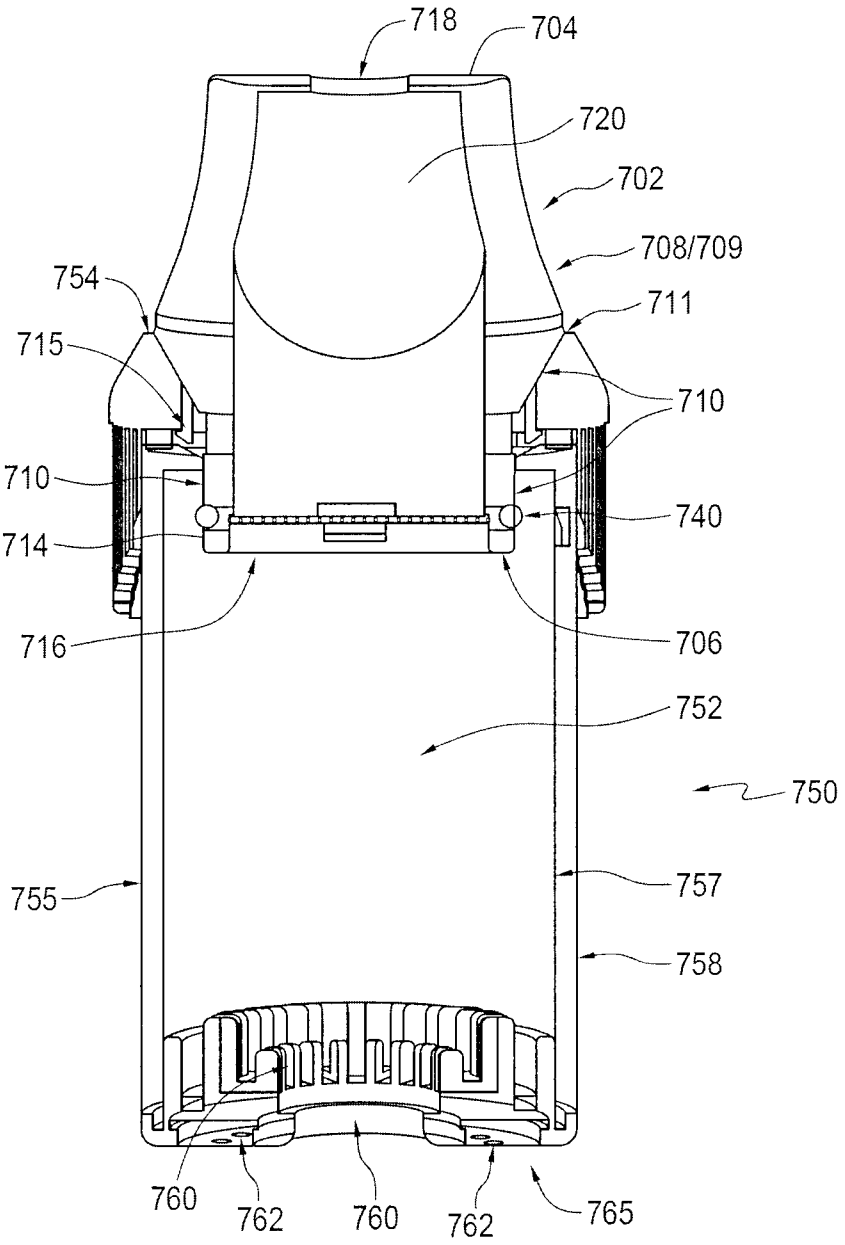
718
704
720
702
708/709
754
711
715
710
710
740
714
716
706
752
750
755
757
758
760
762
760
762
765

FIG. 4C

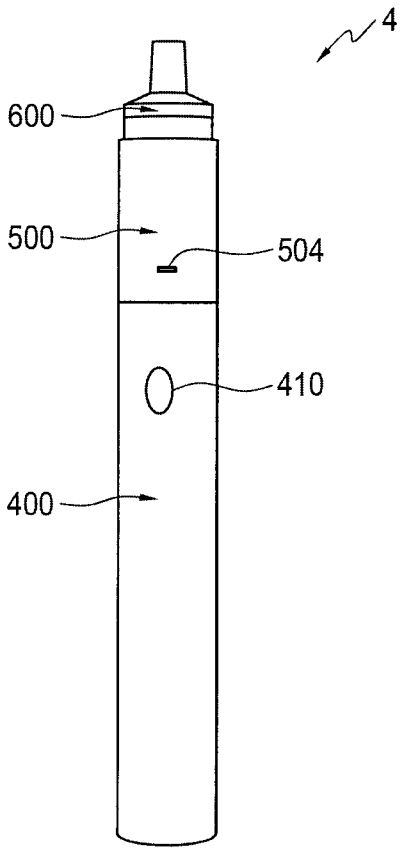

FIG. 5

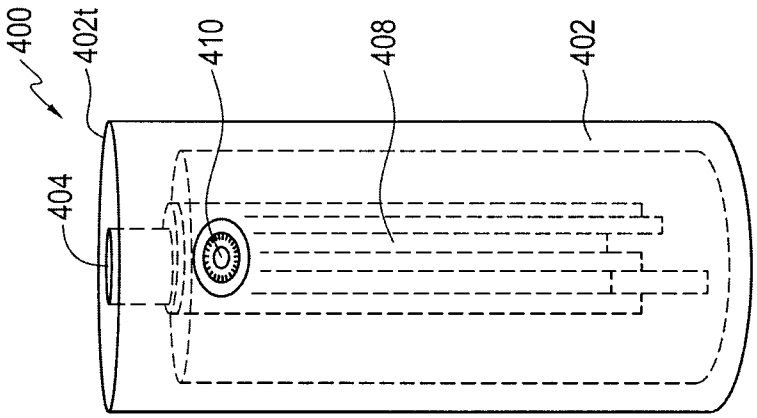

FIG. 6B

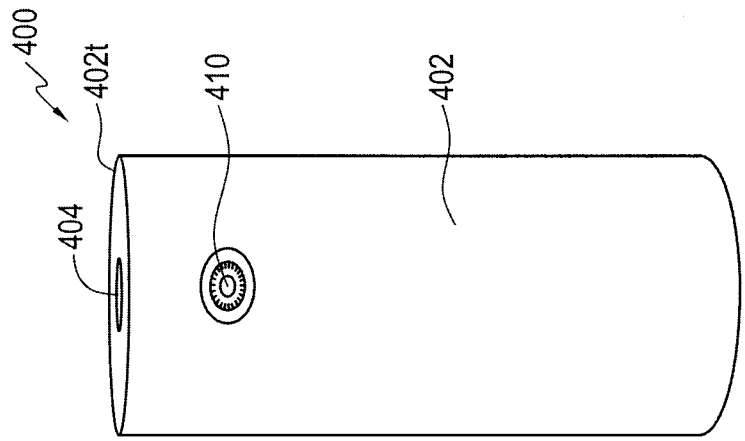

FIG. 6A

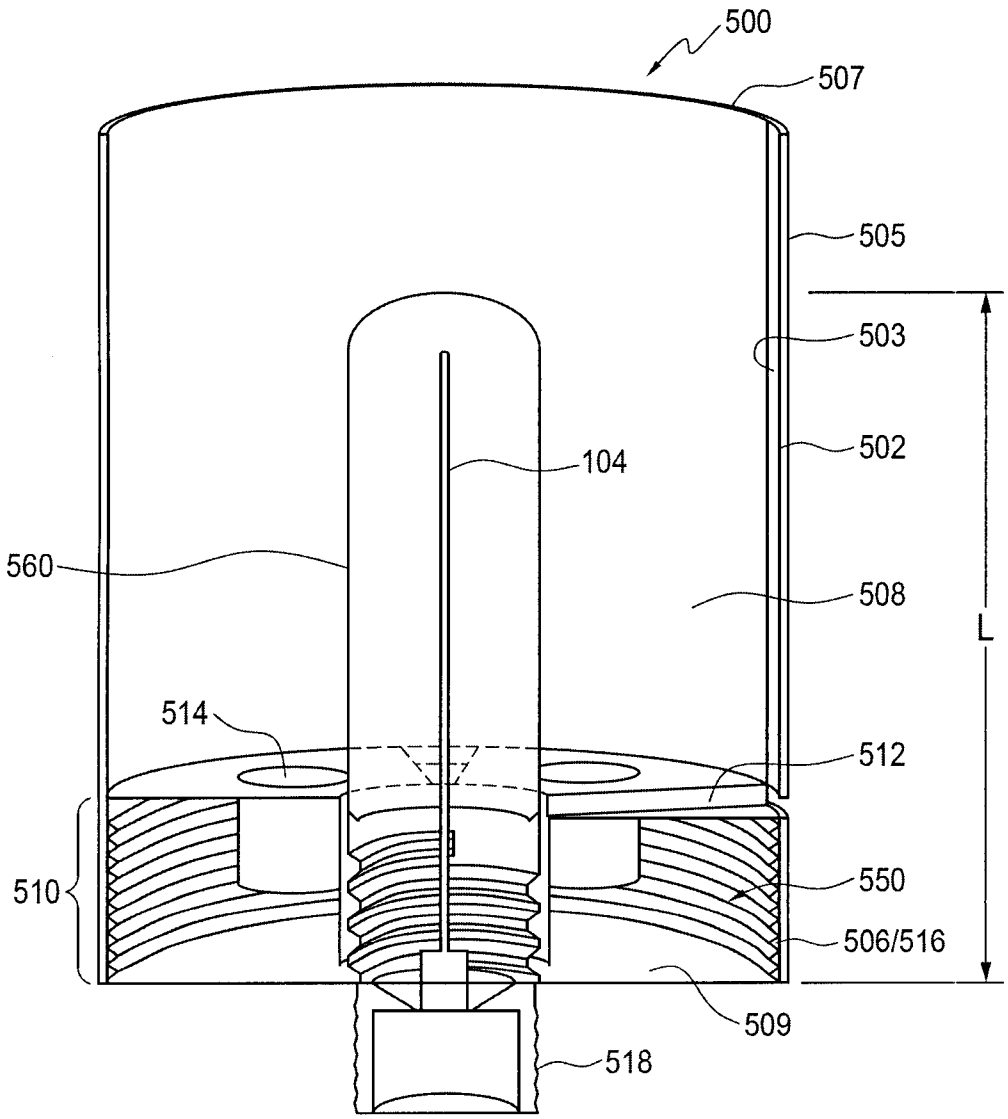

FIG. 7

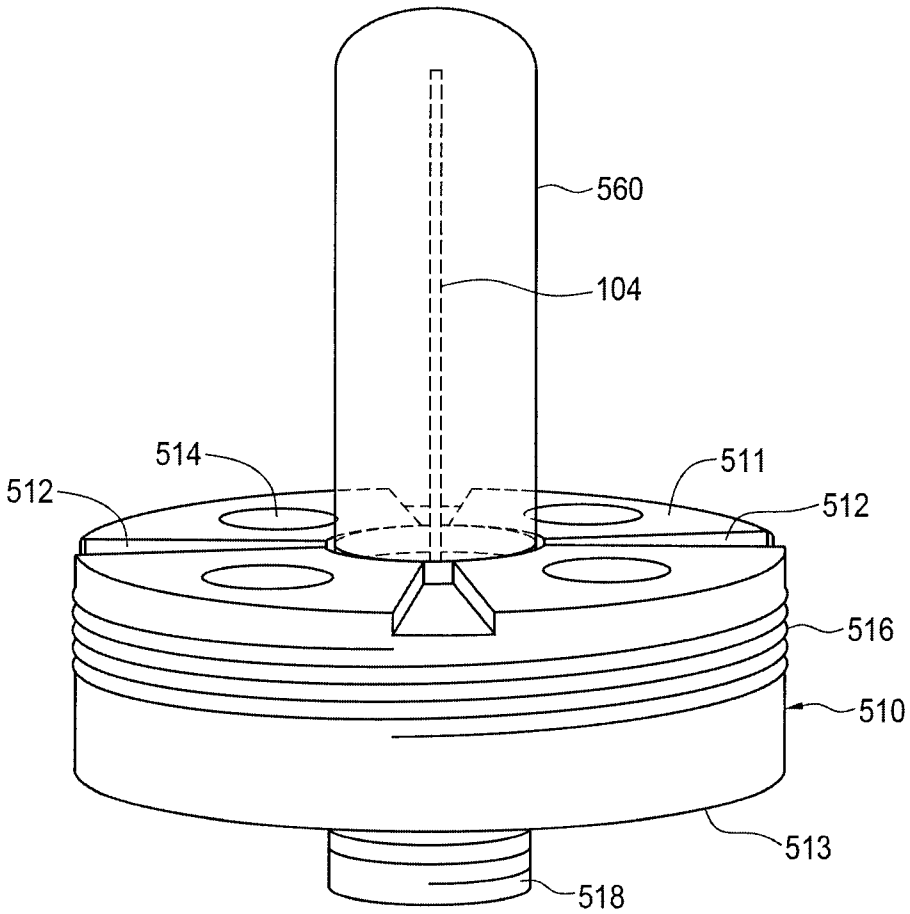

FIG. 8

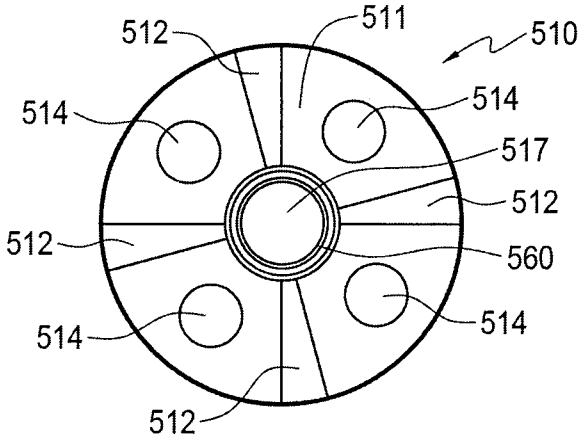

FIG. 9A

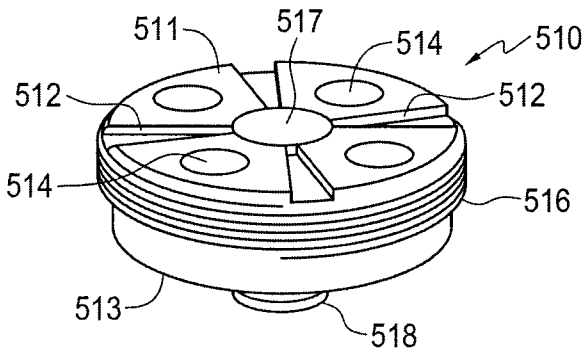

FIG. 9B

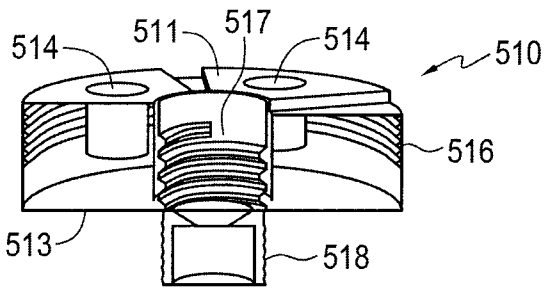

FIG. 9C

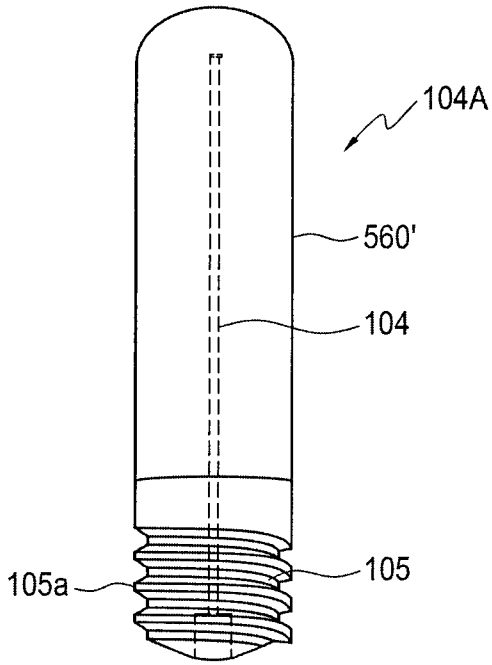

FIG. 10

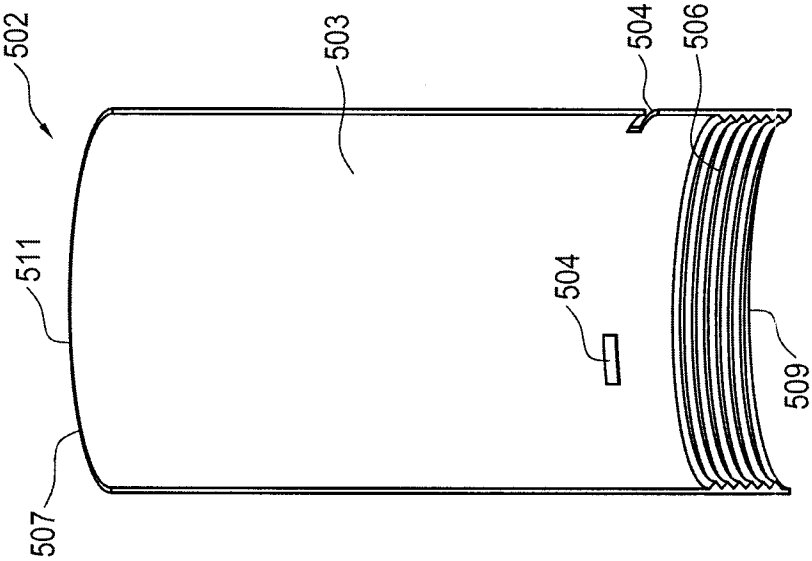

FIG. 11B

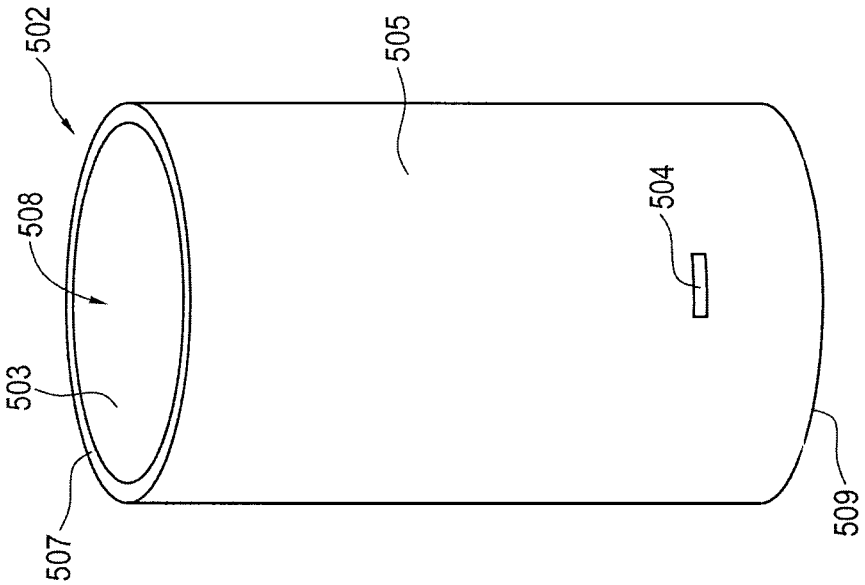

FIG. 11A

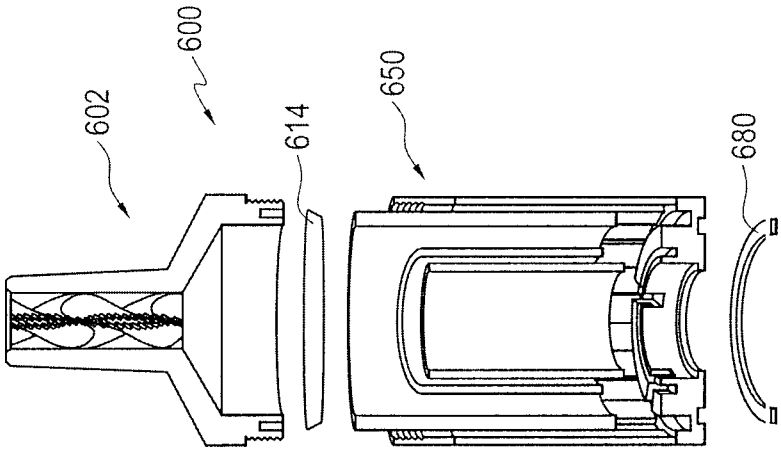

FIG. 12B

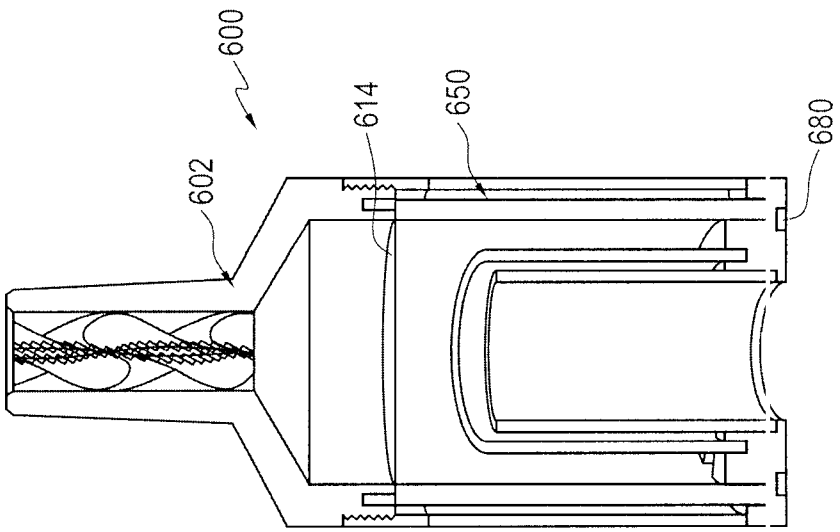

FIG. 12A

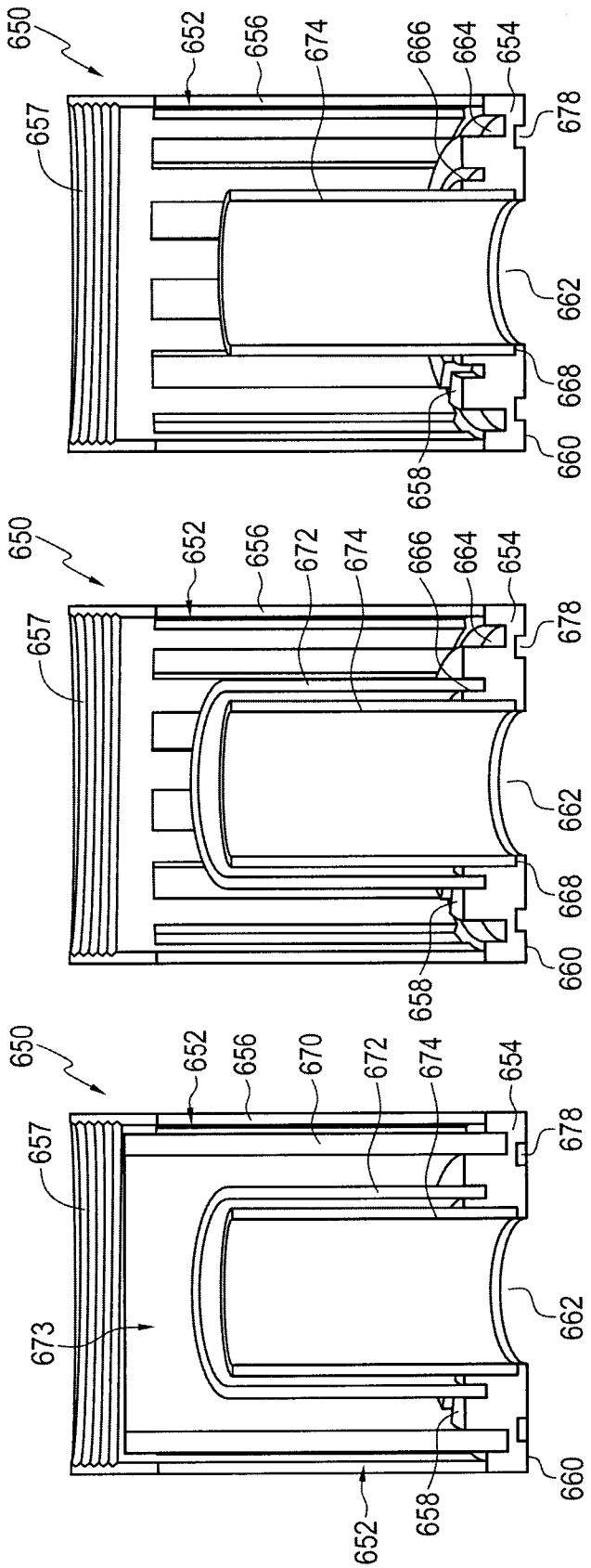

FIG. 13C

FIG. 13B

FIG. 13A

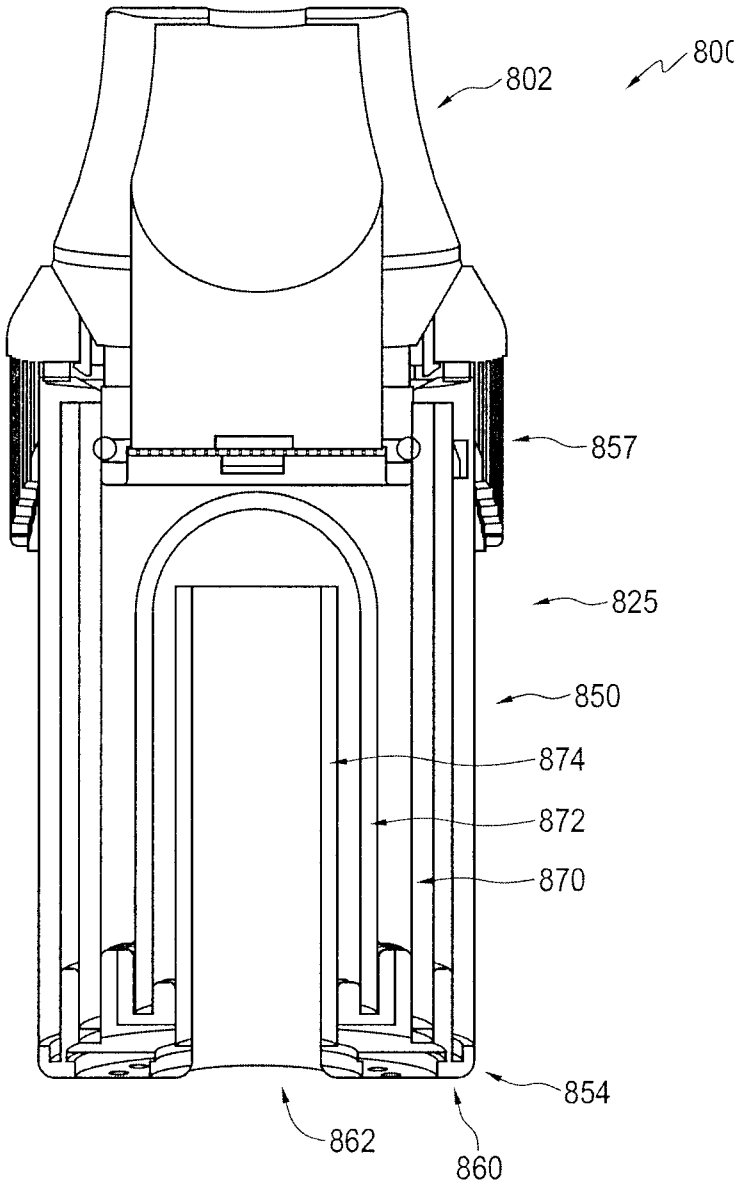

FIG. 13D

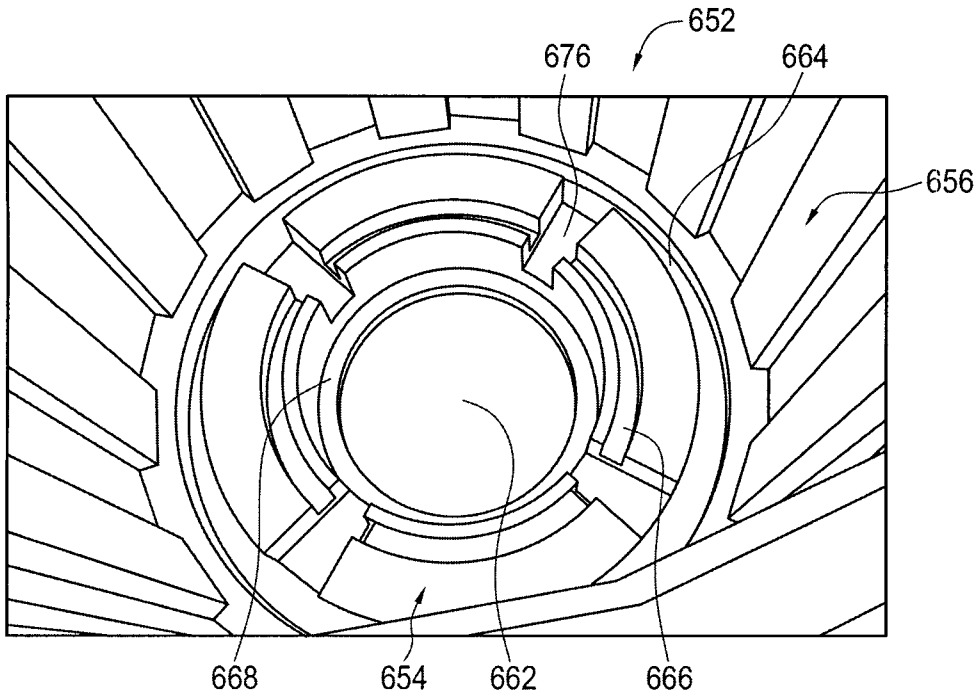

FIG. 14

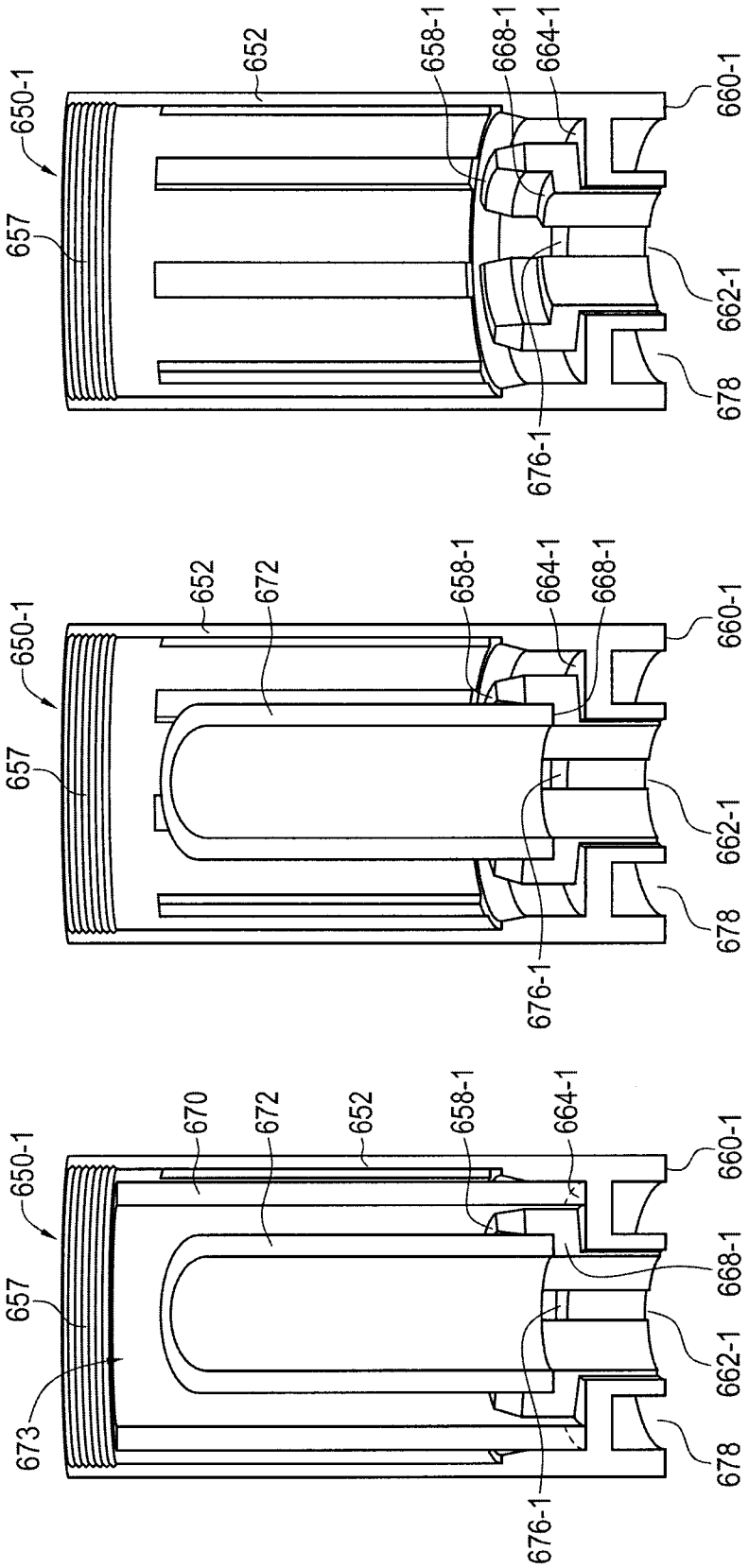

FIG. 15C

FIG. 15B

FIG. 15A

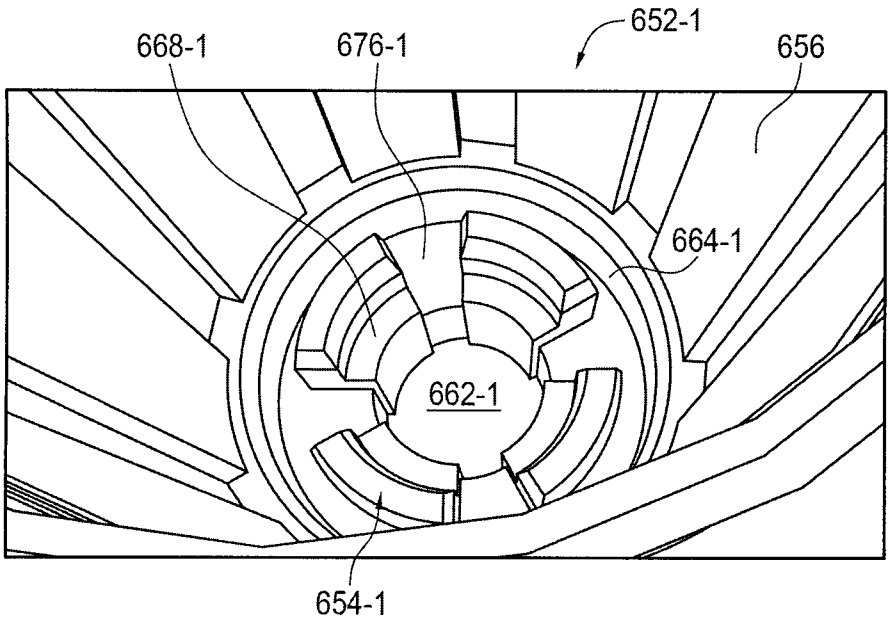

FIG. 16

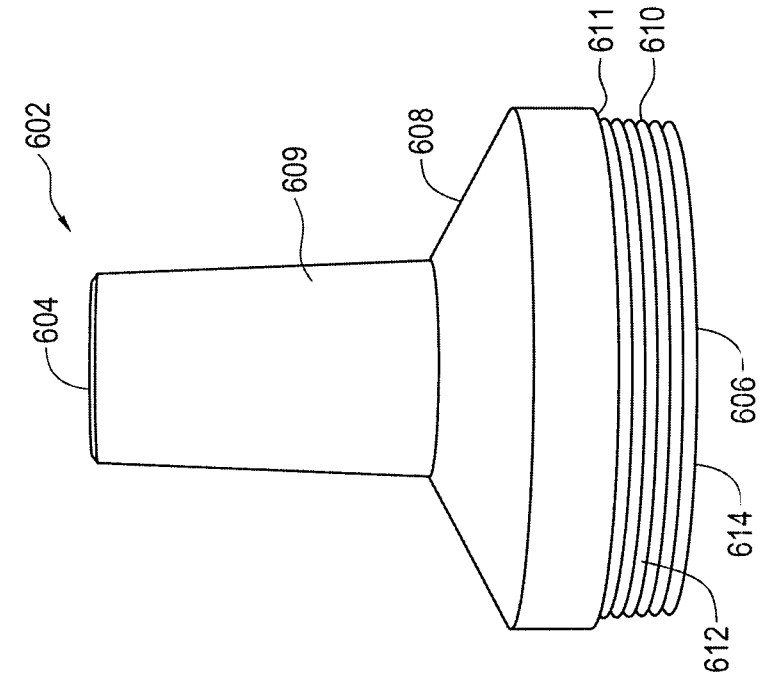

FIG. 17B

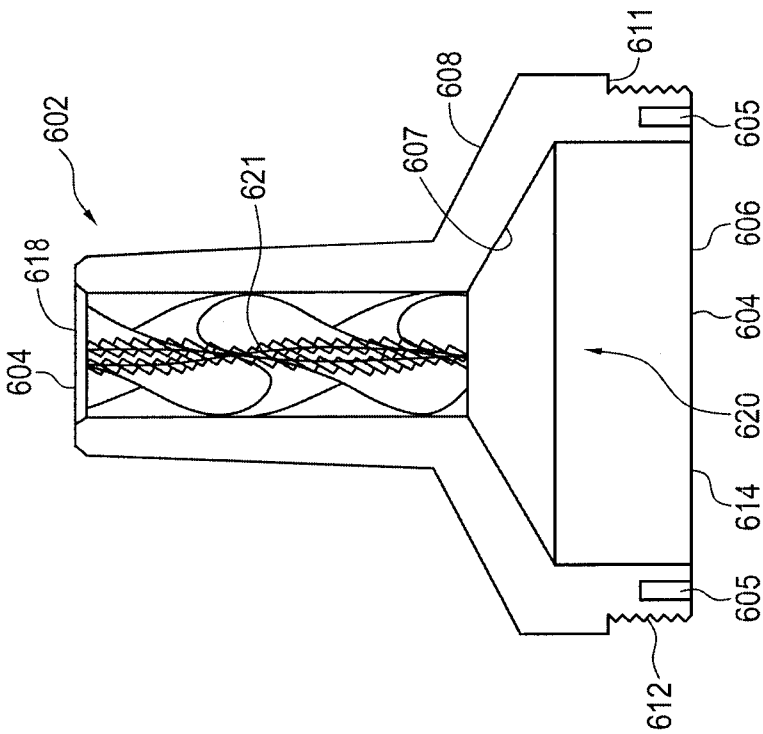

FIG. 17A

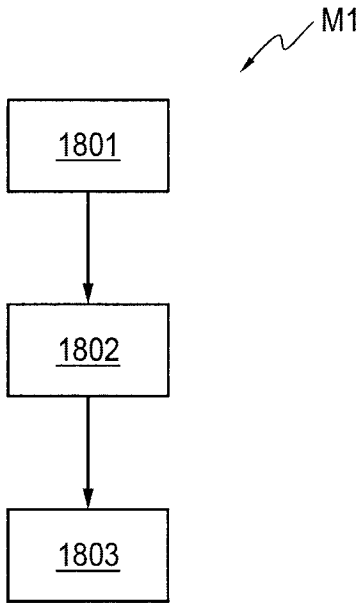

FIG. 18

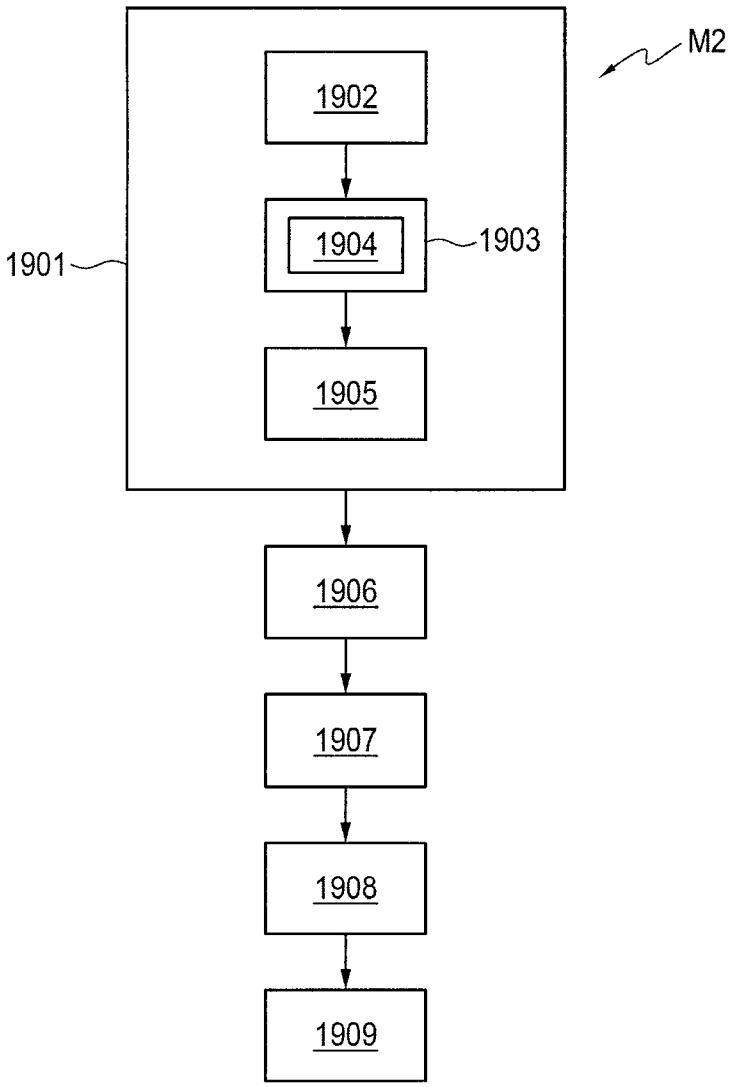

FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050504

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***A24F 47/00*** (2006.01), ***A61M 15/06*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***A24F 47/00*** (2006.01), ***A61M 15/06*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Canadian Patents Database, Questel-Orbit (FamPat)
Keywords : vap+, heat+, receptacle, chamber, cartridge, I?d?, bar?code, radio, mouth?piece, lock, seal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2014/366898A1 (MONSEES, J., et al.) 18 December 2014 (18-12-2014) *Abstract; Figs. 5-7; Para[0081-83]*	1-25
Y	CN204032368U (WONG, S.L.) 24 December 2014 (24-12-2014) *Chinese to English translation using Questel-Orbit* *Abstract; Fig. 1; para[0008]*	3, 5-7, 24, 25
Y	US2013/014755A1 (KUMAR, J., et al.) 17 January 2013 (17-01-2013) *Abstract; Fig. 1; para[0023]*	8
Y	US2015/083149A1 (OGLESBY A.P., et al.) 26 March 2015 (26-03-2015) *Abstract; Fig. 6; para[0094]*	9-11
Y	US2010/163063A1 (FERNANDO, F., et al.) 01 July 2010 (01-07-2010) *Abstract; para[0094]*	12, 13, 20, 23, 24

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

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

Date of the actual completion of the international search 18 May 2016 (18-05-2016)	Date of mailing of the international search report 21 June 2016 (21-06-2016)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer William Tse (819) 639-7914

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2016/050504

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2014366898A1	18 December 2014 (18-12-2014)	US2014366898A1	18 December 2014 (18-12-2014)
		CN105473012A	06 April 2016 (06-04-2016)
		WO2014201432A1	18 December 2014 (18-12-2014)
CN204032368U	24 December 2014 (24-12-2014)	None	
US2013014755A1	17 January 2013 (17-01-2013)	US2013014755A1	17 January 2013 (17-01-2013)
		WO2013009883A1	17 January 2013 (17-01-2013)
US2015083149A1	26 March 2015 (26-03-2015)	US2015083149A1	26 March 2015 (26-03-2015)
		CA2695513A1	05 March 2009 (05-03-2009)
		CN101790662A	28 July 2010 (28-07-2010)
		EP2193312A1	09 June 2010 (09-06-2010)
		EP2193312B1	06 August 2014 (06-08-2014)
		IES20080696A2	08 July 2009 (08-07-2009)
		JP2010538235A	09 December 2010 (09-12-2010)
		US2010308481A1	09 December 2010 (09-12-2010)
		WO2009027959A1	05 March 2009 (05-03-2009)
US2010163063A1	01 July 2010 (01-07-2010)	US2010163063A1	01 July 2010 (01-07-2010)
		US8689804B2	08 April 2014 (08-04-2014)
		AR075320A1	23 March 2011 (23-03-2011)
		AU2009332645A1	07 July 2011 (07-07-2011)
		AU2009332645B2	31 March 2016 (31-03-2016)
		BRPI0923531A2	26 January 2016 (26-01-2016)
		CA2748219A1	01 July 2010 (01-07-2010)
		CN102264251A	30 November 2011 (30-11-2011)
		CN102264251B	02 July 2014 (02-07-2014)
		CO6390090A2	29 February 2012 (29-02-2012)
		EP2201850A1	30 June 2010 (30-06-2010)
		EP2378905A1	26 October 2011 (26-10-2011)
		IL213435D0	31 July 2011 (31-07-2011)
		IL213435A	31 December 2014 (31-12-2014)
		JP2012513750A	21 June 2012 (21-06-2012)
		JP5548703B2	16 July 2014 (16-07-2014)
		KR20110096548A	30 August 2011 (30-08-2011)
		MX2011006919A	28 July 2011 (28-07-2011)
		NZ593341A	27 September 2013 (27-09-2013)
		RU2011130819A	27 January 2013 (27-01-2013)
		RU2517125C2	27 May 2014 (27-05-2014)
		SG172779A1	29 August 2011 (29-08-2011)
		TW201029590A	16 August 2010 (16-08-2010)
		TWI495435B	11 August 2015 (11-08-2015)
		UA102423C2	10 July 2013 (10-07-2013)
		US2014196736A1	17 July 2014 (17-07-2014)
		WO2010073122A1	01 July 2010 (01-07-2010)
		WO2010073122A8	14 July 2011 (14-07-2011)