US 20070045288A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0045288 A1**

Nelson (43) **Pub. Date: Mar. 1, 2007**

(54) **INHALER**

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(21) Appl. No.: **11/322,956**

(22) Filed: **Dec. 30, 2005**

Related U.S. Application Data

(60) Provisional application No. 60/713,611, filed on Sep. 1, 2005.

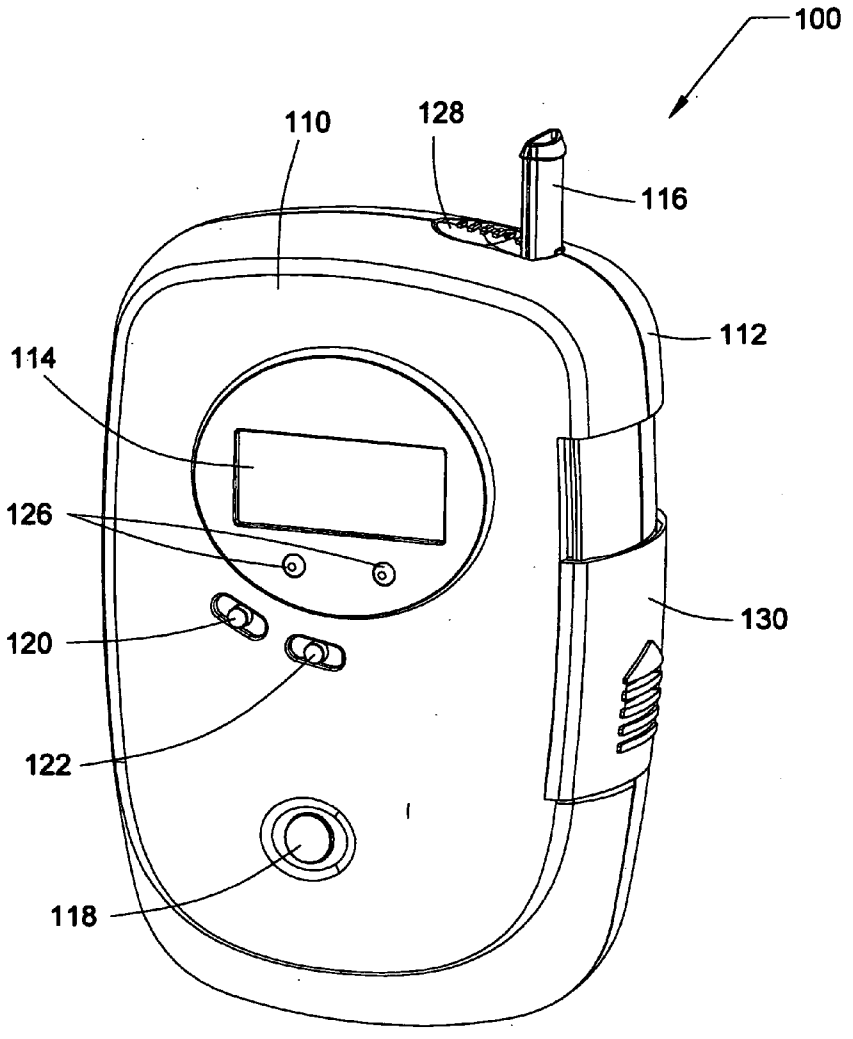
Publication Classification

(51) **Int. Cl.**
H05B 3/00 (2006.01)

(52) **U.S. Cl.** **219/533**; 219/201

(57) **ABSTRACT**

There is disclosed an apparatus having a housing, a heating element, a heating element switch, a heating chamber, a heating chamber cover, and a controller. The housing is handheld. The heating element is disposed within the housing. The heating element switch may be electrically coupled with the heating element. The heating chamber is disposed within the housing. The heating chamber cover may be adapted to at least partially eject the heating chamber from the housing when the heating chamber cover is displaced relative to the housing. The controller is electrically coupled with the heating element switch. The controller is adapted to control a transfer of energy to the heating element. The controller may be adapted to prevent the transfer of energy to the heating element if the heating chamber cover is not in a closed position relative to the housing.



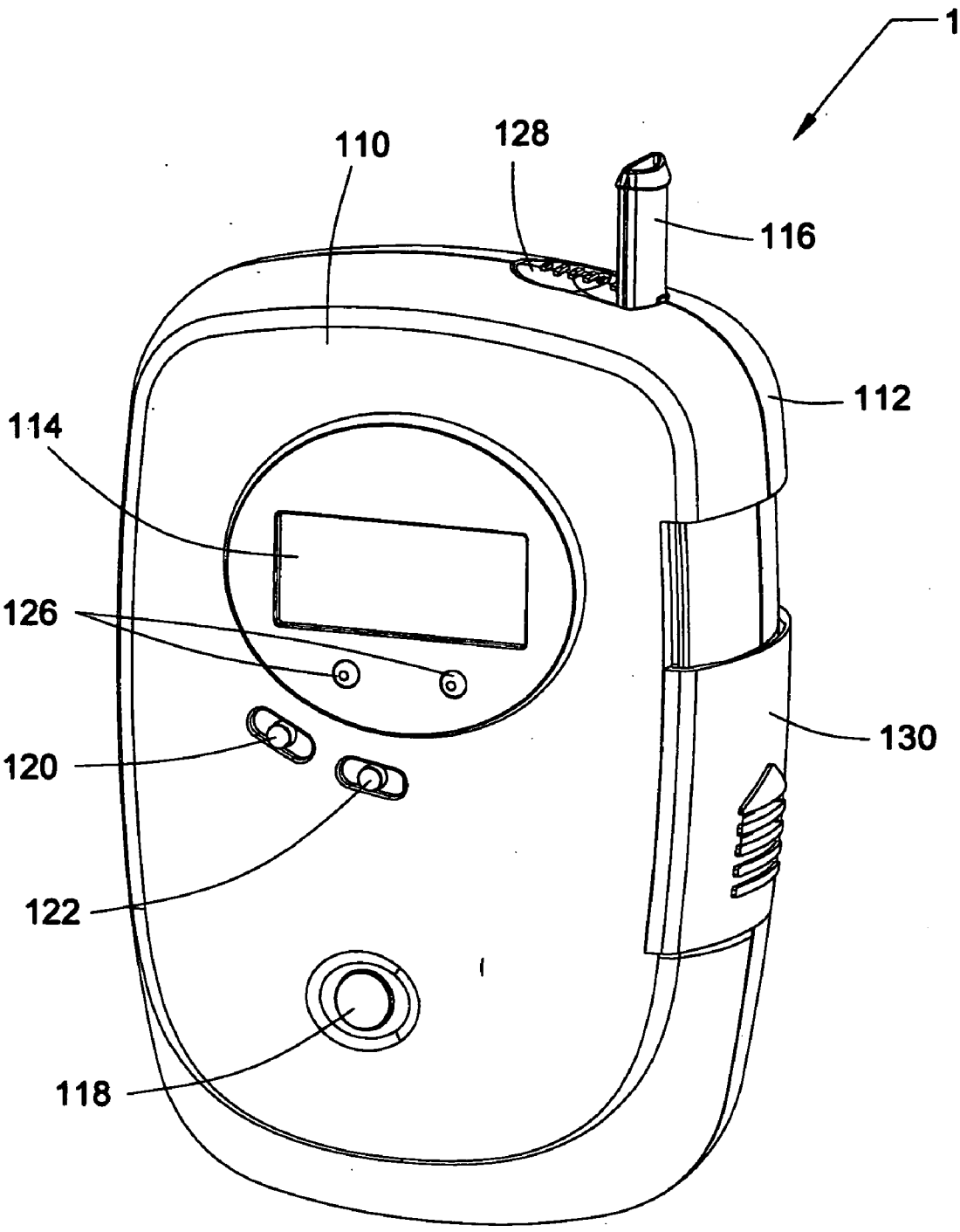


FIG. 1

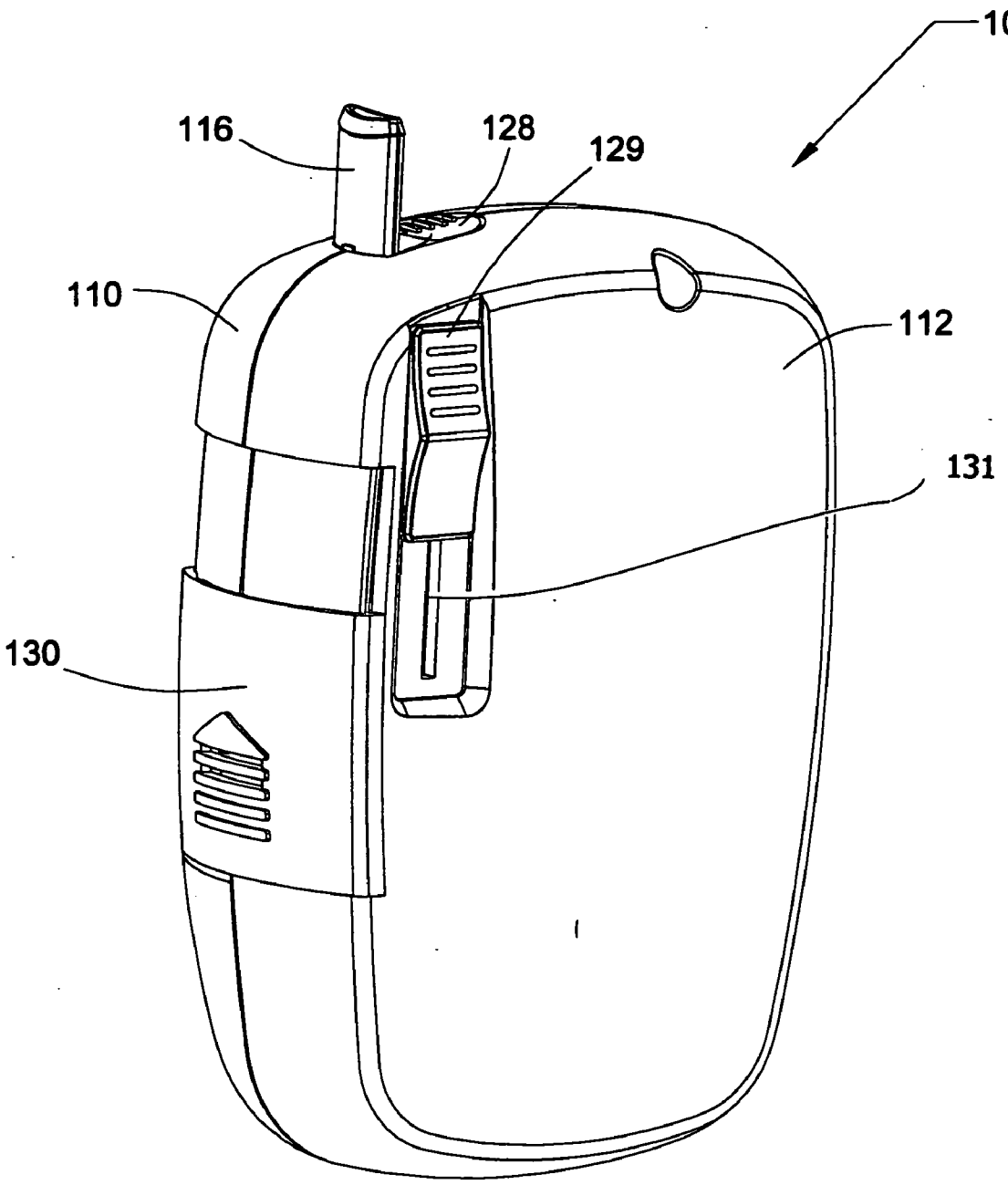


FIG. 2

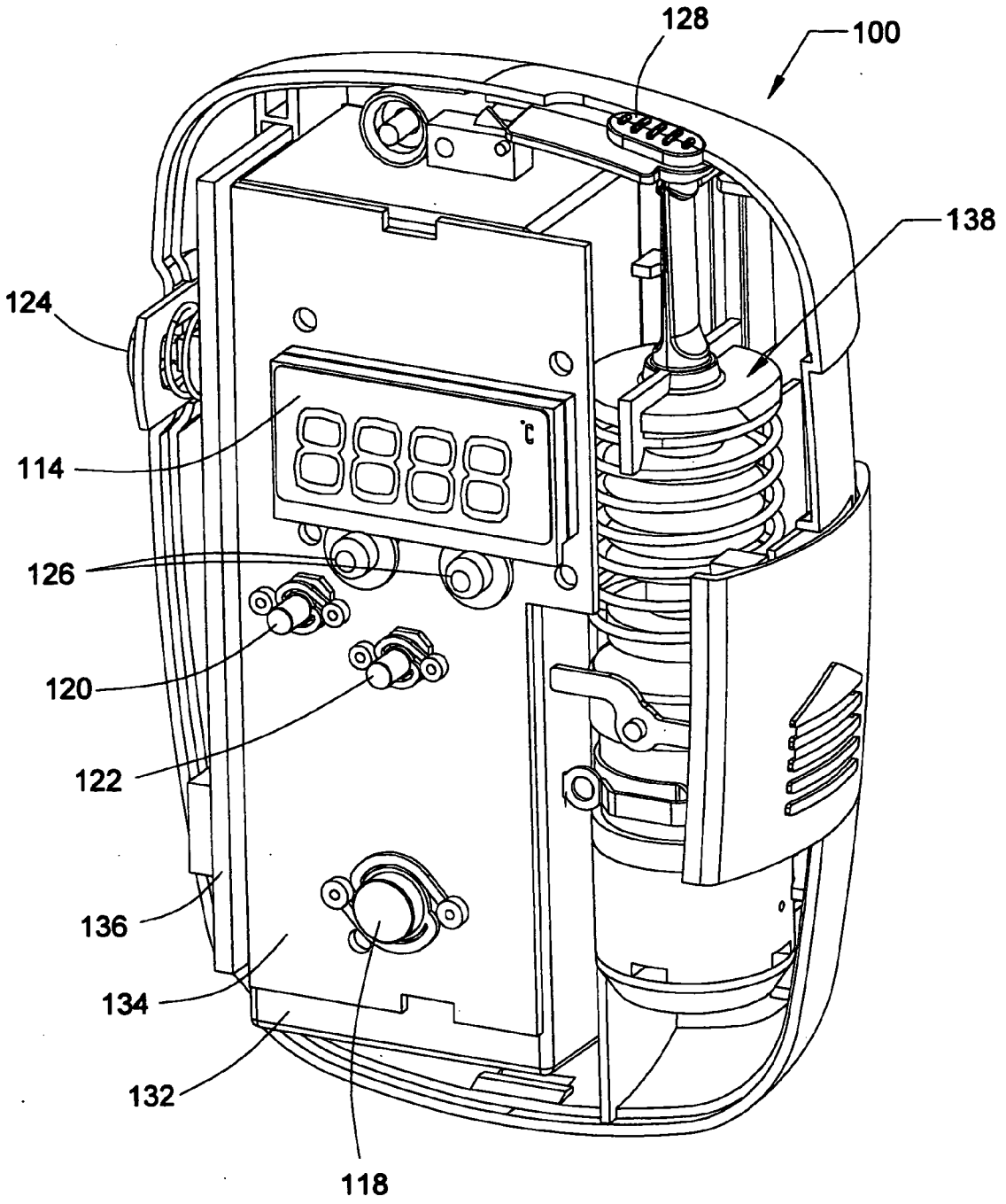


FIG. 3

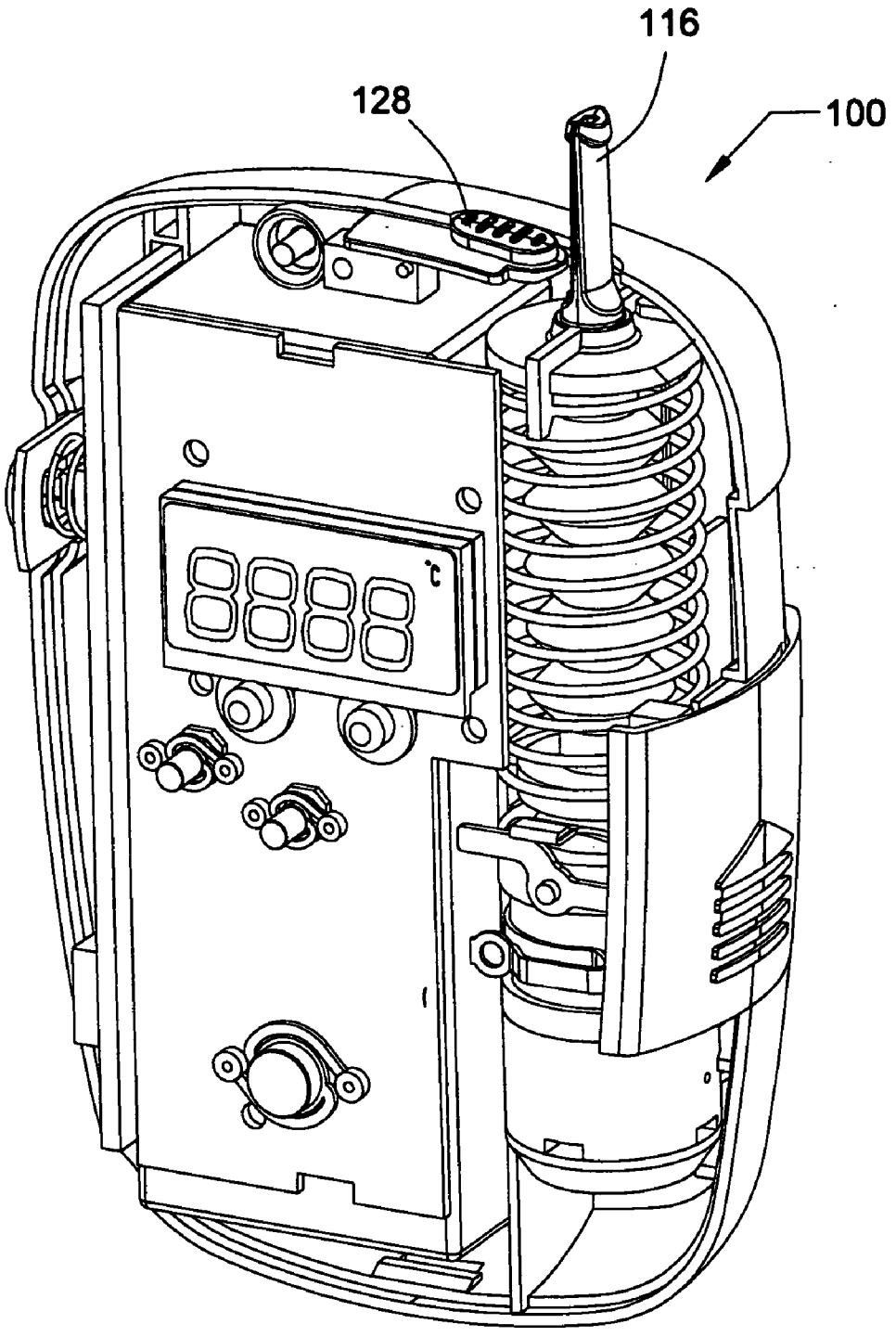


FIG. 4

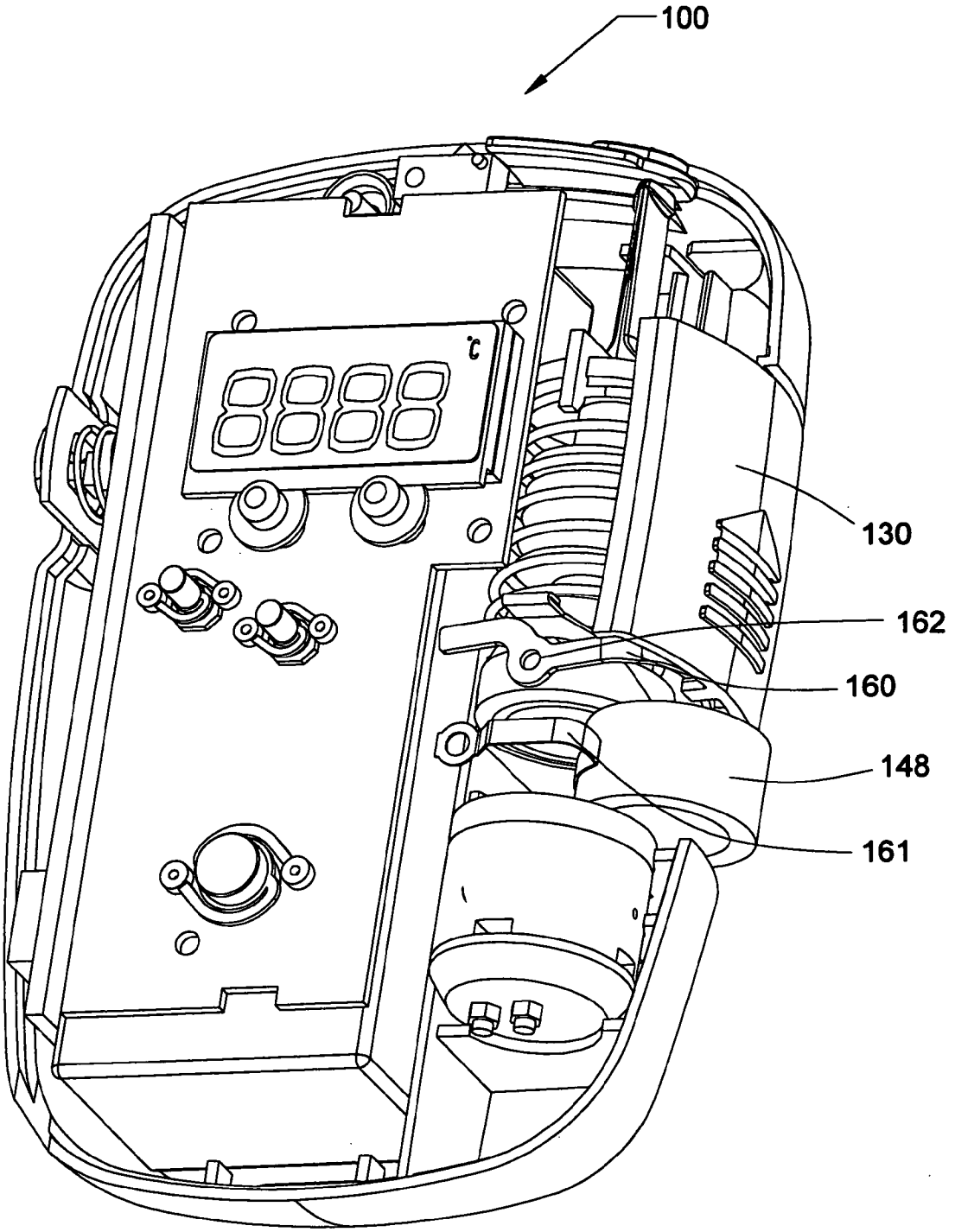


FIG. 5

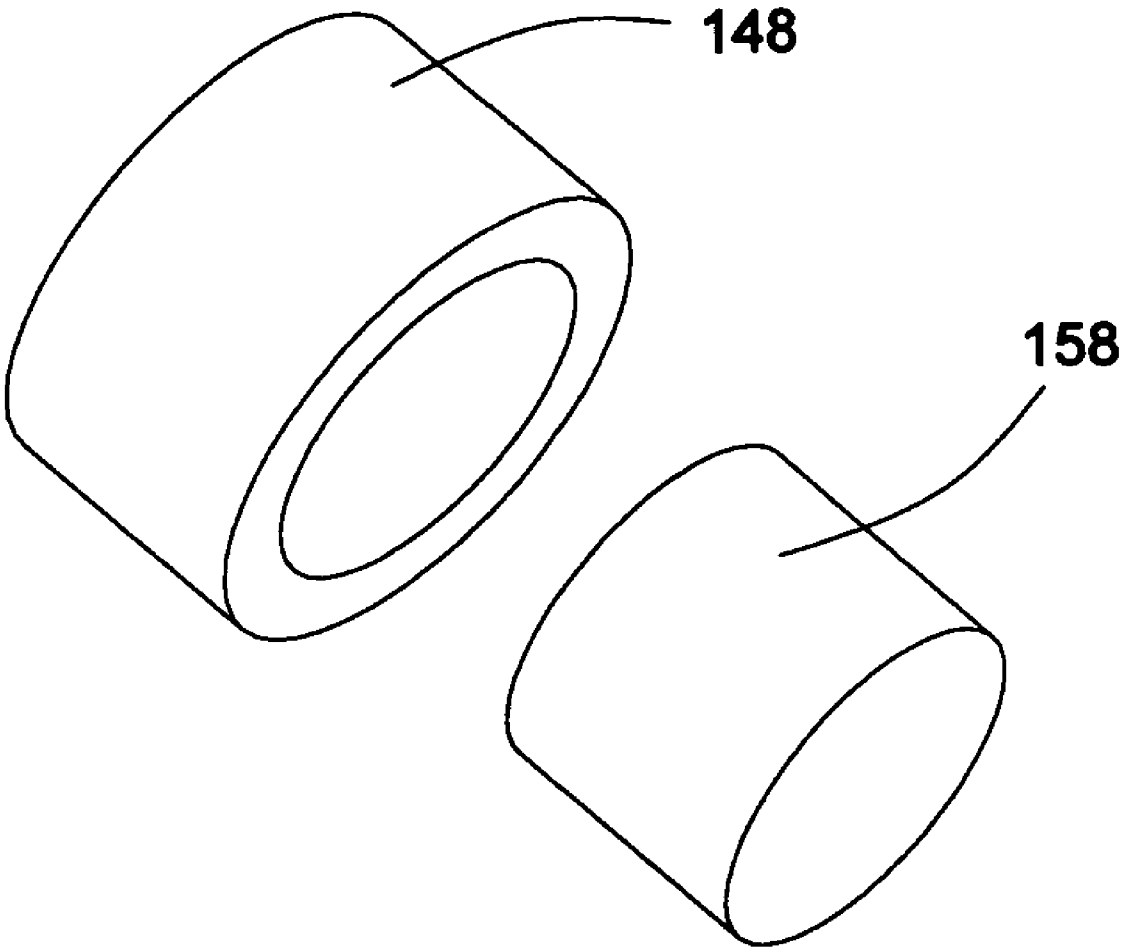


FIG. 6

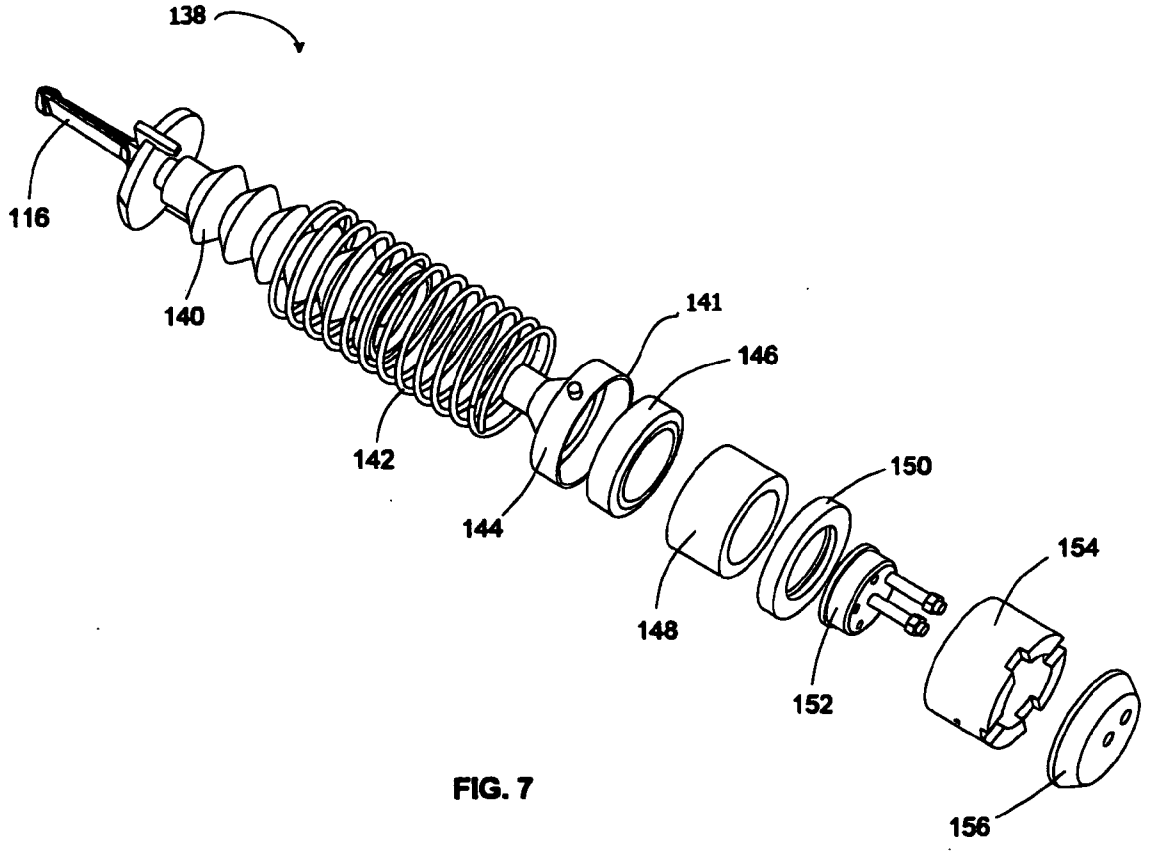


FIG. 7

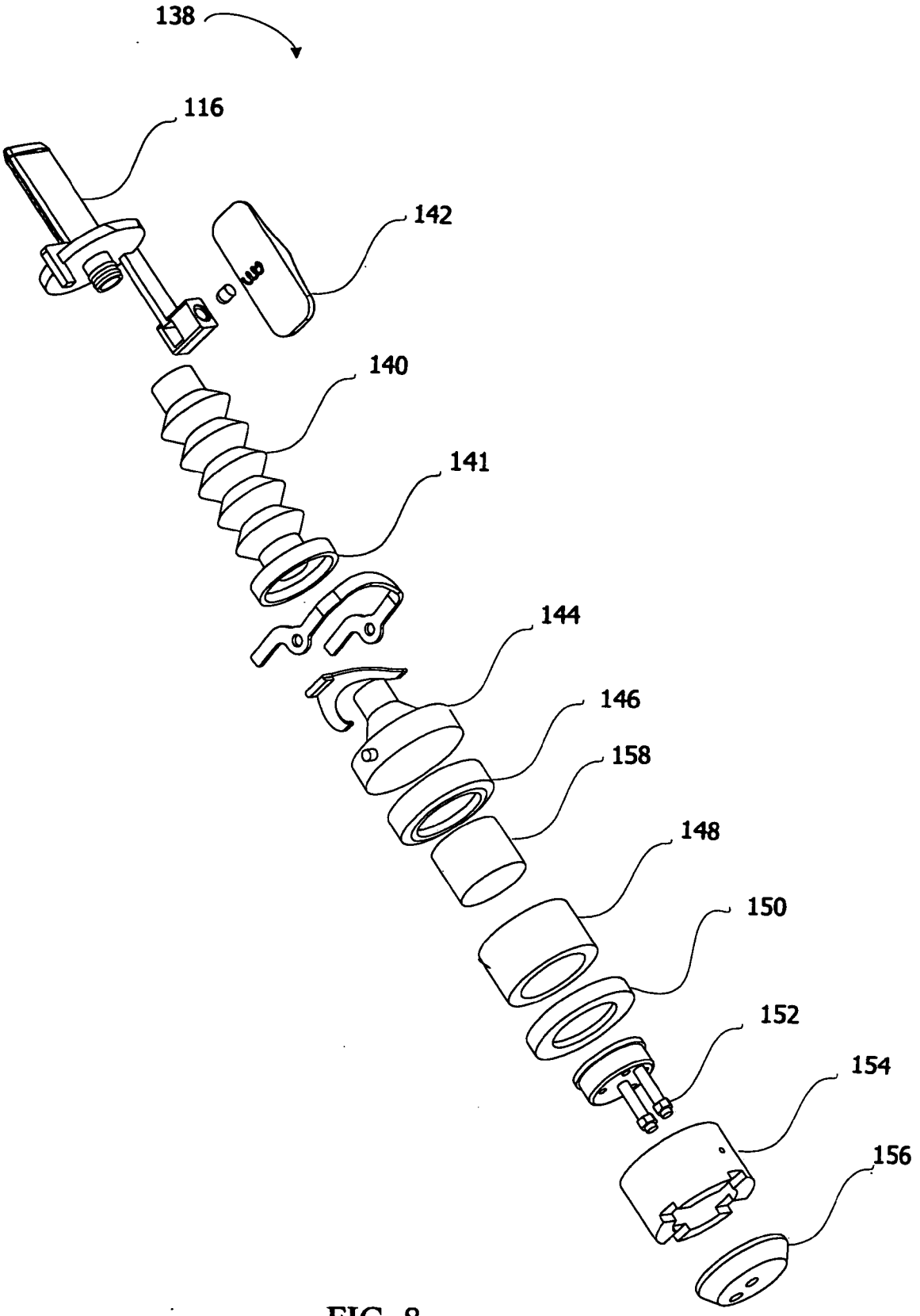


FIG. 8

INHALER

RELATED APPLICATION INFORMATION

[0001] This application claims priority from Provisional Application No. 60/713,611, filed Sep. 1, 2005, which is incorporated herein by reference.

NOTICE OF COPYRIGHTS AND TRADE DRESS

[0002] A portion of the disclosure of this patent document contains material which is subject to copyright protection. This patent document may show and/or describe matter which is or may become trade dress of the owner. The copyright and trade dress owner has no objection to the facsimile reproduction by anyone of the patent disclosure as it appears in the Patent and Trademark Office patent files or records, but otherwise reserves all copyright and trade dress rights whatsoever.

BACKGROUND

[0003] 1. Field

[0004] This disclosure relates to inhaling devices.

[0005] 2. Description of the Related Art

[0006] Herbs and botanicals have been used for thousands of years by both ancient and modern civilizations. Aromatherapy, herbology, and phyto-inhalation products are popular among many people.

[0007] At least a billion people worldwide smoke tobacco and other phyto materials. However, because of health considerations or various laws and regulations, smoking is now prohibited in many airplanes, restaurants and other public places.

[0008] Products are now being introduced to deliver the pleasures of smoking without polluting the environment. Examples of such products include nicotine chewing gum and patches.

DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is a front perspective view of an inhaler.

[0010] FIG. **2** is a rear perspective view of an inhaler.

[0011] FIG. **3** is a front perspective view of an inhaler with a cover removed.

[0012] FIG. **4** is a front perspective view of an inhaler with a cover removed.

[0013] FIG. **5** is a front perspective view of an inhaler with a cover removed.

[0014] FIG. **6** is a plan view of a heating chamber and consumable product.

[0015] FIG. **7** is a perspective exploded view of a volatization assembly.

[0016] FIG. **8** is a perspective exploded view of a volatization assembly.

DETAILED DESCRIPTION

[0017] Throughout this description, the embodiments and examples shown should be considered as exemplars, rather than limitations on the apparatus and methods disclosed or claimed.

[0018] Description of Systems

[0019] Referring now to FIG. **1**, there are shown a front perspective view of a volatizing device **100**. The term volatize refers to causing a material to evaporate, become volatile, become a vapor or be carried by a vapor. The volatizing device **100** may be designed to volatize a phyto material. The term phyto refers to a plant. The term plant refers to any organism constituting the kingdom Plantae.

[0020] In general, volatizing devices volatize a substance. Essential components of such substances are commonly referred to by the coined terms substituent or constituent. However, as used herein, the term constituent refers only to a phyto material or an essential oil.

[0021] The volatizing device **100** may include a front housing **110**, a rear housing **112**, a display **114**, a mouthpiece **116**, a power button **118**, a temperature increase button **120**, a temperature decrease button **122**, two indicator lights **126**, a mouthpiece cover **128**, a mouthpiece slider **129**, and a heating chamber cover **130**.

[0022] The term housing refers to a structure that at least partially covers, protects, or encloses a device. As assembled, the front housing **110** and the rear housing **112** may provide a structure for the volatizing device **100**. The volatizing device **100** may be designed to be handheld. The term handheld refers to a device that is designed to be operated while held in the hand of a person. A handheld device may be held and operated in one hand, or may be held with one hand and operated with a second hand, or may be held in one hand and operated in another fashion. A handheld device may be portable, fit within a person's shirt pocket, slacks pocket, purse, or handbag. Additionally, a handheld device may be adapted to be secured to something (e.g., a wristband or a belt) via a clip, an adhesive, a Velcro® type hook and loop fastener, or other securing device. A handheld device is typically lightweight. Thus, the volatizing device **100** is both portable and designed for privacy.

[0023] For example, the dimensions of the volatizing device **100** may be 3 inches in width, 4 inches in length and 1 inch in depth or other dimensions. The front housing **110**, rear housing **112**, mouthpiece **116**, mouthpiece cover **128** and heating chamber cover **130** may include a plastic material, a metal material, a composite material, a ceramic material and/or combinations thereof.

[0024] The materials selected for the components of the volatizing device **100** may be determined based on cost of manufacture, life cycle durability, vibration and shock resistance, resistance to deformation based on heat, and other factors. In order to prevent lacerations of a person's skin or clothing, the exterior surfaces of the volatizing device **100** may be beveled, rounded, and/or relatively smooth. In order to prevent discomfort and/or burns to a person's skin or clothing, the components of the volatizing device **100** may include heat insulating features. For example, the interior of the volatizing device features may include an insulating foam fill. Additional insulating features may include surface coatings and/or treatments such as powder coating and or paints utilizing ceramic and/or other insulating materials.

[0025] The term mouthpiece refers to a portion of an apparatus adapted both to allow a fluid to flow there through and at least partially fit on or within a mouth of a person or mammal. The mouthpiece **116** may at least partially define

a cavity. The term cavity refers to a hollow space at least partially surrounded by a housing. The mouthpiece **116** may include a material selected to be comfortable, both in texture and taste to a person's lips and tongue. The mouthpiece **116** may have dimensions of ¾ inches in width, ½ inch in depth and 2 inches in length, or other dimensions. The mouthpiece **116** may be disposed at a position which is both comfortable for a person to hold the volatizing device **110** and inhale a volatized material from the mouthpiece **116**.

[**0026**] The mouthpiece **116** may be adapted to be at least partially retractable into the volatizing device **116**. In a retracted position, the mouthpiece cover **128** may be displaced to cover, hide and/or protect the mouthpiece **116**. The term displace refers to the act of physically shifting, sliding, moving, or rotating something. For example, the mouthpiece may slide and/or rotate to a position within the volatizing device **116**.

[**0027**] In turn, the mouthpiece cover **128** may be slid, shifted, and/or rotated to hide the mouthpiece **116**. By enclosing the mouthpiece **116**, germs, debris or other undesirable substances may be prevented from building up on the mouthpiece **116**. When the volatizing device **100** is operated, a user may inhale a volatized fluid via the mouthpiece **116**. The term fluid includes liquids and/or gases which may or may not include suspended fine particulate solids. Examples of volatized materials which a person may inhale include nicotine, essential oils, elixirs, therapeutic agents, tonics, pharmaceuticals, phyto based constituents and/or other remedies.

[**0028**] The mouthpiece **116** may be the sole or primary exit for volatized materials. If volatization occurs with the mouthpiece **116** either retracted and/or covered, unsafe temperature and/or pressure may build up within the volatizing device **110** and cause a failure. Therefore, the volatizing device **100** may include safety features that prevent operation while the mouthpiece cover **128** is covering or partially covering the mouthpiece **116** and/or when the mouthpiece is retracted or partially retracted within a cavity defined by the front housing **110** and rear housing **112**. Such safety features may be mechanically activated and/or electronically activated.

[**0029**] Referring now to FIG. **2**, there is shown a rear perspective view of the volatizing device **100**. In this view, a mouthpiece slider **129** is visible. The mouthpiece slider is an example of a mechanical device which may displace the mouthpiece **116**. The mouthpiece slider **129** may be attached to or integral to the mouthpiece **116**. The mouthpiece slider **129** may be adapted to slide through a slot **131**. The slot **131** may be defined by the rear housing **112**, the front housing **110** (not shown) or other portion of the volatizing device **100**. Other examples (not shown) of mechanical devices that may displace the mouthpiece **116** include winding knobs, springs, belts, wheels and other devices.

[**0030**] A sensor (not shown) may detect whether the mouthpiece **116** is extended or not. This sensor may be used to control whether some or all functions of the volatizing device **100** are operable. For example, while the device may be able to power up when the mouthpiece **116** is extended, volatization may be restricted. As a safety precaution, extension of the mouthpiece **116** coupled with switching of the power button **118** may both be required for activation of the volatization device **100**.

[**0031**] The heating chamber cover **130** is a cover adapted to at least partially conceal and/or enclose an aperture (not shown) in the front housing **110** and/or the rear housing **112** at a location proximate to a heating chamber (described below). The heating chamber cover **130** may be displaceable relative to the front housing **110**, the rear housing **112**, another portion of the volatizing device **100** or combinations thereof.

[**0032**] In FIG. **2**, the heating chamber cover **130** is shown in a closed position. The term closed refers to the blocking, preventing, or obstruction of access to the interior or contents of a structure. The term position refers to an arrangement of parts in relation to one another or to an external source of orientation or reference.

[**0033**] The heating chamber cover **130** may be displaced from the closed position to an open position. Referring briefly to FIG. **5**, there is shown a front perspective view of an inhaler with a cover removed. In FIG. **5**, the heating chamber cover **130** is in an open position, and a heating chamber **148** is accessible to a user of the volatizing device **100**. Although the heating chamber cover **130** is shown as a device which slides among open and closed positions, the heating chamber cover **130** may be displaced among open and closed positions via rotations, which may include hinges, pins, pivots or other rotating devices, notches, snapping on and off and other electrical and/or mechanical methods.

[**0034**] The heating chamber cover **130** may provide protection to the user such that when the volatizing device **100** is being operated, the user and/or materials proximate the volatizing device **100** are not subjected to burns and/or fire. Such protection may be achieved by providing a heat insulation barrier between the heating chamber **148** and the exterior of the volatizing device **100**.

[**0035**] As volatization is a process which requires heat, the heating chamber **148** may achieve harmful temperatures. As a safety feature, the heating chamber cover **130** may lock in position relative to the volatizing device **100** if the heating chamber **148** exceeds a predetermined temperature. A predetermined temperature may be selected as 120° F. or another temperature. The term lock refers to fastening together or closing of one thing relative to another. The term fasten refers to causing parts which are separate to hold together. The locking feature may be achieved via expansion of coupled materials, a latch, a cam, a gear, electronic controls or other means. Thus, the locking feature may prevent burns, fires and/or other harm.

[**0036**] The power button **118**, the temperature increase button **120**, the temperature decrease button **122**, and a heater button **124** (FIG. **3**) may be push-button switches. The term switch refers to a device for making, breaking, opening, closing, or modifying the connections of an electrical circuit. A button or push-button is a type of switch which may have the shape of a disk, ball, other shape that is able to be pushed, indented, or deformed inward by a person's finger, thumb or hand.

[**0037**] The power button **118**, the temperature increase button **120**, the temperature decrease button **122**, and the heater button **124** may be other types of switches. The location of the switches may be selected based on ease of operation and ergonomics while holding the volatizing

device **100** in a single hand. Thus, the switches may all be located on the front housing **110** or the rear housing **120**. The front housing **110** and the rear housing **120** may be designed such that when assembled, they form, in combination, a plurality of sides (not shown). For example, the front housing **110** and the rear housing **120** may define an elongate rectangular solid, a cylinder, a sphere or other geometry. Thus, an example the heater button **124** may be disposed on a left side of the volatizing device **100** as shown in FIG. **3**.

[**0038**] To promote safe operation, the location of the switches may be distributed around the volatizing device **100** in order to prevent accidental activation. Although the power button **118** may serve as the primary switch for enabling the volatizing device **100**, additional switches may be required to be activated simultaneously and/or in a timed sequence to activate the volatizing device **100**.

[**0039**] Moreover, the power button **118**, the temperature increase button **120**, the temperature decrease button **122** and the heater button **124** may be a single switch (not shown) that interacts with a controller (not shown) and the display **114**. In such an embodiment, a user of the volatizing device **100** may have the ability to scroll through menus and enter various information to control the volatizing device **100**. Such information may include the user's name, password, type of material to be volatized, amount of material to be volatized, heat and temperature parameters for volatization, time, date, and other information.

[**0040**] A display is a device which provides a visual image. Examples of displays include light emitting diodes (LED), liquid crystal displays (LCD) and other display types. Additional examples of displays include a single or plurality of analog gauges, wheels, needle pointers and other mechanical indicators. The display **114** may be disposed on, within or behind the front housing **110**, the rear housing **112** or both. The display **114** may be a single unit or a combination of display units (not shown). The display **114** may have dimensions and geometry that are familiar to users of handheld devices. For example, the display **114** may have a width of 2 inches and a length of 4 inches, or other dimensions. The display **114** may provide various information including the temperature within a heating chamber (discussed below).

[**0041**] The indicator lights **126** may be separate or distinct from the display **114**. The indicator lights **126** may provide information that indicates that a battery (not shown) has sufficient charge to perform a volatization operation. The indicator lights **126** may illuminate when the unit is ready to volatize a material or is actively volatizing a material. The indicator lights **126** may identify an unsafe condition and indicate an automatic shutdown, for example excessive heat or battery failure. The indicator lights may be disposed proximate the display **114** or near one of the switches, for example the power button **118**, or other location.

[**0042**] The volatizing device **100** may include an illuminator (not shown), for example a small light bulb or LED, which may temporarily illuminate the display **114** should the operating environment be dim or dark. Additionally, the display **114** may be designed to support Braille. Such an embodiment may include a plurality of small dots, disks or balls that variably protrude from the display in order to communicate information to a blind person. Additionally, the display **114** may be designed to support sound. Such an embodiment may include a speaker or other sound emitting device.

[**0043**] Referring now to FIG. **7** and FIG. **8**, there are shown perspective exploded views of a volatization assembly **138**. The volatization assembly **138** may include the mouthpiece **116**, a vapor tube **140**, a mouthpiece extension device **142**, a chamber lid **144**, an upper seal **146**, a heating chamber **148**, a lower seal **150**, a heating element **152**, a heating element housing **154**, and a heating element cover plate **156**. The majority of the volatization assembly **138** may be disposed within a cavity defined by the front housing **110** and the rear housing **112**. However, some portions of the volatization assembly **138** may extend outside of the front housing **110** and the rear housing **112**.

[**0044**] The mouthpiece **116** may be disposed at one end of the volatization assembly **138**. The mouthpiece **116** may be attached to, integral with or abut the vapor tube **140**. The mouthpiece **116** and the vapor tube **140** may, in combination, define a cavity for fluids to flow therethrough. Thus, the mouthpiece **116** may receive a volatized material in fluid form via the vapor tube **140**.

[**0045**] The vapor tube **140** may be expandable. The term tube refers to a hollow elongated body that is adapted to convey fluids. The term expandable refers to the ability to modify a body's shape such that the modified body has a larger volume than the original body. For example, the vapor tube **140** may expand via bending, folding, elongating, or stretching. The vapor tube **140** may also be adapted to retract, contract or compact to a smaller size and volume.

[**0046**] The mouthpiece extension device **142** is a member that assists in displacing the mouthpiece **116** and/or the vapor tube **140**. The mouthpiece extension device **142** may be integral to, attached to, or abut the mouthpiece slider **129** (FIG. **2**). The mouthpiece extension device **142** may be integral to, attached to, or abut either the mouthpiece **116** or the vapor tube **140**. The mouthpiece extension device **142** may be embodied as a spring as shown in FIG. **7**, as a lever as shown in FIG. **8** or another member. The mouthpiece extension device **142** may be displaced upward to shift the mouthpiece **116** into an extended position when the mouthpiece cover **128** is in the open position.

[**0047**] Disposed from top to bottom between the vapor tube **140** and the heating element **152** may be a chamber lid **144**, an upper seal **146**, a heating chamber **148** and a lower seal **150**.

[**0048**] The chamber lid **144** may be integral to, attached to, or abut an opening **141** of the vapor tube **140**. The chamber lid **144** and the vapor tube **140** may at least partially define a cavity through which a fluid may flow. Thus, the vapor tube **140** may receive a volatized material via the chamber lid **144**.

[**0049**] The upper seal **146** may be disposed between the chamber lid **144** and the heating chamber **148**. The upper seal **146** may be integral to, attached to, or abut one or both of the chamber lid **144** and/or the heating chamber **148**. The upper seal **146** may have a permeable surface and/or at least partially define a cavity along with the chamber lid **144**. Thus, the chamber lid **144** may receive a volatized material via the upper seal **146**.

[0050] The upper seal **146** and the lower seal **150** may include a mesh, filter, or screen to prevent non-vapor or solid material from passing from the heating chamber **148** to either the chamber lid **144** or the heating element **152**. Using a mesh, filter, or screen may prevent loose tobacco or herbs from coming in contact with the heating element **152** resulting in ignition. Additionally, the mesh, filter, or screen may prevent solid particulate matter from being inhaled by a human or other mammal and/or emitted into the environment.

[0051] The lower seal **150** may be disposed between the heating chamber **148** and the heating element housing **154**. The lower seal **150** may abut, be integral with or attached to the heating chamber **148** and the heating element **152** and/or the heating element housing **154**. The lower seal **150** may be permeable to fluids.

[0052] The heating element **152** may be disposed at least partially within the heating element housing **154**. The heating element **152** may include an electrical resistive material, for example, an aluminum alloy, a ferrous alloy, carbon filament yarns, and equivalents thereof similar to the materials used in an electrocautery surgical tool, a heating element of an automotive cigarette lighter, or an electric stove heating element. Additionally, the heating element **152** may include a honeycomb ceramic heating element, an infrared heating element, and/or an inductive heating element. The term heating element refers to a component which radiates heat based at least in part on a chemical reaction, electrical resistance, friction, electromagnetic fields, inductance or other physical effect.

[0053] The heating element cover plate **156** may be disposed abutting, integral to, or attached to an end of the heating element housing **154**. The heating element housing **154** and the heating element cover plate **156** may include a heat resistant material with insulating properties. Heat resistant materials include ceramics, sintered metals, composites, fabrics and other materials.

[0054] Referring now to FIG. **6**, there is shown the heating chamber **148** and a consumable product **158**. The heating chamber **148** may at least partially define a cavity. The heating chamber **148** may have the geometry of a hollow sphere, rectangular solid, cylinder or other shape. The consumable product of FIG. **6** is a constituent **158**. The constituent **158** may be a phyto material or essential oil. The constituent **158** may be formed and adapted for being disposed within the heating chamber **148**. Examples of a constituent are a pre-formed cartridge of tobacco, a compressed matrix of material similar to a medicine tablet, or a matrix of material similar to a sponge, surgical cotton, compressed surgical cotton or gauze used to hold a liquid form of constituent, essential oils, or herbs.

[0055] Unlike smoking where 80%-90% of the essential ingredients are burned off and never absorbed by the lungs, volatization is very efficient. Thus, the quantity of a phyto material, such as tobacco, to safisfy a user may be substantially less than that in a cigarette or cigar. Hence, a user may save money by not purchasing as much tobacco. Moreover, the volafization process releases substantially less byproducts into the environment as the majority of a volatized material is transferred directly to a user's lungs. In turn, second hand smoke and foul odor issues may be substantially eliminated.

[0056] Each volatization operation may correspond to an inhalation of a fluid. The number of inhalations per constituent **158** may depend upon the nature of the constituent, the moisture content of the constituent, and the user's lung capacity. For some materials or constituents, one or two inhalations may be all that is necessary to extract all of the essential ingredients. Other constituents, tobacco for example, may require multiple inhalations.

[0057] Many phyto materials volatize between 100 and 150 degrees Celsius. The nicotine in tobacco, for example, vaporizes between approximately 180 and 200 degrees Celsius. Volatile oils such as camphor and mint vaporize at as low as 30 to 60 degrees Celsius. Some medicinal herbs vaporize at 190 to 210 degrees Celsius. However, the moisture content and ambient pressure may determine the ideal volatization conditions. Many phyto materials ignite at 235° C. Thus, a predetermined maximum temperature for the heating chamber **148** may be set at 230° C. or other temperature.

[0058] The heating chamber **148** may include a heat resistant material with insulating properties. The term chamber refers to a structure which at least partially encloses a space designed for a special purpose, such as volatizing or heating. The heating chamber **148** may have a cylindrical form with open ends, a spherical mesh, a porous cube or other geometry. The cross section of the heating chamber **148** may have a rectangular, circular, triangular or other shaped geometry. The size of the heating chamber **148** may be selected based on the number of volatizations a given quantity of constituent may be used for. For example, a one gram sample of constituent, which may require 500 cubic millimeters or other volume, may provide multiple doses or inhalations of volatized material.

[0059] Referring now to FIG. **8**, the volatizing device **100** may include a sensor (not shown). The term sensor refers to a device designed to respond to a physical stimulus and transmit a resulting signal. The term signal refers to a detectable physical quantity or impulse, such as a voltage, current, or magnetic field strength. Examples of sensors include temperature sensors, pressure sensors, mass sensors, displacement sensors, and other sensors.

[0060] The sensor (not shown) may be disposed proximate the heating element **152**. The term proximate refers to being physically very near. The sensor (not shown) may provide a signal to a controller (described below). Thus, the controller may monitor the temperature of the heating element **152**. Additional sensors may be disposed within the heating chamber **148**, upstream and/or downstream of the heating chamber **148** and/or exterior or integral to the front housing **110** or rear housing **112**. Such sensors may provide the controller with data regarding the ambient environmental conditions, the parameters of the heating element **152**, the heating chamber **154**, the constituent **158**, the volatized fluid (not shown), and other elements of the volatizing device **100**.

[0061] Referring again to FIG. **5**, the volatizing device **100** may include an extractor **160**, an extractor spring **161**, and an extractor pivot **162**. The extractor **160**, extractor spring **161** and extractor pivot **162**, in combination, form an embodiment of an ejector. The term ejector refers to a device that drives something out or physically displaces something.

An ejector may be electronically and/or mechanically activated. Examples of ejectors include levers, slides, springs, and displaceable magnets.

[0062] With respect to the ejector of FIG. **5**, when the heating chamber cover **130** is shifted to an open position such that the heating chamber **148** is exposed, the extractor **160** rotates about the extractor pivot **162**. In turn, the ejector lifts the upper seal **146**, and the extractor spring **161** ejects the heating chamber **148** from the volatization assembly **138**.

[0063] Referring to FIGS. **3**, **4**, and **5**, there is shown a front perspective view of an inhaler with a cover removed. The volatizing device **100** may include a battery **132**, a front circuit board **134**, a side circuit board **136**, and the volatization assembly **138**.

[0064] The battery **132** may be supplemented with or substituted with a USB power source, a solar cell, a vehicle's accessory power source, a household AC power or other power source. The term battery refers to a cell, group of cells, electrical device or system which converts stored chemical and/or mechanical energy into electrical energy by a reversible chemical and/or mechanical process, and can provide electrical power to a circuit or system. The battery **132** may have a geometry to provide easy installation and replacement. Examples of batteries include alkaline, nickel cadmium, nickel metal hydride, lithium ion, polymer lithium ion, and other materials. The battery **132** may be rechargeable and/or disposable.

[0065] The battery **132** may be recharged by installing the volatizing device **100** into a recharging cradle (not shown) or by plugging a power cord into a power connector (not shown). When the volatizing device **100** is being charged, the indicator light **126** and/or the display **114** may identify that the volatizing device is being charged. Such identification may be via a flashing LED or display of a string of characters such as "charging." Additional embodiments of indication include illuminating unique colors for charge state. For example, red may indicate charging is in process and green may indicate charging is complete.

[0066] The front circuit board **132** and/or the side circuit board **136** may include a controller. The controller may control operation of the device **100**, including how energy is transferred energy to the heating element **152**. The term transfer refers to the act of causing energy to pass from one source to another. The term energy refers to a capacity for doing work. The controller may include one or more logic arrays, memories, analog circuits, digital circuits, software, firmware, and processors such as microprocessors, field programmable gate arrays (FPGAs), application specific integrated circuits (ASICs), programmable logic devices (PLDs) and programmable logic arrays (PLAs), an electric device and/or combinations therein. An electric device may include a computing device, a processor, a storage device, a memory or combinations thereof.

[0067] A storage device may include a storage media included with or otherwise coupled or attached to a computing device. These storage media include, for example, magnetic media such as hard disks, floppy disks and tape; optical media such as compact disks (CD-ROM and CD-RW) and digital versatile disks (DVD and DVD±RW); flash memory cards; and any other storage media. As used herein, a storage device is a device that allows for reading and/or writing to a storage medium. Storage devices include hard disk drives, DVD drives, flash memory devices, and others.

[0068] By data unit, it is meant a frame, cell, datagram, packet or other unit of information.

[0069] A "computing device" is a device with a processor and memory that can execute instructions. Computing devices can be, for example, personal computers, video game systems, personal video recorders, digital image recorders, digital video recorders, digital audio recorders, telephones, personal digital assistants (PDAs), and special-purpose devices.

[0070] Computing devices may run an operating system, such as Linux, Unix, MS-DOS, Microsoft Windows, Palm OS, and Apple Mac OS X operating systems. The volatizing device **100** may connect to, be integrated with, and/or communicate with one or more computing devices. By having the ability the communicate with other computing devices, the volatization process may be externally controlled or monitored. Moreover, programming the controls of the volatizing device **100** may be performed externally and/or communicated to the controller for standalone operation.

[0071] Such communications may be achieved via wired communications, fiber optic communication, and/or wireless communications such as WiFi®, infrared communication, Bluetooth®, WiMax, UHF, VHF, CDMA, TDMA, GSM, or other cellular other wireless communication. The volatizing device **100** may be a component of a computing device. The volatizing device **100** may embody one or more computing device.

[0072] The controller may record information. The term record refers to causing information to be registered by a storage device via electrical and/or mechanical means so that the information may be reproduced.

[0073] The information may include, but is not limited to, battery life remaining, temperature setting of the heating element **152**, temperature setting of the heating chamber **148**, number of doses for a current constituent, date, time, date and time last used, and an alarm for next use. Such information may be displayed on the display **114**.

[0074] The term alarm refers to a device that causes a notice, warning, or announcement that calls attention to a circumstance or event. The alarm for next use may indicate a dispensing time for sensitive medicines to the user. Examples of an alarm include information displayed on the display **114**, sound projected from a speaker (not shown), vibration from a vibrating element (not shown), blinking from the indicator lights **126** and combinations therein.

[0075] The alarm may activate after a predetermined time period has elapsed. The term elapsed refers to a passing of time.

[0076] A volatization assembly is a subset of components of a volatizing device which volatizes a phyto material and allows for the displacement of the resulting fluid to exit the volatizing device. Typical resulting fluids from a volatizing device are inhaled into a user's lungs in a much smoother fashion than typical smoke.

[0077] Description of Processes of Operation and Use

[0078] Referring again to FIG. **1**, the mouthpiece cover **128** may be slid into the open position. The mouthpiece **116** may then be extended outside of a cavity defined by the front housing **110** and rear housing **120**. The extension of the mouthpiece **116** may be achieved via a spring mechanism (not shown), the mouthpiece extension lever **129** (not shown), or other process. As a safety feature, when the mouthpiece **116** is in a retracted position, the controller may prevent operation of the volatizing device **100**.

[0079] Referring again to both FIG. **1** and FIG. **5**, the heating chamber **148** may be at least partially ejected from the volatizing device **100** by displacing the heating chamber cover **130**.

[0080] A user may then remove the heating chamber **148**. The user may insert a phyto material, for example, a tobacco cartridge, a loose tobacco or herb into the heating chamber **148**. If the phyto material is a machine formed tobacco cartridge, the user may insert the cartridge into the heating chamber **148**. The user may center the cartridge in the heating chamber **148** so the ends of the cartridge are flush with the ends of the heating chamber **148**. If the phyto material includes loose materials, such as tobacco or herbs, the user may insert the loose phyto material into one of the heating chamber **148** that includes a mesh screen.

[0081] A user may then insert the heating chamber **148** into the volatizing device **100**. The user may displace the heating chamber cover **130** into a closed or locked position. The user may physically observe a click, snap or resistance indicating proper closure.

[0082] The volatizing device **100** may be powered by switching the power button **118**. In response, the display **114** may display an alphanumeric message and/or the current temperature to indicate to a user that the power is on. The user may adjust the temperature setting by pressing the temperature increase button **120** or temperature decrease button **122**. When the temperature setting is adjusted as desired the existing setting may remain displayed for a predetermined time to allow the user to confirm the temperature setting.

[0083] Once the volatizing device **100** has been prepared for operation, for example, a constituent has been loaded in the heating chamber **148**, the heating chamber **148** has been loaded in the volatization assembly **138**, the heating chamber cover **130** has been closed, the mouthpiece **116** has been extended and the power button **118** has been activated, then the volatization process may commence by activating the heater button **124**.

[0084] Energy may be transferred to the heating element **152** (FIG. **7**) in response to switching and/or sustained depressing the heat activation button **124** (FIG. **3**). When the heating chamber **148** achieves the predetermined temperature, the controller, based on a signal provided by a sensor, may cause energy to cease flowing to the heating element **152**. Likewise, when the temperature within heating chamber **148** falls below the predetermined temperature, the controller may cause energy to flow to the heating element **152**.

[0085] While the heater button **124** is depressed, an indicator light **126** may illuminate and/or a temperature may be displayed on the display **114**. The controller may prevent energy from being transferred to the heating element **152** when the heating chamber **148** reaches a predetermined temperature, for example 190° C. Thus, a given constituent will not ignite or burn.

[0086] During operation, a user may press and hold the heater button **124** for a time sufficient to heat up the heating element **152** and the constituent to a temperature sufficient to volatize or vaporize the constituent.

[0087] While holding the heater button **124** the user may apply suction at the mouthpiece **116** by inhaling slightly. The suction from inhaling may introduce ambient air into the heating element housing **154** and through the heating chamber **148**. The term ambient refers to surrounding environmental conditions.

[0088] Thus, the ambient air may be heated and then aid in volatizing the constituent. The resulting volatized fluid may then pass through the expandable vapor tube **140**, through the mouthpiece **116** and into the surrounding environment, a mammal or a human.

[0089] After the user has received a desired quantity of volatized fluid, the user may switch the power button **118** to power down the volatizing device **100**.

[0090] The controller may provide various safety functions. For example, the controller may prevent energy from being transferred to the heating element **152** if the temperature or pressure indicated by one of the sensors exceeds a predetermined value. For example, if the temperature of the heating element **152** exceeds 235° C. or the temperature inside the heating chamber **148** exceeds 230° C., the controller may prevent energy from being transferred to the heating element **152**.

[0091] Predetermined temperatures or pressures may be selected and/or programmed based on the constituent **158**, the heating element **152**, the materials which compose the front and rear housings **110**, **112** or other parameters. Predetermined temperatures and pressures may be set below the ignition point of a given constituent **158**.

[0092] Following consumption of a phyto material, the user may desire to remove the volatized phyto material. However, the heating chamber **148** may be at a harmful temperature. The controller and/or a mechanical device (not shown) may cause the heating chamber cover **130** to remain in a locked position until the heating chamber **148** cools to a safe temperature.

[0093] Once the heating chamber **148** is relatively cool, the user may remove the heating chamber **148** and then remove the consumed material. Consumed material may be blown out, shaken out, be removed with a cotton swab, a toothpick, a small bristle brush, or other cleanser or device.

[0094] The battery **132** may require periodic recharging or replacement. The controller may monitor the charge of the battery **132**. If the battery **132** requires recharging, the controller may cause an image to be displayed on the display **114** and/or an indicator light **126** to illuminate a predetermined color and/or blink. Additionally, the controller may cause a speaker (not shown) to emit a pre-recorded message, a chirp or beep. The controller may be adapted to notify the user when the batter has 5 minutes of use remaining or other charge remaining.

[0095] To recharge the volatizing device **100**, the user may connect the volatizing device **100** via a charging transformer into a standard 120 AC outlet or another power source. During charging, the controller may cause a message to be displayed on the display **114**, and/or an indicator light **126** to illuminate or flash. When the battery **132** is fully charged, the controller may cause the user to be so notified.

[0096] The controller may prevent the battery from overcharging or undercharging. Such techniques are provided with the use of smart batteries and smart chargers. Thus, the controller may include software that enables the volatizing device **100** to provide smart charger functionality.

[0097] Additionally, the controller may prevent energy from being transferred to the heating element **152** if the heating chamber cover **130** is open or if the mouthpiece **116** is in a retracted position. This prevents unintentional heating of the heating element **152** if the heater button **124** is accidentally depressed.

[0098] Heating elements, switches and controllers may fail due to rapid cycling. Moreover, rapid cycling of the heating element **154** may cause deformation of structural materials such as the front housing **110** and the rear housing **112**. In order to prevent premature failure of the volatizing device **100**, the controller may prevent energy from being transferred to the heating element **152** if a predetermined time has not elapsed from the last transfer of energy to the heating element **152**.

[0099] Closing Comments

[0100] The foregoing is merely illustrative and not limiting, having been presented by way of example only. Although examples have been shown and described, it will be apparent to those having ordinary skill in the art that changes, modifications, and/or alterations may be made.

[0101] Although many of the examples presented herein involve specific combinations of method acts or system elements, it should be understood that those acts and those elements may be combined in other ways to accomplish the same objectives. With regard to flowcharts, additional and fewer steps may be taken, and the steps as shown may be combined or further refined to achieve the methods described herein. Acts, elements and features discussed only in connection with one embodiment are not intended to be excluded from a similar role in other embodiments.

[0102] For any means-plus-function limitations recited in the claims, the means are not intended to be limited to the means disclosed herein for performing the recited function, but are intended to cover in scope any means, known now or later developed, for performing the recited function.

[0103] As used herein, "plurality" means two or more.

[0104] As used herein, a "set" of items may include one or more of such items.

[0105] As used herein, whether in the written description or the claims, the terms "comprising", "including", "carrying", "having", "containing", "involving", and the like are to be understood to be open-ended, i.e., to mean including but not limited to. Only the transitional phrases "consisting of" and "consisting essentially of", respectively, are closed or semi-closed transitional phrases with respect to claims.

[0106] Use of ordinal terms such as "first", "second", "third", etc., in the claims to modify a claim element does not by itself connote any priority, precedence, or order of one claim element over another or the temporal order in which acts of a method are performed, but are used merely as labels to distinguish one claim element having a certain name from another element having a same name (but for use of the ordinal term) to distinguish the claim elements.

[0107] As used herein, "and/or" means that the listed items are alternatives, but the alternatives also include any combination of the listed items.

1. An apparatus comprising:

a housing adapted to be handheld

a heating element disposed within the housing

a heating element switch electrically coupled with the heating element

a heating chamber disposed within the housing

a heating chamber cover adapted to at least partially eject the heating chamber from the housing when the heating chamber cover is displaced relative to the housing

a controller electrically coupled with the heating element switch, the controller adapted to control a transfer of energy to the heating element

wherein the controller is adapted to prevent the transfer of energy to the heating element if the heating chamber cover is not in a closed position relative to the housing.

2. The apparatus of claim 1 wherein the heating chamber cover is adapted to lock in a closed position relative to the housing when a temperature of the heating chamber is greater than a predetermined temperature.

3. The apparatus of claim 1 further comprising

a storage device adapted to record a time that energy was transferred to the heating element

an alarm adapted to provide a next use reminder based on the time that energy was transferred to the heating element.

4. The apparatus of claim 3 wherein the controller is adapted to prevent the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element.

5. The apparatus of claim 1 further comprising a mouthpiece displaceable relative to the housing, the mouthpiece at least partially defining a cavity which is adapted to receive a volatized phyto material, wherein the controller is adapted to prevent the transfer of energy to the heating element if the mouthpiece is not displaced relative to the housing.

6. The apparatus of claim 5 further comprising a tube disposed between the mouthpiece and the heating chamber, the tube adapted to flex, the tube at least partially defining the cavity.

7. The apparatus of claim 1 further comprising a first temperature sensor disposed within the heating chamber, wherein the controller is adapted to prevent the transfer of energy to the heating element if the first temperature sensor provides a first signal indicating at least a first predetermined temperature within the heating chamber.

8. The apparatus of claim 7 further comprising a second temperature sensor proximate the heating element, wherein the controller is adapted to prevent the transfer of energy to the heating element if the second temperature sensor pro-

vides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature.

9. The apparatus of claim 8 wherein the controller is adapted to prevent the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures.

10. The apparatus of claim 1 wherein the apparatus is an inhaler device.

11. The apparatus of claim 1 further comprising

a storage device adapted to record a time that energy was transferred to the heating element

an alarm adapted to provide a next use reminder based on the time that energy was transferred to the heating element

a mouthpiece displaceable relative to the housing, the mouthpiece at least partially defining a cavity which is adapted to receive a volatized phyto material

a tube disposed between the mouthpiece and the heating chamber, the tube adapted to flex, the tube at least partially defining the cavity

a first temperature sensor disposed within the heating chamber

a second temperature sensor proximate the heating element

wherein the heating chamber cover is adapted to lock in a closed position relative to the housing when a temperature of the heating chamber is greater than a predetermined temperature

wherein the controller is adapted to prevent the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element

wherein the controller is adapted to prevent the transfer of energy to the heating element if the mouthpiece is not displaced relative to the housing

wherein the controller is adapted to prevent the transfer of energy to the heating element if the first temperature sensor provides a first signal indicating at least a first predetermined temperature within the heating chamber

wherein the controller is adapted to prevent the transfer of energy to the heating element if the second temperature sensor provides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature

wherein the controller is adapted to prevent the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures

wherein the apparatus is an inhaler device.

12. An apparatus comprising:

a housing adapted to be handheld

a heating element disposed within the housing

a heating element switch electrically coupled with the heating element

a heating chamber disposed within the housing

a mouthpiece displaceable relative to the housing, the mouthpiece at least partially defining a cavity which is adapted to receive a volatized phyto material

a controller electrically coupled with the heating element switch, the controller adapted to control a transfer of energy to the heating element

wherein the controller is adapted to prevent the transfer of energy to the heating element if the mouthpiece is not displaced relative to the housing.

13. The apparatus of claim 12 further comprising a heating chamber cover adapted to at least partially eject the heating chamber from the housing when the heating chamber cover is displaced relative to the housing.

14. The apparatus of claim 13 wherein the controller is adapted to prevent the transfer of energy to the heating element if the heating chamber cover is not in a closed position relative to the housing.

15. The apparatus of claim 13 wherein the heating chamber cover is adapted to lock in a closed position relative to the housing when a temperature of the heating chamber is greater than a predetermined temperature.

16. The apparatus of claim 12 further comprising

a storage device adapted to record a time that energy was transferred to the heating element

an alarm adapted to provide a next use reminder based on the time that energy was transferred to the heating element.

17. The apparatus of claim 16 wherein the controller is adapted to prevent the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element.

18. The apparatus of claim 12 further comprising a tube disposed between the mouthpiece and the heating chamber, the tube adapted to flex, the tube at least partially defining the cavity.

19. The apparatus of claim 12 further comprising a first temperature sensor disposed within the heating chamber, wherein the controller is adapted to prevent the transfer of energy to the heating element if the first temperature sensor provides a first signal indicating at least a first predetermined temperature within the heating chamber.

20. The apparatus of claim 19 further comprising a second temperature sensor proximate the heating element, wherein the controller is adapted to prevent the transfer of energy to the heating element if the second temperature sensor provides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature.

21. The apparatus of claim 20 wherein the controller is adapted to prevent the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures.

22. The apparatus of claim 12 wherein the apparatus is an inhaler device.

23. A storage medium having instructions thereon which when executed by a processor will cause the processor to perform actions comprising:

controlling a transfer of energy to a heating element of an apparatus adapted to be handheld

preventing the transfer of energy to the heating element if a heating chamber cover of the apparatus is not in a closed position relative to a housing of the apparatus.

24. The storage medium of claim 23 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising

recording a time that energy was transferred to the heating element

providing a next use reminder based on the time that energy was transferred to the heating element.

25. The storage medium of claim 24 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element.

26. The storage medium of claim 23 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a mouthpiece of the apparatus is not displaced relative to the housing.

27. The storage medium of claim 23 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a first temperature sensor of the apparatus, the first temperature sensor disposed within a heating chamber of the apparatus, provides a first signal indicating at least a first predetermined temperature within the heating chamber.

28. The storage medium of claim 27 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a second temperature sensor of the apparatus, the second temperature sensor proximate the heating element, provides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature.

29. The storage medium of claim 28 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures.

30. The storage medium of claim 29 embodied in an inhaler device.

31. The storage medium of claim 23 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising

recording a time that energy was transferred to the heating element

providing a next use reminder based on the time that energy was transferred to the heating element

preventing the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element

preventing the transfer of energy to the heating element if a mouthpiece of the apparatus is not displaced relative to the housing

preventing the transfer of energy to the heating element if a first temperature sensor of the apparatus, the first temperature sensor disposed within a heating chamber of the apparatus, provides a first signal indicating at least a first predetermined temperature within the heating chamber

preventing the transfer of energy to the heating element if a second temperature sensor of the apparatus, the second temperature sensor proximate the heating element, provides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature

preventing the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures.

32. The storage medium of claim 31 embodied in an inhaler device.

33. A storage medium having instructions thereon which when executed by a processor will cause the processor to perform actions comprising:

controlling a transfer of energy to a heating element of an apparatus adapted to be handheld

preventing the transfer of energy to the heating element if a mouthpiece of the apparatus is not displaced relative to a housing of the apparatus.

34. The storage medium of claim 33 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a heating chamber cover of the apparatus is not in a closed position relative to the housing.

35. The storage medium of claim 33 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising

recording a time that energy was transferred to the heating element

providing a next use reminder based on the time that energy was transferred to the heating element.

36. The storage medium of claim 35 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a predetermined time has not elapsed from the time that energy was transferred to the heating element.

37. The storage medium of claim 33 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a first temperature sensor of the apparatus, the first temperature sensor disposed within a heating chamber of the

apparatus, provides a first signal indicating at least a first predetermined temperature within the heating chamber.

38. The storage medium of claim 37 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if a second temperature sensor of the apparatus, the second temperature sensor proximate the heating element, provides a second signal indicating at least a second predetermined temperature proximate the heating element, the second predetermined temperature different than the first predetermined temperature.

39. The storage medium of claim 23 having further instructions thereon which when executed by the processor will cause the processor to perform further actions comprising preventing the transfer of energy to the heating element if an ambient temperature exterior to the housing exceeds a third predetermined temperature different than both the first and second predetermined temperatures.

40. The storage medium of claim 39 embodied in an inhaler device.

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