



(11)

EP 3 068 242 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:

27.05.2020 Bulletin 2020/22

(21) Application number: **14786753.5**

(22) Date of filing: **01.10.2014**

(51) Int Cl.:

A24F 7/00 (2006.01)

(86) International application number:

PCT/US2014/058567

(87) International publication number:

WO 2015/069391 (14.05.2015 Gazette 2015/19)

(54) **MOUTHPIECE FOR SMOKING ARTICLE**

MUNDSTÜCK FÜR RAUCHARTIKEL

EMBOUT BUCCAL POUR ARTICLE À FUMER

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **11.11.2013 US 201314076789**

(43) Date of publication of application:

21.09.2016 Bulletin 2016/38

(73) Proprietor: **R. J. Reynolds Tobacco Company**
Winston-Salem, NC 27102-1487 (US)

(72) Inventors:

- **CHAPMAN, Paul S.**
Winston-Salem, NC 27107 (US)
- **OGLESBY, Robert L.**
Kernersville, NC 27284 (US)
- **JONES, Wesley S.**
Lexington, NC 27295 (US)

- **LIN, Kenneth Shou-Chein**
San Marino, CA 91108 (US)
- **AMON, Moris**
Cleveland, OH 44124 (US)
- **HEYDARPOUR, Ramin**
Beverly Hills, CA 90210 (US)

(74) Representative: **Hoeger, Stellrecht & Partner**
Patentanwälte mbB
Uhlandstrasse 14c
70182 Stuttgart (DE)

(56) References cited:

EP-A1- 0 491 952	EP-A1- 1 656 842
WO-A1-2013/040275	WO-A1-2014/130176
CN-U- 202 005 248	US-A1- 2012 312 313
US-A1- 2013 220 315	US-A1- 2013 247 924
US-A1- 2013 255 702	

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present disclosure relates to aerosol delivery devices such as smoking articles, and more particularly to wrapped mouthpiece constructions useful in such devices. An electrically resistive heater may be configured to heat a material, which may be made or derived from tobacco or otherwise incorporate tobacco, to form an inhalable substance for human consumption.

BACKGROUND

[0002] US 2012/0312313 A1 discloses an electronic smoking apparatus comprising a main body, an atomizer or vaporizer, a cartridge section coupled to the main body, wherein the cartridge section comprises a rigid support and a padded material surrounding the rigid support.

[0003] Many smoking devices have been proposed through the years as improvements upon, or alternatives to, smoking products that require combusting tobacco for use. Many of those devices purportedly have been designed to provide the sensations associated with cigarette, cigar, or pipe smoking, but without delivering considerable quantities of incomplete combustion and pyrolysis products that result from the burning of tobacco. To this end, there have been proposed numerous smoking products, flavor generators, and medicinal inhalers that utilize electrical energy to vaporize or heat a volatile material, or attempt to provide the sensations of cigarette, cigar, or pipe smoking without burning tobacco to a significant degree. See, for example, the various alternative smoking articles, aerosol delivery devices and heat generating sources set forth in the background art described in U.S. Pat. No. 7,726,320 to Robinson et al., U.S. Pat. App. Pub. No. 2013-0255702, U.S. Pat. App. Ser. No. 13/536,438 to Sebastian et al., filed June 28, 2012, U.S. Pat. App. Ser. No. 13/602,871 to Collett et al., filed September 4, 2012, and U.S. Pat. App. Ser. No. 13/647,000 to Sears et al., filed October 8, 2012.

[0004] Certain tobacco products that have employed electrical energy to produce heat for smoke or aerosol formation, and in particular, certain products that have been referred to as electronic cigarette products, have been commercially available throughout the world. Representative products that resemble many of the attributes of traditional types of cigarettes, cigars or pipes have been marketed as ACCORD® by Philip Morris Incorporated; ALPHA™, JOYE 510™ and M4™ by InnoVapor LLC; CIRRUS™ and FLING™ by White Cloud Cigarettes; COHITA™, COLIBRI™, ELITE CLASSIC™, MAGNUM™, PHANTOM™ and SENSE™ by Epufter® International Inc.; DUOPRO™, STORM™ and VAPORKING® by Electronic Cigarettes, Inc.; EGAR™ by Egar Australia; eGo-C™ and eGo-T™ by Joyetech; ELUSION™ by Elusion UK Ltd; EONSMOKE® by Eonsmoke LLC; GREEN SMOKE® by Green Smoke Inc. USA; GREENARETTE™ by Greenarette LLC; HALLIGAN™, HENDU™, JET™, MAXXQ™, PINK™ and PITBULL™ by Smoke Stik®; HEATBAR™ by Philip Morris International, Inc.; HYDRO IMPERIAL™ and LXE™ from Crown7; LOGIC™ and THE CUBAN™ by LOGIC Technology; LUCI® by Luciano Smokes Inc.; METRO® by Nicotek, LLC; NJOY® and ONEJOY™ by Sottera, Inc.; NO. 7™ by SS Choice LLC; PREMIUM ELECTRONIC CIGARETTE™ by PremiumEstore LLC; RAPP E-MYSTICK™ by Ruyan America, Inc.; RED DRAGON™ by Red Dragon Products, LLC; RUYAN® by Ruyan Group (Holdings) Ltd.; SMART SMOKER® by The Smart Smoking Electronic Cigarette Company Ltd.; SMOKE ASSIST® by Coastline Products LLC; SMOKING EVERYWHERE® by Smoking Everywhere, Inc.; V2CIGS™ by VMR Products LLC; VAPOR NINE™ by VaporNine LLC; VAPOR4LIFE® by Vapor 4 Life, Inc.; VEPPPO™ by E-CigaretteDirect, LLC and VUSE® by R. J. Reynolds Vapor Company. Yet other electrically powered aerosol delivery devices, and in particular those devices that have been characterized as so-called electronic cigarettes, have been marketed under the tradenames BLU™; COOLER VISIONS™; DIRECT E-CIG™; DRAGONFLY™; EMIST™; EVERSMOKE™; GAMUCCI®; HYBRID FLAME™; KNIGHT STICKS™; ROYAL BLUES™; SMOKETIP® and SOUTH BEACH SMOKE™.

[0005] It may be desirable to provide a smoking article that employs heat produced by electrical energy to provide sensations of smoking a cigar, cigarette, or pipe, but without combusting tobacco to any significant degree, without need for a combustion heat source, and without necessarily delivering considerable quantities of incomplete combustion and/or pyrolysis products. Furthermore, it may be desirable for such a smoking article to include a comfortable mouthpiece that is similar to mouthpieces and/or the sensory profile aspects associated with existing smoking articles such as, for examples, cigars, cigarettes, or pipes. In other aspects, it may be desirable to provide such a smoking with a mouthpiece that provides a solid rigid main body surrounded by coating material that provides a user with a comfortable sensory experience during contact with the user's mouth (e.g., lips, teeth, and/or tongue) and that also provides a visible display of indicia such as, for example, product identification, advertising, labeling, or other visual indicia. It may further be desirable to provide a rigid-bodied smoking article that includes a mouthpiece providing comfortable mouth-feel characterized by smokers as "bite" or "bite sensation," where the mouthpiece can effectively display information about the smoking article.

BRIEF SUMMARY

[0006] The present disclosure relates to wrapping materials and other constructions for a mouthpiece component or portion of a smoking article or other aerosol delivery device configured to produce aerosol. In certain embodiments, a rigid tube body may form part of a mouthpiece for a smoking article, with a tipping cover that encircles an outer circumference along a length of the mouthpiece, where the tipping cover includes a polymeric label in a form selected from a seamless tube, a seamed tube, an overmold, or any combination thereof, which may overlie a tipping wrap. In certain embodiments, a rigid tube body may form part of a mouthpiece for a smoking article, with a tipping wrap that encircles an outer circumference along a length of the mouthpiece to form at least a double layer that includes more flexibility and/or less resistance to permanent indentation than the rigid tube.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG. 1 shows a sectional view through an aerosol delivery device comprising a control body and a cartridge including an atomizer according to an example embodiment of the present disclosure;
 FIGS. 2A-2C show, respectively, a side view and a perspective view of a smoking article, and a side view of a mouthpiece of said smoking article;
 FIGS. 3A and 3B show, respectively, a perspective view and a transverse section view of a mouthpiece portion;
 FIG. 4A shows a tubular body shell;
 FIG. 4B shows a spiral-wound/angled tipping wrap around the tubular body shell of FIG. 4A;
 FIG. 4C shows a tipping cover embodied as a label around the tubular body shell and angled tipping wrap of FIGS. 4A-4B;
 FIGS. 5A-5E show steps of assembling a mouth-end tipping material with label on a smoking article tube; and
 FIGS. 6-9 show diagrammatic views of tipping covers that may have one or a plurality of layers.

DETAILED DESCRIPTION

[0008] Various embodiments are described below with reference to the drawings. The relationship and functioning of the various elements of the embodiments may better be understood by reference to the following detailed description. However, embodiments are not limited to those illustrated in the drawings. It should be understood that the drawings are not necessarily to scale, and in certain instances details may have been omitted that are not necessary for an understanding of embodiments disclosed herein, such as - for example -conventional fabrication and assembly. The term "smoking article" is used herein as a matter of convention, although many embodiments may not actually burn tobacco or generate any combustion-based aerosol (in the form of smoke or otherwise); rather, the terms "smoking" and/or "vaping" are used to refer to drawing an aerosol into a user's mouth for purpose of experiencing flavor(s) and/or other sensation(s) associated with aerosol components.

[0009] The invention is defined by the claims, may be embodied in many different forms, and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey enabling disclosure to those skilled in the art. As used in this specification and the claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Reference to "dry weight percent" or "dry weight basis" refers to weight on the basis of dry ingredients (i.e., all ingredients except water).

[0010] The present disclosure provides descriptions of mechanisms, components, features, and methods configured to dynamically change a visual characteristic in response to feedback. While the mechanisms are generally described herein in terms of embodiments associated with aerosol delivery devices such as so-called "e-cigarettes," it should be understood that the mechanisms, components, features, and methods may be embodied in many different forms and associated with a variety of articles. For example, the description provided herein may be employed in conjunction with embodiments of traditional smoking articles (e.g., cigarettes, cigars, pipes, etc.), heat-not-burn cigarettes, and related packaging for any of the products disclosed herein. Accordingly, it should be understood that the description of the mechanisms, components, features, and methods configured to provide for illumination disclosed herein are discussed in terms of embodiments relating to aerosol delivery mechanisms by way of example only, and may be embodied and used in various other products and methods.

[0011] In this regard, the present disclosure provides descriptions of aerosol delivery devices that use electrical energy to heat a material (preferably without combusting the material to any significant degree) to form an inhalable substance; such articles most preferably being sufficiently compact to be considered "hand-held" devices. An aerosol delivery device may provide some or all of the sensations (e.g., inhalation and exhalation rituals, types of tastes or flavors, organoleptic

effects, physical feel, use rituals, visual cues such as those provided by visible aerosol, and the like) of smoking a cigarette, cigar, or pipe, without any substantial degree of combustion of any component of that article or device. The aerosol delivery device may not produce smoke in the sense of the aerosol resulting from by-products of combustion or pyrolysis of tobacco, but rather, that the article or device may yield vapors (including vapors within aerosols that can be considered to be visible aerosols that might be considered to be described as smoke-like) resulting from volatilization or vaporization of certain components of the article or device. In highly preferred embodiments, aerosol delivery devices may incorporate tobacco and/or components derived from tobacco.

[0012] Aerosol delivery devices of the present disclosure also can be characterized as being vapor-producing articles or medicament delivery articles. Thus, such articles or devices can be adapted so as to provide one or more substances (e.g., flavors and/or pharmaceutical active ingredients) in an inhalable form or state. For example, inhalable substances can be substantially in the form of a vapor (i.e., a substance that is in the gas phase at a temperature lower than its critical point). Alternatively, inhalable substances can be in the form of an aerosol (i.e., a suspension of fine solid particles or liquid droplets in a gas). For purposes of simplicity, the term "aerosol" as used herein is meant to include vapors, gases and aerosols of a form or type suitable for human inhalation, whether or not visible, and whether or not of a form that might be considered to be smoke-like.

[0013] In use, aerosol delivery devices of the present disclosure may be subjected to many of the physical actions employed by an individual in using a traditional type of smoking article (e.g., a cigarette, cigar or pipe that is employed by lighting and inhaling tobacco). For example, the user of an aerosol delivery device of the present disclosure can hold that article much like a traditional type of smoking article, draw on one end of that article for inhalation of aerosol produced by that article, take puffs at selected intervals of time, etc.

[0014] Aerosol delivery devices of the present disclosure generally include a number of components provided within an outer body or shell. The overall design of the outer body or shell can vary, and the format or configuration of the outer body that can define the overall size and shape of the aerosol delivery device can vary. Typically, an elongated body resembling the shape of a cigarette or cigar can be formed from a single, unitary shell; or the elongated body can be formed of two or more separable pieces. For example, an aerosol delivery device can comprise an elongated shell or body that can be substantially tubular in shape and, as such, resemble the shape of a conventional cigarette or cigar. In one embodiment, all of the components of the aerosol delivery device are contained within one outer body or shell. Alternatively, an aerosol delivery device can comprise two or more shells that are joined and are separable. For example, an aerosol delivery device can possess at one end a control body comprising an outer body or shell containing one or more reusable components (e.g., a rechargeable battery and various electronics for controlling the operation of that article), and at the other end and removably attached thereto an outer body or shell containing a disposable portion (e.g., a disposable flavor-containing cartridge). More specific formats, configurations and arrangements of components within the single shell type of unit or within a multi-piece separable shell type of unit will be evident in light of the further disclosure provided herein. Additionally, various aerosol delivery device designs and component arrangements can be appreciated upon consideration of the commercially available electronic aerosol delivery devices, such as those representative products listed in the background art section of the present disclosure.

[0015] Aerosol delivery devices of the present disclosure most preferably comprise some combination of a power source (i.e., an electrical power source), at least one control component (e.g., means for actuating, controlling, regulating and ceasing power for heat generation, such as by controlling electrical current flow the power source to other components of the article), a heater or heat generation component (e.g., an electrical resistance heating element or component commonly referred to as an "atomizer"), and an aerosol precursor composition (e.g., commonly a liquid capable of yielding an aerosol upon application of sufficient heat, such as ingredients commonly referred to as "smoke juice," "e-liquid" and "e-juice"), and a mouthend region or tip for allowing draw upon the aerosol delivery device for aerosol inhalation (e.g., a defined air flow path through the article such that aerosol generated can be withdrawn therefrom upon draw). Exemplary formulations for aerosol precursor materials that may be used according to the present disclosure are described in U.S. Pat. Pub. No. 2013/0008457 to Zheng et al..

[0016] Alignment of the components within the aerosol delivery device can vary. In specific embodiments, the aerosol precursor composition can be located near an end of the article (e.g., within a cartridge, which in certain circumstances can be replaceable and disposable), which may be proximal to the mouth of a user so as to maximize aerosol delivery to the user. Other configurations, however, are not excluded. Generally, the heating element can be positioned sufficiently near the aerosol precursor composition so that heat from the heating element can volatilize the aerosol precursor (as well as one or more flavorants, medicaments, or the like that may likewise be provided for delivery to a user) and form an aerosol for delivery to the user. When the heating element heats the aerosol precursor composition, an aerosol is formed, released, or generated in a physical form suitable for inhalation by a consumer. It should be noted that the foregoing terms are meant to be interchangeable such that reference to release, releasing, releases, or released includes form or generate, forming or generating, forms or generates, and formed or generated. Specifically, an inhalable substance is released in the form of a vapor or aerosol or mixture thereof. Additionally, the selection of various aerosol delivery device components can be appreciated upon consideration of the commercially available electronic aerosol

delivery devices, such as those representative products listed in the background art section of the present disclosure.

[0017] An aerosol delivery device incorporates a battery or other electrical power source to provide current flow sufficient to provide various functionalities to the article, such as resistive heating, powering of control systems, powering of indicators, and the like. The power source can take on various embodiments. Preferably, the power source is able to deliver sufficient power to rapidly heat the heating member to provide for aerosol formation and power the article through use for the desired duration of time. The power source preferably is sized to fit conveniently within the aerosol delivery device so that the aerosol delivery device can be easily handled; and additionally, a preferred power source is of a sufficiently light weight to not detract from a desirable smoking experience.

[0018] One example embodiment of an aerosol delivery device 100 is provided in FIG. 1. As seen in the cross-section illustrated therein, the aerosol delivery device 100 can comprise a control body 102 and a cartridge 104 that can be permanently or detachably aligned in a functioning relationship. Although a threaded engagement is illustrated in FIG. 1, it is understood that further means of engagement may be employed, such as a press-fit engagement, interference fit, a magnetic engagement, or the like.

[0019] In specific embodiments, one or both of the control body 102 and the cartridge 104 may be referred to as being disposable or as being reusable. For example, the control body may have a replaceable battery or a rechargeable battery and thus may be combined with any type of recharging technology, including connection to a typical electrical outlet, connection to a car charger (i.e., cigarette lighter receptacle), and connection to a computer, such as through a universal Ser. bus (USB) cable. For example, an adaptor including a USB connector at one end and a control body connector at an opposing end is disclosed in U.S. Pat. App. Ser. No. 13/840,264, filed Mar. 15, 2013. Further, in some embodiments the cartridge may comprise a single-use cartridge, as disclosed in U.S. Pat. App. Ser. No. 13/603,612, filed September 5, 2012.

[0020] In the exemplified embodiment, the control body 102 includes a control component 106, a flow sensor 108, and a battery 110, which can be variably aligned, and can include a plurality of indicators 112 at a distal end 114 of an outer body 116. The indicators 112 can be provided in varying numbers and can take on different shapes and can even be an opening in the body (such as for release of sound when such indicators are present).

[0021] An air intake 118 may be positioned in the outer body 116 of the control body 102. A coupler 120 also is included at the proximal attachment end 122 of the control body 102 and may extend into a control body projection 124 to allow for ease of electrical connection with an atomizer or a component thereof, such as a resistive heating element (described below) when the cartridge 104 is attached to the control body. Although the air intake 118 is illustrated as being provided in the outer body 116, in another embodiment the air intake may be provided in a coupler as described, for example, in U.S. Pat. App. Ser. No. 13/841,233; Filed March 15, 2013.

[0022] The cartridge 104 includes an outer body 126 with a mouth opening 128 at a mouthend 130 thereof to allow passage of air and entrained vapor (i.e., the components of the aerosol precursor composition in an inhalable form) from the cartridge to a consumer during draw on the aerosol delivery device 100. The aerosol delivery device 100 may be substantially rod-like or substantially tubular shaped or substantially cylindrically shaped in some embodiments.

[0023] The cartridge 104 further includes an atomizer 132 comprising a resistive heating element 134 (e.g., a wire coil) configured to produce heat and a liquid transport element 136 (e.g., a wick) configured to transport a liquid. Various embodiments of materials configured to produce heat when electrical current is applied therethrough may be employed to form the resistive heating element 134. Example materials from which the wire coil may be formed include Kanthal (FeCrAl), Nichrome, Molybdenum disilicide (MoSi_2), molybdenum silicide (MoSi), Molybdenum disilicide doped with Aluminum ($\text{Mo}(\text{Si},\text{Al})_2$), and ceramic (e.g., a positive temperature coefficient ceramic). Further to the above, representative heating elements and materials for use therein are described in U.S. Pat. No. 5,060,671 to Counts et al.; U.S. Pat. No. 5,093,894 to Deevi et al.; U.S. Pat. No. 5,224,498 to Deevi et al.; U.S. Pat. No. 5,228,460 to Sprinkel Jr., et al.; U.S. Pat. No. 5,322,075 to Deevi et al.; U.S. Pat. No. 5,353,813 to Deevi et al.; U.S. Pat. No. 5,468,936 to Deevi et al.; U.S. Pat. No. 5,498,850 to Das; U.S. Pat. No. 5,659,656 to Das; U.S. Pat. No. 5,498,855 to Deevi et al.; U.S. Pat. No. 5,530,225 to Hajaligol; U.S. Pat. No. 5,665,262 to Hajaligol; U.S. Pat. No. 5,573,692 to Das et al.; and U.S. Pat. No. 5,591,368 to Fleischhauer et al..

[0024] Electrically conductive heater terminals 138 (e.g., positive and negative terminals) at the opposing ends of the heating element 134 are configured to direct current flow through the heating element and configured for attachment to the appropriate wiring or circuit (not illustrated) to form an electrical connection of the heating element with the battery 110 when the cartridge 104 is connected to the control body 102. Specifically, a plug 140 may be positioned at a distal attachment end 142 of the cartridge 104. When the cartridge 104 is connected to the control body 102, the plug 140 engages the coupler 120 to form an electrical connection such that current controllably flows from the battery 110, through the coupler and plug, and to the heating element 134. The outer body 126 of the cartridge 104 can continue across the distal attachment end 142 such that this end of the cartridge is substantially closed with the plug 140 protruding therefrom.

[0025] A reservoir may utilize a liquid transport element to transport an aerosol precursor composition to an aerosolization zone. One such example is shown in FIG. 1. As seen therein, the cartridge 104 includes a reservoir layer 144

comprising layers of nonwoven fibers formed into the shape of a tube encircling the interior of the outer body 126 of the cartridge, in this embodiment. An aerosol precursor composition is retained in the reservoir layer 144. Liquid components, for example, can be sorptively retained by the reservoir layer 144. The reservoir layer 144 is in fluid connection with a liquid transport element 136. The liquid transport element 136 transports the aerosol precursor composition stored in the reservoir layer 144 via capillary action to an aerosolization zone 146 of the cartridge 104. As illustrated, the liquid transport element 136 is in direct contact with the heating element 134 that is in the form of a metal wire coil in this embodiment.

[0026] It is understood that an aerosol delivery device that can be manufactured according to the present disclosure can encompass a variety of combinations of components useful in forming an electronic aerosol delivery device. Reference is made for example to the reservoir and heater system for controllable delivery of multiple aerosolizable materials in an electronic smoking article disclosed in U.S. Pat. App. Ser. No. 13/536,438, filed June 28, 2012. Further, U.S. Pat. App. Ser. No. 13/602,871, filed September 4, 2012, discloses an electronic smoking article including a microheater.

[0027] In another embodiment substantially the entirety of the cartridge may be formed from one or more carbon materials, which may provide advantages in terms of biodegradability and absence of wires. In this regard, the heating element may comprise a carbon foam, the reservoir may comprise carbonized fabric, and graphite may be employed to form an electrical connection with the battery and controller. Such carbon cartridge may be combined with one or more elements as described herein for providing illumination of the cartridge in some embodiments. An example embodiment of a carbon-based cartridge is provided in U.S. Pat. App. Ser. No. 13/432,406; filed March 28, 2012.

[0028] In use, when a user draws on the article 100, the heating element 134 is activated (e.g., such as via a puff sensor), and the components for the aerosol precursor composition are vaporized in the aerosolization zone 146. Drawing upon the mouthend 130 of the article 100 causes ambient air to enter the air intake 118 and pass through the central opening in the coupler 120 and the central opening in the plug 140. In the cartridge 104, the drawn air passes through an air passage 148 in an air passage tube 150 and combines with the formed vapor in the aerosolization zone 146 to form an aerosol. The aerosol is whisked away from the aerosolization zone 146, passes through an air passage 152 in an air passage tube 154, and out the mouth opening 128 in the mouthend 130 of the article 100.

[0029] The various components of an aerosol delivery device according to the present disclosure can be chosen from components described in the art and commercially available. Examples of batteries that can be used according to the disclosure are described in U.S. Pat. App. Pub. No. 2010/0028766.

[0030] An exemplary mechanism that can provide puff-actuation capability includes a Model 163PC01D36 silicon sensor, manufactured by the MicroSwitch division of Honeywell, Inc., Freeport, Ill. Further examples of demand-operated electrical switches that may be employed in a heating circuit according to the present disclosure are described in U.S. Pat. No. 4,735,217 to Gerth et al.. Further description of current regulating circuits and other control components, including microcontrollers that can be useful in the present aerosol delivery device, are provided in U.S. Pat. Nos. 4,922,901, 4,947,874, and 4,947,875, all to Brooks et al., U.S. Pat. No. 5,372,148 to McCafferty et al., U.S. Pat. No. 6,040,560 to Fleischhauer et al., and U.S. Pat. No. 7,040,314 to Nguyen et al..

[0031] The aerosol precursor, which may also be referred to as an aerosol precursor composition or a vapor precursor composition, can comprise one or more different components. For example, the aerosol precursor can include a polyhydric alcohol (e.g., glycerin, propylene glycol, or a mixture thereof). Representative types of further aerosol precursor compositions are set forth in U.S. Pat. No. 4,793,365 to Sensabaugh, Jr. et al.; U.S. Pat. No. 5,101,839 to Jakob et al.; PCT WO 98/57556 to Biggs et al.; and Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco, R. J. Reynolds Tobacco Company Monograph (1988).

[0032] Still further components can be utilized in the aerosol delivery device of the present disclosure. For example, U.S. Pat. No. 5,261,424 to Sprinkel, Jr. discloses piezoelectric sensors that can be associated with the mouth-end of a device to detect user lip activity associated with taking a draw and then trigger heating; U.S. Pat. No. 5,372,148 to McCafferty et al. discloses a puff sensor for controlling energy flow into a heating load array in response to pressure drop through a mouthpiece; U.S. Pat. No. 5,967,148 to Harris et al. discloses receptacles in a smoking device that include an identifier that detects a non-uniformity in infrared transmissivity of an inserted component and a controller that executes a detection routine as the component is inserted into the receptacle; U.S. Pat. No. 6,040,560 to Fleischhauer et al. describes a defined executable power cycle with multiple differential phases; U.S. Pat. No. 5,934,289 to Watkins et al. discloses photonic-optronic components; U.S. Pat. No. 5,954,979 to Counts et al. discloses means for altering draw resistance through a smoking device; U.S. Pat. No. 6,803,545 to Blake et al. discloses specific battery configurations for use in smoking devices; U.S. Pat. No. 7,293,565 to Griffen et al. discloses various charging systems for use with smoking devices; U.S. Pat. No. 8,402,976 to Fernando et al. discloses computer interfacing means for smoking devices to facilitate charging and allow computer control of the device; U.S. Pat. App. Pub. No. 2010/0163063 by Fernando et al. discloses identification systems for smoking devices; and WO 2010/003480 by Flick discloses a fluid flow sensing system indicative of a puff in an aerosol generating system. Further examples of components related to electronic aerosol delivery articles and disclosing materials or components that may be used in the present article include U.S. Pat. No. 4,735,217 to Gerth et al.; U.S. Pat. No. 5,249,586 to Morgan et al.; U.S. Pat. No. 5,666,977 to Higgins et al.; U.S. Pat.

No. 6,053,176 to Adams et al.; U.S. 6,164,287 to White; U.S. Pat. No. 6,196,218 to Voges; U.S. Pat. No. 6,810,883 to Felter et al.; U.S. Pat. No. 6,854,461 to Nichols; U.S. Pat. No. 7,832,410 to Hon; U.S. Pat. No. 7,513,253 to Kobayashi; U.S. Pat. No. 7,896,006 to Hamano; U.S. Pat. No. 6,772,756 to Shayan; U.S. Pat. No. 8,156,944 and 8,375,957 to Hon; U.S. Pat. App. Pub. Nos. 2006/0196518 and 2009/0188490 to Hon; U.S. Pat. App. Pub. No. 2009/0272379 to Thorens et al.; U.S. Pat. App. Pub. Nos. 2009/0260641 and 2009/0260642 to Monsees et al.; U.S. Pat. App. Pub. Nos. 2008/0149118 and 2010/0024834 to Oglesby et al.; U.S. Pat. App. Pub. No. 2010/0307518 to Wang; WO 2010/091593 to Hon; and U.S. Pat. App. Ser. No. 13/841,233, filed March 15, 2013. A variety of the materials disclosed by the foregoing documents may be incorporated into the present devices in various embodiments, and all of the foregoing disclosures are incorporated herein by reference in their entireties.

[0033] In rigid-bodied smoking articles, and particularly in electronic cigarettes, it is desirable to provide a "mouth feel" or "bite" that users will find comfortable. Of course, this may vary by user, but it is appreciated that many users prefer a construction that allows holding the smoking article between one's lips and/or between one's teeth that does not include direct contact of the teeth with a rigid metal or ceramic surface. Certain plastics or other polymers are used to construct mouthpieces in some smoking articles. Preferred embodiments described herein may include a metal and/or ceramic construction of a rigid tubular body that houses components for delivering an aerosol (which components may include electronic circuitry, heating elements, feedback devices, and other components). In particular, embodiments described herein may include embodiments of Vuse™ digital electronic cigarettes (R.J. Reynolds Vapor Company) and/or smoking articles and/or components of smoking articles described in one or more of U.S. Pat. No. 4,922,901 to Brooks et al.; U.S. Pat. No. 5,249,586 to Morgan et al.; U.S. Pat. No. 5,388,594 to Counts et al.; U.S. Pat. No. 5,666,977 to Higgins et al.; US Pat. No. 6,196,218 to Voges; U.S. Pat. No. 6,810,883 to Felter et al.; U.S. Pat. No. 6,854,461 to Nichols; U.S. Pat. No. 7,832,410 to Hon; U.S. Pat. No. 7,513,253 to Kobayashi; U.S. Pat. No. 7,726,320 to Robinson et al.; U.S. Pat. No. 7,896,006 to Hamano; U.S. Pat. No. 6,772,756 to Shayan; U.S. Pat. No. 8,079,371 to Robinson et al.; U.S. Pat. Pub. No. 2009/0095311 to Hon; U.S. Pat. Pub. Nos. 2006/0196518, 2009/0126745, and 2009/0188490 to Hon; U.S. Pat. Pub. No. 2009/0272379 to Thorens et al.; U.S. Pat. Pub. Nos. 2009/0260641 and 2009/0260642 to Monsees et al.; U.S. Pat. Pub. Nos. 2008/0149118 and 2010/0024834 to Oglesby et al.; U.S. Pat. Pub. No. 2010/0307518 to Wang; and WO 2010/091593 to Hon; U.S. Pat. App. Ser. No. 13/432,406, filed March 28, 2012, U.S. Pat. App. Ser. No. 13/536,438, filed June 28, 2012, U.S. Pat. App. Ser. No. 13/602,871, filed September 4, 2012, U.S. Pat. App. Ser. No. 13/647,000, filed October 8, 2012, and U.S. Pat. App. Ser. No. 13/827,994 filed on March 14, 2013.

[0034] Tipping materials in typical cigarettes, and in segmented smoking articles that use a combustible fuel element to heat rather than burn smokable material such as tobacco, typically include paper materials that cover a filter material (which may be encompassed by plug wrap material) to form a mouth-end of the subject smoking article. Examples of tipping materials are described in U.S. Pat. Nos. 7,789,089 to Dube et al., and in U.S. Pat. App. Publ. Nos. 2007/0215167 to Crooks et al., 2010/0108081 to Joyce et al., 2010/0108084 to Norman et al., and 2013/0167849 to Ademe et al. Representative techniques for producing smoking articles incorporating wrapping materials or having wrapping materials applied thereto are set forth in U.S. Pat. Nos. 5,469,871 to Barnes et al.; and U.S. Pat. Pub. Nos. 2010/0186757 to Crooks et al. and 2012/0067360 to Conner et al.

[0035] One embodiment of a smoking article 500 may include a tipping-covered mouthpiece 502 (which may be embodied, for example, as a cartridge or a control body as described above with reference to FIG. 1 above). The smoking article is described with reference to FIGS. 2A-2C, which show, respectively, a side view and a perspective view of the smoking article 500, and a side view of the mouthpiece 502. The smoking article 500 includes a shell 513 that is illustrated as a rigid tubular body made of stainless steel. The shell 513 may have a non-round/cylindrical profile and/or may include another metal, ceramic, or other rigid material. A distal-end indicator 512 may provide visual indication (e.g., via light, color change, or other indication) of device activity and/or status (e.g., battery life, puff activity, or other). Internal components and functions thereof may include those of aerosol-generating smoking devices known in the art and/or may specifically include components and/or functions disclosed in the embodiment of FIG. 1 above, or other devices referenced herein, including that all features, examples, and embodiments therein may be combined with each other and aspects of the present disclosure in a manner that those of skill in the art will appreciate with reference to the present disclosure.

[0036] The smoking article may incorporate tobacco within an electrically-powered, aerosol-generating device. At least one form of tobacco can be positioned at one or more specific locations within the smoking article. Aerosol-forming material may be employed in addition to the tobacco. The mouthpiece 502 may be used by the smoker to inhale components of tobacco that are generated by the action of heat upon components of that smoking article. A representative smoking article includes a source of electrical power (e.g., a battery), a controller mechanism including a sensor that is capable of selectively powering certain components of the device (e.g., electrical resistance heating elements) at least during periods of draw, and at least one heating device (e.g., an electrical resistance heating unit) for forming a thermally generated aerosol that incorporates components of tobacco. During use, a cartridge containing some form of tobacco is positioned within or in connection with the smoking article, and after use, the used cartridge may be removed from the device. When desired, another cartridge may be positioned for further use.

[0037] As shown in FIGS. 2A-2C (although not clearly visible in all views), the mouthpiece 502 also includes a shell

503 that is illustrated as a rigid tubular body made of stainless steel. The mouthpiece shell 503 is shown as a rigid tube may have a non-round/cylindrical profile and/or may include another metal, ceramic, or other rigid material. A larger outer circumference mouth-end region of the tubular shell 503 includes a tipping cover 504 transversely disposed thereabout to form at least a double layer. A smaller-circumference region 508 of the tubular shell 503 is configured to engage a distal portion 510 of the smoking article (which distal portion may be configured, for example, as a cartridge or control body). In the illustrated embodiment, the mouthpiece 502 is configured to be disposed of (or recycled), while the distal portion 510 is configured for continued/multiple use with a serial plurality of mouthpieces 502, where each mouthpiece may have the same, similar, or different flavor and/or other sensory profiles associated with use. Each of the embodiments described below with reference to FIGS. 3A-5E may have an external appearance similar or identical to that shown in FIGS. 2A-2C.

[0038] FIGS. 3A-3B show one embodiment of a double-wrapped mouthpiece 202 for a smoking article. This mouthpiece 202 may be incorporated as part of any smoking article described herein (including those items incorporated by reference, subject to technical considerations thereof).

[0039] FIG. 3A shows a diagrammatic/simplified perspective view of the mouth-end of the mouthpiece 202, and FIG. 3B shows a transverse section view along line 3B-3B of FIG. 3A. The innermost component shown is a metal tubular body shell 203. The shell 203 is circumscribed by a double-layer tipping wrap 220. An inner/lower layer 222 is a cushioning layer that will provide a comfortable bite/mouth-feel for many users by providing a resilient layer between the user's tongue and/or teeth and the rigid shell 203. The inner/lower layer may include one or more of foam tape (e.g., 3M Scotch™ Permanent Mounting foam tape (Cat #110)), rayon web fleece, cigarette filter tow, cigarette plug wrap, and/or cellulose acetate non-woven web that is adhered or otherwise secured around the shell's outer circumference and transverse to the shell's longitudinal axis in a manner forming a band therearound. The longitudinal joint/edge may be formed, for example, as a butt joint (preferably mitered slightly to account for curvature of the underlying tube, which may provide some overlap), or in another joint construction. Generally, an inner layer of this and other embodiments may include fleece, filter paper, plug wrap, cellulose acetate non-woven web, polymeric film, polymeric foam, or any combination thereof.

[0040] An upper/outer layer 224 of the double-layer tipping wrap 220 is provided in the form of an adhesive label or sleeve 224. In many embodiments the inner/lower layer 222 has a first thickness that is greater than a second thickness of the upper/outer layer 224. In the illustrated embodiment and in other embodiments, the upper/outer layer 224 may include indicia (letters/words, images, colors, textures, or other indicia) that identify properties of the mouthpiece 202 and/or a smoking article incorporating the mouthpiece. Exemplary indicia may communicate flavor(s), product source identification (e.g., branding, trademark, etc.), and/or other information, and/or it may provide aesthetic appeal. The label 224 may be an adhesive label with a paper and/or polymer construction. For example, its construction may be the same as or similar to the filter paper or plug wrap used on conventional cigarettes. Generally, an outer layer of this and other embodiments may include fleece, filter paper, plug wrap, cellulose acetate non-woven web, polymeric film, polymeric foam, or any combination thereof.

[0041] The softness, "mouth feel," or other characterization of how a user will experience and interact with the mouth end/ mouthpiece of a smoking article can be described in different manners. In particular, with reference to the focus of the present disclosure upon providing a desirable sensory interaction when the main body of the smoking article is substantially rigid, it may be useful to consider means of explaining or describing this qualitative aspect. In some embodiments, including actual and constructive experimental examples below, the trait is described with reference to durometer, which is a well-understood means for measuring hardness as a material's or structure's resistance to permanent indentation on a "Shore M" hardness scale. In each of the embodiment, the wrapped mouth end portion, whether single-wrapped, double-wrapped, and/or otherwise multiply wrapped, with or without an outer wrapping material (e.g., printable or preprinted polymer) includes more flexibility and/or less resistance to permanent indentation.

[0042] Another means of describing this trait with reference to one or more of a polymeric label, a wrapped coating, or any combination thereof applied to a smoking article is Young's Modulus, which is a common means of describing of elastic modulus, sometimes called the modulus of elasticity. It is a measure of the stiffness of an elastic material and provides a quantitative means of characterizing materials. It is defined as the ratio of the stress along an axis over the strain along that axis in the range of stress in which Hooke's law holds. Its SI unit is the Pascal (Pa or N/m^2 or $\text{m}^{-1} \cdot \text{kg} \cdot \text{s}^{-2}$). The practical units used are megapascals (MPa or N/mm^2) or gigapascals (GPa or kN/mm^2). In anisotropic materials, Young's modulus may have different values depending on the direction of the applied force with respect to the material's structure. Young's modulus, E , can be calculated by dividing the tensile stress by the tensile strain in the elastic (initial, linear) portion of the stress-strain curve, applying a standard formula.

[0043] Different polymeric materials, including a range of "softness" characteristics options may be used for mouthpiece cushioning over a rigid body. At least three categories of polymers may be used by themselves, in blended formulation, and/or as a multilayer composite structure. The "softness" of the composite label could vary depending on the choices of material, the processing condition of the film (i.e. orientation process and the layer architecture). The range of moduli will fall within these three general categories:

Polymeric material options for smoking article labels			
	Polymer	Young's Modulus	Comment
1	Oriented Films (e.g., PETG, BOPP)	2.5-5 GPa	One preferred material used in smoking article labels
2	Polyolefins (e.g., PE, PP)	0.2-2 GPa	Blends and/or multilayer composite structures can result in different modulus
3	Elastomers (e.g., PU, Silicone, Natural latex)	0.01-0.1 GPa	Softest of preferred options; can be used as a blend or in multilayer structures

[0044] In one working example, 3M Scotch™ Permanent Mounting foam tape (Cat #110, as available in September 2013 from 3M Co., St. Paul, Minn.) forms the inner/lower layer and is wrapped transversely around/ adhered to a stainless steel tube constructed as a mouthpiece for a smoking article, and a pre-printed polymer wrapper label is adhered around its exterior surface to form the upper/outer layer. This example of foam tape is about 1.5 mm thick by 13 mm wide, including a foam layer with adhesive on both sides separated by a release liner. When wrapped around a 9.2 mm diameter stainless steel tube of an electronic cigarette mouth end, the resulting cigarette mouthpiece includes an outer diameter of about 12.7 mm and has a durometer reading of about 90 hardness, when including a peel-off printed stiff polymer wrapper label and about 47 hardness with the label removed. Those of skill in the art will appreciate that, in other embodiments, these sizes will vary in keeping with the dimensions of the underlying tube body, which has an uncoated durometer of about 100 (which may read about 98 to about 100, if the tube is thin-walled enough to flex).

[0045] In another working example, Southeast Non-Woven HNB3 substrate (non-woven cellulose acetate web about 1.7 mm thick by about 25 mm wide) was hand-cut to a 29 mm length. This forms the inner/lower layer and is wrapped transversely around/ adhered to a stainless steel tube constructed as a mouthpiece for a smoking article, with the wrap forming a butt joint at its ends, and an outermost pre-printed polymer wrapper layer placed over it to form a final mouthpiece construction. When wrapped around a 9.2 mm diameter stainless steel tube with the printed polymer wrapper label applied over the web, the resulting cigarette mouth piece exhibits a diameter of 11.2 mm and has a durometer reading of about 90 Shore M hardness. In another embodiment, Schweitzer-Mauduit 240M9S plug wrap (as commercially available in September 2013) was adhered around its exterior surface to form the upper/outer layer rather than the polymer wrapper.

[0046] In another working example, rayon web fleece (e.g., SDH27 from BFF Technical Fabrics in Bridgewater, Somerset, GB; Z8713 from Hoftex Group AG in Hof, Germany) is cut in a length substantially equal to the outer circumference of the stainless steel mouthpiece tubular shell. This fleece forms the inner/lower layer and is wrapped transversely around/ adhered to a stainless steel tube constructed as a mouthpiece for a smoking article, and a pre-printed polymer wrapper label is adhered around its exterior surface to form the upper/outer layer. When wrapped twice around a 9.2 mm diameter stainless steel tube and with the printed polymer wrapper label applied, the resulting cigarette mouth piece exhibits a diameter of 10.0 mm and has a durometer reading of about 91 Shore M hardness. When three wraps of fleece are used, the outer diameter is about 11.1 mm and hardness remains unchanged at 92. Individual layers of fleece (without pre-printed polymer wrapper label) exhibit hardness numbers of 83 for three layers, 87 for two layers, and 92 for a single layer.

[0047] The term "substantially" as used above with reference to the length of a rectangular piece of fleece relative to the outer circumference of the stainless steel mouthpiece tubular shell will be understood by those in the art. Specifically, it will be appreciated that the length and the circumference need not be exactly identical, but will be about the same within reasonable tolerances (e.g., +/- about 1% to about 10% of a given value), and taking into account the potential for slightly mitered or tapered ends that may be used to provide smooth end-to-end abutment/fit of rectangular three-dimensional material around a cylinder. This same relative dimensional consideration applies elsewhere throughout the present disclosure, including with reference to lengths described at least about some multiple of (e.g., 1x, 2x, 3x) the outer circumference. That is for "a length at least about two times the outer circumference," the length need not be exactly two times the circumference, but preferably will be within reasonable tolerances, and may include slightly mitered or tapered ends or otherwise overlap slightly to provide substantially smooth fit of a rectangular three-dimensional material around a cylinder. As such the length may be slightly less or slightly greater than the described multiple of the circumference, but will be understood by those in the art to substantially circumferentially encompass that circumference.

[0048] FIGS. 4A-4C show another embodiment of a double-wrapped mouthpiece 302 for a smoking article. The innermost component shown is a metal tubular body shell 303, shown uncovered in FIG. 4A may be incorporated as part of any smoking article described herein (including those items incorporated by reference, subject to technical consider-

ations thereof).

[0049] FIG. 4B shows a mid-step assembly view of the double-wrapped mouthpiece 302 for a smoking article. In this embodiment, the shell 303 is circumscribed by a double-layer tipping wrap 320, the inner/lower layer 322 of which (shown in FIG. 4B) is wrapped transversely but not perpendicularly relative to a longitudinal axis of the rigid tube and is trimmed to form a cylindrical wrap 322 that is - as a cylinder - substantially coaxial relative to said longitudinal axis. This spiral-wound or otherwise angled inner/lower layer 322 preferably is a cushioning layer that will provide a comfortable bite/mouth-feel for many users by providing a resilient layer between the user's tongue and/or teeth and the rigid shell 313. The inner/lower layer may include one or more of foam tape (e.g., 3M Scotch™ Permanent Mounting foam tape (Cat #110)), rayon web fleece, cigarette filter tow, cigarette plug wrap, and/or cellulose acetate non-woven web that is adhered or otherwise secured around the shell's outer circumference and transverse to the shell's longitudinal axis in a manner forming a band therearound.

[0050] FIG. 4C shows the inner/lower layer trimmed to form a cylinder as described and an upper/outer layer 324 of the double-layer tipping wrap 320 provided in the form of an adhesive label or sleeve 324 (which may include pressure-sensitive or pressure-activated adhesive). In many embodiments the inner/lower layer 322 will have a first thickness that is greater than a second thickness of the upper/outer layer 324. In the illustrated embodiment and in other embodiments, the upper/outer layer 324 may include indicia (letters/words, images, colors, textures, or other indicia) that identify properties of the mouthpiece 302 and/or a smoking article incorporating the mouthpiece. Exemplary indicia may communicate flavor(s), product source identification (e.g., branding, trademark, etc.), and/or other information, and/or it may provide aesthetic appeal. The label 324 may be an adhesive label with a paper and/or polymer construction. For example, its construction may be the same as or similar to the filter paper or plug wrap used on conventional cigarettes. The materials and methods described here with reference to FIGS. 4A-4C may be used with the working examples described above related to FIGS. 3A-3B.

[0051] FIGS. 5A-5D show a method of assembling a double-wrapped mouthpiece 402 for a smoking article, and FIG. 5E shows a transverse cross-sectional view of the assembled mouthpiece. As shown in FIG. 4A, an inner layer portion 422 of an elongate double-tipping wrap 420 is attached to a mouthpiece tube 403 (e.g., by a pressure-sensitive adhesive or other adhesive or attachment means). The double-tipping wrap 420 preferably includes a total length at least about twice the outer circumference of the tube 403, and may include an overlap portion to form a length exceeding that outer circumference (e.g., by about 3 mm to about 6 mm or more) such that an outermost end of the elongate tipping wrap overlaps an innermost end thereof when wrapped around the mouthpiece. In other embodiments, the length may be three or more times the outer circumference, but preferably is about a whole number multiple of the outer circumference.

[0052] As shown in FIGS. 5B-5C, a first portion of the length is sufficient to encircle the outer circumference of the mouthpiece tube 403, as the tube is rolled up into the wrap 420. This first lengthwise portion preferably includes a cushioning-type material, such as - for example - one of the cushioning-type materials described above with reference to FIGS. 3A-4C. A second lengthwise portion of the double-tipping wrap 420 includes what will form an outward-facing surface configured as an upper/outer layer 424, which may include indicia (letters/words, images, colors, textures, or other indicia, such as - for example - the indicia identified by reference number 427) that identify properties, manufacturing source, or other information about the mouthpiece 402 and/or a smoking article incorporating the mouthpiece.

[0053] FIG. 5D shows the mouthpiece 402 with the double-tipping wrap 420 wrapped nearly two full times around the tube body 403, which has been rolled/rotated nearly 720° to engage the double-tipping wrap 420. The upper/outer layer encompasses the inner/lower layer, as shown in the transverse section view of FIG. 5E, which shows the mouthpiece 402 as fully assembled. As shown therein, the contours of the layers and the assembly process may be configured to provide a substantially circular outer profile without a significantly tactile-noticeable seam at the outermost end of the upper/outer layer 424.

[0054] In addition to, or in alternative to, the wrapping assemblies described, certain embodiments may include a tipping cover, which may be configured (for example) as a polymeric label and may be configured to receive and/or display visual indicia (e.g., providing information about a smoking article or smoking article component such as, for example, trade name, flavor(s), or other characteristics). The tipping cover may be constructed as a wrappable strip, a tube, or other configuration. Examples of tipping covers including polymeric labels that may be configured as heat-shrink tubes or in other configurations are described below, including with reference to FIGS. 6-9, each of which diagrammatically shows structural layers for a tubular or strip construction of a tipping cover. Such tubular tipping cover constructions may be slid on, rolled on, and/or otherwise oriented around the mouthpiece, and - depending upon the size and composition - may be heat-shrunk to conform, may be applied with adhesive, or otherwise secured to the mouthpiece using means appropriate to the tipping cover, which will be appreciated by those of skill in the art with reference to the particular composition of the tipping cover.

[0055] FIG. 6 diagrammatically shows an exploded section view of a tipping cover 604 (which may be configured as a tubular sleeve, a wrap, or other construction, including - for example - heat-shrinkable, tightly-conforming, or other dimensioned construction). The multi-layer construction may include printing/graphics 604b applied outward/upward facing to an inner surface of an outer layer 604a, or to an outer surface of an inner layer 604g. It should be appreciated

in this and other embodiments that a "printing/ graphics/ color layer" will not have substantial structural thickness and that - as with other drawing figures - diagrammatic FIGS. 6-9 are not to scale. An adhesive layer 604h (e.g., pressure sensitive or other adhesive) may be provided to secure to a mouthpiece body 603 and/or to cushioning material (not shown) around that body, such as described with reference to FIGS. 3A-5E. When the tipping cover 604 is applied to a

mouthpiece, smoking article, or the like, the final appearance may be substantially similar to that shown in FIGS. 2A-2C. **[0056]** In some embodiments, heavy gauge (that is, about 100 μm to about 150 μm thick) reverse-printed PVC or PETG sleeves may be used to cover and/or decorate the unwrapped, single-wrapped, or multi-wrapped cushioned surface of a mouth end piece. The printed material (e.g., graphic images, characters) may use water or solvent-based inks. One such embodiment is shown in FIG. 7, which diagrammatically depicts an exploded section view of a tipping cover 704 (which may be configured as a sleeve, a wrap, or other construction). The single layer 704a may include printing/graphics 704b applied outward/upward facing to an inner surface of the layer 704a, which inner surface will be applied/ secured to a mouthpiece body and/or cushioning material around that body. As described elsewhere, this securement and that of the other embodiments or combinations thereof may be done using heat-shrink, adhesive, and/or other securement means, potentially including friction-fit. When the tipping cover 704 is applied to a mouthpiece, smoking article, or the like, the final appearance may be substantially similar to that shown in FIGS. 2A-2C.

[0057] In some embodiments, standard gauge (that is, about 50 μm to about 70 μm thick) PETG, PS, and/or PVC shrink sleeve materials may be adhesive-laminated together to form a two-ply shrink sleeve (about 125 μm to about 170 μm thick). The inner side of an outer, outward-facing layer may be reverse printed with indicia, and adhered (e.g., by emulsion laminated adhesive) to an inward-facing solvent sealed layer of PETG, PS, and/or PVC. This may be applied in strip form or as a heat-shrink cylinder used to cover and/or decorate the unwrapped, single-wrapped, or multi-wrapped cushioned surface of a mouth end piece. One such embodiment is shown in FIG. 8, which diagrammatically depicts an exploded section view of a composite tipping cover 804 (which may be configured as a sleeve, a wrap, or other construction). An outer layer 804a may include printing/graphics 804b applied outward/upward facing to an inner surface of the outer layer 804a, which inner surface will be adhered to an inner layer 804g by an adhesive 804c. The inward/downward facing surface of the inner layer 804g, which will be applied/ secured to a mouthpiece body and/or cushioning material around that body (not shown). As described elsewhere, this securement and that of the other embodiments or combinations thereof may be done using heat-shrink, adhesive, and/or other securement means including friction fit. When the tipping cover 804 is applied to a mouthpiece, smoking article, or the like, the final appearance may be substantially similar to that shown in FIGS. 2A-2C.

[0058] Appropriate adhesives used for forming multilayer tipping covers, whether in the form of polymeric labels or otherwise, may include -for example- dry bond or wet bond adhesives. Illustrative (but non-limiting) examples of dry bond adhesives generally may be applied as follows: a liquid form of the adhesive (e.g., polyurethane dispersion, acrylic emulsion, water-based EVA and PVOH, high-solid silicone solvents) may be coated on the substrate (one layer of a multi-ply composite), dried and then laminated to a second, third, etc. substrate using heated nip rolls. Illustrative (but non-limiting) examples of wet bond adhesives generally may be applied as follows: a liquid form of the adhesive (e.g., polyurethane dispersion, acrylic emulsions, water-based EVA, PVOH, latex) may be coated on the substrate (one layer of a multi-ply composite), laminated to a second, third, etc. substrate, and then dried using heat such as heated air flow. The ink may be a water-based or solvent-based ink, preferably approved for use with food, tobacco, and similar products (e.g., including well-known inks available from Sun Chemical of Richmond, Va.).

[0059] In still other embodiments, a three-ply polymeric label may be provided, including an outer, outward-facing layer (which may be reverse printed with indicia) of PETG, PS, and/or PVC shrink sleeve materials. This outer layer may be adhesive laminated to an intermediate core layer (of a bulk softening material, for example, PE, EVA, and/or CoPP). This intermediate core layer may be adhesive laminated to an inner layer of solvent sealed PETG, PS, and/or PVC. The inner surface of the intermediate layer and/or the outward-facing surface of the inner layer may be printed with a solid color, with the same or different graphic(s) as the outer layer. This may help to provide a "3D optical effect" where the outer layer print appears to float above or otherwise have depth-difference relative to the inner layer. As such, in a three-ply embodiment, standard (about 50 μm thick) PETG shrink sleeve materials may be adhesive laminated on either side of a low-melting, (about a 50 μm to about 75 μm thick) polyolefin core layer to form an about 150 μm to about 175 μm thick composite structure. The core layer may be clear, and its thickness and/or greater elasticity/ lower durometer preferably will provide a mouth feel that may be more comfortable/ desirable to a user than an uncoated metal tube body of a smoking article.

[0060] One such three-ply embodiment is shown in FIG. 9, which diagrammatically depicts an exploded section view of a composite tipping cover 904 (which may be configured as a sleeve, a wrap, or other construction). An outer layer 904a may include printing/graphics 904b applied outward/upward facing to an inner surface of the outer layer 904a, which inner surface may be adhered to an intermediate/core layer 904d by an adhesive 904c. A second layer of adhesive 904e may secure the intermediate layer 904d of this three-ply construction to the inner layer 904g, an outward-facing surface of which may include a print layer (e.g., graphics, solid color(s)) 904f. The inward/downward facing surface of the inner layer 904g, may be applied/ secured to a mouthpiece body and/or cushioning material around that body (not

shown). When the tipping cover 904 is applied to a mouthpiece, smoking article, or the like, the final appearance may be substantially similar to that shown in FIGS. 2A-2C.

[0061] In each preferred shrink sleeve embodiment, the shrink sleeve materials may be heated or otherwise activated to shrink conformingly around a single or multiple layer of wrapping material that, as applied, provides a lower durometer/ greater flexibility than the rigid body of a tubular mouthpiece (corresponding to a more desirable mouth-feel/ bite for many users). In some embodiments, they may be applied directly to the rigid tube body. In such embodiments, the application may be secured by using heat shrink activation in a manner known in the art and appropriate to the particular heat-shrink properties known for the given material. In some embodiments, the material may be applied as an overmold. In an appropriate overmold technique, the steel tube, with or without a sleeve or wrap-around label or cushioning material already applied to it, may be inserted into a slightly larger-diameter injection mold cavity, whereupon a molten thermo-plastic is injected into the gap between the tube and the cavity wall to form a tightly adhered outer cylindrical sleeve around the tube. In some embodiments, adhesive may be used to secure a tipping cover to underlying material. In various embodiments, any combination of heat-shrink, adhesive, and overmolding may be used to secure a tipping cover to a mouthpiece and or greater portion of a smoking article, whether directly to a rigid tube body and/or to underlying material such as the cushioning material(s) discussed herein.

[0062] Different embodiments of tipping covers may include silicone, latex, PET (polyethylene terephthalate), PETG (polyethylene terephthalate copolymer), PS (polystyrene), OPP (oriented polypropylene), BOPP (biaxially-oriented polypropylene), OPS (oriented polystyrene), PE (polyethylene), EPS (expanded polystyrene), PEF (polyethylene furanoate), PVDF (polyvinylidene difluoride), PEX (cross-linked polyethylene), PEBAX (polyether block amide; including heat-shrink PEBAX), PE (polyethylene), EVA (ethylene vinyl acetate), CoPP (polypropylene copolymer), FEP (fluorinated ethylene propylene), PTFE (polytetrafluoroethylene), and PVC (polyvinyl chloride), or any combination thereof within a single layer, within each layer of a multi-layer composition, and/or in each of the separate layers (e.g., one or more of the materials in each layer, alone or combined with other materials, where each layer of a multi-layer tipping cover may include the same or different compositions, which those of skill in the art will recognize with reference to the properties of each component).

[0063] Each of these materials may readily be procured from a variety of suppliers. Tipping covers using these materials may be configured as seamed or seamless shrink-tubes, shrink sleeves, soft sleeves (e.g., silicone tube/sleeve; a sleeve that may be stretched, pulled over the tube, then released to conform therearound, in contrast to tubes or sleeves that may be slipped on and shrunk by heat, UV, or other means), adhesive labels, stretch labels, stretch tubes, or composites/hybrids of one or more such structures.

[0064] Shrink sleeves (or tubes) are distinctly different from the elastic, rollable, or other soft sleeve embodiments described, which do not use a process of heating or otherwise treating the shrink material to conform and, in many embodiments, adhere to the underlying tube - which may include cushioning wrap material. It should also be noted that wrap materials may be applied in some mode other than an encircling/wrapping motion. Also, shrink sleeve and/or shrink tube materials described herein have properties well-known in the material science arts such that, one having skill in the art and informed by the present disclosure will be enabled to construct such a tube and/or sleeve, and apply material-appropriate-manner of curing or other treatment (e.g., UV or other EMF irradiation, heat, chemical treatment, or other means) that will shrink the tube and/or sleeve in a manner conforming to an underlying generally rigid tube body, which may further include one or more cushioning wrap layers. Stated another way, tipping cover embodiments may include or be comprised essentially of a shrink material (e.g., in the form of a tube and/or sleeve) that is configured to conform securely around the mouthpiece tube body and/or any material in between the tube body and the tipping cover when treated in a material-appropriate-manner.

[0065] Table 1 below shows different combinations of one-layer and two-layer structures for embodiments of a mouth-piece including a tipping cover identifying where visual indicia may be printed. The inner layer may be a single-wrapped cushioning or other material, including polymer label-type material, or a multi wrapped cushioning or other material. A "patch" label or layer refers to a layer that encircles less than a full circumference of the underlying tube body.

TABLE 1 - Tipping Cover Embodiments with Print Surface(s)

<u>Wrap or Inner Layer of Tipping Cover</u>	<u>Outer Layer</u>	<u>Graphics/print surface</u>
-	Clear welded shrink sleeve	Inside outer label
-	Clear welded shrink sleeve	Steel tube
Colored welded shrink sleeve	Clear welded shrink sleeve	Outside inner label
Colored pressure-sensitive wrap-around	Clear welded shrink sleeve	Outside inner label
Colored shrink tube	Clear welded shrink sleeve	Inside outer label

(continued)

<u>Wrap or Inner Layer of Tipping Cover</u>	<u>Outer Layer</u>	<u>Graphics/print surface</u>
-	Colored shrink tube	Outside outer label
-	Clear shrink tube	Steel tube
Colored welded shrink sleeve	Clear shrink tube	Outside inner label
Colored pressure-sensitive wrap-around	Clear shrink tube	Outside inner label
Colored shrink tube	Clear shrink tube	Outside inner label
-	Colored soft sleeve	Outside outer label
-	Clear soft sleeve	Steel tube
Colored welded shrink sleeve	Clear soft sleeve	Outside inner label
Colored pressure-sensitive wrap-around	Clear soft sleeve	Outside inner label
Colored shrink tube	Clear soft sleeve	Outside inner label
-	Clear silicone overmold	Steel tube
Colored silicone overmold	In-mold patch label	Outside outer label

[0066] Table 2 below shows different combinations of one-layer and two-layer tipping cover structures for embodiments of a mouthpiece.

TABLE 2 - Tipping Cover Embodiments

<u>Inner Layer*</u>	<u>OuterLayer</u>
-	Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)
-	Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)
Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)	Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)
Pressure Sensitive (Paper, OPP, PET)	Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)
Shrink tube (PEX, PVDF, PVC, PEF)	Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)
-	Shrink tube (PEX, PVDF, PVC, PEF)
-	Shrink tube (PEX, PVDF, PVC, PEF)
Shrink tube (PEX, PVDF, PVC, PEF)	Shrink tube (PEX, PVDF, PVC, PEF)
Pressure Sensitive (Paper, OPP, PET)	Shrink tube (PEX, PVDF, PVC, PEF)
Shrink tube (PEX, PVDF, PVC, PEF)	Shrink tube (PEX, PVDF, PVC, PEF)
-	Soft sleeve (Silicone, Latex, PE)
-	Soft sleeve (Silicone, Latex, PE)
Shrink Sleeve (PETG, PVC, OPS, PE, PP, EPS)	Soft sleeve (Silicone, Latex, PE)
Pressure Sensitive (Paper, OPP, PET)	Soft sleeve (Silicone, Latex, PE)
Colored shrink tube	Soft sleeve (Silicone, Latex, PE)
-	Silicone over-mold
Silicone over-mold	In-mold Patch (PE, OPP, PET, PS)

EXAMPLES:

[0067] Certain aspects of embodiments of the present disclosure may be understood with reference to the following examples. These examples are set forth as illustrative and are not to be construed as limiting.

EXAMPLE 1: Using a 9.2 mm diameter stainless steel tube about 50 mm in length, a strip of 3M Scotch™ Permanent Mounting foam tape (Cat #110) was adhered to one edge of the tube at about a 25 degree angle relative to the tube's longitudinal axis and spiral wound with the tape's edges abutted tightly together to form a continuous layer of foam about 1.5 mm thick. Edges were trimmed to provide an approximately 35 mm length of cushioned surface upon which a preprinted polymer wrapper label was applied (multi-layer laminate comprising PE and OPP films). Resulting diameter of the mouth end piece was 12.7 mm. A desirable range of foam thickness may include about 0.1 mm to about 1.0 mm or, in some embodiments, about 0.30 mm to about 0.70 mm when an embodiment is desired with a smaller diameter mouthpiece than the about 1.5 mm- to about 2 mm-thick foam tape provided in this Example. Another iteration of this concept would be to have the foam layer pre-applied as part of the pre-printed label's construction (e.g., Labec™ by Commodore Solutions of Bloomfield, NY). (This embodiment is similar to that described above with reference to FIGS. 4A-C).

EXAMPLE 2: Another example of a multi-wrapped mouthpiece was constructed using a strip of non-woven cellulose acetate web that was about 1.7 mm thick by about 25 mm wide that was cut to a length of about 29 mm. After using transparent tape to anchor it to an about 9.2 mm outer diameter stainless steel tube, the non-woven cellulose acetate piece was wrapped around the tube with the about 29 mm length encircling the tube to form a "butt joint." Thereafter, another strip with about the same dimensions was attached in the same manner immediately abutting the first strip along the longitudinal end of each, and was then cut circumferentially to form about an about 36 mm longitudinal length of the padded tube mouthpiece along the tube. Then, a preprinted polymer wrapper label was applied. In this example, the resulting outer diameter of the mouth end piece was about 11.2 mm. A desirable range of web thickness may include about 0.1 mm to about 1.0 mm or, in some embodiments, about 0.30 mm to about 0.70 mm thickness, which may be about 0.5 mm. (This embodiment is somewhat similar to that shown in FIG. 4B, except that the abutting seam between web portions is transversely circumferential around the tube body, rather spiral wound.)

EXAMPLE 3: Another example of a multi-wrapped mouthpiece was constructed using a strip of non-woven Rayon fleece web that was about 0.15 mm thick by about 36 mm wide, which was cut to a length of about 29 mm. After using transparent tape to anchor this strip to an about 9.2 mm outer diameter stainless steel tube, the non-woven Rayon fleece piece was wrapped around the tube with the about 29 mm length encircling the tube. A preprinted polymer wrapper label was applied over the fleece piece to form the cushioned mouth end tipping. Resulting diameter of the mouth end piece was about 9.6 mm. A desirable fleece thickness in certain embodiments where a smaller diameter is desired may range from about 0.1 mm to about 1.0 mm, with certain embodiments preferably about 0.30 mm to 0.70 mm, which may be about 0.5 mm.

EXAMPLE 4: Additionally, another similar (to Example 2) cigarette mouth piece was constructed by using transparent tape to anchor a non-woven Rayon fleece strip that was about 58 mm long to an about 9.2 mm outer diameter stainless steel tube and wrapped around the tube with the about 52 mm length encircling the tube twice to form an overlapping joint. A preprinted polymer wrapper label was applied over this fleece strip to form the mouth end tipping. The resulting diameter of the mouth end piece was about 10 mm.

EXAMPLE 5: Another cigarette mouth piece (similar to Examples 2 and 3) was constructed by using transparent tape to anchor a non-woven Rayon fleece strip that was about 88 mm long to an about 9.2 mm outer diameter stainless steel tube and wrapped around the tube with the about 88 mm length thrice encircling the tube to form an overlapping joint. A preprinted polymer wrapper label was applied over the fleece piece to form the mouth end tipping. Resulting diameter of the mouth end piece was about 11.1 mm. A desirable range of fleece thickness in some other embodiments may range from about 0.1 mm to about 1.0 mm or, in certain embodiments, about 0.30 mm to about 0.70 mm, which may be about 0.5 mm. (The construction of this example may be appreciated with reference to FIGS. 5A-C, although those drawings do not show the multiply-wrapped aspect of the fleece strip).

EXAMPLE 6: Another example of a multi-wrapped mouthpiece was constructed using a strip of 50 gram/m² tipping paper web that was about 0.077 mm thick and about 36 mm wide, which was cut to a length of about 29 mm. After using transparent tape to anchor the strip of paper web to an about 9.2 mm outer diameter stainless steel tube, the 50 gram tipping paper piece was wrapped around the tube with the about 29 mm length encircling the tube. A preprinted polymer wrapper label was applied over the paper piece to form the mouth end tipping. The outer diameter of the mouth end piece thus formed was about 10.0 mm. A desirable range of paper web thickness in certain other embodiments may range from about 0.1 mm to about 1.0 mm or, in some embodiments, about 0.30 mm to about 0.70 mm, which may be about 0.4 mm or about 0.5 mm.

EXAMPLE 7: Another cigarette mouth piece was constructed by using transparent tape to anchor a 50 gram/m² tipping paper piece that was about 58 mm long to a 9.2 mm outer diameter stainless steel tube. Thereafter, the tipping paper was wrapped around the tube with the about 58 mm length encircling the tube twice and forming an overlapping joint. A pre-printed polymer wrapper label was applied over the paper piece to complete the mouth end tipping structure. The final outer diameter of the mouth end piece was about 10.4 mm.

EXAMPLE 8: Another cigarette mouth piece (similar to Examples 5 and 6) was constructed using transparent tape to anchor a 50-gram tipping paper strip that was about 88 mm long to an about 9.2 mm stainless steel tube. The

tipping paper strip was thrice wrapped around the tube to form a cushioned mouth end. A preprinted polymer wrapper label was applied over the paper piece to form the mouth end tipping. Resulting diameter of the mouth end piece was about 11.5 mm. A desirable range of paper web thickness in certain other embodiments may range from about 0.1 mm to about 1.0 mm or, in some embodiments, about 0.30 mm to about 0.70 mm, which may be about 0.4 mm or about 0.5 mm.

EXAMPLE 9 Another smoking article mouthpiece was constructed as follows: an about 33 mm wide by about 36 mm long self-adhesive label strip with printed insignia was applied to a stainless steel tube about 9.2 mm in outer diameter and about 37 mm in height. The label was manually wrapped in its width direction around the steel tube so that the label overlapped with itself by about 4 mm. A length of Raychem RNF-100-1/2-CL-FSP clear cross-linked polyethylene shrink tubing was received in flattened form from Tyco Electronics (Menlo Park, Calif.). An about 37 mm-long piece was cut and slipped over the stainless steel tube previously prepared as described. This shrink tubing had an original layflat width of 22 mm, corresponding to an outer diameter of 14mm when shaped round, so that it could be slipped effortlessly onto the steel tube. The tubing was shrunk in a natural convection oven preheated to 235°F for about 5 minutes, then removed from the oven and allowed to cool back to room temperature. In the final product, the tubing was tightly shrunk around the steel tube and self-adhesive label. The lengths of the shrink tubing and steel tube matched each other closely. The two original axial crease lines on the shrink tubing, due its being flattened by the manufacturer, had disappeared. The insignia on the self-adhesive label were clearly and vividly visible through the shrink tubing. The shrunk tubing had a final thickness of about 0.45mm. The self-adhesive label overlap could not be felt by touch through the shrink tubing such that there was no perceptible seam line. It should be appreciated that the tipping cover embodied here as a heat-shrink sleeve may cover the entire smoking article length, or any portion thereof (e.g., limited to the mouthpiece length, or to some other length as desired).

[0068] Those of skill in the art will appreciate that embodiments not expressly illustrated herein may be practiced within the scope of the claims, including that features described herein for different embodiments may be combined with each other and/or with currently-known or future-developed technologies while remaining within the scope of the claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation unless specifically defined by context, usage, or other explicit designation. It is therefore intended that the foregoing detailed description be regarded as illustrative rather than limiting. And, it should be understood that the following claims are intended to define the scope of this invention. Furthermore, the advantages described above are not necessarily the only advantages of the invention, and it is not necessarily expected that all of the described advantages will be achieved with every embodiment.

Claims

1. A mouthpiece (202, 302, 402, 502) for a smoking article, the mouthpiece comprising:
 - a portion including a rigid tube (203, 303, 403, 503) having an outer circumference; and
 - a tipping wrap (220, 320, 420, 504) including a length;
 - where the tipping wrap comprises a two-layer tipping wrap that is transversely wrapped around the outer circumference of the mouthpiece portion to form at least a double layer including a lower/inner cushioning layer (422) having a first thickness and an upper/outer layer (424) having a second thickness less than the first thickness, where the double layer includes more flexibility than the rigid tube.
2. The mouthpiece of claim 1, where the rigid tube is constructed of a metal material including stainless steel, a ceramic material, or a combination thereof.
3. The mouthpiece of claim 1,
 - where the tipping wrap is configured as an elongate tipping wrap that includes a length at least about two times the outer circumference;
 - where the elongate tipping wrap is transversely double wrapped around the outer circumference of the mouthpiece portion to form the at least a double layer.
4. The mouthpiece of claim 3, where elongate tipping wrap includes a length that is at least three times the outer circumference and where the elongate tipping wrap is further wrapped around the outer circumference of the mouthpiece portion so as to be triple-wrapped.
5. The mouthpiece of claim 3, where the elongate tipping wrap includes pressure-sensitive adhesive attaching the

wrap to itself, to the rigid tube, or both.

6. The mouthpiece of claim 3, where the length of the elongate tipping wrap is a whole number multiple of the outer circumference of the mouthpiece portion and further includes an additional length of about 3 mm to about 6 mm such that an outermost end of the elongate tipping wrap overlaps an innermost end thereof when wrapped around the mouthpiece.
7. The mouthpiece of claim 3, where the elongate tipping wrap comprises rayon web fleece, cigarette filter paper, cigarette plug wrap, cellulose acetate non-woven web, or any combination thereof.
8. The mouthpiece of claim 3, where a portion of the elongate tipping wrap that is externally visible when wrapped around the mouthpiece portion comprises visible indicia (427) including information about the smoking article.
9. The mouthpiece of claim 1, where the upper/outer layer comprises visible indicia including information about the smoking article.
10. The mouthpiece of claim 9, where the tipping wrap length includes a first length of the lower/inner layer and a second length of the upper/outer layer, and further where the first length and second length are substantially the same as each other and as the mouthpiece outer circumference such that ends of the tipping wrap abut to form a smooth joint when wrapped around the mouthpiece outer circumference.
11. The mouthpiece of claim 9, where the tipping wrap length includes a first length of the lower/inner layer and a second length of the upper/outer layer, and further where the first length is substantially the same as the mouthpiece outer circumference and the second length is longer at one end such that ends of the tipping wrap first length abut to form a smooth joint when wrapped around the mouthpiece outer circumference and the longer end of the second length overlaps that smooth joint.
12. The mouthpiece of claim 9, where the lower/inner cushioning layer comprises fleece, filter paper, plug wrap, cellulose acetate non-woven web, polymeric film, polymeric foam, or any combination thereof, and the upper/outer layer comprises fleece, filter paper, plug wrap, cellulose acetate non-woven web, polymeric film, polymeric foam, or any combination thereof.
13. The mouthpiece of claim 9, where the upper/outer layer comprises a polymeric label material.
14. The mouthpiece of claim 9, where the lower/inner cushioning layer is wrapped transversely but not perpendicularly relative to a longitudinal axis of the rigid tube and is trimmed to form a cylindrical wrap that is substantially perpendicular relative to said longitudinal axis.
15. The mouthpiece of claim 14, where the upper/outer layer is wrapped substantially perpendicular relative to said longitudinal axis.

Patentansprüche

1. Ein Mundstück (202, 302, 402, 502) für einen Rauchartikel, das Mundstück umfassend:
einen Bereich, welcher ein starres Rohr (203, 303, 403, 503) mit einem Außenumfang umfasst; und
eine Mundstückumhüllung (220, 320, 420, 504), welche eine Länge aufweist;
wobei die Mundstückumhüllung eine zweilagige Mundstückumhüllung umfasst, welche quer um den Außenumfang des Mundstückbereichs herum gewickelt ist, um mindestens eine Doppellage zu bilden, welche eine untere/innere Polsterlage (422) mit einer ersten Dicke und eine obere/äußere Lage (424) mit einer zweiten Dicke, welche kleiner ist als die erste Dicke, umfasst, wobei die Doppellage mehr Flexibilität aufweist als das starre Rohr.
2. Das Mundstück nach Anspruch 1, wobei das starre Rohr aufgebaut ist aus einem Metallmaterial, welches Edelstahl umfasst, einem Keramikmaterial oder einer Kombination hiervon.
3. Das Mundstück nach Anspruch 1,

wobei die Mundstückumhüllung als eine langgestreckte Mundstückumhüllung ausgebildet ist, welche eine Länge aufweist, die mindestens ungefähr das Zweifache des Außenumfangs beträgt;
wobei die langgestreckte Mundstückumhüllung quer in Doppelwicklung um den Außenumfang des Mundstückbereichs herum gewickelt ist, um die mindestens eine Doppellage zu bilden.

- 5 4. Das Mundstück nach Anspruch 3, wobei die langgestreckte Mundstückumhüllung eine Länge aufweist, welche mindestens das Dreifache des Außenumfangs beträgt und wobei die langgestreckte Mundstückumhüllung ferner in Dreifachwicklung um den Außenumfang des Mundstückbereichs herum gewickelt ist.
- 10 5. Das Mundstück nach Anspruch 3, wobei die langgestreckte Mundstückumhüllung ein druckempfindliches Adhäsivmaterial umfasst, welches die Umhüllung an sich selbst, an das starre Rohr oder an beides heftet.
- 15 6. Das Mundstück nach Anspruch 3, wobei die Länge der langgestreckten Mundstückumhüllung ein ganzzahliges Vielfaches des Außenumfangs des Mundstückbereichs beträgt und ferner eine zusätzliche Länge von ungefähr 3 mm bis ungefähr 6 mm umfasst, derart, dass bei umwickeltem Mundstück ein äußerstes Ende der langgestreckten Mundstückumhüllung ein innerstes Ende derselben überlappt.
- 20 7. Das Mundstück nach Anspruch 3, wobei die langgestreckte Mundstückumhüllung ein Rayon-Fleece-Bahnenmaterial, ein Zigarettenfilterpapier, eine Zigarettenpfropfenumhüllung, ein Celluloseacetat-Nonwoven-Bahnenmaterial oder eine beliebige Kombination hiervon umfasst.
- 25 8. Das Mundstück nach Anspruch 3, wobei ein Bereich der langgestreckten Mundstückumhüllung, welcher bei umwickeltem Mundstückbereich äußerlich sichtbar ist, eine sichtbare Kennzeichnung (427) umfasst, welche Information über den Rauchartikel umfasst.
- 30 9. Das Mundstück nach Anspruch 1, wobei die obere/äußere Lage eine sichtbare Kennzeichnung umfasst, welche Information über den Rauchartikel umfasst.
- 35 10. Das Mundstück nach Anspruch 9, wobei die Mundstückumhüllungslänge eine erste Länge der unteren/inneren Lage und eine zweite Länge der oberen/äußeren Lage umfasst und wobei ferner die erste Länge und die zweite Länge einander sowie dem Mundstückaußenumfang gleichen, derart, dass bei umwickeltem Mundstückaußenumfang die Enden der Mundstückumhüllung aneinanderstoßen, um eine glatte Naht zu bilden.
- 40 11. Das Mundstück nach Anspruch 9, wobei die Mundstückumhüllungslänge eine erste Länge der unteren/inneren Lage und eine zweite Länge der oberen/äußeren Lage umfasst und wobei ferner die erste Länge im Wesentlichen gleich dem Mundstückaußenumfang ist und die zweite Länge an einem Ende länger ist, derart, dass bei umwickeltem Mundstückaußenumfang die Enden der ersten Mundstückumhüllungslänge aneinanderstoßen, um eine glatte Naht zu bilden, und das längere Ende die glatte Naht überlappt.
- 45 12. Das Mundstück nach Anspruch 9, wobei die untere/innere Polsterlage ein Fleece, ein Filterpapier, eine Pfropfenumhüllung, ein Celluloseacetat-Nonwoven-Bahnenmaterial, eine polymere Folie, einen polymeren Schaum oder eine beliebige Kombination hiervon umfasst und wobei die obere/äußere Lage ein Fleece, ein Filterpapier, eine Pfropfenumhüllung, ein Celluloseacetat-Nonwoven-Bahnenmaterial, eine polymere Folie, einen polymeren Schaum oder eine beliebige Kombination hiervon umfasst.
- 50 13. Das Mundstück nach Anspruch 9, wobei die obere/äußere Lage ein polymeres Etikettenmaterial umfasst.
- 55 14. Das Mundstück nach Anspruch 9, wobei die untere/innere Lage quer, aber nicht senkrecht zu einer Längsachse des starren Rohrs gewickelt ist und so getrimmt ist, dass sie eine zylindrische Umhüllung bildet, welche im Wesentlichen senkrecht zu der Längsachse steht.
15. Das Mundstück nach Anspruch 14, wobei die obere/äußere Lage im Wesentlichen senkrecht zu der Längsachse gewickelt ist.

Revendications

1. Embout buccal (202, 302, 402, 502) pour un article à fumer, l'embout buccal comprenant :

une portion incluant un tube rigide (203, 303, 403, 503) ayant une circonférence extérieure ; et
une enveloppe d'assemblage (220, 320, 420, 504) incluant une longueur ;
où l'enveloppe d'assemblage comprend une enveloppe d'assemblage à deux couches qui est enveloppée
transversalement autour de la circonférence extérieure de la portion d'embout buccal pour former au moins
une double couche incluant une couche de rembourrage inférieure/intérieure (422) ayant une première épaisseur
et une couche supérieure/extérieure (424) ayant une seconde épaisseur plus petite que la première épaisseur,
où la double couche inclut plus de flexibilité que le tube rigide.

2. Embout buccal selon la revendication 1, où le tube rigide est constitué d'un matériau métallique incluant de l'acier
inoxydable, d'un matériau céramique, ou d'une combinaison de ceux-ci.

3. Embout buccal selon la revendication 1,
où l'enveloppe d'assemblage est configurée comme une enveloppe d'assemblage allongée qui inclut une longueur
d'au moins environ deux fois la circonférence extérieure ;
où l'enveloppe d'assemblage allongée est doublement enroulée transversalement autour de la circonférence exté-
rieure de la portion d'embout buccal pour former l'au moins une double couche.

4. Embout buccal selon la revendication 3, où une enveloppe d'assemblage allongée inclut une longueur qui est d'au
moins trois fois la circonférence extérieure et où l'enveloppe d'assemblage allongée est enveloppée en plus autour
de la circonférence extérieure de la portion d'embout buccal de façon à être triplement enveloppée.

5. Embout buccal selon la revendication 3, où l'enveloppe d'assemblage allongée inclut un adhésif sensible à la
pression attachant l'enveloppe à elle-même, au tube rigide, ou les deux.

6. Embout buccal selon la revendication 3, où la longueur de l'enveloppe d'assemblage allongée est un nombre entier
multiple de la circonférence extérieure de la portion d'embout buccal et inclut en outre une longueur supplémentaire
d'environ 3 mm à environ 6 mm de telle sorte qu'une extrémité la plus éloignée de l'enveloppe d'assemblage allongée
recouvre une extrémité la plus à l'intérieur de celle-ci lorsqu'elle est enveloppée autour de l'embout buccal.

7. Embout buccal selon la revendication 3, où l'enveloppe d'assemblage allongée comprend un molleton en bande
de rayonne, un papier-filtre de cigarette, un papier pour filtres de cigarette, une bande non tissée en acétate de
cellulose, ou une quelconque combinaison de ceux-ci.

8. Embout buccal selon la revendication 3, où une portion de l'enveloppe d'assemblage allongée qui est visible de
manière externe lorsqu'elle est enveloppée autour de la portion d'embout buccal comprend des indices visibles
(427) incluant des informations relatives à l'article à fumer.

9. Embout buccal selon la revendication 1,
où la couche supérieure/extérieure comprend des indices visibles incluant des informations relatives à l'article à
fumer.

10. Embout buccal selon la revendication 9, où la longueur d'enveloppe d'assemblage inclut une première longueur de
la couche inférieure/intérieure et une seconde longueur de la couche supérieure/extérieure, et en outre où les
première longueur et seconde longueur sont sensiblement les mêmes l'une que l'autre et que la circonférence
extérieure d'embout buccal de telle sorte que des extrémités de l'enveloppe d'assemblage viennent en butée pour
former un joint lisse lorsqu'elle est enveloppée autour de la circonférence extérieure d'embout buccal.

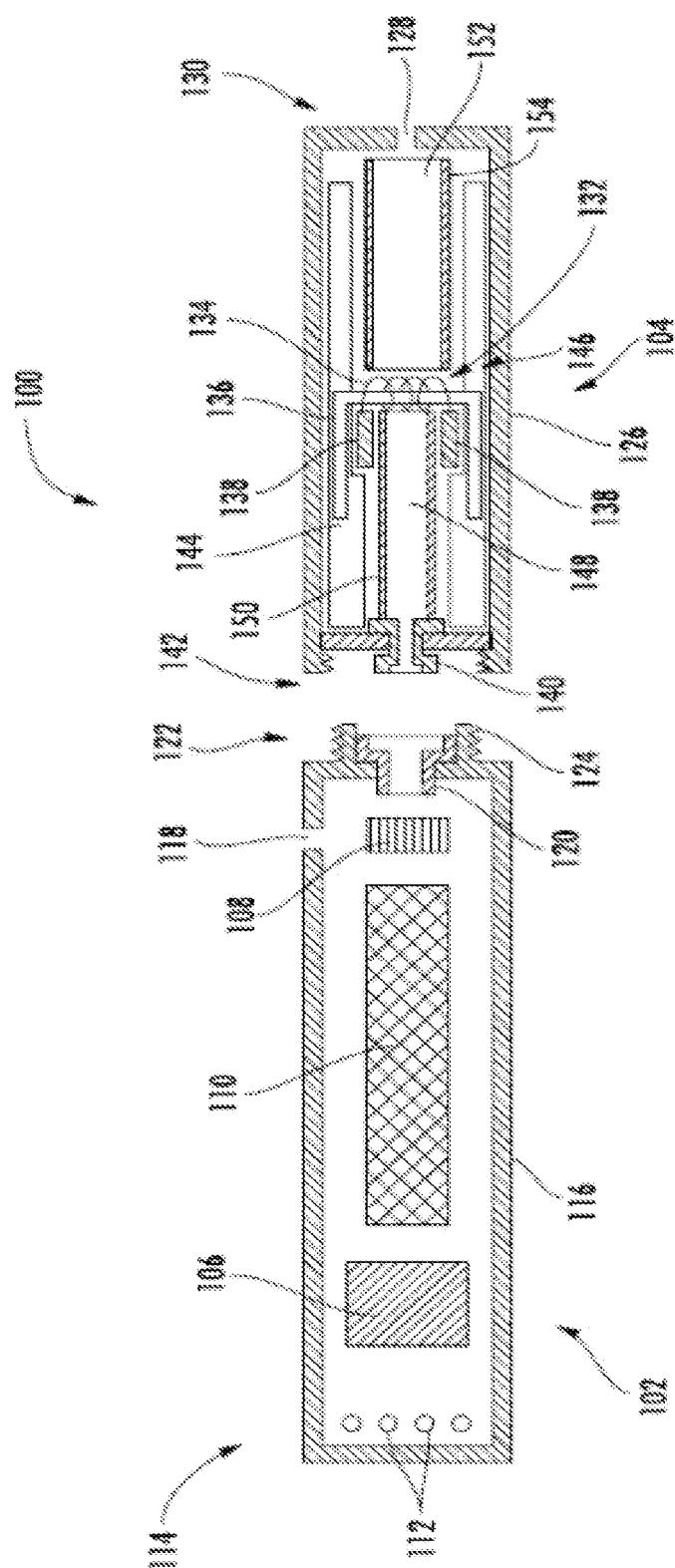
11. Embout buccal selon la revendication 9, où la longueur d'enveloppe d'assemblage inclut une première longueur de
la couche inférieure/intérieure et une seconde longueur de la couche supérieure/extérieure, et en outre où la première
longueur est sensiblement la même que la circonférence extérieure d'embout buccal et la seconde longueur est
plus longue au niveau d'une extrémité de telle sorte que des extrémités de la première longueur d'enveloppe
d'assemblage viennent en butée pour former un joint lisse lorsqu'elle est enveloppée autour de la circonférence
extérieure d'embout buccal et l'extrémité plus longue de la seconde longueur recouvre ce joint lisse.

12. Embout buccal selon la revendication 9, où la couche de rembourrage inférieure/intérieure comprend un molleton, un papier-filtre, un papier pour filtres, une bande non tissée en acétate de cellulose, un film polymère, une mousse polymère, ou une quelconque combinaison de ceux-ci, et la couche supérieure/extérieure comprend un molleton, un papier-filtre, un papier pour filtres, une bande non tissée en acétate de cellulose, un film polymère, une mousse polymère, ou une quelconque combinaison de ceux-ci.

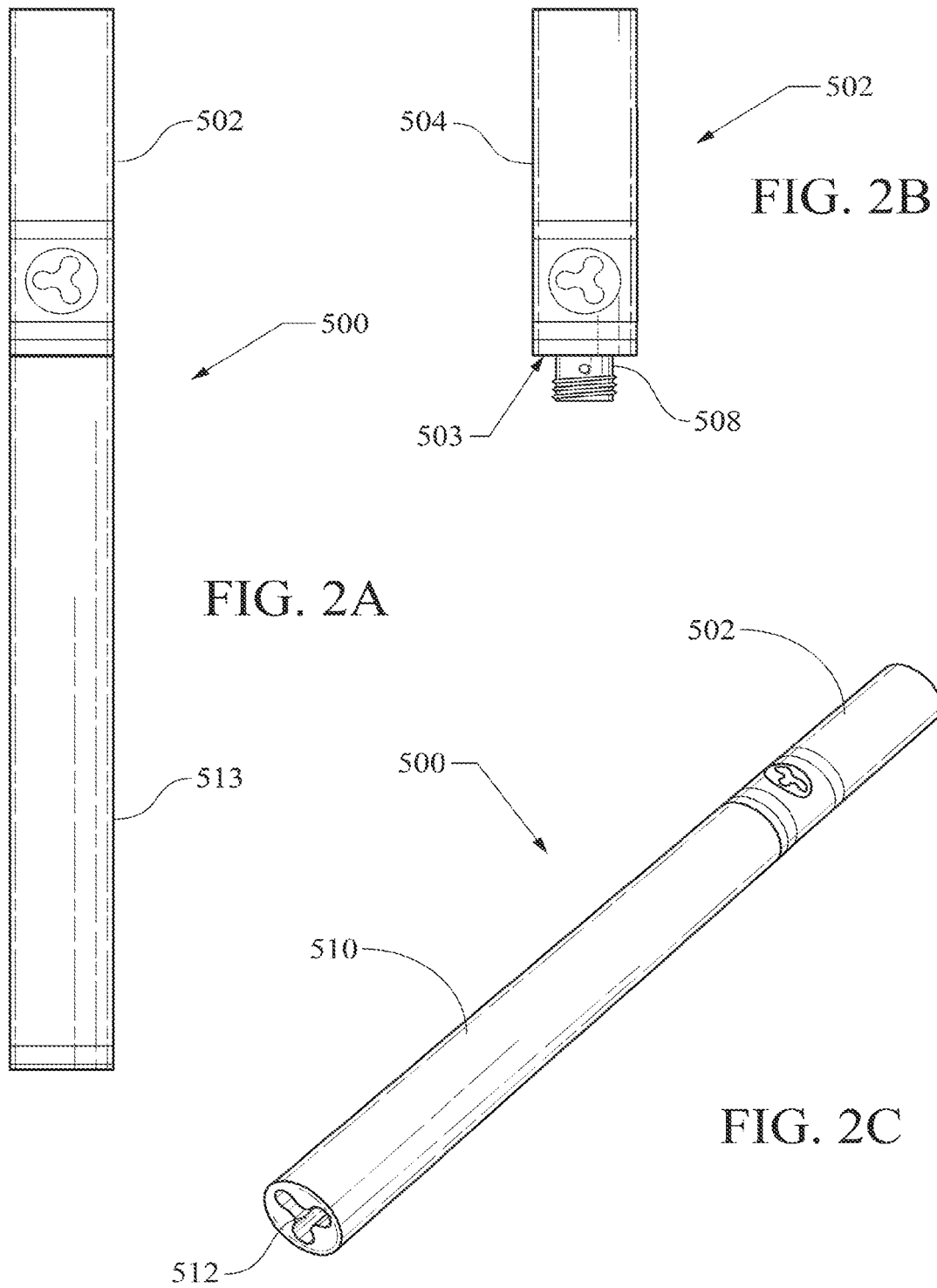
13. Embout buccal selon la revendication 9, où la couche supérieure/extérieure comprend un matériau d'étiquette polymère.

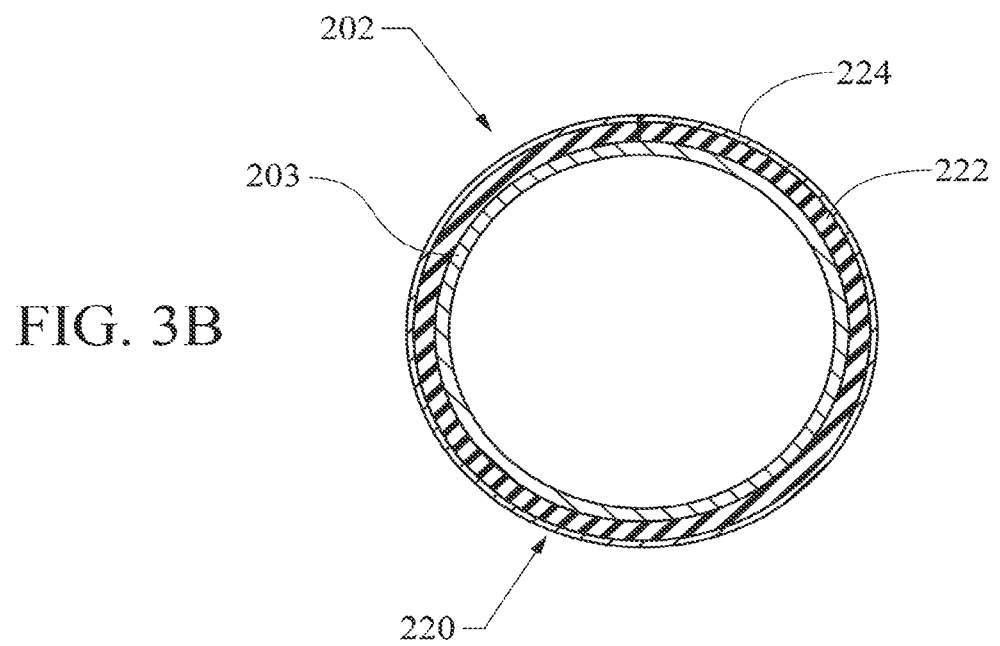
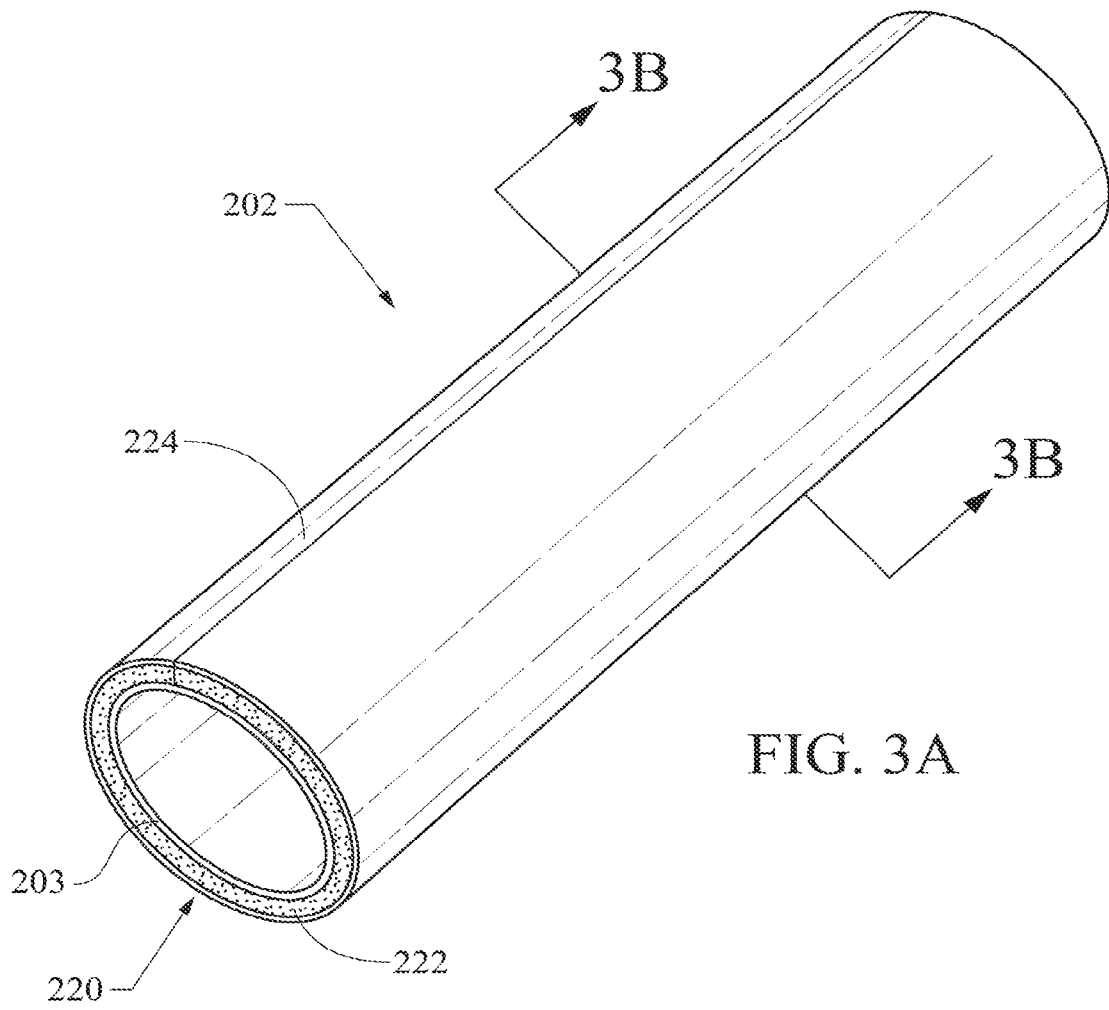
14. Embout buccal selon la revendication 9, où la couche de rembourrage inférieure/intérieure est enveloppée transversalement mais pas perpendiculairement par rapport à un axe longitudinal du tube rigide et est coupée pour former une enveloppe cylindrique qui est sensiblement perpendiculaire par rapport audit axe longitudinal.

15. Embout buccal selon la revendication 14, où la couche supérieure/extérieure est enveloppée sensiblement perpendiculaire par rapport audit axe longitudinal.



IGL





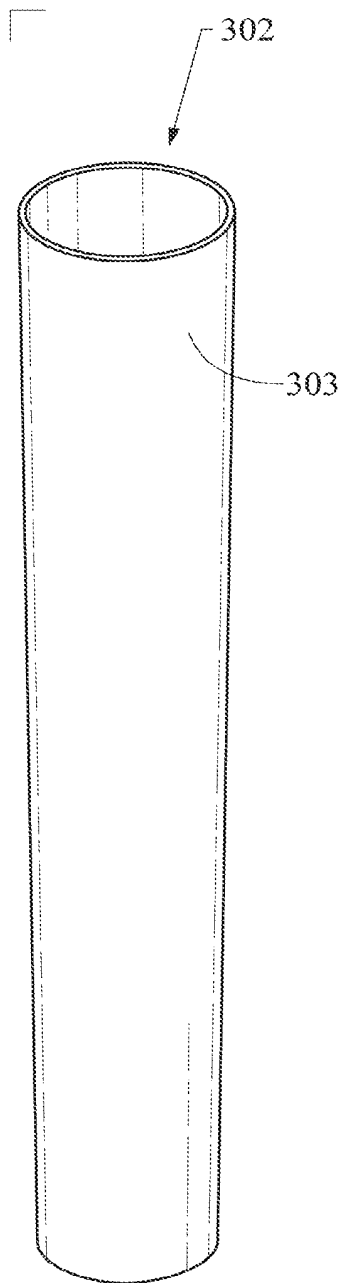


FIG. 4A

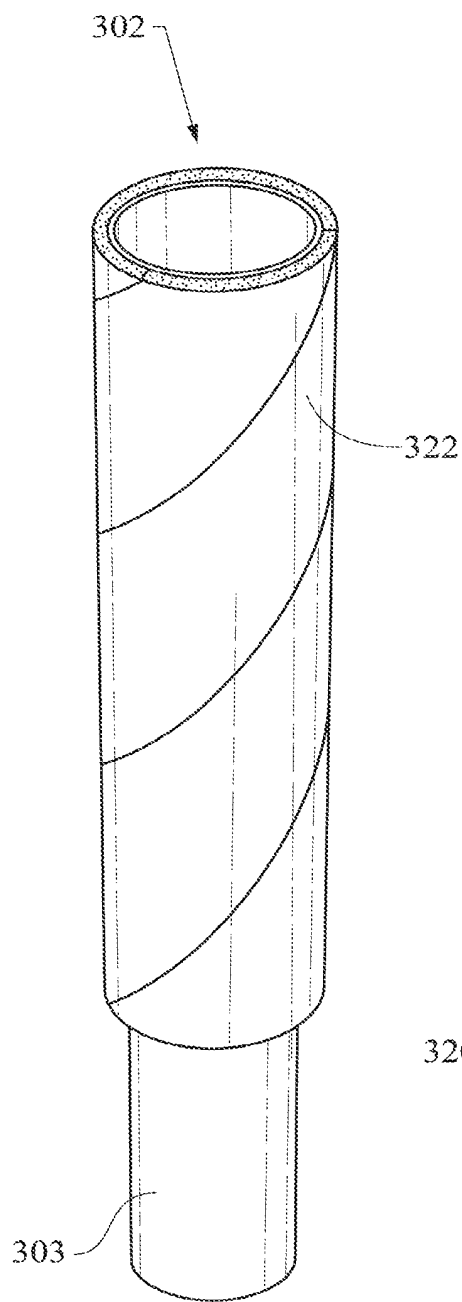


FIG. 4B

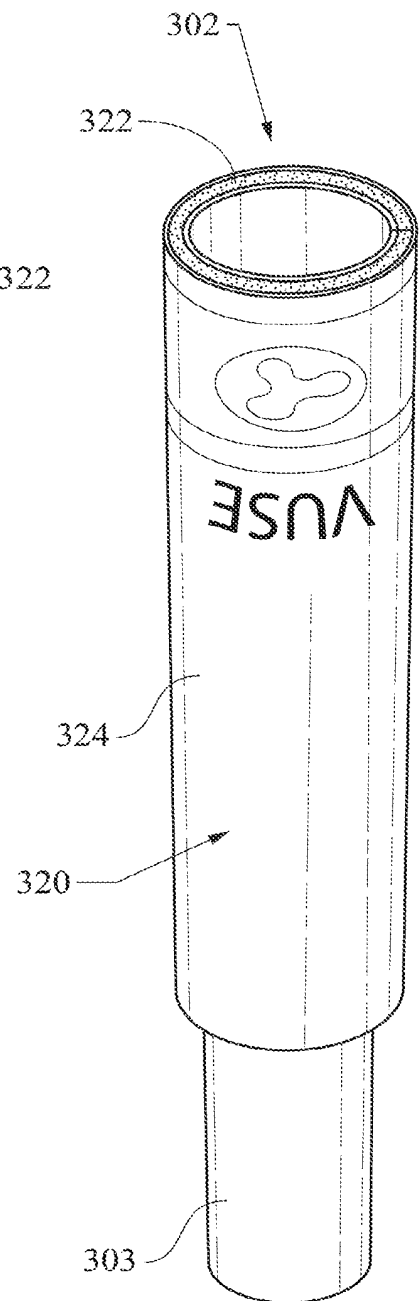
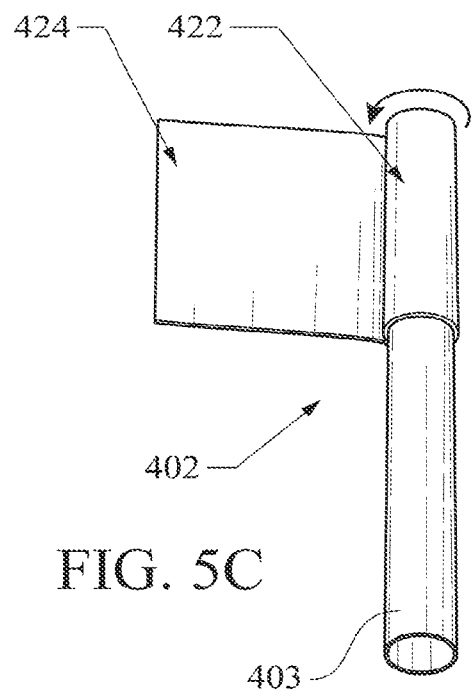
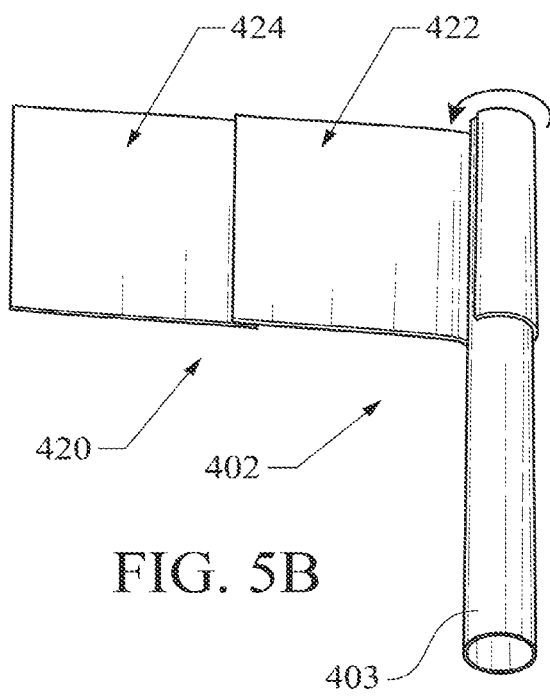
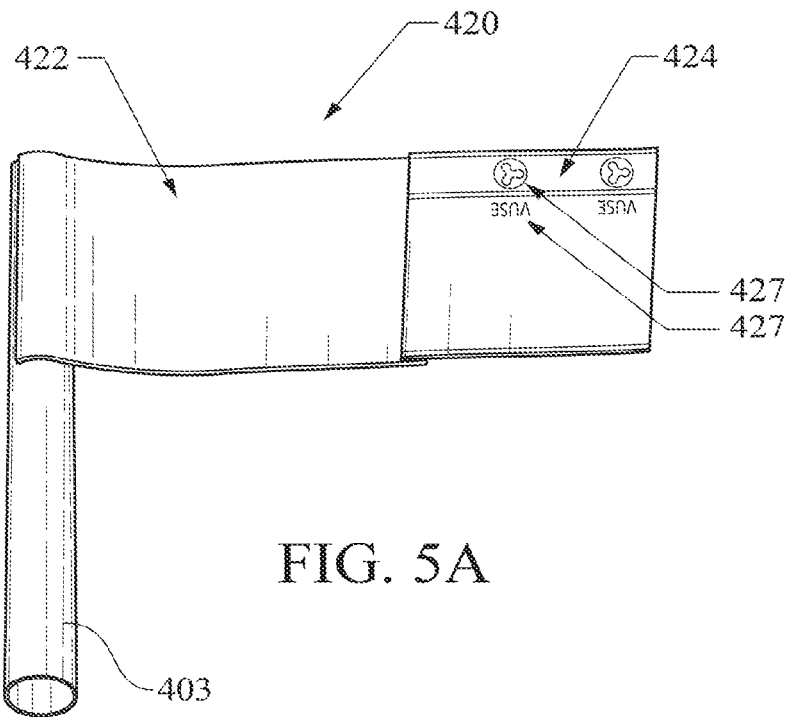
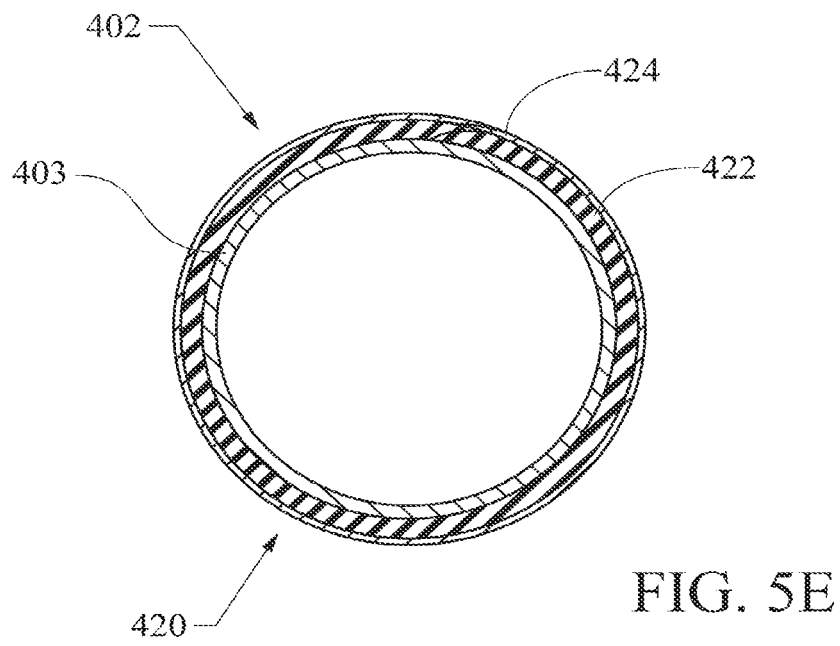
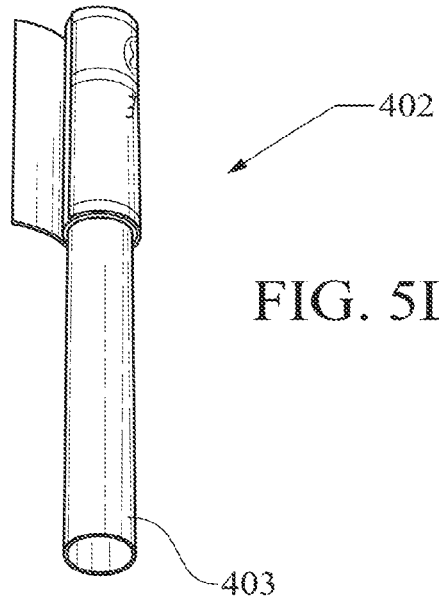


FIG. 4C





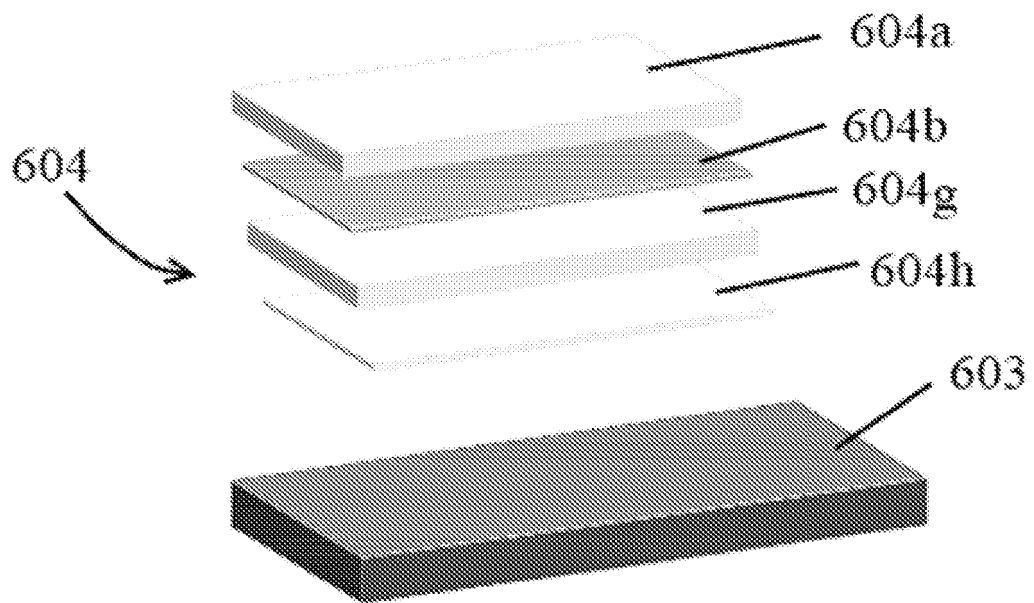


FIG. 6

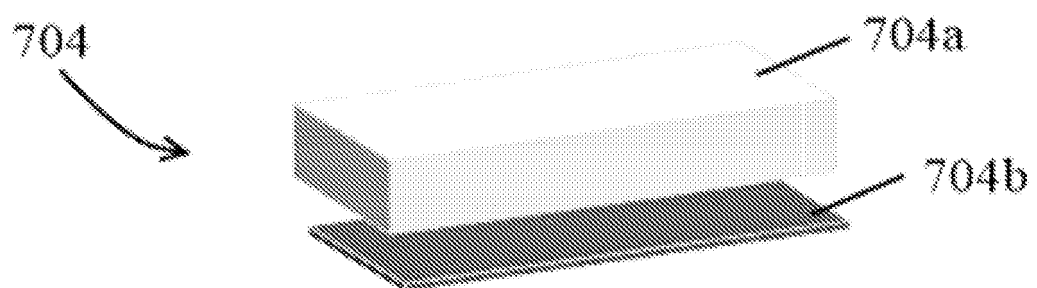


FIG. 7

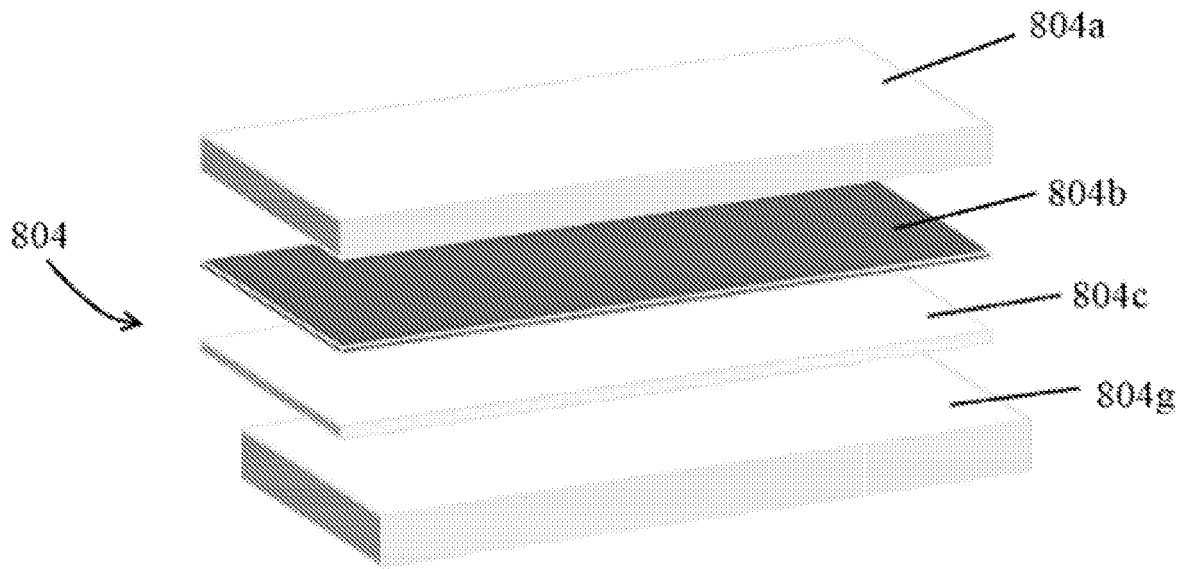


FIG. 8

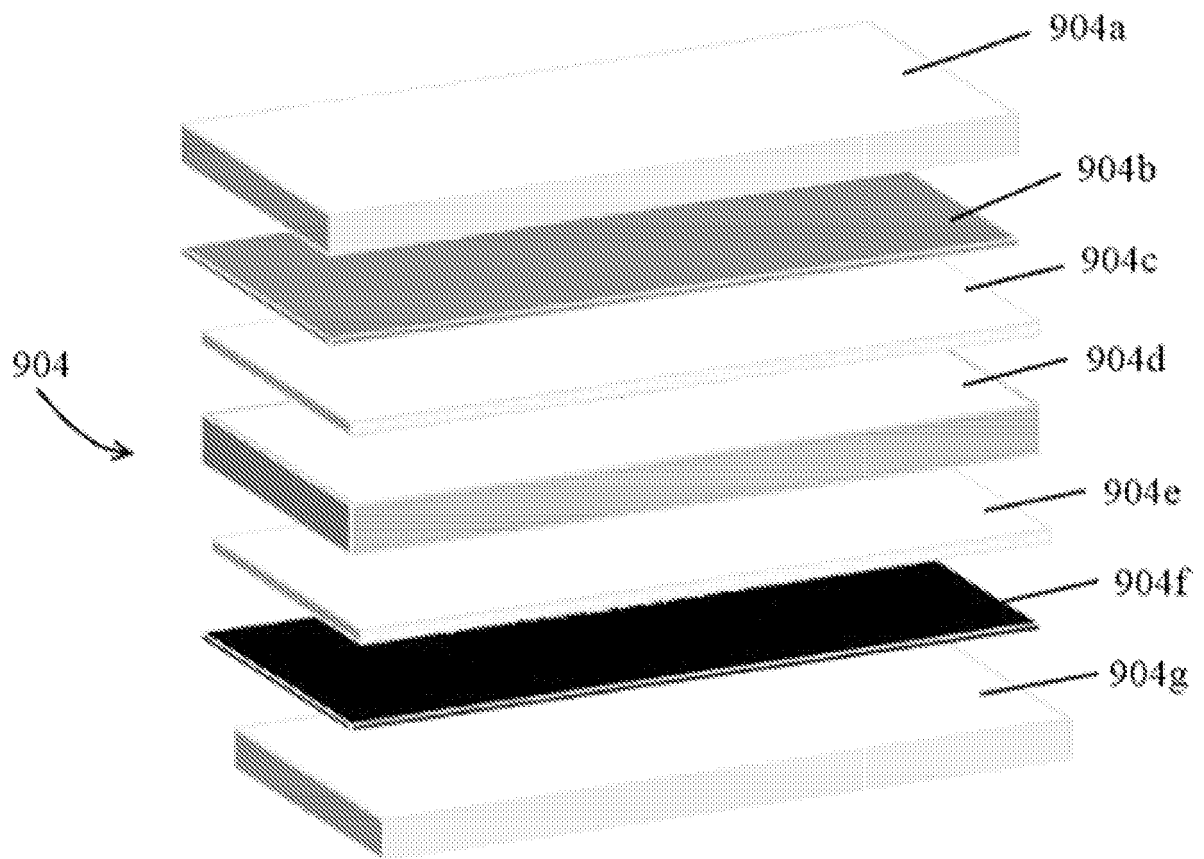


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- US 20120312313 A1 [0002]
- US 7726320 B, Robinson [0003] [0033]
- US 20130255702 [0003]
- US 53643812, Sebastian [0003] [0026] [0033]
- US 60287112, Collett [0003] [0026] [0033]
- US 64700012, Sears [0003] [0033]
- US 20130008457 A, Zheng [0015]
- US 84026413 [0019]
- US 60361212 [0019]
- US 84123313 [0021] [0032]
- US 5060671 A, Counts [0023]
- US 5093894 A, Deevi [0023]
- US 5224498 A, Deevi [0023]
- US 5228460 A, Sprinkel Jr [0023]
- US 5322075 A, Deevi [0023]
- US 5353813 A, Deevi [0023]
- US 5468936 A, Deevi [0023]
- US 5498850 A, Das [0023]
- US 5659656 A, Das [0023]
- US 5498855 A, Deevi [0023]
- US 5530225 A, Hajaligol [0023]
- US 5665262 A, Hajaligol [0023]
- US 5573692 A, Das [0023]
- US 5591368 A, Fleischhauer [0023]
- US 43240612 [0027] [0033]
- US 20100028766 [0029]
- US 4735217 A, Gerth [0030] [0032]
- US 4922901 A [0030] [0033]
- US 4947874 A [0030]
- US 4947875 A, Brooks [0030]
- US 5372148 A, McCafferty [0030] [0032]
- US 6040560 A, Fleischhauer [0030] [0032]
- US 7040314 B, Nguyen [0030]
- US 4793365 A, Sensabaugh, Jr. [0031]
- US 5101839 A, Jakob [0031]
- WO 9857556 A, Biggs [0031]
- US 5261424 A, Sprinkel, Jr. [0032]
- US 5967148 A, Harris [0032]
- US 5934289 A, Watkins [0032]
- US 5954979 A, Counts [0032]
- US 6803545 B, Blake [0032]
- US 7293565 B, Griffen [0032]
- US 8402976 B, Fernando [0032]
- US 20100163063, Fernando [0032]
- WO 2010003480 A, Flick [0032]
- US 5249586 A, Morgan [0032] [0033]
- US 5666977 A, Higgins [0032] [0033]
- US 6053176 A, Adams [0032]
- US 6164287 A, White [0032]
- US 6196218 B, Voges [0032] [0033]
- US 6810883 B, Felter [0032] [0033]
- US 6854461 B, Nichols [0032] [0033]
- US 7832410 B, Hon [0032] [0033]
- US 7513253 B, Kobayashi [0032] [0033]
- US 7896006 B, Hamano [0032] [0033]
- US 6772756 B, Shayan [0032] [0033]
- US 8156944 B [0032]
- US 8375957 B, Hon [0032]
- US 20060196518 [0032]
- US 20090188490 A, Hon [0032] [0033]
- US 20090272379, Thorens [0032]
- US 20090260641 [0032]
- US 20090260642 A, Monsees [0032] [0033]
- US 20080149118 [0032]
- US 20100024834 A, Oglesby [0032] [0033]
- US 20100307518, Wang [0032]
- WO 2010091593 A, Hon [0032] [0033]
- US 5388594 A, Counts [0033]
- US 8079371 B, Robinson [0033]
- US 20090095311 A, Hon [0033]
- US 20060196518 A [0033]
- US 20090126745 A [0033]
- US 20090272379 A, Thorens [0033]
- US 20090260641 A [0033]
- US 20080149118 A [0033]
- US 20100307518 A, Wang [0033]
- US 82799413 [0033]
- US 7789089 B, Dube [0034]
- US 20070215167 A, Crooks [0034]
- US 20100108081 A, Joyce [0034]
- US 20100108084 A, Norman [0034]
- US 20130167849 A, Ademe [0034]
- US 5469871 A, Barnes [0034]
- US 20100186757 A, Crooks [0034]
- US 20120067360 A, Conner [0034]

Non-patent literature cited in the description

- Chemical and Biological Studies on New Cigarette Prototypes that Heat Instead of Burn Tobacco. R. J. Reynolds Tobacco Company Monograph, 1988 [0031]