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PTO/AIA/50 (10-17)
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REISSUE PATENT APPLICATION TRANSMITTAL

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Attorney Docket No.	38802-0004RE1
First Named Inventor	Kyle D. Newton
Original Patent Number	9596887
Original Patent Issue Date (Month/Day/Year)	03/21/2017
Priority Mail Express® Label No.	

APPLICATION FOR REISSUE OF:
(Check applicable box) ☒ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS (37 CFR 1.173)

1. ☒ **Fee Transmittal Form** (PTO/SB/56)
2. ☒ **Applicant asserts small entity status.** See 37 CFR 1.27.
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☒ **Specification and Claims** in double column copy of patent format *(amended, if appropriate)*
5. ☒ **Drawing(s)** *(proposed amendments, if appropriate)*
6. ☒ **Reissue Oath/Declaration or Substitute Statement** (37 C.F.R. 1.175) (PTO/AIA/05, 06 or 07)
7. ☒ **Application Data Sheet** **NOTE:** Benefit claims under 37 CFR 1.78 and foreign priority claims under 37 CFR 1.55 MUST be set forth in an Application Data Sheet (ADS).
8. ☒ **Original U.S. Patent currently assigned?** ☒ Yes ☐ No *(If Yes, check applicable box(es))*
   - ☒ Written Consent of all Assignees (PTO/AIA/53)
   - ☒ 37 CFR 3.73(c) Statement (PTO/AIA/96)
9. ☐ **CD-ROM or CD-R** in duplicate, Computer Program (*Appendix*) or large table
   - ☐ Landscape Table on CD
10. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required))*
    - a. ☐ Computer Readable Form (CRF)
    - b. ☐ Specification Sequence Listing on:
      - i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      - ii. ☐ Paper
    - c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

11. ☐ **Statement of status and support for all changes to the claims.** See 37 CFR 1.173(c).
12. ☒ **Power of Attorney**
13. ☐ **Information Disclosure Statement (IDS)** PTO/SB/08 or PTO-1449
    - ☐ Copies of citations attached
14. ☐ **English translation of Reissue Oath/Declaration** *(if applicable)*
15. ☐ **Return Receipt Postcard** (MPEP § 503) (Should be specifically itemized)
16. ☒ **Preliminary Amendment** (37 CFR 1.173; MPEP § 1453)
17. ☐ **Other:**

☐ This is a continuation reissue or divisional reissue application (*i.e.,* a second or subsequent reissue application for the same issued patent). *(Check box if applicable.)*

18. CORRESPONDENCE ADDRESS

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Signature	/Kary Yergler/	Date	20 March 2019
Name (Print/Type)	Kary Yergler	Registration No.	71,612

This collection of information is required by 37 CFR 1.173. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Reissue, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PTO/SB/56 (07-12)
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REISSUE APPLICATION FEE TRANSMITTAL FORM

Docket Number (Optional)
38802-0004RE1

Application as Filed – Part 1

	(1) Claims in Patent	(2) Claims Filed in Reissue Application	(3) Number Extra	Small Entity Rate ($)	Small Entity Fee ($)		Other than a Small Entity Rate ($)	Other than a Small Entity Fee ($)
Total Claims (37CFR1.16(i))	(A) 16	(B) 16	**** 0 =	X 50.00 =	0		X =	
Independent Claims (37 CFR 1.16(h))	(C) 1	(D) 1	* 0 =	X 230.00 =	0		X =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			31	0	or		
			Filing Fee (37 CFR 1.16(e))		150			
			Search Fee (37 CFR 1.16(n))		330			
			Examination Fee (37 CFR 1.16(r))		1,100			
			Total Filing Fee		1,580			

Application as Amended – Part 2

	(1) Claims Remaining After Amendment		(2) Highest Number Previously Paid For	(3) Extra Claims Present	Small Entity Rate ($)	Small Entity Fee ($)		Other than a Small Entity Rate ($)	Other than a Small Entity Fee ($)
Total Claims (37 CFR 1.16(i))	*** 40	MINUS	** 20	* = 20	X 50 =	1000		X =	
Independent Claims (37 CFR 1.16(h))	*** 2	MINUS	***** 3	= 0	X 0 =	0	or	X =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				31	0			
				Total Additional Fee		1000			

* Enter (D) minus 3, or "0" if (D) is less than 3.
** If the "Highest Number of Total Claims Previously Paid For" is less than 20, enter "20" in this space.
*** After any cancellation of claims.
**** Enter (B) – 20, or enter "0" if (B) is less than 20.
***** If the "Highest Number of Independent Claims Previously Paid For" is less than 3, enter "3" in this space.

☒ Applicant claims small entity status. See 37 CFR 1.27.

☒ Please charge Deposit Account No. 06-1050 in the amount of _____.

☒ The Director is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. 06-1050.

☐ A check in the amount of $ _____ to cover the filing/additional fee is enclosed.

☐ Payment made via EFS-Web.

☐ Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

/Kary Yergler/ — Signature
20 March 2019 — Date
Kary Yergler — Typed or printed name
71,612 — Registration Number, if applicable
(214) 292-4036 — Telephone Number

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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the wick aperture **40** as described hereinbefore, and enclosing the atomizing chamber **38**. The resilient seal **42** is disposed between the exterior of the chimney **36** and the interior of the housing **12**, thereby sealing the upper end of the fluid reservoir **43**. The tip end resilient insert **4**, with the aerosol outlet port **5**, closes the upper end of the cartridge housing **12**, and the chimney **36** is thereby aligned and sealed to the aerosol outlet **5**. The housing **12** is engaged with the atomizer assembly **28**, which urges the ends of the wick **37** downwardly and constrains them within the annular cavity **39** formed between the interior of the housing **12** and the exterior of the atomizing chamber **38**. The wick **37** is thusly enabled to absorb the liquid (not shown). The atomizer **32** has a first end electrically coupled to the atomizer assembly body **28** and a second end electrically coupled to the electrical coupler **22**. The electrical circuit is completed when the cartridge is engaged with the power supply portion, discussed hereinbefore. The atomizing chamber **38** is thusly sealed but for the entry of fresh air through air inlet port **26** and the exit of air and aerosol up chimney **36** and out aerosol outlet **5**.

Reference is directed to FIGS. **11***a*, **11***b*. **11***c*, and **11***d*, which are a first end view, a first side section view, a second end view, and a second side section view drawing, respectively, of an atomizing assembly **28** according to an illustrative embodiment of the present invention. The assembly is based on a metal body **28** that has a electrical coupler **22** insulatively supported **24** therein. The electrical coupler **22** has an air inlet port formed therethrough. The electrical coupler has a pair of air recesses **27** machined on its face so that an air channel is created when the cartridge is engaged with the power supply portion of the electronic cigarette. In this manner, the air path is from the exterior, through the air inlet vents **16**, through the air recesses **27**, through the air inlet port **26** of the electrical coupler and u to the atomizer **32**. The wick **37** is positioned through the central cavity of the atomizer **32** and extends through the pair of semicircular recesses **30** in the body **28**. The wick is a fibrous bundle, which is formed from a temperature resistant material, and may be selected from amongst aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass fibers. Or, from other suitable materials known to those skilled in the art.

Reference is directed to FIGS. **12***a*, **12***b*, and **12***c*, which are a first end view, a side section view, and a second end view drawing, respectively, of an atomizing chamber **38** and chimney **6** according to an illustrative embodiment of the present invention. In the illustrative embodiment, the atomizing chamber **38** and chimney **36** are formed as a single unit. The atomizing chamber **38** and the chimney **36** are cylindrical in form. The resilient seal **42** is a donut shaped polymeric material that is pressed onto the upper end of the chimney **36**. The atomizing chamber **38** includes a pair of opposing wick apertures **40** formed therein, which provide clearance for the wick (not shown) to pass into the atomizing chamber **38**.

Reference is directed to FIGS. **13***a*, **13***b*, and **13***c*, which are a first end view, a side section view, and a second end view drawing, respectively, of a mouthpiece housing **12** according to an illustrative embodiment of the present invention. The housing **12** is a cylindrical plastic tube in the illustrative embodiment. The plastic is transparent or translucent to facilitate visual inspection of the liquid content. The tip end resilient insert **4**, with the aerosol outlet port **5**, closes the upper end of the cartridge housing **12**.

Thus, the present invention has been described herein with reference to a particular embodiment for a particular application. Those having ordinary skill in the art and access to the present teachings will recognize additional modifications, applications and embodiments within the scope thereof.

It is therefore intended by the appended claims to cover any and all such applications, modifications and embodiments within the scope of the present invention.

What is claimed is:

1. An electronic cigarette cartridge apparatus, comprising: a housing having a mouthpiece with an aerosol outlet; an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of the liquid in response to electric current flowing therethrough; said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture; a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber, and a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer; wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

2. The apparatus of claim **1**, further comprising:

an inlet vent formed on the exterior of said housing and coupled to deliver air to said atomizing chamber air inlet.

3. The apparatus of claim **2**, and wherein said inlet vent is coupled to said atomizing chamber air inlet by a conduit.

4. The apparatus of claim **3**, and wherein said conduit sealably passes through said liquid reservoir.

5. The apparatus of claim **1**, and wherein said chimney sealably passes through said liquid reservoir.

6. The apparatus of claim **1**, and wherein said atomizer is a resistive heating element.

7. The apparatus of claim **6**, and wherein said wick is partially engages said resistive heating element.

8. The apparatus of claim **1**, and wherein said atomizer has a tubular form defining an open central passage.

9. The apparatus of claim **8**, and wherein said wick passes through said open central passage.

10. The apparatus of claim **1**, and wherein said atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture.

11. The apparatus of claim **1**, and wherein said wick is fabricated as a bundle of heat resistant fibers.

12. The apparatus of claim **11**, and wherein said bundle of heat resistant fibers is fiberglass.

13. The apparatus of claim **11**, and wherein said bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

14. The apparatus of claim **1**, and wherein said liquid reservoir is formed as an annular cavity between the interior of said housing and said atomizing chamber.

15. The apparatus of claim **1**, and wherein said liquid reservoir includes an external access opening, for enabling addition of liquid into said liquid reservoir.

16. The apparatus of claim **15**, and wherein said external access opening is a removable mouthpiece.

* * * * *

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ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to electronic cigarettes. More specifically, the present invention relates to an electronic cigarette with an internal liquid reservoir.

Description of the Related Art

Electronic cigarettes have become increasingly popular in recent times. Electronic cigarettes emulate a tobacco cigarettes, but without the combustion of tobacco during use. Rather than burning tobacco, a liquid is atomized within the electronic cigarette, which emulates the smoke produced in a tobacco cigarette. The liquid may contain flavoring agents such as tobacco flavor, menthol, and others, to enhance the "smoking" experience of the electronic cigarette. Nicotine has been added to the atomization liquid in prior art electronic cigarettes. In certain prior art electronic cigarettes, a reserve of liquid is stored within the cigarette housing in a porous material, which is placed into contact with an atomizing assembly such that the liquid can be gradually transferred to the atomizing assembly during consumption. A replaceable cartridge with a liquid soaked porous material has been provided to enable consumers to replenish the supply of liquid as it is depleted during use by replacing the cartridge. It should be appreciated that the structural and electrical components in an electronic cigarette are durable and outlast, by a long measure, the period of consumption for the quantity of liquid provided in such a porous reservoir.

Consumers of electronic cigarettes are experienced at replacing the liquid reservoir cartridges as the liquid is depleted during consumption. In fact, it is common for consumers to carry spare cartridges so that they are readily available in the event their current cartridge becomes depleted. In fact, this arrangement can become somewhat tedious after a period of use, and there is a general desire on the marketplace to extend the duration of use between cartridge changes, or even the elimination of the need to ever change cartridges. Thus is can be appreciated that there is a need in the art for an apparatus for increasing the quantity of liquid stored within an electronic cigarette and other means to reduce the frequency of replacing or adding additional liquid during use.

SUMMARY OF THE INVENTION

The need in the art is addressed by the apparatus of the present invention. The present invention teaches an electronic cigarette apparatus including an elongated housing that has a mouthpiece with an aerosol outlet, and an atomizer disposed within an atomizing chamber. The atomizer selectively generates an aerosol of the liquid in response to suction pressure at the aerosol outlet. The atomizing chamber has an air inlet, an atomizer outlet coupled to the aerosol outlet, and a first wick aperture. A liquid reservoir is disposed within the elongated housing, which is sealably separated from the atomizing chamber. A wick disposed through the first wick aperture between the liquid reservoir and the atomizing chamber and it is configured to transfer the liquid by capillarity from the liquid reservoir to the atomizer.

In a specific embodiment, the foregoing apparatus further includes an inlet vent formed on the exterior of the elongated housing that is coupled to deliver air to the atomizing chamber air inlet. In a refinement to this embodiment, the inlet vent is coupled to the atomizing chamber air inlet by a conduit. In a further refinement, the conduit sealably passes through the liquid reservoir.

In a specific embodiment of the foregoing apparatus, the atomizer outlet and the aerosol outlet are coupled together by a chimney. In a refinement to this embodiment, the chimney sealably passes through the liquid reservoir.

In a specific embodiment of the foregoing apparatus, the atomizer is a resistive heating element. In a refinement to this embodiment, the wick is partially engages the resistive heating element.

In a specific embodiment of the foregoing apparatus, the atomizer has a tubular form defining an open central passage. In a refinement to this embodiment, the wick passes through the open central passage.

In a specific embodiment of the foregoing apparatus, the atomizing chamber further includes a second wick aperture, and the apparatus is arranged such that a first end of the wick passes through the first wick aperture and a second end of the wick passes through the second wick aperture.

In a specific embodiment of the foregoing apparatus, the wick is fabricated as a bundle of heat resistant fibers. In a refinement to this embodiment, the bundle of heat resistant fibers is fiberglass. In another refinement to this embodiment, the bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

In a specific embodiment of the foregoing apparatus, the liquid reservoir is formed as an annular cavity between the interior of the elongated housing and the atomizing chamber. In another specific embodiment of the foregoing apparatus, the liquid reservoir includes an external access opening, for enabling addition of liquid into the liquid reservoir. In a refinement to this embodiment, the external access opening is a removable mouthpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view drawing of an electronic cigarette according to an illustrative embodiment of the present invention.

FIGS. **2***a*, **2***b*, and **2***c* are a tip end view, a side view, and mouthpiece end view, respectively, drawings of an electronic cigarette according to an illustrative embodiment of the present invention.

FIGS. **3***a* and **3***b* are side view drawings, respectively, of a cartridge portion and a power supply portion of an electronic cigarette according to an illustrative embodiment of the present invention.

FIGS. **4***a*, **4***b*, and **4***c* are tip end view, side section view, and mouthpiece end view, respectively, drawings of an electronic cigarette according to an illustrative embodiment of the present invention.

FIGS. **5***a* and **5***b* are side section view drawings, respectively, of a cartridge portion and a power supply portion of an electronic cigarette according to an illustrative embodiment of the present invention.

FIG. **6** is a functional block diagram an electronic cigarette according to an illustrative embodiment of the present invention.

FIG. **7** is a detailed side section view drawing of a liquid reservoir cartridge according to an illustrative embodiment of the present invention.

FIG. **8** is an exploded view drawing of a liquid reservoir cartridge according to an illustrative embodiment of the present invention.

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FIG. **9** is a partially exploded section view drawing of a liquid reservoir cartridge according to an illustrative embodiment of the present invention.

FIG. **10** is a section view drawing of a liquid reservoir cartridge according to an illustrative embodiment of the present invention.

FIG. **11***a*, **11***b*, **11***c*, and **11***d* are a first end view, a first side section view, a second end view, and a second side section view drawing, respectively, of an atomizing assembly according to an illustrative embodiment of the present invention.

FIGS. **12***a*, **12***b*, and **12***c* are a first end view, a side section view, and a second end view drawing, respectively, of an atomizing chamber according to an illustrative embodiment of the present invention.

FIGS. **13***a*, **13***b*, and **13***c* are a first end view, a side section view, and a second end view drawing, respectively, of a mouthpiece housing according to an illustrative embodiment of the present invention.

DESCRIPTION OF THE INVENTION

Illustrative embodiments and exemplary applications will now be described with reference to the accompanying drawings to disclose the advantageous teachings of the present invention.

While the present invention is described herein with reference to illustrative embodiments for particular applications, it should be understood that the invention is not limited thereto. Those having ordinary skill in the art and access to the teachings provided herein will recognize additional modifications, applications, and embodiments within the scope hereof and additional fields in which the present invention would be of significant utility.

In considering the detailed embodiments of the present invention, it will be observed that the present invention resides primarily in combinations of steps to accomplish various methods or components to form various apparatus and systems. Accordingly, the apparatus and system components and method steps have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the present invention so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the disclosures contained herein.

In this disclosure, relational terms such as first and second, top and bottom, upper and lower, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms "comprises," "comprising," or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element proceeded by "comprises a" does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

The present invention advances the art of electronic cigarettes by teaching an electronic cigarette that provides a liquid reservoir, which effectively delivers liquid at the requisite rates from the reservoir to an atomizer in a open atomizing chamber. This arrangement enables production of aerosol of the liquid at desired rates of atomization without excessive liquid transfer during periods of non-use. This function is enabled though utilization of a wick aperture through the atomizing chamber and a wick disposed between the liquid reservoir and the atomizer. The wick enables the transfer of liquid by capillarity in a controlled manner without flooding the open atomization chamber.

Reference is directed to FIG. **1** is a perspective view drawing of an electronic cigarette **2** according to an illustrative embodiment of the present invention. The electronic cigarette **2** comprises a housing having a first elongated portion **10** and a second elongated portion **12**. The second elongated portion **12**, also referred to as the "cartridge" in certain illustrative embodiments, comprises a mouthpiece end **4**, which has an aerosol outlet (not shown) for drawing air through the cartridge **12**. The first elongated portion **10** and the second elongated portion **12** are removable joined together with a mechanical coupler **14**. One or more air inlet vents **16** are provided about the coupler **14** for allowing airflow into the cartridge **12** when the user draws air through the electronic cigarette **2**. The first elongated portion **10** comprises a tip end **6**, which in the illustrative embodiment, is fabricated from a translucent material enabling the transmission of light therethrough. Within the second elongated portion **12** is disposed a liquid reservoir (not fully shown). The liquid reservoir includes a clear or translucent window **13** to the exterior of the housing **12** for visually determining the liquid level **15** within the liquid reservoir.

Now, considering FIGS. **2***a*, **2***b*, and **2***c*, these are a tip end view, a side view, and mouthpiece end view, respectively, drawing of an electronic cigarette according to an illustrative embodiment of the present invention. Note that the first elongated portion **10** and second elongated portion **12** combine at coupler **14** to present a complete electronic cigarette **2** that closely resembles a tobacco cigarette. The cartridge **12** is fabricated with a finished material resembling the filter of a tobacco cigarette, and the first elongated portion **10** is fabricated to resemble the tobacco roll of a tobacco cigarette. As noted above, the cartridge **12** includes a window **13** for visually determining the liquid level of the internal liquid reservoir (not shown). The mouthpiece end **4** includes an aerosol outlet opening **5**, for drawing air and aerosol out of the cartridge **12**. Air is inlet to the electronic cigarette **2** at the vent openings **16** located at the coupler **14**. The air inlet openings **16** can be located elsewhere on the electronic cigarette **2**, and is a matter of design choice. In the illustrative embodiment, the tip end **6** is a translucent gray material resembling an ash.

Reference is directed to FIGS. **3***a* and **3***b*, which are side view drawings, respectively, of a cartridge portion **12** and a power supply portion **10** of an electronic cigarette according to an illustrative embodiment of the present invention. A threaded extension **20** on the power supply portion **10** of the housing threadably engages the mechanical coupler **14** on the cartridge portion **12**. In addition, as will be described more fully hereinafter, an electrical connection is also facilitated in the connection between the threaded extension **20** and the mechanical coupler **14**. The cartridge portion **12** can thusly be installed, uninstalled, and replaced as needed. The cartridge portion contains the liquid reservoir and the window **13** provides the visual cue as to the liquid remaining The tip end **4** can be removed in certain illustrative embodiments to facilitate the addition of liquid to the reservoir. The tip end **6** glow by light of an internal amber LED in response to suction pressure at the aerosol outlet **5**.

Reference is directed to FIGS. **4***a*, **4***b*, and **4***c*, which are tip end view, side section view, and mouthpiece end view, respectively, drawings of an electronic cigarette according to

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an illustrative embodiment of the present invention. Reference is additionally directed to FIGS. **5***a* and **5***b*, which are side section view drawings, respectively, of a cartridge portion and a power supply portion of an electronic cigarette correspond to this illustrative embodiment. FIGS. **4** and **5** correspond to the same illustrative embodiment and provide details of the internal structures of the illustrative embodiment. The tip end **4** is a resilient insert that engages the interior of the cartridge housing **12** and provides the aerosol outlet **5**, which is a passage formed therethrough. Within the cartridge housing **12** is an atomizing chamber **38** that has an open chimney **36** extending to the aerosol outlet **5**. The chimney **36** is located within the cartridge housing by a resilient seal **42**. The annular space formed between the interior of the cartridge housing **12** and the chimney **36** defines the liquid reservoir **43**. At the upper end, resilient seal **42** closes and seals the liquid reservoir **43**. The lower end of the reservoir **43** engages the atomizer assembly **28**, which will be more fully described hereinafter.

In FIGS. **4** and **5**, the atomizer assembly **28** include the atomizer **32**, which is disposed within the atomizer chamber **38**. In addition, the atomizer assembly **28** comprises the mechanical coupler **14** that engages the threaded extension **20** of the power supply portion **10**. Within the mechanical coupler **14**, and also a part of the atomizer assembly **28**, is an electrical coupler **22** that has an air inlet port **26** formed therethrough, which is pneumatically coupled into the atomizing chamber **38**. Thusly, the pathway for the flow of fresh air in and aerosol out includes air drawn through the mechanical coupler **14**, through the air inlet port **26**, to the atomizer **32** within the atomizing chamber **38**, up the chimney **36** and out the aerosol outlet **5**.

In FIGS. **4** and **5**, the power supply portion **10** of the housing has a threaded extension **20** that engages the mechanical coupler **14**. There is also a corresponding electrical connection such that the power supply portion **10** can deliver electric current to the atomizer **32** to facilitate generation of aerosol. Two conductors are provided, including the outer mechanical connection and the central pneumatic/electric connection. Suitable milling for air-flow channels is provided to facilitate solid mechanical, conductive electrical, and pneumatic connections. In the illustrative embodiment, power is derived from a storage battery **11**. A pressure sensor **48** detects negative pressure within the housing **10** and energizes the atomizer. The pressure sensor **46** is located by a pressure seal **50**. A draw circuit **52** provides the electrical operation functions. In addition, and amber LED **54** is disposed to illuminate through the translucent tip **6** to emulate burning ash while the draw pressure sensor **48** detects negative pressure.

Reference is directed to FIG. **6**, which is a functional block diagram an electronic cigarette according to an illustrative embodiment of the present invention. This diagram presents the electrical functions of the electronic cigarette. The battery **60** provides power to a draw circuit **70**. A pressure sensor **68** is disposed within the cigarette housing **68**. When negative pressure is detected, the draw circuit **70** delivers electric power to the atomizer **64** and the amber LED **72**. This action causes aerosol to be produced in the presence of the negative pressure, and the tip of the electronic cigarette to glow amber so long as the negative pressure continues. The atomizer **64** is electrically coupled to the circuit through electrical coupler **62**.

Reference is directed to FIG. **7**, which is a detailed side section view drawing of a liquid reservoir cartridge according to an illustrative embodiment of the present invention. This drawing provides further details into the structure and operation of the liquid reservoir cartridge assembly. The cartridge comprises an outer housing **12** that is closed at the upper end by the tip end resilient insert **4**, which has the aerosol port **5** formed therethrough. The lower end of the housing **12** is closed with the atomizer assembly **28**, which has the mechanical coupler **14** at the extreme end. Plural air inlet vents **16** are formed though the mechanical coupler so that fresh air can enter while it is secured to the power supply housing. Within the cartridge housing **12** is the atomizing chamber **38** that is pneumatically coupled to the chimney **36**, which is aligned with the aerosol outlet **5**. The chimney **36** is located and sealed at the upper end by resilient seal **42**. The annular space **43** between the chimney **36** and the interior of the housing **12** defines the liquid reservoir **43**. Note that there is a thinner annular cavity **39** formed between the exterior of the atomizing chamber **38** and interior of the cartridge housing **12**. The fluid **44** is stored in the fluid reservoir **43**, and is also capable of flowing into the annular cavity **39** to saturate wick **37**.

In FIG. **7**, the atomizing assembly **28** is comprised of several components. The atomizer **32** is a coiled nickel-chromium heater through which the wick **37** passes. The wick **37** passes through wick apertures in the atomizing chamber (not shown) on its two ends, and into the annular cavity **39**. The atomizer assembly **28** is machined from a suitable metal and includes the mechanical couple **14**, the electrical coupler **22**, which is supported by an insulative support **24**, and which has the air inlet port **26** formed therethrough. During operation, when there is a negative pressure imposed on the system by drawing air out of the aerosol outlet **5**, and while electric current is delivered to the atomizer **36**, air enters the air inlet port **26** and carries aerosol of the liquid **46** away from the atomizer **32**, up the chimney **36** and out the aerosol outlet **5**. As the liquid in the wick **37** is depleted by the atomizer **32**, capillary action draws additional liquid from the liquid reservoir **43**, through the cavity **39** and to the atomizer **32**.

Reference is directed to FIG. **8**, which is an exploded view drawing of an atomizer **28**, atomizing chamber **38**, chimney **36** and resilient seal **42** according to an illustrative embodiment of the present invention. In the illustrative embodiment, the atomizing chamber **38** and chimney **36** are formed as a single unit. The resilient seal **42** is a donut shaped polymeric material that is pressed onto the upper end of the chimney **36**. The atomizing chamber **38** includes a pair of opposing wick apertures **40** formed therein, which provide clearance for the wick **37** to pass into the atomizing chamber **38**. The atomizing assembly **28** includes the mechanical coupler **14** at its lower end and the atomizer **32** at its upper end. The wick **37** passes through the center of the atomizer **32**. The atomizing assembly has a pair of semicircular recesses **30** formed therein which align cooperatively with the wick apertures **40** in the atomizing chamber when the two units are engaged. This results in a circular aperture through which the wick **37** passes with a slightly compressive fit. This arrangement enables liquid to pass through by capillarity of the wick **37**, but prevents the liquid from flooding the atomizing chamber **38**, which would be detrimental or atomizer function.

Reference is directed to FIG. **9**, which is a partially exploded side section view drawing, and to FIG. **10**, which is an assembled side section view drawing, of a liquid reservoir cartridge according to an illustrative embodiment of the present invention. The wick **37** passes through the atomizer **32** and extends to the outer periphery of the atomizer assembly **28**. The atomizing chamber **38** is engaged with the atomizing assembly **28**, thereby perfecting

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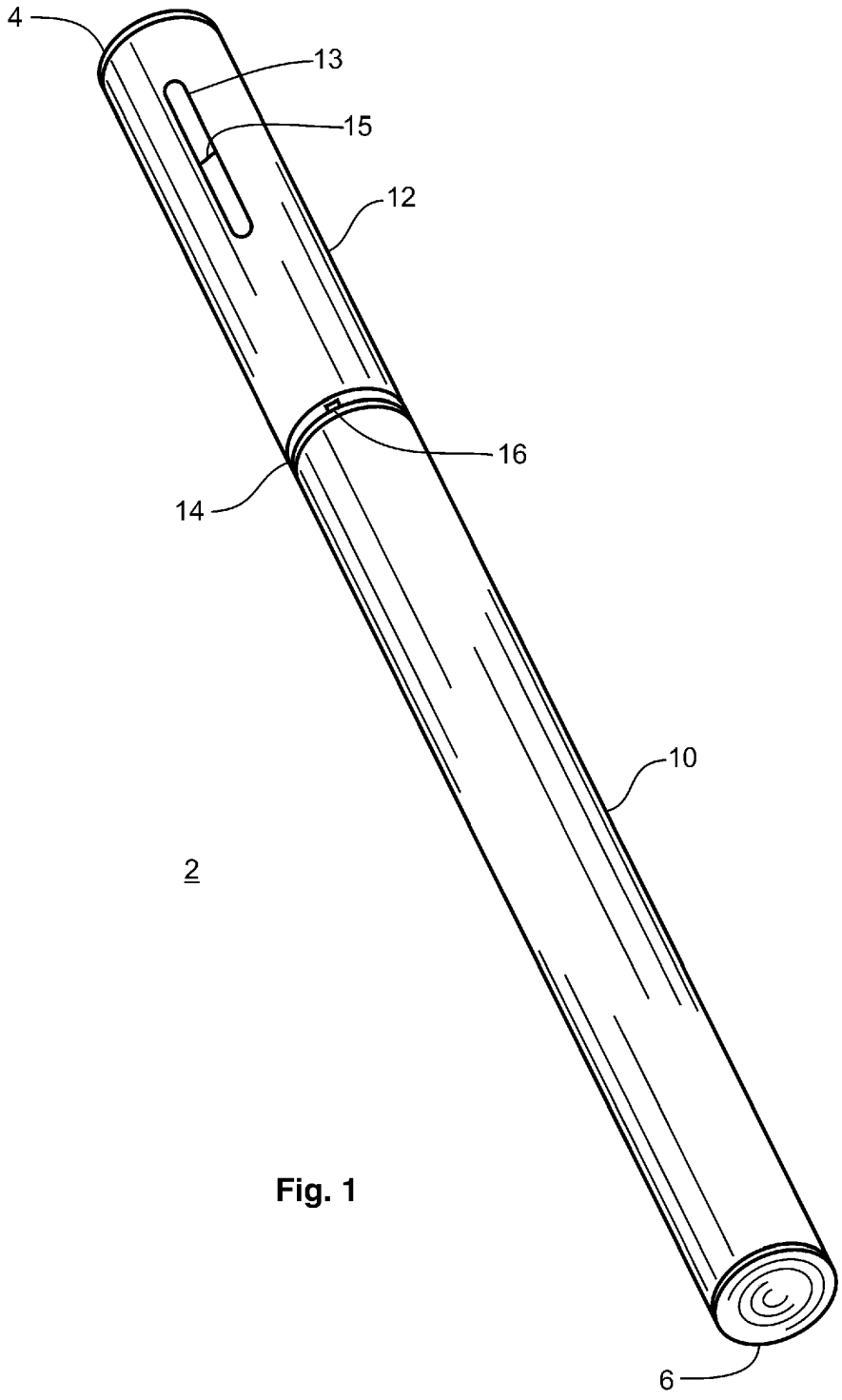


Fig. 1

Fig. 2c



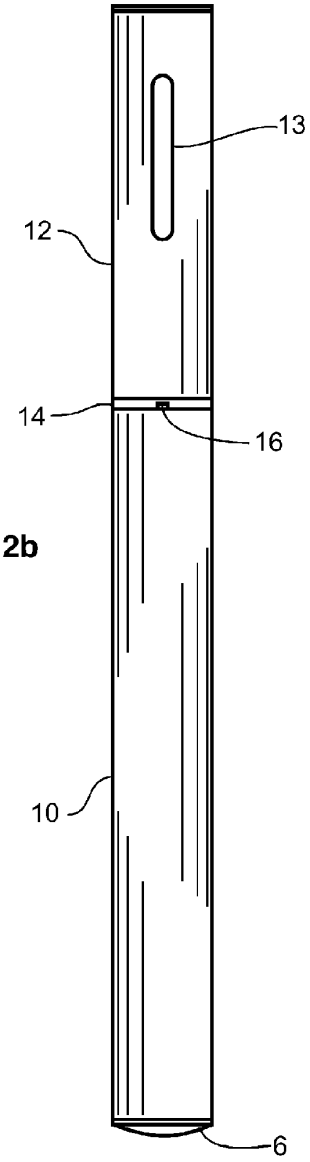


Fig. 2b



Fig. 2a

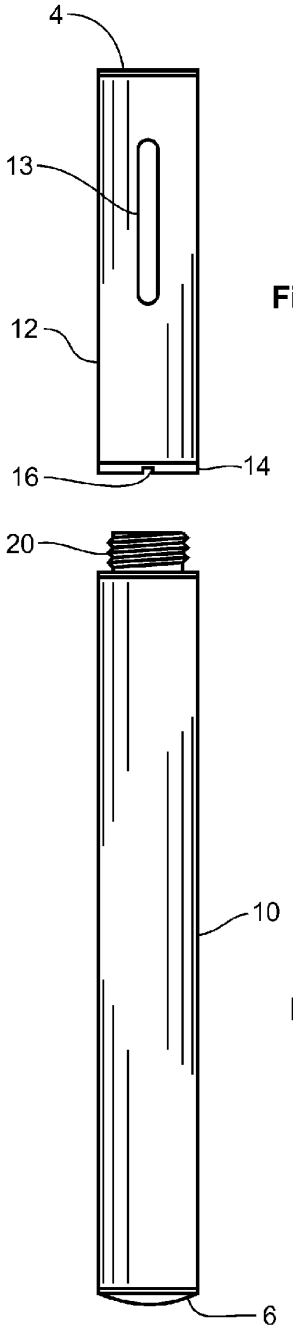


Fig. 3b

Fig. 3a

Fig. 4c

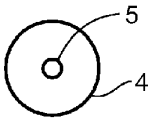


Fig. 4b

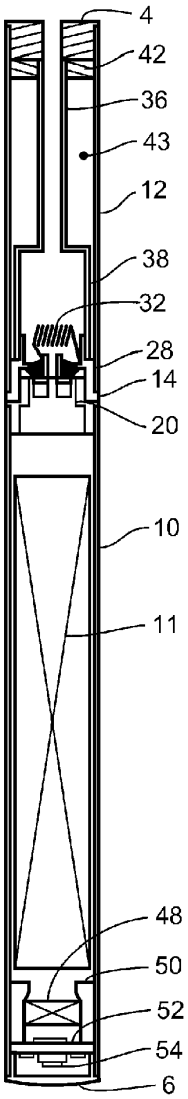


Fig. 4a



Fig. 5b

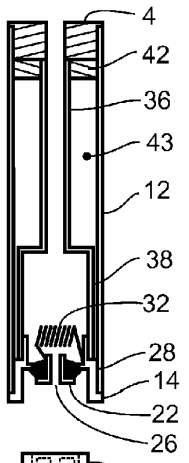
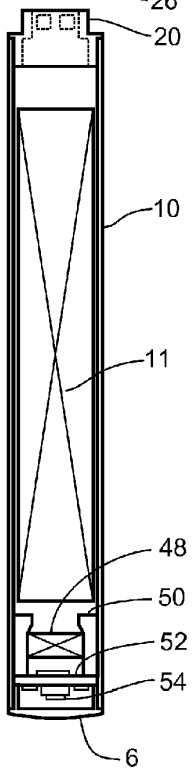


Fig. 5a



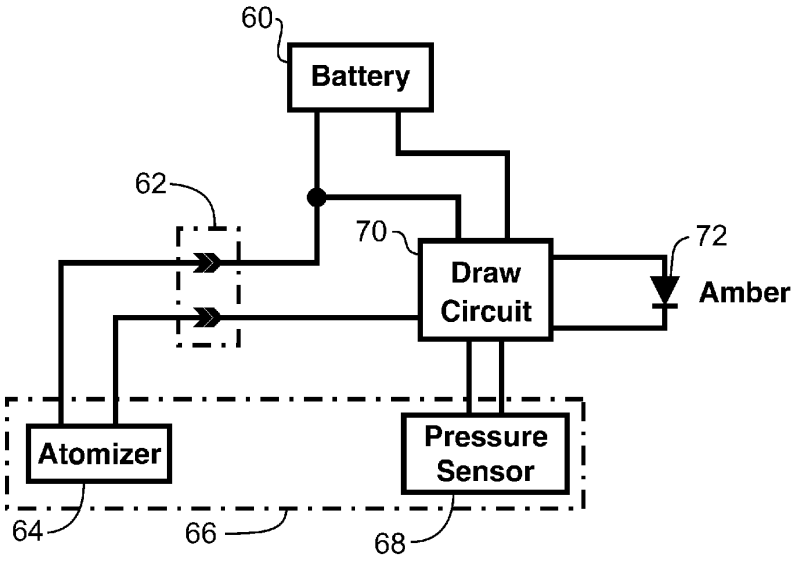

60
Battery
62
70
72
Draw
Circuit
Amber
Atomizer
Pressure
Sensor
64
66
68

Fig. 6

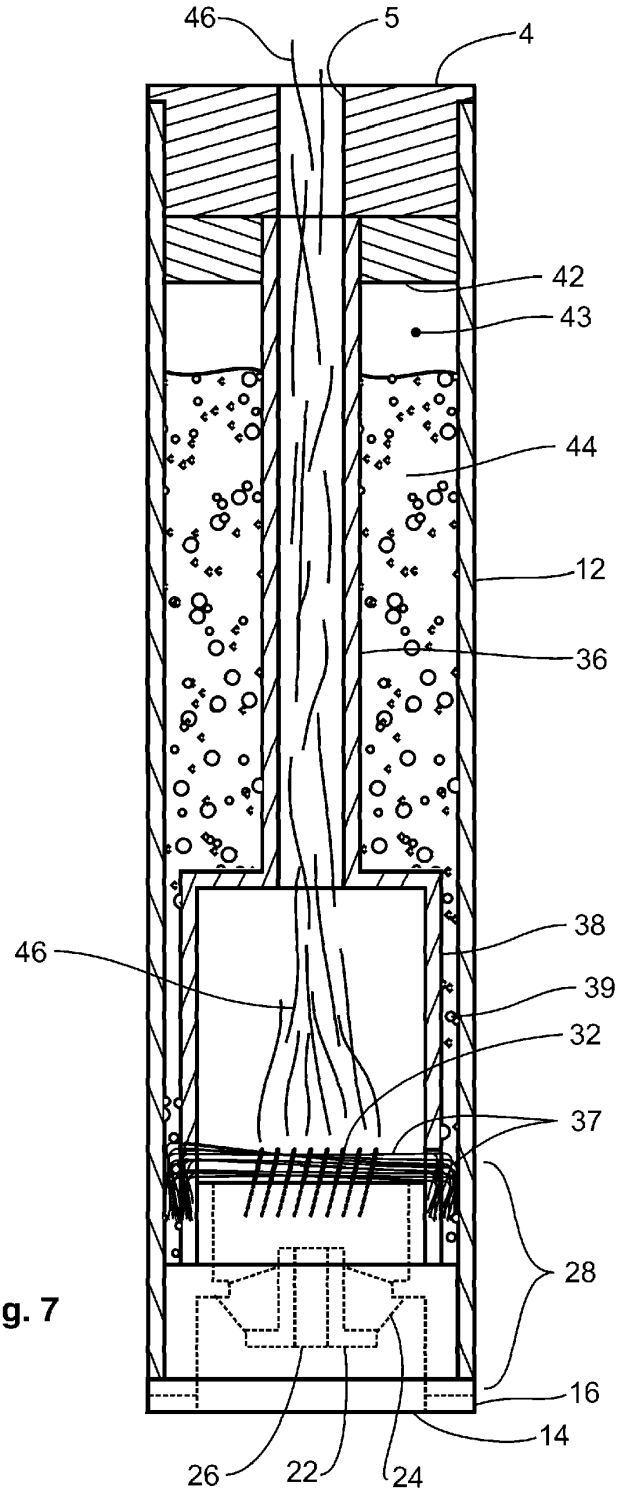


Fig. 7

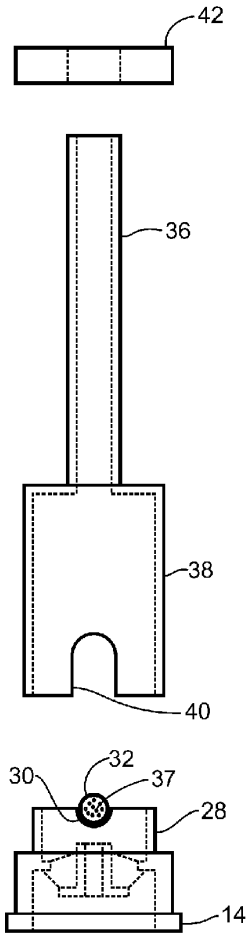


Fig. 8

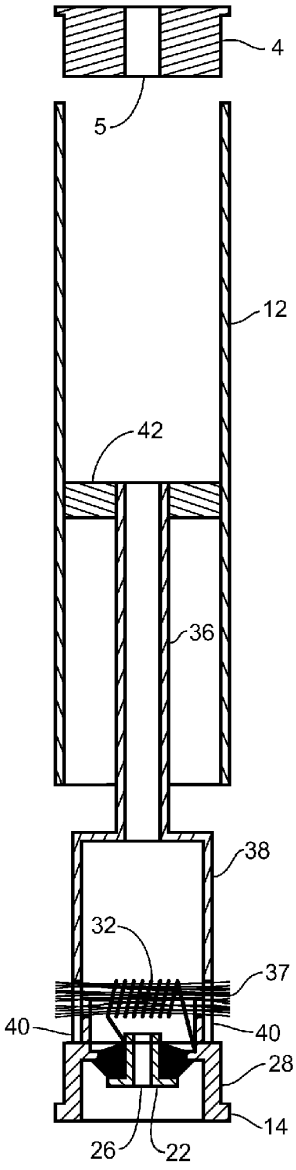


Fig. 9

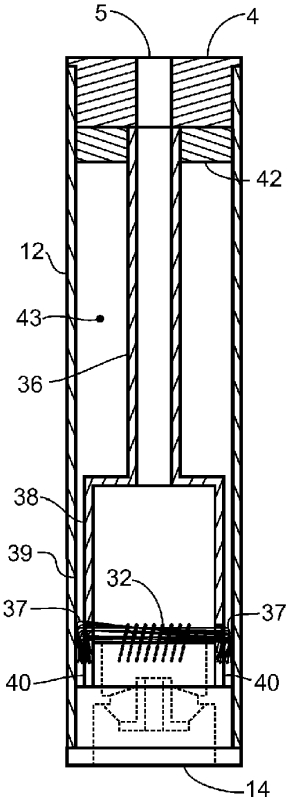


Fig. 10

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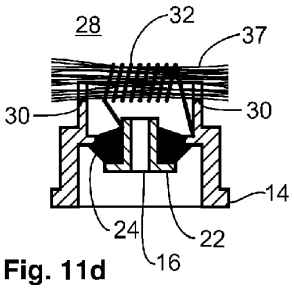


Fig. 11d

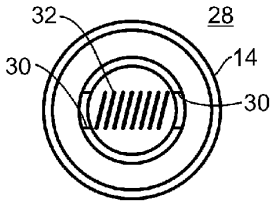


Fig. 11c

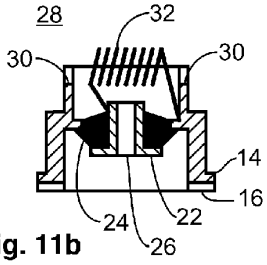


Fig. 11b

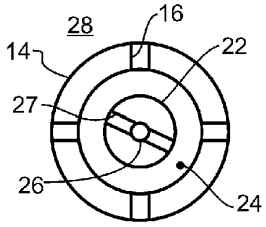


Fig. 11a

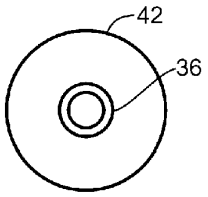


Fig. 12c

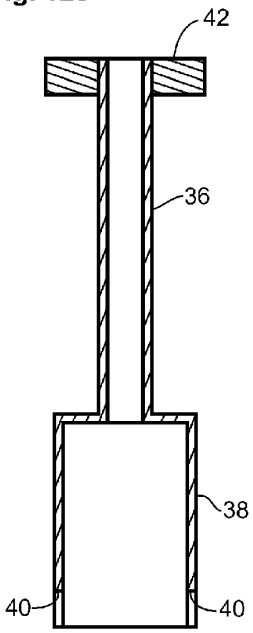


Fig. 12b

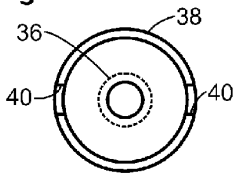


Fig. 12a

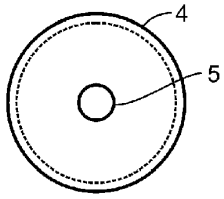


Fig. 13c

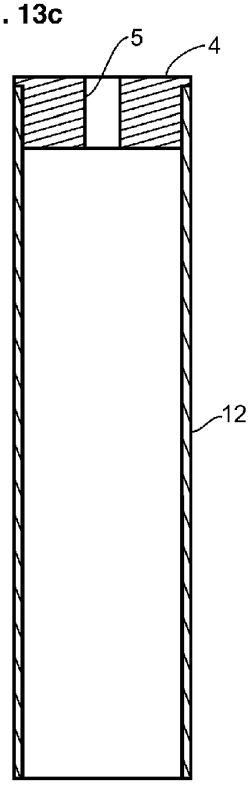


Fig. 13b

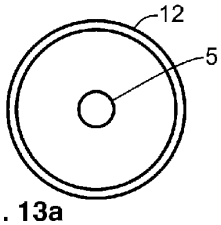


Fig. 13a

US009596887B2

(12) **United States Patent**
Newton

(10) **Patent No.: US 9,596,887 B2**
(45) **Date of Patent: *Mar. 21, 2017**

(54) **ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR**

(71) Applicant: **Kyle D. Newton**, Colleyville, TX (US)

(72) Inventor: **Kyle D. Newton**, Colleyville, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 547 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/219,426**

(22) Filed: **Mar. 19, 2014**

(65) **Prior Publication Data**

US 2015/0034108 A1 Feb. 5, 2015

Related U.S. Application Data

(63) Continuation of application No. 13/955,153, filed on Jul. 31, 2013, now Pat. No. 8,707,965.

(51) **Int. Cl.**
A24F 47/00 (2006.01)
A61M 15/06 (2006.01)

(52) **U.S. Cl.**
CPC ***A24F 47/008*** (2013.01); ***A61M 15/06*** (2013.01)

(58) **Field of Classification Search**
CPC A24F 47/008; A61M 15/06
See application file for complete search history.

(56) **References Cited**

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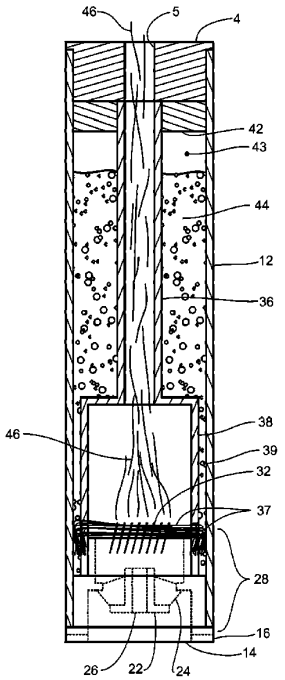
* cited by examiner

Primary Examiner — Michael H Wilson
Assistant Examiner — Eric Yaary
(74) *Attorney, Agent, or Firm* — Dan Brown Law Office; Daniel R. Brown

(57) **ABSTRACT**

An electronic cigarette including an housing that has a mouthpiece with an aerosol outlet, and an atomizer disposed within an atomizing chamber. The atomizer selectively generates an aerosol of the liquid in response to suction pressure at the aerosol outlet. The atomizing chamber has an air inlet, an atomizer outlet coupled to the aerosol outlet, and a first wick aperture. A liquid reservoir is disposed within the housing, which is sealably separated from the atomizing chamber. A wick disposed through the first wick aperture between the liquid reservoir and the atomizing chamber and it is configured to transfer the liquid by capillarity from the liquid reservoir to the atomizer.

16 Claims, 7 Drawing Sheets



NJOY Exhibit 1002.015

Doc Code: REIS.DECL

Document Description: Reissue Declaration Filed In Accordance With MPEP 1414

PTO/AIA/05 (06-12)

Approved for use through 01/31/2020. OMB 0651-0033

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REISSUE APPLICATION DECLARATION BY THE INVENTOR	Docket Number (Optional) 38802-0004RE1

I hereby declare that:
Each inventor's residence and mailing address are stated below next to their name.
I believe I am the original inventor or an original joint inventor of the subject matter which is described and claimed in patent number US 9,596,887, granted March 21, 2017 and for which a reissue patent is sought on the invention titled ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR,

the specification of which

☒ is attached hereto.

☐ was filed on _____ as reissue application number _____

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

I believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☒ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

At least one error upon which reissue is based is described below. If the reissue is a broadening reissue, a claim that the application seeks to broaden must be identified:

This application is a broadening reissue.

The original patent is partly inoperative because it claims less than the patentee is entitled to claim. The claim scope of US 9,596,887 is broadened by the addition of claim 17, which is directed to a method. US 9,596,887 includes only claims directed to an electronic cigarette cartridge apparatus, and does not include any method claims. At least original claim 1 is broadened by the addition of new method claim 17 for at least the reason that original claim 1 is not a method claim, and for at least the additional reason that new independent method claim 17 does not require "a housing having a mouthpiece", "an atomizer", nor "a first wick aperture."

This collection of information is required by 37 CFR 1.175. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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(REISSUE APPLICATION DECLARATION BY THE INVENTOR, page 2)	Docket Number (Optional) 38802-0004RE1

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Legal name of sole or first inventor (*E.g.*, Given Name (first and middle (if any) and Family Name or Surname)
Kyle D. Newton

Inventor's Signature	Date (Optional) March 18, 2019

Residence: City	State	Country
Southlake	TX	United States

Mailing Address
525 Commerce St., Suite 100
Southlake, TX 76092

City	State	Zip	Country
Southlake	TX	76092	United States

☐ Additional joint inventors are named on the _____ supplemental sheet(s) PTO/AIA/10 attached hereto.

NJOY Exhibit 1002.017

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The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.,* GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT	Docket Number (Optional) 38802-0004RE1

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s)
Kyle D. Newton

Patent Number US 9,596,887	Date Patent Issued March 21, 2017

Title of Invention
ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

1. ☒ Filed herein is a statement under 37 CFR 3.73(c). (Form PTO/AIA/96)

2. ☐ Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee."

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are VAPETECH, LLC, and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)
VAPETECH, LLC

Signature	Date March 18, 2019

Typed or printed name and title of person signing for assignee (if assigned)

Kyle D. Newton
Director, Vapetech, LLC

This collection of information is required by 37 CFR 1.172. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: VAPETECH, LLC

Application No./Patent No.: _____ Filed/Issue Date: _____

Titled: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

VAPETECH, LLC, a Texas Limited Liability Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of the option 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of the options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Kyle D. Newton To: The Newton Living Trust 2009
The document was recorded in the United States Patent and Trademark Office **on August 21, 2014,** at Reel **033580**, Frame **0146**, or for which a copy thereof is attached.

2. From: The Newton Living Trust 2009 To: VAPETECH, LLC
The document was recorded in the United States Patent and Trademark Office **on December 30, 2014,** at Reel **034602**, Frame **0166**, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

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5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

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6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy *(i.e.,* a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Kary Yergler/	20 March 2019
Signature	Date
Kary Yergler	71,612
Printed or Typed Name	Title or Registration Number

NJOY Exhibit 1002.021

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

Application Number	
Filing Date	
First Named Inventor	Kyle D. Newton
Title	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
Art Unit	
Examiner Name	
Attorney Docket Number	38802-0004RE1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Kary Yergler/	Date (Optional)	
Name	Kary Yergler	Registration Number	71,612
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on the Transmittal.)

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter, which may be an application filed after the date of this power of attorney, or identified above:

26191

OR

☐ I hereby appoint Practitioner(s) named in the attached list as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter, which may be an application filed after the date of this power of attorney, or identified above.

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☐ The address associated with the above-mentioned Customer Number

OR

☒ The address associated with Customer Number: **26191**

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

VAPETECH, LLC

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	March 18, 2019
Name	Kyle D. Newton		
Title	Director, Vapetech, LLC		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

91326749.doc

REMARKS

This is a preliminary amendment that accompanies a reissue application based on U.S. Patent No. 9,596,887. The following remarks are made pursuant to 37 C.F.R. §1.172.

Paragraph (63) on the cover page of the patent regarding "Related U.S. Application Data" has been amended to correct the claim of benefit of the patent. The Application Data Sheet (ADS) submitted herewith incorporates the correction to the claim of benefit, as described above.

Claims 1-16 are the original claims of the patent. Claims 17-40 have been added. As a result, claims 1-40 are pending for reissue examination, of which claims 1 and 17 are independent. No new matter has been added with these added claims. Applicant asks that all claims be examined in view of these amendments to the claims.

Support for the new claims can be found throughout the specification and drawings of U.S. Patent No. 9,596,887. For example, support for new claim 17 can be found at least in original claim 1, Abstract, col. 3 line 61-col. 4 line 6, col. 6 lines 9-19, and Figs. 7-10 and their corresponding textual description.

Support for new claims 18-19 can be found at least in original claim 1, Abstract, col. 3 line 61-col. 4 line 6, col. 6 lines 13-19, and Figs. 7-10 and their corresponding textual description.

Support for new claims 20 and 21 can be found at least in col. 7 lines 13-21, and Figs. 6-10 and their corresponding textual description.

Support for new claims 22-27 can be found at least in original claim 1, col. 3 line 61-col. 4 line 6, col. 6 lines 13-19, col. 6 lines 50-59, and Figs. 7-10, 11a-12b, and their corresponding textual description.

Support for new claims 28-30 can be found at least in original claim 1, col. 1 lines 58-60, col. 7 lines 7-8 and 18-21, and Figs. 7-10 and their corresponding textual description.

Support for new claim 31-32 can be found at least in col. 7 lines 49-50, and Figs. 7-10, 12a-12b, and their corresponding textual description.

Support for new claim 33 can be found at least in col. 6 lines 41-43, col. 7 lines 47-50, and Figs. 7, 8, and 12b and their corresponding textual description.

Support for new claim 34 can be found at least in col. 4 lines 25-27 and 38-40, col. 7 lines 56-64, Figs. 1, 2b, and 3b, and their corresponding textual description.

Support for new claim 35 can be found at least in original claim 1, Abstract, col 5 lines 8-12, and Figs. 4b, 5b, 7, 9, 10, and 13b, and their corresponding textual description.

Support for new claims 36-38 can be found at least in col. 4 lines 62-64, col. 5 lines 43-50 and 55-63, and Figs. 1, 2a-2b, 3a, 4a-4b, 5a, and 6, and the corresponding textual description thereof.

Support for new claims 39-40 can be found at least in original claim 1, col. 1 lines 58-60, col. 7 lines 7-8 and 18-21 and 49-50, and Figs. 7-10, 12a-12b, and their corresponding textual description.

The excess claims fees for the additional claims are being paid via EFS herewith. The Commissioner is hereby authorized to charge any deficiencies or other necessary fees, or credit any overpayments to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: 20 March 2019

/Kary Yergler/

Kary Yergler
Reg. No. 71,612

Customer Number 26191
Fish & Richardson P.C.
Telephone: (214) 292-4036
Facsimile: (877) 769-7945

91327464.doc

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of the liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber, and

a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

2. The apparatus of claim 1, further comprising:

an inlet vent formed on the exterior of said housing and coupled to deliver air to said atomizing chamber air inlet.

3. The apparatus of claim 2, and wherein said inlet vent is coupled to said atomizing chamber air inlet by a conduit.

4. The apparatus of claim 3, and wherein said conduit sealably passes through said liquid reservoir.

5. The apparatus of claim 1, and wherein said chimney sealably passes through said liquid reservoir.

6. The apparatus of claim 1, and wherein said atomizer is a resistive heating element.

7. The apparatus of claim 6, and wherein said wick is partially engages said resistive heating element.

8. The apparatus of claim 1, and wherein said atomizer has a tubular form defining an open central passage.

9. The apparatus of claim 8, and wherein said wick passes through said open central passage.

10. The apparatus of claim 1, and wherein said atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture.

11. The apparatus of claim 1, and wherein said wick is fabricated as a bundle of heat resistant fibers.

12. The apparatus of claim 11, and wherein said bundle of heat resistant fibers is fiberglass.

13. The apparatus of claim 11, and wherein said bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

14. The apparatus of claim 1, and wherein said liquid reservoir is formed as an annular cavity between the interior of said housing and said atomizing chamber.

15. The apparatus of claim 1, and wherein said liquid reservoir includes an external access opening, for enabling addition of liquid into said liquid reservoir.

16. The apparatus of claim 15, and wherein said external access opening is a removable mouthpiece.

17. (New) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the atomizing chamber, the liquid reservoir being sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

18. (New) The method of claim 17, where the liquid reservoir is without a porous material for storing the liquid.

19. (New) The method of claim 17, wherein transferring liquid from a liquid reservoir to an atomizing chamber with a wick comprises transferring the liquid by capillarity with the wick.

20. (New) The method of claim 17, wherein generating an aerosol of the liquid comprises generating aerosol with an electrically powered atomizer in the atomizing chamber.

21. (New) The method of claim 17, wherein channeling the aerosol with a chimney comprises channeling the aerosol with the chimney through the liquid reservoir, the chimney being sealed from the liquid reservoir.

22. (New) The apparatus of claim 1, wherein the wick extends between the liquid reservoir and an interior of the atomizing chamber.

23. (New) The apparatus of claim 1, wherein the liquid reservoir adjacent the wick is free from porous material.

24. (New) The apparatus of claim 1, wherein the first wick aperture is circular.

25. (New) The apparatus of claim 1, comprising an atomizing assembly comprising a body and the atomizer, the atomizing assembly comprising a first recess formed therein that aligns with the first wick aperture in the atomizing chamber and provides a compressive fit around the wick.

26. (New) The apparatus of claim 25, where the first wick aperture and the first recess cooperate to define a circular aperture.

27. (New) The apparatus of claim 10, wherein the first wick aperture and the second wick aperture each comprise a fixed width slot terminating in a curved end, the fixed width configured to receive the wick.

28. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber.

29. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet.

30. (New) The apparatus of claim 1, wherein the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

31. (New) The apparatus of claim 1, wherein the chimney and atomizing chamber are cylindrical and the maximum exterior diameter of the chimney is less than the maximum interior diameter of the atomizing chamber.

32. (New) The apparatus of claim 1, wherein the apparatus is elongate, and the maximum transverse exterior dimension of the chimney is less than the maximum transverse interior diameter of the atomizing chamber.

33. (New) The apparatus of claim 1, wherein the atomizing chamber and the chimney are formed as a single unit.

34. (New) The apparatus of claim 1, wherein the housing comprises a transparent material through which the liquid in the liquid reservoir can be viewed from the exterior of the apparatus.

35. (New) The apparatus of claim 1, comprising an insert in the housing, the insert comprising the aerosol outlet.

36. (New) The apparatus of claim 1 coupled to a power supply portion, wherein the power supply portion comprises a pressure sensor configured to detect negative pressure within the power supply portion and energize the atomizer.

37. (New) The apparatus of claim 36, wherein the power supply portion comprises an LED positioned at a tip end of the power supply portion, the LED configured to illuminate in response to the pressure sensor detecting negative pressure in the power supply portion.

38. (New) The apparatus of claim 37, wherein the LED comprises an amber LED configured to emulate burning ash when illuminated.

39. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet, the chimney and atomizing chamber are cylindrical, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

40. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber, the atomizing chamber and the chimney are formed

as a single unit, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

Amendments to the Specification:

Please replace paragraph (63) on the patent cover sheet and titled "Related U.S. Application Data" with the following amended paragraph:

Continuation of application No. 13/955,153, filed on Jul. 31, 2013, now Pat. No. 8,707,965, which is a continuation of application No. 13/157,024, filed on Jun. 28, 2011, now Pat. No. 8,528,569.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Kyle D. Newton	Art Unit	:	Unknown
Application No.	:	To be assigned	Examiner	:	Unknown
Filed	:	Herewith			
Title	:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT FOR REISSUE APPLICATION

Reissue of U.S. Patent No. 9,596,887 is respectfully requested. Prior to examination, please amend the application as indicated on the following pages.

PTO/AIA/14 (11-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kyle	D.	Newton	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Southlake	TX	US

Mailing Address of Inventor:

Address 1	525 Commerce St., Suite 100
Address 2	

City	State/Province	Postal Code	Country
Southlake	TX	76092	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	26191		
Email Address	apsi@fr.com	Add Email	Remove Email

Application Information:

Title of the Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR		
Attorney Docket Number	38802-0004RE1	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	7	**Suggested Figure for Publication (if any)**	

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	◯ Limited Recognition (37 CFR 11.9)
Customer Number	26191		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	reissued of	14219426	2014-03-19	9596887	2017-03-21

NJOY Exhibit 1002.035

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14219426	Continuation of	13955153	2013-07-31	8707965	2014-04-29

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13955153	Continuation of	13157024	2011-06-28	8528569	2013-09-10

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. — Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. — Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

NJOY Exhibit 1002.036

PTO/AIA/14 (11-15)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

NJOY Exhibit 1002.037

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	VAPETECH, LLC		
Mailing Address Information For Applicant:			
Address 1	525 Commerce Street 57 Stage Coach Road Fort Wor		
Address 2			
City	Fort Worth	**State/Province**	TX
Country	US	Postal Code	76244
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Kary Yergler/			Date (YYYY-MM-DD)	2019-03-20
First Name	Kary	Last Name	Yergler	Registration Number	71612

Additional Signature may be generated within this form by selecting the Add button. Add

NJOY Exhibit 1002.039

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	38802-0004RE1
	Application Number	
Title of Invention	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

NJOY Exhibit 1002.041

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Filer:	Kary Jacob Yergler/Candice Rockett
Attorney Docket Number:	38802-0004RE1

Filed as Small Entity

Filing Fees for Reissue (Utility)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY REISSUE BASIC	2014	1	150	150
REISSUE OR REISSUE DESIGN CPA SEARCH FEE	2114	1	330	330
REISSUE OR REISSUE DESIGN CPA EXAM. FEE	2314	1	1100	1100
Pages:				
Claims:				
REISSUE CLAIMS IN EXCESS OF 20 FOR SMALL	2205	20	50	1000
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		2580

Electronic Acknowledgement Receipt	
EFS ID:	35485159
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	26191
Filer:	Kary Jacob Yergler/Denise Siede
Filer Authorized By:	Kary Jacob Yergler
Attorney Docket Number:	38802-0004RE1
Receipt Date:	20-MAR-2019
Filing Date:	
Time Stamp:	20:51:25
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2580
RAM confirmation Number	032119INTEFSW00006306061050
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Reissue Application	38802-0004RE1-REISSUE-TRANSMITTAL-1.pdf	216997 9bcfed1b7b99083491b531bc56207c9efdf239d1	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	38802-0004RE1-REISSUE-FEE-TRANSMITTAL.pdf	94605 c05c9dd61285a362ef2e993d0ae32fc437b0dff9	no	1
Warnings:					
Information:					
3		38802-0004RE1-Patent-to-Reissue.pdf	636907 7aea9bc437c6651c38906f59b1127b5ae9a932c0	yes	12

Multipart Description/PDF files in .zip description

Document Description	Start	End
Claims	12	12
Specification	9	11
Drawings-only black and white line drawings	2	8
Specification	1	1

Warnings:					
Information:					
4	Reissue dec filed in accordance with MPEP 1414	38802-0004RE1-Reissue-OathDEC-PTOAIA-05.pdf	226593 d2ff0aec0ea410feb57d733c8b7ab6481a3b8d51	no	3
Warnings:					
Information:					

NJOY Exhibit 1002.045

5	Consent of Assignee accompanying the declaration	38802-0004RE1-WrittenConsent-ofASSIGNEE-PTOAIA-53.pdf	185870 e67dc9d67fa0caaf00df7b8e38f90b18503238a2	no	1
Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73	38802-0004RE1-STMT-UNDER373c.pdf	93037 88fd6bdccd48d5f559a404aaa8acfba3fab98232	no	2
Warnings:					
Information:					
7	Power of Attorney	38802-0004RE1-POA-2-executed.pdf	97908 52bb3a3c3cc743b8e79df6d3863b128e938b78c1	no	2
Warnings:					
Information:					
8		38802-0004RE1-PRELIM-AMENDMENT-10.pdf	68370 81e8b398bb14c3977c2bf1453dc0906fb81355b6	yes	10

Multipart Description/PDF files in .zip description

Document Description	Start	End
Applicant Arguments/Remarks Made in an Amendment	9	10
Claims	3	8
Specification	2	2
Preliminary Amendment	1	1

Warnings:					
Information:					
9	Application Data Sheet	38802-0004RE1-ADS-8-updated.pdf	1822767 c6f39cc276d3a3127f9b8010ec28bbd9378e6cc6	no	8
Warnings:					
Information:					

10	Fee Worksheet (SB06)	fee-info.pdf	37113 464b3f9c98c4f47f4035ff83323eb805f044c3b5	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	3480167	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/359,938

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	150		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	1100		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	40 minus 20 =	* 20	x 50 =	1000	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 230 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	2580		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

NJOY Exhibit 1002.048

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/359,938	03/20/2019	1747	2580	38802-0004RE1	40	2

CONFIRMATION NO. 6916

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

FILING RECEIPT



Date Mailed: 03/22/2019

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Kyle D. Newton, Southlake, TX;

Applicant(s)

Vapetech, LLC, Fort Worth, TX, Assignee (with 37 CFR 1.172 Interest);

Assignment For Published Patent Application

Vapetech, LLC, Fort Worth, TX

Power of Attorney: The patent practitioners associated with Customer Number 26191

Domestic Priority data as claimed by applicant

This application is a REI of 14/219,426 03/19/2014 PAT 9596887
which is a CON of 13/955,153 07/31/2013 PAT 8707965
which is a CON of 13/157,024 06/28/2011 PAT 8528569

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

NJOY Exhibit 1002.049

If Required, Foreign Filing License Granted: 03/21/2019

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/359,938**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

Preliminary Class

131

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

NJOY Exhibit 1002.050

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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NJOY Exhibit 1002.051

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

Substitute for Form PTO-1360
(For use with Form PTO/SB/06)

Application Number	Filing Date
16359938	

Applicant(s) Kyle Newton

* May be used for additional claims or amendments

CLAIMS	AS FILED		AFTER FIRST AMENDMENT		AFTER SECOND AMENDMENT	
	Indep	Depend	Indep	Depend	Indep	Depend
1	1					
2		1				
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Total Depend	38	↵	0	↵	0	↵
Total Claims	40		0		0	

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NJOY Exhibit 1002.052

To: PATDOCTC@fr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 26191

Mar 22, 2019 04:14:20 AM

Dear PAIR Customer:

FISH & RICHARDSON P.C. (TC)
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UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 26191 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
16359938	APP.FILE.REC	03/22/2019	38802-0004RE1

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

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Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Litigation Search Report CRU 3999

Reissue Application No.: 16/359,338

TO: Jean Witz
Location: CRU
Art Unit: 3991
Date: April 16, 2019

U.S. Patent Number: 9,596,887

From: Patricia Martin
Paralegal Specialist
Location: CRU 3999
Phone: (571) 272-7705

Search Notes

1) I performed a search on the patent in Lexis Court Link for any open dockets or closed cases.

2) I performed a Key Cite Search in Westlaw, which retrieves all history on the patent including any litigation.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

No Litigation was found

Citing References (20)

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**1.** APPARATUS FOR IMPLEMENTING CARTRIDGE OF ELECTRONIC CIGARETTE, HAS WICK THAT IS POSITIONED THROUGH RESPECTIVE WICK APERTURE BETWEEN LIQUID RESERVOIR AND ATOMIZING CHAMBER TO TRANSFER LIQUID BY CAPILLARITY FROM RESERVOIR TO ATOMIZER Out Of Plan DWPI 2015-10643D	July 31, 2013	DWPI	—	—
—	**2.** RF 034602/0166 Out Of Plan	Dec. 30, 2014	Assignments	—	—
—	**3.** RF 033580/0146 Out Of Plan	Aug. 21, 2014	Assignments	—	—
—	**4.** DEVICES FOR VAPORIZATION OF A SUBSTANCE Out Of Plan US PAT 10244793 , U.S. PTO Utility Devices for generating and releasing vapor. In particular, described herein are portable devices for generating a low-temperature inhalable vapor having an elongated tubular body...	Apr. 02, 2019	Patents	—	—
—	**5.** VAPORIZER CARTRIDGE Out Of Plan US PAT D842536 , U.S. PTO Design	Mar. 05, 2019	Patents	—	—
—	**6.** CARTRIDGE FOR USE WITH A VAPORIZER DEVICE Out Of Plan US PAT 10201190 , U.S. PTO Utility Apparatuses including vaporizer device bodies and cartridges are provided. In some implementations, an apparatus includes a cartridge and a body. The cartridge comprises a storage...	Feb. 12, 2019	Patents	—	—
—	**7.** CHARGING DEVICE Out Of Plan US PAT D836541 , U.S. PTO Design	Dec. 25, 2018	Patents	—	—
—	**8.** CARTRIDGE FOR USE WITH A VAPORIZER DEVICE Out Of Plan US PAT 10159282 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for a vaporizer device comprises an elongate and flattened storage compartment configured to...	Dec. 25, 2018	Patents	—	—
—	**9.** VAPORIZATION DEVICE SYSTEMS AND METHODS Out Of Plan US PAT 10117465 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for use with a vaporization device comprises a wick, a resistive heating element in contact...	Nov. 06, 2018	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**10. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10117466 , U.S. PTO Utility Vaporization devices and methods of operating them are described. In particular, cartridges are described for use with a vaporizer device body in which a cartridge is received in a...	Nov. 06, 2018	Patents	—	—
—	**11. VAPORIZER APPARATUS** Out Of Plan US PAT 10111470 , U.S. PTO Utility Cartridges for use with a vaporizer device are provided. In some implementations, a cartridge comprises a storage compartment, a mouthpiece, a wicking material, and a heating...	Oct. 30, 2018	Patents	—	—
—	**12. SECURELY ATTACHING CARTRIDGES FOR VAPORIZER DEVICES** Out Of Plan US PAT 10104915 , U.S. PTO Utility Systems and methods to generate an inhalable vapor in an electronic vaporization device. Described herein are cartridges including a vaporizable material that may be securely...	Oct. 23, 2018	Patents	—	—
—	**13. VAPORIZER APPARATUS** Out Of Plan US PAT 10076139 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, an apparatus comprises a cartridge and a vaporizer body. The cartridge comprises a storage compartment...	Sep. 18, 2018	Patents	—	—
—	**14. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10070669 , U.S. PTO Utility Cartridges for generating an aerosol are provided. In some implementations, a cartridge comprises a body, a heating element, and a mouthpiece. The body includes a storage...	Sep. 11, 2018	Patents	—	—
—	**15. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10058124 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a vaporizer device comprises a cartridge and a device body. The cartridge comprises a cartridge body having...	Aug. 28, 2018	Patents	—	—
—	**16. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10058129 , U.S. PTO Utility Cartridges for vaporizer devices are provided. In some implementations, a cartridge includes a reservoir configured to hold a vaporizable material, a heater, and a first contact...	Aug. 28, 2018	Patents	—	—
—	**17. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10058130 , U.S. PTO Utility Methods of fabricating a cartridge are provided. In some implementations, a method comprises forming a storage compartment having a first end and a second end opposite the first...	Aug. 28, 2018	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**18.** VAPORIZATION DEVICE SYSTEMS AND METHODS Out Of Plan US PAT 10045567 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge comprises a storage compartment holding a vaporizable material, a wick in contact with the...	Aug. 14, 2018	Patents	—	—
—	**19.** VAPORIZATION DEVICE SYSTEMS AND METHODS Out Of Plan US PAT 10045568 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for use with a vaporization device comprises a flattened body, a mouthpiece, a reservoir within...	Aug. 14, 2018	Patents	—	—
—	**20.** VAPORIZER DEVICE WITH CARTRIDGE Out Of Plan US PAT D825102 , U.S. PTO Design	Aug. 07, 2018	Patents	—	—

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Search > Patent Search > Searching

Patent Search 8,596,887 4/16/2019

No cases found.

Return to Search

(Charges for search still apply)

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NJOY Exhibit 1002.058

TotalPatent One™

Objects

9596887 or 9,596,887

NJOY Exhibit 1002.059

1 record found out of 126,835,516 searched

Publications Families

Publication number	Publication date	Title
US9596887B2	03/21/2017	Electronic cigarette with liquid reservoir

1

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Secondary Materials (0)

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Research

Results for: 9596887 or 9,596,887

News (4) Sort by: Relevance

1. US Patent Issued on March 21 for "Electronic cigarette with liquid reservoir" (Texas Inventor)

   US Fed News Mar 23, 2017 233 words
   ... *For further information, including images, charts and tables, please visit: http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=**9596887**&OS=**9596887**&RS=**9596887** For any query with respect to this article or any other ...
   ... ALEXANDRIA , Va. , March 23 -- United States Patent no. **9,596,887** , issued on March 21. "Electronic cigarette with liquid reservoir" was ...

2. No Headline In Original

   Diarios Oficiais - Brazil Sep 15, 2017 PAGINAS SEM CADERNO; Pg. 1978 1517 words
   ... autos do processo n. nº 2013.07.1.0122760-7), em sua cláusula ?4? (ID **9596887**), previu que a parte demanda manteria o cumprimento da ordem ...
   ... Vara Cível de Taguatinga - DF), em sua cláusula ?6? (ID **9596887**), estabelece que: ? Como consequência desta quitação, a parte autora desiste ...

3. Newton Kyle D Awarded Patent for Electronic Cigarette with Liquid Reservoir

   Global IP News. Tobacco Patent News Mar 23, 2017 228 words
   ... Name: Tobacco Patent News Patent Application Number: 14/219,426 Patent Publication Number: **9,596,887** International Patent Classification Codes: A24F 47/008 (20130101), A61M 15/06 (20130101) Patent ...

4. Construction of 02 nos. Community Toilet Sanitary Electrical works & Running water supply etc under Revewnue Buget DPHE FY 2017-18

   Tenders Monitor Africa-Asia May 21, 2018 253 words
   ... 20000 Start Date: 10-Jun-2018 Completion Date: 30-Aug-2018 Document : http://www.bidsinfo.com /adminexe/documents/-BD3~20180521- **9596887**.html...

Content type: News
Terms: 9596887 or 9,596,887
Search Type: Boolean - Fewer Results
Narrow By: None

NJOY Exhibit 1002.062

Date and Time: Apr 16, 2019 06:54:37 a.m. EDT

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NJOY Exhibit 1002.063

PARALEGAL SPECIALIST *REISSUE APPLICATION CHECKLIST* (For applications filed on or after September 16, 2012)	Application No. 16/359,938	Filing Date 3/20/2019
	Examiner J. Witz	Art Unit/SPE 3991

For additional assistance, see the "Reissue Application Guide". Answer YES or NO to the questions below, and add comments as necessary. See a CRU supervisor or reissue specialist for further assistance, if needed.

SECTION I: PRIOR TO EXAMINATION

1. **Is the reissue application under examination filed on or after 9/16/2012?**

ⓧ **Yes** ◯ **No** **Comments:**
If NO, DO NOT use this checklist. Contact a CRU supervisor or reissue specialist to obtain a PRE-AIA reissue checklist and guide.

2. **Is the original patent still in force, i.e., it has not expired due to the conclusion of its patent term or lapsed due to non-payment of the scheduled maintenance fees?** *A reissue application must actually issue as a reissue patent before expiration of the original patent. Accordingly, always make sure the patent has not expired; this should be monitored throughout the prosecution of the reissue application. See "Reissue Application Guideline" for methods of checking patent term, and MPEP § 1415.01.*

ⓧ **Yes** ◯ **No** **Comments:**
If NO, contact a CRU supervisor or reissue specialist

3. **Has the notice of the filing of the reissue application been published in the Official Gazette (O.G.)?** *See MPEP § 1430 and the "Reissue Application Guide" for additional information. Check PALM contents for code* ***NRE*** *.*

ⓧ **Yes** **OG date** 4/16/2019 ◯ **No** **Comments:**
If NO, STOP examination and have your supervisor request OPAP to effect publication. Reissue RCEs are not announced in the O.G.

4. **Is the current date more than two months after the O.G. publication date?** *See MPEP 1441 and the "Reissue Application Guide" for additional information.*

◯ **Yes** ⓧ **No** **Comments:**
If NO, wait until the two-month period has expired before preparing and issuing an Office action, unless directed otherwise by a written decision by Office of Patent Legal Administration (OPLA) or Office of Petitions contained in the file wrapper .

NJOY Exhibit 1002.064

5. **Is the original patent involved in litigation? NOTE**: *A litigation search should be performed if not found in the file. If YES, a shortened reply period of one month may have to be set by the Examiner, or prosecution may have to be suspended. See "Reissue Application Guide" and consult a CRU supervisor or reissue specialist.*

◯ **Yes** ⓧ **No** **Comments:**
If NO, proceed with examination.

6. **Is the original patent currently involved in a post issuance proceeding, such as: reexamination proceeding, post grant review, inter-partes review, or covered business method review?** *To determine if the patent is undergoing reexamination, check "Continuity" information in PALM using the original patent number or the Continuity Data Map in eDAN. If YES, see a CRU supervisor or reissue specialist who will e-mail the Office of Patent Legal Administration (OPLA) for consideration of a merger of the reexam and reissue proceedings. For the post grant review the applicant is required to inform the examiner or you can interface with the PTAB webpage:*

https://ptabtrials.uspto.gov/prweb/PRWebLDAP2/Hcl5xOSeX_yQRYZAnTXXCg%5B%5B/!STANDARD?UserIdentifier=searchuser*

◯ **Yes** ⓧ **No** **Comments:**
If YES, contact a CRU supervisor or reissue specialist.

7. **Is there a signed reissue oath or declaration or substitute statement in lieu of a declaration? Is there a signed consent of assignee or a statement of non-assignment?**

(a) Oath/Declaration/Substitute Statement in lieu of declaration
ⓧ **Yes** ◯ **No** **Comments:**
If NO, contact a CRU supervisor or reissue specialist to return the application to OPAP.

(b) Consent of Assignee
ⓧ **Yes** ◯ **No** **Comments:**
CRU supervisor or reissue specialist to return the application to OPAP.

SECTION II: EXAMINATION

8. **Is this a reissue of a patent that was issued from an application with an effective filing date on or after March 16, 2013?**

ⓧ **Yes** ◯ **No** **Comments:**
If YES, then follow the AIA-FITF (First Inventor To File) rules for examination of the reissue application. ***Note:*** *This does not mean that the claims are necessarily subject to the new prior art regime. See guide and consult CRU supervisor or reissue specialist if there is any question as to the effective filing date of the claims in reissue.*

9. **Are the original patent file wrapper and any relevant related patent applications available through eDAN, MADRAS, or PE2E?**

ⓧ **Yes** ◯ **No** **Comments:**
If NO, order the paper file wrapper(s) through PALM. ***NOTE:*** *the original patent file wrapper must be reviewed regardless of whether the answer is "Yes" or "No". This review includes: any prior art references, restriction requirements, surrendered subject matter/recapture, rejections (including double patenting), priority claims, and determining perfection of foreign priority. See MPEP § 1440. If file is unavailable, consult a CRU supervisor or reissue specialist.*

10. **Has the original patent or the reissue application been assigned?** *The Assignee in the reissue is the applicant (37 C.F.R. 1.172) and must be indicated as the Applicant on the ADS and all inventors must be named in the inventor section by their legal names.*

ⓧ **Yes** ◯ **No** **Comments:**
If YES, check a), b), and c) below; if NO proceed to item 11.

(a) Did the applicant file an Application Data Sheet (ADS) identifying the assignee as the applicant and listing the named inventors in the inventors section by their legal names?
ⓧ **Yes** ◯ **No** **Comments:**
If NO, object to ADS or lack thereof.

(b) Did the applicant establish ownership of the patent by filing a Statement under 37 CFR 3.73(c) (or form PTO/AIA/96) signed by, or on behalf of, the assignee(s) pursuant to 37 CFR 3.73(c)(2)-(d)(3)? *See MPEP § 1410.02 and the "Reissue Application Guide" for additional information.*
ⓧ **Yes** ◯ **No** **Comments:**
If NO, object to the application under 37 CFR 1.172(a), using form paragraph 14.16- 14.16.06.

(c) Did the applicant file a Consent of Assignee that is signed by all of the assignees (37 CFR 1.172(a) (or PTO form PTO/AIA/53)? *See MPEP § 1410.02 and the "Reissue Application Guide" for additional information.*
ⓧ **Yes** ◯ **No** **Comments:**
If NO, object to the application under 37 CFR 1.172(a), using form paragraph 14.15. ***NOTE: Consent of Assignee and the Statement under 37 CFR 3.73(c) must be signed by:*** *i) a person having apparent authority in the organization (e.g., president, vice-president, CEO), ii) a person who establishes he/she is authorized to act on behalf of the assignee, or iii) attorney of record (must be given a power of attorney).*

11. **Is the signed AIA oath/declaration or substitute statement in lieu of a declaration (PTO/AIA/05, PTO/AIA/06, PTO/AIA/07, or its equivalent) compliant with the requirements of 37 CFR 1.63 and 1.175 for an AIA application?** *See reissue guide for the list of requirements. If NO, then reject all claims under 35 U.S.C 251 (citing all the relevant reasons).*

⊗ **Yes** ◯ **No** **Comments:**
If YES, then proceed to item 12.

12. **Is there an oath/declaration signed by Assignee (PTO/AIA/06 or its equivalent) which indicates that the original patent (i.e. patent that is being reissued) was filed under 37 CFR 1.46?** *If YES then the original patent application must have been filed on or* ***after*** *September 16, 2012. If (a) filed before 9/16/12 or (b) if the original patent application was filed after September 16, 2012 and a review of the original file wrapper does not indicate that the patent was filed under 37 CFR 1.46, then object to the oath/declaration for being defective using Form Paragraph. 14.01.06 (in OACS) followed by rejection of all the claims for being based on a defective oath/declaration Form Paragraph 14.14.*

◯ **Yes** ⊗ **No** **Comments:**

13. **Does the reissue application contain a foreign priority or domestic benefit claim to an earlier filed application?**

⊗ **Yes** ◯ **No** **Comments:**
If YES, an Application Data Sheet (ADS) must be filed to claim foreign priority or domestic benefit. Correction of foreign priority benefit or correction of continuing application data may need a petition for unintentional delay. See "Reissue Application Guide" for additional information.

14. **Is the reissue application a divisional or a continuation of another pending reissue application, or is there a child reissue application that is a divisional or continuation of this reissue application?** *To determine this, check the "Continuity" in eDAN or PALM, and verify that the applicant has claimed domestic benefit on the ADS. See MPEP § 1451.*

◯ **Yes** ⊗ **No** **Comments:**
If YES, see "Reissue Application Guide" for special instructions.

15. **Does the reissue application contain a protest(s) under 37 CFR 1.291(a)?**

◯ **Yes** ⊗ **No** **Comments:**
If YES, the protest must be considered. Protests may be filed during the two-month period following the O.G. notice, or anytime up until the Notice of Allowance, and should be considered in the next Office Action. Check with a CRU supervisor or reissue specialist to see whether the protest is compliant. If the protest was filed after close of prosecution, check whether a petition under 1.182 was filed and granted. For handling protests, See "Reissue Application Guide" and MPEP § 1441.01 and 1901.

16. **Were there any changes made to the original patent by a Certificate of Correction dated prior to the filing of the reissue?** *See MPEP § 1411.01 and the "Reissue Application Guide" for additional information.*

◯ **Yes** ⓧ **No** **Comments:**
If YES, check to see if the changes were properly presented as a part of the original patent without any markings (i.e., no brackets or underlining). If the changes were not properly presented, the examiner must require correction by the applicant in the form of a replacement paragraph (or paragraphs).

17. **Are all amendments to the specification, drawings and claims compliant with 37 CFR 1.173(b)-(g)?** *All amendment markings (i.e., brackets, underlining, no strikethrough) are made relative to the original patent text, and not relative to the prior amendment. A full listing of the claims is not required with each amendment in a reissue application. See amendment practice described in "Reissue Application Checklist Guideline" for proper markings. See MPEP § 1453 for additional information.*

ⓧ ***Yes*** ◯ ***No*** ***Comments:***
If NO, object to the claims, drawings, and/or specification under 37 CFR 1.173(b).

NOTES:

Paralegal: /Patricia Martin/	Date Complete: 4/16/2019

Reissue Checklist Doc Code :* **RE.CLK.CHK***

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

Application Number	16/359,938
Filing Date	March 20, 2019
First Named Inventor	Kyle D. Newton
Title	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
Art Unit	
Examiner Name	
Attorney Docket Number	38802-0004RE1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Joshua A. Griswold/	Date (Optional)	September 23, 2019
Name	Joshua A. Griswold	Registration Number	46,310
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

91355250.doc

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on the Transmittal.)

☒ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter, which may be an application filed after the date of this power of attorney, or identified above:

26191

OR

☐ I hereby appoint Practitioner(s) named in the attached list as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter, which may be an application filed after the date of this power of attorney, or identified above.

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☐ The address associated with the above-mentioned Customer Number

OR

☒ The address associated with Customer Number: **26191**

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

VAPETECH, LLC

☒ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	March 18, 2019
Name	Kyle D. Newton		
Title	Director, Vapetech, LLC		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☒ *Total of 1 forms are submitted.

91326749.doc

Electronic Acknowledgement Receipt	
EFS ID:	37238811
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	26191
Filer:	Joshua A. Griswold/Candice Rockett
Filer Authorized By:	Joshua A. Griswold
Attorney Docket Number:	38802-0004RE1
Receipt Date:	23-SEP-2019
Filing Date:	20-MAR-2019
Time Stamp:	11:55:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	38802-0004RE1-NEWPOA-final.pdf	355321 a23b00fab2033f278a4e155319531695d13a3027	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	355321

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	16/359,938
Filing Date	2019-03-20
First Named Inventor	Kyle D. Newton
Title	Electronic Cigarette with Liquid Reservoir
Art Unit	3991
Examiner Name	Witz, Jean C.
Attorney Docket Number	62210-492RI1US

SIGNATURE of Applicant or Patent Practitioner

Signature	/Elissa M. Kingsland/	Date (Optional)	2019-11-19
Name	Elissa M. Kingsland	Registration Number	63,259
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

[X] I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 148514

OR

[ ] I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

[X] The address associated with the above-mentioned Customer Number

OR

[ ] The address associated with Customer Number:

OR

[ ] Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

JUUL Labs, Inc.

[ ] Inventor or Joint Inventor (title not required below)

[ ] Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

[X] Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

[ ] Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	8 August 2017
Name	Wayne Sobon		
Title	Vice President, Intellectual Property		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

[ ] Total of 1 forms are submitted.

Electronic Acknowledgement Receipt	
EFS ID:	37789818
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	26191
Filer:	Elissa Marie Kingsland
Filer Authorized By:	
Attorney Docket Number:	38802-0004RE1
Receipt Date:	19-NOV-2019
Filing Date:	20-MAR-2019
Time Stamp:	15:49:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	62210-492RI1US_Corrected_ADS.pdf	22179 7e3dbfca14a5ce1fcf9a6ebe8da8e3ea80686549	no	4

Warnings:

Information:					
This is not an USPTO supplied ADS fillable form					
2	Assignee showing of ownership per 37 CFR 3.73	62210-492RI1US_373.pdf	23005 7905f5a30e9e4fc9f273350290607e3c19cfc856	no	2
Warnings:					
Information:					
3	Power of Attorney	62210-492RI1US_POA.pdf	315757 c0296fd25952bcb4bf37e79f888f5779976fd04d	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	360941	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Corrected Application Data Sheet

Inventor Information

Inventor Number::	1
Name Prefix::	
Given Name::	Kyle
Middle Name::	D.
Family Name::	Newton
City of Residence::	Southlake
State of Residence::	TX
Country of Residence::	United States
Street of mailing address::	525 Commerce St., Suite 100
City of mailing address::	Southlake
State or Province of mailing address::	TX
Country of mailing address::	United States
Postal or Zip Code of mailing address::	76092

Correspondence Information

Correspondence Customer Number::	~~26191~~ 148514
E-Mail address::	~~apsi@fr.com~~ IPDocketingBOS@mintz.com

Application Information

Application Number::	16/359,938
Filing Date::	03/20/19
Application Type::	Reissue

NJOY Exhibit 1002.077

Subject Matter::	Utility
CD-ROM or CD-R?::	None
Sequence submission?::	None
Computer Readable Form (CRF)?::	No
Title::	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
Attorney Docket Number::	~~38802-0004RE1~~ 62210-492RI1US
Request for Early Publication?::	No
Request for Non-Publication?::	No
Small Entity?::	~~Yes~~ No
Petition included?::	No
Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2::	No
This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013::	No

Representative Information

Representative Customer Number::	~~26191~~ 148514

NJOY Exhibit 1002.078

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::	Prior Appl Status::
This Application	Reissue of	14/219,426	03/19/14	Patented
14/219,426	Continuation of	13/955,153	07/31/13	Patented
13/955,153	Continuation of	13/157,024	06/28/11	Patented

Foreign Priority Information

Applicant Information

Applicant Number::	1
Applicant Type::	Assignee
Organization Name::	~~VAPETECH, LLC~~ JUUL Labs, Inc.
Street of mailing address::	~~525 Commerce Street 57 Stage Coach Road Fort Wor~~ 560 20th Street Building 104
City of mailing address::	~~Fort Worth~~ San Francisco
State or Province of mailing address::	~~TX~~ CA
Country of mailing address::	US
Postal or Zip Code of mailing address::	~~76244~~ 94107

Assignee Information Including Non-Applicant Assignee Information

NJOY Exhibit 1002.079

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Elissa M. Kingsland/	Date (YYYY-MM-DD)	2019-11-19
Name	Elissa M. Kingsland	Registration Number	63,259

93499762v.1

NJOY Exhibit 1002.080

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: JUUL Labs, Inc.

Application No./Patent No.: 16/359,938 Filed/Issue Date: March 20, 2019

Titled: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

JUUL Labs, Inc. (Name of Assignee) , a Corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. [x] The assignee of the entire right, title, and interest.

2. [ ] An assignee of less than the entire right, title, and interest (check applicable box):

   [ ] The extent (by percentage) of its ownership interest is _____ %). Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   [ ] There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. [ ] The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. [ ] The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. [x] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Newton, Kyle D. To: The Newton Living Trust 2009
   The document was recorded in the United States Patent and Trademark Office at
   Reel 033580, Frame 0146, or for which a copy thereof is attached.

2. From: The Newton Living Trust 2009 To: VAPETECH LLC
   The document was recorded in the United States Patent and Trademark Office at
   Reel 034602, Frame 0166, or for which a copy thereof is attached.

NJOY Exhibit 1002.081

STATEMENT UNDER 37 CFR 3.73(c)

3. From: VAPETECH LLC To: JUUL LABS, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 050833 , Frame 0753 , or for which a copy thereof is attached.

4. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ , Frame _____ , or for which a copy thereof is attached.

5. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ , Frame _____ , or for which a copy thereof is attached.

6. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____ , Frame _____ , or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Elissa M. Kingsland/	2019-11-19
Signature	Date
Elissa M. Kingsland	63,259
Printed or Typed Name	Title or Registration Number

93498952v.1

NJOY Exhibit 1002.082

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/359,938	03/20/2019	Kyle D. Newton	38802-0004RE1

CONFIRMATION NO. 6916

148514
Mintz/JUUL
One Financial Center
Boston, MA 02111

POWER OF ATTORNEY NOTICE

OC000000112873798

Date Mailed: 11/26/2019

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/19/2019.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cmhaywood/

NJOY Exhibit 1002.083

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of: Kyle D. Newton	
Application No.: 16/359,938	Confirmation No.: 6916
Filed: March 20, 2019	Art Unit: 3991
For: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	Examiner: J. C. Witz

SECOND PRELIMINARY AMENDMENT FOR REISSUE APPLICATION

Via EFS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Prior to examination on the merits, please amend the above-identified U.S. reissue patent application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 18 of this paper.

Electronic Patent Application Fee Transmittal

Application Number:	16359938
Filing Date:	20-Mar-2019
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Filer:	Elissa Marie Kingsland/Mary O'Donnell
Attorney Docket Number:	38802-0004RE1

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	15	100	1500
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	14	460	6440
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**7940**

Electronic Acknowledgement Receipt	
EFS ID:	37995397
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	148514
Filer:	Elissa Marie Kingsland
Filer Authorized By:	
Attorney Docket Number:	38802-0004RE1
Receipt Date:	11-DEC-2019
Filing Date:	20-MAR-2019
Time Stamp:	14:36:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$7940
RAM confirmation Number	E2019BAE36431616
Deposit Account	500311
Authorized User	Elissa Kingsland
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1		Second_Preliminary_Amendment.pdf	71297 a5d3e3d66fbfee3a9a6349fc5dc008ddb379255d	yes	20
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Applicant Arguments/Remarks Made in an Amendment		18	20	
	Claims		2	17	
	Preliminary Amendment		1	1	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32115 c90ee775ba332a7306440191f555c5aa4772bbfb	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	103412		

NJOY Exhibit 1002.088

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REMARKS

Upon entry of the foregoing amendments, claims 1-55 are pending in this reissue application based on U.S. Patent No. 9,596,887 (the '887 Patent). Claims 1, 17, and 41-55 are the independent claims.

Claims 1-16 are the original claims of the '887 Patent. New claims 17-40 were previously added by the preliminary amendment filed March 20, 2019 (the "first preliminary amendment"). New claims 41-55 are added herein. No new matter has been added. Applicant asks that all claims be examined in view of the foregoing amendments.

Support for the new claims 17-55 can be found throughout the specification and drawings of the '887 Patent. For example, support for previously added, new claims 17-40 was provided in the first preliminary amendment. With respect to the additional new claims 41-55, support for each of these claims can be found, *inter alia*, as set forth below:

- Claims 41 and 42: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-27, 38-42, and 48-60; col. 5, lines 1-5, 10-12, 20-43, and 53-55; col. 6, lines 4-9, 13-19, 23-25, 35-37, and 45-48; col. 7, lines 2-8 and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

- Claims 43 and 44: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-24, 40-42, and 48-60; col. 5, lines 1-5, 10-12, 20-43, and 53-55; col. 6, lines 4-9, 13-19, 23-25, 35-37, and 45-48; col. 7, lines 2-8 and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

- Claim 45: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-24, 40-42, and 48-60; col. 5, lines 1-5, 10-12, 20-43, and 53-55; col. 6, lines 4-37, 45-48, and 56-59; col. 6, line 64 to col. 7, line 12; col. 7, lines 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

NJOY Exhibit 1002.090

- Claims 46 and 47: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-24, 40-42, and 48-60; col. 5, lines 1-5, 10-12, 20-43, and 53-55; col. 6, lines 4-9, 13-19, 23-25, 35-37, and 45-48; col. 7, lines 2-8 and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

- Claims 48 and 49: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-24, 40-42, and 48-60; col. 5, lines 1-5, 10-17, 20-43, and 53-55; col. 6, lines 4-9, 11-19, 23-25, 35-37, and 45-48; col. 7, lines 2-8 and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

- Claims 50 and 51: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-27, 38-42, and 48-60; col. 5, lines 1-5, 10-17, 20-43, and 53-55; col. 6, lines 4-9, 11-19, 23-25, 35-37, 41-43, 45-49, and 51-56; col. 7, lines 2-8, 36-38, 47-49, and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, 11c, and 12b.

- Claims 52 and 53: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 12-20, and 28-30; col. 4, lines 1-4, 23-27, 38-42, and 48-60; col. 5, lines 1-5, 10-17, 20-43, and 53-55; col. 6, lines 4-9, 11-25, 35-37, 41-43, 45-49, and 51-56; col. 7, lines 2-8, 36-38, 47-49, and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, 11c, 12a, and 12b.

- Claims 54 and 55: Abstract; col. 1, lines 51-63; col. 2, lines 1-4, 8-10, 16-20, and 28-30; col. 4, lines 1-4, 23-24, 40-42, and 48-60; col. 5, lines 1-5, 10-12, 20-43, and 53-55; col. 6, lines 4-9, 13-19, 23-25, 35-37, 41-43, and 45-48; col. 7, lines 2-8, 47-49, and 52-55; FIGS. 1, 2b, 3a, 3b, 4b, 4c, 5b, 6-10, and 12b.

Please charge our Deposit Account. 50-0311 in the amount of $7,940.00 covering the excess claims fees for the additional new claims 41-55 pursuant to 37 C.F.R. §§ 1.16(h) and 1.16(i). The Director is hereby authorized to charge any deficiency in the fees filed, asserted to

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be filed or which should have been filed herewith to our Deposit Account No. 50-0311, Reference No.: 16/359,938 from which the undersigned is authorized to draw.

Dated: December 11, 2019

Respectfully submitted,

Electronic Signature: /Elissa M. Kingsland/
Elissa M. Kingsland
Registration No.: 63,259
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AMENDMENTS TO THE CLAIMS

1. An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of the liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber, and

a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

2. The apparatus of claim 1, further comprising:

an inlet vent formed on the exterior of said housing and coupled to deliver air to said atomizing chamber air inlet.

3. The apparatus of claim 2, and wherein said inlet vent is coupled to said atomizing chamber air inlet by a conduit.

4. The apparatus of claim 3, and wherein said conduit sealably passes through said liquid reservoir.

5. The apparatus of claim 1, and wherein said chimney sealably passes through said liquid reservoir.

6. The apparatus of claim 1, and wherein said atomizer is a resistive heating element.

7. The apparatus of claim 6, and wherein said wick is partially engages said resistive heating element.

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8. The apparatus of claim 1, and wherein said atomizer has a tubular form defining an open central passage.

9. The apparatus of claim 8, and wherein said wick passes through said open central passage.

10. The apparatus of claim 1, and wherein said atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture.

11. The apparatus of claim 1, and wherein said wick is fabricated as a bundle of heat resistant fibers.

12. The apparatus of claim 11, and wherein said bundle of heat resistant fibers is fiberglass.

13. The apparatus of claim 11, and wherein said bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

14. The apparatus of claim 1, and wherein said liquid reservoir is formed as an annular cavity between the interior of said housing and said atomizing chamber.

15. The apparatus of claim 1, and wherein said liquid reservoir includes an external access opening, for enabling addition of liquid into said liquid reservoir.

16. The apparatus of claim 15, and wherein said external access opening is a removable mouthpiece.

17. (New) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the atomizing chamber, the liquid reservoir being sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

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channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

18. (New) The method of claim 17, where the liquid reservoir is without a porous material for storing the liquid.

19. (New) The method of claim 17, wherein transferring liquid from a liquid reservoir to an atomizing chamber with a wick comprises transferring the liquid by capillarity with the wick.

20. (New) The method of claim 17, wherein generating an aerosol of the liquid comprises generating aerosol with an electrically powered atomizer in the atomizing chamber.

21. (New) The method of claim 17, wherein channeling the aerosol with a chimney comprises channeling the aerosol with the chimney through the liquid reservoir, the chimney being sealed from the liquid reservoir.

22. (New) The apparatus of claim 1, wherein the wick extends between the liquid reservoir and an interior of the atomizing chamber.

23. (New) The apparatus of claim 1, wherein the liquid reservoir adjacent the wick is free from porous material.

24. (New) The apparatus of claim 1, wherein the first wick aperture is circular.

25. (New) The apparatus of claim 1, comprising an atomizing assembly comprising a body and the atomizer, the atomizing assembly comprising a first recess formed therein that aligns with the first wick aperture in the atomizing chamber and provides a compressive fit around the wick.

26. (New) The apparatus of claim 25, where the first wick aperture and the first recess cooperate to define a circular aperture.

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27. (New) The apparatus of claim 10, wherein the first wick aperture and the second wick aperture each comprise a fixed width slot terminating in a curved end, the fixed width configured to receive the wick.

28. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber.

29. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet.

30. (New) The apparatus of claim 1, wherein the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

31. (New) The apparatus of claim 1, wherein the chimney and atomizing chamber are cylindrical and the maximum exterior diameter of the chimney is less than the maximum interior diameter of the atomizing chamber.

32. (New) The apparatus of claim 1, wherein the apparatus is elongate, and the maximum transverse exterior dimension of the chimney is less than the maximum transverse interior diameter of the atomizing chamber.

33. (New) The apparatus of claim 1, wherein the atomizing chamber and the chimney are formed as a single unit.

34. (New) The apparatus of claim 1, wherein the housing comprises a transparent material through which the liquid in the liquid reservoir can be viewed from the exterior of the apparatus.

35. (New) The apparatus of claim 1, comprising an insert in the housing, the insert comprising the aerosol outlet.

36. (New) The apparatus of claim 1 coupled to a power supply portion, wherein the power supply portion comprises a pressure sensor configured to detect negative pressure within the power supply portion and energize the atomizer.

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37. (New) The apparatus of claim 36, wherein the power supply portion comprises an LED positioned at a tip end of the power supply portion, the LED configured to illuminate in response to the pressure sensor detecting negative pressure in the power supply portion.

38. (New) The apparatus of claim 37, wherein the LED comprises an amber LED configured to emulate burning ash when illuminated.

39. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet, the chimney and atomizing chamber are cylindrical, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

40. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber, the atomizing chamber and the chimney are formed as a single unit, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

41. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

42. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

43. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

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an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

44. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

45. (New) A cartridge comprising:

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber comprising a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and a liquid reservoir configured to contain an atomization liquid; the atomizing chamber further comprising an atomizer outlet;

a wick partially disposed within the atomizing chamber, the wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir, the wick configured to draw the atomization liquid into the atomizing chamber by capillarity; and

an atomizer disposed within the atomizing chamber, the atomizer configured to receive electric current from a battery in the power supply portion to facilitate generation of an aerosol by vaporizing the atomization liquid drawn into the atomizing chamber by the wick;

wherein the atomizer outlet and the aerosol outlet are coupled by a chimney.

46. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

47. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

48. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

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an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

49. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

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a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

50. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the fluid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

51. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the fluid reservoir and locating the chimney within the cartridge housing;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

52. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the elongated housing and the chimney;

a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the fluid reservoir and locating the chimney within the cartridge housing;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

53. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the elongated housing and the chimney;

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a resilient seal disposed between an exterior of the chimney and an interior of the housing, the resilient seal sealing an upper end of the fluid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

54. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

55. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/359,938	Filing Date 03/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	40 minus 20 =	* 20		x $100 =	2000
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	* 0		x $460 =	0
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	2000

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/11/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 55	Minus	** 40	= 15		x $100 =	1500
	Independent (37 CFR 1.16(h))	* 17	Minus	*** 3	= 14		x $460 =	6440
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	7940

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/359,938	03/20/2019	Kyle D. Newton	62210-492RI1US

CONFIRMATION NO. 6916

148514
Mintz/JUUL
One Financial Center
Boston, MA 02111

POA ACCEPTANCE LETTER

OC000000114184823

Date Mailed: 01/24/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/19/2019.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cmhaywood/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/359,938	03/20/2019	Kyle D. Newton	38802-0004RE1

CONFIRMATION NO. 6916

POWER OF ATTORNEY NOTICE

26191
FISH & RICHARDSON P.C. (TC)
PO BOX 1022
MINNEAPOLIS, MN 55440-1022

OC000000114184773

Date Mailed: 01/24/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/19/2019.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/cmhaywood/

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Application	Document	Mailroom Date	Attorney Docket No.
16359938	N570	01/24/2020	62210-492RI1US
	N570	01/24/2020	62210-492RI1US

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Litigation Search Report CRU 3999

Reissue Application No.: 16/359,338

TO: Norca Torres Velazquez
Location: CRU
Art Unit: 3991
Date: May 26, 2020

U.S. Patent Number: 9,596,887

From: Patricia Martin
Paralegal Specialist
Location: CRU 3999
Phone: (571) 272-7705

Search Notes

1) I performed a search on the patent in Lexis Court Link for any open dockets or closed cases.

2) I performed a Key Cite Search in Westlaw, which retrieves all history on the patent including any litigation.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

No Litigation was found

Citing References (34)

Treatment	Title	Date	Type	Depth	Headnote(s)
—	**1.** APPARATUS FOR IMPLEMENTING CARTRIDGE OF ELECTRONIC CIGARETTE, HAS WICK THAT IS POSITIONED THROUGH RESPECTIVE WICK APERTURE BETWEEN LIQUID RESERVOIR AND ATOMIZING CHAMBER TO TRANSFER LIQUID BY CAPILLARITY FROM RESERVOIR TO ATOMIZER Out Of Plan DWPI 2015-10643D	July 31, 2013	DWPI	—	—
—	**2.** RF 050833/0753 Out Of Plan	Oct. 25, 2019	Assignments	—	—
—	**3.** RF 034602/0166 Out Of Plan	Dec. 30, 2014	Assignments	—	—
—	**4.** RF 033580/0146 Out Of Plan	Aug. 21, 2014	Assignments	—	—
—	**5.** PatStat 9596887	Apr. 16, 2019	Patent Status Files	—	—
—	**6.** VAPE PEN Out Of Plan US PAT D871665 , U.S. PTO Design	Dec. 31, 2019	Patents	—	—
—	**7.** VAPE PEN Out Of Plan US PAT D870962 , U.S. PTO Design	Dec. 24, 2019	Patents	—	—
—	**8.** CALIBRATED DOSE CONTROL Out Of Plan US PAT 10512282 , U.S. PTO Utility Methods and vaporizer apparatuses that estimate, measure and/or predict the amount of vapor and/or material (including active ingredients) released by the vaporizer apparatus. In...	Dec. 24, 2019	Patents	—	—
—	**9.** VAPORIZER DEVICE WITH CARTRIDGES Out Of Plan US PAT D861975 , U.S. PTO Design	Oct. 01, 2019	Patents	—	—
—	**10.** VAPORIZATION DEVICE WITH LIP SENSING Out Of Plan US PAT 10405582 , U.S. PTO Utility Apparatuses, including systems and devices ("vaporizers"), for vaporizing material to form an inhalable aerosol that include capacitive lips sensing to regulate the temperature...	Sep. 10, 2019	Patents	—	—
—	**11.** VAPORIZER CARTRIDGE Out Of Plan US PAT D858868 , U.S. PTO Design	Sep. 03, 2019	Patents	—	—
—	**12.** VAPORIZER CARTRIDGE Out Of Plan US PAT D858869 , U.S. PTO Design	Sep. 03, 2019	Patents	—	—
—	**13.** VAPORIZER CARTRIDGE Out Of Plan US PAT D858870 , U.S. PTO Design	Sep. 03, 2019	Patents	—	—
—	**14.** COMBINED VAPORIZER TAMP AND PICK TOOL Out Of Plan US PAT D851830 , U.S. PTO Design	June 18, 2019	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**15. VAPORIZER CARTRIDGE** Out Of Plan US PAT D849996 , U.S. PTO Design	May 28, 2019	Patents	—	—
—	**16. FILLABLE VAPORIZER CARTRIDGE AND METHOD OF FILLING** Out Of Plan US PAT 10279934 , U.S. PTO Utility Methods of filling a tank reservoir of an electronic cigarette or cartridge for an electronic cigarette with a vaporizable material so that air is not entrapped within the...	May 07, 2019	Patents	—	—
—	**17. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10264823 , U.S. PTO Utility Cartridges for use with a vaporizer body are provided. In some implementations, a cartridge having a top end and a bottom end comprises a mouthpiece proximate to the top end, a...	Apr. 23, 2019	Patents	—	—
—	**18. DEVICES FOR VAPORIZATION OF A SUBSTANCE** Out Of Plan US PAT 10244793 , U.S. PTO Utility Devices for generating and releasing vapor. In particular, described herein are portable devices for generating a low-temperature inhalable vapor having an elongated tubular body...	Apr. 02, 2019	Patents	—	—
—	**19. VAPORIZER CARTRIDGE** Out Of Plan US PAT D842536 , U.S. PTO Design	Mar. 05, 2019	Patents	—	—
—	**20. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10201190 , U.S. PTO Utility Apparatuses including vaporizer device bodies and cartridges are provided. In some implementations, an apparatus includes a cartridge and a body. The cartridge comprises a storage...	Feb. 12, 2019	Patents	—	—
—	**21. CHARGING DEVICE** Out Of Plan US PAT D836541 , U.S. PTO Design	Dec. 25, 2018	Patents	—	—
—	**22. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10159282 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for a vaporizer device comprises an elongate and flattened storage compartment configured to...	Dec. 25, 2018	Patents	—	—
—	**23. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10117465 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for use with a vaporization device comprises a wick, a resistive heating element in contact...	Nov. 06, 2018	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**24. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10117466 , U.S. PTO Utility Vaporization devices and methods of operating them are described. In particular, cartridges are described for use with a vaporizer device body in which a cartridge is received in a...	Nov. 06, 2018	Patents	—	—
—	**25. VAPORIZER APPARATUS** Out Of Plan US PAT 10111470 , U.S. PTO Utility Cartridges for use with a vaporizer device are provided. In some implementations, a cartridge comprises a storage compartment, a mouthpiece, a wicking material, and a heating...	Oct. 30, 2018	Patents	—	—
—	**26. SECURELY ATTACHING CARTRIDGES FOR VAPORIZER DEVICES** Out Of Plan US PAT 10104915 , U.S. PTO Utility Systems and methods to generate an inhalable vapor in an electronic vaporization device. Described herein are cartridges including a vaporizable material that may be securely...	Oct. 23, 2018	Patents	—	—
—	**27. VAPORIZER APPARATUS** Out Of Plan US PAT 10076139 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, an apparatus comprises a cartridge and a vaporizer body. The cartridge comprises a storage compartment...	Sep. 18, 2018	Patents	—	—
—	**28. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10070669 , U.S. PTO Utility Cartridges for generating an aerosol are provided. In some implementations, a cartridge comprises a body, a heating element, and a mouthpiece. The body includes a storage...	Sep. 11, 2018	Patents	—	—
—	**29. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10058124 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a vaporizer device comprises a cartridge and a device body. The cartridge comprises a cartridge body having...	Aug. 28, 2018	Patents	—	—
—	**30. VAPORIZATION DEVICE SYSTEMS AND METHODS** Out Of Plan US PAT 10058129 , U.S. PTO Utility Cartridges for vaporizer devices are provided. In some implementations, a cartridge includes a reservoir configured to hold a vaporizable material, a heater, and a first contact...	Aug. 28, 2018	Patents	—	—
—	**31. CARTRIDGE FOR USE WITH A VAPORIZER DEVICE** Out Of Plan US PAT 10058130 , U.S. PTO Utility Methods of fabricating a cartridge are provided. In some implementations, a method comprises forming a storage compartment having a first end and a second end opposite the first...	Aug. 28, 2018	Patents	—	—

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Treatment	Title	Date	Type	Depth	Headnote(s)
—	**32.** VAPORIZATION DEVICE SYSTEMS AND METHODS Out Of Plan US PAT 10045567 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge comprises a storage compartment holding a vaporizable material, a wick in contact with the...	Aug. 14, 2018	Patents	—	—
—	**33.** VAPORIZATION DEVICE SYSTEMS AND METHODS Out Of Plan US PAT 10045568 , U.S. PTO Utility Vaporizer devices and apparatuses are provided. In some implementations, a cartridge for use with a vaporization device comprises a flattened body, a mouthpiece, a reservoir within...	Aug. 14, 2018	Patents	—	—
—	**34.** VAPORIZER DEVICE WITH CARTRIDGE Out Of Plan US PAT D825102 , U.S. PTO Design	Aug. 07, 2018	Patents	—	—

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   Search Type: Terms and Connectors
   Narrowed by:

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Results for: **9596887 or 9,596,887**

Dockets

1. GLAVIN, SHAWN M

... Voluntary Petition Chapter 7(13-10244) [misc,volp7] (306.00) filing fee. Receipt number **9596887** , amount $ 306.00. (U.S. Treasury) (Entered: 02/25/2013) Receipt of Voluntary ...
... Voluntary Petition Chapter 7(13-10244) [misc,volp7] (306.00) filing fee. Receipt number **9596887**, amount $ 306.00. (U.S. Treasury) (Entered: 02/25/2013)...
... VOLUNTARY PETITION CHAPTER 7(13-10244) [MISC,VOLP7] (306.00) FILING FEE. RECEIPT NUMBER **9596887** , AMOUNT $ 306.00. (U.S. TREASURY)(ENTERED: 02/25/2013) Events since last full ...
... VOLUNTARY PETITION CHAPTER 7(13-10244) [MISC,VOLP7] (306.00) FILING FEE. RECEIPT NUMBER **9596887**, AMOUNT $ 306.00. (U.S. TREASURY)(ENTERED: 02/25/2013)...

Court: Pennsylvania Western Bankruptcy Court | **Date:** Feb 25, 2013

2. 1:15bk11788, Univita Health Inc.

Court: Delaware Bankruptcy Court | **Date:** Aug 28, 2015

3. 4:16bk35930, Bennu Oil & Gas, LLC and Bennu Holdings, LLC

... 2016-12-02T08:12:00 Lafayette LLC 32532 Collection Center Drive Chicago IL 60693-0325 0 **9596887** 1 Element Materials Technology C cr ELEMENT MATERIALS TECHNOLOGY 2016-12-02T08:12:00 Attn: ...

Court: Texas Southern Bankruptcy Court | **Date:** Nov 30, 2016

4. 06-1-01262-6, STATE OF WASHINGTON VS MCDONNELL, DANIEL

... Order For Pretrial Release - 9:30$5,000 4 2006-09-05 Order To Release **9596887** EntryCode: ORRL Order To Release 5 2006-09-05 Preliminary AppearanceCommissioner Thomas L. ...

Court: Whatcom County Superior Court | **Date:** Sep 05, 2006

5. 2018-002242, Reverse Mortgage Solutions Inc v. Gualtieri

... filed 30 2019-03-20 Notice of the Date of Continued Sheriff's Sale **9596887** Filing Attorney Reverse Mortgage Solutions Inc Comments Notice of the Date ...

Court: Delaware County Court of Common Pleas | **Date:** Mar 22, 2018

6. ACEVEDO MARIO vs. ACEVEDO GRISELDA REBECCA

... (Oca) 2004-07-28 - 9596893 - 2004-07-28 - 9596890 - 2004-07-28 - **9596887** - 2004-07-28 - 9596884 - 2004-07-28 - 9596881 - 2004-07-28 - ...

PATRICIA MARTIN

Court: Dallas District Court | **Date:** Jul 28, 2004

7. ALLIANT BK v. FISCHETTI, ANTHONY M

... 9596886 Entry Type AFF Non Retail Install Sales Trans 4 2005-07-29 **9596887** Entry Type Affidavit Non-Consumer CR Transact 5 2005-07-29 9596888 Entry Type ...

Court: Montgomery County Court of Common Pleas | **Date:** Jul 29, 2005

8. Arrow Financial Services LLC ASSIGNEE OF HOUSEHOLD BANK vs. Lisa Cornelison, John Cornelison

... Other court received discovery control plan and scheduling order by fax. **9596887** 2009-07-02 1.5 each (no formal pre trial requested) 9596888 2009-07-02 case ...

Court: Collin County Court | **Date:** Oct 10, 2008

9. BANK OF AMERICA N A vs. KRYSTYN F JONES, et al

... JONES; VER: F; K 2009-01-15 ALIAS SUMMONS - RETURNED NOT SERVED **9596887** Details Comment:: ALIAS SUMMONS RETD NOT SERVED UNKNOWN SPOUSE OF KRYSTYN ...

Court: Pinellas Circuit & County Court | **Date:** Aug 12, 2008

10. BEHAVIORAL MED COTTON O'NEIL CLINI Vs. WHETSTONE,ERIC,D

... $5.00 Debit Transaction received from THOMAS A VALENTINE (5.00 CV Surcharge). **9596887** 2004-11-16 Electronic Request for Application for examination of judgment debtor filed ...

Court: Shawnee County District Court | **Date:** Sep 01, 2004

11. Carmen Rodriguez vs Marcos Nino

... No ___ vmg Pet Disso Marr w/children 2003-10-28 Uniform custody juris **9596887** Entry Time:03:34 PM Filer Name:Rodriguez, Carmen Entry Comments:Filed declaration under uniform ...

Court: Fresno County Superior Court | **Date:** Oct 28, 2003

12. Champion Investments, LLCv.Linda S Aland, PC

... request for atty's fees 9596886 2009-02-03 certificate of last known address **9596887** 2009-02-04 Original Answer 9596888 2009-02-04 Default Judgment Denied 9596889 2009-02-04 Correspondence ...

Court: Collin County District Court | **Date:** Jan 06, 2009

13. CITIBANK SOUTH DAKOTA NA VS ALLEN PALMA

... Name Type Status Disposition Date CITIBANK SOUTH DAKOTA NA ALLEN PALMA **9596887** ...

Court: Hudson County Superior Court | **Date:** Sep 19, 1997

NJOY Exhibit 1002.120

14. Commonwealth of Pennsylvania v. James Edwards, Appellant

... Filer: Per Curiam 2008-07-07 Dismissed Failure to Comply with Pa.R.A.P. 3517 **9596887** Filer: Per Curiam 2008-07-02 Docketing Statement Received 9596886 Participant Type: Appellant ...

Court: Pennsylvania Superior Court Eastern District | **Date:** May 22, 2008

15. Cunningham v. Neal, et al

... to plaintiff Mack Cunningham Jr. at MPCJF (sd) [Entry date 07/06/95] **9596887** Return of undeliverable mail (D.I. 13) sent to plaintiff Mack Cunningham ...

Court: Delaware District Court | **Date:** Oct 24, 1994

16. Department of Revenue Petitioner vs. Elias Santiago Respondent

... Filed and Mailed 9596889 2016-03-30 Clerk's Certificate of Compliance W_AO 2012-64-UFC **9596887** 2016-05-16 Complete Registration Package Returned 9596885 Additional Text Return to sender/Insufficient ...

Court: Broward Circuit & County Court | **Date:** Mar 18, 2016

17. DEUTSCHE BANK NATIONAL TRUST COMPANY vs. VAZQUEZ, EDWIN

... #11422 FOR $5.50 MAILED TO DOUGLAS C. ZAHM, P.A. ON 5/17/12 **9596887** 2012-03-23 CIVIL OVERPAYMENT OVER $5 RECEIPT: 213096 DATE: 03/23/2012 9596888 2012-03-23 ...

Court: Osceola Circuit & County Court | **Date:** Jan 20, 2012

18. DISCOVER BANK v. KAPLAN PINA

... Code CMPL Pages 20 COMPLAINT FILED 2017-07-12 REQUEST FOR PRETRIAL SUMMONS **9596887** Code RQST Pages 3 REQUEST FOR PRETRIAL SUMMONS 2017-07-12 NOTICE OF ...

Court: Seminole Circuit & County Court | **Date:** Jul 12, 2017

19. DOLORES T KATZ

... PA 152353069 4687 1 I 1996-07-01T00:00:00 ALLEGHENY SSN / ITIN: xxx-xx-4687 **9596887** KENNETH STEIDL D DEBTOR STEIDL STEINBERG 4123918000 210 GRANT STREET SUITE ...

Court: Pennsylvania Western Bankruptcy Court | **Date:** Jul 01, 1996

20. Fox VS Wong

... Oppos to Art Wong's MO For Order Compellingpltf to Post Bond **9596887** Reply to Pltf's Oppos to Art Wong's MO For Order Compellingpltf ...

Court: San Francisco County Superior Court | **Date:** May 03, 1993

NJOY Exhibit 1002.121

21. FRANK W PATTON SR ETAL v. BAPTIST HEALTH SYSTEM

... 9596883 Type SERVICE ASSIGNED TO CLERK 1 00039 1998-12-10 CIT (SHERIFF) **9596887** Type REQUEST FOR 00040 1999-01-08 GEORGE CASE MD 9596891 Type CERTIFICATE ...

Court: Bexar County District Court | **Date:** Jun 09, 1998

22. HSBC BANK USA NA vs. FARIDA KHAN MF

... 9596886 2009-02-24 NOTICE OF FILING AFFID. OF AVOIDANCE FOR FARIDA KHAN **9596887** 2008-11-19 SUMMONS ISSUED FARIDA KHAN (BOYD'S) NEW CENTURY MORTGAGE CORPORATION UNK ...

Court: St. Lucie Circuit & County Court | **Date:** Nov 14, 2008

23. In the matter of Davana Stephanie Pasillas

... 2 Letters of Conservatorship filed. 19 2016-03-17 Order Appointing Probate Conservator **9596887** Page Count 3 Order Appointing Probate Conservator 20 2016-03-17 Petition for ...

Court: Sacramento County Superior Court | **Date:** Jan 27, 2016

24. Juan C. & Cinthia L. Salvatierra v. Commissioner of Internal Revenue

... gen. So much of mot. as moves to cons. is gr. **9596887** Served B 07/20/2000 ORDER so much of mot. to cont. & ...

Court: Tax Court | **Date:** Feb 08, 2000

25. KERSEY, JOSEPH LAWRENCE vs. KERSEY, IRENE VALERIE

... AND NOTICE OF FINAL APPEALABLE ORDER ISSUED. Receipt: 313797 Date: 02/21/2006 **9596887** Amount: 2.00 Amount Due: 0.00 FINAL APPEALABLE ORDER FILED AND NOTICE ...

Court: Butler County Court of Common Pleas | **Date:** Jun 27, 2005

26. MONTGOMERY, TREVOR

... Voluntary Petition (Chapter 7)(16-90752) [misc,volp7cc] (335.00) Filing Fee. Receipt number **9596887** . Fee amount 335.00 (re: Doc# 1) (U.S. Treasury) (Entered: 07/27/2016) ...
... Voluntary Petition (Chapter 7)(16-90752) [misc,volp7cc] (335.00) Filing Fee. Receipt number **9596887** . Fee amount 335.00 (re: Doc# 1) (U.S. Treasury) (Entered: 07/27/2016) ...

Court: Illinois Central Bankruptcy Court | **Date:** Jul 27, 2016

27. SCHROEDER, STEVEN C AND SCHROEDER, DANELLA M

... VOLUNTARY PETITION CHAPTER 7(13-10234) [MISC,VOLP7] (306.00) FILING FEE. RECEIPT NUMBER **9596887** , AMOUNT $ 306.00. (U.S. TREASURY)(ENTERED: 02/25/2013) Events since last full ...

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... VOLUNTARY PETITION CHAPTER 7(13-10234) [MISC,VOLP7] (306.00) FILING FEE. RECEIPT NUMBER **9596887**, AMOUNT $ 306.00. (U.S. TREASURY)(ENTERED: 02/25/2013)...

Court: Pennsylvania Western Bankruptcy Court | **Date:** Feb 22, 2013

28. STATE OF FLORIDA v. BARGOUTHI, SAMER TYSIR

... -CREDIT FOR TIME SERVED IN LEE CO JAIL: 60 DAYS 7526841 **9596887** 2002-09-23 NOTICE OF APPEARANCE MAILED TO BONDSMAN 7724651 9689647 2002-10-11 -SUBPOENA(S) ...

Court: Lee Circuit & County Court | **Date:** Sep 04, 2002

29. STATE OF FLORIDA v. CRAWFORD, DESSIE B

... 2000-09-25 SUBPOENA(S) RETURNED AND FILED 9527041 6662036 2001-02-27 Speedy Trial Waived **9596887** 9146109 2002-05-28 PRESENT WITH ATTORNEY 9601797 7270948 2000-08-24 NOTICE OF APPEARANCE ...

Court: Lee Circuit & County Court | **Date:** May 26, 2000

30. Susannah Born-Grissom vs.Jorge Ayala-Valles

... 9596885 2009-06-19 Demand for Jury Trial 9596886 2009-06-19 Answer to Complaint **9596887** EntryDetails: Defendants Answer to Plaintiffs Complaint 2009-06-19 Initial Appearance Fee Disclosure ...

Court: Clerk of courts | **Date:** May 27, 2009

31. TOSADO, SUSAN MAE v. POWELL, ANTHONY MICHAEL

... COVER SHEET FILED 9596886 COVER SHEET FILED 1990-06-29 COVER SHEET FILED **9596887** COVER SHEET FILED 1990-06-29 CERTIFICATE 9596888 CERTIFICATE 1990-06-29 CERTIFICATE 9596889 CERTIFICATE ...

Court: Orange Circuit & County Court | **Date:** Jun 29, 1990

32. Vander Vegt, Karen Vs. Providence Health & Services

... 9596888 2011-12-01 Report of Parties' Planning Meeting^Attorney: Whipple, Benjamin I (9311096) **9596887** 2011-12-01 Unopposed Motion for Untimely Filing of Repy to Counterclaims:^Attorney: Whipple, ...

Court: Palmer District and Superior Courts | **Date:** Aug 23, 2011

33. YU, JACQUELINE vs. YU, WAI HUA

... 1990-01-17 (PETITION) FOR INCREASE IN CHILD SUPPORT: FILED BY FORMER WIFE **9596887** PETITION Code PET 17 1990-01-17 (PETITION) FOR INCREASE IN CHILD SUPPORT: ...

Court: Palm Beach Circuit & County Court | **Date:** Oct 18, 1979

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News (4) Sort by: Relevance

1.
US Patent Issued on March 21 for "Electronic cigarette with liquid reservoir" (Texas Inventor)

US Fed News | Mar 23, 2017 | 233 words
... *For further information, including images, charts and tables, please visit: http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=**9596887**&OS=**9596887**&RS=**9596887** For any query with respect to this article or any other ...
... ALEXANDRIA , Va. , March 23 -- United States Patent no. **9,596,887** , issued on March 21. "Electronic cigarette with liquid reservoir" was ...

2.
No Headline In Original

Diarios Oficiais - Brazil | Sep 15, 2017 | PAGINAS SEM CADERNO; Pg. 1978 | 1517 words
... autos do processo n. nº 2013.07.1.0122760-7), em sua cláusula ?4? (ID **9596887**), previu que a parte demanda manteria o cumprimento da ordem ...
... Vara Cível de Taguatinga - DF), em sua cláusula ?6? (ID **9596887**), estabelece que: ?Como consequência desta quitação, a parte autora desiste ...
... autos do processo n. nº 2013.07.1.0122760-7), em sua cláusula ?4? (ID **9596887**), previu que a parte demanda manteria o cumprimento da ordem ...
... Vara Cível de Taguatinga - DF), em sua cláusula ?6? (ID **9596887**), estabelece que: ?Como consequência desta quitação, a parte autora desiste ...

3.
Newton Kyle D Awarded Patent for Electronic Cigarette with Liquid Reservoir

Global IP News. Tobacco Patent News | Mar 23, 2017 | 228 words
... Name: Tobacco Patent News Patent Application Number: 14/219,426 Patent Publication Number: **9,596,887** International Patent Classification Codes: A24F 47/008 (20130101), A61M 15/06 (20130101) Patent ...

4.
Construction of 02 nos. Community Toilet Sanitary Electrical works & Running water supply etc under Revewnue Buget DPHE FY 2017-18

Tenders Monitor Africa-Asia | May 21, 2018 | 253 words
... 20000 Start Date: 10-Jun-2018 Completion Date: 30-Aug-2018 Document : http://www.bidsinfo.com /adminexe/documents/-BD3~20180521- **9596887**.html...

Content type: News
Terms: 9596887 or 9,596,887
Search Type: Boolean - Fewer Results
Narrow By: None
Date and Time: May 26, 2020 09:48:24 a.m. EDT

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/359,938	03/20/2019	Kyle D. Newton	62210-492RI1US	6916

148514 7590 06/17/2020

Mintz/JUUL
One Financial Center
Boston, MA 02111

EXAMINER	
TORRES VELAZQUEZ, NORCA LIZ	

ART UNIT	PAPER NUMBER
3991	

NOTIFICATION DATE	DELIVERY MODE
06/17/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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NJOY Exhibit 1002.129

Office Action Summary	**Application No.** 16/359,938	**Applicant(s)** Newton, Kyle D.	
	Examiner NORCA L TORRES VELAZQUEZ	**Art Unit** 3991	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☐ Claim(s) _____ is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 41-44 and 46-55 is/are allowed.

7) ☑ Claim(s) 1-26,28-40 and 45 is/are rejected.

8) ☑ Claim(s) 27 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

NJOY Exhibit 1002.130

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Reissue Applications

For reissue applications filed before September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the law and rules in effect on September 15, 2012. Where specifically designated, these are "pre-AIA" provisions.

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

The present reissue application is a **broadening reissue** of US 9,596,887 Patent (the '887 Patent herein), and it includes new claims 17-55.

Invention of the '024 Patent

The '887 Patent issued with sixteen (16) claims. The amendments filed 3/20/2019 and 12/11/2019 included new claims 17-55. Claims 1-55 are pending in the present reissue. Independent claims 1, 17, 45 and 54 are representative as follows:

1. An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of the liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber, and

a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

17. (New) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the atomizing chamber, the liquid reservoir being sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

45. (New) A cartridge comprising:

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber comprising a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and a liquid reservoir configured to contain an atomization liquid; the atomizing chamber further comprising an atomizer outlet;

a wick partially disposed within the atomizing chamber, the wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir, the wick configured to draw the atomization liquid into the atomizing chamber by capillarity; and

an atomizer disposed within the atomizing chamber, the atomizer configured to receive electric current from a battery in the power supply portion to facilitate generation of an aerosol by vaporizing the atomization liquid drawn into the atomizing chamber by the wick;

wherein the atomizer outlet and the aerosol outlet are coupled by a chimney.

54. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

Claim Rejections - 35 USC § 112, Second Paragraph

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 45 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 1 recites the limitation "an aerosol of **the liquid**" in line 4. There is insufficient antecedent basis for this limitation within the claim. The liquid was not positively claimed. It is advised to amend the claim to claim “a liquid” to provide proper antecedent basis.

Claim 45 recites the limitation "from a battery **in the power supply portion.**" There is insufficient antecedent basis for this limitation within the claim. The claim does not claim a power supply portion.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claims 1, 5-6, 8, 17-21, 23-26, 29-33 and 36-40 are rejected under 35 U.S.C. 102(a)(2) as being anticipated by FANG (CN 101606758; US 2011/0011396 A1 used for translation).

FANG relates to an electronic cigarette using an atomizer. (Abstract, [0002])

FANG discloses an embodiment of an electronic cigarette 400 that includes a *container 100 configured for storing a tobacco flavored liquid*, an *atomizer 200* configured for vaporizing the liquid by electric heating, and a battery tube 300 configured for powering the atomizer 200 and controlling the atomizer 200 to vaporize the liquid. [0012] In Fig. 2 (reproduced below), the reference shows container 100 that is detachably connected to the atomizer 200 to facilitate replacement of the container 100 and the liquid. The container 100 includes an inhalation element 1, a liquid tank 2, and an absorbent element 3. The inhalation element 1 is shaped as a substantially hollow cylinder defining an opening 102 at one end and *an inhalation hole 104* at the other end thereof. The liquid tank 2 defines *a smoke channel 106* in a middle portion thereof communicating with the inhalation hole 104. The liquid tank 2 is received in the inhalation

element 1 and contacts a sidewall of the inhalation element 1 with one end. The sidewall of the inhalation element 1 and the other end of the liquid tank 2 cooperatively define a gap 108 therebetween to receive the absorbent element 3. The inhalation element 1, the liquid tank 2 and the absorbent element 3 cooperatively define *a liquid storage area 110* to receive the liquid. (Refer to [0013])

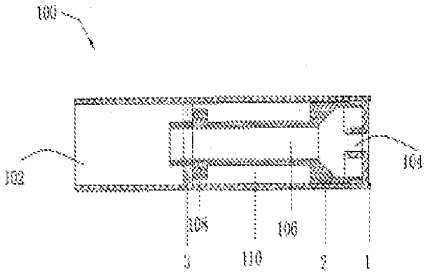


FIG. 2

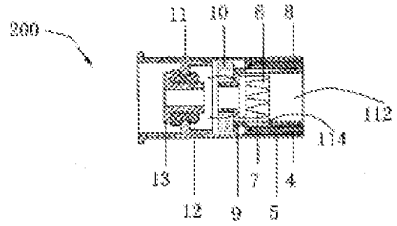


FIG. 3

Referring to Fig. 3 (reproduced above), the atomizer 200 *includes a liquid conducting element 4*, a heating wire 7, a metal fiber element 8, *an atomizing cup 9*, among others. The atomizing cup 9 defines *a cavity 112* in a middle portion thereof. The cavity 112 communicates with the smoke channel 106. The atomizing cup 9 defines *two coaxial through holes 114* on a sidewall thereof communicating with the cavity 112. The heating wire 7 is located inside the sleeve 6. When the heating wire 7 is heated by electricity, *the liquid is vaporized and then*

passes through the smoke channel 106 and the inhalation hole 104 to reach a user's mouth. The atomizer 200 uses the metal fiber element 8 to guide the liquid to reach the heating wire 7 according to capillary principle, such that an improved atomizing effect can be achieved. The *liquid conducting material 4 is capable of storing the tobacco flavored liquid temporarily according to capillary principle* and can resist heat from conducting to container 100 effectively. [0014]

Regarding **claim 1**, the electronic cigarette 400 of FANG comprises:

-a container 100 (equated to housing) that has an inhalation element 1 (equated to mouthpiece) with an inhalation hole 104 (equated to aerosol outlet) (Refer to [0013], Fig. 1 and Fig. 2)

-an atomizer 200 configured for vaporizing the liquid by electric heating [0013]

-the atomizer includes a cavity 112 that couples to smoke channel 106, the atomizing cup 9 defines two coaxial through holes 114 on a sidewall thereof communicating with the cavity 112, such that the liquid guided by the metal fiber element 8 can flow into the sleeve 6. (Refer to [0014])

-a liquid storage area 110 (equated to claimed liquid reservoir)

- the apparatus includes a liquid conducting material 4 that is capable of storing the tobacco flavored liquid temporarily according to capillary principle and a metal fiber element 8 that guides the liquid to reach the heating wire 7 according to capillary. [0014] The liquid conducting material 4 and the metal fiber element 8 provide for the claimed wick.

- cavity 112 (atomizer outlet) and the inhalation hole 104 (aerosol outlet) are coupled by smoke channel 106 (chimney).

Regarding the limitation "*atomizing chamber having an air inlet*," it is noted that the portion opposite to the cavity 112 in Fig. 3 provides for an air inlet. The switch 18 is attached to that portion and switch 18 includes a perforated plate 516 that allows for airflow to pass through. (Refer to [0017]) Thus, the atomizing chamber inherently possess an air inlet in order for the electronic cigarette to properly work as described in [0018].

Regarding **claim 5**, the smoke channel 106 (chimney) sealably passes through the liquid storage area 100 (liquid reservoir). (Refer to Fig. 2)

Regarding **claim 6**, FANG teaches using electric heating to vaporize the liquid. It uses a heating wire 7. (Refer to [0012]; Fig. 3)

Regarding **claim 8**, Fig. 3 shows that the atomizer has a tubular form defining an open central passage.

Regarding **claim 17**, the electronic cigarette of FANG provides for the transferring of liquid from a liquid reservoir (liquid storage area 110) of an electronic cigarette cartridge (container 100) to an atomizing chamber (atomizer 200) with a wick (conducting material 4 and the metal fiber element 8) extending between the liquid reservoir and the atomizing chamber.

Regarding the limitations "generating an aerosol of the liquid in the atomizing chamber; and channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet," FANG teaches that the liquid is vaporized and then passes through the smoke channel 106 and the inhalation hole 104 to reach a user's mouth. (Refer to [0014]) Thus, claim 17 is anticipated by FANG.

Regarding **claims 18 and 23**, the liquid storage area 110 of FANG is defined by the inhalation element 1, the liquid tank 2 and the absorbent element 3. (Refer to [0013] and Fig. 2)

The liquid storage area 110 has been equated to the claimed liquid reservoir. The liquid is stored within space 110.

Regarding **claim 19**, the transferring of liquid from the liquid storage area 110 in FANG to the atomizer 200 with liquid conducting material 4 and metal fiber element 8 comprises transferring the liquid by capillarity as here claimed. (Refer to [0014])

Regarding **claim 20**, FANG teaches the use of an atomizer 200 configured for vaporizing the liquid by electric heating. [0012]

Regarding **claim 21**, FANG teaches that the liquid is vaporized and then passes through the smoke channel 106 (equated to chimney) and the inhalation hole 104 to reach a user's mouth. (Refer to [0014]) It is noted that the smoke channel 106 is defined by the liquid tank 2 and it is sealed from the liquid tank 2. (Refer to [0013], Fig. 1 and Fig. 2)

Regarding **claim 24**, the coaxial through holes 104 appear to be circular. (Refer to Fig. 3)

Regarding **claims 25 and 26**, FANG teaches that the sleeve 6 is received in the cavity 112 and aligned with the two through holes 114, such that the liquid guided by the metal fibers element 8 can flow into the sleeve 6. [0014]

Regarding **claim 30**, the apparatus of Fig. 1 shows a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

Regarding **claim 31-33**, Fig. 1 shows a cylindrical chimney and atomizing chamber 100 with the chimney having an exterior diameter less than the diameter of the chamber. Similarly, it shows that the maximum transverse dimension of the chimney is less than that of the interior diameter of the atomizing chamber. Both appear as a single unit.

Regarding **claim 36**, FANG teaches a battery tube 300 and a switch 18 that includes an actuating film 514. When there is a negative pressure, the switch is turned off via actuating film 514. When there is positive pressure, the switch cannot be turned off. (Refer to [0017] and [0018])

Regarding **claims 37-38**, FANG teaches an LED 27 that is turned on by the control circuit board 19 when the side of the actuating film 514 is in negative pressure condition, to imitate a lighting effect as a conventional cigarette. (Refer to last sentence of [0018])

Regarding **claims 29 and 39**, Fig. 1 the construction of FANG shows a sealed connection of the smoke channel 106 and the atomizer outlet 112 with a sealed path from the atomizer outlet through the smoke channel 106 to the inhalation hole 104.

Regarding **claim 40**, FANG teaches an atomizing electronic cigarette embodiment characterized in that the housing is an integrated whole. Thus, providing a single unit. (Refer to [0056] and Fig. 6)

Claims 1, 2, 3, 6, 7, 11, 15, 17-20, 22-23 and 33-35 are rejected under 35 U.S.C. 102(a)(2) as being anticipated by TAKEUCHI (US 6,155,268).

TAKEUCHI relates to a flavor-generating device for enjoying inhalation of flavor or for enjoying simulated smoking. (Col. 1, lines 4-6)

In the embodiment disclosed in Fig. 8 (reproduced below), TAKEUCHI shows a device 100 that comprises a housing (formed by the wall defining upper chamber 121) having a mouthpiece 161 with an aerosol outlet 102; an atomizer provided by heater 371 that responds to electric current provided by power source 44 and it is coupled to aerosol outlet 102 by the upper chamber 121; there is an air passageway 104 and a liquid passageway 371 (equated to the claimed wick). The liquid passageway 371 is in liquid communication with the liquid source 34

in the container 32 (liquid reservoir). The liquid passageway 371 is defined between the aperture formed by two substantially parallel plates spaced apart from each other. The distal end portion (the outlet portion of the liquid source) of the liquid passageway 371 is heated by plate like heaters 421 and 422 (these are equated to the claimed atomizer) mounted to the plate 361 and 362, respectively. The upper chamber 121 provides for the atomizing chamber and the chimney. Thus, **claim 1** is anticipated by TAKEUCHI. Regarding **claim 7**, the wick engages with the resistive heating elements 421 and 422. The liquid passageway transports the liquid flavor source therethrough by capillary force. (Refer to Abstract; Col. 8, lines 59-67 bridging to Col. 9, lines 1-34; Fig. 10)

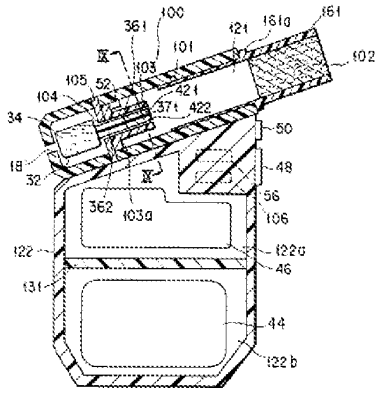


FIG. 8

Regarding **claims 2 and 3**, the housing has an air intake port 18 that delivers air to the air passageway 104 and coupled by conduit formed by space around container 32. (Refer to Fig. 8)

Regarding **claim 6**, plates 421 and 422 are plate like heaters. (Col. 9, lines 33-34)

Regarding **claim 11**, TAKEUCHI further teaches that liquid passageway 36 through which the liquid flavor source is transported by the capillary force can be constituted by bundled fibers. (Refer to Col. 3, lines 36-50; Fig. 1)

Regarding **claim 15**, TAKEUCHI teaches that a pouring port 58 for replenishing the liquid source 34 is connected to the liquid container 32. An end portion of the pouring port 58 is exposed to the outside of the casing 12 so as to permit pouring the liquid source 34 into the liquid container 32. Usually, a removable cap 59 is provided in the exposed end portion of the pouring port 58. (Col. 7, lines 18-23; Fig. 1)

Regarding **claim 17**, the device of TAKEUCHI transfers liquid from liquid reservoir 32 to atomizer (42, 421 & 422) in upper chamber (121) via a wick (36, 371). The liquid reservoir is sealed from an interior of the atomizer (Refer to Figs. 1 and 8). The heater generates an aerosol of the liquid and it is then channeled to an aerosol outlet (22, 102) via the upper chamber 121 (chimney). (Refer to Fig. 1 and 8)

Regarding **claims 18 and 23**, the reference only teaches the inclusion of liquid in the liquid reservoir 32. (Refer to Col. 5, lines 28-39)

Regarding **claim 19**, TAKEUCHI teaches that the liquid passageway transports the liquid flavor source therethrough by capillary force. (Refer to Abstract)

Regarding **claim 20**, TAKEUCHI teaches an electrically powered atomizer. (Refer to Col. 6, lines 15-28)

Regarding **claim 22**, the liquid passage 371 extends between the liquid container 32 and the atomizer (heating elements 421 & 422). (Refer to Fig. 8)

Regarding **claim 33**, the atomizing chamber and the chimney are formed as a single unit as provided by the walls of the upper chamber 121. (Refer to Fig. 8)

Regarding **claim 34**, TAKEUCHI teaches that a transparent peeping window (not shown) can be formed in that portion of the side wall of the casing 12 which corresponds to the liquid container 32 in place of using the liquid amount sensor 54 in order to observe the remaining

amount of the liquid flavor source 34 within the liquid container 32. In this case, the liquid container 32 itself must be formed of a transparent or translucent material. (Col. 7, lines 31-37).

Regarding **claim 35**, TAKEUCHI teaches that mouthpiece 161 may be detachably inserted directly into the open end portion of the upper chamber 121. (Refer to Col. 9, lines 9-22; Fig. 8)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 28 are rejected under 35 U.S.C. 103 as being unpatentable over FANG as applied to claims 1, 5-6, 8, 17-21, 23-26, 29-33 and 36-40 above, and further in view of HON (CA 2884987).

Regarding **claim 2**, while FANG provides an air inlet via cavity 112 (as set forth above), it fails to teach an inlet vent formed on the exterior of the housing and coupled to deliver air to said atomizing chamber air inlet.

HON discloses an atomizing electric cigarette. (Abstract; Page 1, first paragraph) The atomizing electric cigarette comprises: a housing 8' with an aerosol outlet *"a;"* an atomizer 5 with an air vent 101 and a liquid permeating component 6 (wick); a liquid storage component 3. The atomizer outlet and the aerosol outlet are coupled by channel 31. (Refer to Figs. 1 and 2 (reproduced below); Page 2, first paragraph; Pages 5-6) It would have been obvious to provide

the housing of FANG with an inlet vent on the exterior of the housing with the purpose of forming an airflow loop. (Refer to Page 3, paragraph 5)

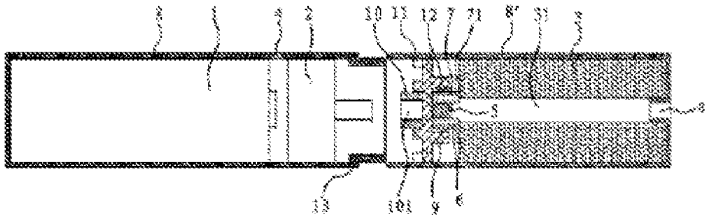


Fig. 1

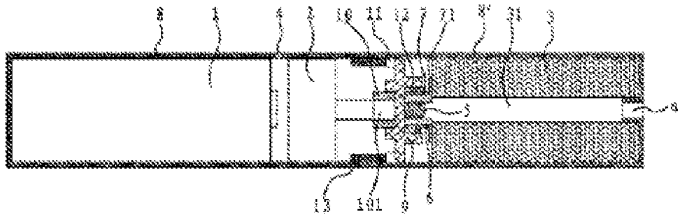


Fig. 2

Regarding **claim 28**, in Fig.6 (reproduced below) HON teaches an embodiment in which the liquid storage component 3 surrounds and is sealed from an interior of the atomizing chamber 5.

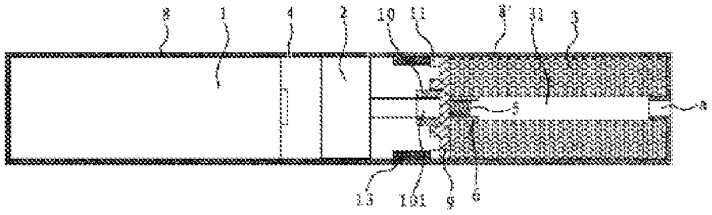


Fig. 6

Claims 7, 9, 11-13, 15 and 34 are rejected under 35 U.S.C. 103 as being unpatentable over FANG as applied to claims 1, 5-6, 8, 17-21, 23-26, 29-33 and 36-40 above, and further in view of TAKEUCHI (US 6,155,268).

Regarding **claim 34**, FANG fails to teach that the housing comprises a transparent material.

TAKEUCHI relates to a flavor-generating device for enjoying inhalation of flavor or for enjoying simulated smoking. (Col. 1, lines 4-6) In one embodiment, the reference teaches a device that comprises a chamber 121 having an air inlet port 18 for introducing the air thereinto and an inhalation port 22 through which a user inhales a flavor, and defining a gas passageway 20 between the air inlet port and the inhalation port; a liquid container 32 for storing a liquid 34 containing a flavor substance, and maintained at substantially an atmospheric pressure; at least one liquid passageway 37 having a first end portion which is in a fluid communication with the liquid and a second end portion which is in a fluid communication with the gas passageway, for transporting the liquid from the liquid container to the second end portion by capillary force; and a heater 42 mounted at the second end portion of the liquid passageway, for heating and gasifying or evaporating the liquid transported from the liquid container. (Col. 2, lines 1-16; Col. 4, lines 29-67 bridging Col. 5, lines 1-62; Figure 1) TAKEUCHI teaches that a transparent peeping window (not shown) can be formed in that portion of the side wall of the casing 12 which corresponds to the liquid container 32 in place of using the liquid amount sensor 54 in order to observe the remaining amount of the liquid flavor source 34 within the liquid container 32. In this case, the liquid container 32 itself must be formed of a transparent or translucent material. (Col. 7, lines 31-37).

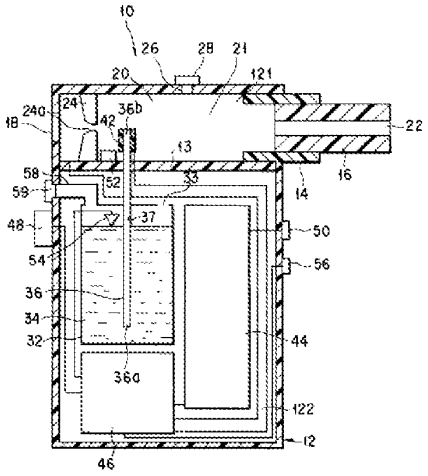


FIG. 1

Since both, FANG and TAKEUCHI, are directed to smoking apparatuses, the purpose disclosed by TAKEUCHI would have been recognized in the pertinent art of FANG.

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify the housing of FANG and provide it with a transparent peeping window of TAKEUCHI with the motivation of observing the remaining amount of the liquid within the liquid container so as to find the timing for replenishing the liquid as disclosed by TAKEUCHI. (Col. 7, lines 38-41).

Regarding **claims 7, 9 and 11-13**, FANG fails to teach that the wick partially engages the resistive heating element, that it passes through the open central passage or that it is a bundle of fibers. TAKEUCHI further teaches that liquid passageway 36 through which the liquid flavor source is transported by the capillary force can be constituted by bundled fibers. (Refer to Col. 3, lines 36-50; Fig. 1) The liquid passageway 36 equates to a wick. TAKEUCHI shows that the liquid passageway 36 engages with the resistive heating element 42. (Refer to Figs. 2a-2c, Col. 7, lines 57-67 bridging to Col. 8, lines 1-4) While TAKEUCHI does not specifically teaches the

use of heat resistant fibers, it would have been obvious to one of ordinary skill in the art to use a heat resistant material (such as fiberglass, aramid, fluorocarbon, sulfide, melamine, polymide, carbon and glass, which are well known heat resistant materials); when bundled fibers are used in the liquid passageway and are engaged with the heating element 42. Regarding **claim 15**, TAKEUCHI teaches that a pouring port 58 for replenishing the liquid source 34 is connected to the liquid container 32. An end portion of the pouring port 58 is exposed to the outside of the casing 12 so as to permit pouring the liquid source 34 into the liquid container 32. Usually, a removable cap 59 is provided in the exposed end portion of the pouring port 58. (Col. 7, lines 18-23; Fig. 1)

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1-16 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 8,528,569 in view of HON (CA 2884987).

Claims 1 and 5 of the '569 Patent provide for a similar invention as claim 1 of the present reissue, except that they fail to claim that the atomizer generates an aerosol of the liquid "in response to electric current flowing therethrough." HON discloses an atomizing electronic cigarette and teaches that when the user inhales, as the sensor 2 communicates with the air vent 101, the through hole 51, the channel 31 and the air suction port "a" form an airflow loop with the auxiliary air inlet 4. When the gas flow is generated inside the electronic cigarette, the sensor 3

switches the circuit on, the electric heater 5 starts to heat to make the cigarette liquid in the liquid permeating component 6 be gasified after reaching the boiling point. (Abstract; Page 7, last paragraph bridging to Page 8, first paragraph). Thus, it would have been obvious to a person having ordinary skill in the art to use an electric current with the motivation of producing aerosol as disclosed by HON. (Page 7, last paragraph bridging to Page 8, first paragraph) Claims 2-4 and 6-17 of the '569 Patent provide for the limitations in dependent claims 2-16 of the present reissue.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims 41-44 and 46-55 are allowable because the prior art of record fails to teach that the atomizing chamber comprises a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and the liquid reservoir and a wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir. **Claim 45** is free of prior art for the same reasons but it is rejected under 112(b) as set forth above.

Dependent claims 4, 10, 14, 16 and 27 are free of prior art, but are rejected on the ground of nonstatutory double patenting as set forth above.

The prior art of record fails to teach an electronic cigarette cartridge apparatus of the present invention in which the conduit that connects the inlet vent on the exterior of the housing that delivers air to the atomizing chamber air inlet, sealably passes through the liquid reservoir as claimed in **Claim 4.**

Regarding **claims 10 and 27**, the prior art of record fails to teach that the "atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes

through said first wick aperture and a second end of said wick passes through said second wick aperture." **Claim 27** (which depends on claim 10), is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding **claim 14**, Fig. 2 of FANG shows liquid storage area 110 (liquid reservoir) formed as an annular cavity between the interior of the container 100 (housing) and the smoke channel 106. However, it fails to teach having the liquid storage area 110 between the container and the atomizing chamber.

Regarding **claim 16**, while the prior art of TAKEUCHI teaches an external access opening to add liquid to the liquid reservoir, it fails to teach that the external access opening is a removable mouthpiece.

Related prior art

2011/0303231 - Li

2013/0081642 – Safari

2014/0209105 - Sears

Conclusion

Claim 27 is objected.

Claims 1-26, 28-40 and 45 are rejected.

Claims 41-44 and 46-55 are allowable.

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 9,596,887 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NORCA LIZ TORRES VELAZQUEZ whose telephone number is (571)272-1484. The examiner can normally be reached on M-Th 7:00 am - 4:30 pm and alternate Fridays-.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Speer can be reached on (313) 446-4825. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Central Reexamination Unit 3991

Conferees:

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Patent Reexamination Specialist
Central Reexamination Unit 3991

/TIMOTHY M SPEER/
Supervisory Patent Examiner, Art Unit 3991

Notice of References Cited	Application/Control No. 16/359,938	Applicant(s)/Patent Under Reexamination Newton, Kyle D.	
	Examiner NORCA L TORRES VELAZQUEZ	Art Unit 3991	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6155268-A	12-2000	Takeuchi; Manabu	A24F47/008	131/273
*	B	US-20110011396-A1	01-2011	FANG; XIAOLIN	A24F47/002	128/202.21
*	C	US-20110303231-A1	12-2011	LI; YONGHAI	A24F47/008	131/329
*	D	US-20120111347-A1	05-2012	Hon; Lik	A24F40/42	131/329
*	E	US-20130081642-A1	04-2013	Safari; Robert	A24F47/008	131/329
*	F	US-20140209105-A1	07-2014	Sears; Stephen Benson	A24F47/008	131/328
	G					
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	K					
	L					
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N	CN-101606758	12-2009	CN		A24F47/008
	O	CA-2884987-A1	08-2010	CA	HON LIK	A24F47/008
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	Art Unit
	NORCA L TORRES VELAZQUEZ	3991

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61M15/06 B01D19/0047 B05B7/1693 A24B15/167	05/27/2020	NT
A24C5/12 A61M15/06 A24F47/00 A24F47/002	05/27/2020	NT

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor's name search; assignee name search	05/27/2020	nt
reviewed prosecution of 14/219,426 and parent cases: 13/955,153 13/157,024	05/27/2020	nt
EAST textsearch	05/27/2020	nt

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/NT/ Patent Reex Specialist, Art Unit 3991	

NJOY Exhibit 1002.152

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	**Art Unit**
	NORCA L TORRES VELAZQUEZ	3991

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	05/27/2020								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
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	36	✓								
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	38	✓								
	39	✓								
	40	✓								
	41	=								
	42	=								

NJOY Exhibit 1002.153

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	**Art Unit**
	NORCA L TORRES VELAZQUEZ	3991

CLAIM		DATE								
Final	Original	05/27/2020								
	43	=								
	44	=								
	45	✓								
	46	=								
	47	=								
	48	=								
	49	=								
	50	=								
	51	=								
	52	=								
	53	=								
	54	=								
	55	=								

NJOY Exhibit 1002.154

Bibliographic Data

Application No: 16/359,938

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /Norca L. Torres Velazquez/ Examiner's Signature | Initials

Title: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/20/2019	131	3991	62210-492RI1US
RULE			

APPLICANTS

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CONTINUING DATA

This application is a REI of 14219426 03/19/2014 PAT 9596887

14219426 is a CON of 13955153 07/31/2013 PAT 8707965

13955153 is a CON of 13157024 06/28/2011 PAT 8528569

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

03/21/2019

STATE OR COUNTRY

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FILING FEE RECEIVED

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Office de la Propriété Intellectuelle du Canada
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(21) 2 884 987

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(62) Demande originale/Original Application: 2 752 255

(30) Priorité/Priority: 2009/02/11 (CN200920001296.3)

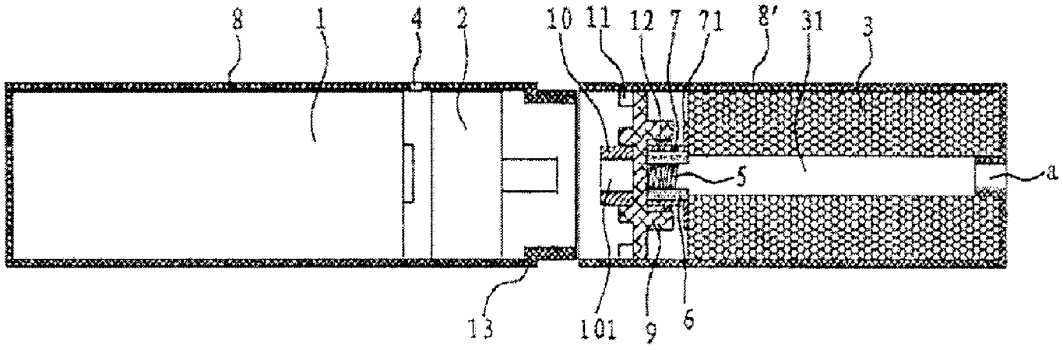
(51) Cl.Int./Int.Cl. *A24F 47/00* (2006.01)

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HON, LIK, HK

(74) Agent: FASKEN MARTINEAU DUMOULIN LLP

(54) Titre : CIGARETTE ELECTRONIQUE A PULVERISATION AMELIOREE
(54) Title: AN IMPROVED ATOMIZING ELECTRONIC CIGARETTE



(57) Abrégé/Abstract:
An improved atomizing electronic cigarette has a power device (1), a sensor (2), an atomizing core component and a liquid storage component (3). The cigarette also has a containing shell, an auxiliary air inlet (4) is provided on the shell. The atomizing core component includes an electric heater (5) and a liquid permeating component (6). The electric heater (5) has a through hole (51), the liquid storage component (3) has a channel (31), and the sensor (2) is connected with the through hole (51) and the channel (31), and forms an airflow loop by the auxiliary air inlet. The liquid permeating component (6) in the atomizing core component of the cigarette is directly sleeved on the electric heater (5), so that the cigarette can adequately heat gasified smoke with uniform small drops, and the user can accept easily and the smoke can easily enter lung bubble and can be absorbed conveniently. The electric heater (5) and the liquid storage component (3) are connected with the through hole (51) and the channel (31), so that the smoke generated by atomizing process can be cooled under the push of airflow, and the absorbed smoke meets the taste of smoker. The cigarette has detachable split structure, so that the cigarette can exchange and carry conveniently

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ABSTRACT

An improved atomizing electronic cigarette has a power device (1), a sensor (2), an atomizing core component and a liquid storage component (3). The cigarette also has a containing shell, an auxiliary air inlet (4) is provided on the shell. The atomizing core component includes an electric heater (5) and a liquid permeating component (6). The electric heater (5) has a through hole (51), the liquid storage component (3) has a channel (31), and the sensor (2) is connected with the through hole (51) and the channel (31), and forms an airflow loop by the auxiliary air inlet. The liquid permeating component (6) in the atomizing core component of the cigarette is directly sleeved on the electric heater (5), so that the cigarette can adequately heat gasified smoke with uniform small drops, and the user can accept easily and the smoke can easily enter lung bubble and can be absorbed conveniently. The electric heater (5) and the liquid storage component (3) are connected with the through hole (51) and the channel (31), so that the smoke generated by atomizing process can be cooled under the push of airflow, and the absorbed smoke meets the taste of smoker. The cigarette has detachable split structure, so that the cigarette can exchange and carry conveniently

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An improved atomizing electronic cigarette

Technical field of the invention

The invention relates to an atomizing electric cigarette, in particular to an improved atomizing electric cigarette.

Background of the invention

As a cigarette substitute, atomizing electronic cigarettes have occupied a large percentage of the market for smoking substitute products, meanwhile, the improvement and maturity of atomizing electronic cigarette technology is a prerequisite for widespread application and acceptance of electronic cigarettes.

At present, the existing atomizing electronic cigarettes still have many problems and shortcomings, for example, poor atomization, large liquid drops in the final atomized smoke, nonuniform smoke caused by different sizes of liquid drops, too much moisture in the smoke, poor mouthfeel, etc. In some conditions, the smoke is at a high temperature because of insufficient cool-down and will cause discomfort.

The above problems cause significant differences between real cigarettes and electronic cigarettes for smokers, which is not conducive for smokers to select electronic cigarettes in place of real ones.

Summary of the invention

In order to overcome various shortcomings in the prior art, some embodiments of the invention provide an improved atomizing electronic cigarette having a liquid permeating component in an atomizer that is directly sleeved on an electric heater. Cigarette liquid stored in a liquid storage component permeates into the liquid permeating component. The electric heater directly interacts with the liquid permeating component, such that the cigarette liquid is atomized more sufficiently with smaller and more uniform atomized or vaporized droplets. In another aspect, by communicating through holes and channels provided and arranged in the electric heater and the liquid storage component, the atomized large drops can adhere to the liquid storage component under the pressure of airflow, such that the inhaled smoke is more similar to the feel a real cigarettes to more suitable meet the taste of smoker.

The main technical solution of an embodiment of the invention is as follows: an improved

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atomizing electronic cigarette is provided, comprising a power supply unit, a sensor, an atomizing core component and a liquid storage component, further comprising a housing containing above components. An auxiliary air inlet is arranged on the housing. One end of the housing is provided with an air suction port. The atomizing core component comprises an electric heater that can atomize liquid from the liquid storage component. The liquid storage component can have an internal channel through which the atomized gas can flow, and the auxiliary air inlet, the sensor and the suction nozzle can form an airflow loop. The through hole through which gas flows can be formed from an internal channel having channel walls in the liquid storage component such that the atomized gas is directly contacted with the core of the liquid storage component through the channel walls, and large particles of atomized gas can be absorbed due to contact with the liquid storage container. Also, the sensor can communicate with the channel to form an airflow loop with the auxiliary air inlet.

The invention also employs the following affiliated technical solution: the atomizing core component comprises a liquid permeating component that is sleeved on an electric heater, a channel or through hole through which gas flows is arranged in the atomizing core component, and the channel or through hole is made up of the structure of the electric heater and liquid permeating component.

The electric heater of the atomizing core component can be directly inserted or stretch directly into the channel of the liquid storage component, such that the atomized gas directly flows through the channel.

The liquid storage component can be internally provided with a hollow channel, a through-hole channel, an annular channel or a cross section of sparse mesh channels or combinations thereof, through which gas flows.

The atomizing core component can further comprise a liquid conduction or transportation component in contact with the liquid permeating component and the liquid storage component.

The liquid conduction or transportation component can be sleeved on the liquid permeating component, and include a conduction part that extends from one end of the liquid conduction component in the radial direction to contact with the liquid storage component.

The sensor can be an air pressure sensor or air flow sensor. The housing can comprise a first housing and a second housing, the power device and the sensor are located in the first housing, the atomizing core component and the liquid storage component are located in the second housing, and the auxiliary air inlet is arranged in an area of the first housing and/or the

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second housing close to the sensor.

A bracket is arranged in the second housing, where the atomizing core component is fixed on the bracket. The electric heater is connected with the power supply unit and the sensor, and starts to heat or stops heating according to the flow situation of gas through the sensor.

An air-intake connection component and an electrode ring are arranged on the bracket, the air-intake connection component and the electrode ring are electrically connected with two leads of the electric heater respectively. The air-intake connection component achieves electric connection through connection with the sensor. The electrode ring is electrically connected with the power device through the connection of the air-intake connection component and the sensor. The air-intake connection component also has an air vent, and the sensor communicates with the air vent. The through hole and the channel and forms an airflow loop with the auxiliary air inlet.

The first housing and the second housing are joined through the connection of the air-intake connection component and the sensor, and the air-intake connection component and the sensor are connected by means of splicing or plugging, threads, or clamping.

An air suction port is arranged on the second housing, and the sensor communicates with the air vent, the through hole, the channel and the air suction port, and forms an airflow loop with the auxiliary air inlet.

The housing can be an integrated or whole, the front end of which is provided with the auxiliary air inlet, and the sensor communicates with the air vent, the through hole, the channel and the air suction port and forms an airflow loop with the auxiliary air inlet.

The liquid permeating component can be in contact with the liquid storage component. The atomizing core component can be sleeved in the channel of the liquid storage component. The peripheral surface of the liquid permeating component can be mated with the inner wall of the channel.

The liquid storage component can be made of micro-hole ceramic, foamed ceramic, natural fiber, artificial fiber or foam metal material. The liquid permeating component can be made of ceramic fiber, quartz fiber, glass fiber, aramid fiber, common fiber, paper, fabric or non-woven fabric material. The electric heater can be formed by spirally winding electric heating wires or made up of electric heating film arranged on the inner surface of the liquid permeating component, and the electric heater formed by spirally winding or electric heating film on the inner surface of the liquid permeating component can be hollow to form the

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through hole.

The thickness of the liquid permeating component can be from 0.5 to 5mm, and the diameter of the through hole can be from 0.5 to 4mm.

Zeolite particles can be added in the liquid permeating component.

Aspects of the invention can have the following beneficial effects:

(1) the liquid permeating component in the atomizing core component can be directly sleeved on the electric heater such that cigarette liquid in the liquid storage component can permeate into the liquid permeating component. The thickness of the liquid permeating component can be designed to be only 1mm, such that cigarette liquid permeated in the liquid permeating component can be completely atomized, vaporized or gasified by the electric heater more easily, by for example, when the cigarette liquid in the liquid permeating component is gasified after reaching the boiling point when the electric heater heats. As a result, the gasification of the liquid is more efficient. For example, the drops are smaller and more uniform, having a diameter between 0.04 micrometers to 0.8 micrometers. Such vapor is much more like real cigarette smoke in terms of dispersion degree and appearance. Such vapor is more easily accepted by the pulmonary aveoli and can be absorbed conveniently. Meanwhile, as through holes and channels that are communicated together are arranged in the electric heater and the liquid storage component, atomized gas can pass through the liquid storage component smoothly. And atomized large drops can be absorbed at, or adhere to, the liquid storage component under the pressure of airflow, a common problem in the prior art where vapor having large particles is passed directly to the user. Thus current embodiments produce inhaled smoke that more closely meets the taste of smoker.

(2) In another solution of the some embodiments of the invention, the atomized core component is sleeved in the channel of the liquid storage component, such that the liquid permeating component is directly contacted with the liquid storage component. The cigarette liquid can permeate and conduct more sufficiently and rapidly, to more efficiently produce vapor or atomized smoke. In addition, the structure is simple and saves space, such that the volume of the whole atomizing electronic cigarette can be smaller.

(3) In another embodiment of the invention, the electronic cigarette is designed to be detachable and changeable, such that change of components can be simply achieved by detaching and reassembling the first and second housings. Such an electronic cigarette is more convenient to carry as it is also more portable.

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Brief description of the drawings

Fig. 1 is a side sectional view of an electronic cigarette according to the invention, showing the first housing separate from the second housing;

Fig. 2 is a side sectional view of an electronic cigarette according to the invention, showing the first housing connected to the second housing;

Fig. 3 is a side sectional view of an atomizing core component in an electronic cigarette according to the invention;

Fig. 4 is a top view of an atomizing core component in an electronic cigarette according to the invention;

Fig. 5 is an electrical connection block diagram for forming a closed loop among components of an electronic cigarette according to the invention, and

Fig. 6 is a side cutaway view of an electronic cigarette according to another embodiment of the invention.

Detailed description of the invention

The invention will be described in detail below in conjunction with the drawings.

As shown in Fig. 1 to Fig. 5, the invention provides an improved atomizing electronic cigarette, comprising a power device 1, a sensor 2, an atomizing core component and a liquid storage component 3, further comprising a housing containing the above components. An auxiliary air inlet 4 is arranged on an area of the housing close to the sensor 2. The atomizing core component comprises an electric heater 5 and a liquid permeating component 6 sleeved on the electric heater 5. The electric heater 5 is of a hollow structure and has a through hole 51 through which gas flows. The liquid storage component 3 internally has a channel 31 through which the gas flows. The channel can be a hollow channel, a through-hole channel, an annular channel or a channel with local sparse mesh in cross section or combinations thereof, the purpose of which is to make the atomized gas that passes through the channel contact with the liquid storage core of the liquid storage component, and to make the liquid storage component 3 coordinate with the liquid permeating component 6 to permeate cigarette liquid to the liquid permeating component 6. In addition, the sensor 2 communicates with the through hole 51 and the channel 31 and forms an airflow loop with the auxiliary air inlet 4.

In the embodiment, as shown in Fig. 1 to Fig. 3, the atomizing core component further

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comprises a liquid conduction component 7 that is contacted with the liquid permeating component 6 and with the liquid storage component 3. The liquid conduction component 7 is sleeved on the liquid permeating component 6, with a conduction part 71 that extends from one end of the liquid conduction component in the radial direction, and is contacted with the liquid storage component 3. As a result, cigarette liquid on the liquid storage component 3 is absorbed and permeated to the liquid permeating component. In order to make the liquid conduction component 7 mate with the liquid permeating component 6 more tightly to improve the liquid conductivity, a fastening sleeve 12 can be sleeved on the liquid conduction component 7.

As shown in Fig. 1, the sensor 2 can be an air pressure sensor or airflow sensor. In the embodiment, an airflow sensor is used. The housing comprises a first housing 8 and a second housing 8', the power supply unit 1 and the sensor 2 are located in the first housing 8, the atomizing core component and the liquid storage component 3 are located in the second housing 8', and the auxiliary air inlet 4 is arranged in an area of the first housing 8 and/or the second housing 8' close to the sensor 2. In the embodiment, the auxiliary air inlet 4 is arranged on the first housing 8 and located in an area close to the sensor 2. The power supply unit 1 is a battery that can be a rechargeable battery or disposable battery.

A bracket 9 is arranged in the second housing 8', the atomizing core component is fixed on the bracket 9, and the electric heater 5 is connected with the power device 1 and the sensor 2 and starts to heat or stops heating according to the flow situation of gas detected by the sensor 2. An air-intake connection component 10 and an electrode ring 11 are arranged on the bracket 9. The air-intake connection component 10 and the electrode ring 11 are electrically connected with two leads of the electric heater 5, respectively. The air-intake connection component 10 achieves an electrical connection through connection with the sensor 2. The electrode ring 11 is electrically connected with the power device 1 through the connection of the air-intake connection component 10 and the sensor 2. A complete closed loop is formed, as shown in Fig. 4. The function of the sensor is to switch on or off the whole circuit according to the gas flow. When user inhales, gas inside the electronic cigarette flows. At this time, the sensor switches the circuit on to start the electric heater 5 to heat. When the user stops inhaling, gas stops flowing, and the sensor switches the circuit off to make the electric heater 5 stop heating. An electrode ring post 13 corresponding to the electrode ring 10 is arranged at the opening of the first housing 8. A contact part 131 extends from the electrode ring post 13 in the axial direction. The electrode ring post 13 is connected with the

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power device 1. When the first housing 8 and the second housing 8' are connected, the contact part 131 is inserted into the second housing 8' and contacted with the electrode ring 11, thereby to form a complete closed loop.

In this embodiment, the first housing 8 and the second housing 8' are connected through the connection of the air-intake connection component 10 and the sensor 2, and the air-intake connection component 10 and the sensor 2 are connected by means of splicing or plugging, threads, or clamping. Through such a detachable and changeable split structure, the change of components can be simply achieved by detaching and reassembling the first housing 8 and the second housing 8', such that it is convenient to carry and use the electronic cigarette. This embodiment discloses a connection structure by means of threads.

As shown in Fig. 1, the air-intake connection component 10 also has an air vent 101, the sensor 2 communicates with the air vent 101, the through hole 51 and the channel 31 and forms an airflow loop with the auxiliary air inlet 4. An air suction port a is arranged on the second housing 8', and the sensor 2 communicates with the air vent 101, the through hole 51, the channel 31 and the air suction port a and forms an airflow loop with the auxiliary air inlet 4.

The liquid storage component 3 is made of liquid storage core materials such as micro-hole ceramic, foamed ceramic, natural fiber, artificial fiber or foam metal material. The liquid permeating component 6 is made of ceramic fiber, quartz fiber, glass fiber, aramid fiber, common fiber, paper, fabric or non-woven fabric material. The thickness of the liquid permeating component 6 is from 0.5 to 5mm. The electric heater 5 is formed by spirally winding electric heating wires, which forms the through hole 51. The diameter of the through hole 51 can be from 0.5 to 4mm. In this embodiment, the thickness of the liquid permeating component 6 is 1mm, and the diameter of the through hole 51 is 1mm.

The liquid permeating component 6 in the atomizing core component is directly sleeved on the electric heater 5. Cigarette liquid in the liquid storage component 3 is conducted and permeated to the liquid permeating component 6 by the liquid conduction component 7. The thickness of the liquid permeating component 6 is 1mm. As a result, the permeated cigarette liquid can be completely gasified by the electric heater 5 more easily. When the user inhales, as the sensor 2 communicates with the air vent 101, the through hole 51, the channel 31 and the air suction port a and forms an airflow loop with the auxiliary air inlet 4. When gas flow is generated inside the electronic cigarette, the sensor 3 switches the circuit on, the electric heater 5 starts to heat to make the cigarette liquid in the liquid permeating component 6 be gasified

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after reaching the boiling point. At the same time, because the through hole 51 and the channel 31 of the electric heater 5 and the liquid storage component 3 are in communication, smoke generated during atomizing process can be further cooled under the push of airflow and finally inhaled to the mouth cavity of the user through the air suction port a.

In another preferred embodiment of the invention, as shown in Fig. 6, the liquid permeating component 6 is contacted with the liquid storage component 3. The atomizing core component is sleeved in the channel 31 of the liquid storage component 3, and the peripheral surface of the liquid permeating component 6 is mated with the inner wall of the channel 31.

The liquid storage component 3 can be made of micro-hole ceramic, foamed ceramic, natural fiber, artificial fiber or foam metal material. The liquid permeating component 6 can be made of ceramic fiber, quartz fiber, glass fiber, aramid fiber, common fiber, paper, fabric or non-woven fabric material. The thickness of the liquid permeating component 6 ranks from 0.5 to 5mm. The electric heater 5 is formed by spirally winding electric heating wires to form a through hole 51. The diameter of the through hole 51 can be from 0.5 to 4mm. In this embodiment, the thickness of the liquid permeating component 6 is 1mm and the diameter of the through hole 51 is 1mm.

In this embodiment, the atomizing core component is integrally sleeved in the channel 31 of the liquid storage component 3, such that the spherical surface of the liquid permeating component 6 is directly contacted with the inner wall of the channel 31 of the liquid storage component 3. Because the contact area is larger, the permeation and conduction of cigarette liquid is more sufficient and rapid, and the atomized smoke efficiently generated. At the same time, the structure is simple and saves space, so as to minimize the size of the atomizing electronic cigarette.

In other embodiments, an improved atomizing electronic cigarette is provided comprising a power device (1), a sensor (2), an atomizing core component and a liquid storage component (3), further comprising a housing containing the above components, an auxiliary air inlet (4) being arranged on the housing. One end of the housing is provided with an air suction port, characterized in that the atomizing core component comprises an electric heater (5), the electric heater (5) atomizes liquid in a liquid storage component (3). The liquid storage component (3) internally has a channel (31) through which the atomized gas flows, and the auxiliary air inlet (4), the sensor (2) and the suction nozzle form an airflow loop.

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In other aspects the atomizing electronic cigarette can be characterized in that the atomizing core component comprises a liquid permeating component (6) that is sleeved on the electric heater (5), a channel (51) through which gas flows is arranged in the atomizing core component, and the channel (51) is made up of the structure of the electric heater (5).

In other aspects the atomizing electronic cigarette can be characterized in that the electric heater (5) of the atomizing core component is directly inserted into the channel (31) of the liquid storage component (3), and the atomized gas directly flows through the channel (31).

In other aspects the atomizing electronic cigarette is characterized in that the liquid storage component (3) is internally provided with the channel (31) which is a hollow channel, a through-hole channel, an annular channel or a channel with local sparse mesh in cross section or combinations thereof, through which gas flows.

In other aspects the atomizing electronic cigarette is characterized in that the atomizing core component further comprises a liquid conduction component (7) that is contacted with the liquid permeating component (6), and with the liquid storage component (3).

In other aspects, the atomizing electronic cigarette is characterized in that the liquid conduction component (7) is sleeved on the liquid permeating component (6), a conduction part (71) extends from one end of the liquid conduction component in the radial direction, and the conduction part (71) is contacted with the liquid storage component (3).

In other aspects, the atomizing electronic cigarette is characterized in that the sensor (2) is an air pressure sensor or airflow sensor, the housing comprises a first housing (8) and a second housing (8'), the power device (1) and the sensor (2) are located in the first housing (8), the atomizing core component and the liquid storage component (3) are located in the second housing (8'), and the auxiliary air inlet (4) is arranged in an area of the first housing (8) and/or the second housing (8') close to the sensor.

In other aspects, the atomizing electronic cigarette is characterized in that a bracket (9) is arranged in the second housing (8'), the atomizing core component is fixed on the bracket (9), and the electric heater (5) is connected with the power device (1) and the sensor (2) and starts to heat or stops heating according to the flow situation of gas through the sensor (2).

In other aspects, the atomizing electronic cigarette is characterized in that an air-intake connection component (10) and an electrode ring (11) are arranged on the bracket (9), the air-intake connection component (10) and the electrode ring (11) are electrically connected with two leads of the electric heater (5) respectively, the air-intake connection component (10)

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achieves electric connection through connection with the sensor (2), the electrode ring (11) is electrically connected with the power device (1) through the connection of the air-intake connection component (10) and the sensor (2), the air-intake connection component (10) also has an air vent (101), the sensor (2) communicates with the air vent (101), the through hole (51) and the channel (31) and forms an airflow loop with the auxiliary air inlet (4).

In other aspects, the atomizing electronic cigarette is characterized in that the first housing (8) and the second housing (8') are connected through the connection of the air-intake connection component (10) and the sensor (2), and the air-intake connection component (10) and the sensor (2) are connected by means of splicing or plugging, threads or clamping.

In other aspects, the atomizing electronic cigarette is characterized in that an air suction port (a) is arranged on the second housing (8'), and the sensor (2) communicates with the air vent (101), the through hole (51), the channel (31) and the air suction port (a) and forms an airflow loop with the auxiliary air inlet (4).

In other aspects, the atomizing electronic cigarette is characterized in that the housing is an integrated whole, the front end of which is provided with the auxiliary air inlet (4), and the sensor (2) communicates with the air vent (101), the through hole (51), the channel (31) and the air suction port (a) and forms an airflow loop with the auxiliary air inlet (4).

In other aspects, the atomizing electronic cigarette is characterized in that the liquid permeating component (6) is contacted with the liquid storage component (3), the atomizing core component is sleeved in the channel (31) of the liquid storage component (3), and the peripheral surface of the liquid permeating component (6) is mated with the inner wall of the channel (31).

In other aspects, the atomizing electronic cigarette is characterized in that the liquid storage component (3) is made of micro-hole ceramic, foamed ceramic, natural fiber, artificial fiber or foam metal material, the liquid permeating component (6) is made of ceramic fiber, quartz fiber, glass fiber, aramid fiber, common fiber, paper, fabric or non-woven fabric material, the electric heater (5) is formed by spirally winding electric heating wires or made up of electric heating film arranged on the inner surface of the liquid permeating component, and the electric heater formed by spirally winding or electric heating film on the inner surface of the liquid permeating component is hollow to form the through hole (51).

In other aspects, the atomizing electronic cigarette is characterized in that the thickness of the liquid permeating component (6) ranks from 0.5 to 5mm, and the diameter of the through

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hole (51) ranks from 0.5 to 4mm.

In other aspects, the atomizing electronic cigarette is characterized in that zeolite particles are added in the liquid permeating component (6).

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CLAIMS

1. An electronic cigarette comprising:

   a power supply;

   an sensor;

   a liquid storage area;

   a suction nozzle; and

   an atomizing component, wherein the atomizing component comprises an electric heater, and a liquid permeating component, wherein at least a portion of the electric heater and at least a portion of the liquid permeating component, in combination, form a first channel through which gas can flow.

2. The electronic cigarette of claim 1, wherein the electric heater comprises a coiled wire, and the first channel is formed in the direction of the axis of the coiled wire.

3. The electronic cigarette of claims 1 or 2, wherein the liquid permeating component is sleeved on the electric heater.

4. The electronic cigarette of claims 1, 2 or 3, further comprising a liquid conducting component in fluidic contact with the liquid storage area and the liquid permeating component.

5. The electronic cigarette of claims 1, 2, 3, or 4, further comprising a second channel through the liquid storage area and through which gas can flow.

6. The electronic cigarette of claim 5, wherein the first channel and the second channel are in direct communication.

7. The electronic cigarette of claim 5, wherein at least a portion of the atomizing component is in at least a portion of the second channel.

8. The electronic cigarette of claim 5, wherein at least a portion of the electric heater and the liquid permeating component is in at least a portion of the second channel.

9. The electronic cigarette of claim 5, wherein the electric heater and the liquid permeating component is in at least a portion of the second channel.

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10. The electronic cigarette of claim 5, wherein the electric heater and the liquid permeating component are not in the second channel.

11. The electronic cigarette of claim 1, 2, 3, 4 or 5, wherein the first channel has a substantially circular cross-section having a diameter between 0.5 and 4 mm.

12. The electronic cigarette of claim 4, wherein the liquid conduction component is sleeved on the liquid permeating component,

13. The electronic cigarette of claim 12, wherein the liquid conduction component further comprises a conduction extension that extends from one end of the liquid conduction component to the liquid storage area.

14. The electronic cigarette of claims 1, 2, 3, 4 or 5, further comprising a housing.

15. The electronic cigarette of claim 14, wherein the housing comprises a first housing part and a second housing part, and wherein the first housing part includes the power supply and the sensor, and the second housing part includes the atomizing component and the liquid storage area.

16. The electronic cigarette of claim 15, where in the first housing part and the second housing part are selectively detachable.

17. The electronic cigarette of any one of claims 1–16 further comprising a bracket, wherein the atomizing component is mounted on the bracket.

18. The electronic cigarette of any one of claims 1–16, wherein the liquid storage area comprises micro-hole ceramic, foamed ceramic, natural fiber, artificial fiber or foam metal material.

19. The electronic cigarette of any one of claims 1–16, wherein the liquid permeating component comprises ceramic fiber, quartz fiber, glass fiber, aramid fiber, common fiber, paper, fabric or non-woven fabric material,

20. The electronic cigarette of any one of claims 1–16, wherein the liquid permeating component comprises zeolite particles.

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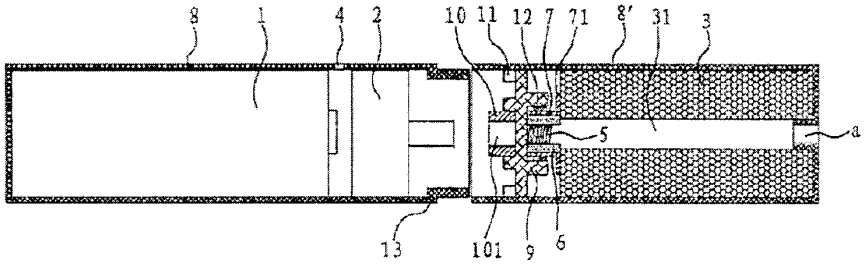


Fig. 1

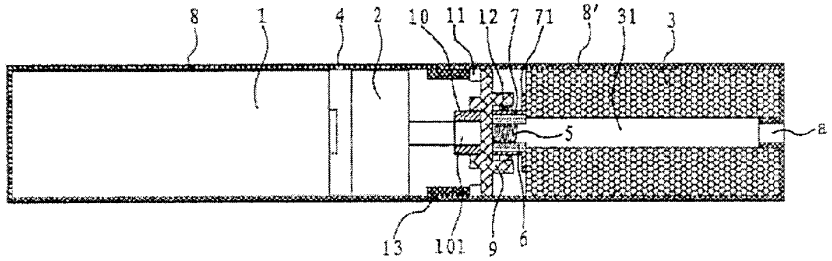


Fig. 2

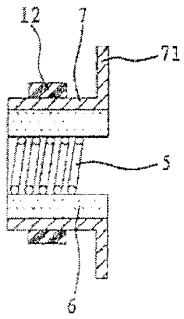


Fig. 3

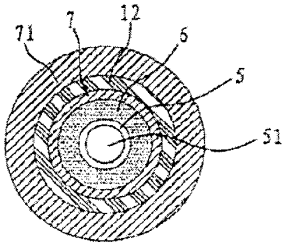


Fig. 4

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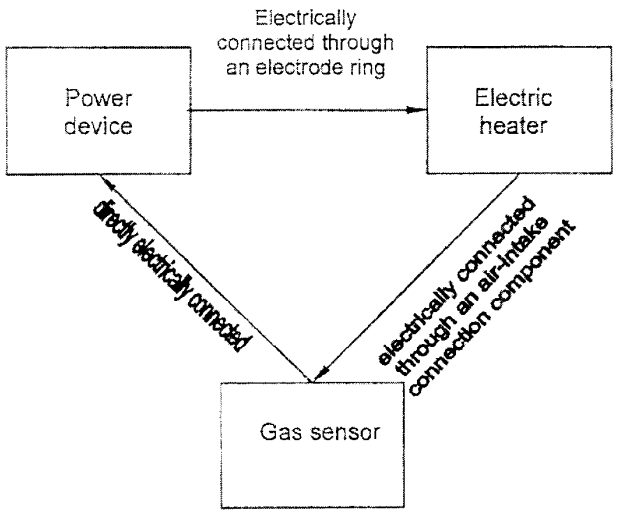


Fig. 5

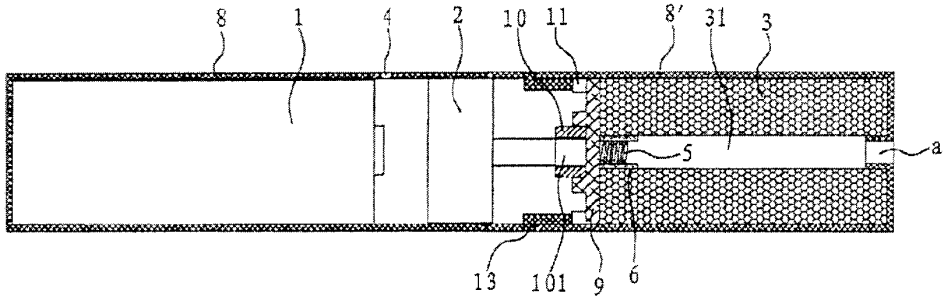
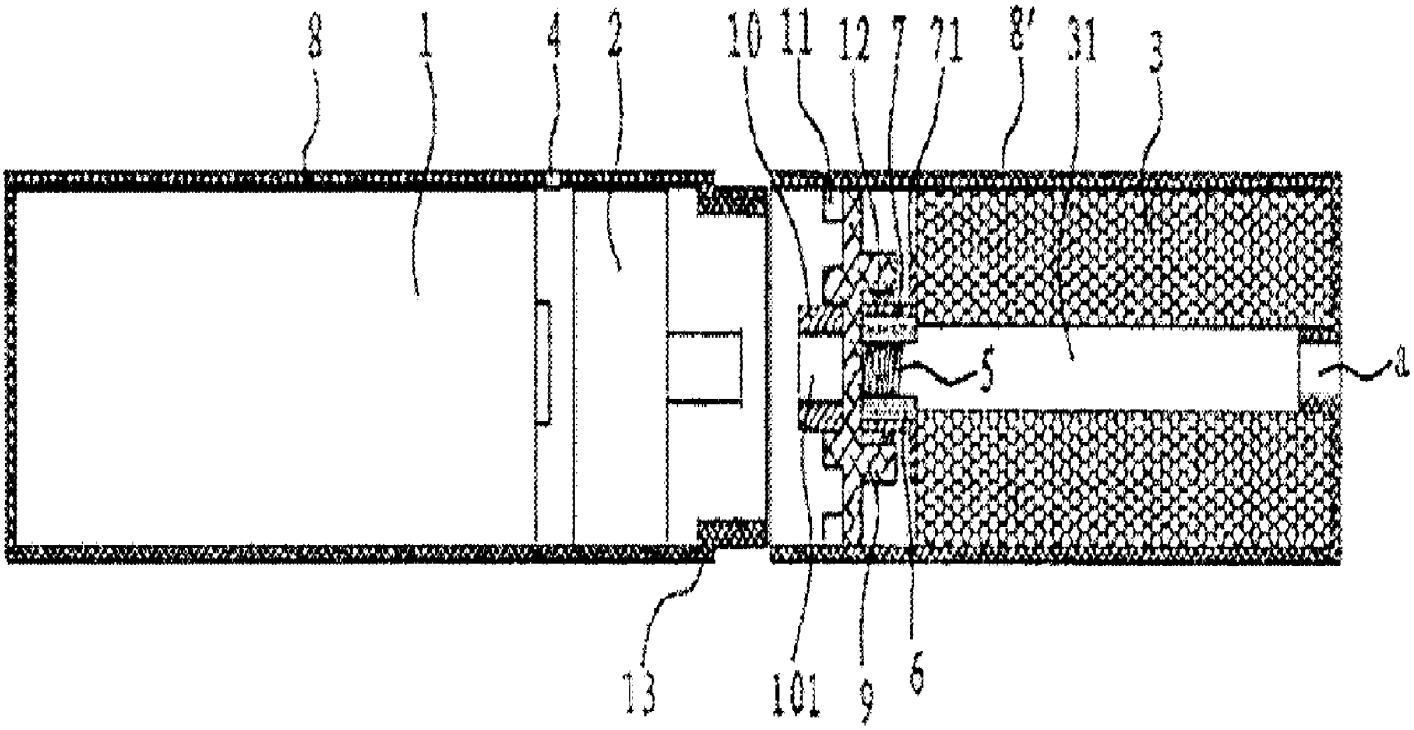


Fig. 6

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EAST Search History

EAST Search History (Prior Art)

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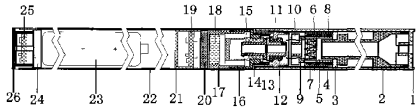
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权利要求书 2 页 说明书 5 页 附图 3 页

[54] 发明名称

电子烟

[57] 摘要

一种电子烟，包括：烟咀，用于存储烟液；雾化器，与所述烟咀相连通过电加热将所述烟液雾化；电池管，与所述雾化器相连以提供电源，所述电池管内设有在气压的作用下移动的动膜，所述动膜的移动控制雾化器将所述烟液雾化。通过电加热将烟液雾化，不需要明火即可获得与香烟气味相近的雾化烟液，可以避免产生火灾。上述电子烟可作为香烟的替代品，长期使用可有效避免香烟对人体的危害，同时可以降低吸烟成本，无烟灰、无明火，环保而且无消防隐患。



NJOY Exhibit 1002.182

1、一种电子烟，其特征在于，所述电子烟包括：

烟咀，用于存储烟液；

雾化器，与所述烟咀相连通过电加热将所述烟液雾化；

电池管，与所述雾化器相连以提供电源，所述电池管内设有在气压的作用下移动的动膜，所述动膜的移动控制雾化器将所述烟液雾化。

2、根据权利要求 1 所述的电子烟，其特征在于，所述烟咀与雾化器活动连接，所述烟咀包括中空的吸咀、油缸和吸油棉，所述油缸收容在所述吸咀内，所述油缸中间设有烟道，所述吸咀、油缸和吸油棉之间形成存储所述烟液的储油区。

3、根据权利要求 2 所述的电子烟，其特征在于，所述吸咀一端为完整的开口，另一端开设吸气口与所述烟道连通，所述油缸一端与吸咀紧密接触，另一端与吸咀之间留有间隙，吸油棉封堵在所述间隙上。

4、根据权利要求 2 所述的电子烟，其特征在于，所述雾化器包括导油棉、不锈钢管、套管、电热丝、金属纤维、雾化杯，沿所述电子烟的轴向从外向内依次为所述吸咀、不锈钢管、导油棉、金属纤维、雾化杯，所述导油棉和金属纤维的端部紧贴所述吸油棉，所述雾化杯设有中空的腔体，所述腔体与所述烟道连通，所述雾化杯的侧壁设有通孔，所述套管与所述通孔相对，所述套管内设有所述电热丝使所述金属纤维传导的烟液流入所述套管内。

5、根据权利要求 4 所述的电子烟，其特征在于，所述雾化器还包括无纺布、螺母、螺母硅胶垫片、短钉销，所述无纺布套在所述雾化杯远离所述油缸的一端，所述螺母紧接所述不锈钢管并且与所述不锈钢管同轴设置，所述短钉销放置在所述螺母内，所述螺母硅胶垫片卡在所述螺母和短钉销之间固定所述短钉销。

6、根据权利要求 4 所述的电子烟，其特征在于，所述电池管包括咪头座、包含所述动膜的咪头、主控电路板及管体，所述主控电路板与所述电热丝电连接，所述咪头座放置在所述管体内，所述咪头放置在所述咪头座内且所述动膜朝向所述腔体，所述动膜移动时触发所述主控电路板控制通往所述电热丝的电流。

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7、根据权利要求 6 所述的电子烟，其特征在于，所述咪头还包括多孔板，所述多孔板位于所述动膜和所述腔体之间，所述多孔板和所述动膜之间形成单向开关。

8、根据权利要求 7 所述的电子烟，其特征在于，所述咪头还包括设置在所述动膜和多孔板之间的绝缘板。

9、根据权利要求 6 所述的电子烟，其特征在于，所述电池管还包括第二绝缘片、灯控板和灯盖，所述灯盖封住所述管体与所述雾化器相反的一端，所述灯控板安装在所述第二绝缘片和灯盖之间并与所述主控电路板电连接。

10、根据权利要求 5 所述的电子烟，其特征在于，所述电池管包括螺丝硅胶垫片、长钉销及螺丝，所述螺丝与螺母都为中空体，并通过螺纹连接，所述长钉销放置在所述螺丝内，所述螺丝硅胶垫片卡在所述螺丝和长钉销之间固定所述长钉销，所述短钉销及长钉销为中空体，所述短钉销及长钉销之间形成的管道与所述腔体连通。

NJOY Exhibit 1002.184

电子烟

【技术领域】

本发明涉及一种电子产品，尤其是一种电子烟。

【背景技术】

吸烟有害健康是公知常识，抽烟时不仅会损害吸烟者的健康，影响到周围人员的健康（俗称“二手烟”），如果燃烧的烟头处理不慎，还会导致火灾。

【发明内容】

基于此，有必要提供一种避免产生火灾的电子烟。

一种电子烟，包括：烟咀，用于存储烟液；雾化器，与所述烟咀相连通过电加热将所述烟液雾化；电池管，与所述雾化器相连以提供电源，所述电池管内设有在气压的作用下移动的动膜，所述动膜的移动控制雾化器将所述烟液雾化。

优选地，所述烟咀与雾化器活动连接，所述烟咀包括中空的吸咀、油缸和吸油棉，所述油缸收容在所述吸咀内，所述油缸中间设有烟道，所述吸咀、油缸和吸油棉之间形成存储所述烟液的储油区。

优选地，所述吸咀一端为完整的开口，另一端开设吸气口与所述烟道连通，所述油缸一端与吸咀紧密接触，另一端与吸咀之间留有间隙，吸油棉封堵在所述间隙上。

优选地，所述雾化器包括导油棉、不锈钢管、套管、电热丝、金属纤维、雾化杯，沿所述电子烟的轴向从外向内依次为所述吸咀、不锈钢管、导油棉、金属纤维、雾化杯，所述导油棉和金属纤维的端部紧贴所述吸油棉，所述雾化杯设有中空的腔体，所述腔体与所述烟道连通，所述雾化杯的侧壁设有通孔，所述套管与所述通孔相对，所述套管内设有所述电热丝使所述金属纤维传导的烟液流入所述套管内。

NJOY Exhibit 1002.185

优选地，所述雾化器还包括无纺布、螺母、螺母硅胶垫片、短钉销，所述无纺布套在所述雾化杯远离所述油缸的一端，所述螺母紧接所述不锈钢管并且与所述不锈钢管同轴设置，所述短钉销放置在所述螺母内，所述螺母硅胶垫片卡在所述螺母和短钉销之间固定所述短钉销。

优选地，所述电池管包括咪头座、包含所述动膜的咪头、主控电路板及管体，所述主控电路板与所述电热丝电连接，所述咪头座放置在所述管体内，所述咪头放置在所述咪头座内且所述动膜朝向所述腔体，所述动膜移动时触发所述主控电路板控制通往所述电热丝的电流。

优选地，所述咪头还包括多孔板，所述多孔板位于所述动膜和所述腔体之间，所述多孔板和所述动膜之间形成单向开关。

优选地，所述咪头还包括设置在所述动膜和多孔板之间的绝缘板。

优选地，所述电池管还包括第二绝缘片、灯控板和灯盖，所述灯盖封住所述管体与所述雾化器相反的一端，所述灯控板安装在所述第二绝缘片和灯盖之间并与所述主控电路板电连接。

优选地，所述电池管包括螺丝硅胶垫片、长钉销及螺丝，所述螺丝与螺母都为中空体，并通过螺纹连接，所述长钉销放置在所述螺丝内，所述螺丝硅胶垫片卡在所述螺丝和长钉销之间固定所述长钉销，所述短钉销及长钉销为中空体，所述短钉销及长钉销之间形成的管道与所述腔体连通。

通过电加热将烟液雾化，不需要明火即可获得与香烟气味相近的雾化烟液，可以避免产生火灾。

【附图说明】

图 1 为一实施例的电子烟的剖面图；

图 2 为电子烟的烟咀的剖面图；

图 3 为电子烟的雾化器的剖面图；

图 4 为电子烟的电池管的剖面图；

图 5 为电子烟的咪头在动膜和多孔板分离时的示意图；

图 6 为电子烟的咪头在动膜和多孔板接触时的示意图。

【具体实施方式】

NJOY Exhibit 1002.186

如图 1 所示，其为一实施例的电子烟的剖面图。同时参阅图 2 至图 4，电子烟包括存储烟液的烟咀 100、通过电加热将烟液雾化的雾化器 200 和提供电源并控制雾化器 200 将烟液雾化的电池管 300。烟咀 100、雾化器 200 和电池管 300 依次连接。本实施方式中，电子烟呈圆柱形，在其他实施方式中，也可以是椭圆柱形、方柱形等。

烟咀 100 与雾化器 200 活动连接，便于更换烟咀 100。烟咀 100 内放置烟液，用户可以使用放置不同类型烟液的烟咀。烟咀 100 包括吸咀 1、油缸 2 和吸油棉 3。吸咀 1 为中空的圆柱体，一端为完整的开口 102，另一端开设一小的吸气口 104。油缸 2 中间设有烟道 106，烟道 106 与吸气口 104 连通。烟道 106 在靠近吸气口 104 的横切面较大，从而便于烟液在雾化时与油缸 2 的内壁接触，将烟液中的水汽液化，避免较多的水汽影响口感。油缸 2 收容在中空的吸咀 1 内，油缸 2 一端与吸咀 1 紧密接触，另一端与吸咀 1 之间留有间隙 108。吸油棉 3 封堵在间隙 108 上。吸咀 1、油缸 2 和吸油棉 3 之间形成存储烟液的储油区 110，间隙 108 使得存储在储油区 110 的烟液传输到吸油棉 3 的速度较慢，避免烟液被过快损耗和雾化的烟液浓度过高。吸咀 1 与油缸 2 采用食品用 PP 料制成，作为一次性烟液存储器。

雾化器 200 包括导油棉 4、不锈钢管 5、套管 6、电热丝 7、金属纤维 8、雾化杯 9、无纺布 10、螺母 11、螺母硅胶垫片 12、短钉销 13。不锈钢管 5 紧贴吸咀 1 的内壁。沿电子烟的轴向从外向内依次为吸咀 1、不锈钢管 5、导油棉 4、金属纤维 8、雾化杯 9。导油棉 4 和金属纤维 8 的端部紧贴吸油棉 3。雾化杯 9 设有中空的腔体 112。油缸 2 的另一端套接在雾化杯 9 中，使腔体 112 与烟道 106 连通。雾化杯 9 的侧壁设有通孔 114。套管 6 与通孔 114 相对，使得金属纤维 8 传导的烟液可以流入套管 6 内。套管 6 内设有电热丝 7，电热丝 7 通电时可以加热烟液，使烟液雾化，雾化的烟液通过耐高温的烟道 106 和吸气口 104 传递至吸烟者口中。电子烟的雾化器 200 利用毛细管原理，采用金属纤维 8 做导油线，快速传导烟液至电热丝 7，烟雾效果非常好。电热丝 7 优选为镍铬丝。雾化杯 9 材质为聚四氟乙烯，作为发热丝支架，可以有效防止热能的散发。导油棉 4 利用毛细管原理暂时存储烟液，并有效阻止高温对吸咀 1 的传导发热。无

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纺布 10 套在雾化杯 9 远离油缸 2 的一端。螺母 11 紧接不锈钢管 5 并且与不锈钢管 5 同轴设置。短钉销 13 放置在螺母 11 内，螺母硅胶垫片 12 卡在螺母 11 和短钉销 13 之间以固定短钉销 13。

电池管 300 包括螺丝硅胶垫片 14、长钉销 15、螺丝 16、咪头座 17、咪头 18、主控电路板 19、第一绝缘片 20、主控板绝缘套 21、管体 22、第二绝缘片 24、灯控板 25、灯盖 26。螺丝 16 与螺母 11 都为中空体，并通过螺纹连接。长钉销 15 放置在螺丝 16 内，螺丝硅胶垫片 14 卡在螺丝 16 和长钉销 15 之间以固定长钉销 15。短钉销 13 及长钉销 15 也为中空体，短钉销 13 及长钉销 15 之间形成的管道 116 与腔体 112 连通。螺丝 16 可以以过盈配合的方式固定在管体 22 内。咪头座 17 放置在管体 22 内并紧接螺丝 16 设置，咪头 18 放置在咪头座内。第一绝缘片 20 靠近咪头 18 放置在管体 22 内。主控电路板 19 放置在第一绝缘片 20 和主控板绝缘套 21 之间并与电热丝 7 电连接。咪头 18 用于触发主控电路板 19 控制通往电热丝 7 的电流。其中主控板绝缘套 21 为罩体结构，第一绝缘片 20 盖在罩体结构的主控板绝缘套 21 的敞口上。电芯 23 可以放置在管体 22 内的主控板绝缘套 21 和第二绝缘片 24 之间并与主控电路板 19 电连接。灯盖 26 封住管体 22 与雾化器 200 相反的一端，灯控板 25 安装在第二绝缘片 24 和灯盖 26 之间并与主控电路板 19 电连接，灯控板 25 上设有发光二极管。

如图 5 及图 6 所示，咪头 18 包括负极 502、正极 504、印刷电路板 506、金属圈 508、铝壳 510、绝缘板 512、动膜 514 及多孔板 516。负极 502 和正极 504 设置在印刷电路板 506 上，印刷电路板 506 通过金属圈 508 与动膜 514 相连，多孔板 516 也与印刷电路板 506 相连，绝缘板 512 设置在动膜 514 和多孔板 516 之间。动膜 514 和多孔板 516 之间形成单向开关，在动膜 514 和多孔板 516 接触时（如图 6 所示），开关闭合，负极 502 和正极 504 连通；在动膜 514 和多孔板 516 分离时（如图 5 所示），开关断开，负极 502 和正极 504 断开。绝缘板 512 设置在动膜 514 和多孔板 516 之间防止动膜 514 和多孔板 516 在意外的情况下接触。在将咪头 18 安装在电子烟中时，动膜 514 朝向腔体 112 和管道 116，多孔板 516 位于动膜 514 和腔体 112 之间，多孔板 516 可以使气体透过，在腔体 112 中呈现负压时将动膜 514 吸附到多孔板 516 上，使开关闭合。而如果腔体

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112 中呈现正压时，动膜 514 会被气压推动远离多孔板 516，开关不会闭合，从而实现单向开关的效果。

使用时，使用者在吸气口 104 吸气，在烟道 106、腔体 112、管道 116 内产生负压，使开关式咪头 18 靠近管道 116 的动膜 514 一边呈现负压，动膜 514 在气压的作用下移动和多孔板 516 接触，负极 502 和正极 504 连通产生电信号，使主控电路板 19 上的芯片感应电信号后导通电流，使雾化杯 9 中的电热丝 7 产生热能。电热丝 7 将通过金属纤维 8 传导的烟液加热雾化，雾化的烟液通过管道 116、腔体 112、烟道 106 和吸气口 104 进入使用者口中。开关式咪头 18 为单向开关，配合主控电路板 19，在动膜 514 一边未呈现负压时，电热丝 7 不工作，具有没工作时不耗电的特殊性能，节约能源。咪头 18 灵敏度高，吸气力度小，能抗外来燥音。在动膜一边呈现负压的同时，主控电路板 19 还控制电压加至灯控板 25 的发光二极管上，使二极管点亮，模拟香烟燃烧时的效果。

上述电子烟可作为香烟的替代品，长期使用可有效避免香烟对人体的危害，同时可以降低吸烟成本，无烟灰、无明火，环保而且无消防隐患。

以上所述实施例仅表达了本发明的几种实施方式，其描述较为具体和详细，但并不能因此而理解为对本发明专利范围的限制。应当指出的是，对于本领域的普通技术人员来说，在不脱离本发明构思的前提下，还可以做出若干变形和改进，这些都属于本发明的保护范围。因此，本发明专利的保护范围应以所附权利要求为准。

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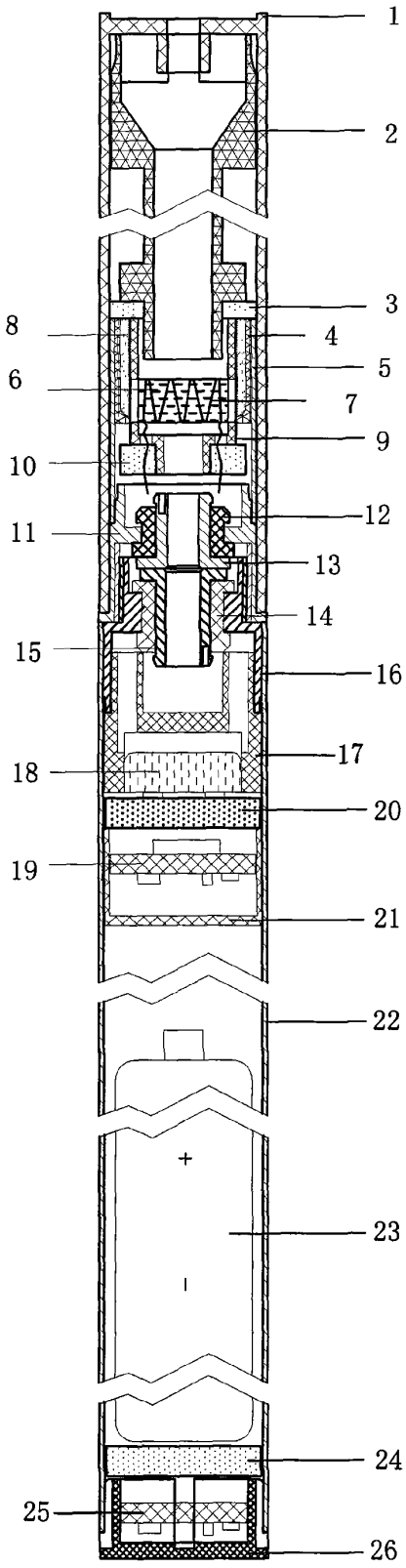


图 1

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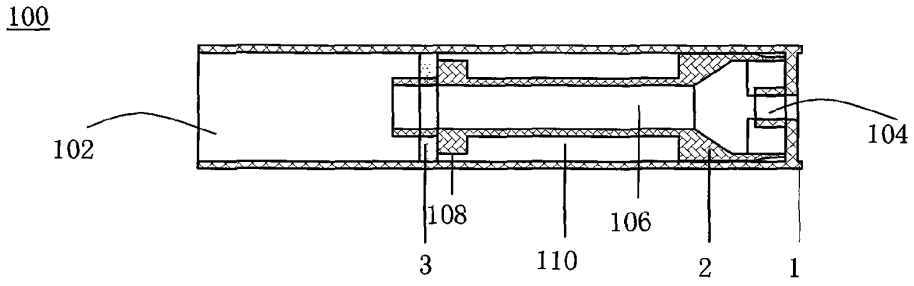


图 2

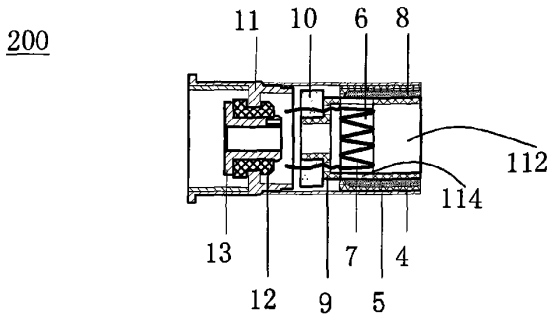


图 3

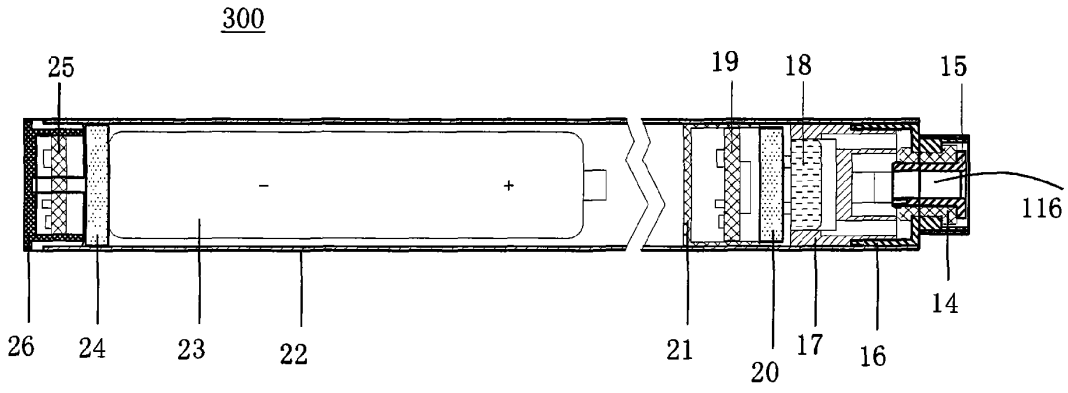


图 4

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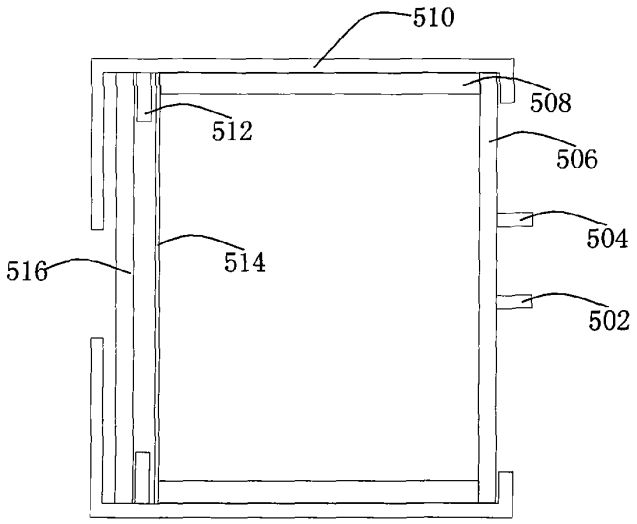


图 5

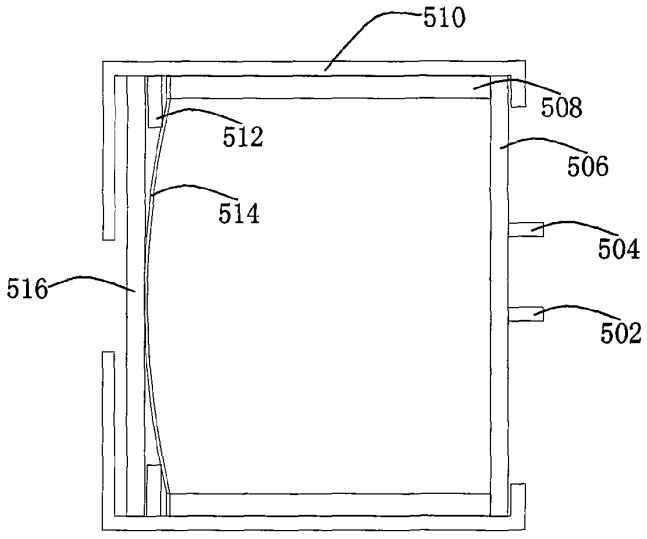


图 6

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/359,938	Filing Date 03/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/09/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JULIET MCMILLAN/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of: Kyle D. Newton	
Application No.: 16/359,938	Confirmation No.: 6916
Filed: March 20, 2019	Art Unit: 3991
For: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	Examiner: N. L. Torres Velazquez

AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION UNDER 37 C.F.R. § 1.111

VIA EFS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

This paper is in response to the non-final Office Action dated June 17, 2020.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 19 of this paper.

AMENDMENTS TO THE CLAIMS

1. (Amended) An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of [the]a liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber[,]; and

a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer, the wick being fabricated as a bundle of heat resistant fibers;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

2. The apparatus of claim 1, further comprising:

an inlet vent formed on the exterior of said housing and coupled to deliver air to said atomizing chamber air inlet.

3. (Amended) The apparatus of claim 2, [and]wherein said inlet vent is coupled to said atomizing chamber air inlet by a conduit.

4. (Amended) The apparatus of claim 3, [and]wherein said conduit sealably passes through said liquid reservoir.

5. (Amended) The apparatus of claim 1, [and]wherein said chimney sealably passes through said liquid reservoir.

6. (Amended) The apparatus of claim 1, [and]wherein said atomizer is a resistive heating element.

7. (Amended) The apparatus of claim 6, [and]wherein said wick [is]partially engages said resistive heating element.

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8. (Amended) The apparatus of claim 1, [and]wherein said atomizer has a tubular form defining an open central passage.

9. (Amended) The apparatus of claim 8, [and]wherein said wick passes through said open central passage.

10. (Amended) The apparatus of claim 1, [and]wherein said atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture.

Cancel claim 11.

12. (Amended) The apparatus of claim [11]1, [and]wherein said bundle of heat resistant fibers is fiberglass.

13. (Amended) The apparatus of claim [11]1, [and]wherein said bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

14. (Amended) The apparatus of claim 1, [and]wherein said liquid reservoir is formed as an annular cavity between [the]an interior of said housing and said atomizing chamber.

15. (Amended) The apparatus of claim 1, [and]wherein said liquid reservoir includes an external access opening[,] for enabling addition of liquid into said liquid reservoir.

16. (Amended) The apparatus of claim 15, [and]wherein said external access opening is a removable mouthpiece.

17. (New, amended) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the atomizing chamber, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

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channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

18. (New) The method of claim 17, where the liquid reservoir is without a porous material for storing the liquid.

19. (New) The method of claim 17, wherein transferring liquid from a liquid reservoir to an atomizing chamber with a wick comprises transferring the liquid by capillarity with the wick.

20. (New) The method of claim 17, wherein generating an aerosol of the liquid comprises generating aerosol with an electrically powered atomizer in the atomizing chamber.

21. (New) The method of claim 17, wherein channeling the aerosol with a chimney comprises channeling the aerosol with the chimney through the liquid reservoir, the chimney being sealed from the liquid reservoir.

22. (New) The apparatus of claim 1, wherein the wick extends between the liquid reservoir and an interior of the atomizing chamber.

23. (New) The apparatus of claim 1, wherein the liquid reservoir adjacent the wick is free from porous material.

24. (New) The apparatus of claim 1, wherein the first wick aperture is circular.

25. (New, amended) The apparatus of claim 1, further comprising an atomizing assembly comprising a body and the atomizer, the atomizing assembly comprising a first recess formed therein that aligns with the first wick aperture in the atomizing chamber and provides a compressive fit around the wick.

26. (New, amended) The apparatus of claim 25, wherein the first wick aperture and the first recess cooperate to define a circular aperture.

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27. (New) The apparatus of claim 10, wherein the first wick aperture and the second wick aperture each comprise a fixed width slot terminating in a curved end, the fixed width configured to receive the wick.

28. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber.

29. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet.

30. (New) The apparatus of claim 1, wherein the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

31. (New, amended) The apparatus of claim 1, wherein the chimney and atomizing chamber are cylindrical and the maximum exterior diameter of the chimney is less than the maximum interior diameter of the atomizing chamber.

32. (New) The apparatus of claim 1, wherein the apparatus is elongate, and the maximum transverse exterior dimension of the chimney is less than the maximum transverse interior diameter of the atomizing chamber.

33. (New) The apparatus of claim 1, wherein the atomizing chamber and the chimney are formed as a single unit.

34. (New, amended) The apparatus of claim 1, wherein the housing comprises a transparent material through which the liquid in the liquid reservoir can be viewed from the exterior of the apparatus.

35. (New, amended) The apparatus of claim 1, further comprising an insert in the housing, the insert comprising the aerosol outlet.

36. (New, amended) The apparatus of claim 1, coupled to a power supply portion, wherein the power supply portion comprises a pressure sensor configured to detect negative pressure within the power supply portion and energize the atomizer.

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37. (New) The apparatus of claim 36, wherein the power supply portion comprises an LED positioned at a tip end of the power supply portion, the LED configured to illuminate in response to the pressure sensor detecting negative pressure in the power supply portion.

38. (New) The apparatus of claim 37, wherein the LED comprises an amber LED configured to emulate burning ash when illuminated.

39. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet, the chimney and atomizing chamber are cylindrical, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

40. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber, the atomizing chamber and the chimney are formed as a single unit, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

41. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

42. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

43. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

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an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

44. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

45. (New, amended) A cartridge comprising:

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber comprising a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and a liquid reservoir configured to contain an atomization liquid; the atomizing chamber further comprising an atomizer outlet;

a wick partially disposed within the atomizing chamber, the wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir, the wick configured to draw the atomization liquid into the atomizing chamber by capillarity; and

an atomizer disposed within the atomizing chamber, the atomizer configured to receive electric current from a battery to facilitate generation of an aerosol by vaporizing the atomization liquid drawn into the atomizing chamber by the wick;

wherein the atomizer outlet and the aerosol outlet are coupled by a chimney.

46. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

47. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

48. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

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an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

49. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

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a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

50. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

51. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

52. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the cartridge housing and the chimney;

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a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

53. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an

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exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the cartridge housing and the chimney;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

54. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

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a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

55. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

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a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

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REMARKS

The Office Action addresses claims 1-55, with claims 1, 17, and 41-55 being independent. Claims 1-26, 28-40, and 45 are rejected. Claims 41-44 and 46-55 are allowable, and claim 27 is objected to. Reconsideration is respectfully requested.

Amendments to the Claims

Original claim 11 is cancelled without prejudice or disclaimer.

Original independent claim 1 is amended to incorporate the subject matter of claim 11. Claim 1 is further amended to address the § 112 rejection thereof, namely to replace "the liquid" in line 4 to "a liquid," and to correct an inadvertent typographical error.

Original dependent claims 3-10 and 12-16 are amended as indicated above to correct inadvertent typographical errors. Claims 12 and 13 are further amended to update their dependency, namely to replace "1" with "11," in view of the amendments made to claim 1 and the cancellation of claim 11 herein.

New independent claim 17 is amended to add the term "wherein" before "the liquid reservoir" and to replace "being" with "surrounds and is" in line 4. Support for the these amendments can be found throughout the specification and drawings, for example, col. 1, lines 58-60, col. 7, lines 18-21, and FIGS. 7 and 10 of U.S. Patent No. 9,596,887 (the '887 Patent) for which this reissue application is based on.

New dependent claims 25, 26, 31, 34, 35, and 36 are amended to correct inadvertent typographical errors. For example, claims 25 and 35 are each amended to add the term "further" in line 1; claim 26 is amended to replace "where" with "wherein" in line 1; claims 31 and 34 are amended to remove the extra space before the term "cylinder" and "through" in line 2, respectively; and claim 36 is amended to add a comma after "claim 1" in line 1.

New independent claim 45 is amended to address the § 112 rejection thereof, namely to remove "in the power supply portion," in line 12.

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New independent claims 50-53 are amended to recite "the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture," starting at line 23, 26, 25, and 28, respectively, for antecedent basis purposes. Claims 50-53 are also amended to replace the term "fluid" with "liquid" in line 17, 20, 19, and 22, respectively, for clarity and consistency purposes. Claims 52 and 53 are further amended to replace the term "elongated" with "cartridge" in line 17 and 20, respectively. Further, claims 48-53 are amended to replace "an interior" with "the interior" in line 13, 16, 16, 19, and 18, 21, respectively, and to insert "cartridge" before housing in line 14, 17, 17, 20, 19, and 22, respectively, for clarity and consistency. Support for these amendments can be found throughout the specification and drawings, for example, Abstract, col. 2, lines 16-20, col. 6, lines 22-25 and 45-48, col. 6, line 64 to col. 7, line 2, original claim 10, and FIGS. 8-10 of the '887 Patent.

No new matter is added.

Allowable Subject Matter

Claims 41-44 and 46-55 are indicated as being allowed, and claim 27 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of its base claim and any intervening claims.

Claim 27 is not amended into independent form at this time because independent claim 1 as presented herein, which claim 27 depends therefrom, represents allowable subject matter.

Rejection under 35 U.S.C. § 112

Claims 1 and 45 are rejected under 35 U.S.C. § 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention.

Without conceding to the rejection, to expedite prosecution, claims 1 and 45 are amended as indicated above, thereby rendering this rejection thereof moot. Withdrawal of this rejection is respectfully requested.

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Rejections under 35 U.S.C. §§ 102 and 103

Claims 1, 5-6, 8, 17-21, 23-26, 29-33, and 36-40 are rejected under 35 U.S.C. § 102(a)(2) as being anticipated by CN Patent No. 101606758 of Fang ("Fang"). Claims 1, 2, 3, 6, 7, 11, 15, 17-20, 22-23, and 33-35 are rejected as being anticipated by U.S. Patent No. 6,155,268 of Takeuchi ("Takeuchi"). Claims 2 and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Fang in view of CA Patent No. 2884987 of Hon ("Hon"). Claims 7, 9, 11-13, 15, and 34 are rejected as being unpatentable over Fang in view of Takeuchi.

Independent Claim 1

Fang and Takeuchi each fail to teach or suggest a wick that is "fabricated as a bundle of heat resistant fibers," as recited in claim 1. While the Office Action first alleges with respect to claim 11, which is now incorporated into claim 1, that Takeuchi discloses a bundle of fibers, nothing in Takeuchi discloses heat resistant fibers. *Office Action*, p. 11. In fact, the Office Action later concedes that Takeuchi "does not specifically teach[] the use of heat resistant fibers." *Office Action*, pp. 16-17. As such, Takeuchi does not teach each and every claim limitation as set forth in claim 1.

Additionally, the Office Action concedes that Fang "fails to teach that the wick…is a bundle of fibers." *Id.* at p. 16. Nevertheless, the Office Action looks to Takeuchi for this feature and further alleges with respect to claim 11, which is now incorporated into claim 1, "it would have been obvious to one of ordinary skill in the art to use a heat resistant material." *Id.* at pp. 16-17. However, the Office Action does not provide any reason for the proposed modification of Fang in view of Takeuchi that satisfies the standard of establishing a *prima facie* case of obviousness.

While the Office Action on page 16 likens the liquid conducting material 4 and the metal fiber element 8 of Fang to the claimed wick as recited in claim 1, the Office Action fails to provide any rationale as to why a person skilled in the art would in fact want to replace the liquid conducting material 4 and the metal fiber element 8 with a bundle of fibers, much less a bundle of heat resistant fibers. Rather, the Office Action simply cites to Takeuchi for its general

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teaching of using bundled fibers to transport liquid in a smoking device. *Id.* at p. 16. As such, the Office Action lacks the rational underpinning required of a proper *prima facie* case of obviousness.

Further, even assuming *arguendo* that such a modification to Fang would have been made by a person skilled in the art, Takeuchi is completely silent as to the type of materials that could or would be used to form its bundled fibers. While the Office Action appreciates this lack of teaching, the Office Action still goes on to allege that it would have been obvious to use heat resistant materials. *Id.* at p. 17. The Office Action supports this allegation by merely reciting the heat resistant materials that are recited in Applicant's claims 12 and 13, and stating, without providing any documentary evidence, that such materials "are well known heat resistant materials." *Id.* This unsupported statement is not capable of instant and unquestionable demonstration so as to be properly subject to official notice. Such a leap of logic clearly relies on "specific knowledge of the prior art" so as to require citation of a reference instead of reliance on common knowledge. *MPEP § 2144.03* (citing *In re Ahlert*, 424 F.2d 1088, 1091 (CCPA 1970); *In re Grose,* 592 F.2d 1161, 1167-68 (CCPA 1979); *In re Eynde,* 480 F.2d 1364, 1370 (CCPA 1973)). Moreover, even if official notice was properly taken, which Applicant does not concede, the Office Action still fails to provide any rationale as to why a person skilled in the art would in fact want modify to Fang in view of Takeuchi to include a wick formed of a bundle of heat resistant fibers. In fact, the Office Action only states that it would have been obvious to use heat resistant material with respect to Takeuchi, and thus, fails to articulate any reason or motivation to use such material in Fang. *Office Action*, p. 17.

Accordingly, for at least these reasons, claim 1 distinguishes over Fang and Takeuchi, alone or in combination, and represents allowable subject matter. Claims 2, 3, 5-9, 12, 13, 15, 22-26, and 29-40 depend from claim 1 and represent allowable subject matter at least because they depend from an allowable base claim. Without conceding to the rejections, to expedite prosecution, claim 11 is cancelled by the present paper, thereby rendering these rejections thereof moot.

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Independent Claim 17

Fang and Takeuchi each fail to teach or suggest an atomizing chamber and a liquid reservoir in which "the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber," as recited in claim 17. The Office Action likens "cavity 112" of Fang and "upper chamber 121" of Takeuchi to the recited "atomizing chamber" and further likens "liquid storage area 110" of Fang and "container 32" of Takeuchi to the recited "liquid reservoir." *Id.* at pp. 7 and 11. However, as shown in FIG. 1 of Fang, the liquid storage area 110 does not surround the cavity 112. Similarly, as shown in FIG. 8 of Takeuchi, the container 32 does not surround the upper chamber 121. Accordingly, for at least these reasons, claim 17 distinguishes over Fang and Takeuchi, alone or in combination, and represents allowable subject matter. Claims 18-21 depend from claim 17 and represent allowable subject matter at least because they depend from an allowable base claim.

Dependent Claims 2 and 28

Claims 2 and 28 depend from claim 1, which is shown above to be patentable over Fang and Takeuchi, alone or in combination. Hon is only relied on for dependent claim features and does not cure the above-discussed deficiencies of Fang and Takeuchi with respect to claim 1. Applicant thus respectfully submits that claims 2 and 28 distinguish over Fang, Takeuchi, and Hon, alone or in any combination, and represent allowable subject matter.

Double Patenting Rejection

Claims 1-16 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 8,528,569 in view of Hon.

Applicant respectfully defers the filing of a terminal disclaimer to overcome the double patenting rejection until such time the claims of the present application are allowed, in view of the claim amendments presented herein and the possibility of future claim amendments.

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Conclusion

In conclusion, Applicant submits that all pending claims are now in condition for allowance for at least the reasons discussed above, and allowance thereof is respectfully requested. Applicant's amendment of the claims does not constitute a concession that the claims are not allowable in their unamended form. The Examiner is encouraged to telephone the undersigned attorney for Applicant if such communication is deemed to expedite prosecution of this application.

The fee for a three month extension of time is submitted herewith. In the event that a petition for an extension of time is required to be submitted at this time, Applicant hereby petitions under 37 C.F.R. § 1.136(a) for an extension of time for as many months as are required to ensure that the above-identified application does not become abandoned.

All fees due are believed to be paid. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 50-0311, Reference No.: 16/359,938, from which the undersigned is authorized to draw.

Dated: December 17, 2020

Respectfully submitted,

Electronic signature: /mdvl/
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of:
Kyle D. Newton

Application No.: 16/359,938	Confirmation No.: 6916
Filed: March 20, 2019	Art Unit: 3991
For: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	Examiner: N. L. Torres Velazquez

INFORMATION DISCLOSURE STATEMENT (IDS)

FILED VIA EFS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Pursuant to 37 C.F.R. §§ 1.56, 1.97, and 1.98, the attention of the United States Patent and Trademark Office is hereby directed to the references listed on the attached PTO/SB/08. It is respectfully requested that the information be expressly considered during the prosecution of the above-identified application, and that the references be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is filed after the mailing date of a first Office Action on the merits, but before the mailing date of any of a Final Action under 37 C.F.R. § 1.113, a Notice of Allowance under 37 C.F.R. § 1.311 or an action that otherwise closes prosecution in this application (37 C.F.R. § 1.97(c)).

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of U.S. patents and U.S. patent application publications are not submitted.

In accordance with 37 C.F.R. § 1.98(d)(1) and as noted by a double-asterisk next to the Cite No. on the attached PTO/SB/08, the foreign patent references are not supplied because they were previously cited by or submitted to the Office in prior application numbers 13/157,024 filed June 28, 2011 and/or 13/955,153 filed July 31, 2013 and/or 14/219,426 filed March 19, 2014 and relied on in the above-identified application for an earlier effective filing date under 35 U.S.C. § 120.

In accordance with 37 C.F.R. § 1.56(a)(1), Applicant hereby notes that the attached PTO/SB/08 includes references cited in USPTO Office Actions and/or search reports of a foreign patent office in related applications. Applicant hereby provides the Office with the following chart of related, pending or patented US applications:

U.S. App No.	Filing Date	Publication or Patent No.
13/157,024	Jun 28, 2011	US 8,528,569
13/955,153	Jul 31, 2013	US 8,707,965
14/219,426	Mar 19, 2014	US 9,596,887

In accordance with 37 C.F.R. § 1.97(g), the filing of this Information Disclosure Statement shall not be construed as a representation that a search has been made. In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to be an admission that the information cited in this Information Disclosure Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b).

It is submitted that the Information Disclosure Statement is in compliance with 37 C.F.R. § 1.98, and the Examiner is respectfully requested to consider the listed references.

NJOY Exhibit 1002.220

Any fees believed to be due have been paid herewith. However, the Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed, or which should have been filed herewith to our Deposit Account No. 50-0311, under Application No.: 16/359,938 from which the undersigned is authorized to draw.

Dated: December 17, 2020

Respectfully submitted,

Electronic signature: /mdvl/
Michael D. Van Loy
Registration No.: 52,315
MINTZ LEVIN COHN FERRIS GLOVSKY
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Attorney for Applicant

101857458v.1

NJOY Exhibit 1002.221

Used in Lieu of PTO/SB/08A/B
(Based on PTO 11-07 version)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	16/359,938
				Filing Date	March 20, 2019
				First Named Inventor	Kyle D. Newton
				Art Unit	3991
(Use as many sheets as necessary)				Examiner Name	N. L. Torres Velazquez
Sheet	1	of	1	Attorney Docket Number	

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A	US-7,726,320	06-01-2010	Robinson et al.	
	B	US-8,528,569	09-10-2013	Newton	
	C	US-20050016550-A1	01-27-2005	Katase	
	D	US-20050172976-A1	08-11-2005	Newman et al.	
	E	US-20060196518-A1	09-07-2006	Hon	
	F	US-20070267031-A1	11-22-2007	Hon	
	G	US-20090095311-A1	04-16-2009	Han	
	H	US-20100031967-A1	02-11-2010	Inagaki	
	I	US-20110011396-A1	01-20-2011	Fang	
	J	US-20110303231-A1	12-15-2011	Li et al.	
	K	US-20120111347-A1	05-10-2012	Hon	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	**A	CN-201379072-Y	01-13-2010	Li, Han		
	**B	WO-2010091593-A1	08-19-2010	Hon, Lik		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. * CITE NO.: Those application(s) which are marked with an single asterisk (*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(iii)) because that application was filed after June 30, 2003 or is available in the IFW. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English language Translation is attached.

101857464v.1

Electronic Patent Application Fee Transmittal

Application Number:	16359938
Filing Date:	20-Mar-2019
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Filer:	Elissa Marie Kingsland/Carrah Malone
Attorney Docket Number:	62210-492RI1US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**1740**

Electronic Acknowledgement Receipt	
EFS ID:	41420639
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	148514
Filer:	Elissa Marie Kingsland
Filer Authorized By:	
Attorney Docket Number:	62210-492RI1US
Receipt Date:	17-DEC-2020
Filing Date:	20-MAR-2019
Time Stamp:	16:57:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1740
RAM confirmation Number	E2020BGG58094830
Deposit Account	500311
Authorized User	Elissa Kingsland
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		492RI1Response.pdf	111784 7c065887fc844fcc25602f42b29898ad65f05b7c	yes	24
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	18	
	Applicant Arguments/Remarks Made in an Amendment		19	24	
Warnings:					
Information:					
2	Transmittal Letter	492RI1IDS.pdf	27654 538dfff8710be83deb58bbfe30fc6b0c3289a28a	no	3
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	492RI1SB08.pdf	160093 fbc86cddffaf562ce0747e6a971af6f05f87bfdd	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
4	Fee Worksheet (SB06)	fee-info.pdf	32524 5e0699b144bcb28d8a491f3a2be8b7992c28c81f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	332055		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/359,938	Filing Date 03/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/17/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 54	Minus	** 55	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 17	Minus	*** 17	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/RHONDA BELL/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/359,938	03/20/2019	Kyle D. Newton	62210-492RI1US	6916

148514 7590 01/14/2021

Mintz/JUUL
One Financial Center
Boston, MA 02111

EXAMINER	
TORRES VELAZQUEZ, NORCA LIZ	

ART UNIT	PAPER NUMBER
3991	

NOTIFICATION DATE	DELIVERY MODE
01/14/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPDocketingBOS@mintz.com
IPFileroombos@mintz.com
mintzdocketing@cpaglobal.com

NJOY Exhibit 1002.229

Office Action Summary	**Application No.** 16/359,938	**Applicant(s)** Newton, Kyle D.	
	Examiner NORCA L TORRES VELAZQUEZ	**Art Unit** 3991	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 17 December 2020.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-10 and 12-55 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☑ Claim(s) 41-55 is/are allowed.

7) ☑ Claim(s) 1-10,12-26 and 28-40 is/are rejected.

8) ☑ Claim(s) 27 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

NJOY Exhibit 1002.230

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Reissue Applications

For reissue applications filed before September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the law and rules in effect on September 15, 2012. Where specifically designated, these are "pre-AIA" provisions.

For reissue applications filed on or after September 16, 2012, all references to 35 U.S.C. 251 and 37 CFR 1.172, 1.175, and 3.73 are to the current provisions.

The present reissue application is a **broadening reissue** of US 9,596,887 Patent (the '887 Patent herein), and it includes new claims 17-55. This is a Non-Final action in response to the amendment and remarks filed December 17, 2020.

Invention of the '024 Patent

The '887 Patent issued with sixteen (16) claims. The amendment filed 12/17/2020 cancels claim 11 and includes amendments to some of the new claims 17-55. Claims 1-10 and 12-55 are pending in the present reissue. Independent claims 1, 17, 45 and 54 are representative as follows:

1. (Amended) An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of [the] a liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, and a first wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber[,]; and

a wick disposed through said first wick aperture between said liquid reservoir and said atomizing chamber and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer, the wick being fabricated as a bundle of heat resistant fibers;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

17. (New, *Amended*) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the atomizing chamber, the liquid reservoir *surrounds and is* sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

45. (New, Amended) A cartridge comprising:

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber comprising a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and a liquid reservoir configured to contain an atomization liquid; the atomizing chamber further comprising an atomizer outlet;

a wick partially disposed within the atomizing chamber, the wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir, the wick configured to draw the atomization liquid into the atomizing chamber by capillarity; and

an atomizer disposed within the atomizing chamber, the atomizer configured to receive electric current from a battery to facilitate generation of an aerosol by vaporizing the atomization liquid drawn into the atomizing chamber by the wick;

wherein the atomizer outlet and the aerosol outlet are coupled by a chimney.

54. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

Withdrawn Claim Rejection

The rejection of claims 1 and 45 under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph are withdrawn in view of the amendment filed 12/17/2020.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claims 1, 2, 3, 6, 7, 15, 17-20, 22-23 and 33-35 are rejected under 35 U.S.C. 102(a)(2) as being anticipated by TAKEUCHI (US 6,155,268) as evidenced by COLLETT et al. (US 2014/0060554 A1).

TAKEUCHI relates to a flavor-generating device for enjoying inhalation of flavor or for enjoying simulated smoking. (Col. 1, lines 4-6)

In the embodiment disclosed in Fig. 8 (reproduced below), TAKEUCHI shows a device 100 that comprises a housing (formed by the wall defining upper chamber 121) having a mouthpiece 161 with an aerosol outlet 102; an atomizer provided by heater 371 that responds to electric current provided by power source 44 and it is coupled to aerosol outlet 102 by the upper chamber 121; there is an air passageway 104 and a liquid passageway 371 (equated to the claimed wick). The liquid passageway 371 is in liquid communication with the liquid source 34 in the container 32 (liquid reservoir). The liquid passageway 371 is defined between the aperture formed by two substantially parallel plates spaced apart from each other. The distal end portion (the outlet portion of the liquid source) of the liquid passageway 371 is heated by plate like heaters 421 and 422 (these are equated to the claimed atomizer) mounted to the plate 361 and 362, respectively. The upper chamber 121 provides for the atomizing chamber and the chimney. TAKEUCHI further teaches that liquid passageway 36 through which the liquid flavor source is transported by the capillary force can be constituted by bundled fibers. (Refer to Col. 3, lines 36-50; Fig. 1)

Regarding the limitation that the wick is fabricated of "heat resistant fibers," it is noted that the bundled fibers of TAKEUCHI are used in the same manner as the bundled fibers of the '938 Patent - that is, for transporting the liquid containing a flavor substance from a liquid container (reservoir) by capillary force to heater (atomizer) for gasifying the liquid. Since the

device of TAKEUCHI functions in the same manner as the claimed device, the bundled fibers of TAKEUCHI must necessarily have a similar degree of heat resistance.

COLLETT et al. is presented herein as evidentiary reference that lists appropriate heat resistant fibers commonly used in forming wicks in electronic smoking articles. COLLETT et al. teaches the use of a wick to transport one or more aerosol precursor compositions from a reservoir to a microheater in the smoking article. COLLETT et al. uses, for example, natural and synthetic fibers, such as cotton, cellulose, polyesters, polyamides, polylactic acids, *glass fibers*, and the like. Other exemplary materials that can be used in the wick include *metal ceramics*, and carbonized filaments. Fibers used in forming the wick *can be provided singly, bundled*, as a woven fabric, or as a non-woven fabric. (Refer to [0124])

Thus, **claim 1** is anticipated by TAKEUCHI.

Regarding **claim 7**, the wick engages with the resistive heating elements 421 and 422. The liquid passageway transports the liquid flavor source therethrough by capillary force. (Refer to Abstract; Col. 8, lines 59-67 bridging to Col. 9, lines 1-34; Fig. 10)

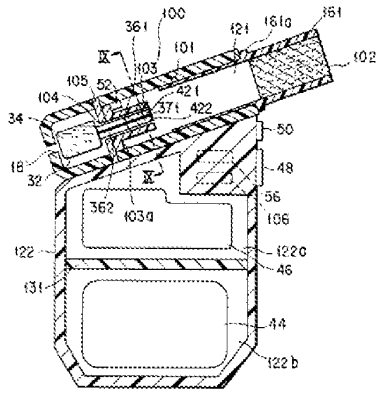


FIG. 8

Regarding **claims 2 and 3**, the housing has an air intake port 18 that delivers air to the air passageway 104 and coupled by conduit formed by space around container 32. (Refer to Fig. 8)

Regarding **claim 6**, plates 421 and 422 are plate like heaters. (Col. 9, lines 33-34)

Regarding **claim 15**, TAKEUCHI teaches that a pouring port 58 for replenishing the liquid source 34 is connected to the liquid container 32. An end portion of the pouring port 58 is exposed to the outside of the casing 12 so as to permit pouring the liquid source 34 into the liquid container 32. Usually, a removable cap 59 is provided in the exposed end portion of the pouring port 58. (Col. 7, lines 18-23; Fig. 1)

Regarding **claim 17**, the device of TAKEUCHI transfers liquid from liquid reservoir 32 to atomizer (42, 421 & 422) in upper chamber (121) via a wick (36, 371). The liquid reservoir is sealed from an interior of the atomizer (Refer to Figs. 1 and 8). The heater generates an aerosol of the liquid and it is then channeled to an aerosol outlet (22, 102) via the upper chamber 121 (chimney). (Refer to Fig. 1 and 8)

Regarding **claims 18 and 23**, the reference only teaches the inclusion of liquid in the liquid reservoir 32. (Refer to Col. 5, lines 28-39)

Regarding **claim 19**, TAKEUCHI teaches that the liquid passageway transports the liquid flavor source therethrough by capillary force. (Refer to Abstract)

Regarding **claim 20**, TAKEUCHI teaches an electrically powered atomizer. (Refer to Col. 6, lines 15-28)

Regarding **claim 22**, the liquid passage 371 extends between the liquid container 32 and the atomizer (heating elements 421 & 422). (Refer to Fig. 8)

Regarding **claim 33**, the atomizing chamber and the chimney are formed as a single unit as provided by the walls of the upper chamber 121. (Refer to Fig. 8)

Regarding **claim 34**, TAKEUCHI teaches that a transparent peeping window (not shown) can be formed in that portion of the side wall of the casing 12 which corresponds to the liquid

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container 32 in place of using the liquid amount sensor 54 in order to observe the remaining amount of the liquid flavor source 34 within the liquid container 32. In this case, the liquid container 32 itself must be formed of a transparent or translucent material. (Col. 7, lines 31-37).

Regarding **claim 35**, TAKEUCHI teaches that mouthpiece 161 may be detachably inserted directly into the open end portion of the upper chamber 121. (Refer to Col. 9, lines 9-22; Fig. 8)

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 and 13 are rejected under 35 U.S.C. 103 as being unpatentable over TAKEUCHI (US 6,155,268) in view of COLLETT et al. and further evidenced by HON.

TAKEUCHI is relied upon as set forth above.

While TAKEUCHI teaches that liquid passageway 36 through which the liquid flavor source is transported by the capillary force can be constituted by bundled fibers (Refer to Col. 3,

lines 36-50; Fig. 1); it fails to specifically teach the use of fiberglass fibers or fibers selected from: aramid, fluorocarbon, sulfide, melamine, polyimide, carbon and glass.

COLLETT et al. relates to an electronic smoking article. (Abstract) COLLETT et al. teaches the use of a wick to transport one or more aerosol precursor compositions from a reservoir to a micro-heater in the smoking article. COLLETT et al. uses, for example, natural and synthetic fibers, such as cotton, cellulose, polyesters, polyamides, polylactic acids, *glass fibers*, and the like. Other exemplary materials that can be used in the wick include *metal ceramics*, and carbonized filaments. Fibers used in forming the wick *can be provided singly, bundled*, as a woven fabric, or as a non-woven fabric. (Refer to [0124]) COLLETT et al. shows that bundled wicks made of materials such as glass and metal ceramic would have been obvious to one of ordinary skill in the art.

The use of wicks made of materials such as glass and metal ceramic in the bundled fibers of TAKEUCHI would have been obvious to one of ordinary skill in the art. The use of heat resistant fibers in a wick is further evidenced by HON, which teaches a liquid permeating component 6 (wick) made of ceramic fiber, quartz fiber, glass fiber, aramid fiber, among other materials. (Refer to [0040])

Thus, **claims 12 and 13** would have been obvious.

Claim 1, 5-6, 8, 12-13, 23-26, 29-33 and 36-40 are rejected under 35 U.S.C. 103 as being unpatentable over FANG (CN 101606758; US 2011/0011396 A1 used for translation) in view of COLLETT et al. (US 2014/0060554 A1).

FANG relates to an electronic cigarette using an atomizer. (Abstract, [0002])

FANG discloses an embodiment of an electronic cigarette 400 that includes a *container 100 configured for storing a tobacco flavored liquid*, an *atomizer 200* configured for vaporizing

the liquid by electric heating, and a battery tube 300 configured for powering the atomizer 200 and controlling the atomizer 200 to vaporize the liquid. [0012] In Fig. 2 (reproduced below), the reference shows container 100 that is detachably connected to the atomizer 200 to facilitate replacement of the container 100 and the liquid. The container 100 includes an inhalation element 1, a liquid tank 2, and an absorbent element 3. The inhalation element 1 is shaped as a substantially hollow cylinder defining an opening 102 at one end and *an inhalation hole 104* at the other end thereof. The liquid tank 2 defines *a smoke channel 106* in a middle portion thereof communicating with the inhalation hole 104. The liquid tank 2 is received in the inhalation element 1 and contacts a sidewall of the inhalation element 1 with one end. The sidewall of the inhalation element 1 and the other end of the liquid tank 2 cooperatively define a gap 108 therebetween to receive the absorbent element 3. The inhalation element 1, the liquid tank 2 and the absorbent element 3 cooperatively define *a liquid storage area 110* to receive the liquid. (Refer to [0013])

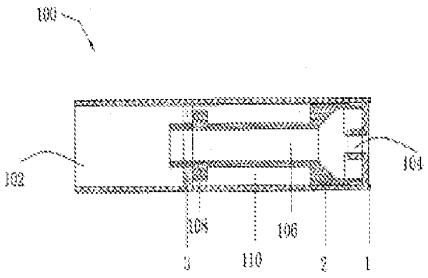


FIG. 2

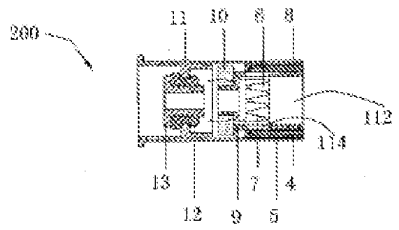


FIG. 3

Referring to Fig. 3 (reproduced above), the atomizer 200 *includes a liquid conducting element 4*, a heating wire 7, a metal fiber element 8, *an atomizing cup 9*, among others. The atomizing cup 9 defines *a cavity 112* in a middle portion thereof. The cavity 112 communicates with the smoke channel 106. The atomizing cup 9 defines *two coaxial through holes 114* on a sidewall thereof communicating with the cavity 112. The heating wire 7 is located inside the sleeve 6. When the heating wire 7 is heated by electricity, *the liquid is vaporized and then passes through the smoke channel 106 and the inhalation hole 104 to reach a user's mouth.* The atomizer 200 uses the metal fiber element 8 to guide the liquid to reach the heating wire 7 according to capillary principle, such that an improved atomizing effect can be achieved. The *liquid conducting material 4 is capable of storing the tobacco flavored liquid temporarily according to capillary principle* and can resist heat from conducting to container 100 effectively. [0014]

Regarding **claim 1**, the electronic cigarette 400 of FANG comprises:

-a container 100 (equated to housing) that has an inhalation element 1 (equated to mouthpiece) with an inhalation hole 104 (equated to aerosol outlet) (Refer to [0013], Fig. 1 and Fig. 2)

-an atomizer 200 configured for vaporizing the liquid by electric heating [0013]

-the atomizer includes a cavity 112 that couples to smoke channel 106, the atomizing cup 9 defines two coaxial through holes 114 on a sidewall thereof communicating with the cavity 112, such that the liquid guided by the metal fiber element 8 can flow into the sleeve 6. (Refer to [0014])

-a liquid storage area 110 (equated to claimed liquid reservoir)

- the apparatus includes a liquid conducting material 4 that is capable of storing the tobacco flavored liquid temporarily according to capillary principle and a metal fiber element 8 that guides the liquid to reach the heating wire 7 according to capillary. [0014] The liquid conducting material 4 and the metal fiber element 8 provide for the claimed wick.

- cavity 112 (atomizer outlet) and the inhalation hole 104 (aerosol outlet) are coupled by smoke channel 106 (chimney).

Regarding the limitation "*atomizing chamber having an air inlet*," it is noted that the portion opposite to the cavity 112 in Fig. 3 provides for an air inlet. The switch 18 is attached to that portion and switch 18 includes a perforated plate 516 that allows for airflow to pass through. (Refer to [0017]) Thus, the atomizing chamber inherently possesses an air inlet in order for the electronic cigarette to properly work as described in [0018].

FANG discloses the claimed invention except that it uses a metal fiber element (wick) instead of a wick that is fabricated as a bundle.

COLLETT et al. relates to an electronic smoking article. (Abstract) COLLETT et al. teaches the use of a wick to transport one or more aerosol precursor compositions from a reservoir to a microheater in the smoking article. COLLETT et al. uses, for example, natural and synthetic fibers, such as cotton, cellulose, polyesters, polyamides, polylactic acids, *glass fibers*, and the like. Other exemplary materials that can be used in the wick include *metal ceramics*, and

carbonized filaments. Fibers used in forming the wick *can be provided singly, bundled*, as a woven fabric, or as a non-woven fabric. (Refer to [0124]) COLLETT et al. shows that a single fiber wick and a bundled fiber wick are equivalent wick structures known in the art. Therefore, because these two structures were art-recognized equivalents before the effective filing date of the claimed invention, one of ordinary skill in the art would have found it obvious to substitute the metal fiber element (wick) of FANG for a bundled fiber wick, as taught by COLLETT et al. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout,* 675 F.2d 297, 213 USPQ 532 (CCPA 1982). [Refer to MPEP 2144.06 II] It is further noted that, the metal fibers taught by FANG and the glass fibers and metal ceramic and carbonized filaments taught by COLLETT et al., are expected to exhibit the same heat resistant characteristics of the fibers disclosed in the '938 Patent.

Regarding **claim 5**, the smoke channel 106 (chimney) sealably passes through the liquid storage area 100 (liquid reservoir). (Refer to Fig. 2)

Regarding **claim 6**, FANG teaches using electric heating to vaporize the liquid. It uses a heating wire 7. (Refer to [0012]; Fig. 3)

Regarding **claim 8**, Fig. 3 shows that the atomizer has a tubular form defining an open central passage.

Regarding **claims 12 and 13**, COLLETT et al. teaches the use of *glass fibers, metal ceramics* and carbonized filaments. (Refer to [0124])

Regarding **claim 23**, the liquid storage area 110 of FANG is defined by the inhalation element 1, the liquid tank 2 and the absorbent element 3. (Refer to [0013] and Fig. 2) The liquid

storage area 110 has been equated to the claimed liquid reservoir. The liquid is stored within space 110.

Regarding **claim 24**, the coaxial through holes 104 appear to be circular. (Refer to Fig. 3)

Regarding **claims 25 and 26**, FANG teaches that the sleeve 6 is received in the cavity 112 and aligned with the two through holes 114, such that the liquid guided by the metal fibers element 8 can flow into the sleeve 6. [0014]

Regarding **claim 30**, the apparatus of Fig. 1 shows a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

Regarding **claim 31-33**, Fig. 1 shows a cylindrical chimney and atomizing chamber 100 with the chimney having an exterior diameter less than the diameter of the chamber. Similarly, it shows that the maximum transverse dimension of the chimney is less than that of the interior diameter of the atomizing chamber. Both appear as a single unit.

Regarding **claim 36**, FANG teaches a battery tube 300 and a switch 18 that includes an actuating film 514. When there is a negative pressure, the switch is turned off via actuating film 514. When there is positive pressure, the switch cannot be turned off. (Refer to [0017] and [0018])

Regarding **claims 37-38**, FANG teaches an LED 27 that is turned on by the control circuit board 19 when the side of the actuating film 514 is in negative pressure condition, to imitate a lighting effect as a conventional cigarette. (Refer to last sentence of [0018])

Regarding **claims 29 and 39**, Fig. 1 the construction of FANG shows a sealed connection of the smoke channel 106 and the atomizer outlet 112 with a sealed path from the atomizer outlet through the smoke channel 106 to the inhalation hole 104.

Regarding **claim 40**, FANG teaches an atomizing electronic cigarette embodiment characterized in that the housing is an integrated whole. Thus, a single unit is provided. (Refer to [0056] and Fig. 6)

Claims 2, 17-21 and 28 are rejected under 35 U.S.C. 103 as being unpatentable over FANG and COLLETT et al. as applied to claims 1, 5-6, 8, 12-13, 23-26, 29-33 and 36-40 above, and further in view of HON (CA 2884987).

Regarding **claim 2**, while FANG provides an air inlet via cavity 112 (as set forth above), it fails to teach an inlet vent formed on the exterior of the housing and coupled to deliver air to said atomizing chamber air inlet. COLLETT et al. teaches that to facilitate air flow through the article, an *air intake* 17 can be provided and can substantially comprise an aperture in the shell 15 that allows for air flow into the interior of the article. Moreover, a plurality of air intakes can be provided, and the air intakes can be positioned at any location upstream from the mouthend of the article such that air from the air intake can mingle with and facilitate removal of the formed aerosol from the cavity and through the opening in the mouthend of the article. [0096]

However, COLLETT fails to teach that the inlet vent is coupled to deliver air to the atomizing chamber air inlet.

HON discloses an atomizing electric cigarette. (Abstract; Page 1, first paragraph) The atomizing electric cigarette comprises: a housing 8' with an aerosol outlet *"a;"* an atomizer 5 with an air vent 101 and a liquid permeating component 6 (wick); a liquid storage component 3. The atomizer outlet and the aerosol outlet are coupled by channel 31. (Refer to Figs. 1 and 2 (reproduced below); Page 2, first paragraph; Pages 5-7) It would have been obvious to provide

the housing of FANG with an inlet vent on the exterior of the housing with the purpose of forming an airflow loop. (Refer to Page 3, para 5) Inhaled smoke is more similar to the feel of a real cigarette. (Fang, Page 1, para 5)

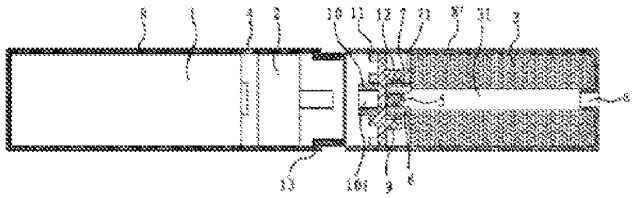


Fig. 1

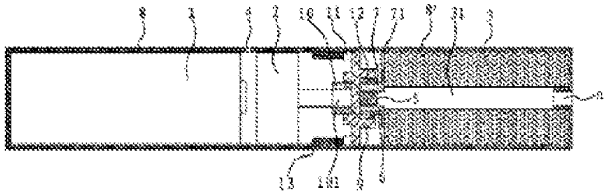


Fig. 2

Regarding **claim 28 and independent claim 17**, in Fig.6 (reproduced below) HON teaches an embodiment in which the liquid storage component 3 surrounds and is sealed from an interior of the atomizing chamber 5.

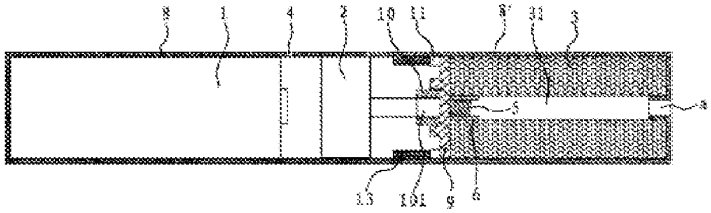


Fig. 6

Regarding **claim 18**, the liquid storage area 110 of FANG is defined by the inhalation element 1, the liquid tank 2 and the absorbent element 3. (Refer to [0013] and Fig. 2) The liquid

storage area 110 has been equated to the claimed liquid reservoir. The liquid is stored within space 110.

Regarding **claim 19**, the transferring of liquid from the liquid storage area 110 in FANG to the atomizer 200 with liquid conducting material 4 and metal fiber element 8 comprises transferring the liquid by capillarity as here claimed. (Refer to [0014])

Regarding **claim 20**, FANG teaches the use of an atomizer 200 configured for vaporizing the liquid by electric heating. [0012]

Regarding **claim 21**, FANG teaches that the liquid is vaporized and then passes through the smoke channel 106 (equated to chimney) and the inhalation hole 104 to reach a user's mouth. (Refer to [0014]) It is noted that the smoke channel 106 is defined by the liquid tank 2 and it is sealed from the liquid tank 2. (Refer to [0013], Fig. 1 and Fig. 2)

Claims 7, 9, 15 and 34 are rejected under 35 U.S.C. 103 as being unpatentable over FANG and COLLETT as applied to claims 1, 5-6, 8, 12-13, 23-26, 29-33 and 36-40 above, and further in view of TAKEUCHI (US 6,155,268).

Regarding **claim 34**, FANG fails to teach that the housing comprises a transparent material.

TAKEUCHI relates to a flavor-generating device for enjoying inhalation of flavor or for enjoying simulated smoking. (Col. 1, lines 4-6) In one embodiment, the reference teaches a device that comprises a chamber 121 having an air inlet port 18 for introducing the air thereinto and an inhalation port 22 through which a user inhales a flavor, and defining a gas passageway 20 between the air inlet port and the inhalation port; a liquid container 32 for storing a liquid 34 containing a flavor substance, and maintained at substantially an atmospheric pressure; at least one liquid passageway 37 having a first end portion which is in a fluid communication with the liquid and a second end portion which is in a fluid communication with the gas passageway, for

transporting the liquid from the liquid container to the second end portion by capillary force; and a heater 42 mounted at the second end portion of the liquid passageway, for heating and gasifying or evaporating the liquid transported from the liquid container. (Col. 2, lines 1-16; Col. 4, lines 29-67 bridging Col. 5, lines 1-62; Figure 1) TAKEUCHI teaches that a transparent peeping window (not shown) can be formed in that portion of the side wall of the casing 12 which corresponds to the liquid container 32 in place of using the liquid amount sensor 54 in order to observe the remaining amount of the liquid flavor source 34 within the liquid container 32. In this case, the liquid container 32 itself must be formed of a transparent or translucent material. (Col. 7, lines 31-37).

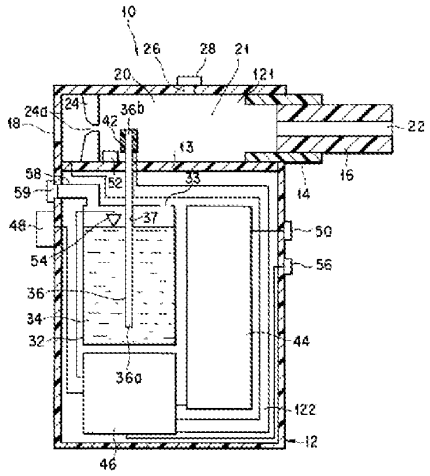


FIG. 1

Since both, FANG and TAKEUCHI, are directed to smoking apparatuses, the purpose disclosed by TAKEUCHI would have been recognized in the pertinent art of FANG.

It would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to modify the housing of FANG and provide it with a transparent peeping window of TAKEUCHI with the motivation of observing the remaining

amount of the liquid within the liquid container so as to ascertain the timing for replenishing the liquid as disclosed by TAKEUCHI. (Col. 7, lines 38-41).

Regarding **claims 7 and 9**, FANG fails to teach that the wick partially engages the resistive heating element or that it passes through the open central passage. TAKEUCHI further teaches that liquid passageway 36 through which the liquid flavor source is transported by the capillary force can be constituted by bundled fibers. (Refer to Col. 3, lines 36-50; Fig. 1) The liquid passageway 36 equates to a wick. TAKEUCHI shows that the liquid passageway 36 engages with the resistive heating element 42. (Refer to Figs. 2a-2c, Col. 7, lines 57-67 bridging to Col. 8, lines 1-4)

Regarding **claim 15**, TAKEUCHI teaches that a pouring port 58 for replenishing the liquid source 34 is connected to the liquid container 32. An end portion of the pouring port 58 is exposed to the outside of the casing 12 so as to permit pouring the liquid source 34 into the liquid container 32. Usually, a removable cap 59 is provided in the exposed end portion of the pouring port 58. (Col. 7, lines 18-23; Fig. 1)

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination

under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

Claims 1-10 and 12-16 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 8,528,569 in view of HON (CA 2884987).

Claims 1, 5 and 12 of the '569 Patent provide for a similar invention as claim 1 of the present reissue, except that they fail to claim that the atomizer generates an aerosol of the liquid "in response to electric current flowing therethrough." HON discloses an atomizing electronic cigarette and teaches that when the user inhales, as the sensor 2 communicates with the air vent 101, the through hole 51, the channel 31 and the air suction port "a" form an airflow loop with the auxiliary air inlet 4. When the gas flow is generated inside the electronic cigarette, the sensor 3 switches the circuit on, the electric heater 5 starts to heat to make the cigarette liquid in the liquid permeating component 6 be gasified after reaching the boiling point. (Abstract; Page 7, last paragraph bridging to Page 8, first paragraph). Thus, it would have been obvious to a person having ordinary skill in the art to use an electric current with the motivation of producing aerosol as disclosed by HON. (Page 7, last paragraph bridging to Page 8, first paragraph) Claims 2-4 and 6-17 of the '569 Patent provide for the limitations in dependent claims 2-16 of the present reissue.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims 41-55 are allowable because the prior art of record fails to teach that the atomizing chamber comprises a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and the liquid reservoir and a wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir.

Dependent claims 4, 10, 14, 16 and 27 are free of prior art.

The prior art of record fails to teach an electronic cigarette cartridge apparatus of the present invention in which the conduit that connects the inlet vent on the exterior of the housing that delivers air to the atomizing chamber air inlet, sealably passes through the liquid reservoir as claimed in **Claim 4.**

Regarding **claims 10 and 27**, the prior art of record fails to teach that the "atomizing chamber further comprises a second wick aperture, and wherein a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture." **Claim 27 (which depends on claim 10), is objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding **claim 14**, Fig. 2 of FANG shows liquid storage area 110 (liquid reservoir) forms as an annular cavity between the interior of the container 100 (housing) and the smoke channel 106. However, it fails to teach having the liquid storage area 110 between the container and the atomizing chamber.

Regarding **claim 16**, while the prior art of TAKEUCHI teaches an external access opening to add liquid to the liquid reservoir, it fails to teach that the external access opening is a removable mouthpiece.

Response to Arguments

- Applicant's arguments filed 12/17/2020 regarding the rejection of claims 1, 2, 3, 6, 7, 11, 15, 17-20, 22-23 and 33-35 under 35 U.S.C. 102(a)(2) as being anticipated by TAKEUCHI (US 6,155,268) have been fully considered but they are not persuasive.

TAKEUCHI teaches wicks constituted by bundled fibers. Regarding, the limitation that the wick is fabricated of "heat resistant fibers," it is noted that the bundled fibers of TAKEUCHI are used in the same manner as the bundled fibers of the '938 Patent - that is, for transporting the liquid containing a flavor substance from a liquid container (reservoir) by capillary force to a heater (atomizer) for gasifying the liquid. Since the device of TAKEUCHI functions in a similar manner, the bundled fibers of TAKEUCHI must necessarily have a similar degree of heat resistance. COLLETT et al. is presented herein as evidentiary reference that lists appropriate heat resistant fibers commonly used in forming wicks in electronic smoking articles. COLLETT et al. teaches the use of a wick to transport one or more aerosol precursor compositions from a reservoir to a microheater in the smoking article. COLLETT et al. uses, for example, natural and synthetic fibers, such as cotton, cellulose, polyesters, polyamides, polylactic acids, *glass fibers*, and the like. Other exemplary materials that can be used in the wick include *metal ceramics*, and carbonized filaments. Fibers used in forming the wick *can be provided singly, bundled*, as a woven fabric, or as a non-woven fabric. (Refer to [0124])

- Applicant's arguments, see response, filed 12/17/2020, with respect to:

- the rejection of claims 1, 5-6, 8, 17-21, 23-26, 29-33 and 36-40 under 35 U.S.C. 102(a)(2) as being anticipated by FANG;

- the rejection of claims 2 and 28 under 35 U.S.C. 103 as being unpatentable over FANG in view of HON (CA 2884987); and

- the rejection of claims 7, 9, 11-13, 15 and 34 under 35 U.S.C. 103 as being unpatentable over FANG in view of TAKEUCHI (US 6,155,268)

have been fully considered and are persuasive. Therefore, these rejections have been withdrawn. However, upon further consideration, **new ground(s) of rejection are made further in view of COLLETT et al. as stated above.**

- Patent owner argues that FANG fails to teach or suggest a wick that is "fabricated as a bundle of heat resistant fibers," as now recited in independent claim 1. (Refer to p. 21 of Remarks filed 12/17/2020).

Regarding the rejections over FANG, it is noted that FANG teaches the use of a wick in the form of a metal fiber element, but it fails to teach the use of a wick that is fabricated as a bundle of fibers. The claims are now rejected over FANG in view of COLLETT et al.

COLLETT et al. teaches the use of fibers such as *glass fibers*, *metal ceramics*, and carbonized filaments. The reference further teaches that fibers used in forming wicks *can be provided singly, bundled*, as a woven fabric, or as a non-woven fabric. (Refer to [0124]) COLLETT et al. shows that bundled wicks are equivalent structures known in the art. Thus, one of ordinary skill in the art would have found it obvious to substitute the metal fiber element (wick) of FANG for a bundled wick.

Conclusion

Claim 27 is objected.

Claims 1-10, 12-26 and 28-40 are rejected.

Claims 41-55 are allowable.

Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. 9,596,887 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely apprise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NORCA LIZ TORRES VELAZQUEZ whose telephone number is (571)272-1484. The examiner can normally be reached on M-Th 7:00 am - 4:30 pm and alternate Fridays-.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Speer can be reached on (313) 446-4825. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Norca L. Torres Velazquez/
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Central Reexamination Unit 3991

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/TIMOTHY M SPEER/
Supervisory Patent Examiner, Art Unit 3991

Notice of References Cited	Application/Control No. 16/359,938	Applicant(s)/Patent Under Reexamination Newton, Kyle D.	
	Examiner NORCA L TORRES VELAZQUEZ	Art Unit 3991	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20140060554-A1	03-2014	Collett; William Robert	A24F47/008	131/328
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

NJOY Exhibit 1002.254

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	**Art Unit**
	NORCA L TORRES VELAZQUEZ	3991

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
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	3	✓	✓							
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	5	✓	✓							
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	10	✓	✓							
	11	✓	-							
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	42	=	=							

NJOY Exhibit 1002.255

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	**Art Unit**
	NORCA L TORRES VELAZQUEZ	3991

CLAIM		DATE								
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	55	=	=							

NJOY Exhibit 1002.256

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/359,938	Newton, Kyle D.
	Examiner	Art Unit
	NORCA L TORRES VELAZQUEZ	3991

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61M15/06 B01D19/0047 B05B7/1693 A24B15/167	05/27/2020	NT
A24C5/12 A61M15/06 A24F47/00 A24F47/002	05/27/2020	NT

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
Inventor's name search; assignee name search	05/27/2020	nt
reviewed prosecution of 14/219,426 and parent cases: 13/955,153 13/157,024	05/27/2020	nt
EAST textsearch	05/27/2020	nt
updated textsearch SEARCH (attached)	12/31/2020	nt

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/NT/ Patent Reex Specialist, Art Unit 3991	

NJOY Exhibit 1002.257

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	("9596887").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	OFF	2020/05/12 10:10 AM
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L3	1	L1 and porous	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 10:41 AM
L4	1	L1 and reservoir	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 10:42 AM
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L6	367	b01d19/0047.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:36 AM
L7	108	b05b7/1693.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:36 AM
L8	0	a24b15-167.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:43 AM
L9	471	a24b15/167.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:43 AM
L10	15	a24c5/12.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:44 AM
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L13	1266	L12 and atomizing	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:46 AM
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L15	903	a24f47/002.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:55 AM
L16	586	a24f47/00.cpc.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 11:56 AM

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L20	30	juul.as. same labs.as.	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/12 12:14 PM
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L95	924	(electronic same cigarette) and window	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/22 02:22 PM
L96	203	L95 and wick	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/22 02:22 PM
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L98	182	L96 and mouthpiece	US-PGPUB; USPAT	OR	OFF	OFF	2020/05/22 02:22 PM
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L140	1	"20050016550".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:09 PM
L141	1	"20050172976".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:09 PM
L142	1	"20060196518".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:09 PM
L143	1	"20070267031".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:10 PM
L144	1	"20090095311".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:10 PM

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L145	1	"20100031967".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:10 PM
L146	1	"20110011396".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:10 PM
L147	1	"20110303231".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:10 PM
L148	1	"20120111347".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:11 PM
L156	11	L137 L139 L140 L141 L142 L143 L144 L145 L146 L147 L148	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:15 PM
L158	2	L156 AND (heat NEAR4 resistant)	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:16 PM
L159	2	L131 AND L156	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 12:16 PM
L160	1	"20140060554".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 01:04 PM
L161	1	L160 AND (aramid fluorocarbon sulfide melamine polyimide carbon glass)	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 01:05 PM
L162	43	william.in. SAME robert.in. SAME collett.in.	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/28 01:07 PM
L163	37	L162 AND (aramid fluorocarbon sulfide melamine polyimide carbon glass)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/28 01:08 PM
L164	22	L156	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/28 01:11 PM
L165	1	"8528569".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 01:12 PM
L166	1	"8707965".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/28 01:12 PM
L167	1	(L166or L165) AND (aramid fluorocarbon sulfide melamine polyimide carbon glass)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/28 01:13 PM
L168	11	L156 AND fibers	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/28 01:14 PM

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L169	4	WO-2010091593-a1	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/12/28 01:19 PM
L170	3	cn-201379072-y	US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2020/12/28 01:20 PM
L171	1	"20140060554".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 10:51 AM
L172	1	L171 AND wick	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 10:52 AM
L173	0	L171 AND bundle	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 10:53 AM
L174	1	L171 AND bundled	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 10:53 AM
L175	1	L172	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 10:53 AM
L176	2	L171 AND (aramid fluorocarbon sulfide melamine polyimide carbon glass)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/29 10:59 AM
L177	1	L171 AND air ADJ intake	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	ON	2020/12/29 12:55 PM
L178	0	"6155268".pn. AND bundles	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:24 PM
L179	0	"6155268".pn. AND bundle	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:24 PM
L180	1	"6155268".pn. AND bundled	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:24 PM
L181	0	L180 AND (aramid fluorocarbon sulfide melamine polyimide carbon glass)	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:25 PM
L182	0	"6155268".pn. AND (aramid fluorocarbon sulfide melamine	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:25 PM

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		polyimide carbon glass)					
L184	1	"20120111347".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:40 PM
L185	1	L184 AND (liquid ADJ storage)	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:41 PM
L186	1	L184 AND (heat resistant)	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:53 PM
L187	28	(heat near2 resistant near2 fibers) AND (cigarette near3 electronic)	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:56 PM
L188	96	(heat near2 resistant near2 fibers) AND (cigarette)	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:57 PM
L189	68	L188 NOT L187	US-PGPUB; USPAT	OR	ON	ON	2020/12/29 02:57 PM
L190	1	"8528569".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/30 09:31 AM
L191	1	"9810373".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/30 11:45 AM
L192	1	L191 AND housing	US-PGPUB; USPAT	OR	ON	ON	2020/12/30 11:45 AM
L193	1	"9596887".pn.	US-PGPUB; USPAT	OR	ON	ON	2020/12/31 08:35 AM
L194	1	L193 AND (heat temperature resistant)	US-PGPUB; USPAT	OR	ON	ON	2020/12/31 08:35 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

NJOY Exhibit 1002.268

Used in Lieu of PTO/SB/08A/B
(Based on PTO 11-07 version)

Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	16/359,938
				Filing Date	March 20, 2019
				First Named Inventor	Kyle D. Newton
				Art Unit	3991
(Use as many sheets as necessary)				Examiner Name	N. L. Torres Velazquez
Sheet	1	of	1	Attorney Docket Number	

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A	US-7,726,320	06-01-2010	Robinson et al.	
	B	US-8,528,569	09-10-2013	Newton	
	C	US-20050016550-A1	01-27-2005	Katase	
	D	US-20050172976-A1	08-11-2005	Newman et al.	
	E	US-20060196518-A1	09-07-2006	Hon	
	F	US-20070267031-A1	11-22-2007	Hon	
	G	US-20090095311-A1	04-16-2009	Han	
	H	US-20100031967-A1	02-11-2010	Inagaki	
	I	US-20110011396-A1	01-20-2011	Fang	
	J	US-20110303231-A1	12-15-2011	Li et al.	
	K	US-20120111347-A1	05-10-2012	Hon	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	**A	CN-201379072-Y	01-13-2010	Li, Han		
	**B	WO-2010091593-A1	08-19-2010	Hon, Lik		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. * CITE NO.: Those application(s) which are marked with an single asterisk (*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(iii)) because that application was filed after June 30, 2003 or is available in the IFW. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

Examiner Signature	/Norca L. Torres Velazquez/ (12/28/2020)	Date Considered	12/28/2020

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English language Translation is attached.

101857464v.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /NT/

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Application	Document	Mailroom Date	Attorney Docket No.
16359938	CTNF	01/14/2021	62210-492RI1US
	892	01/14/2021	62210-492RI1US
	1449	01/14/2021	62210-492RI1US

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UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of:
Kyle D. Newton

Application No.: 16/359,938	Confirmation No.: 6916
Filed: March 20, 2019	Art Unit: 3991
For: ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR	Examiner: N. L. Torres Velazquez

AMENDMENT IN RESPONSE TO NON-FINAL OFFICE ACTION UNDER 37 C.F.R. § 1.111

VIA EFS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

This paper is in response to the non-final Office Action dated January 14, 2021.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 19 of this paper.

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AMENDMENTS TO THE CLAIMS

1. (Twice Amended) An electronic cigarette cartridge apparatus, comprising:

a housing having a mouthpiece with an aerosol outlet;

an atomizer disposed within an atomizing chamber, and operable to selectively generate an aerosol of [the]a liquid in response to electric current flowing therethrough;

said atomizing chamber having an air inlet, an atomizer outlet coupled to said aerosol outlet, [and]a first wick aperture, and a second wick aperture;

a liquid reservoir disposed within said housing and sealably separated from said atomizing chamber[,]; and

a wick in contact with the liquid in the liquid reservoir ~~disposed~~ through said first wick aperture ~~between said liquid reservoir and said atomizing chamber~~ and said second wick aperture, the wick disposed between the liquid reservoir and the atomizer and configured to transfer the liquid by capillarity from said liquid reservoir to said atomizer;

wherein said atomizer outlet and said aerosol outlet are coupled by a chimney.

2. The apparatus of claim 1, further comprising:

an inlet vent formed on the exterior of said housing and coupled to deliver air to said atomizing chamber air inlet.

3. (Amended) The apparatus of claim 2, [and]wherein said inlet vent is coupled to said atomizing chamber air inlet by a conduit.

4. (Amended) The apparatus of claim 3, [and]wherein said conduit sealably passes through said liquid reservoir.

5. (Amended) The apparatus of claim 1, [and]wherein said chimney sealably passes through said liquid reservoir.

6. (Amended) The apparatus of claim 1, [and]wherein said atomizer is a resistive heating element.

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7. (Amended) The apparatus of claim 6, [and]wherein said wick [is]partially engages said resistive heating element.

8. (Amended) The apparatus of claim 1, [and]wherein said atomizer has a tubular form defining an open central passage.

9. (Amended) The apparatus of claim 8, [and]wherein said wick passes through said open central passage.

10. (Twice Amended) The apparatus of claim 1, [and]wherein ~~said atomizing chamber further comprises a second wick aperture, and wherein~~ a first end of said wick passes through said first wick aperture and a second end of said wick passes through said second wick aperture.

Cancel claim 11.

12. (Amended) The apparatus of claim [11]1, [and]wherein said bundle of heat resistant fibers is fiberglass.

13. (Amended) The apparatus of claim [11]1, [and]wherein said bundle of heat resistant fibers is fabricated from a material selected from; aramid, fluorocarbon, sulfide, melamine, polyimide, carbon, and glass.

14. (Amended) The apparatus of claim 1, [and]wherein said liquid reservoir is formed as an annular cavity between [the]an interior of said housing and said atomizing chamber.

15. (Amended) The apparatus of claim 1, [and]wherein said liquid reservoir includes an external access opening[,] for enabling addition of liquid into said liquid reservoir.

16. (Amended) The apparatus of claim 15, [and]wherein said external access opening is a removable mouthpiece.

17. (New, amended) A method, comprising:

transferring liquid from a liquid reservoir of an electronic cigarette cartridge to an atomizing chamber of the cartridge with a wick extending between the liquid reservoir and the

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atomizing chamber, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber;

generating an aerosol of the liquid in the atomizing chamber; and

channeling the aerosol from an outlet of the atomizing chamber to an aerosol outlet of the electronic cigarette cartridge with a chimney coupled to the outlet of the atomizing chamber and to the aerosol outlet.

18. (New) The method of claim 17, where the liquid reservoir is without a porous material for storing the liquid.

19. (New) The method of claim 17, wherein transferring liquid from a liquid reservoir to an atomizing chamber with a wick comprises transferring the liquid by capillarity with the wick.

20. (New) The method of claim 17, wherein generating an aerosol of the liquid comprises generating aerosol with an electrically powered atomizer in the atomizing chamber.

21. (New) The method of claim 17, wherein channeling the aerosol with a chimney comprises channeling the aerosol with the chimney through the liquid reservoir, the chimney being sealed from the liquid reservoir.

22. (New) The apparatus of claim 1, wherein the wick extends between the liquid reservoir and an interior of the atomizing chamber.

23. (New) The apparatus of claim 1, wherein the liquid reservoir adjacent the wick is free from porous material.

24. (New) The apparatus of claim 1, wherein the first wick aperture is circular.

25. (New, amended) The apparatus of claim 1, further comprising an atomizing assembly comprising a body and the atomizer, the atomizing assembly comprising a first recess formed therein that aligns with the first wick aperture in the atomizing chamber and provides a compressive fit around the wick.

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26. (New, amended) The apparatus of claim 25, wherein the first wick aperture and the first recess cooperate to define a circular aperture.

27. (New) The apparatus of claim 10, wherein the first wick aperture and the second wick aperture each comprise a fixed width slot terminating in a curved end, the fixed width configured to receive the wick.

28. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber.

29. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet.

30. (New) The apparatus of claim 1, wherein the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

31. (New, amended) The apparatus of claim 1, wherein the chimney and atomizing chamber are cylindrical and the maximum exterior diameter of the chimney is less than the maximum interior diameter of the atomizing chamber.

32. (New) The apparatus of claim 1, wherein the apparatus is elongate, and the maximum transverse exterior dimension of the chimney is less than the maximum transverse interior diameter of the atomizing chamber.

33. (New) The apparatus of claim 1, wherein the atomizing chamber and the chimney are formed as a single unit.

34. (New, amended) The apparatus of claim 1, wherein the housing comprises a transparent material through which the liquid in the liquid reservoir can be viewed from the exterior of the apparatus.

35. (New, amended) The apparatus of claim 1, further comprising an insert in the housing, the insert comprising the aerosol outlet.

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36. (New, amended) The apparatus of claim 1, coupled to a power supply portion, wherein the power supply portion comprises a pressure sensor configured to detect negative pressure within the power supply portion and energize the atomizer.

37. (New) The apparatus of claim 36, wherein the power supply portion comprises an LED positioned at a tip end of the power supply portion, the LED configured to illuminate in response to the pressure sensor detecting negative pressure in the power supply portion.

38. (New) The apparatus of claim 37, wherein the LED comprises an amber LED configured to emulate burning ash when illuminated.

39. (New) The apparatus of claim 1, wherein the chimney is sealed to the atomizer outlet, the chimney and atomizing chamber are cylindrical, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

40. (New) The apparatus of claim 1, wherein the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber, the atomizing chamber and the chimney are formed as a single unit, and the apparatus comprises a sealed path from the atomizer outlet, through the chimney to the aerosol outlet.

41. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

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a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

42. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

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43. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

44. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

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a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

45. (New, amended) A cartridge comprising:

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber comprising a first wick aperture and a second wick aperture each forming an opening between the atomizing chamber and a liquid reservoir configured to contain an atomization liquid; the atomizing chamber further comprising an atomizer outlet;

a wick partially disposed within the atomizing chamber, the wick having a first wick end extending out of the atomizing chamber through the first wick aperture into the liquid reservoir and a second wick end extending out of the atomizing chamber through the second wick aperture into the liquid reservoir, the wick configured to draw the atomization liquid into the atomizing chamber by capillarity; and

an atomizer disposed within the atomizing chamber, the atomizer configured to receive electric current from a battery to facilitate generation of an aerosol by vaporizing the atomization liquid drawn into the atomizing chamber by the wick;

wherein the atomizer outlet and the aerosol outlet are coupled by a chimney.

46. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

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a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

47. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

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48. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

49. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

NJOY Exhibit 1002.281

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

50. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

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a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

51. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

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a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit.

52. (New, amended) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

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a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the cartridge housing and the chimney;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

53. (New, amended) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber, the atomizing chamber defining an open central passage;

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a non-porous liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid, the liquid reservoir comprising a clear or translucent window to an exterior of the cartridge housing, the clear or translucent window allowing visual determination of a liquid level within the liquid reservoir;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the liquid reservoir between the atomizer outlet and the aerosol outlet, wherein liquid reservoir is also partially defined between the interior of the cartridge housing and the chimney;

a resilient seal disposed between an exterior of the chimney and the interior of the cartridge housing, the resilient seal sealing an upper end of the liquid reservoir and locating the chimney within the cartridge housing;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element;

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick passing through the open central passage between the wick apertures at opposite sides of the atomizing chamber, the wick comprising a first wick end passing through the first wick aperture and a second wick end passing through the second wick aperture; and

an atomizing assembly engaged with the atomizing chamber, the atomizing assembly having a pair of semicircular recesses formed therein, the pair of semicircular recesses aligning cooperatively with the first wick aperture and the second wick aperture of the atomizing chamber to result in a pair of circular apertures through which the first wick end and the second wick end pass with a compressive fit, the atomizing assembly comprising the atomizer.

54. (New) A cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer

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outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

55. (New) An electronic cigarette comprising:

a power supply portion comprising a rechargeable battery; and

a cartridge configured for separable attachment to the power supply portion; the cartridge comprising:

a cartridge housing;

a mouthpiece end comprising an aerosol outlet;

an atomizing chamber disposed within the cartridge housing proximate a lower end of the cartridge housing opposite the mouthpiece end, the atomizing chamber comprising an atomizer outlet and an atomizing chamber air inlet; the atomizing chamber further comprising a first wick aperture and a second wick aperture at opposite sides of the atomizing chamber;

a liquid reservoir at least partially defined by an interior of the cartridge housing and an exterior of the atomizing chamber, the liquid reservoir configured to contain an atomization liquid;

a chimney formed as a single unit with the atomizing chamber, the chimney forming at least part of an aerosol outlet path sealably passing through the reservoir between the atomizer outlet and the aerosol outlet;

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an atomizer disposed within the atomizing chamber, the atomizer comprising a resistive heating element; and

a wick in contact with the atomization liquid in the liquid reservoir through the first wick aperture and the second wick aperture, the wick disposed between the liquid reservoir and the atomizer.

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REMARKS

The Office Action addresses claims 1-10 and 12-55, with claims 1, 17, and 41-55 being independent. Claims 1-10, 12-26, and 28-40 are rejected. Claims 41-55 are allowable, and claim 27 is objected to. Reconsideration is respectfully requested.

Amendments to the Claims

Original independent claim 1 is twice amended to remove the previously added limitation, "the wick being fabricated as a bundle of heat resistant fibers," and to add ", and a second wick aperture" in line 6. Claim 1 is further twice amended to recite that the wick is "in contact with the liquid in the liquid reservoir through said first wick aperture and said second wick aperture, the wick disposed between the liquid reservoir and the atomizer" in lines 9-11. Support for these amendments can be found throughout the specification and drawings, for example, at col. 2, lines 16-20; col. 4, lines 1-4; FIGS. 7-10; and original claim 10 of U.S. Patent No. 9,596,887, on which this reissue application is based.

Original dependent claim 10 is twice amended as indicated above in view of the amendments made to claim 1 herein.

No new matter is added.

Allowable Subject Matter

Claims 41-55 are indicated as being allowed, and claim 27 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of its base claim and any intervening claims.

Claim 27 is not amended into independent form at this time because independent claim 1 as presented herein, which claim 27 depends therefrom, represents allowable subject matter.

Rejection under 35 U.S.C. § 102

Claims 1, 2, 3, 6, 7, 15, 17-20, 22-23, and 33-35 are rejected under 35 U.S.C. § 102(a)(2) as being anticipated by U.S. Patent No. 6,155,268 of Takeuchi ("Takeuchi") as evidenced by

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U.S. Patent Publication No. 2014/0060554 of Collett et al. ("Collett"). Applicant respectfully disagrees.

Independent Claim 1

Takeuchi fails to teach or suggest an atomizing chamber with "a first wick aperture, and a second wick aperture" and "a wick in contact with the liquid in the liquid reservoir through said first wick aperture and said second wick aperture, the wick disposed between the liquid reservoir and the atomizer," as recited in claim 1. Further, Collett fails to supplement these deficiencies of Takeuchi. Accordingly, for at least these reasons, claim 1, and claims 2, 3, 6, 7, 15, 22-23, and 33-35 which depend therefrom, distinguish over Takeuchi and Collett, alone or in combination. Withdrawal of this rejection is respectfully requested.

Indpendent Claim 17

Takeuchi fails to teach or suggest an atomizing chamber and a liquid reservoir in which "the liquid reservoir surrounds and is sealed from an interior of the atomizing chamber," as recited in claim 17. The Office Action likens "upper chamber 121" of Takeuchi to the recited "atomizing chamber" and further likens "container 32" of Takeuchi to the recited "liquid reservoir." *Id.* at p. 7. However, as shown in FIGS. 1 and 8 of Takeuchi, the container 32 ***does not surround*** the upper chamber 121. Instead, as shown in FIG. 1, the container 32 is positioned ***in the lower chamber 122***, and as shown in FIG. 8, the container is positioned ***within*** the upper chamber 121. Further, Collett fails to supplement these deficiencies of Takeuchi. Accordingly, for at least these reasons, claim 17, and claims 18-21 which depend therefrom, distinguish over Takeuchi and Collett, alone or in combination. Withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 1, 5-6, 8, 12-13, 23-26, 29-33, and 36-40 are rejected under 35 U.S.C. § 103 as being unpatentable over CN Patent No. 101606758 of Fang ("Fang") in view of Collett. Claims 2, 17-21, and 28 are rejected under 35 U.S.C. § 103 as being unpatentable over Fang and Collett in view of CA Patent No. 2884987 of Hon ("Hon"). Claims 7, 9, 15, and 34 as being

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unpatentable over Fang and Collett in view of Takeuchi. Claims 12 and 13 are rejected under 35 U.S.C. § 103 as being unpatentable over Takeuchi in view of Collett and further evidenced by Hon. Applicant respectfully disagrees.

Independent Claim 1

Fang and Collett both fail to teach or suggest an atomizing chamber with "a first wick aperture, and a second wick aperture," and "a wick in contact with the liquid in the liquid reservoir through said first wick aperture and said second wick aperture, the wick disposed between the liquid reservoir and the atomizer," as recited in claim 1. Accordingly, for at least these reasons, claim 1, and claims 5-6, 8, 12-13, 23-26, 29-33, and 36-40 which depend therefrom, distinguishes over Fang and Collett, alone or in combination. Withdrawal of this rejection is respectfully requested.

Independent Claim 17

This rejection is improper because ***no*** reason has been provided for the proposed modification of Fang and Collett with Hon that satisfies the standard of establishing a *prima facie* case of obviousness. A *prima facie* case of obviousness can only be established by providing a reason for the proposed modification. *See MPEP § 2143* ("The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious") (discussing *KSR Int'l Co. v. Teleflex Inc.,* 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007)).

Here, the Office Action reproduces FIG. 6 of HON and states that "HON teaches an embodiment in which the liquid storage component 3 surrounds and is sealed from an interior of the atomizing chamber 5." *Office Action*, p. 16. As such, the Office Action merely provides its interpretation of a teaching of Hon without ***any*** rationale as to why a person of ordinary skill in the art would have any reason or motivation to modify Fang with Hon to arrive at Applicant's claimed methods. Accordingly, for at least these reasons, claim 17, and claims 18-21 which depend therefrom, distinguish over Fang, Collett, and Hon, alone or in any combination. Withdrawal of this rejection is respectfully requested.

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Dependent Claims 2 and 28

Claims 2 and 28 depend from claim 1, which is shown above to be patentable over Fang and Collett. Hon is only relied on for dependent claim features and does not cure the above-discussed deficiencies of Fang and Collett with respect to claim 1. Applicant thus respectfully submits that claims 2 and 28 distinguish over Fang, Collet, and Hon, alone or in any combination, and represent allowable subject matter.

Dependent Claims 7, 9, 15, and 34

Claims 7, 9, 15, and 34 depend from claim 1, which is shown above to be patentable over Fang and Collett. Takeuchi is only relied on for dependent claim features and does not cure the above-discussed deficiencies of Fang and Collet with respect to claim 1. Applicant thus respectfully submits that claims 7, 9, 15, and 34 distinguish over Fang, Collett, and Takeuchi, alone or in any combination. Withdrawal of this rejection is respectfully requested.

Dependent Claims 12 and 13

Claims 12 and 13 depend from claim 1, which is shown above to be patentable over Takeuchi and Collett. Hon is only relied on for dependent claim features and does not cure the above-discussed deficiencies of Takeuchi and Collett with respect to claim 1. Applicant thus respectfully submits that claims 12 and 13 distinguish over Takeuchi, Collett, and Hon, alone or in any combination. Withdrawal of this rejection is respectfully requested.

Double Patenting Rejection

Claims 1-10 and 12-16 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 8,528,569 in view of Hon.

Applicant respectfully defers the filing of a terminal disclaimer to overcome the double patenting rejection until such time the claims of the present application are allowed, in view of the claim amendments presented herein and the possibility of future claim amendments.

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Conclusion

In conclusion, Applicant submits that all pending claims are now in condition for allowance for at least the reasons discussed above, and allowance thereof is respectfully requested. Applicant's amendment of the claims does not constitute a concession that the claims are not allowable in their unamended form. The Examiner is encouraged to telephone the undersigned attorney for Applicant if such communication is deemed to expedite prosecution of this application.

The fee for a three-month extension of time is submitted herewith. In the event that a petition for an extension of time is required to be submitted at this time, Applicant hereby petitions under 37 C.F.R. § 1.136(a) for an extension of time for as many months as are required to ensure that the above-identified application does not become abandoned.

All fees due are believed to be paid. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 50-0311, Reference No.: 16/359,938, from which the undersigned is authorized to draw.

Dated: July 14, 2021

Respectfully submitted,

Electronic signature: /mdvl/
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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	16/359,938
				Filing Date	March 20, 2019
				First Named Inventor	Kyle D. Newton
				Art Unit	3991
(Use as many sheets as necessary)				Examiner Name	N. L. Torres Velazquez
Sheet	1	of	5	Attorney Docket Number	

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Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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				First Named Inventor	Kyle D. Newton
				Art Unit	3991
				Examiner Name	N. L. Torres Velazquez
Sheet	2	of	5	Attorney Docket Number	

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				Art Unit	3991
(Use as many sheets as necessary)				Examiner Name	N. L. Torres Velazquez
Sheet	3	of	5	Attorney Docket Number	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 4 of 5

Complete if Known	
Application Number	16/359,938
Filing Date	March 20, 2019
First Named Inventor	Kyle D. Newton
Art Unit	3991
Examiner Name	N. L. Torres Velazquez
Attorney Docket Number	

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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	16/359,938
				Filing Date	March 20, 2019
				First Named Inventor	Kyle D. Newton
				Art Unit	3991
(Use as many sheets as necessary)				Examiner Name	N. L. Torres Velazquez
Sheet	5	of	5	Attorney Docket Number	

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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. * CITE NO.: Those application(s) which are marked with an single asterisk (*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(iii)) because that application was filed after June 30, 2003 or is available in the IFW. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

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[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English language Translation is attached.

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Electronic Patent Application Fee Transmittal

Application Number:	16359938
Filing Date:	20-Mar-2019
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Filer:	Elissa Marie Kingsland/June Watson
Attorney Docket Number:	62210-492RI1US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1480	1480
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**1740**

Electronic Acknowledgement Receipt	
EFS ID:	43237022
Application Number:	16359938
International Application Number:	
Confirmation Number:	6916
Title of Invention:	ELECTRONIC CIGARETTE WITH LIQUID RESERVOIR
First Named Inventor/Applicant Name:	Kyle D. Newton
Customer Number:	148514
Filer:	Elissa Marie Kingsland
Filer Authorized By:	
Attorney Docket Number:	62210-492RI1US
Receipt Date:	14-JUL-2021
Filing Date:	20-MAR-2019
Time Stamp:	11:55:58
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RAM confirmation Number	E20217DB56240557
Deposit Account	500311
Authorized User	Elissa Kingsland
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	AU2014208287B2.pdf	893251 07054a49211ffb7bac8b8fc140b44abf14e186e1	no	22
Warnings:					
Information:					
2	Foreign Reference	AU2017202891B2.pdf	3539761 1059169bf079a47c322bd9811be5a087e6eb4e2e	no	57
Warnings:					
Information:					
3	Foreign Reference	CA2641869A1.pdf	1170807 b0f796323219ef826da5ee2386ae6b87191f3483	no	29
Warnings:					
Information:					
4	Foreign Reference	CN101869356A.pdf	1093254 914f0250b78ef1a55a2ed505aa02629fafae26fa	no	17
Warnings:					
Information:					
5	Foreign Reference	CN102727969B.pdf	876777 6d3da5fc79982d481238bc4aa4d1b14249d60f1a	no	13
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Information:					
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Warnings:					
Information:					

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11	Foreign Reference	DE19619536A1.pdf	1431362 ba6f6eed67d291f9e9b12194e984f24e478c0815	no	22
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21	Foreign Reference	KR20120113519.pdf	471310 c56bca2823dccac5e09bb924e1f0b111e50d9c2c	no	14
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30	Foreign Reference	WO2012173322A1.pdf	605233 b287f0acf2c0d1e4b3cceeaec9b77e4bd60d b10c	no	15
Warnings:					
Information:					
31	Transmittal Letter	492RI1IDS.pdf	77752 b811bde98d697e1e67be1df0b2e29d3b26 2d4a6e	no	2
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32		492RI1Response.pdf	250780 17173a203c57d44e6c9b259523cbc729392 684ab	yes	23

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	18
	Applicant Arguments/Remarks Made in an Amendment	19	23

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33	Information Disclosure Statement (IDS) Form (SB08)	SB08.pdf	192170 4979e8e07712f29dba1b7388340dec19afe 049ee	no	5
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34	Fee Worksheet (SB06)	fee-info.pdf	32647 2d7dad75b4fe56833d31575d9838e26ab45e54f5	no	2
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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ABSTRACT

AEROSOL ELECTRONIC CIGARETTE

An aerosol electronic cigarette includes a battery assembly, an atomizer assembly and a cigarette bottle assembly and also includes a shell(a) which is hollow and integrally formed. Said battery assembly connects with said atomizer assembly and both are located in said shell(a). Said cigarette bottle assembly is located in one end of the shell(a),which is detachable. Said cigarette bottle assembly fits with said atomizer assembly. Said shell(a) has through-air-inlets(a1).

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An aerosol electronic cigarette

Technical Field

The present invention relates to an electronic cigarette, in particular, an aerosol electronic cigarette that doesn't contain tar but nicotine.

Background Art

Today when "smoking is harmful to your health" has become a common sense, there are one billion people smoking cigarettes, and this figure is still rising. On March 1, 2003, the World Health Organization (WHO) issued the first international smoking ban – Framework Convention on Tobacco Control. According to WHO's data, smoking causes 4,900,000 deaths each year. Smoking causes serious respiratory system diseases and cancers, though it is a hard job to persuade the smokers to completely quit smoking.

Nicotine is the effective ingredient of cigarette, which produces a lot of tar mist as the cigarette burns. The tar mist accesses the pulmonary alveolus and is quickly absorbed into the blood. Nicotine thus acts on the receptor of the central nervous system, bringing the euphoria like stimulant drugs to the smokers, who feel light in the head and on wings as well.

Nicotine is a micromolecular alkaloid, which is basically harmless to human bodies with a small dosage. Plus, its half life period is extremely short in blood. Tar is the major harmful substance in tobacco. Tobacco tar comprises of several thousands of ingredients, dozens of which are carcinogenic substances. It has now been proved that second hand smoking is even more harmful to those who don't smoke.

To seek the cigarette substitutes that don't contain harmful tar but nicotine, many inventors have used the relatively pure nicotine to create such products as "Cigarette Patch", "Nicotine Gargle", "Aerosol Packed in the High Pressure Tank with Propellant", "Nicotine Chewing Gum", and "Nicotine Beverage". These products are not as harmful as tar, but are absorbed very slowly. As a result, its peak concentration can't be effectively established in blood, and the smokers can't be satisfied to the full. In addition, the smokers are deprived of the "smoking" habit. Therefore, the substituting products are not real cigarette substitutes or products helping to quit smoking.

The electronic cigarettes currently available on the market may resolve the above-mentioned issue, though they are complicated in structure. Their cigarette bodies can be roughly divided into three sections, which have to be connected through via plugging or thread coupling before use. Also, their batteries have to be changed frequently, making it inconvenient for the users. What's worse, the electronic cigarettes don't provide the ideal aerosol effects, and their atomizing efficiency is not high.

Contents of invention

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To overcome the above-mentioned disadvantages, this invention has been designed to provide an aerosol electronic cigarette that substitutes for cigarettes and helps the smokers to quit smoking.

The purpose of this invention is fulfilled with the following technical solution: an aerosol electronic cigarette includes a battery assembly, an atomizer assembly and a cigarette bottle assembly, and also includes a shell, which is hollow and integrally formed. The said battery assembly connects with the said atomizer assembly and both are located in the said shell. The said cigarette bottle assembly is located in one end of the shell, which is detachable. The said cigarette bottle assembly fits with the said atomizer assembly. The said shell has through-air-inlets.

The additional features of this invention are as follows: the said battery assembly includes the battery, and the operating indicator, electronic circuit board, and airflow sensor, which are connected with the said battery; the signal output of the said airflow sensor is connected with the said electronic circuit board.

It also includes a check valve. The said battery is a rechargeable battery, which has a flexibly connected charging plug. The blades of the said plug come out of the other end of the said shell.

Between the said charging plug and rechargeable battery is a spring, which lies against the body of the said rechargeable battery on one end, and its free end lies against the said charging plug.

The said battery is a rechargeable battery, which has a charging slot on it. The said operating indicator is a LED.

The said airflow sensor may be alternatively a semiconductor force-sensitive chip capacitance sensor or an inductance sensor.

The said electronic circuit board includes an electronic switch circuit.

The said airflow sensor has a silica gel corrugated membrane, which connects with magnetic steel with a reed relay on one of its ends. Both ends of the said reed relay correspond to the relay electrodes.

The said airflow sensor has a silica gel corrugated membrane, which connects with magnetic steel with a Hall element or a magneto-diode or a magneto-triode on one of its ends.

The said atomizer assembly is an atomizer, which includes a porous component and a heating body.

The said atomizer also includes an electric heating rod. The body of the said porous component has a run-through atomizing chamber. The diameter of the said electric heating rod is less than the diameter of the said atomizing chamber. The said electric heating rod enters into the said atomizing chamber, and there is a clearance between the said electric heating rod and interior wall of the atomizing chamber. The said clearance forms a negative pressure cavity. One end of the said

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porous component fits with the said cigarette bottle assembly.

The said electric heating rod includes a cylinder. The said heating body is heating wire, which is wound on the wall of the said cylinder. The said porous component has a protuberance on one end, and the said protuberance fits with the said cigarette bottle assembly. The said protuberance is a half sphere, on the side of which there is a run-through hole connecting to the said atomizing chamber.

The said electric heating rod includes a cylinder. The said heating body is made of electrically conductive ceramic PTC material. The said heating body is set on the wall of the said cylinder. On the wall of both ends of the said cylinder, there are mandrils respectively. The said porous component has a protuberance on one end, and the said protuberance fits with the said cigarette bottle assembly. The said protuberance is a half sphere, on the side of which there is a run-through hole connecting to the said atomizing chamber.

The said heating body is heating wire. The said atomizer assembly includes a frame. The said porous component is set on the said frame. The said porous component is wound with heating wire. The said frame has a run-through hole on it. The said porous component is wound with heating wire in the part that is on the side in the axial direction of the said run-through hole. One end of the said porous component fits with the said cigarette bottle assembly.

The said porous component is made of foamed nickel, stainless steel fiber felt, macromolecular polymer foam or foamed ceramics.

The said heating wire is made of platinum wire, nickel-chromium alloy wire or iron-chromium alloy wire containing rare earth, or is flaked.

A restriction component, which is detachable, is set on one end of the said porous component. There is a restriction hole on the body of the said restriction component. The said restriction hole corresponds to the said atomizing chamber. The pore diameter of the said restriction hole is less than the inner diameter of the atomizing chamber.

The said cigarette bottle assembly includes a hollow cigarette holder shell, and a perforated component for liquid storage inside the said cigarette holder shell. One end of the said cigarette holder shell plugs into the said shell, and the outer peripheral surface of the said cigarette holder shell has an inward ventilating groove. On one end surface of the said cigarette holder shell, there is an air channel extending inward.

The said air channel is located in the center on one end surface of the said cigarette holder shell.

One end of the said porous component lies against one end surface of the said perforated component for liquid storage, and contacts the said perforated component for liquid storage.

The said perforated component for liquid storage is made of such materials as PLA fiber, terylene

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fiber or nylon fiber.

The said perforated component for liquid storage is plastic foam molding or column of multi-layer plates made through plastic injection with polyvinyl chloride, ploypropylene and polycarbonate..

The said electronic cigarette is held in a charging device.

The said charging device includes a case, which contains an auxiliary charging storage battery inside it, and holds the electronic cigarette and the charger for the rechargeable battery embedded in the electronic cigarette, as well as the power supply circuit. The power inputs of the said auxiliary charging storage battery and charger are connected with the power supply circuit respectively.

The said case has a spare liquid supply bottle in it.

The power output of the said auxiliary charging storage battery is connected with the power input of the said charger.

The power output of the said charger is a charging slot, which fits with the charging plug of the rechargeable battery inside the said electronic cigarette, or a charging plug, which fits with the charging slot of the rechargeable battery.

The said charger is a constant voltage & current charger.

On the body of the said shell, there is a pair of slide ways corresponding to the position of the said electronic cigarette, and on the slide ways, there is a slide cover.

This invention will bring the following benefits: (1) For this invention, the perforated component for liquid storage of the cigarette bottle assembly stores the nicotine liquid only, which doesn't contain cigarette tar, considerably reducing the carcinogenic risks of smoking. At the same time, the smokers can still enjoy the feel and excitement of smoking, and there is no fire hazard since there is no need for igniting. (2) For this invention, the battery assembly and atomizer assembly are directly installed inside the shell, and then connected with the cigarette bottle assembly. That is, there is just one connection between two parts, resulting in a very simple structure. For use or change, you just need to plug the cigarette holder into the shell, providing great convenience. When the nicotine liquid in the cigarette bottle assembly is used up or the cigarette bottle assembly is damaged and needs to be changed, the operation will be extremely easy. (3) For this invention, the rechargeable battery inside the battery assembly has a charging plug, whose blades come out of the shell. When the rechargeable battery inside the electronic cigarette runs out of power, it may be directly plugged into the charger for charging, with no need to remove the rechargeable battery, resulting in very easy use. (4) For this invention, the charging device includes the charger and the auxiliary charging storage battery. The electronic cigarette is put inside the charger when not in use, and then the charging device may be electrified to charge the electronic cigarette and the auxiliary charging storage battery as well. In the event that power

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supply is not available for the charging device, the auxiliary charging storage battery may be used to charge the electronic cigarette. Therefore, the electronic cigarette can be charged anywhere you go, and it is very suitable for use when you are on a business or tourist trip. Further, the charging device includes a spare liquid supply bottle, which contains nicotine liquid for spare use when you are on a business or tourist trip. (5) For this invention, on one end of the shell of the cigarette bottle assembly, there is an air channel extending inward. The electronic cigarette works to produce mist, which flows to the shell, generating some fine drips; the find drips are condensed into bigger drips, which fall along the exterior wall of the air channel into the cavity of the shell of the cigarette bottle assembly, so that they are not inhaled by the smoker out of the air channel. (6) In addition, with a little bit modification to the liquid storage, the unit and its connecting structure of this invention may also be loaded with drugs for delivery to the lung.

According to another aspect there is provided an electronic cigarette, comprising: a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly; a liquid storage component in the housing, with the housing having one or more through-air-inlets; the atomizer assembly including a porous component supported by a frame having a run-through hole; a heating wire wound on a part of the porous component in axial alignment with the run-through hole and in the path of air flowing through the run-through hole; and the porous component in contact with liquid in the liquid storage component.

Description of Drawings

Figure 1 is the side section view of the electronic cigarette of this invention.

Figure 2 is the section view of the shell (a) separated from the cigarette bottle assembly of the electronic cigarette of this invention, illustrating the structure of the cigarette bottle assembly that is detachably plug in the shell (a).

Figure 3 is the diagram of the axial structure of the cigarette bottle assembly of this invention, illustrating the ventilating groove on the peripheral surface of the cigarette holder shell.

Figure 4 is the side section view of the cigarette body assembly of this invention, illustrating the structure of the air channel.

Figure 5 is the side section view of the porous component of the atomizer of this invention, illustrating the atomizing chamber, a protruding half sphere structure.

Figure 6 is the diagram of the structure of the electric heating rod of the atomizer of this invention.

Figure 7 is the side section of the atomizer of this invention, illustrating the locations of and connection relating between the electric heating rod and porous component.

Figure 8 is the diagram of the cubic structure of the atomizer of this invention, illustrating the locations of and connection relation between the electric heating rod and porous component.

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Figure 9 is the section view of the check valve of this invention.

Figure 10 is the front section view of the restriction component in the second preferred embodiment of this invention, illustrating the structure of the restriction component.

Figure 11 is the diagram of the axial of the cigarette bottle assembly in the third preferred embodiment of this invention.

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Figure 12 is the A-A section view of Figure 11.

Figure 13 is the diagram of the structure of the electric heating rod of the atomizer in the fourth preferred embodiment of this invention.

Figure 14 is the section view of the porous component of the atomizer in the fourth preferred embodiment of this invention.

Figure 15 is the diagram of the axial structure of Figure 14.

Figure 16 is the side section view of the atomizer in the fourth preferred embodiment of this invention, illustrating the locations of and connection relation between the electric heating rod and porous component.

Figure 17 is the diagram of the axial structure of the atomizer in the fifth preferred embodiment of this invention.

Figure 18 is the side section view of the atomizer in the fifth preferred embodiment of this invention.

Figure 19 is the side section view of the electronic cigarette in the sixth preferred embodiment of this invention, illustrating the diagram of the structure of the airflow sensor adopting Hall element.

Figure 20 is the electric circuit diagram of the electronic cigarette of this invention, with the airflow sensor adopting a reed relay structure.

Figure 21 is the electric circuit diagram of the electronic cigarette of this invention, with the airflow sensor adopting Hall element.

Figure 22 is the diagram of the cubic structure of the charging device of this invention, illustrating the locations of and connection relation of various internal parts.

Figure 23 is the side section view of the charging device of this invention, illustrating the structure of slide way and cover.

Figure 24 is the diagram of the front structure of the charging device of this invention, illustrating the structure of the sliding cover.

Specific Mode for Carrying Out the Invention

This invention is further described as follows on the basis of the drawings.

As shown in Figure 1-10, this utility model provides an aerosol electronic cigarette, which

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includes a battery assembly, an atomizer assembly and a cigarette bottle assembly, and also includes a shell (a), which is hollow and integrally formed. The battery assembly connects with the atomizer assembly and both are located in the shell. The cigarette bottle assembly is located in one end of the shell, which is detachable. The cigarette bottle assembly fits with the atomizer assembly. The shell has through-air-inlets (a1).

In this specific embodiment, the battery assembly includes the battery, and the operating indicator (1), electronic circuit board (4), and airflow sensor (5), which are connected with the battery. It also includes a check valve (7). The signal output of the airflow sensor (5) is connected with the said electronic circuit board (4). The battery is a rechargeable battery (3), which may be either a rechargeable polymer lithium ion battery or a rechargeable lithium ion battery. The airflow sensor (5) may be alternatively a semiconductor force-sensitive chip capacitance sensor or an inductance sensor. The rechargeable battery (3) has a flexibly connected charging plug (2). The blades (21) of the charging plug (2) come out of the other end of the shell (a). Between the charging plug (2) and rechargeable battery (3) is a spring (6), which lies against the body of the rechargeable battery (3) on one end, while its free end lies against the charging plug (2), forming a flexible structure, which buffers the charging plug (2) when plugged for charging, thus protecting the rechargeable battery against any damage. Of course, the rechargeable battery (3) in this embodiment has a charging slot on it, which replaces the structure of charging plug (2) to perform the charging function and protect the rechargeable battery (3) against any damage. The operating indicator (1) is a LED. In this embodiment, there are two LEDs. The electronic circuit board (4) includes an electronic switch circuit, which controls the electric circuit according to the input signals, so that the rechargeable battery (3) electrifies the electric heating rod (82) inside the atomizer (8) and the LEDs as well.

As shown in Figure 1 and 2, the airflow sensor (5) has a silica gel corrugated membrane (53), which connects with magnetic steel (54) with a reed relay (52) on one of its ends. Both ends of the said reed relay (52) correspond to the relay electrodes (51) respectively.

As shown inFigure 5-8, the atomizer assembly is an atomizer (8), which includes a porous component (81) and a heating rod (82). The body of the porous component (82) has a run-through atomizing chamber (811). The diameter of the electric heating rod (82) is less than the diameter of the atomizing chamber (811). The electric heating rod (82) enters into the atomizing chamber (811), and there is a clearance between the electric heating rod (82) and interior wall of the atomizing chamber (811), which forms a negative pressure cavity (83). One end of the said porous component (81) fits with the said cigarette bottle assembly. As Figure 5, 7 and 8 show, the porous component (81) has a protuberance (812) on the other end, and the protuberance (812) fits with the cigarette bottle assembly. The protuberance (812) is a protruding half sphere, on the side of which there is a run-through hole (813) connecting to the atomizing chamber (811). Of course, the protuberance (812) may also be a taper, rectangle or any other shape. The porous component (81) is made of foamed nickel, stainless steel fiber felt, macromolecular polymer foam or foamed ceramics, providing the remarkable capabilities in liquid absorption and diffusion, and the ability to absorb the liquid stored in the cigarette bottle assembly.

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As shown in Figure 6, the electric heating rod (82) includes a cylinder (821). The heating wire (822) is wound on the wall of the cylinder (821). On the wall of both ends of the cylinder (821), there are mandrils (823) respectively, which lie against the interior wall of the atomizing chamber (811) of the porous component (81). There is a negative pressure cavity (83) between the electric heating rod and interior wall of the atomizing chamber.

The heating wire is made of platinum wire, nickel-chromium alloy wire or iron-chromium alloy wire containing rare earth, or is flaked. The electric heating rod (82) may alternatively have on its peripheral wall the heating layer made of electrically conductive ceramic PTC material, to replace the heating wire.

Of this embodiment, the battery assembly and atomizer assembly are mutually connected and then installed inside the integrally formed shell (a) to form a one-piece part. The rechargeable battery (3) may be charged without frequent change of battery. The user just needs to plug the cigarette bottle assembly into the open end of the shell (a), for easy use and very easy change.

As shown in 3 and 4, the cigarette bottle assembly includes a hollow cigarette holder shell (b), and a perforated component for liquid storage (9) inside the shell (b). The perforated component for liquid storage (9) is made of such materials as PLA fiber, terylene fiber or nylon fiber, which are suitable for liquid storage. Alternatively, it may be plastic foam molding or column of multi-layer plates made through plastic injection with polyvinyl chloride, ploypropylene and polycarbonate. One end of the cigarette holder shell (b) plugs into the shell (a), and the outer peripheral surface of the cigarette holder shell (b) has an inward ventilating groove (b2). On one end surface of the cigarette holder shell (b), there is an air channel (b1) extending inward. The air channel (b1) is located in the center on the surface of one end of shell (b).

As shown in Figure 1-9, one end of the porous component (81) lies against one end surface of the said perforated component for liquid storage (9), and contacts the perforated component for liquid storage (9). It absorbs the cigarette liquid from the perforated component for liquid storage (9). When the smoker smokes, the cavity of the cigarette holder shell (b) is in the negative pressure state. In the shell (b), one end of the airflow sensor (5) forms a normal pressure cavity, while the other end forms a negative pressure cavity. The air pressure difference between the normal pressure cavity and negative pressure cavity or the high-speed airflow enables the magnetic steel (54) of the airflow sensor (5) to drive the reed relay(52) to contact the relay electrode (51). As shown in Figure 20, the electric circuit is electrified, and the electronic switch circuit on the electronic circuit board (4) is electrified. Thus, the rechargeable battery (3) starts to electrify the electric heating rod (82) inside the atomizer (8), and at the same time, the LEDs, which are electrified by the rechargeable battery (3), emit light. The air enters the normal pressure cavity through the air inlet (a1), passes the check valve (7) via the airflow passage in the airflow sensor (5), and flows to the negative pressure cavity (83) in the atomizer (8). Since the negative pressure cavity (83) provides the negative pressure compared with the outside, the air flow sprays into it, bringing the cigarette liquid from the porous component (81) to spray into the negative pressure cavity (83) in the form of fine drips. In the meantime, the electric heating rod (82) is electrified by the rechargeable battery (3) under the control of electronic circuit board (4), to heat the fine drips

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for atomization. After atomization, the big-diameter fine drips are re-absorbed by the porous component (81) under the action of vortex, while the small-diameter fine drips are suspended in the airflow to form gasoloid, which is discharged through the negative pressure cavity (83) and run-through hole (813), flows into the cigarette holder shell (b) of the cigarette bottle assembly, and is absorbed by the air channel (b1). When the gasoloid enters the cigarette holder shell (b), multiple small liquid drips are condensed into bigger ones, which fall into the clearance between the cigarette holder shell (b) and air channel (b1) without being absorbed by the air channel (b1). The perforated component for liquid storage (9) of the cigarette bottle assembly and the porous component (81) of the atomizer (8) contact each other to achieve the capillary impregnation for liquid supply.

The unit and its connecting structure of this invention may also be loaded with drugs for delivery to the lung.

As shown in Figure 22, 23 and 24, the electronic cigarette (5) is held in a charging device. The charging device includes a case (1), which contains an auxiliary charging storage battery (2) inside it, and holds the electronic cigarette (5) and the charger (3) for the rechargeable battery embedded in the electronic cigarette (5), as well as the power supply circuit. The power inputs of the auxiliary charging storage battery (2) and charger (3) are connected with the power supply respectively. The charger (3) in this embodiment is a constant voltage & current charger. It may be a GY5210 charger, or any other constant voltage & current charger. The case (1) has a spare liquid supply bottle (4) in it. The power output of the auxiliary charging storage battery (2) is connected with the power input of the charger (3). The power output of the charger (3) is a charging slot (31), which fits with the charging plug of the rechargeable battery inside the electronic cigarette, or a charging plug, which fits with the charging slot of the rechargeable battery.

As shown in Figure 23 and 24 , on the body of the shell (1), there is a pair of slide ways (12) corresponding to the position of the electronic cigarette, and on the slide ways, there is a slide cover (11).

In the second preferred embodiment of this utility model, a restriction component (10), which is detachable, is set on one end of the said porous component (81). There is a restriction hole (101) on the body of the restriction component (10). The restriction hole (101) corresponds to the atomizing chamber (811). The pore diameter of the restriction hole is less than the inner diameter of the atomizing chamber (811) to the extent that the size of the restriction component (10) installed on the porous component (81) varies, for the purpose of airflow capacity control. On the basis of different applications, the restriction component of different sizes and pore diameters may be used.

In the third preferred embodiment of this utility model, as shown in 11 and 12, on the outer peripheral wall of the cigarette shell (b), there is a protruding rib (b2) that is evenly partitioned. The perforated component for liquid storage (9) enters the cigarette holder shell (b) and lies against the protruding rib (b2). Thus, there appears a clearance between the outer peripheral surface of the perforated component for liquid storage (9) and the interior wall of the shell (b). The

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clearance is for connection the shell (a) and cigarette holder shell (b). When the user smokes, the air channel (b1) absorbs the air to cause airflow inside the shell (a), thus triggering the airflow sensor (5) and eventually starting the electronic cigarette. Also, the atomizer (8) works to atomize the cigarette liquid and produce gas flow, which enters the cigarette holder shell (b).

In the fourth preferred embodiment of this utility model, as shown in Figure 13, 14, 15 and 16, on one end of the cylinder (821), there is a fixed plate (84), whose outer peripheral wall has partitioned supports (841). The outer ends of the supports (841) lie against the interior wall of the shell (a), thus suspending the cylinder (821), which is connected with the fixed plate (84), in the cavity of the shell (a). On the surface of the fixed plate (84), there is a mandril (842), whose front end lies against one end of the porous component (81). As a result, the run-through hole on one end of the atomizing chamber (811) won't be blocked, and the mist generated in the atomizing chamber (811) can be dispersed. One end of the porous component (81) has two protuberances (812) at the outlet of atomizing chamber (811). Between the two protuberances (812) is a clearance. The two protuberances (812) lie against the perforated component for liquid storage (9).

In the fifth preferred embodiment of this utility model, as shown in Figure 17 and 18, the atomizer assembly is an atomizer (8), which includes a frame (82), the porous component (81) set on the frame (82), and the heating wire (83) wound on the porous component (81). The frame (82) has a run-through hole (821) on it. The porous component (81) is wound with heating wire (83) in the part that is on the side in the axial direction of the run-through hole (821). One end of the porous component (81) firs with the cigarette bottle assembly. The porous component (81) is made of foamed nickel, stainless steel fiber felt, macromolecular polymer foam or foamed ceramics.

In the sixth preferred embodiment of this utility model, as shown in Figure 19, the airflow sensor (5) has a silica gel corrugated membrane (53), which connects with magnetic steel (54) with a Hall element (52), or a magneto-diode or a magneto-triode on one of its ends. Figure 21 shows the electric circuit of the electronic cigarette of this solution.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as, an acknowledgement or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

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The claims defining the invention are as follows:

1. An electronic cigarette, comprising:

a battery assembly and an atomizer assembly within a housing with the battery assembly electrically connected to the atomizer assembly;

a liquid storage component in the housing, with the housing having one or more through-air-inlets;

the atomizer assembly including a porous component supported by a frame having a run-through hole;

a heating wire wound on a part of the porous component in axial alignment with the run-through hole and in the path of air flowing through the run-through hole; and

the porous component in contact with liquid in the liquid storage component.

2. An electronic cigarette of claim 1 further including an electronic switch circuit electrically connected to the heating wire and to the battery.

3. The electronic cigarette of claim 1 wherein the housing is cylindrical and the liquid storage component is cylindrical and is coaxial with the housing.

4. The electronic cigarette of claim 1 wherein the housing is cylindrical and the heating wire is perpendicular to the housing.

5. The electronic cigarette of claim 1 wherein the porous component is cylindrical and the housing is cylindrical and the porous component is coaxial with the housing.

6. The electronic cigarette of claim 3 wherein the porous component is cylindrical and is coaxial with the liquid storage component and with the housing.

7. The electronic cigarette of claim 2 further including an airflow sensor in the housing electrically connected to the electronic switch circuit.

8. The electronic cigarette of claim 1 wherein the porous component is cylindrical and the liquid storage component is cylindrical and coaxial with the porous component.

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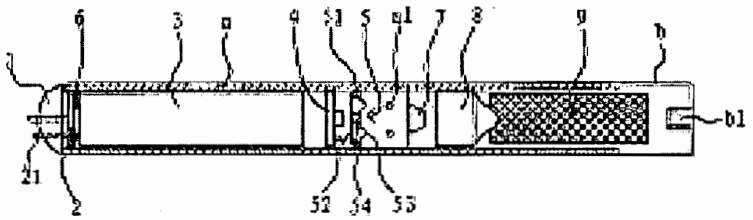


Figure 1

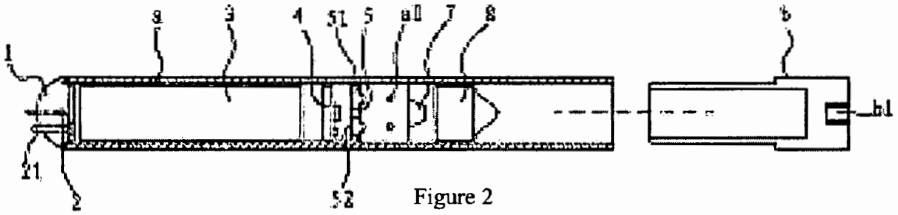


Figure 2

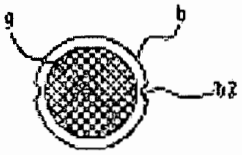


Figure 3

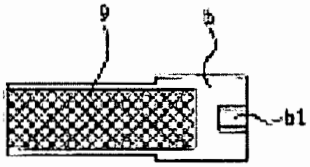


Figure 4

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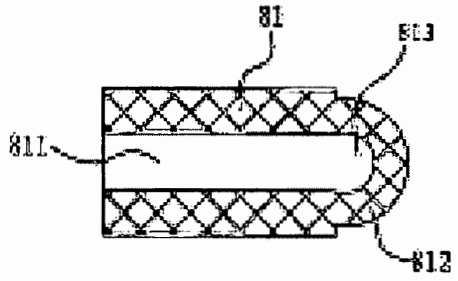


Figure 5

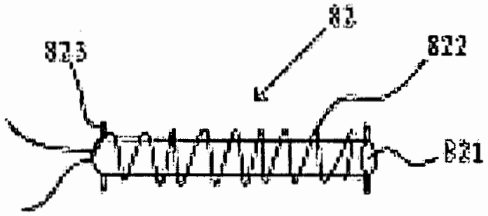


Figure 6

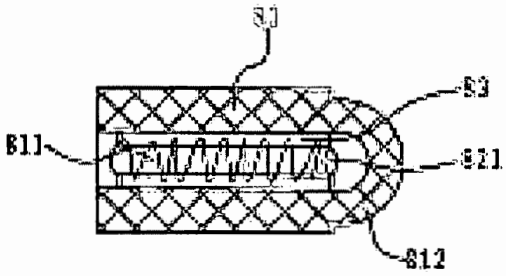


Figure 7

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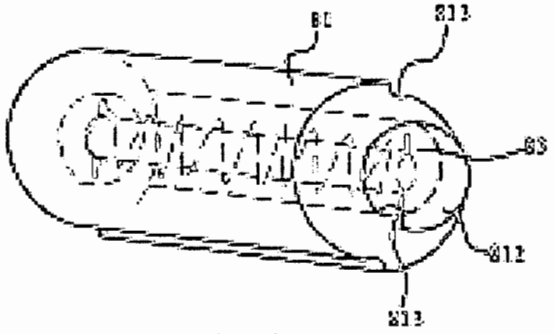


Figure 8

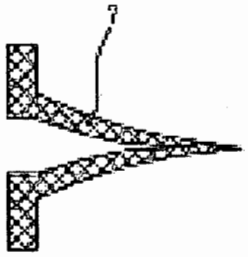


Figure 9

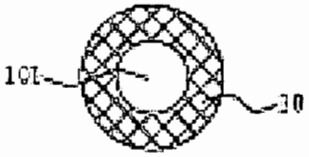


Figure 10

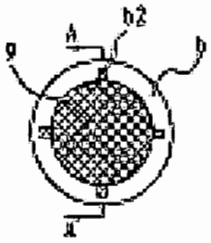


Figure 11

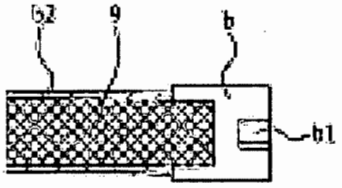


Figure 12

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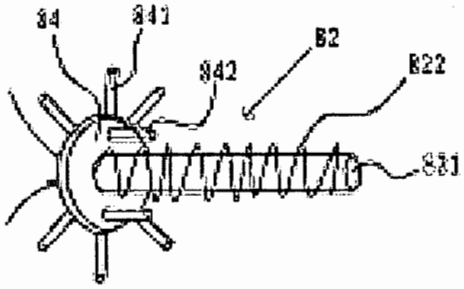


Figure 13

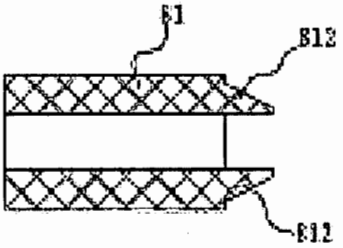


Figure 14



Figure 15

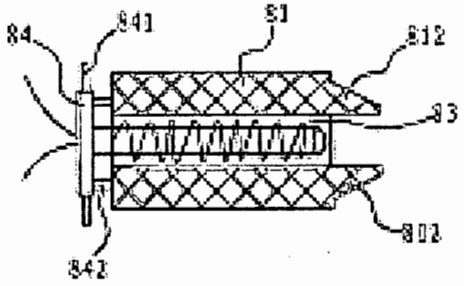


Figure 16

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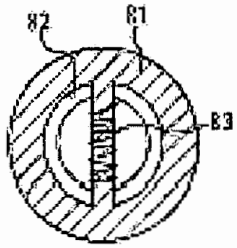


Figure 17

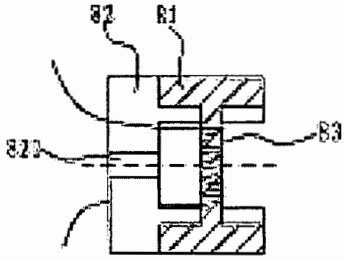


Figure 18

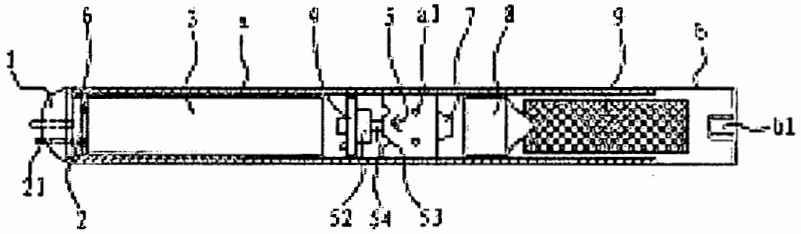


Figure 19

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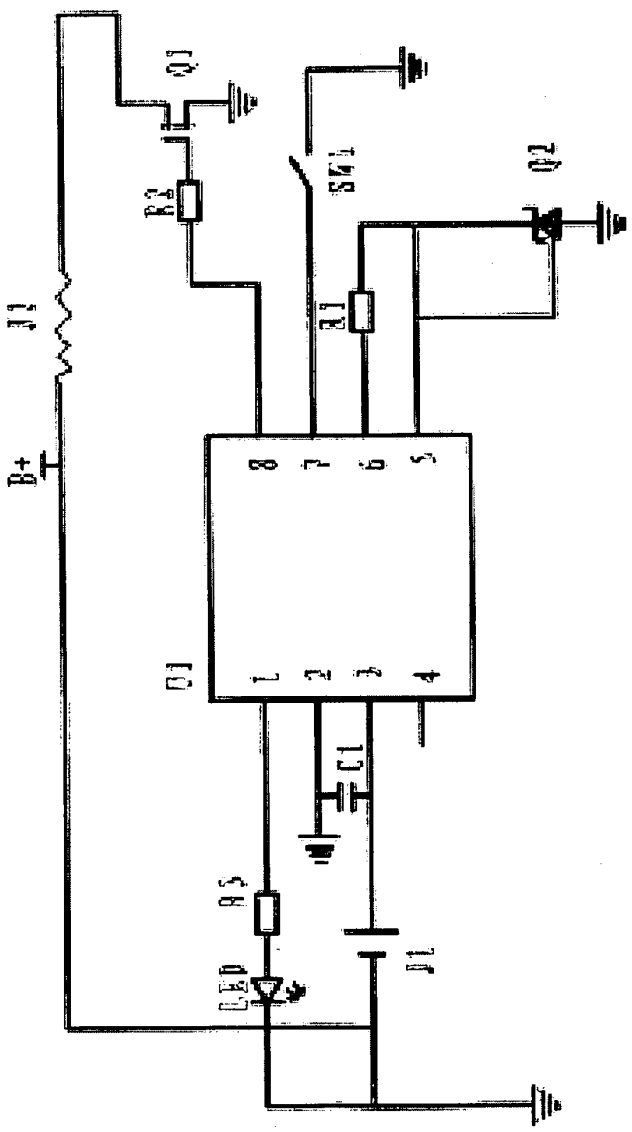


Figure 20

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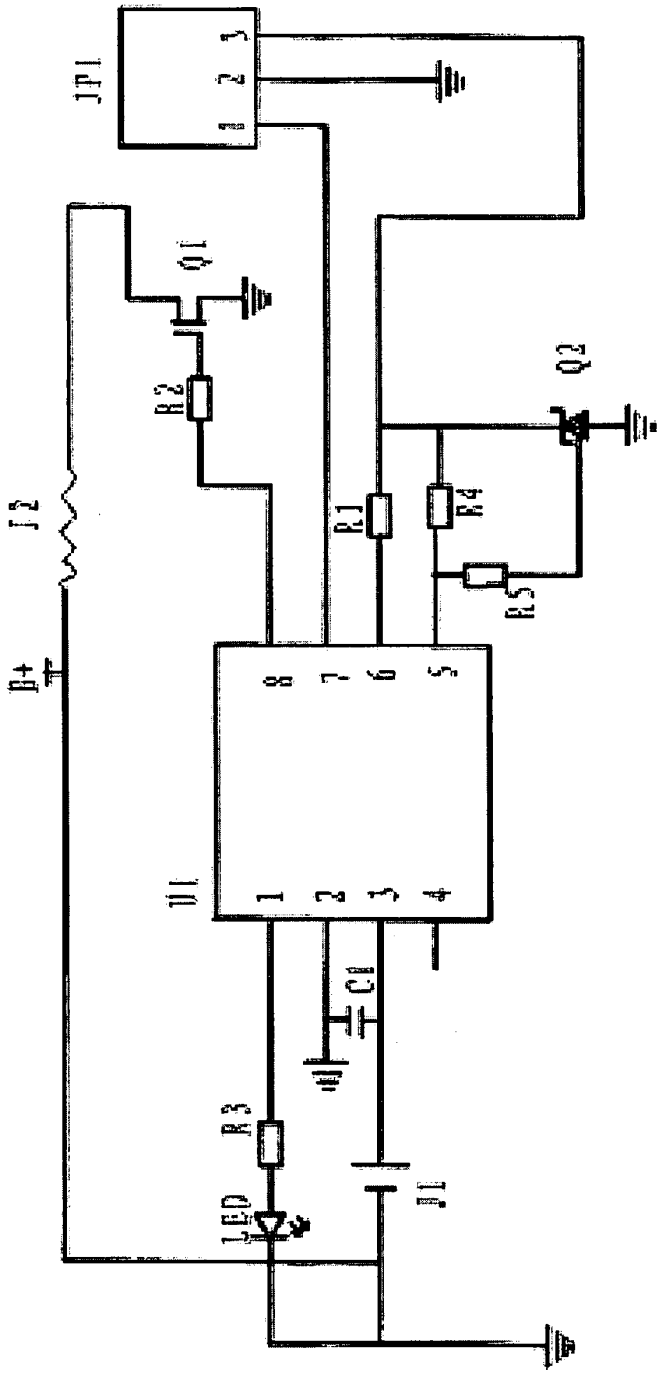


Figure 21

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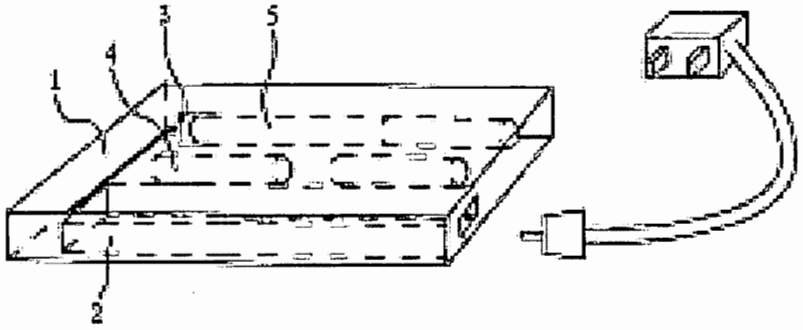


Figure 22

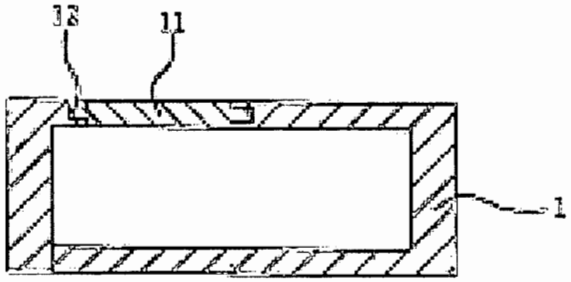


Figure 23

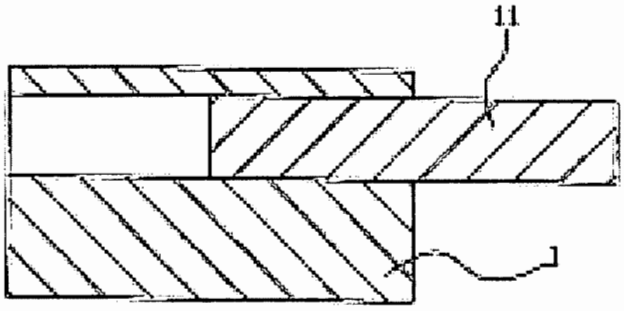


Figure 24

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(12) STANDARD PATENT (11) Application No. **AU 2017202891 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
ELECTRONIC SMOKING DEVICE

(51) International Patent Classification(s)
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ABSTRACT

An electronic smoking device includes a first sensor for detecting a users action for smoking, an air inlet, an air flow path extending from the air inlet, a liquid compartment storing a smoking liquid, a dispensing control device configured to selectively dispense the smoking liquid from the liquid compartment, a vaporizing compartment connected to the liquid compartment and the air flow path, a heater located at the vaporizing compartment, a controller configured to activate the heater to vaporize the smoking liquid dispensed from the liquid compartment when the user's action for smoking is detected by the first sensor, and a smoke outlet connected to the vaporizing compartment, wherein an amount of the smoking liquid dispensed by the dispensing control device is responsive to an amount of air flowing in the vaporizing compartment.

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ELECTRONIC SMOKING DEVICE

CROSS REFERENCE TO PRIOR APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/330,140 filed on April 30, 2010, which is hereby incorporated by reference in its entirety for all purposes as if fully set forth herein.

BACKGROUND OF THE DISCLOSURE

[0002] 1. Field of the Disclosure

[0003] This disclosure is directed to an electronic smoking device, and particularly to an electronic smoking device and an associated pack with enhanced features and functionalities for use therewith.

[0004] 2. Related Art

[0005] Electronic cigarettes are a popular alternative to traditional tobacco based cigarettes that must be burned in order to generate smoke for inhalation. Electronic cigarettes provide a vapor for inhalation, but do not contain certain byproducts of combustion that may be harmful to human health. However, electronic cigarettes are a relatively new invention and current systems do not deliver the same "quality" of experience as traditional cigarettes. For example, electronic cigarettes have relatively slow rate of vaporization and this tends to produce an inconsistent quality of vapor. This may be due to the use of a wick that transports liquid from a disposable cartridge to the vaporizing element. The "wicking" method of fluid transport is

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a relatively slow method and therefore limits the rate at which the user can smoke the cigarette. Additionally, the wick limits the ability to control and monitor the amount of nicotine delivered to the user. Finally, the wick construction is more difficult to assemble and automate manufacturing, has limited quality, and may be contaminated.

[0006] Additionally, the user interface of early generation electronic cigarettes do not provide clear and intuitive information to the user. For example, while traditional cigarettes provide a visual indication when the smoking product has been exhausted, electronic cigarettes do not provide a similar clear indication.

[0007] Some users chose to smoke electronic cigarettes as part of a smoking cessation program. However, it is often difficult for the user to determine the exact amount of the product being consumed and thus difficult to measure the progress of such a cessation program. Accordingly, there is a need for an improved electronic cigarette.

SUMMARY OF THE DISCLOSURE

[0008] According to an aspect of the disclosure, an electronic smoking device includes a first sensor for detecting a user's action for smoking, an air inlet, an air flow path extending from the air inlet, a liquid compartment storing a smoking liquid, a dispensing control device configured to selectively dispense the smoking liquid from the liquid compartment, a vaporizing compartment connected to the liquid compartment and the air flow path, a heater located at the vaporizing compartment, a controller configured to

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activate the heater to vaporize the smoking liquid dispensed from the liquid compartment when the user's action for smoking is detected by the first sensor, and a smoke outlet connected to the vaporizing compartment, wherein an amount of the smoking liquid dispensed by the dispensing control device is responsive to an amount of air flowing in the vaporizing compartment.

[0009] The liquid compartment may include an opening connected to the vaporizing compartment, and the dispensing control device may cover the opening of the liquid compartment.

[0010] The first sensor may include at least one of an air flow sensor, an acoustic sensor, a pressure sensor, a touch sensor, a capacitive sensor, an optical sensor, a hall effect sensor, and an electromagnetic field sensor.

[0011] The controller may be configured to limit an amount of the smoking liquid vaporized by the heater per predetermined period of time. The controller may be configured to disable the electronic smoking device when an accumulated period of time the heater has been turned on reaches a predetermined value.

[0012] The electronic smoking device may further include a second sensor for detecting at least one of an internal voltage and an internal current of the heater, wherein the controller may be configured to adjust a heating operation of the heater based on at least one of the internal voltage and the internal current.

[0013] The electronic smoking device may further include a rechargeable battery for powering the electronic smoking device, and a

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charge/discharge protection circuit for the rechargeable battery. The heater may include a solid state heater.

[0014] According to another aspect of the disclosure, an electronic smoking device includes a first sensor for detecting a user's action for smoking, an air inlet, an air flow path extending from the air inlet, a liquid compartment storing a smoking liquid, a vaporizing compartment connected to the air flow path, a micro liquid screen connected to the liquid compartment to selectively dispense the smoking liquid from the liquid compartment to the vaporizing compartment, a heater located at the vaporizing compartment, a controller configured to activate the heater to vaporize the smoking liquid dispensed from the liquid compartment when the user's action for smoking is detected by the first sensor, and a smoke outlet connected to the vaporizing compartment.

[0015] The micro liquid screen may include a micro aperture pattern, wherein the smoking liquid may be dispensed through the micro aperture pattern when the air flowing in the vaporizing chamber breaks surface tension of the smoking liquid formed at the micro aperture pattern.

[0016] The liquid compartment may include an opening connected to the vaporizing compartment, and the micro liquid screen may cover the opening of the liquid compartment.

[0017] The first sensor may include at least one of an air flow sensor, an acoustic sensor, a pressure sensor, a touch sensor, a capacitive sensor, an optical sensor, a hall effect sensor, and an electromagnetic field sensor.

[0018] The controller may be configured to limit an amount of the smoking liquid vaporized by the heater per predetermined period of time. The

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controller may be configured to disable the electronic smoking device when an accumulated period of time the heater has been turned on reaches a predetermined value.

[0019] The electronic smoking device may further include a second sensor for detecting at least one of an internal voltage and an internal current of the heater, wherein the controller may be configured to adjust a heating operation of the heater.

[0020] The electronic smoking device may further include a rechargeable battery for powering the electronic smoking device, and a charge/discharge protection circuit for the rechargeable battery. The heater comprises a solid state heater.

[0021] According to another aspect of the disclosure, a pack for an electronic smoking device includes a rechargeable battery for powering the pack, a power interface configured to receive electric power from an external power source to charge the rechargeable battery, a communication interface configured to exchange data with a first external device, and a smoking device connector configured to engage the electronic smoking device and provide electric power to the electronic smoking device.

[0022] The smoking device connector may be further configured to exchange data with the electronic smoking device, wherein the pack may further include a user interface and a controller configured to operate the user interface in response to data received from the electronic smoking device via the smoking device connector.

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[0023] The pack may further include a user interface, wherein the user interface may include at least one of an LED lamp, a vibrating motor, a display, and a sound device.

[0024] The pack may further include a communication interface, wherein the communication interface may include at least one of a wired communication interface and a wireless communication interface. The wireless communication interface may be configured to connect the pack to a wireless communication network and exchange data with a second external device in the wireless communication network.

[0025] Additional features, advantages, and embodiments of the disclosure may be set forth or apparent from consideration of the following detailed description, drawings, and claims. Moreover, it is to be understood that both the foregoing summary of the disclosure and the following detailed description are exemplary and intended to provide further explanation without limiting the scope of the disclosure as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The accompanying drawings, which are included to provide a further understanding of the disclosure, are incorporated in and constitute a part of this specification, illustrate embodiments of the disclosure and together with the detailed description serve to explain the principles of the disclosure. No attempt is made to show structural details of the disclosure in more detail than may be necessary for a fundamental understanding of the disclosure and the various ways in which it may be practiced. In the drawings:

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[0027] FIG. 1A shows a structural overview of an electronic smoking device constructed according to the principles of the disclosure.

[0028] FIG. 1B shows a schematic overview of another aspect of the electronic smoking device constructed according to the principles of the disclosure.

[0029] FIG. 2A shows a cross-section view of an exemplary design of the electronic smoking devices shown in FIGS. 1A and 1B, constructed according to the principles of the disclosure.

[0030] FIG. 2B shows an exploded view of the electronic smoking device shown in FIG. 2A.

[0031] FIG. 3 shows a partial perspective view of an air flow path, a container, a housing and a micromesh screen of the electronic smoking device shown in FIG. 2A, constructed according to the principles of the disclosure.

[0032] FIG. 4 shows an enlarged view of the micromesh screen shown in FIG. 3, constructed according to the principles of the disclosure.

[0033] FIG. 5 shows a perspective view of a solid state heater of the electronic smoking device shown in FIG. 2A, constructed according to the principles of the disclosure.

[0034] FIG. 6 shows the solid state heater shown in FIG. 5 arranged in association with the micromesh screen shown in FIG. 4.

[0035] FIG. 7A shows a perspective view of a pack for the electronic smoking device, constructed according to the principles of the disclosure.

[0036] FIG. 7B shows a perspective view of another pack for electronic smoking device, constructed according to the principles of the disclosure.

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[0037] FIG. 7C shows a bottom perspective view of the pack shown in FIG. 7.

[0038] FIG. 8 shows a schematic overview of the pack shown in FIG. 7, constructed according to the principles of the disclosure.

[0039] FIG. 9 shows a conceptual overview of a system for exchanging data over various communication channels using the pack shown in FIG. 7, constructed according to the principles of the disclosure.

[0040] FIGS. 10 and 11 show a schematic of a sensor for the electronic smoking device constructed according to the principles of the disclosure.

[0041] FIGS. 12 and 13 show a schematic of another sensor for the electronic smoking device constructed according to the principles of the disclosure.

[0042] FIGS. 14 and 15 show a schematic of yet another sensor for the electronic smoking device constructed according to the principles of the disclosure.

[0043] FIGS. 16, 17, 18, 19, 20 and 21 show flowcharts of various processes for carrying several advanced functionalities in an electronic smoking device according to the principles of the disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0044] The embodiments of the disclosure and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments and examples that are described and/or illustrated in the accompanying drawings and detailed in the following description. It should be noted that the features illustrated in the drawings are not

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necessarily drawn to scale, and features of one embodiment may be employed with other embodiments as the skilled artisan would recognize, even if not explicitly stated herein. Descriptions of well-known components and processing techniques may be omitted so as to not unnecessarily obscure the embodiments of the disclosure. The examples used herein are intended merely to facilitate an understanding of ways in which the disclosure may be practiced and to further enable those of skill in the art to practice the embodiments of the disclosure. Accordingly, the examples and embodiments herein should not be construed as limiting the scope of the disclosure, which is defined solely by the appended claims and applicable law. Moreover, it is noted that like reference numerals represent similar parts throughout the several views of the drawings.

[0045] FIG. 1A shows a structural overview of an electronic smoking device (ESD) 100 constructed according to the principles of the disclosure. The ESD 100 may be disposable or reusable. The ESD 100 may have a multi-body construction including two or more bodies. For example, the ESD 100 may be a reusable ESD including a first body 100A and a second body 100B and/or the like, that may be easily connected to and disconnected from each other anytime without using any special tools. For example, each body may include threaded parts. Each body may be covered by a different housing. The second body 100B may contain consumable material, such as, *e.g.*, smoking liquid and/or the like. When the consumable material is fully consumed, the second body 100B may be disconnected from the first body 100A and replaced with a new one. Also, the second body 100B may be replaced with another one with a different flavor, strength, type and/or the like.

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Alternatively, the ESD 100 may have a single body construction, as shown in FIG. 2A. Regardless of the construction type, the ESD 100 may have an elongated shape with a first end 102 and a second end 104, as shown in FIG. 2A, which may be similar to a conventional cigarette shape. Other non-conventional cigarette shapes are also contemplated. For example, the ESD 100 may have a smoking pipe shape or the like.

[0046] The ESD 100 may include an air inlet 120, an air flow path 122, a vaporizing chamber 124, a smoke outlet 126, a power supply unit 130, a sensor 132, a container 140, a dispensing control device 141, a heater 146, and/or the like. Further, the ESD 100 may include a controller, such as, *e.g.*, microcontroller, microprocessor, a custom analog circuit, an application-specific integrated circuit (ASIC), a programmable logic device (PLD) (*e.g.*, field programmable gate array (FPGA) and the like) and/or the like and basic digital and analog circuit equivalents thereof, which is explained below in detail with reference to FIG. 1B. The air inlet 120 may extend from, for example, an exterior surface of the housing 110 as shown in FIG. 2A. The air flow path 122 may be connected to the air inlet 120 and extending to the vaporizing chamber 124. The smoke outlet 126 may be connected to the vaporizing chamber 124. The smoke outlet 126 may be formed at the second end 104 of the ESD 100 and connected to the vaporizing chamber 124. When a user sucks the second end 104 of the ESD 100, air outside the air inlet 120 may be pulled in and moved to the vaporizing chamber 124 via the air flow path 122, as indicated by the dotted arrows in FIG. 1. The heater 146 may be a solid state heater shown in FIG. 5 or the like, and located in the vaporizing chamber 124. The container 140 may contain the smoking liquid

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and connected to the vaporizing chamber 124. The container 140 may have an opening connected to the vaporizing chamber 124. The container 140 may be a single container or a group of containers, such as, *e.g.*, containers 140A, 140B and the like, that are connected to or separated from each other.

[0047] The dispensing control device 141 may be connected to the container 140 in order to control flow of the smoking liquid from the container 140 to the vaporizing chamber 124. When the user is not smoking the ESD 100, the dispensing control device 141 may not dispense the smoking liquid from the container 140, which is described below in detail with reference to FIGS. 3 and 4. The dispensing control device 141 may not need any electric power from, for example, the power supply unit 130 and/or the like, for operation.

[0048] In one aspect, the dispensing control device 141 may be a micro liquid screen 141, such as, *e.g.*, micro-etched screen, micromesh screen and the like. As shown in FIG. 4, the micro liquid screen 141 may have a micro aperture pattern 141', which may keep the smoking liquid from seeping out therethrough by a surface tension and/or the like when the ESD 100 is not being used or when an air flow within the vaporizing chamber 124 is minimal. When an external force is applied, the smoking liquid may flow through the micro liquid screen 141. For example, when the user sucks the second end 104 of the ESD 100, an air flow may be formed in the vaporizing chamber 124 from the air flow path 122 to the smoke outlet 126, which may temporarily break the surface tension of the smoking liquid formed at the micro aperture pattern 141' of the at the micro liquid screen 141. When the air flow is discontinued, the surface tension may be reestablished at the micro aperture

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pattern 141' of the micro liquid screen 141, and the smoking liquid may stop being drawn therethrough. The micro liquid screen 141 may have a circular shape with a diameter larger than that of the container 140. One side of the micro liquid screen 141 may face an opening of the container 140 and the air flow path 122, and the other side may face the vaporizing chamber 124 and the heater 141.

[0049] The micro liquid screen 141 may be a passive device that does not require electric power and a control signal. Other passive or active filtering/screening devices are also contemplated for the dispensing control device 141. For example, the dispensing control device may be a semi-active dispensing device, such as, *e.g.*, electro-permeable membrane or the like, which does not allow a liquid to flow therethrough unless an electrical field is applied thereto. Alternatively or additionally, an active dispensing device 142 may be connected to the container 140 in order to consistently dispense substantially the same amount of smoking liquid to the vaporizing chamber 124 each time. As shown in FIG. 6 the dispensing control device 141 and the heater 146 may be located adjacent to each other with a very small gap therebetween, in order to efficiently vaporize the smoking liquid.

[0050] The power supply unit 130 may be connected to one or more components that require electric power, such as, *e.g.*, the sensor 132, the active dispensing device 142, the heater 146, and the like, via a power bus 160. The power supply unit 130 may include a battery (not shown), such as, *e.g.*, a rechargeable battery, a disposable battery and/or the like. The power unit 130 may further include a power control logic (not shown) for carrying out charging of the battery, detecting the battery charge status, performing power

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save operations and/or the like. The power supply unit 130 may include a non-contact inductive recharging system such that the ESD 100 may be charged without being physically connected to an external power source. A contact charging system is also contemplated

[0051] The sensor 132 may be configured to detect the user's action for smoking, such as, *e.g.*, sucking of the second end 104 of the ESD 100, touching of a specific area of the ESD 100 and/or the like. When the user's action for smoking is detected, the sensor 132 may send a signal to other components via a data bus 144. For example, the sensor 132 may send a signal to turn on the heater 146. Also, the sensor 132 may send a signal to the active dispensing device 142 (if utilized) to dispense a predetermined amount of the smoking liquid to the vaporizing chamber 124. When the smoking liquid is dispensed from the container 140 and the heater 146 is turned on, the smoking liquid may be mixed with the air from the air flow path 122 and vaporized by the heat from the heater 146 within the vaporizing chamber 124. The resultant vapor (*i.e.*, smoke) may be pulled out from the vaporizing chamber 144 via the smoke outlet 126 for the user's oral inhalation, as indicated by solid arrows in FIG. 1. In order to prevent the smoke generated in the vaporizing chamber 144 from flowing towards the air inlet 120, the air flow path 122 may include a backflow prevention screen or filter 138.

[0052] When the user's action for smoking is stopped, the sensor 132 may send another signal to turn off the heater 146, the active dispensing device 142, and/or the like, and vaporization and/or dispensing of the smoking liquid may stop immediately. In an alternative embodiment, the sensor 132

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may be connected only to the power supply unit 130. When the user's action for smoking is detected, the sensor 132 may send a signal to the power supply unit 130. In response to the signal, the power supply unit 130 may turn on other components, such as, *e.g.*, the heater 146 and the like, to vaporize the smoking liquid.

[0053] In an embodiment, the sensor 132 may be an air flow sensor. For example, the sensor 132 may be connected to the air inlet 120, the air flow path 122, and/or the like, as shown in FIG. 1. When the user sucks the second end 104 of the ESD 100, some of the air pulled in from the air inlet 120 may be moved towards the sensor 132, which may be detected by the sensor 132. Additionally or alternatively, a capacitive sensor 148 may be used to detect the user's touching of a specific area of the housing 100. For example, the capacitive sensor 148 may be formed at the second end 104 of the ESD 100. When the ESD 100 is moved to the user's mouth and the user's lip touches the second end 104, a change in capacitance may be detected by the capacitive sensor 148, and the capacitive sensor 148 may send a signal to activate the heater 146 and the like. Other types of sensors are also contemplated for detecting the user's action for smoking, including, for example, an acoustic sensor, a pressure sensor, a touch sensor, an optical sensor, a Hall Effect sensor, an electromagnetic field sensor, and/or the like.

[0054] The ESD 100 may further include a communication unit 136 for wired (*e.g.*, SPI (Serial Peripheral Interface) or the like) and/or wireless communications with other devices, such as, *e.g.*, a pack 200 (shown in FIG. 7) for the ESD 100, a computer 310 (shown in FIG. 9) and/or the like. The

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communication unit 136 may also connect the ESD 100 to a wired network (*e.g.*, LAN, WAN, Internet, Intranet and/or the like) and/or a wireless network (*e.g.*, a WIFI network, a Bluetooth network, a cellular data network and/or the like). For example, the communication unit 136 may send usage data, system diagnostics data, system error data, and/or the like to the pack 200, the computer 320, and/or the like. To establish wireless communication, the communication unit 136 may include an antenna and/or the like. The ESD 100 may include a terminal 162 for wired communication. The terminal 162 may be connected to another terminal, such as, *e.g.*, a cigarette connector 216 (shown in FIG. 8) of the pack 200 or the like, in order to exchange data. The terminal 140 may also be used to receive power from the pack 200 or other external power source and recharge the battery in the power supply unit 130.

[0055] When the ESD 100 has a multi-body construction, the ESD 100 may include two or more terminals 162 to establish power and/or data connection therebetween. For example, in FIG. 1, the first body 100A may include a first terminal 162A and the second body 100B may include a second terminal 162B. The first terminal 162A may be connected to a first power bus 160A and a first data bus 144A. The second terminal 162B may be connected to a second power bus 160B and a second data bus 144B. When the first and second bodies 100A and 100B are connected to each other, the first and second terminals 162A and 162B may be connected to each other. Also, the first power bus 160A and the first data bus 144A are connected to the second power bus 160B and the second data bus 144B, respectively. To charge the battery in the power supply unit 130, exchange data and/or the

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like, the first body 100A may be disconnected from the second body 100B and connected to the pack 200 or the like, which may, in turn, connect the first terminal 162A to the cigarette connector 216 of the pack 200 or the like. Alternatively, a separate terminal (not shown) may be provided to the ESD 100 for charging and/or wired communications with an external device.

[0056] The ESD 100 may further include one or more user interface devices, such as, *e.g.*, an LED unit 134, a sound generator (not shown), a vibrating motor (not shown), and/or the like. The LED unit 134 may be connected to the power supply unit 130 via the power bus 160A and the data bus 144A, respectively. The LED unit 134 may provide a visual indication when the ESD 100 is operating. Additionally, when there is an issue and/or problem within the ESD 100, the integrated sensor/controller circuit 132 may control the LED unit 134 to generate a different visual indication. For example, when the container 140 is almost empty or the battery charge level is low, the LED unit 134 may blink in a certain pattern (*e.g.*, blinking with longer intervals for thirty seconds). When the heater 146 is malfunctioning, the heater 146 may be disabled and control the LED unit 134 may blink in a different pattern (*e.g.*, blinking with shorter intervals for one minute). Other user interface devices may be used to show a text, image, and/or the like, and/or generate a sound, a vibration, and/or the like.

[0057] In the ESD 100 shown in FIG. 1A, the sensor 132 alone may not be able to control the user interface devices, the communication unit 136, the sensors 132 and 148 and/or the like. Furthermore, it may not be possible to carry out more complex and sophisticated operations with the sensor 132 alone. Thus, as noted above, a controller, such as, *e.g.*, microcontroller,

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microprocessor, a custom analog circuit, an application-specific integrated circuit (ASIC), a programmable logic device (PLD) (*e.g.*, field programmable gate array (FPGA) and the like) and/or the like and basic digital and analog circuit equivalents thereof, may be included the ESD 100. For example, FIG. 1B shows a structural overview of another ESD 100' constructed according to the principles of the disclosure. The ESD 100' may include a controller 170, a signal generator 172, a signal to power converter 174, a voltage sensor 176, a current sensor 178, a memory 180, and/or the like. Further, the ESD 100' may include a power interface 130A', a charge/discharge protection circuit 130B', a battery 130C', one or more sensors (*e.g.*, sensor 132A, sensor 132B and/or the like), a user interface 134', a communication interface 136', a heater 146' and/or the like, which may be similar to the components of the ESD 100 shown in FIG. 1A. Two or more components may be integrated as a single chip, a logic module, a PCB, or the like, to reduce size and manufacturing costs and simplify the manufacturing process. For example, the controller 170 and a sensor 132A may be integrated as a single semiconductor chip.

[0058] The controller 170 may perform various operations, such as, *e.g.*, heater calibration, heating parameter adjustment/control, dosage control, data processing, wired/wireless communications, more comprehensive user interaction, and/or the like. The memory 180 may store instructions executed by the controller 170 to operate the ESD 100' and carry out various basic and advanced operations. Further, the memory 180 may store data collected by the controller 170, such as, *e.g.*, usage data, reference data, diagnostics data, error data, and/or the like. The charge/discharge protection circuit 130B' may

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be provided to protect the battery 130C' from being overcharged, overly discharged, damaged by an excessive power and/or the like. Electric power received by the power interface 130A' may be provided to the battery 130C' via the charge/discharge protection circuit 130B'. Alternatively, the controller 170 may perform the charge/discharge protection operation when the charge/discharge protection circuit 130B' is not available. In this case, the electric power received by the power interface 130A' may be provided to the battery 130C' via the controller 170.

[0059] The signal generator 172 may be connected to the controller 170, the battery 130C' and/or the like, and may configured to generate a power control signal, such as, *e.g.*, a current level signal, a voltage level signal, a pulse-width modulation (PWM) signal and the like, to control the power supplied to the heater 146'. Alternatively, the power control signal may be generated by the controller 170. The converter 174 may be connected to the signal generator 172 or the controller 170 to convert the power control signal from the signal generator 172 to an electrical power provided to the heater 146. With this configuration, the power from the battery 130C' may be transferred to the heater 146' via the signal generator 172 or via the signal generator 172 and the converter 174. Alternatively, the power from the battery 130C' may be transferred to the signal generator 172 via the controller 170 and transferred to the heater 146 directly or via the signal to power converter 174.

[0060] The voltage sensor 176 and the current sensor 178 may be provided to detect an internal voltage and current of the heater 146', respectively, for heater calibration, heating parameter control and/or the like.

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For example, each heater 146 may have a slightly different heating temperature, which may be caused by a small deviation in resistance. To produce a more consistent unit-to-unit heating temperature, the integrated sensor/controller circuit 132 may measure a resistance of the heater 146 and adjust heating parameters (*e.g.*, an input current level, heating duration, voltage level, and/or the like) accordingly. Also, the heating temperature of the heater 146 may change while the heater 146 is turned on. The integrated sensor 132 / controller 170 circuit may monitor a change in resistance while the heater 146 is turned on and adjust the current level in a real-time basis to maintain the heating temperature at substantially the same level. Further, the integrated sensor 132 / controller circuit 170 may monitor whether or not the heater 146 is overheating and/or malfunctioning, and disable the heater 146 for safety purposes when the heating temperature is higher than a predetermined temperature range and/or the heater 146 or other component is malfunctioning.

[0061] For example, FIGS. 16, 17, 18, 19, 20 and 21 show various processes for carrying out advanced functionalities in the ESD 100 or ESD 100' according to the principles of the disclosure. FIG. 16 shows a flowchart for a process 1600 for heater characterization based heat control refinement according to the principles of the disclosure. Upon starting the process 1600 (at 1610), TIME may be set to zero (0) (at 1620). When the sensor 132 (*i.e.*, air flow sensor) is not on (NO at 1630), the process 1600 may move back to set TIME to zero (0) (at 1620). When the sensor is on (YES at 1630), the controller 170 may read an air flow rate (at 1640). Then the controller 170 may look up a characterization formula (*e.g.*, one or more time versus

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temperature curves or the like) or table (*e.g.*, lookup table or the like) based on at least one of the air flow rate and the time in order to obtain COMMAND VALUE, which is a value that the controller 170 determines to be for the heater 146 at any moment in time (at 1650). The COMMAND VALUE may then be applied to the heater 146, and the heater 146 generates heat based on the COMMAND VALUE (at 1660). The controller 170 may then wait for a time period TIME STEP (*e.g.*, 1 second) (at 1670), which defines a time interval between the air flow rate reading (at 1640) and the TIME STEP is added to the current TIME (at 1680) and the process 1600 may move back to checking whether the sensor 132 is on or not (at 1630).

[0062] FIG. 17 shows a flowchart for process 1700 for heater self-calibration control according to the principles of the disclosure. Upon starting the process 1700 (at 1710), REFERENCE COMMAND may be applied to the heater 146. The REFERENCE COMMAND may be a heater command value established by the manufacturer to test a resistance of the heater 146. Then the voltage sensor 176 may read the internal voltage (*i.e.*, HEATER VOLTAGE) of the heater 146 (at 1730). The HEATER VOLTAGE may be then compared to REFERENCE VOLTAGE, which may be a normal voltage drop expected to be measured across the heater 146 based on the characterization of the heater wire at the manufacturer. When the HEATER VOLTAGE is greater than the REFERENCE VOLTAGE (YES at 1740), the value of the HEATER VOLTAGE divided by the REFERENCE VOLTAGE may be set as COMPENSATION FACTOR (at 1750), which may be a value, by which future heater commands may be multiplied for the purpose of compensating for inconsistency of the heater resistance value among the

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heaters. The COMPENSATION FACTOR may be initially set to one (1). When the HEATER VOLTAGE is the smaller than the REFERENCE VOLTAGE (NO at 1740, YES at 1760), the value of the HEATER VOLTAGE divided by the REFERENCE VOLTAGE may be set as the COMPENSATION FACTOR (at 1770). When the HEATER VOLTAGE is not greater than the REFERENCE VOLTAGE (NO at 1740) and not smaller than the REFERENCE VOLTAGE (NO at 1760), there may be no change in the COMPENSATION FACTOR and the process 1700 may terminate (at 1780).

[0063] FIG. 18 shows a flowchart for a process 1800 for current monitoring based heater control according to the principles of the disclosure. Upon starting the process (at 1810), TARGET COMMAND may be set as COMMAND VALUE (at 1820). The TARGET COMMAND may be a constant that sets a target heat command for the heater 146 typically based on characterizations of the heater wire at the manufacturer. The COMMAND VALUE may be a value that the controller 170 may send to the heater 146. The COMMAND VALUE may be a value that the controller 170 believes the heater command should be at any moment in time. When the sensor 132 (*e.g.*, inhalation sensor) is turned off (NO at 1830), the process 1800 may move back to step 1820. When the sensor 132 is turned on (YES at 1830), a heater control signal may be generated based on the COMMAND VALUE (at 1840) and the current sensor 178 may read an internal current of the heater 146 (at 1850) and store it as SENSOR CURRENT. Then, the SENSOR CURRENT may be compared to the TARGET COMMAND (at 1860, 1870). WHEN the SENSOR CURRENT is greater than the TARGET COMMAND (YES at 1860), an absolute value of COMMAND VALUE–(COMMAND

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VALUE--TARGET COMMAND) may be set as a new COMMAND VALUE (at 1865) and the process 1800 may move to step 1830. When the SENSOR CURRENT is smaller than the TARGET COMMAND (NO at 1860, YES at 1870), an absolute value of COMMAND VALUE + (COMMAND VALUE--TARGET COMMAND) may be set as the new COMMAND VALUE (at 1875) and the process 1800 may move to step 1830. When the SENSOR CURRENT is not greater than and not smaller than the TARGET COMMAND (NO at 1860, NO at 1870), no change may be made to the COMMAND VALUE and the process 1800 may move to step 1830.

[0064] FIG. 19 shows a flowchart for a process 1900 for limiting smoking liquid deterioration and contamination after the first use according to the principles of the disclosure. Upon starting the process 1900 (at 1910), the controller may read the sensor 132 (at 1920) to check whether the sensor 132 is on or not. When the sensor 132 is not on (NO at 1930), the process 1900 may move back to read the sensor 132 (at 1920). When the sensor 132 is on (YES at 1930), the controller 170 may wait for a predetermined period of time TIME STEP (at 1940) and increment CUMULATIVE TIME by the TIME STEP (at 1950). The CUMULATIVE TIME may be a count value that indicates a total period of time since the heater 146 was first activated during the life of the ESD 100'. Then the CUMULATIVE TIME may be compared to TOTAL TIME LIMIT, which is a constant that sets an upper limit for the total period of time that may elapse between a first use and a last use of the ESD 100'. When the CUMULATIVE TIME has not reached the TOTAL TIME LIMIT (NO at 1960), and the process 1900 may move back to step 1940. When the CUMULATIVE TIME has reached the TOTAL TIME LIMIT (YES at 1960), the

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ESD 100' may be disabled permanently (at 1970), and the process 1900 may terminate at 1980.

[0065] FIG. 20 shows a flowchart of a process 2000 for simplified dosage and/or heater control according to the principles of the disclosure. Upon starting the process 2000, the controller 170 may read the sensor 132 (at 2020). When the sensor 132 is not on (NO at 2030), the controller 170 may keep reading the sensor 132 (at 2020). When the sensor 132 is on (YES at 2030), the controller 170 may compare HEATER ON TIME and RECENT TIME. The HEATER ON TIME may indicate a period of time the heater 146 has been turned on since the last time the heater 146 has been turned off. The RECENT TIME may be a constant that sets a limit for the time period the heater 146 may stay turned on during any given period of time, thereby establishing a limit for the dosage per unit time that may be delivered. When the HEATER ON TIME is greater than the RECENT TIME (YES at 2040), the process 2000 may move to reading the sensor 132 (at 2020). When the HEATER ON TIME is smaller than the RECENT TIME (NO at 2040), a CUMULATIVE ON TIME may be compared to TOTAL TIME (at 2050). THE CUMULATIVE ON TIME may be a count value that indicates the total time the heater has been turned on during the produce life of the ESD 100'. The TOTAL TIME may be a constant that sets a total period of time the heater 146 may stay turned on the product life of the ESD 100'. When the CUMULATIVE ON TIME has not reached the TOTAL TIME (NO at 2050), the heater 146 may be turned on (at 2055) and the process 2000 may move back to step 2020. When the CUMULATIVE ON TIME has reached the TOTAL TIME

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(YES at 2050), the ESD 100' may be permanently disabled (at 2060), and the process 2000 may terminate (at 2070).

[0066] FIG. 21 shows a flowchart of a process 2100 for stuck sensor checking, heater temperature control, and forced system halting according to the principles of the disclosure. Upon starting the process 2110, the controller 170 may initialize both a stuck sensor value STUCK SENSOR and a sensor state SENSOR STATE by indicating them as false values (at 2112), and read an input of the sensor 132 (at 2114). When the SENSOR STATE is positive (YES at 2120), the controller 170 may set the SENSOR STATE as a true value, increment a stuck counter value STUCK COUNTER by the factor of one (1) (at 2124). When the STUCK COUNTER is equal to or larger than a stuck counter limit value STUCK COUNTER LIMIT (YES at 2130), the controller 170 may set the STUCK SENSOR as a true value (at 2132). When the STUCK COUNTER is not equal to or larger than the STUCK COUNTER LIMIT (NO at 2130), the controller 170 may set the STUCK SENSOR as a false value (at 2134). When the SENSOR STATE is negative (NO at 2120), the controller 170 may set the SENSOR STATE as a false value (at 2126), initialize the STUCK COUNT to zero (0) (at 2128), which may complete stuck sensor checking.

[0067] After setting the STUCK SENSOR as a true value (at 2132), the controller 170 may turn off the heater 146 (at 2152). Alternatively, after setting the STUCK SENSOR as a false value (at 2134), the controller 170 may check whether or not the sensor 132 is on (at 2140). When the sensor 132 is on (YES at 2140), a value of TIME STEP multiplied by RISE RATE may be added to a running average value RUNNING AVERAGE (at 2142).

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When the sensor 132 is not on (NO at 2140), the value of TIME STEP multiplied by RISE RATE may be subtracted from the RUNNING AVERAGE (at 2144). Then, the controller 170 may check whether or not the sensor 132 is on (at 2150). When the sensor 132 is not on (NO at 2150), the controller 170 may turn off the heater 146 (at 2152) and wait for the TIME STEP (at 2170), and the process 2100 may move back to read the sensor input (at 2114). When the sensor 132 is on (YES at 2150), the controller 170 may check whether the RUNNING AVERAGE is equal to or larger than a heat time limit value HEAT TIME LIMIT (at 2160). When the RUNNING AVERAGE is not equal to or larger than the HEAT TIME LIMIT (NO at 2160), the controller 170 may turn on the heater 146 and the process 2100 may move to step 2170. When the RUNNING AVERAGE is equal to or larger than the HEAT TIME LIMIT (YES at 2160), the controller 170 may turn off the heater 146 (at 2164) and forcefully halt the ESD 100' for a period FORCE OFF TIME (at 2166). Then, the value of the FALSE OFF TIME multiplied by the FALL RATE may be subtracted from the RUNNING AVERAGE (at 2168) and the process 2100 may move to step 2170. Accordingly, the controller 170 may execute this process to avoid issues of the sensor being stuck and control the temperature of the heater 146.

[0068] FIG. 2A shows a cross-section view of an exemplary design of the ESD 100 shown in FIG. 1, constructed according to the principles of the disclosure. FIG. 2B shows an exploded view of the ESD 100 shown in FIG. 2A. As noted above, the ESD 100 shown in FIGS. 2A and 2B may a single body construction and covered by a single housing 110 such that the ESD 100 may not be accidentally disassembled or broken into pieces. Further, the

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single body construction may be easier and less costly to design and manufacture. Thus, the single body construction may be more suitable for a disposable ESD.

[0069] Referring to FIGS. 2A and 2B concurrently, the housing 100 may have an elongated tubular shape with the LED unit 134 formed at the first end 102 and the smoke outlet 126 formed at the second end 104. The air inlet 120 may extend inwardly from the housing 110 and may be connected to the air flow path 122. The ESD 100 may further include a wall structure 131 in order to completely separate a compartment that contains the battery 130 from the air inlet 120, the air flow path 122, the container 140 and/or the like such that components in each section may be safely sealed off from each other and functions of the components may be isolated from each other. The smoke outlet 126 may be formed at a tip end piece 150. The heater 146 may be fixed by pushing the tip end piece 150 into an opening of the housing 110 at the second end 104.

[0070] In one aspect, the container 140 may surround the air flow path 122. More specifically, as shown in FIG. 3, the container 140 may have an elongated tubular shape and surrounded by the housing 110. The air flow path 122 may extend along the center of the container 140. The air flow path 122 may also have an elongated tubular shape with a smaller diameter. The housing 110, the container 140 and the air flow path 122 may be concentric. As noted above, the air flow path 122 may be connected to the air inlet 120 at one end and the other end may be connected to the vaporizing chamber 124. The container 140 may also connected to the vaporizing chamber 124. In order to control dispensing of the smoking liquid from the container 140 to the

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vaporizing chamber 124, the dispensing control device 141 may be formed between the container 140 and the vaporizing chamber 124.

[0071] FIG. 7A shows a perspective view of the pack 200 for an ESD, constructed according to the principles of the disclosure. The pack 200 may have a conventional cigarette pack shape but other shapes are also contemplated. FIG. 7B shows a perspective view of another pack 200' and FIG. 7C shows a bottom perspective view of the pack 200' shown in FIG. 7B. FIG. 8 shows a structural overview of the pack 200 of FIG. 7A and the pack 200' of FIGS. 7B and 7C, constructed according to the principles of the disclosure. Referring to FIGS. 7A, 7B, 7C and 8 concurrently, the pack 200 may include a main body 202, a lid 204, one or more user interface devices (*e.g.*, an indication light 206 (in FIG. 7A), 206A and 206B (in FIG. 7B), a switch 208, a vibration motor 234 (shown in Fig 8), a further display (not shown), a sound device (not shown) and/or the like), one or more connectors (*e.g.*, a cigarette connector 216, a power connector 222, a data connector 224 and/or the like) and/or the like. The pack 200 may further include a controller 210, a memory 212, a communication processor 214, an antenna 218, a battery 220, a lid switch 232, a lid switch plunger 232', and/or the like. The lid switch plunger 232' may be connected to the lid switch 232 and configured to detecting opening and closing of the lid 204.

[0072] As noted above, the cigarette connector 216 may be connected to the terminal 162 of the ESD 100 to charge the battery in the power supply unit 130, exchange data with the integrated sensor/controller circuit 132 and/or the like. The terminal 162 and the cigarette connector 216 may be connected by a threaded type connection. Other connection types are also

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contemplated, including, such as, *e.g.*, a non-threaded type connection, a stationary connection, a push-in (pressing) connection, and/or the like. The power connector 222 may be connected to an external power source (USB, transformer, or the like) to charge the battery 220. Additionally or alternatively, the pack 200 may include a non-contact inductive recharging system such that the pack 200 may be charged without being physically connected to any external power source. The battery 220 and the battery 130 in ESD 100 may be charged at different voltages. Thus, the pack 200 may include multiple internal voltage nets (not shown). The data connector 224 may be connected to, for example, the user's computer 310 (shown in FIG. 9) and/or the like to exchange data between the pack 200 and the computer 310. The power connector 222 and the data connector 224 may be combined. For example, the pack 200' may include a USB connector 221 (shown in FIG. 7C), a FireWire connector and/or the like, that may function as both the power connector 222 and the data connector 224.

[0073] The controller 210 may be configured to control overall operations of the pack 200 including one or more components noted above. For example, the controller 210 may carry out a power saving scheme by, for example, entering a power save mode or the like, when the power connector 222 is disconnected from an external power source and the lid 204 has not been opened for a predetermined period of time. Opening and closing the lid 204 may be detected by the lid switch 232. Also, the controller 210 may detect the battery charge level of the battery 220 in the pack 200 and the battery in the ESD 100 when the ESD 100 is connected to the pack 200. Further, the controller 210 may operate the user interface devices to indicate

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a status of the ESD 100 and the pack 200. For example, the controller 210 may operate the LED indicator 206 to blink with longer intervals when the ESD 100 is connected to the cigarette connector 216 and being charged by the battery 220 or an external power source. When there is a problem with the ESD 100 or the pack 200, the controller 210 may show an alert message or an error message on the display (not shown), generate an alert sound and/or the like. For example, when the container 140 is empty or the battery charge level is low in the ESD 100, the controller 210 may show a message on the display, activate the vibration motor 234 and/or the like. Further, when the heater 146 is overheating or malfunctioning, the controller 210 may control the LED indicator 206 to blink with shorter intervals, display a heater error message on the display, generate an alert sound and/or the like. In other words, any error detected in the ESD 100 may be transmitted to the pack 200. Further, when the pack 200 is connected to an external device, such as, *e.g.*, computer or the like, an error message may be displayed on the external device.

[0074] The communication processor 214 may carry out wired communications via the data connector 224 and/or wireless communications via the antenna 218, which is described below in detail with reference to FIG. 9. The memory 212 may include instructions to be executed by the controller 210 to carry out various operations. The memory 212 may further include usage information (*e.g.*, smoking liquid level in the container 140, how many containers 140 have been consumed, amount of nicotine consumed, and/or the like), product information (*e.g.*, model number, serial number and/or the like), user information (*e.g.*, the user's name, sex, age, address, job,

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educational background, job, professional background, interests, hobbies, likes and don't-likes and/or the like) and/or the like. The user information may be received from the user's computer 310 via the data connector 224 or wirelessly via the antenna 218 and stored in the memory 212. Alternatively, the user information may be received by a social network website, such as, *e.g.*, Facebook™, LinkedIn™, Eharmony™ and/or the like, via the data connector 224 or wirelessly via the antenna 218.

[0075] The data stored in the pack 200 (*e.g.*, the usage information, the product information, the user information and/or the like) may be shared with other devices and/or entities (*e.g.*, vendors, healthcare service providers, social networks and/or the like). For example, FIG. 9 shows a conceptual overview of a system 300 for exchanging data of the pack 200 over various communication channels, constructed according to the principles of the disclosure. The system 300 may be a network of a plurality of communication devices, such as, *e.g.*, one or more packs 200 (*e.g.*, a first pack 200A owned by a first user 310A, a second pack 200B owned by a second user 310B and/or the like), one or more computers 320 (*e.g.*, a desktop PC 320A, a laptop PC 320B, a mobile phone (not shown), a personal data assistant (PDA) (not shown), a tablet PC (not shown) and/or the like) and/or the like, that are connected to each other via various wired and/or wireless communication channels 360 (*e.g.*, LAN, WAN, Internet, intranet, Wi-Fi network, Bluetooth network, cellular network and/or the like). The user 310 may download and install a software application in her or his computers 320 such that the computer 320 and the pack 200 may exchange data with each other. Further,

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an app may be installed in the user's smartphone, which may be then connected to the pack 200 directly or via the communication channels 360.

[0076] As shown in FIG. 9, the packs 200A and 200B may communicate directly with each other via the communication processor 214 and the antenna 218. For example, the packs 200A and 200B may exchange the user information with each other. When the users 310A and 310B have the same hobby or graduated from the same school, the controller 210 in each of the packs 200A and 200B may operate the user interface devices to notify the match. For example, the pack 200A may make a sound and/or show a message that the user 310B who graduated from the same school is near by the user 310A on the display. Additionally, a smartphone or a tablet computer running the app noted above may be used to interact with other users. Accordingly, the packs 200A and 200B may be used for social networking devices.

[0077] Further, the packs 200A and 200B may be connected directly to the wired and/or wireless communication channels 360 or indirectly via the computers 320A and 320B, respectively. Based on the usage data, the pack 200A may automatically send an order request to the vendor 340 when the user 310A needs more disposable ESDs or a new supply of the second bodies 100B. Further, the packs 200B may send usage data to the healthcare service provider 330, such as, *e.g.*, a physician's office, a hospital and/or the like, such that a physician, a nurse, a hospital staff and/or the like may track and analyze nicotine consumption by the user 310B. The user 310B may also use the usage data to monitor how much she or he smokes

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and check whether she or he has been smoking less or more for a period time.

[0078] Furthermore, the ESD 100 may be susceptible to bacterial growth after a certain period of time. The usage data may be used to determine how long the ESD 100 has been used and automatically disable the ESD 100 when the ESD 100 has been used for a certain period of time and/or severity of the usage.

[0079] FIGS. 10 and 11 show a schematic of a sensor for the electronic smoking device constructed according to the principles of the disclosure. As shown in Figs. 10 and 11, the sensor may include an emitter (IR or visible) 1006, detector 1004, rotating disk 1002 with windows, stator 1010, and a holder 1012. The disk 1002 may have slanted windows to convert airflow into rotary thrust. Airflow causes the disk 1002 to spin. The rate of spin corresponds to airflow. The rate of spin may be detected by frequency of light pulses from the emitter device 1006 received by detector 1004. Other embodiments exist where disk has a reflective surface. The emitter 1006 and detector 1004 are arranged on the same side of the disk 1002. The detector 1004 looks for pulses in reflections from the disk surface as the disk 1002 spins. Other embodiments exists where axis of disk is rotated 90° relative to the air flow, similar to a water wheel.

[0080] FIGS. 12 and 13 show a schematic of another sensor for the electronic smoking device constructed according to the principles of the disclosure. As shown in Figs. 12 and 13, a housing 1212 includes a stator 1210 and a disk 1202 that may have slanted windows to convert airflow into rotary thrust. Airflow causes disk 1202 to spin. The rate of spin corresponds

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to airflow. The rate of spin may be detected by frequency of pulses received by Hall Effect sensor 1206 from magnets 1208. Other embodiments exist where capacitive sensing regions or physical contacts are used instead of Hall Effect sensor 1206 and magnets 1208. Other embodiments exist where electric field can be applied to electromagnet (not shown). The electromagnet will prevent the disk from spinning. This provides the ability to stop airflow if so desired in order to control dosage.

[0081] FIGS. 14 and 15 show a schematic of yet another sensor for the electronic smoking device constructed according to the principles of the disclosure. As shown in Figs. 14 and 15, the sensor includes a housing 1402, plunger with holes 1404 to allow airflow, holder 1406, spring 1406, an emitter (IR or visible) 1408, a detector 1410, and Windows 1412 in the plunger 1404. Airflow causes plunger 1404 to compress the spring 1406. The windows 1412 in the plunger 1404 produce "light/no light condition that can be read by detector 1410. The number of windows corresponds to amount of airflow. This configuration may be used for optical sensors, capacitive sensors, hall-effect sensors and the like.

[0082] While the disclosure has been described in terms of exemplary embodiments, those skilled in the art will recognize that the disclosure can be practiced with modifications in the spirit and scope of the appended claims. These examples given above are merely illustrative and are not meant to be an exhaustive list of all possible designs, embodiments, applications, or modifications of the disclosure.

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[0083] Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0084] The reference to any prior art in this specification is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge in Australia.

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The Claims Defining the Invention are as Follows:

1. An electronic smoking device comprising the following:

a body through which a flow path at least partially extends;

an air inlet in the body that is fluidly connected to the flow path;

a liquid compartment for storing a liquid within the body;

a vaporizer positioned in the body and configured to receive liquid from the liquid compartment and air from the flow path to generate vaporized liquid;

an outlet in the body configured to receive vaporized liquid from the vaporizer;

an airflow sensor configured to detect a flow of air through the flow path indicative of a user action;

an active dispensing device configured to control flow from the liquid compartment; and

controller circuitry connected to the vaporizer, the airflow sensor, and the active dispensing device, the controller circuitry configured to activate the active dispensing device in response to a signal from the airflow sensor indicative of the user action, and thereby control dosage of vaporized liquid.

2. The electronic smoking device of claim 1, wherein the controller circuitry is configured to control the dosage for any given period of time.

3. The electronic smoking device of claim 2, wherein the controller circuitry is configured to control the dosage per unit time.

4. The electronic smoking device of claim 2, wherein the controller circuitry is configured to control the dosage for a cumulative period of time.

5. The electronic smoking device of claim 1, wherein the controller circuitry is configured to control the dosage by dispensing a predetermined amount of liquid per user action.

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6. The electronic smoking device of claim 5, wherein the predetermined amount of liquid is consistently dispensed as the same amount.

7. The electronic smoking device of claim 1, wherein dosage is controlled by varying flow between the air inlet and the outlet.

8. The electronic smoking device of claim 7, wherein dosage is further controlled by varying the amount of liquid mixed with air before vaporization.

9. The electronic smoking device of claim 8, wherein the controller circuitry is capable of controlling a dispensing device to control liquid flow from the liquid compartment to the vaporizer.

10. The electronic smoking device of claim 7, wherein dosage is further controlled by varying the amount of vaporized liquid in the air.

11. The electronic smoking device of claim 10, wherein the amount of vaporized liquid in the air is controlled by activation of the vaporizer.

12. The electronic smoking device of claim 7, wherein dosage is controlled by limiting flow of air through the body.

13. The electronic smoking device of claim 12, wherein the circuitry is further configured to transmit a disabling signal to the airflow sensor, and the airflow sensor is further configured, in response to the disabling signal from the controller circuitry, to stop airflow through the flow path.

14. The electronic smoking device of claim 1, wherein the active dispensing device is configured to dispense a predetermined amount of liquid.

15. The electronic smoking device of claim 14, wherein the active dispensing device is configured to consistently dispense the same amount of liquid each time activated.

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16. The electronic smoking device of claim 1, further comprising a controller comprising the controller circuitry, wherein the controller determines a limit for dosage per unit time that may be delivered.

17. The electronic smoking device of claim 16, further comprising a sensor configured to detect a user action, wherein the controller is responsive to time that the sensor is activated in order to control the vaporizer.

18. The electronic smoking device of claim 17, further comprising memory connected to the controller, wherein the memory includes a time limit for which the vaporizer can be activated.

19. The electronic smoking device of claim 18, wherein the time limit corresponds to a total time that the vaporizer can be activated for a life of the electronic smoking device.

20. The electronic smoking device of claim 1, further comprising a vaporizing compartment connected to the liquid compartment and the flow path, wherein the vaporizer is disposed in the vaporizing compartment and the outlet is fluidly coupled to the vaporizing compartment.

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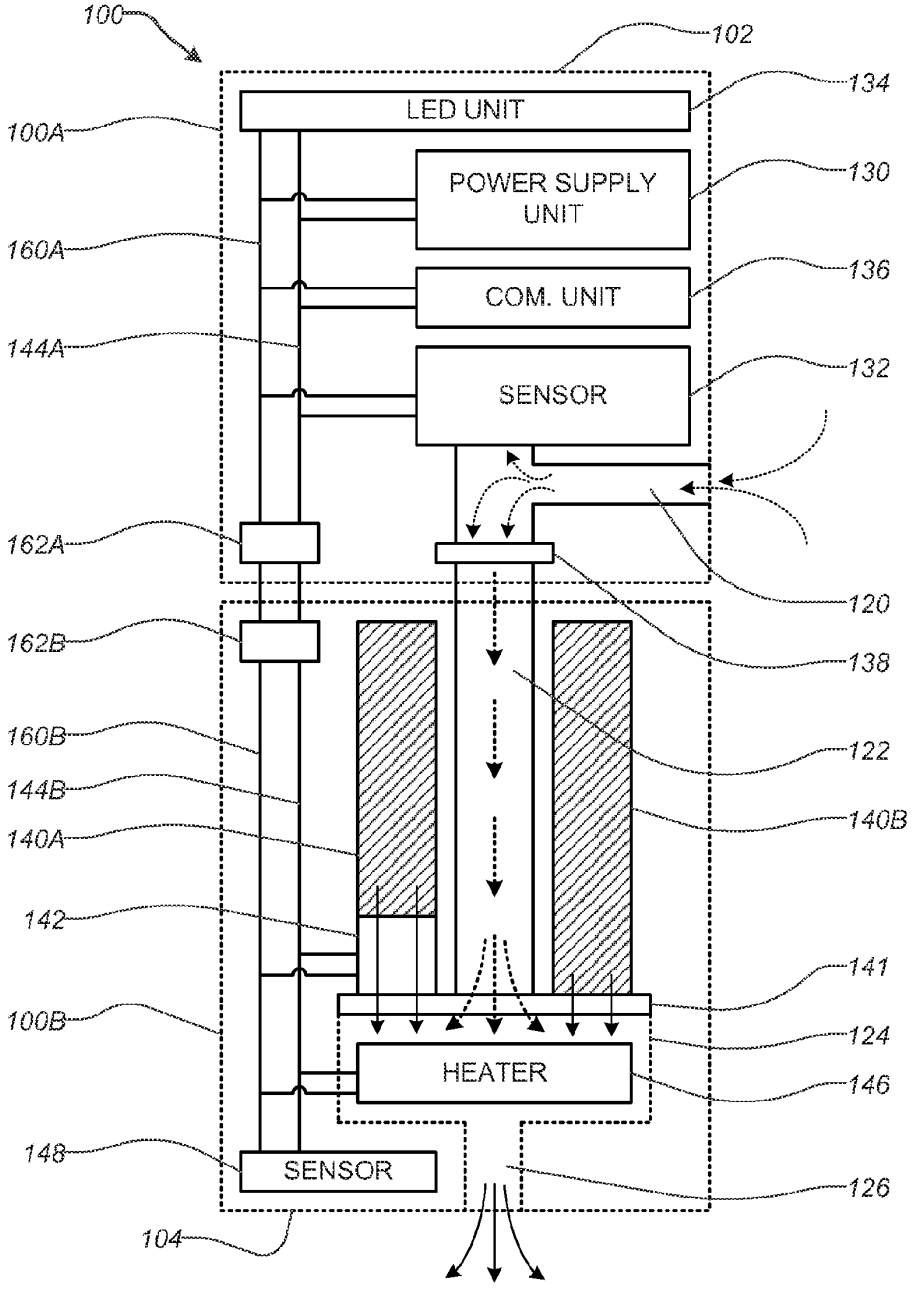


FIG. 1A

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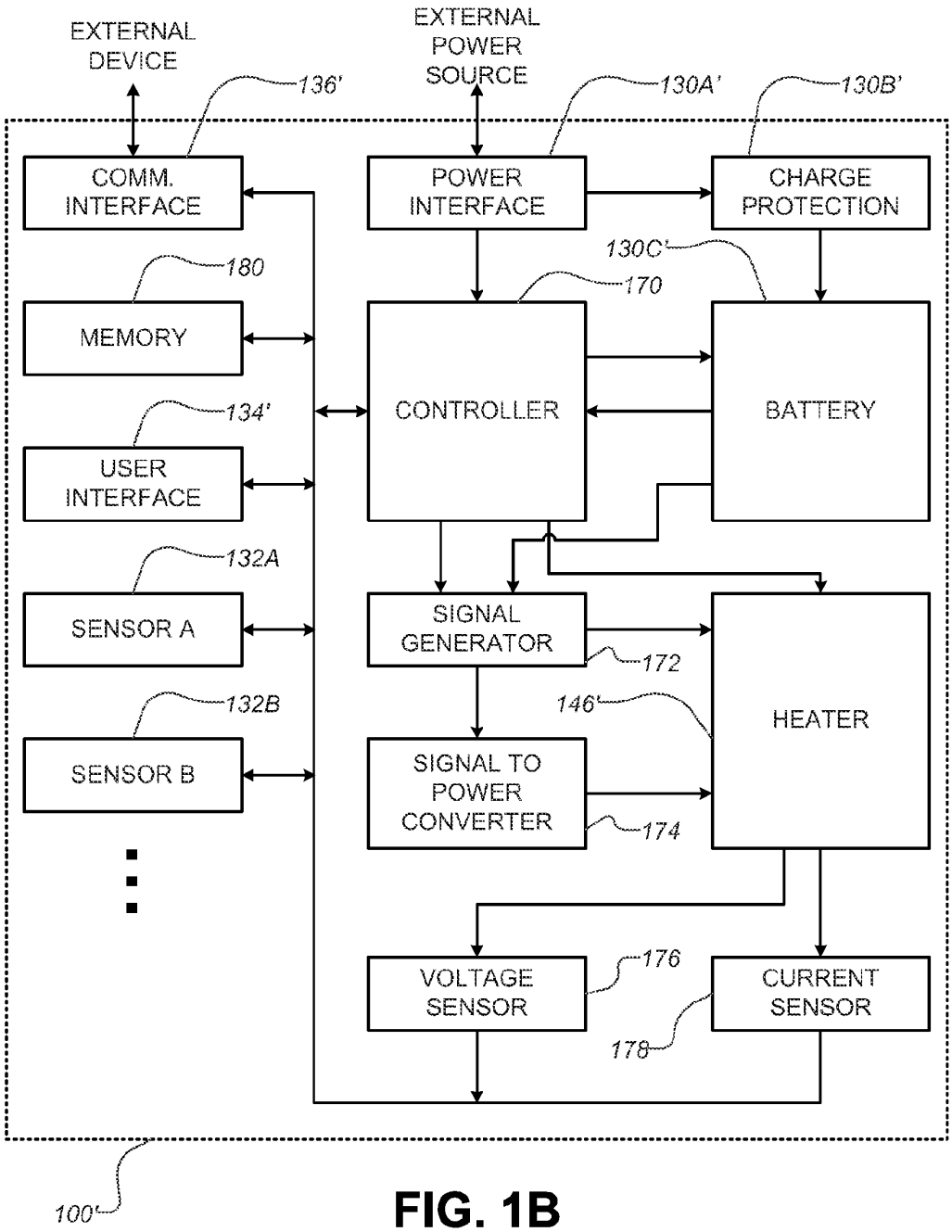

EXTERNAL DEVICE
EXTERNAL POWER SOURCE
136'
130A'
130B'
COMM. INTERFACE
POWER INTERFACE
CHARGE PROTECTION
130C'
180
170
MEMORY
CONTROLLER
BATTERY
134'
USER INTERFACE
132A
SENSOR A
SIGNAL GENERATOR
172
146'
HEATER
132B
SENSOR B
SIGNAL TO POWER CONVERTER
174
VOLTAGE SENSOR
176
CURRENT SENSOR
178
100'

FIG. 1B

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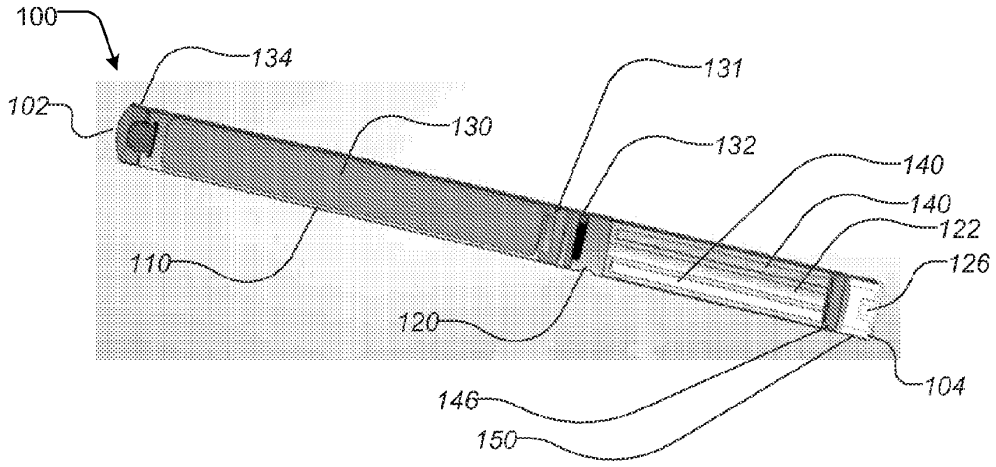


FIG. 2A

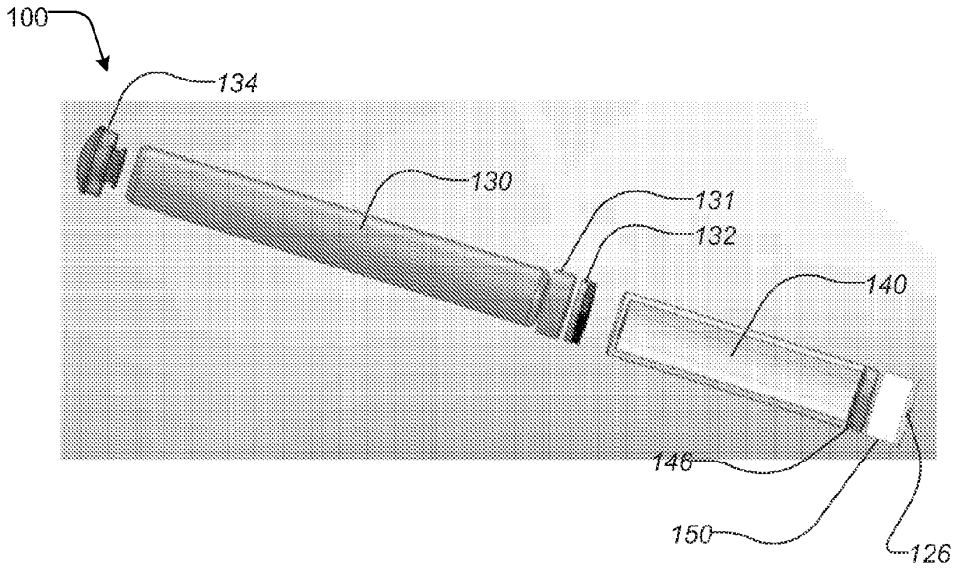


FIG. 2B

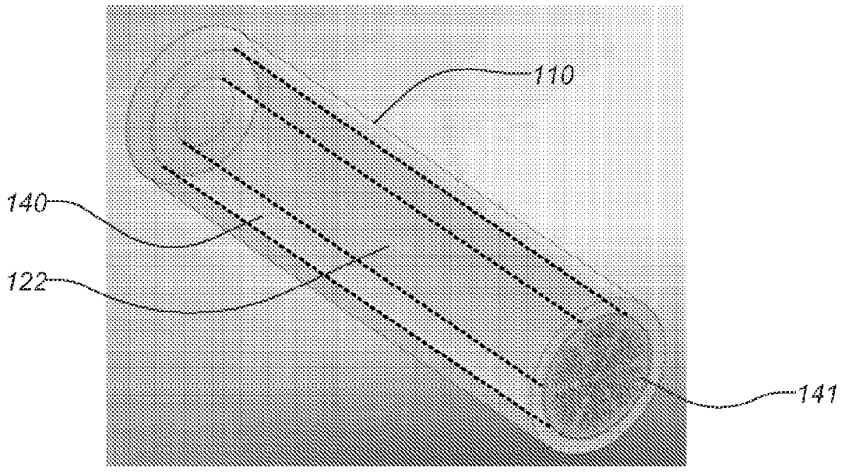


FIG. 3

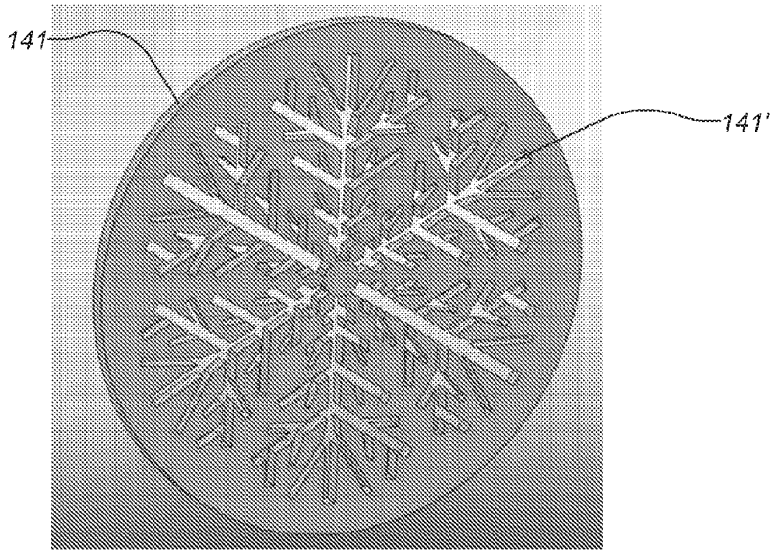


FIG. 4

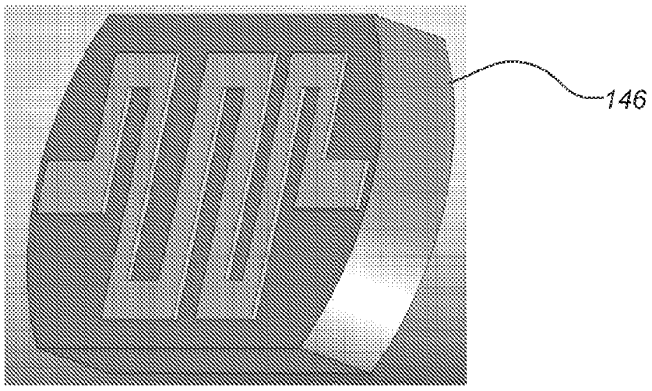


FIG. 5

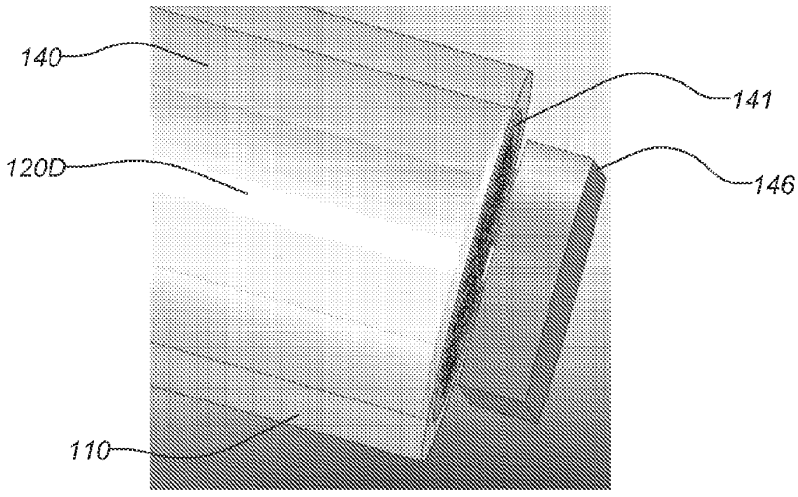


FIG. 6

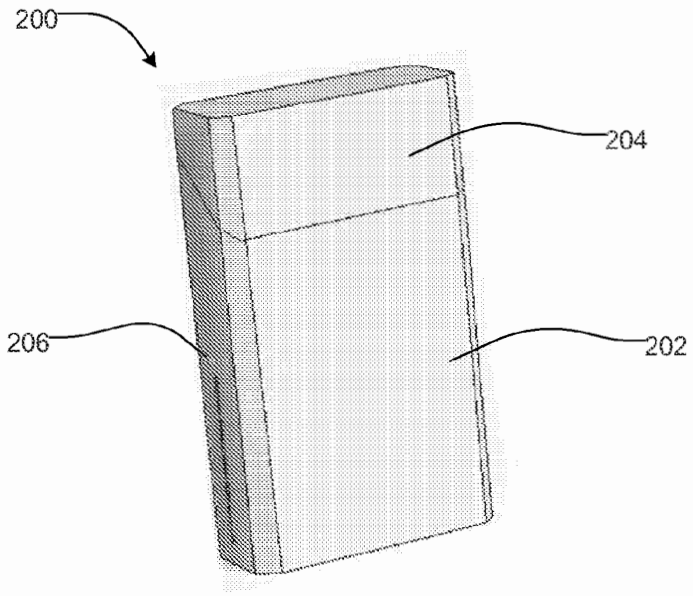


FIG. 7A

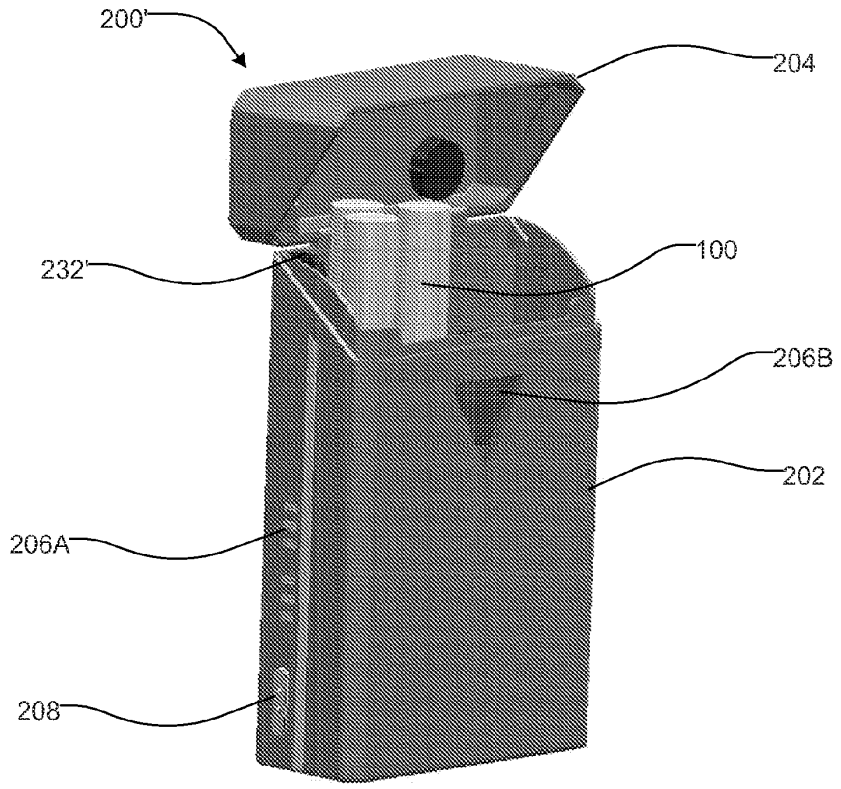


FIG. 7B

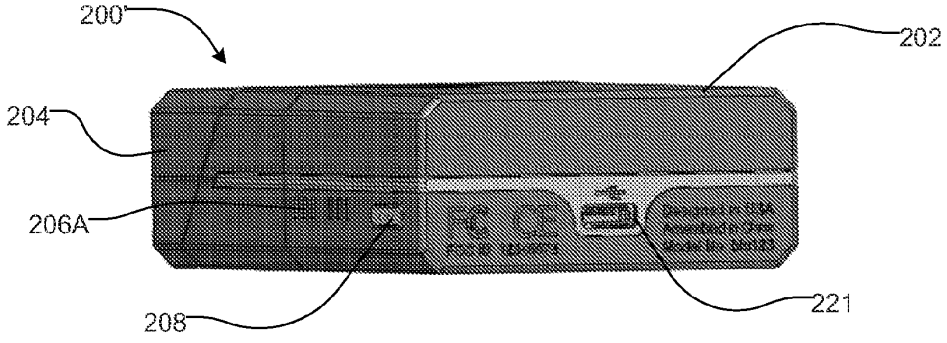


FIG. 7C

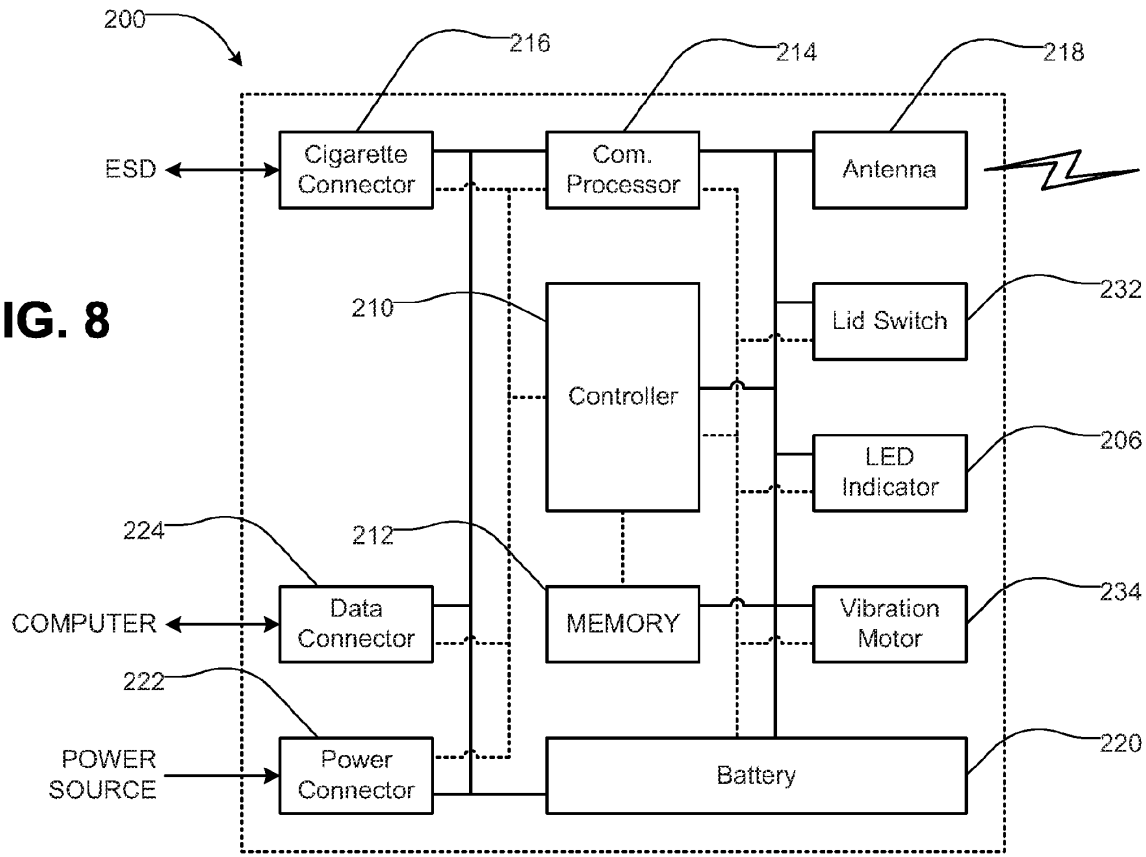


FIG. 8

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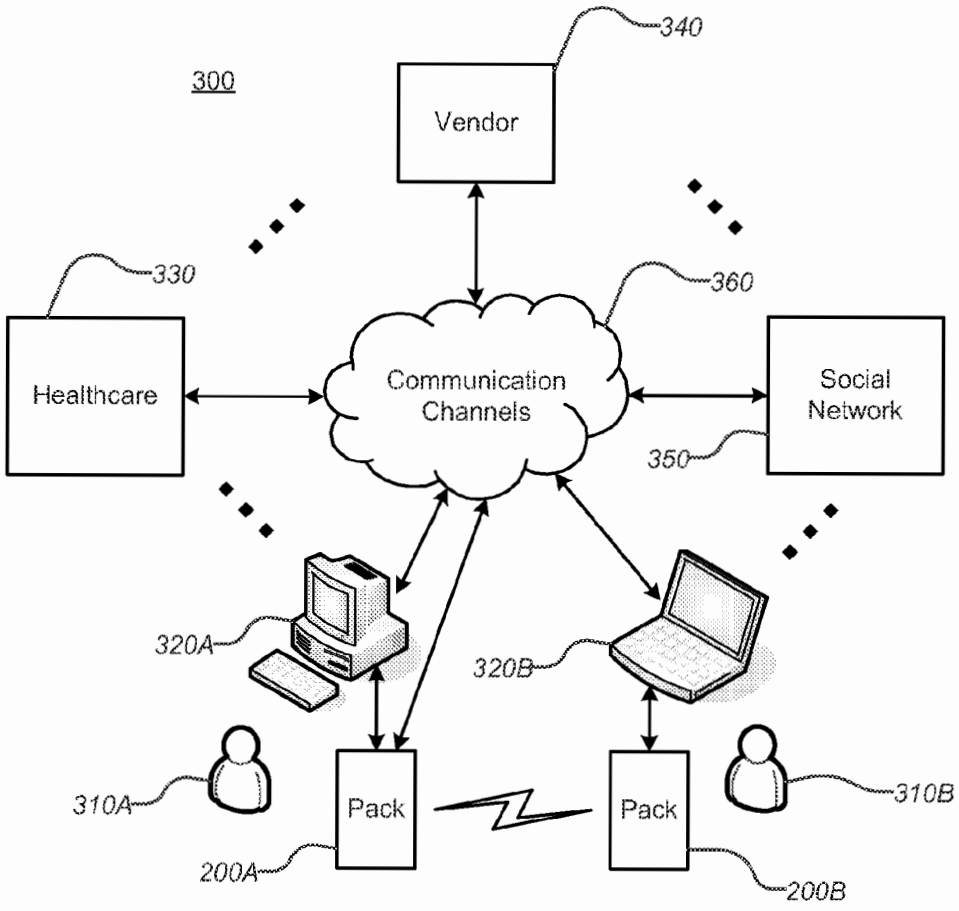

300
340
Vendor
330
Healthcare
360
Communication Channels
Social Network
350
320A
320B
310A
Pack
Pack
310B
200A
200B

FIG. 9

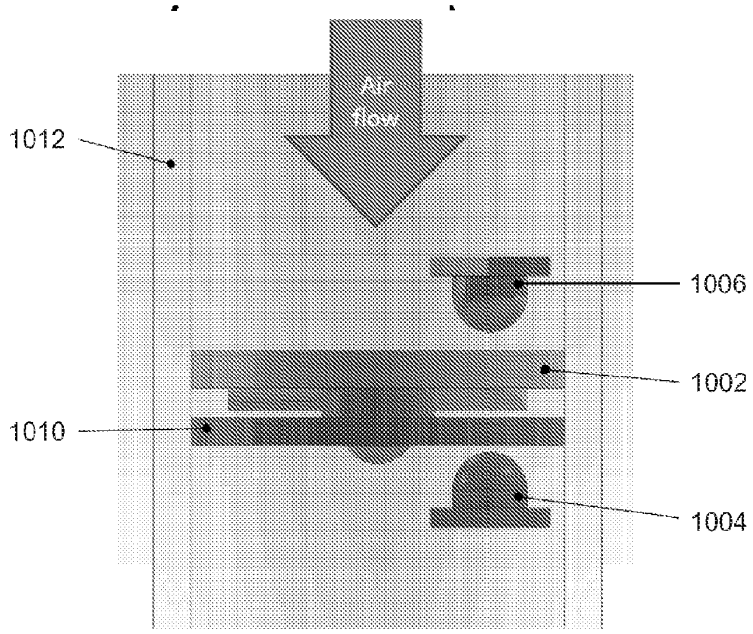


FIG. 10

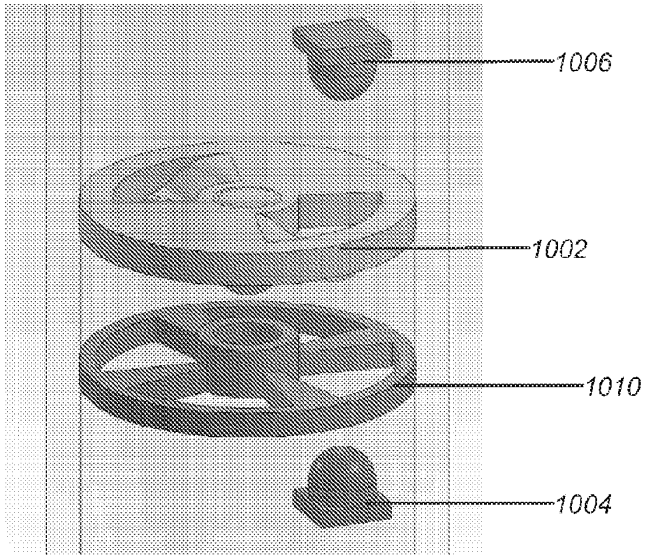


FIG. 11

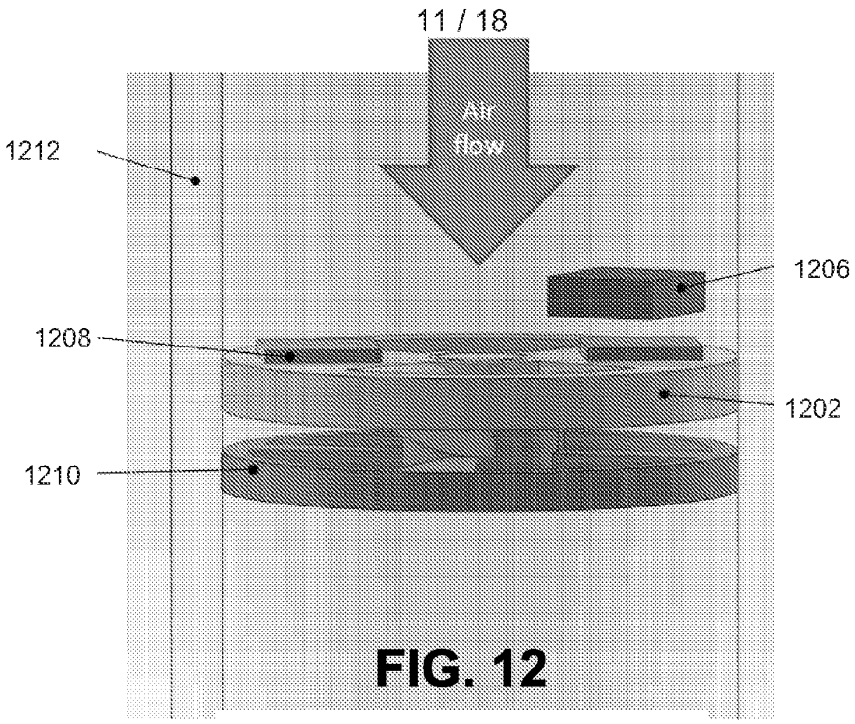


FIG. 12

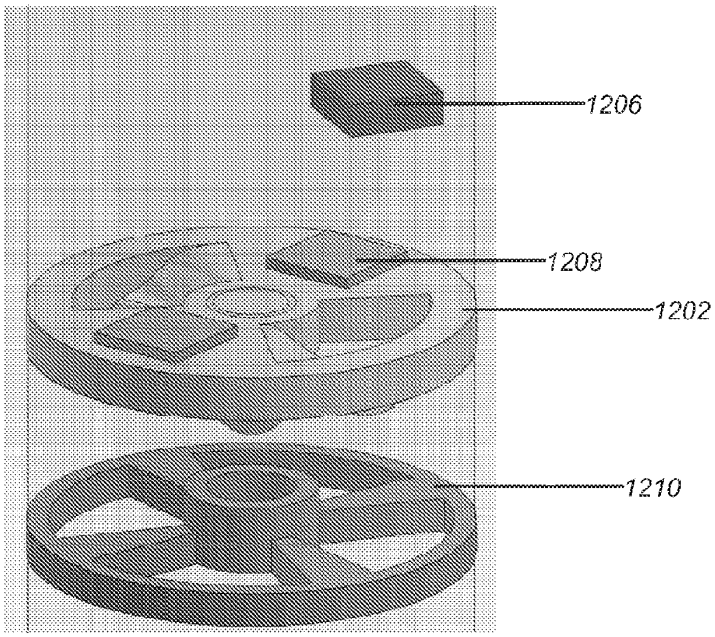


FIG. 13

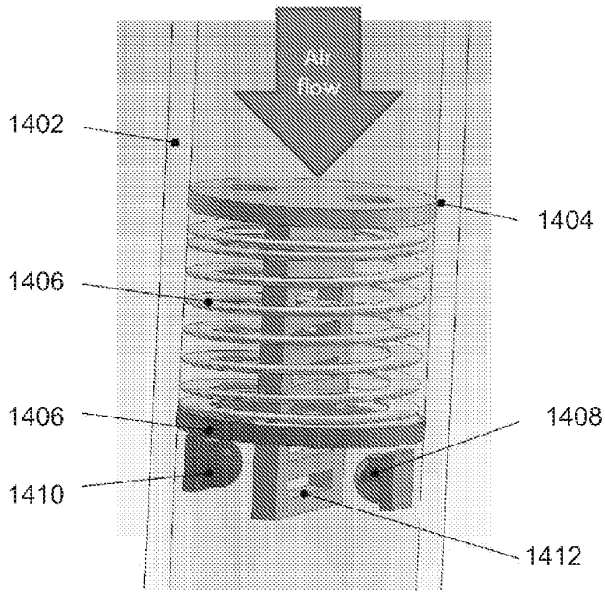

AIR FLOW
1402
1404
1406
1406
1408
1410
1412

FIG. 14

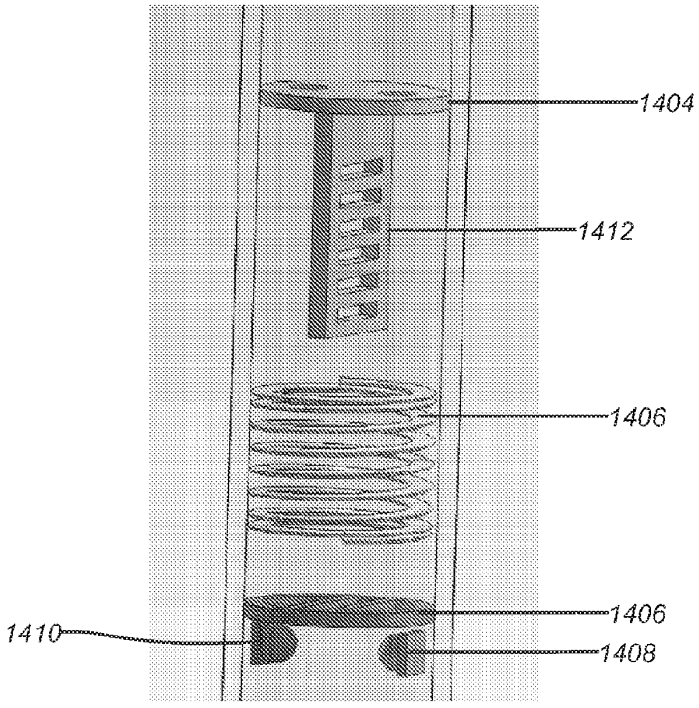

1404
1412
1406
1406
1410
1408

FIG. 15

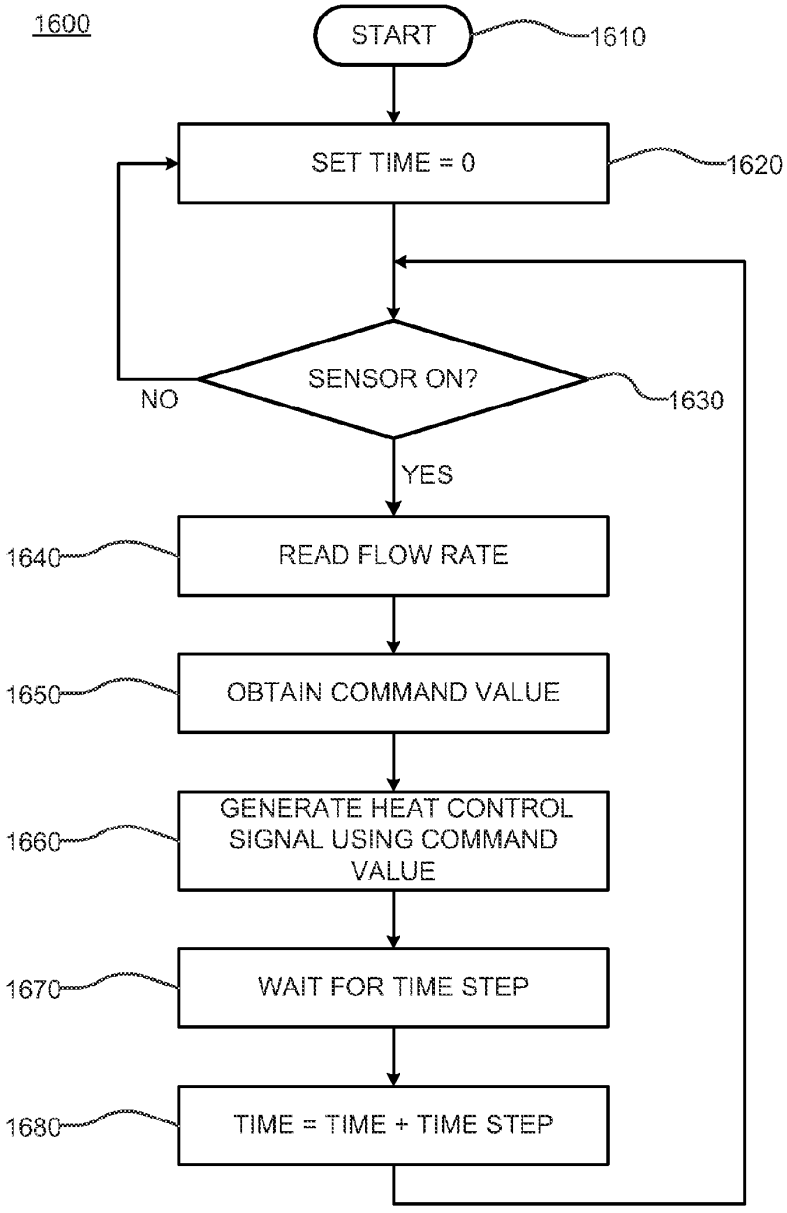

1600
START
1610
SET TIME = 0
1620
SENSOR ON?
NO
1630
YES
1640
READ FLOW RATE
1650
OBTAIN COMMAND VALUE
1660
GENERATE HEAT CONTROL SIGNAL USING COMMAND VALUE
1670
WAIT FOR TIME STEP
1680
TIME = TIME + TIME STEP

FIG. 16

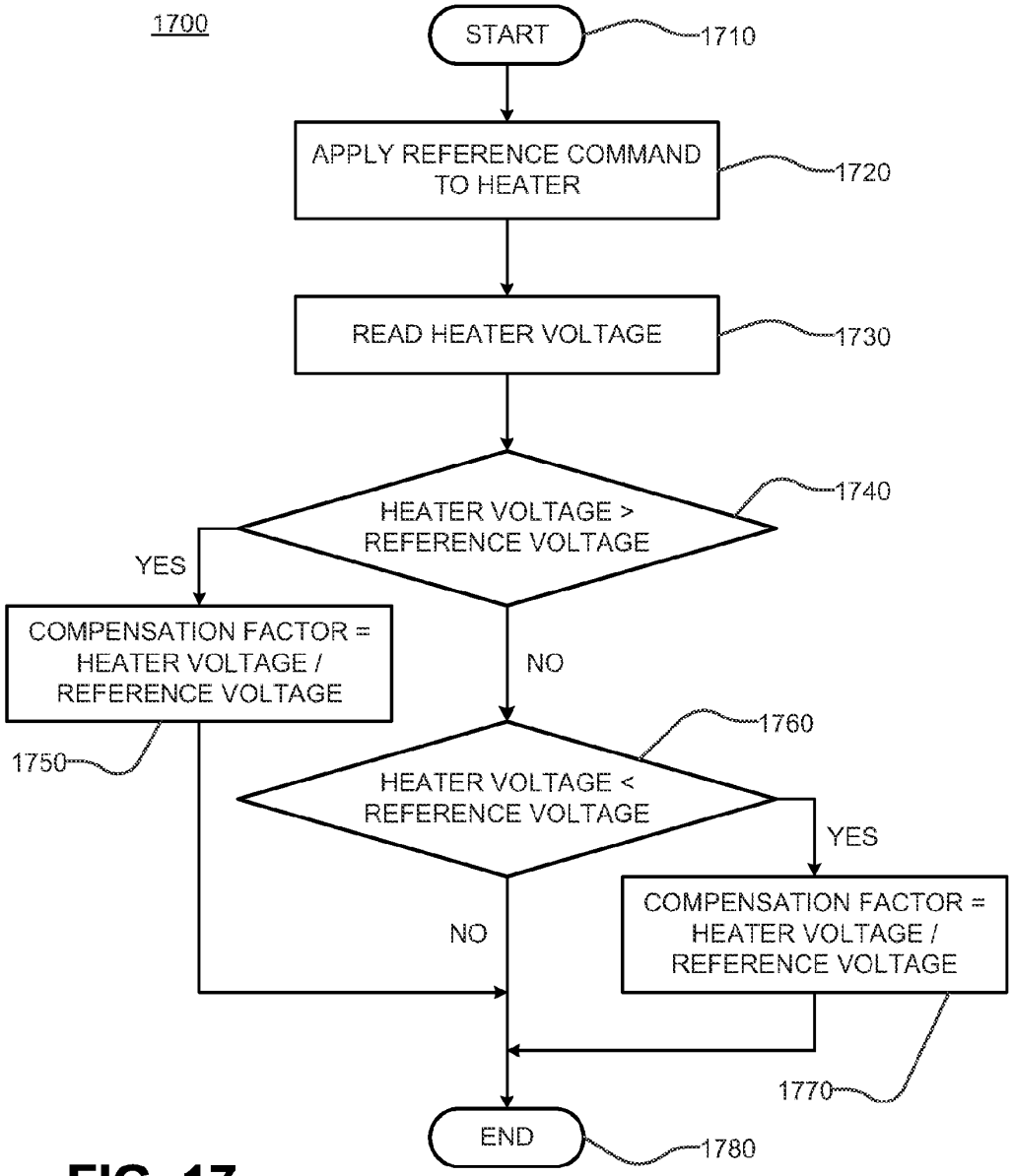

1700
START
1710
APPLY REFERENCE COMMAND TO HEATER
1720
READ HEATER VOLTAGE
1730
HEATER VOLTAGE > REFERENCE VOLTAGE
1740
YES
NO
COMPENSATION FACTOR = HEATER VOLTAGE / REFERENCE VOLTAGE
1750
HEATER VOLTAGE < REFERENCE VOLTAGE
1760
YES
NO
COMPENSATION FACTOR = HEATER VOLTAGE / REFERENCE VOLTAGE
1770
END
1780

FIG. 17

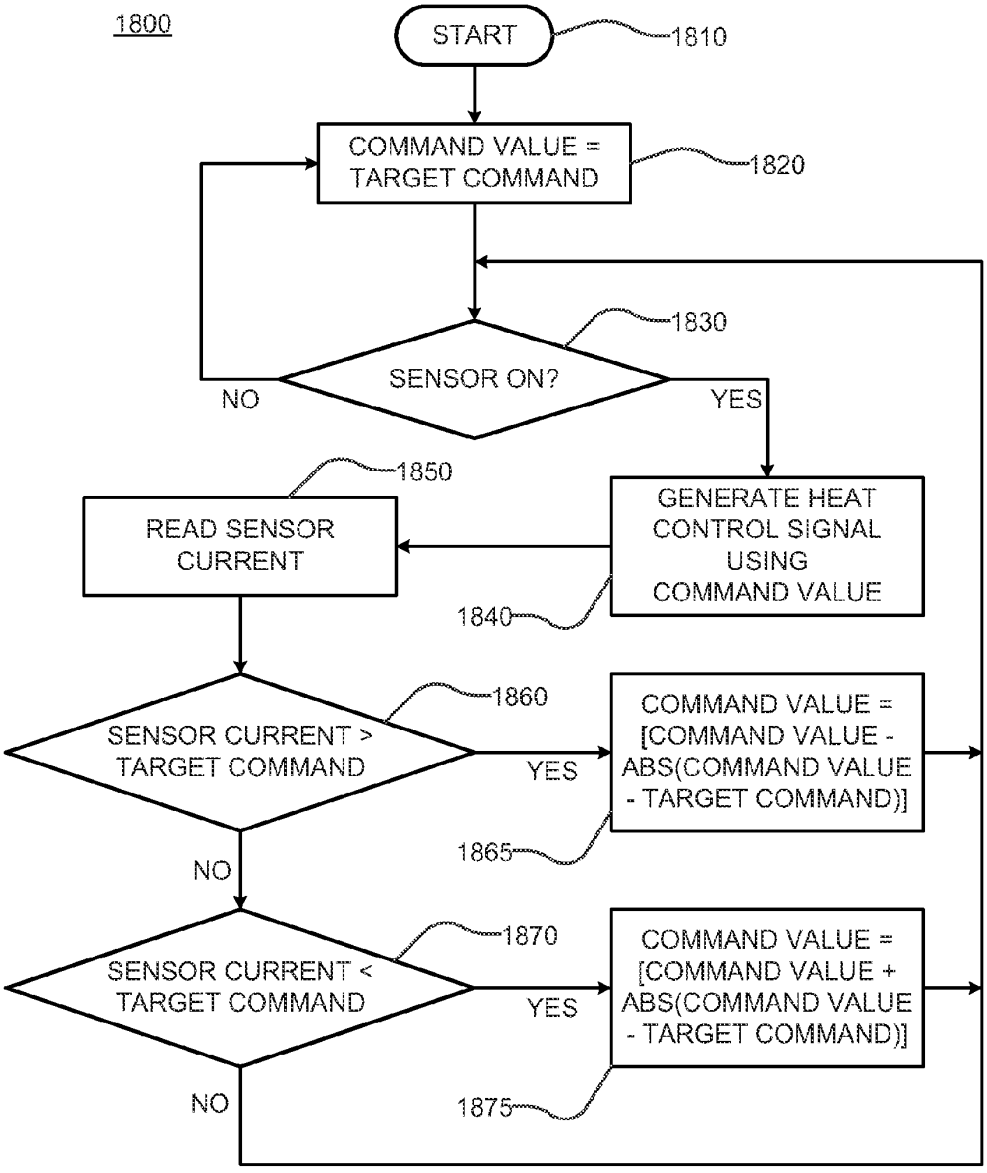

1800
START
1810
COMMAND VALUE = TARGET COMMAND
1820
1830
SENSOR ON?
NO
YES
1850
READ SENSOR CURRENT
GENERATE HEAT CONTROL SIGNAL USING COMMAND VALUE
1840
SENSOR CURRENT > TARGET COMMAND
1860
YES
COMMAND VALUE = [COMMAND VALUE - ABS(COMMAND VALUE - TARGET COMMAND)]
1865
NO
SENSOR CURRENT < TARGET COMMAND
1870
YES
COMMAND VALUE = [COMMAND VALUE + ABS(COMMAND VALUE - TARGET COMMAND)]
NO
1875

FIG. 18

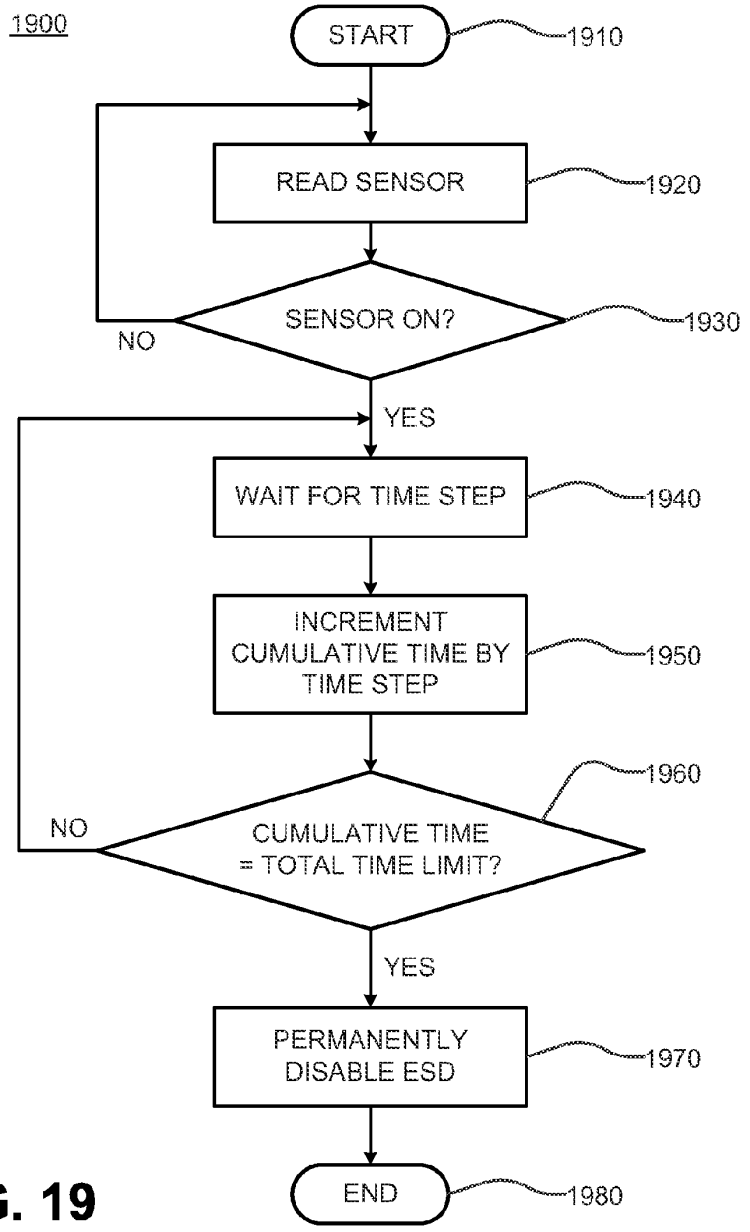

1900
START
1910
READ SENSOR
1920
SENSOR ON?
1930
NO
YES
WAIT FOR TIME STEP
1940
INCREMENT CUMULATIVE TIME BY TIME STEP
1950
1960
NO
CUMULATIVE TIME = TOTAL TIME LIMIT?
YES
PERMANENTLY DISABLE ESD
1970
END
1980

FIG. 19

2017202891 01 May 2017

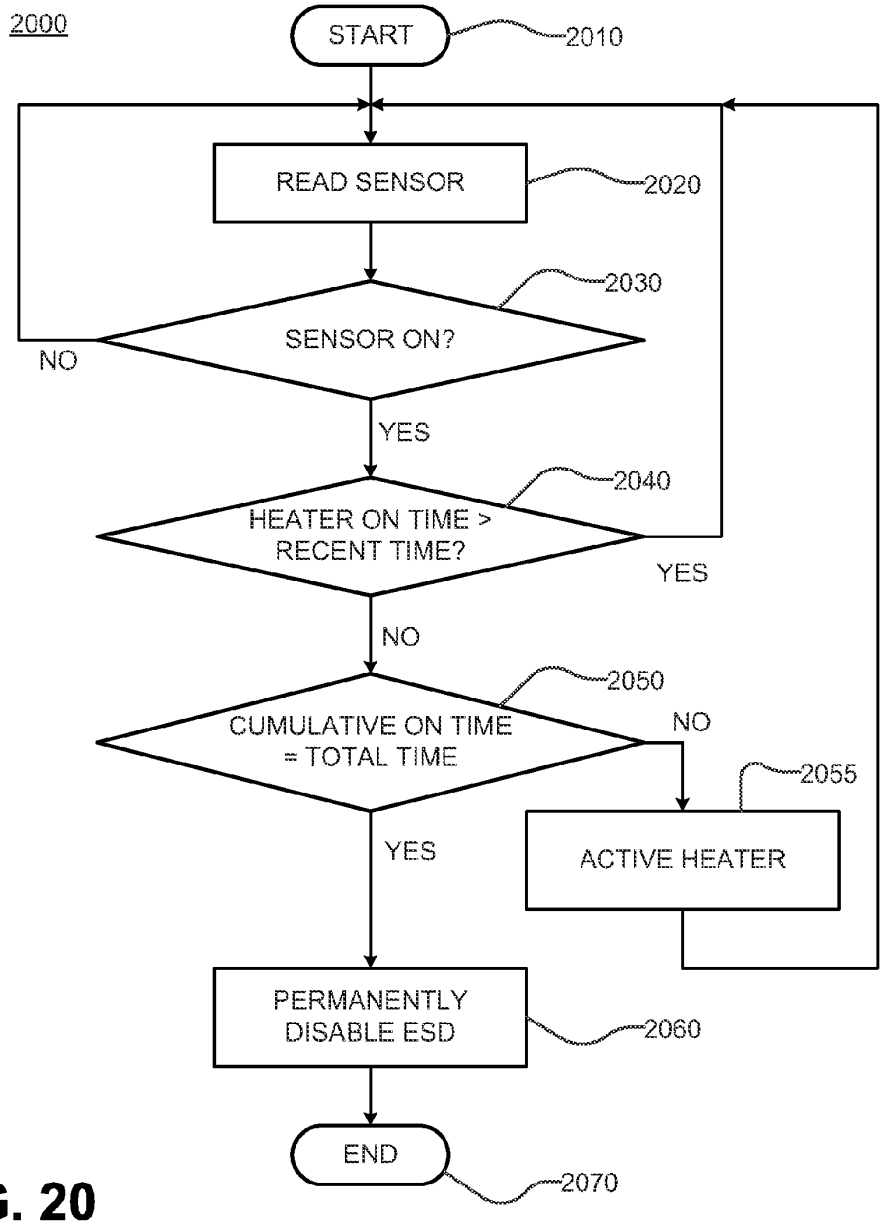


FIG. 20

2017202891 01 May 2017

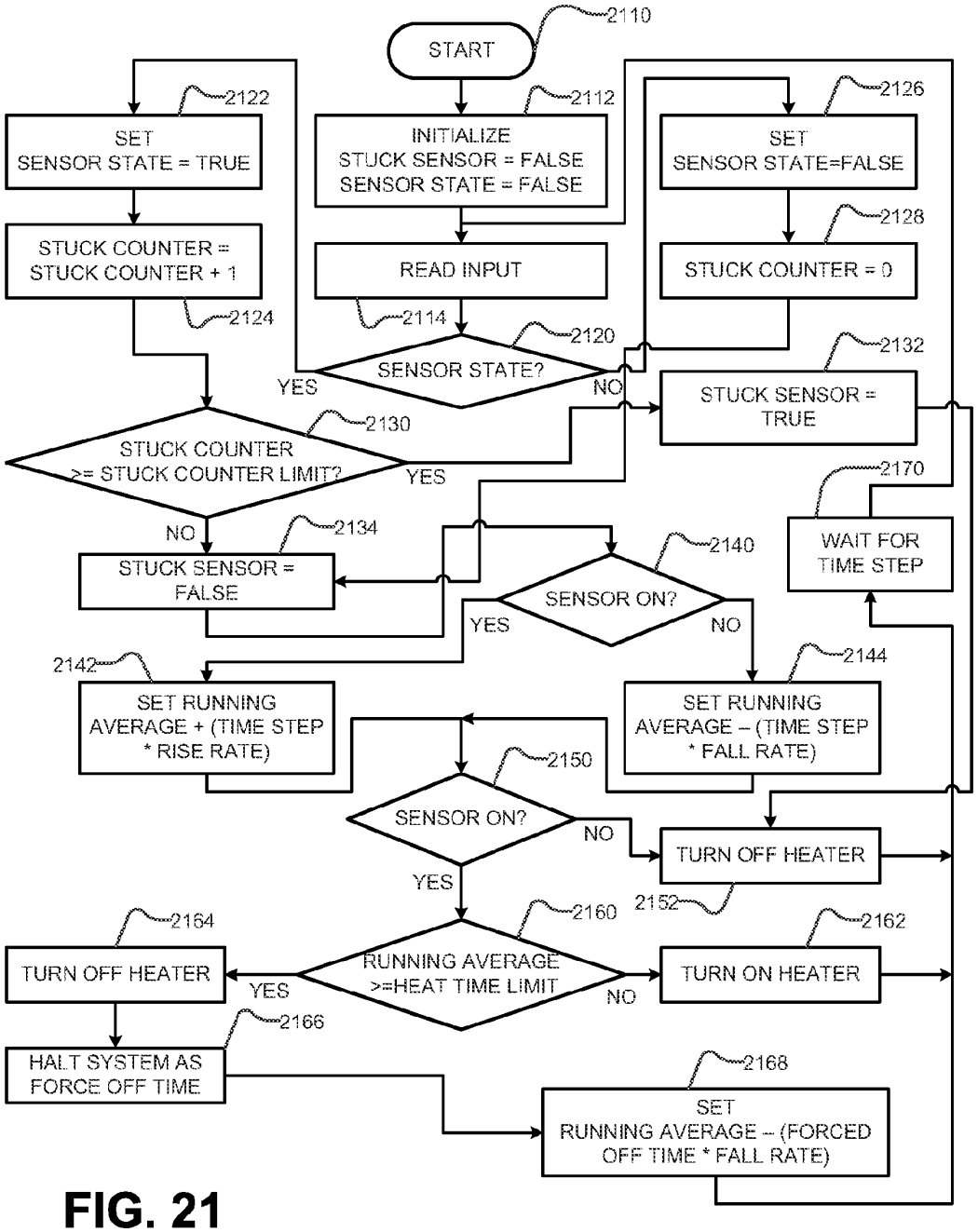


FIG. 21

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CANADIAN PATENT APPLICATION

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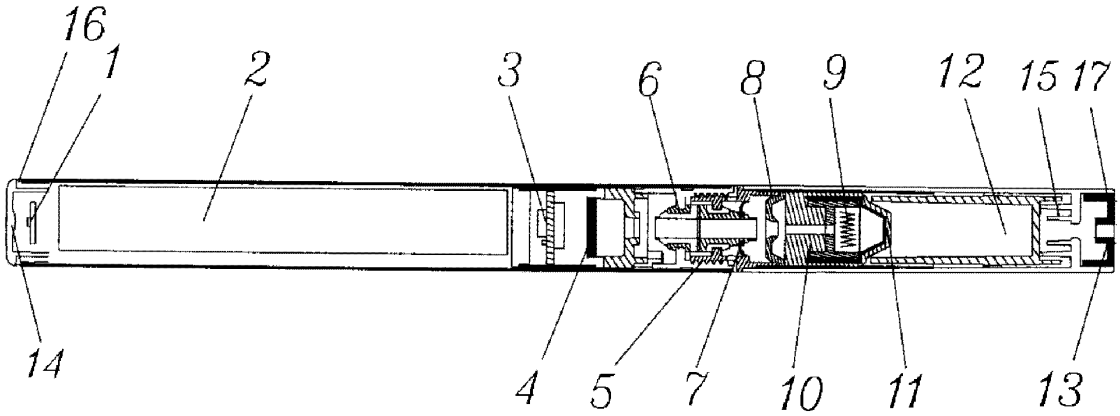
(51) Cl.Int./Int.Cl. *A61M 15/06* (2006.01), *A24D 1/00* (2006.01), *A24F 1/28* (2006.01), *A61M 11/00* (2006.01), *B05B 17/06* (2006.01)

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(72) Inventeur/Inventor:
XIA, HAO RAN, CN

(54) Titre : CIGARETTE ELECTRONIQUE, ECOLOGIQUE ET NON COMBUSTIBLE A ATOMISEUR SERVANT DE SUBSTITUT A LA CIGARETTE

(54) Title: ENVIRONMENTAL FRIENDLY, NON-COMBUSTIBLE, ATOMIZING ELECTRONIC CIGARETTE HAVING THE FUNCTION OF A CIGARETTE SUBSTITUTE



(57) Abrégé/Abstract:
The present invention relates to an environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, comprising a controller and an actuator removably connected. The interior of the controller has, from left to right, an indicating light cover, a signal indicating light, a rechargeable lithium battery, an integrated circuit board, an electret microphone, a hollow connecting conductor B; the interior of the actuator has, from left to right, a hollow connecting conductor A, a vibrating diaphragm, a liquid blocking film, a second liquid storage chamber, a heater, a liquid transmission mechanism, a liquid storage chamber, a soft mouthpiece; the connecting conductor A has air intake holes; a gap is left between the soft mouthpiece and the liquid storage chamber as an airflow passage; a space is left between the electret microphone and the connecting conductor B to allow the electret microphone's operation. This invention is smoker-, environmentally- friendly.

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ABSTRACT

The present invention relates to an environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, comprising a controller and an actuator removably connected. The interior of the controller has, from left to right, an indicating light cover, a signal indicating light, a rechargeable lithium battery, an integrated circuit board, an electret microphone, a hollow connecting conductor B; the interior of the actuator has, from left to right, a hollow connecting conductor A, a vibrating diaphragm, a liquid blocking film, a second liquid storage chamber, a heater, a liquid transmission mechanism, a liquid storage chamber, a soft mouthpiece; the connecting conductor A has air intake holes; a gap is left between the soft mouthpiece and the liquid storage chamber as an airflow passage; a space is left between the electret microphone and the connecting conductor B to allow the electret microphone's operation. This invention is smoker-, environmentally- friendly.

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DESCRIPTION

TITLE OF THE INVENTION

Environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute.

BACKGROUND OF THE INVENTION

The present invention relates to a cigarette substitute and more particularly pertains to an environmental, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute.

Nowadays, though that "smoking is hazardous to health" has been the general knowledge commonly known by people, there are still over one billion smokers worldwide. The Department of Environmental Protection of the United States currently proclaims that tobacco smoke in the air is a Class A carcinogen. According to the data released by the World Health Organization and other departments, about 4.9 million people worldwide are killed each year due to smoking related diseases; however, for various reasons, it is a very difficult task to have a smoker quit smoking completely. The nicotine in tobacco is a chemical substance susceptible of making people addictive to smoking and difficult to quit. The experts of the Medical Society of the United States have pointed out that nicotine is one of the strongest and most forceful substances to make people addictive. Researchers have further determined how nicotine makes smokers addictive through the reactions in human brains. During smoking, alkaloid nicotine generates a large amount of tar droplets in cigarette burning, which enter alveoli and are rapidly absorbed, causing "euphoria", similar to that of stimulants, for example, a smoker experiences a giddy or an ecstatic feeling. Alkaloid nicotine is small molecular alkaloid, a small dosage is essentially harmless to people's body and the half-life in blood is quite short.

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Nevertheless, tobacco also contains other harmful substances, namely, tar, carbon monoxide, benzopyrene, polynuclear aromatic hydrocarbons (PAHs), nitrosamine, AZO compounds and so on which are strong carcinogens of great hazards to human life and health.

As to find an instantaneous means to satisfy the tobacco dependency of smokers and to reduce the hazards of tobacco to the lowest, also not to change people's smoking habits, many smoking cessation products have small dosages of alkaloid nicotine incorporated therein, such as, nicotine patches, nicotine mouthwash, nicotine lozenges and so on. Although these products resolve the dependency problem of smokers to a certain extent, the usage method of these products are not compatible with the smoking habits of smokers. It is therefore difficult for smokers to accept them. There are also some smoking cessation products which have alkaloid medicated liquid passed through and heated in mechanical devices for smokers to smoke. Though this is more acceptable for smokers in respect of smoking habits, this easily causes losses to smokers due to the unstable properties of the conventional mechanical constructions, being prone to damage and complicated in operating. In order to minimize the change of smoking habits of smokers, some try to add activated carbon filters, liquid filters and other filtering devices on the bases of cigarettes, so as to reduce the hazards of cigarettes on human bodies to a certain extent. Some people try to construct apparatuses similar to the kind of oxygen inhaling apparatuses by means of large size machine apparatuses. Although the smokers' demands are resolved to a certain extent, the apparatuses are gigantic and are of high manufacturing cost. Many also require specific places and are not acceptable to smokers. The effects of smoking cessation are not satisfactory.

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BRIEF SUMMARY OF THE INVENTION

In view of the aforesaid disadvantages now present in the prior arts, the object of the present invention is to provide an environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, the external appearance of which similar to a cigarette, and is compact and easy to carry. It is of simple construction and low cost, compatible with smokers smoking habits, without tar, without carbon monoxide and other harmful substances, thereby reducing carcinogenic risks, has no need to be lit, thus avoiding the hidden risk of fire calamities, and there is no environmental pollution of the inhaling smoke.

To attain this, the present invention adopts the following technical proposal:

An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, comprising a controller and an actuator which are removably connected, wherein the interior of the controller is disposed with, from left to right, an indicating light cover 14, a signal indicating light 1, a rechargeable lithium battery 2, an integrated circuit board 3, an electret microphone 4 and a hollow connecting conductor B 6; the interior of the actuator is disposed with, from left to right, a hollow connecting conductor A 5, a vibrating diaphragm 7, a liquid blocking film 8, a second liquid storage chamber 10, a heater 9, a liquid transmission mechanism 11, a liquid storage chamber 12 and a soft mouthpiece 13; the connecting conductor A 5 is disposed with air intake holes 702; a gap is left between the soft mouthpiece 13 and the liquid storage chamber 12 as an airflow passage; a space is left between the electret microphone 4 and the connecting conductor B 6 to allow operation of the electret microphone 4.

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On the basis of the abovementioned technical proposal, the connecting conductor B 6 and the connecting conductor A 5 are respectively disposed with coupling screw threads or locking grooves.

On the basis of the abovementioned technical proposal, the connecting conductor B 6 and the connecting conductor A 5 are connected by means of hollow contacting copper cap screw threads or by means of locking grooves.

On the basis of the abovementioned technical proposal, the outer surfaces of both the controller and the actuator are disposed with a stainless steel outer casing, the interior of the soft mouthpiece 13 is disposed with a liquid blocking groove 15, the outer end face of the soft mouthpiece 13 is disposed with a liquid blocking cover 17, the base end of the controller or the indicating light cover 14 is disposed with ventilating air holes 16.

On the basis of the abovementioned technical proposal, the interior of the stainless steel outer casing of the actuator is further disposed with an insulation layer.

On the basis of the abovementioned technical proposal, the integrated circuit board 3 comprises a control means IC1, the first pin of the control means IC1 is connected with one end of a capacitor C1, one end of a resistor R7, one end of a resistor R1 and a collector electrode of a transistor Q1 respectively, the other end of the resistor R7 is connected with a VCC (virtual channel connection) terminal, the emitting electrode of the transistor Q1 is connected with one end of a resistor R5 and the fourth pin of the control means IC1 respectively, the other end of the resistor R1 is connected with the base electrode of the transistor Q1 and one end of a resistor R2 respectively, the other end of the resistor R2 is connected with a K terminal and one end of a resistor R4 respectively, the other end of the resistor R4 is connected with the other end of the resistor R5, a GND (ground) terminal and a heater- terminal,

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the second pin of the control means IC1 is connected with one end of a resistor R3, the other end of the resistor R3 is connector with a K terminal, the third pin of the control means IC1 is connected with a heater+ terminal and one end of a resistor R6 respectively, the other end of the resistor R6 is connected with a GND (ground) terminal, the fifth pin of the control means IC1 is connected with the cathode of an LED (light emitting diode) light D1 through an LE (light emitter) terminal, the anode of the LED light D1 is connected with one end of a resistor R8, the other end of the resistor R8 is connected with a GND terminal, the sixth pin of the control means IC1 is connected with the gate electrode of the MOS FET (metal-oxide-semiconductor field-effect transistor) Q2, the source electrode of the MOS FET Q2 is connected with a heater+ terminal, a drain electrode is connected with a power source VCC, the seventh pin of the control means IC1 is connected with an S terminal, the eighth pin of the control means IC1 is connected with the other end of the capacitor C1 and a GND terminal respectively, the heater- terminal is connected with the anode of the heater, the heater+ terminals are connected with the cathode of the heater, an on/off switch S1 is connected between the K terminal and the S terminal.

The environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute of the present invention has an external appearance similar to a cigarette, and is compact and easy to carry. It is of simple construction and low cost, compatible with smokers smoking habits, without tar, without carbon monoxide and other harmful substances, thereby reducing carcinogenic risks, has no need to be lit, thus avoiding the hidden risk of fire calamities, and there is no environmental pollution of the inhaling smoke.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a structural view of the environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute.

FIG. 2 is an exploded structural view of the environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute.

FIG. 3 is a structural view of the connecting conductor A, the connecting conductor B and the vibrating diaphragm.

FIG. 4 is a structural view of the liquid blocking film, the second liquid storage chamber, the heater and the liquid transmission mechanism.

FIG. 5 is a structural view showing the airflow circulation in the mouthpiece part and the construction of the soft mouthpiece.

FIG. 6 is a schematic circuit diagram of the integrated circuit board.

The markings on the drawings are: 1 is a signal indicating light, 2 is a rechargeable lithium battery, 3 is an integrated circuit board, 4 is an electret microphone, 5 is a connecting conductor A, 6 is a connecting conductor B, 7 is a vibrating diaphragm, 8 is a liquid blocking film, 9 is a heater, 10 is a second liquid storage chamber, 11 is a liquid transmission mechanism, 12 is a liquid storage chamber, 13 is a soft mouthpiece, 14 is an indicating light cover, 15 is a liquid blocking groove, 16 is a ventilating air hole, 17 is a liquid blocking cover.

DETAILED DESCRIPTION OF THE INVENTION

The preferred embodiment of the present invention is further described in detail with the following embodiment and the accompanying drawings.

FIG. 1 is a structural view of the environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, FIG. 2 is

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an exploded structural view of the environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, comprising a controller and an actuator which are removably connected, wherein the interior of the controller is disposed with, from left to right, an indicating light cover 14, a signal indicating light 1, a rechargeable lithium battery 2, an integrated circuit board 3, an electret microphone 4 and a hollow connecting conductor B 6; the interior of the actuator is disposed with, from left to right, a hollow connecting conductor A 5, a vibrating diaphragm 7, a liquid blocking film 8, a second liquid storage chamber 10, a heater 9, a liquid transmission mechanism 11, a liquid storage chamber 12 and a soft mouthpiece 13; the connecting conductor A 5 is disposed with air intake holes 702; a gap is left between the soft mouthpiece 13 and the liquid storage chamber 12 as an airflow passage; a space is left between the electret microphone 4 and the connecting conductor B 6 to allow operation of the electret microphone 4. As illustrated in FIG. 1, the electret microphone 4 divides the controller into two independent cavities. The indicating light cover 14, the signal indicating light 1 and the rechargeable lithium battery 2 are inside the left side cavity. The electret microphone 4 and the connecting conductor B 6 are inside the right side cavity. The outcome that "the electret microphone 4 divides the controller into two separate cavities" can be attained by existing prior arts, while the preferred disposition is to tightly seal the gap between the electret microphone 4 and the outer casing of the controller with a soft plastic on the circumference of the electret microphone 4. As illustrated in FIGS. 1 and 2, the rechargeable lithium battery 2 is a built-in component. When the connecting conductor B 6 of the controller is connected with a charger, the rechargeable lithium battery 2 can immediately be recharged by means of the integrated circuit board 3. When the connecting conductor B 6 is connected with the

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actuator through the connecting conductor A 5, an environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute is assembled. The signal indicating light 1 can simulate the glowing and dimming effect of a cigarette tip with each inhalation of a smoker. The signal indicating light 1 is electrically powered by the rechargeable lithium battery 2 by means of the integrated circuit board 3. The heater 9 is electrically powered by the rechargeable lithium battery 2 by means of the connecting conductor A 5, the connecting conductor B 6 and the integrated circuit board 3. The present invention operates as follows: when the present invention is used, the medicated liquid flows into the second liquid storage chamber 10 from the liquid storage chamber 12 by means of the liquid transmission mechanism 11. The heater 9 is enclosed in the liquid transmission mechanism 11 (refer to FIG. 4). Under the inhaling action of a smoker, airflow enters the actuator from the air intake holes 702 on the side of the actuator. The vibrating diaphragm 7 vibrates under the airflow action, and consequently, the electret microphone 4 also vibrates. The vibration is then converted into an on/off signal by the control means IC1 (refer to FIG. 6) on the integrated circuit board 3. The heater 9 starts to operate and the medicated liquid in the atomizing chamber of the heater 9 is atomized momentarily. The atomized medicated liquid is inhaled from by the smoker through the soft mouthpiece 13.

On the basis of the abovementioned technical proposal, the connecting conductor B 6 and the connecting conductor A 5 are respectively disposed with coupling screw threads or locking grooves. The controller and the actuator are connected by means of the connection between the connecting conductor B 6 and the connecting conductor A 5. Other than the connection method by screw threads and locking grooves, the connection can be attained by applying other prior arts. On

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the basis of the abovementioned technical proposal, the connecting conductor B 6 and the connecting conductor A 5 are connected by means of hollow contacting copper cap screw threads or by means of locking grooves. When the controller and the actuator are connected by means of the connection between the connecting conductor B 6 and the connecting conductor A 5, an integrated body having a shape similar to a cigarette is assembled.

On the basis of the abovementioned technical proposal, for safety, aesthetic and convenient use, the outer surfaces of both the controller and the actuator are disposed with a stainless steel outer casing, the interior of the soft mouthpiece 13 is disposed with a liquid blocking groove 15, the outer end face of the soft mouthpiece 13 is disposed with a liquid blocking cover 17, the base end of the controller or the indicating light cover 14 is disposed with ventilating air holes 16. The application of the liquid blocking groove 15 and the liquid blocking cover 17 is to prevent the medicated liquid from being inhaled into the mouth. The application of ventilating air holes 16 is to ensure good heat radiation of the left side cavity of the controller.

On the basis of the abovementioned technical proposal, the interior of the stainless steel outer casing of the actuator is further disposed with an insulation layer. The purpose is to prevent the hidden safety problem caused by the high temperature of the heater 9.

On the basis of the abovementioned technical proposal, the integrated circuit board 3 comprises the control circuit of the entire system. The electronic time delay function, the electronic clearance reset function are attained by software programs. It also comprises a heater driving circuit and a control means IC1. The integrated circuit board 3 receives a signal of the electret microphone 4, sends it to

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the control means IC1 for analysis and processing. Thereafter, the signal is converted to a control signal to control the heater. Simultaneously, the control means IC1 further sends out a glowing and dimming control signal to the signal indicating light 1. The entire circuit is simple and practical and can be attained by applying prior arts accordingly to functional needs.

The biological and physical phenomena of the current chip technology, biology and microelectronics and so on provide the technical bases for the present invention. The advantages of the present invention are: smoking without tar, carbon monoxide and other harmful substances, thereby substantially reducing the carcinogenic risk while smokers still have the smoking feeling; no need to lit and therefore no fire hazard. The inhaling smoke is actually the water vapor of the vaporized medicated liquid, and has no environmental pollution. A low and weak electricity level of 4.2 volts is used to supply electricity and power consumption is low. No combusted substance is generated in its operation. No cigarette ash, no fire, no hidden fire hazards, and is therefore easily acceptable to the general public.

The present invention is further described in detail with the embodiment described in FIGS. 3 to 6.

FIG. 3 is a structural view of the connecting conductor A 5, the connecting conductor B 6 and the vibrating diaphragm 7. As illustrated in the figure, the side of the connecting conductor A 5 is disposed with air intake holes 702. The air intake holes 702 connect the hollow part of the connecting conductor A 5 and the outer part of the actuator. The right side of the connecting conductor A 5 is disposed with a vibrating diaphragm 7 which can cover the air intake holes 702 and strengthen and extend the airflow vibration. When a smoker inhales, airflow enters from the air intake holes 702, driving the vibrating diaphragm to vibrate, which in turn results in

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the vibration in the hollow part 606 of the connecting conductor B 6. This causes the electret microphone 4 to send out a low frequency signal. The control means IC1 on the integrated circuit board examines and analyses the low frequency signal and the heater 9 starts to operate in correspondence with the inhalation of the smoker. When the inhaling force of a smoker is reduced, the vibrating diaphragm 7 ceases to vibrate and the airflow passage between the air intake holes 702 and the actuator is cut off by the vibrating diaphragm 7. The electret microphone ceases to operate and the control means IC1 receives no low frequency signal. The heater 9 therefore ceases to operate. Under the action of small airflow, the heater 9 is being connected and cut off, i.e. control of the immediate heating of the heater 9 is attained. The vibrating diaphragm 7 can be made of rubber or silicon. As illustrated in FIG. 3, the connecting conductor A 5 and the connecting conductor B 6 form a connected outer circumference by an interior screw thread 602 and an exterior screw thread 604 respectively. The anode of the input conductive wire which is which is connected to the heater through the screw threads is connected with the rechargeable lithium battery 2 through the integrated circuit board 3. The cathode of the input conductive wire which is connected to the heater through two hollow cylindrical conductors 601, 603 is connected with the rechargeable lithium battery 2 through the integrated circuit board 3. Insulating material rings 605 are used between the cathodes 601, 603 and the anodes 602, 604. In the present embodiment, the insulating material rings 605 can be made of silicon or rubber, and can also be made of other insulating materials. When the connecting conductor B 6 and the connecting conductor A 5 are connected by means of hollow contacting copper cap screw threads or by means of locking grooves, attention has also to be paid to the insulation issue of the cathodes and the anodes and can be attained by existing prior arts.

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FIG. 4 is a structural view of the liquid blocking film 8, the second liquid storage chamber 10, the heater 9 and the liquid transmission mechanism 11. As illustrated in the figure, the heater 9 comprises an atomizing chamber disposed with a heating filament 901 and an outer heat insulation base 902. The base part and the side of the heat insulation base 902 are disposed with an ejecting hole 904 and overflow holes 903 respectively. The heating filament 901 can be made of platinum filament, nickel-chrome alloy or iron-chrome-aluminum alloy filament containing rare earth elements. It can also be made into a film-shaped or a ring-shaped body. The heat insulation base 902 can be made of ceramics and so on. The right side of the heater is disposed with the liquid transmission mechanism 11. The liquid transmission mechanism 11 is formed by a mounting frame 1101 and a liquid transmission means 1102. The mounting frame 1101 services a fixation function. The liquid transmission means 1102 is made of a multi-layer nickel foam mesh or other porous metal bodies. The liquid transmission means 1102 can also be made of stainless steel fiber mat, high molecular polymer foam or ceramic foam. The left side of the heater 9 is the second liquid storage chamber 10. The second liquid chamber 10 is constructed by filling multi-layer nickel foam mats into the base part and the periphery of the heat insulation base 902. One end of the liquid transmission mechanism 11 is connected with the second liquid storage chamber 10 by means of the liquid transmission means 1102, while the other end is in contact with the liquid storage chamber 12. The second liquid storage chamber 10 temporarily stores the medicated liquid and the liquid blocking film 8 prevents the medicated liquid in the second liquid storage chamber 10 from flowing out, thereby avoiding the medicated liquid to flow into the controller, thus affecting the circuit. The operating mechanism is as follows: Under the action of the airflow, liquid droplets are drawn into the other

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side of the heat insulation base 902 through the ejecting hole 904 on the heat insulation base 902. Under the action of the heating filament 901, the liquid is atomized momentarily and flows out of the heater 9 from the overflow holes 903. It then flows through the airflow passage gap between the soft mouthpiece and the liquid storage chamber 12 to the soft mouthpiece 13 and is finally being inhaled through the soft mouthpiece.13.

FIG. 5 is a structural view showing the airflow circulation in the mouthpiece part and the construction of the soft mouthpiece 13. As illustrated in the figure, the soft mouthpiece 13 is disposed on the outer end face of the actuator. Its soft silicon has a very good mouth feel and allows slight chewing. The interior side of the soft mouthpiece 13 is further disposed with a liquid blocking groove 15 made of soft silicon to prevent liquid from being drawn into the mouth. The exterior side 1301 of the soft mouthpiece 13 extends to the base part of the liquid blocking film 8. It can be made of environmentally friendly material such as polypropylene and effectively prevents the release of internal heat. The soft mouthpiece 13 is further disposed with a liquid blocking cover 17 made of soft silicon to prevent liquid from being drawn into the mouth. The liquid blocking groove 15 is in contact with one end of the liquid storage chamber 12. The liquid storage chamber 12 is a tubular body with an opening on one end. It is first disposed with medicinal cotton fibers and then filled with raw medicated liquid. By means of capillary action of the liquid transmission mechanism 11, the medicated liquid in the liquid storage chamber 12 is induced into the second liquid storage chamber 10. As illustrated in the figure, the atomized medicated liquid flowing out from the overflow holes 903 flows through the airflow passage gap between the soft mouthpiece and the liquid storage chamber 12 to the

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liquid blocking groove 15, and then flows to the liquid blocking cover 17, and is finally being inhaled into the mouth of a smoker.

The integrated circuit board 3 comprises the control circuit of the entire system. The electronic time delay function, the electronic clearance reset function are attained by software programs. It also comprises a heater driving circuit and a control means IC1. FIG. 6 is a schematic circuit diagram of the integrated circuit board 3. As illustrated in the figure, the integrated circuit board 3 is controlled by the control means IC1. The control means IC1 is a core intelligent control unit and is mainly responsible for receiving and differentiating input signals, controlling the signal indicating light and the heater 9. The entire device uses a 3.7V lithium battery to supply electricity. VCC represents connecting to the cathode of the battery and GND represents connecting to the anode of the battery. In the figure, the two terminals S, K are connected with the cathode and the anode of the electret microphone. The control signal provided by the electret microphone can be regarded as on/off signal provided by an on/off switch S1. The control means IC1 detects the battery voltage at 10-second intervals. It first determines if the voltage of the power source is higher than 3.3V. If yes, after the signal sent out by the electret microphone is being analyzed, the signal which conforms with specification is converted to an on/off signal. The control signal is output to the heater driving circuit. The transistor amplifies the output signal of the control means IC1. The heating filament is connected with the power supply to generate heat and the heater operates and momentarily heats the liquid alkaloid nicotine. Simultaneously it outputs signals causing the LED emit red or orange light, resembling the lighted tip of a cigarette. It can also output time delay signals to cause the LED light to gradually glow or dim, thereby making the simulated cigarette tip even more similar to a real cigarette. If the

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battery voltage is lower than 3.3V, the electret microphone is turned off. The heater 9 does not operate. When the entire device is not active, the control means IC1 enters a sleeping mode and the power consumption of the entire device is less than 15uA. The standby time of the entire device extended, as far as possible, to two and half years' theoretical standby time. When a user continuously uses the present device for 15 times in one minute, the control means IC1 will send out a signal to cut off the output of the heating circuit and simultaneously output a signal to the LED indicating light so that it flashes for 10 seconds. When S1 is continuously connected for more than 6 seconds, the heating circuit is cut off automatically and a signal is simultaneously sent to the LED and so on. The control means IC1 can further be installed with other programmers to attain even more functions and to provide convenience for revisions and improvements of subsequent inventions. The present invention can also be connected with an LCD monitor at a signal output terminal to display more information. The present invention uses the control means IC1 to control the operating processes to ensure the reliability in the operation of an electronic cigarette and to ensure better smoking feeling. The control means IC1 can be attained by applying prior arts, for example, the existing microcontrollers can be selected as the control means IC1. Provided that the basic functions above can be attained, there is no restriction in detail on the selection of the microcontroller. The inhaled "smoke" of the present invention is in fact the "water vapor" of the atomized medicated liquid which does not contain tar, carbon monoxide, benzopyrene, polynuclear aromatic hydrocarbons (PAHs), nitrosamine, AZO compounds and so on which are strong carcinogens. The "water vapor" is liquefied rapidly in the air and does not pollute the environment. The heating part is heated momentarily under low voltage and low current and there is no combustion and

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therefore no hidden fire hazard. The outer casing is made of a special type of stainless steel which can effectively shield electromagnetic waves. To further describe in detail, the first pin of the control means IC1 is connected with one end of a capacitor C1, one end of a resistor R7, one end of a resistor R1 and a collector electrode of a transistor Q1 respectively, the other end of the resistor R7 is connected with a VCC (virtual channel connection) terminal, the emitting electrode of the transistor Q1 is connected with one end of a resistor R5 and the fourth pin of the control means IC1 respectively, the other end of the resistor R1 is connected with the base electrode of the transistor Q1 and one end of a resistor R2 respectively, the other end of the resistor R2 is connected with a K terminal and one end of a resistor R4 respectively, the other end of the resistor R4 is connected with the other end of the resistor R5, a GND (ground) terminal and a heater- terminal, the second pin of the control means IC1 is connected with one end of a resistor R3, the other end of the resistor R3 is connector with a K terminal, the third pin of the control means IC1 is connected with a heater+ terminal and one end of a resistor R6 respectively, the other end of the resistor R6 is connected with a GND (ground) terminal, the fifth pin of the control means IC1 is connected with the cathode of an LED (light emitting diode) light D1 through an LE (light emitter) terminal, the anode of the LED light D1 is connected with one end of a resistor R8, the other end of the resistor R8 is connected with a GND terminal, the sixth pin of the control means IC1 is connected with the gate electrode of the MOS FET (metal-oxide-semiconductor field-effect transistor) Q2, the source electrode of the MOS FET Q2 is connected with a heater+ terminal, a drain electrode is connected with a power source VCC, the seventh pin of the control means IC1 is connected with an S terminal, the eighth pin of the control means IC1 is connected with the other end of the capacitor C1 and a GND terminal

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respectively, the heater- terminal is connected with the anode of the heater, the heater+ terminals are connected with the cathode of the heater, an on/off switch S1 is connected between the K terminal and the S terminal.

The world's smallest 8-bit microcontroller PIC12C5xx series, manufactured by Microchip, can be selected for the control means IC1.

The present invention operates as follows: after the controller and the actuator are connected by means of the connecting conductors A, B, an environmental friendly, non-combustible, atomizing electronic cigarette is assembled. When a smoker inhales, airflow enters the actuator through the air intake holes on the side of the connecting conductor A 5, through the vibrating diaphragm, the liquid blocking film, the heater, and is finally inhaled from the mouthpiece. A passage hole is disposed on the connecting conductors of the controller and the actuator. When a smoker inhales, the airflow inside the controller flows towards the actuator, thereby activating the control circuit. The side of the indicating light cover on the other side of the controller, is also disposed with ventilating air holes, so part of the battery cavity is in communication with the atmospheric pressure. As such, under the action of the air vibration on the side of the controller, the electret microphone sends out a low frequency signal. IC1 analyzes the vibrating properties, sends out an on/off signal, thereby connecting the electric current. At this time, the indicating light slowly glows under the control of IC1, and simultaneously current flows through the connecting conductors, causing the heater to operate. Due to the airflow action in the heating chamber, the medicated liquid is injected into the atomizing chamber in the form of microscopic droplets. The medicated liquid is momentarily atomized by the action of the heater. After atomization, droplets of large diameter adhere to the wall and are reabsorbed by the liquid transmission mechanism through the overflow holes under

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an eddy action, while droplets of small diameter are suspended and floated in the airflow forming water vapor which is inhaled through the atomized steam passage and mouthpiece.

The abovementioned illustration is merely the preferred embodiment of the present invention and the scope of protection of the present invention is not limited thereto. Within the scope of the disclosure of the present invention, other variations may easily be effected by persons skilled in the art and should be covered by the scope of protection of the present invention.

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CLAIMS

1. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute, comprising a controller and an actuator which are removably connected, wherein the interior of the controller is disposed with, from left to right, an indicating light cover (14), a signal indicating light (1), a rechargeable lithium battery (2), an integrated circuit board (3), an electret microphone (4) and a hollow connecting conductor B (6); the interior of the actuator is disposed with, from left to right, a hollow connecting conductor A (5), a vibrating diaphragm (7), a liquid blocking film (8), a second liquid storage chamber (10), a heater (9), a liquid transmission mechanism (11), a liquid storage chamber (12) and a soft mouthpiece (13); the connecting conductor A (5) is disposed with air intake holes (702); a gap is left between the soft mouthpiece (13) and the liquid storage chamber (12) as an airflow passage; a space is left between the electret microphone (4) and the connecting conductor B (6) to allow operation of the electret microphone (4).

2. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 1, wherein the connecting conductor B (6) and the connecting conductor A (5) are respectively disposed with coupling screw threads or locking grooves.

3. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 2, wherein the connecting conductor B (6) and the connecting conductor A (5) are connected by means of hollow contacting copper cap screw threads or by means of locking grooves.

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4. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 1 or 2 or 3, wherein the outer surfaces of both the controller and the actuator are disposed with a stainless steel outer casing, the interior of the soft mouthpiece (13) is disposed with a liquid blocking groove (15), the outer end face of the soft mouthpiece (13) is disposed with a liquid blocking cover (17), the base end of the controller or the indicating light cover (14) is disposed with ventilating air holes (16).

5. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 4, wherein the interior of the stainless steel outer casing of the actuator is further disposed with an insulation layer.

6. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 1 or 2 or 3, wherein the integrated circuit board (3) comprises a control means IC1, the first pin of the control means IC1 is connected with one end of a capacitor C1, one end of a resistor R7, one end of a resistor R1 and a collector electrode of a transistor Q1 respectively, the other end of the resistor R7 is connected with a VCC (virtual channel connection) terminal, the emitting electrode of the transistor Q1 is connected with one end of a resistor R5 and the fourth pin of the control means IC1 respectively, the other end of the resistor R1 is connected with the base electrode of the transistor Q1 and one end of a resistor R2 respectively, the other end of the resistor R2 is connected with a K terminal and one end of a resistor R4 respectively, the other end of the resistor R4 is connected with the other end of the resistor R5, a GND (ground) terminal and a heater- terminal, the second pin of the control means IC1 is connected with one end of a resistor R3, the other end of the resistor R3 is connector with a K terminal, the

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third pin of the control means IC1 is connected with a heater+ terminal and one end of a resistor R6 respectively, the other end of the resistor R6 is connected with a GND (ground) terminal, the fifth pin of the control means IC1 is connected with the cathode of an LED (light emitting diode) light D1 through an LE (light emitter) terminal, the anode of the LED light D1 is connected with one end of a resistor R8, the other end of the resistor R8 is connected with a GND terminal, the sixth pin of the control means IC1 is connected with the gate electrode of the MOS FET (metal-oxide-semiconductor field-effect transistor) Q2, the source electrode of the MOS FET Q2 is connected with a heater+ terminal, a drain electrode is connected with a power source VCC, the seventh pin of the control means IC1 is connected with an S terminal, the eighth pin of the control means IC1 is connected with the other end of the capacitor C1 and a GND terminal respectively, the heater- terminal is connected with the anode of the heater, the heater+ terminals are connected with the cathode of the heater, an on/off switch S1 is connected between the K terminal and the S terminal.

7. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 4, wherein the integrated circuit board (3) comprises a control means IC1, the first pin of the control means IC1 is connected with one end of a capacitor C1, one end of a resistor R7, one end of a resistor R1 and a collector electrode of a transistor Q1 respectively, the other end of the resistor R7 is connected with a VCC (virtual channel connection) terminal, the emitting electrode of the transistor Q1 is connected with one end of a resistor R5 and the fourth pin of the control means IC1 respectively, the other end of the resistor R1 is connected with the base electrode of the transistor Q1 and one end of a resistor R2 respectively, the other end of the resistor R2 is connected with a K

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terminal and one end of a resistor R4 respectively, the other end of the resistor R4 is connected with the other end of the resistor R5, a GND (ground) terminal and a heater- terminal, the second pin of the control means IC1 is connected with one end of a resistor R3, the other end of the resistor R3 is connector with a K terminal, the third pin of the control means IC1 is connected with a heater+ terminal and one end of a resistor R6 respectively, the other end of the resistor R6 is connected with a GND (ground) terminal, the fifth pin of the control means IC1 is connected with the cathode of an LED (light emitting diode) light D1 through an LE (light emitter) terminal, the anode of the LED light D1 is connected with one end of a resistor R8, the other end of the resistor R8 is connected with a GND terminal, the sixth pin of the control means IC1 is connected with the gate electrode of the MOS FET (metal-oxide-semiconductor field-effect transistor) Q2, the source electrode of the MOS FET Q2 is connected with a heater+ terminal, a drain electrode is connected with a power source VCC, the seventh pin of the control means IC1 is connected with an S terminal, the eighth pin of the control means IC1 is connected with the other end of the capacitor C1 and a GND terminal respectively, the heater- terminal is connected with the anode of the heater, the heater+ terminals are connected with the cathode of the heater, an on/off switch S1 is connected between the K terminal and the S terminal.

8. An environmental friendly, non-combustible, atomizing electronic cigarette having the function of a cigarette substitute as in Claim 5, wherein the integrated circuit board (3) comprises a control means IC1, the first pin of the control means IC1 is connected with one end of a capacitor C1, one end of a resistor R7, one end of a resistor R1 and a collector electrode of a transistor Q1 respectively, the other end of the resistor R7 is connected with a VCC (virtual channel connection)

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terminal, the emitting electrode of the transistor Q1 is connected with one end of a resistor R5 and the fourth pin of the control means IC1 respectively, the other end of the resistor R1 is connected with the base electrode of the transistor Q1 and one end of a resistor R2 respectively, the other end of the resistor R2 is connected with a K terminal and one end of a resistor R4 respectively, the other end of the resistor R4 is connected with the other end of the resistor R5, a GND (ground) terminal and a heater- terminal, the second pin of the control means IC1 is connected with one end of a resistor R3, the other end of the resistor R3 is connector with a K terminal, the third pin of the control means IC1 is connected with a heater+ terminal and one end of a resistor R6 respectively, the other end of the resistor R6 is connected with a GND (ground) terminal, the fifth pin of the control means IC1 is connected with the cathode of an LED (light emitting diode) light D1 through an LE (light emitter) terminal, the anode of the LED light D1 is connected with one end of a resistor R8, the other end of the resistor R8 is connected with a GND terminal, the sixth pin of the control means IC1 is connected with the gate electrode of the MOS FET (metal-oxide-semiconductor field-effect transistor) Q2, the source electrode of the MOS FET Q2 is connected with a heater+ terminal, a drain electrode is connected with a power source VCC, the seventh pin of the control means IC1 is connected with an S terminal, the eighth pin of the control means IC1 is connected with the other end of the capacitor C1 and a GND terminal respectively, the heater- terminal is connected with the anode of the heater, the heater+ terminals are connected with the cathode of the heater, an on/off switch S1 is connected between the K terminal and the S terminal.

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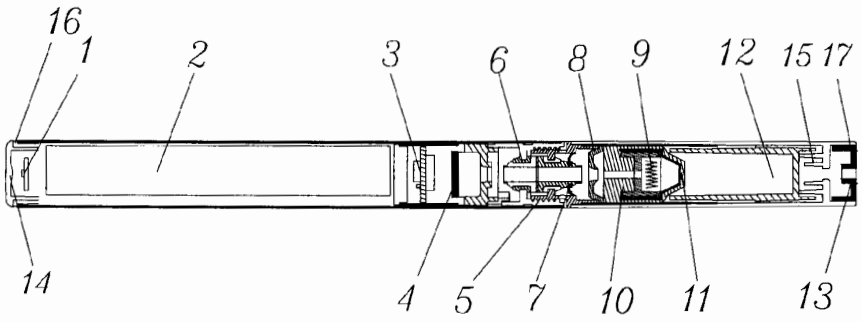


FIG. 1

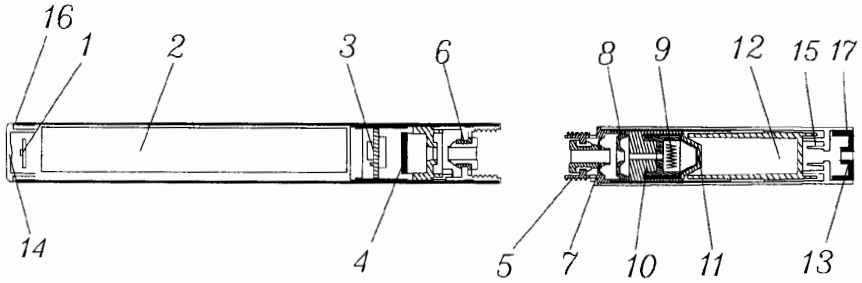


FIG. 2

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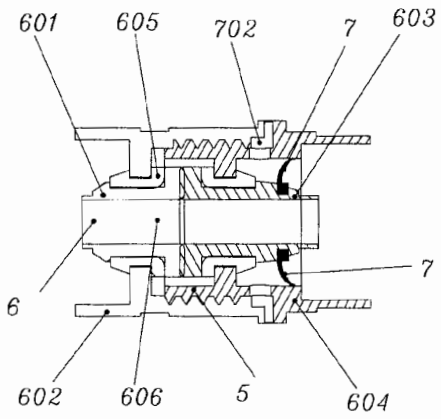


FIG. 3

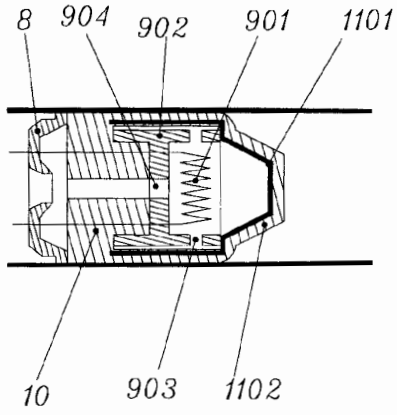


FIG. 4

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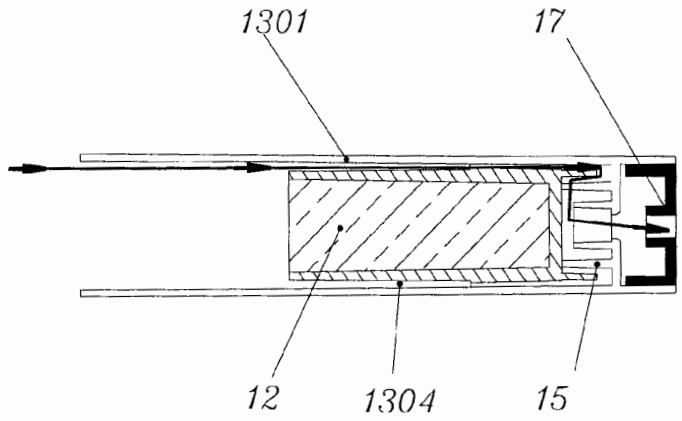


FIG. 5

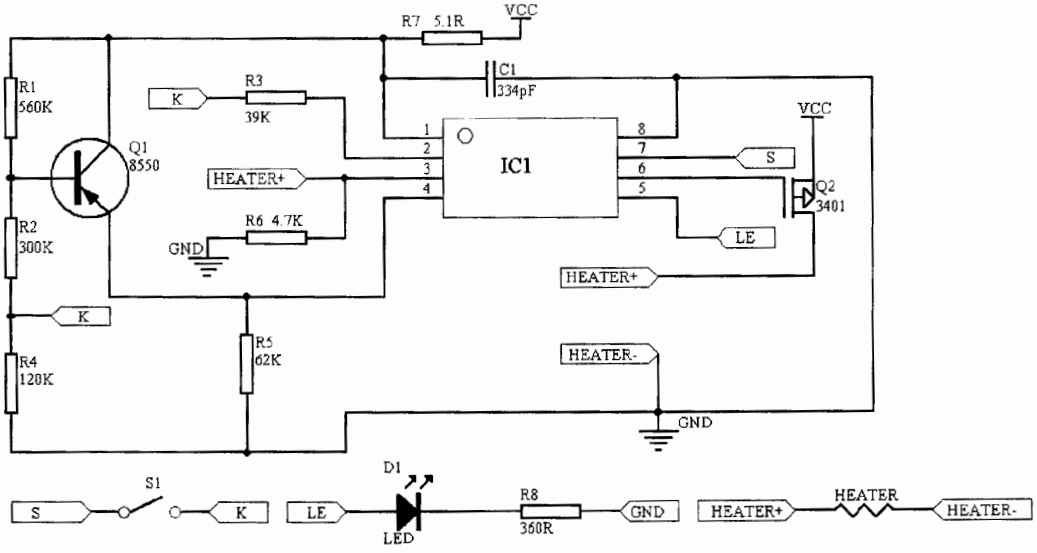
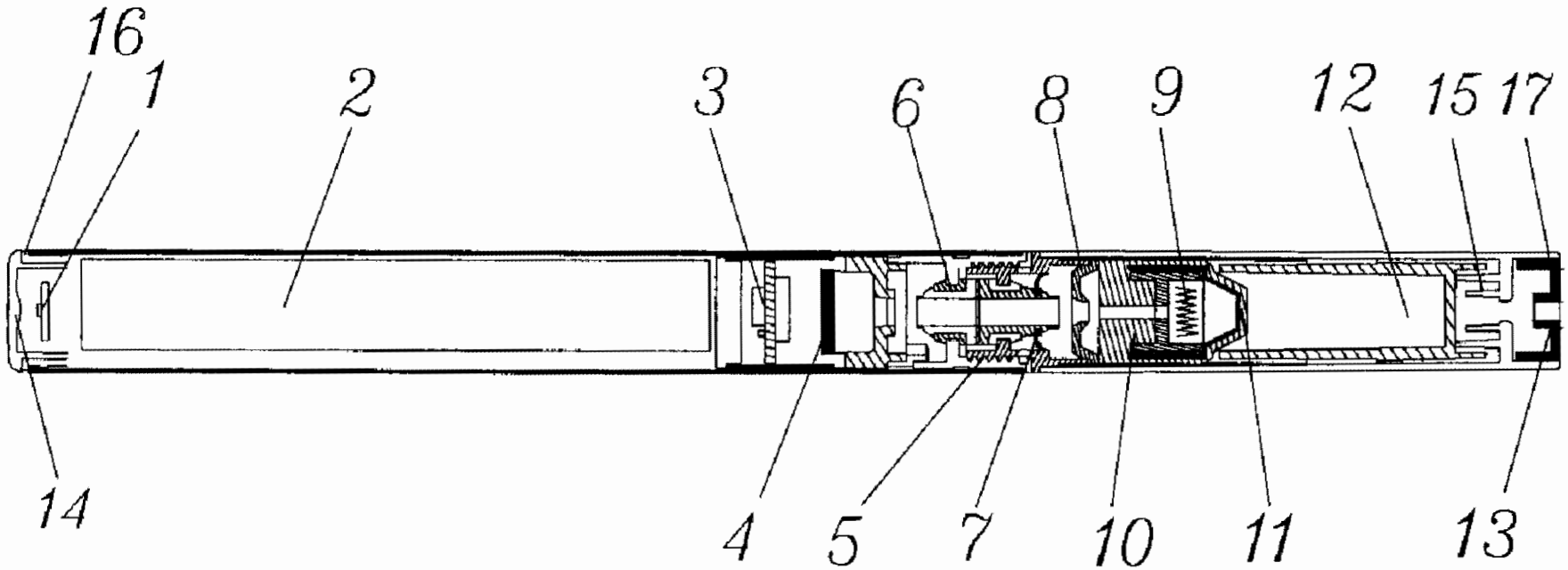


FIG. 6

NJOY Exhibit 1002.414



NJOY Exhibit 1002.415

Espacenet

Bibliographic data: CN101869356 (A) — 2010-10-27

Simulation electronic cigarette and cigarette case thereof

Inventor(s): ZHEQI LIU ± (LIU ZHEQI)

Applicant(s): ZHEQI LIU ± (LIU ZHEQI)

Classification: - international: *A24F47/00*
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Application number: CN200910106841 20090423

Priority number(s): CN200910106841 20090423

Abstract of CN101869356 (A)

The invention provides a simulation electronic cigarette and a cigarette case thereof. The simulation electronic cigarette comprises a cigarette holder, a liquid bearer, an atomizer and a cigarette stem, wherein the atomizer comprises an atomizer casing, a high-temperature insulating body, an atomizing head, a porous permeating part, an electric heating wire and an adsorption body, wherein the atomizer casing is provided with a cavity and is arranged in a casing of the cigarette holder; the high-temperature resistant insulating body is arranged in the atomizer casing and is internally provided with an atomizing cavity; the atomizing head is connected to an outer circumferential surface of the high-temperature insulating body; the electric heating wire is accommodated in the atomizing cavity and is electrically connected to a battery and a control circuit in a cigarette stem tube; the adsorption body is accommodated in the atomizing cavity, is wound on the electric heating wire and is connected with the porous permeating part; and the atomizer casing, the high-temperature insulating body, the atomizing head and the cigarette stem tube are respectively provided with ventilating open pores forming a gas path with a smoke outlet. Therefore, the invention improves the service efficiency of atomizing liquid, prevents the leakage, and simplifies the work control and a charging mode of a charging battery.

NJOY Exhibit 1002.416

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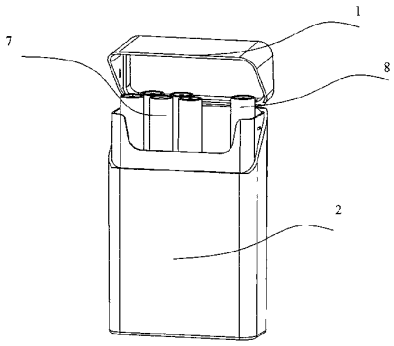
权利要求书 2 页 说明书 8 页 附图 5 页

(54)发明名称

仿真电子烟及其烟盒

(57)摘要

本发明提供了一种仿真电子烟及其烟盒，仿真电子烟包括：烟嘴、液体承载器、雾化器以及烟杆，雾化器包括：雾化器套管，具有中空腔体且设置于烟嘴的壳体中；耐高温绝缘体，设置于雾化器套管内且内设置有雾化腔；雾化头，连接于所述耐高温绝缘体的外周面上，与液体承载器相连接并导流液体；多孔渗透件，设置于雾化头以及所述耐高温绝缘体的外周面上；电热丝，容置于雾化腔内，电连接于烟杆管内的电池及控制电路；以及吸附体，容置于所述雾化腔内，缠绕于电热丝上且与多孔渗透件连接；雾化器套管、耐高温绝缘体、雾化头及烟杆管均设置有与出烟孔形成气体通路的通气开孔。由此，提高了雾化液使用效率并防止泄露、简化工作控制及充电电池的充电方式。



CN 101869356 A

NJOY Exhibit 1002.417

1. 一种仿真电子烟，其包括：

烟嘴，包括壳体并设有出烟孔；

液体承载器，设置于所述烟嘴内并承载有液体，且所述液体承载器与所述出烟孔气体连通；

雾化器，可拆装地连接于所述液体承载器；以及

烟杆，包括可拆卸地连接于所述雾化器上的烟杆管以及设置在所述烟杆管内的充电电池及控制电路；

其特征在于，所述雾化器包括：

雾化器套管，具有中空腔体且设置于所述烟嘴的壳体中；

耐高温绝缘体，设置于所述雾化器套管内且内设置有雾化腔；

雾化头，连接于所述耐高温绝缘体的外周面上，并与所述液体承载器相连接并导流所述液体；

多孔渗透件，设置于所述雾化头以及所述耐高温绝缘体的外周面上；

电热丝，容置于所述雾化腔内，且电连接于所述充电电池和所述控制电路；以及

吸附体，容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接；

其中，所述雾化器套管、所述耐高温绝缘体、所述雾化头以及所述烟杆管均设置有与所述出烟孔形成气体通路的通气开孔。

2. 如权利要求 1 所述的仿真电子烟，其特征在于，所述烟杆设置有与外界空气连通并与所述雾化器套管的通气开孔连通的开孔，所述控制电路包括有可选择地与所述充电电池电连通的气压电子开关。

3. 如权利要求 1 所述的仿真电子烟，其特征在于，所述的雾化头形成有可刺穿所述液体承载器以使所述多孔渗透件与所述液体形成液体连通的突出部。

4. 如权利要求 1 所述的仿真电子烟，其特征在于，所述仿真电子烟还包括有设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述充电电池电连接的灯。

5. 如权利要求 2 所述的仿真电子烟，其特征在于，所述烟杆还包括与所述控制电路以及所述充电电池的正负极分别电连接的正极顶杆以及负极顶杆，所述正极顶杆以及负极顶杆在所述仿真电子烟工作时电连接于所述加热丝的正负极而在所述仿真电子烟充电时与外部电源的正负极电连接。

6. 如权利要求 2 所述的仿真电子烟，其特征在于，所述仿真电子烟还包括设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述电池电连接的充电指示灯。

7. 如权利要求 5 所述的仿真电子烟，其特征在于，所述雾化器还包括与所述电热丝以及所述电池和控制电路形成电连接的且固定于所述雾化器套管内的正极弹簧和负极弹簧。

8. 如权利要求 1 所述的仿真电子烟，其特征在于，所述多孔渗透件为镍网，所述吸附体为玻纤绳。

9. 如权利要求 1 所述的仿真电子烟，其特征在于，所述烟杆还包括有与所述充电电池电连接的且在吸烟时与所述电热丝电连接的插头或 USB 插口。

10. 一种仿真电子烟烟盒，其特征在于，包括：

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外壳体，包括烟盒盖和烟盒本体，烟盒盖和烟盒本体形成外壳体容置腔，且烟盒盖和烟盒本体在后表面上连成一体而在前表面以及侧向两侧上分开，烟盒本体前表面外侧设置有与烟盒盖的下边沿相配合的配合部；

内壳体，容置在外壳体的烟盒本体内；

烟弹容置部，设置在内壳体的上部；

电子烟充电容置部，设置在内壳体的上部，容置权利要求 1-8 所述的仿真电子烟；

以及电子烟充电部，设置在内壳体中，且包括彼此电连接的充电控制电路、与电子烟电连接的充电接口、以及与外界电源连接的接口；

其中，烟盒本体前表面的上部内侧或内壳体的上部设置有凹形边，所述凹形边的底边高于配合部的上边沿，烟弹容置部的顶部平齐于或低于所述凹形边的底边，烟充电容置部的顶部平齐于或低于所述凹形边的底边。

11. 如权利要求 10 所述的仿真电子烟烟盒，其特征在于，所述烟弹容置部沿着内壳体的长度方向设置成一排或两排，烟充电容置部沿着内壳体的长度方向与所述烟弹容置部对齐。

12. 如权利要求 11 所述的仿真电子烟烟盒，其特征在于，所述仿真电子烟可拆卸式，所述仿真电子烟烟盒还包括设置在所述内壳体上部的将不带有充电电池的电子烟部分进行容置的烟嘴容置部，所述烟嘴容置部设置成：该烟嘴容置部的顶表面平齐于或低于所述凹形边的底边、所述烟嘴容置部沿着内壳体的长度方向与所述烟弹容置部对齐、且插入烟嘴容置部后的所述不带有充电电池的电子烟部分的顶部与插置的烟弹的顶部平齐。

13. 如权利要求 12 所述的仿真电子烟烟盒，其特征在于，所述充电接口设置成：电子烟的充电部分通过所述电子烟充电容置部插入到所述充电接口之后，使得插置后的所述电子烟的充电部分的顶部与插置后的烟弹的顶部平齐。

14. 如权利要求 13 所述的仿真电子烟烟盒，其特征在于，所述充电接口为螺接或插接接口。

15. 如权利要求 11 所述的仿真电子烟烟盒，其特征在于，所述仿真电子烟烟盒还包括设置在所述内壳体上部的备用电子烟容置部，所述备用电子烟容置部设置成：该备用电子烟容置部的顶表面平齐于或低于所述凹形边的底边、所述备用电子烟容置部沿着内壳体的长度方向与所述烟弹容置部对齐、且该备用电子烟插入备用电子烟容置部后的该备用电子烟的顶部与插置后的烟弹的顶部平齐。

16. 如权利要求 10 所述的仿真电子烟烟盒，其特征在于，所述电子烟充电部与外界电源连接的接口为设置在内壳体下部的可露出到烟盒本体外的 USB 插口或插头。

17. 如权利要求 16 所述的仿真电子烟烟盒，其特征在于，所述 USB 插口或插头设置内壳体的下部且连接有导出装置，且在内壳体及烟盒本体的底部向下或向侧面设置有供所述 USB 插口或插头移动并从外壳体中露出的槽孔。

18. 如权利要求 10 所述的仿真电子烟烟盒，其特征在于，所述电子烟充电部还包括设置在内壳体的外表面上的充电指示灯，且在所述烟盒本体上的相应位置上设置有通孔。

19. 如权利要求 10 所述的仿真电子烟烟盒，其特征在于，所述烟盒本体在所述电子烟充电部的与外界电源连接的接口部位处设置有撕掉以露出所述接口部位的易撕毁部。

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仿真电子烟及其烟盒

技术领域

[0001] 本发明涉及一种仿真电子烟及其烟盒，特别涉及一种提高雾化液的使用效率并有效地防止泄露的仿真电子烟及其具有充电功能的仿真电子烟烟盒。

背景技术

[0002] 吸烟有害健康是一种公知常识，吸烟每年造成数百万人的死亡，并引发多种疾病，戒烟是一种全球化的趋势，各国政府都在积极倡导戒烟，但让吸烟者戒烟是一种非常困难的事情，且烟民的数量在全球呈增长的趋势，首次吸烟烟民的年龄越来越小。另外，随着烟民数量的增加，全球每年需要的烟叶量也在增长，需要使用大量的耕地来种植烟叶，满足烟厂生产卷烟的需求，虽然烟草行业能够为政府带来巨额的税收，但对全民健康会造成巨大的隐患，特别是对于非烟民来说，二手烟造成的危害更大。

[0003] 为了避免吸烟造成的危害，世界各国的研究人员都在努力寻找香烟的替代品，首先制造出了低烟碱含量和低焦油含量的卷烟，但低烟碱含量和低焦油含量的卷烟对于吸烟者来说，口感淡没有味道，烟民不喜欢；其次，研究人员研发了很多卷烟的替代品，如戒烟贴、烟碱口香糖、烟碱饮料等，这些产品虽然不包含焦油，又具有烟的口感，但这些产品改变了吸烟者的习惯，也解决不了烟瘾上来时烟民过瘾的问题，因此，不能够被称为真正的香烟替代品；第三，研究人员推出了电子烟产品，依靠其设计的电路，瞬间将放置于烟嘴中的液体雾化，产生烟雾，而烟嘴中液体的配方可以按照需求和口感的要求进行配制，能够解决烟民的需求。目前电子烟产品存在的主要问题是：1、产品结构复杂，如 CN201197839Y 和 CN201079011Y 的结构；2、采用电池充电或电网的 220v 交流电来进行充电，电池的更换会给使用者带来不便，交流电属于强电，对于电子烟的限压、稳压要求高，并可能造成短路，使电子烟产品不能使用；3、液体的雾化采用的是喷射雾化和超声波雾化，这种雾化方式对烟嘴中液体的流出不易控制，会产生漏液的问题，例如 CN201197839Y 和 CN201079011Y 就可能存在着这个问题；4、在现有的电子烟产品中，采用的是气动膜指南针式点火开关，该开关结构复杂，采用金属片进行接触，使用一段时间后会造成接触效果不好，影响使用。

[0004] 尽管上述现有技术提供了电子烟的结构，但是电子烟缺乏与之配套的烟盒，目前使用的烟盒体积较大，携带和使用不便，制约了电子烟市场的发展。尽管 CN201094280Y 在电子香烟盒方面给出的研究，提出了采用各种内置电池对电子烟进行充电，烟盒的作用仅仅是充电，另外，采用了内置电池，使得烟盒的结构复杂，制造成本增加，该烟盒给电子烟的充电时需要将整支电子烟放入烟盒的特定位置，导致烟盒的外形难与传统烟盒接近。此外，打开烟盒之后，其看到的内部布局与普通香烟完全不同，这样就对消费者的吸引力降低。

发明内容

[0005] 鉴于现有技术存在的上述缺陷，本发明的目的在于提供一种仿真电子烟，其可提高雾化液的使用效率并有效地防止泄露。

[0006] 本发明的另一个目的在于提供一种仿真电子烟，其使得电子烟的使用更简捷，易

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于控制，效果更佳。

[0007] 本发明还有的目的在于提供一种仿真电子烟，其改变电子烟的充电模式，以可使用弱电进行充电，从而提高安全可靠性。

[0008] 本发明的目的在于提供一种仿真电子烟烟盒，该烟盒可以达到与传统烟盒逼真的程度。

[0009] 本发明的另一个目的在于，提供一种仿真电子烟烟盒，其无需内部设置电池，而可直接利用外部电源进行充电。

[0010] 本发明的再一个目的在于，提供一种仿真电子烟烟盒，其在对一支仿真电子烟充电的同时，消费者可使用另一支配备的仿真电子烟吸烟。

[0011] 为了实现本发明的上述目的，本发明提供了一种仿真电子烟，其包括：烟嘴，包括壳体并设有出烟孔；液体承载器，设置于所述烟嘴内并承载有液体，且所述液体承载器与所述出烟孔气体连通；雾化器，可拆装地连接于所述液体承载器；以及烟杆，包括可拆卸地连接于所述雾化器上的烟杆管以及设置在所述烟杆管内的充电电池及控制电路。其中，所述雾化器包括：雾化器套管，具有中空腔体且设置于所述烟嘴的壳体中；耐高温绝缘体，设置于所述雾化器套管内且内设置有雾化腔；雾化头，连接于所述耐高温绝缘体的外周面上，并与所述液体承载器相连接并导流所述液体；多孔渗透件，设置于所述雾化头以及所述耐高温绝缘体的外周面上；电热丝，容置于所述雾化腔内，且电连接于所述充电电池和所述控制电路；以及吸附体，容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接。其中，所述雾化器套管、所述耐高温绝缘体、所述雾化头以及所述烟杆管均设置有与所述出烟孔形成气体通路的通气开孔。

[0012] 针对发明的上述目的，优选地，所述烟杆设置有与外界空气连通并与所述雾化器套管的通气开孔连通的开孔，所述控制电路包括有可选择地与所述充电电池电连通的气压电子开关。

[0013] 针对发明的上述目的，优选地，所述烟杆还包括与所述控制电路以及所述充电电池的正负极分别电连接的正极顶杆以及负极顶杆，所述正极顶杆以及负极顶杆在所述仿真电子烟工作时电连接于所述加热丝的正负极而在所述仿真电子烟充电时与外部电源的正负极电连接。

[0014] 在本发明的仿真电子烟中，优选地，所述的雾化头形成有可刺穿所述液体承载器以使所述多孔渗透件与所述液体形成液体连通的突出部。

[0015] 在本发明的仿真电子烟中，优选地，所述仿真电子烟还包括有设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述充电电池电连接的灯。

[0016] 在本发明的仿真电子烟中，优选地，所述仿真电子烟还包括设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述充电电池电连接的充电指示灯。

[0017] 在本发明的仿真电子烟中，优选地，所述雾化器还包括与所述电热丝以及所述充电电池和控制电路形成电连接的且固定于所述雾化器套管内的正极弹簧和负极弹簧。

[0018] 在本发明的仿真电子烟中，优选地，所述多孔渗透件为镍网，所述吸附体为玻纤绳。

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[0019] 在本发明的仿真电子烟中，优选地，所述烟杆还包括有与所述充电电池电连接的且在吸烟时与所述电热丝电连接的插头或USB插口。

[0020] 基于本发明的仿真电子烟，提高了雾化液的使用效率并有效地防止泄露；电子烟的使用更简捷，易于控制，效果更佳；改变电子烟的充电模式，以可使用弱电进行充电，从而提高安全可靠性。

[0021] 此外，使用本发明的产品具有逼真的仿真效果，该烟既对吸烟者无害，又具有吸烟时吞云吐雾的效果，由于液体是按照需要配制的，对人体和环境无害，该烟无需点燃，安全性很高，能够为消费者所接受。另外，该产品的推广使用，会减少社会对烟叶的需求，能够保护耕地。

[0022] 针对本发明的另一个方面，本发明提供了一种仿真电子烟烟盒，包括：外壳体，包括烟盒盖和烟盒本体，烟盒盖和烟盒本体形成外壳体容置腔，且烟盒盖和烟盒本体在后表面上连成一体而在前表面以及侧向两侧上分开，烟盒本体前表面外侧设置有与烟盒盖的下边沿相配合的配合部；内壳体，容置在外壳体的烟盒本体内；烟弹容置部，设置在内壳体的上部，容置仿真电子烟；电子烟充电容置部，设置在内壳体的上部；以及电子烟充电部，设置在内壳体中，且包括彼此电连接的充电控制电路、与电子烟电连接的充电接口、以及与外界电源连接的接口；其中，烟盒本体前表面的上部内侧或内壳体的上部设置有凹形边，所述凹形边的底边高于配合部的上边沿，烟弹容置部的顶部平齐于或低于所述凹形边的底边，烟充电容置部的顶部平齐于或低于所述凹形边的底边。

[0023] 在所述仿真电子烟烟盒中，优选地，所述烟弹容置部沿着内壳体的长度方向设置成一排或两排，烟充电容置部沿着内壳体的长度方向与所述烟弹容置部对齐。

[0024] 在所述仿真电子烟烟盒中，优选地，所述电子烟可拆卸式，所述仿真电子烟烟盒还包括设置在所述内壳体上部的将不带有充电电池的电子烟部分进行容置的烟嘴容置部，所述烟嘴容置部设置成：该烟嘴容置部的顶表面平齐于或低于所述凹形边的底边、所述烟嘴容置部沿着内壳体的长度方向与所述烟弹容置部对齐、且插入烟嘴容置部后的所述不带有充电电池的电子烟部分的顶部与插置的烟弹的顶部平齐。

[0025] 在所述仿真电子烟烟盒中，优选地，所述充电接口设置成：电子烟的充电部分通过所述电子烟充电容置部插入到所述充电接口之后，使得插置后的所述电子烟的充电部分的顶部与插置后的烟弹的顶部平齐。

[0026] 在所述仿真电子烟烟盒中，优选地，所述充电接口为螺接或插接接口。

[0027] 在所述仿真电子烟烟盒中，优选地，所述仿真电子烟烟盒还包括设置在所述内壳体上部的备用电子烟容置部，所述备用电子烟容置部设置成：该备用电子烟容置部的顶表面平齐于或低于所述凹形边的底边、所述备用电子烟容置部沿着内壳体的长度方向与所述烟弹容置部对齐、且该备用电子烟插入备用电子烟容置部后的该备用电子烟的顶部与插置后的烟弹的顶部平齐。

[0028] 在所述仿真电子烟烟盒中，优选地，所述电子烟充电部与外界电源连接的接口为设置在内壳体下部的可露出到烟盒本体外的USB插口或插头。

[0029] 在所述仿真电子烟烟盒中，优选地，所述USB插口或插头设置内壳体的下部且连接有导出装置，且在内壳体及烟盒本体的底部向下或向侧面设置有供所述USB插口或插头移动并从外壳体中露出的槽孔。

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[0030] 在所述仿真电子烟烟盒中，优选地，所述电子烟充电部还包括设置在内壳体的外表面上的充电指示灯，且在所述烟盒本体上的相应位置上设置有通孔。

[0031] 在所述仿真电子烟烟盒中，优选地，所述烟盒本体在所述电子烟充电部的与外界电源连接的接口部位处设置有撕掉以露出所述接口部位的易撕毁部。

[0032] 基于本发明的仿真电子烟烟盒，其烟盒可以达到逼真普通香烟的程度；此外本发明的仿真电子烟烟盒无需内部设置电池，而可直接利用外部电源进行充电。再有本发明的仿真电子烟烟盒，其在对一支仿真电子烟充电的同时，消费者可同时利用另一支配用仿真电子烟吸烟，从而提高了消费者的使用便利性。

附图说明

[0033] 图 1 为依据本发明的仿真电子烟的整体结构图；

[0034] 图 2 为依据本发明的仿真电子烟的烟嘴和液体承载器的结构示意图；

[0035] 图 3 是依据本发明一实施方式的雾化器的构件的分解图；

[0036] 图 4 是依据本发明一实施方式的烟杆的构件的分解图；

[0037] 图 5 是依据本发明的仿真电子烟的灯帽的结构示意图。

[0038] 图 6 为依据本发明的仿真电子烟烟盒的外壳体拆解后的结构示意图；

[0039] 图 7 是依据本发明的仿真电子烟烟盒的内壳体、烟弹容置部、电子烟充电容置部、电子烟上节容置部、备用电子烟容置部的结构示意图，其中透视地示出电子烟充电接口以及 USB 插口；

[0040] 图 8 是依据本发明的烟弹的结构示意图；

[0041] 图 9 是依据本发明的仿真电子烟烟盒的总装示意图。

具体实施方式

[0042] 下面参照附图来详细说明依据本发明的仿真电子烟及其烟盒。

[0043] 首先参照图 1 至图 5 来说明依据本发明的仿真电子烟。

[0044] 参照图 1 至图 5，依据本发明的仿真电子烟包括：烟嘴 10，包括壳体 101 并设有出烟孔 102；液体承载器 20，设置于烟嘴 10 的壳体 101 内并承载有液体（图未示出），且液体承载器 20 与出烟孔 102 气体连通；雾化器 30，可拆装地连接于液体承载器 20；以及烟杆 40，包括可拆卸地连接于所述雾化器 30 上的烟杆管 470 以及设置在所述烟杆管 470 内的电池 450 及控制电路 460。

[0045] 其中，烟雾化器 30 包括：雾化器套管 310，具有中空腔体且设置于烟嘴 10 的壳体 101 中；耐高温绝缘体 320，设置于雾化器套管 310 内且内设置有雾化腔；雾化头 330，连接于耐高温绝缘体 320 的外周面上，并与液体承载器 20 相连接，以导流液体；多孔渗透件（图未示出），设置于雾化头 330 以及耐高温绝缘体 320 的外周面上；电热丝（图未示出），容置于所述雾化腔内，且电连接于所述电池和所述控制电路；以及吸附体（图未示出），容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接。其中，雾化器套管 310、耐高温绝缘体 320、雾化头 330、以及所述烟杆管 470 均设置有与出烟孔 102 形成气体通路的通气开孔或开口（例如附图标记 3101、3301、3201 所示）。

[0046] 在上述实施方式中，则当雾化头 330 与液体承载器 20 相连接时，则液体承载器 20

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内的液体将被引导并保留在所述多孔渗透件上，而由于在所述雾化腔内设置有缠绕于所述电热丝上且与所述多孔渗透件 330 连接的吸附体，所述液体将通过渗流作用被吸附到所述吸附体上，以在电热丝加热时将所述液体雾化，从而形成烟雾。这样就可以避免直接对保留在所述多孔渗透件上的液体进行时导致的雾化量过大、液体承载器 20 中的液体使用时间短的缺陷。此外，由于吸附体和所述多孔渗透件之间的连接，通过它们二者之间的渗透所用，可以防止所述多孔渗透件上保留的液体通过雾化器套管 310 和烟嘴 10 的壳体 101 之间的间隙泄露出，从而进一步提高了液体承载器 20 的使用效率。

[0047] 在上述实施方式中，所述耐高温绝缘体 320 可以为陶瓷绝缘材料，以承受所述加热丝工作时所产生的高温。

[0048] 在上述实施方式中，所述多孔渗透件可以为镍网，所述吸附体可以为玻纤绳。

[0049] 在上述实施方式中，液体承载器所含的液体可包含各种符合要求的成分，以满足不同口感和各种治疗的需求，例如加入各种治疗口腔疾病和提神醒脑作用的中医成分。

[0050] 在上述实施方式中，雾化头 330 形成有突出部 3302，其可刺穿液体承载器 20 以使所述多孔渗透件与所述液体形成液体连通，如图 3 所示。此时液体承载器 20 可在相应部位设置有可被突出部 3302 穿破、以使液体流出的铝箔（图未示出）。

[0051] 在上述实施方式中，在雾化器套管 310、耐高温绝缘体 320 以及雾化头 330 设置的与出烟孔 102 形成气体通路的通气开孔或开口，由于其与外界空气连通，使得抽吸本发明的仿真电子烟时更容易，从而与抽吸普通香烟时的抽吸阻力大体相当。

[0052] 针对本发明的仿真电子烟，为了使电子烟的使用更简捷，易于控制，效果更佳，控制电路 460 还可设置有气压电子开关，其通过感测烟杆管内的气流变化来导通电池 450、控制电路 460 以及加热丝之间的电连通。此时烟杆 40 设置有与外界空气连通并与所述套管的通气开孔连通的开孔（图未示出）。在吸仿真电子烟时，通过这些开孔实现了将外部空气导入并引导至出烟孔 102，同时致动气压电子开关以启动雾化操作，所述空气与雾化产生的气体一起被从出烟孔 102 吸出。

[0053] 为了更进一步地逼近抽吸普通香烟时的视觉，所述仿真电子烟还可包括有设置于烟杆 40 端部的可拆装的透光灯帽 50，烟杆 40 内设置有与控制电路 460 以及电池 450 电连接的灯（未示出）。所述灯发出红光，以模拟普通香烟点燃的烟头部分。

[0054] 此外，为了实现将外部空气引入到烟杆管 470 中，灯帽 50 的周边缘可可设置有通气孔 501。

[0055] 在依据本发明的仿真电子烟中，电池 450 可以为充电电池。优选地，为了能无需将充电电池拆下而直接进行充电，烟杆 40 还包括与控制电路 460 以及充电电池的正负极分别电连接的正极顶杆 410 以及负极顶杆 420，正极顶杆 410 以及负极顶杆 420 在所述仿真电子烟工作时电连接于所述加热丝的正负极、而在所述仿真电子烟充电时与外部电源（图未示出）的正负极电连接。正极顶杆 410 以及负极顶杆 420 之间的绝缘可以采用各种方式，在一个实施方式中，如图 4 所示的形式，具体而言，正极顶杆 410 置于绝缘套管 430 的腔体内，而绝缘套管 430 置于负极顶杆 420 的腔体内，或者采用相反的顺序进行套装。此外，为了降低吸烟时的阻力，可使得安装在最里面的相应顶杆设置有通孔（例如附图标记 4401 所示），以与雾化头 330 的开口及出烟孔 102 气体连通。此时，控制电路中设置有相应的与吸烟操作匹配的工作电路以及与给充电电池进行充电相匹配的充电控制电路。

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[0056] 此外，可替代地，可以在电池上设置有一个与其相连接的插头或USB插口（图未示出），所述插头或USB插口可以与外部电源或电热丝实现电连接。

[0057] 此外，为了显示充电状态，还可在烟杆40的烟杆管470的端部设置可拆装的透光灯帽50，所述烟杆内40内设置与控制电路460以及电池450电连接的充电指示灯。此时，吸烟时的模拟点燃烟头的灯和充电时的充电指示灯可以为同一灯，或者为具有不同颜色的灯。当吸烟时的模拟点燃烟头的灯和充电时的充电指示灯为同一灯时，需要对控制电路进行改变，以实现吸烟和充电时不同电路之间的切换，这个属于本领域的公知常识，在此不再赘述。

[0058] 在依据本发明的仿真电子烟中，为了克服公知电子烟在电热丝电连接时由于采用硅胶所带来的老化问题，雾化器30还可包括与所述电热丝以及所述电池和控制电路形成电连接的且固定于雾化器套管310内的正极弹簧340和负极弹簧350，如图3所示。在此所述电连接可以通过正极弹簧340和负极弹簧350锡焊、钎焊、缠结等方式来实现。

[0059] 此外，在依据本发明的仿真电子烟中，雾化器30与烟杆40之间的结合方式可以为插接、螺接等。在一优选实施方式中，如图3和图4所示，可采用螺接方式，通过设置在雾化器套管310内的螺套360以及设置在烟杆管470中并置于烟杆管470一端的螺杆440来实现雾化器30与烟杆40之间的结合。当然，也可以反过来，螺套可以设置在烟杆中而螺杆设置在雾化器套管中。

[0060] 此外，当采用螺杆和螺套连接时，可在螺杆或螺套的边缘设置与外界空气连通的开口，以与雾化头330的开口及出烟孔102气体连通；或者如图4中所示，在螺杆440的本体凸缘上设置与外界空气连通的开口4401，以与安装在烟杆管470中的各相应部件设置的开口或孔形成气体连通。同时，安装在烟杆管470中的螺杆或螺套还可以与外部的充电器的相应部件连接，以实现普通插头式的电连接或USB式的电连接，从而在不同电压进行不同模式的充电。

[0061] 此外，为了增加雾化头的稳定性，还可设置有固定座370，如图3所示。此时前述设置在耐高温绝缘件320的雾化头310卡在固定座370的两个凸部3701上。同时固定座370中间设置有上下贯通孔3702，以与雾化头310的开孔3301气体连通。

[0062] 其次参照图1以及图6至图9来说明依据本发明的仿真电子烟。

[0063] 参照图1以及图6至图9，依据本发明的仿真电子烟烟盒包括：外壳体，包括烟盒盖1和烟盒本体2，烟盒盖1和烟盒本体2形成外壳体容置腔23，且烟盒盖1和烟盒本体2在后表面上连成一体而在前表面及侧向两侧上分开，烟盒本体2前表面的上部内侧设置有凹形边21，在烟盒本体2前表面外侧设置有与烟盒盖1的下边沿11相配合的配合部25，下边沿11与配合部25的上边沿251在烟盒关闭时形成密封，凹形边21的底边210高于配合部25的上边沿251；内壳体3，容置在外壳体的烟盒本体2内；烟弹容置部4，设置在内壳体3的上部，且烟弹容置部4的顶部平齐于或低于凹形边21的底边210；电子烟充电容置部5，设置在内壳体3的上部，且电子烟充电容置部5的顶部平齐于或低于凹形边21的底边210；以及电子烟充电部（图未示出），设置在内壳体3中，且包括彼此电连接的充电控制电路（图未示出）、与电子烟电连接的充电接口6、以及与外界电源连接的接口（图未示出）。此外，烟盒本体2前表面的上部内侧设置的凹形边21可替代地设置于内壳体3上，具体而言，内壳体3的上边31在前表面和两个侧面上延伸，以形成类似烟盒本体2前表面的上部

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内侧设置的凹形边，此时形成的凹形边的底边依然高于配合部 25 的上边沿 251。

[0064] 在依据本发明的仿真电子烟烟盒中，为了逼近普通香烟烟盒打开时的效果，优选地，烟弹容置部 4 沿着内壳体 3 的长度方向设置成一排或两排，以使电子烟的烟弹 7 插入到烟弹容置部 4 之后，就像普通香烟烟盒打开后看到每支烟的过滤嘴一样。

[0065] 在依据本发明的仿真电子烟烟盒中，为了逼近普通香烟烟盒打开时的效果，优选地，电子烟充电容置部 5 沿着内壳体 3 的长度方向与所述成排的烟弹容置部 4 对齐。此时，进一步优选地，充电接口 6 的位置为：在通过电子烟充电容置部 5 将电子烟 8 的下节 81（内含充电电池）插入到所述充电接口 6 之后，使得插置后的电子烟 8 的下节 81 的顶部与插置的烟弹 7 的顶部平齐或大致平齐。由此，将电子烟 8 的下节 81 插入到电子烟充电容置部 5 中之后，就像普通香烟烟盒打开后看到整齐排放的带滤嘴的烟一样。

[0066] 此外，为了防止随意放置电子烟上节 82 而造成的丢失且同时为了逼近普通香烟烟盒打开时的效果，在电子烟 8 的下节 81 插入到电子烟充电容置部 5，可将电子烟 8 的上节 82 插入到烟嘴容置部 12（或者可替代地，烟嘴容置部 12 直接等同于烟弹容置部 4），此时，烟嘴容置部 12 的设置成：烟嘴容置部 12 的顶表面平齐于或低于所述凹形边 21 的底边 210、烟嘴容置部 12 沿着内壳体 3 的长度方向与所述成排的烟弹容置部 4 对齐、且插入烟嘴容置部 12 后的电子烟 8 的上节 82 的顶部与插置的烟弹 7 的顶部平齐或大体平齐。可替代地，由于电子烟的充电接口的设置各部相同，如果电子烟为可拆卸的，可以将电子烟可拆卸部分中带有充电电池的部分装入即可；反之可将真个电子烟直接插入（例如充电接口位于电子烟的端头）。

[0067] 在依据本发明的仿真电子烟烟盒中，为了在避免仅存在一支电子烟时对消费者所造成的不便（即，这支电子烟充电而消费者需要抽吸电子烟，而照成不便），优选地，在内壳体 3 中还设置有备用电子烟容置部 9，可以将另一支电子烟插入，从而消费者可以同时便利地利用另一支电子烟。为了逼近普通香烟烟盒打开时的效果，备用电子烟容置部 9 的设置为：该备用电子烟容置部 9 的顶表面平齐于或低于所述凹形边 21 的底边 210、所述备用电子烟容置部 9 沿着内壳体 3 的长度方向与所述烟弹容置部 4 对齐、且该备用电子烟插入备用电子烟容置部 9 后的该备用电子烟的顶部与插置后的烟弹 7 的顶部平齐或大体平齐。

[0068] 在依据本发明的仿真电子烟烟盒中，为了对电子烟 8 进行充电，电子烟充电部与外界电源连接的接口为设置在内壳体 3 下部的可露出到烟盒本体 2 之外的 USB 插口 11 或插头（图未示出）。

[0069] 在依据本发明的仿真电子烟烟盒中，优选地，所述 USB 或插头设置内壳体 3 的下部且连接有导出装置（图未示出），且在内壳体 3 及烟盒本体 2 的底部向下或向侧面设置有供所述 USB 插口或插头移动并从烟盒本体 2 露出的槽孔（例如滑动槽和出入孔）（图未示出）。

[0070] 在依据本发明的仿真电子烟烟盒中，优选地，电子烟充电部还包括设置在内壳体 3 的外表面上的充电指示灯（图未示出），且在烟盒本体 2 上的相应位置上设置有通孔（图未示出），以在对电子烟 8 的充电电池进行充电时，通过充电指示灯来显示充电状态。

[0071] 在依据本发明的仿真电子烟烟盒中，优选地，盒本体 2 的底部上设置有易撕毁部（图未示出），其对应于所述电子烟充电部的与外界电源连接的接口部位设置。在打开烟盒包装塑料膜之后，可以将易撕毁部撕掉，从而露出所述接口部位。

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[0072] 在依据本发明的仿真电子烟烟盒中，优选地，所述电子烟充电部的与电子烟 8 的下节 81 电连接的充电接口为螺接或插接接口。

[0073] 在依据本发明的仿真电子烟烟盒中，所述外壳体和内壳体均由绝缘材料（例如塑料）制成。

[0074] 为了简化制造工艺，内壳体可以与烟弹容置部、电子烟充电容置部、电子烟上节容置部、备用电子烟容置部、烟嘴容置部等一体成型。

[0075] 在上述说明中，所述长度方向为图 6 所示的平行于纸面的方向，宽度方向为与纸面垂直的方向，高度方向为与上述长度方向和宽度方向相垂直的方向，该方向的定义与普通香烟烟盒的长、宽、高方向的定义一致。

NJOY Exhibit 1002.427

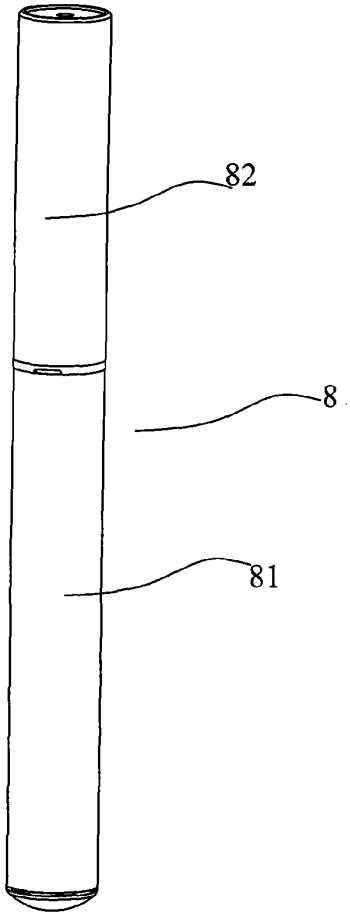


图 1

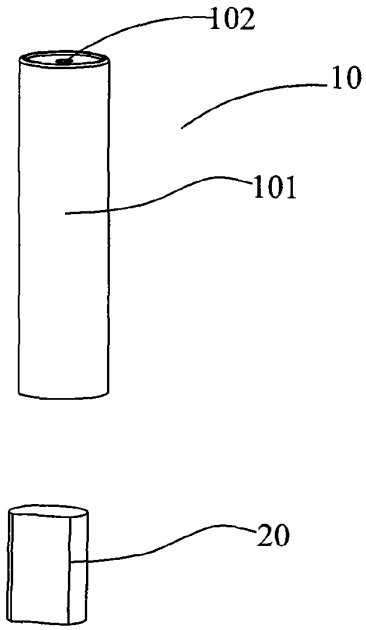


图 2

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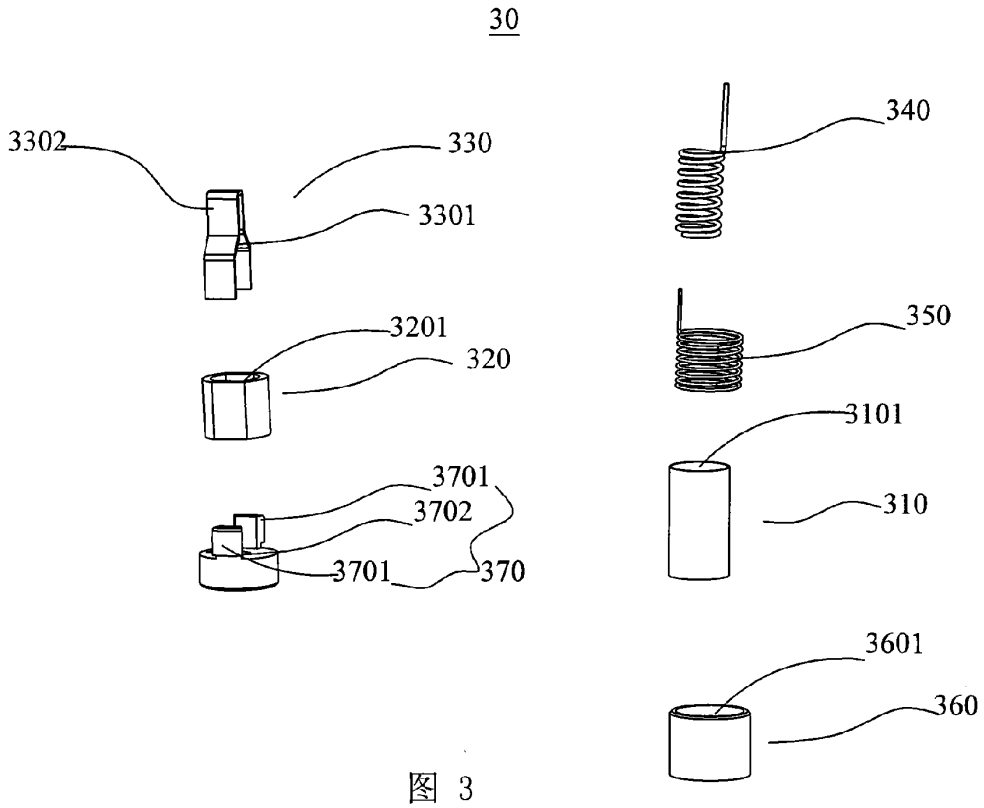


图 3

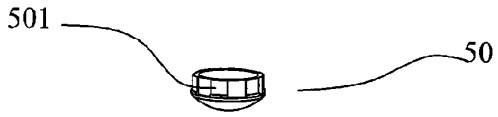


图 5

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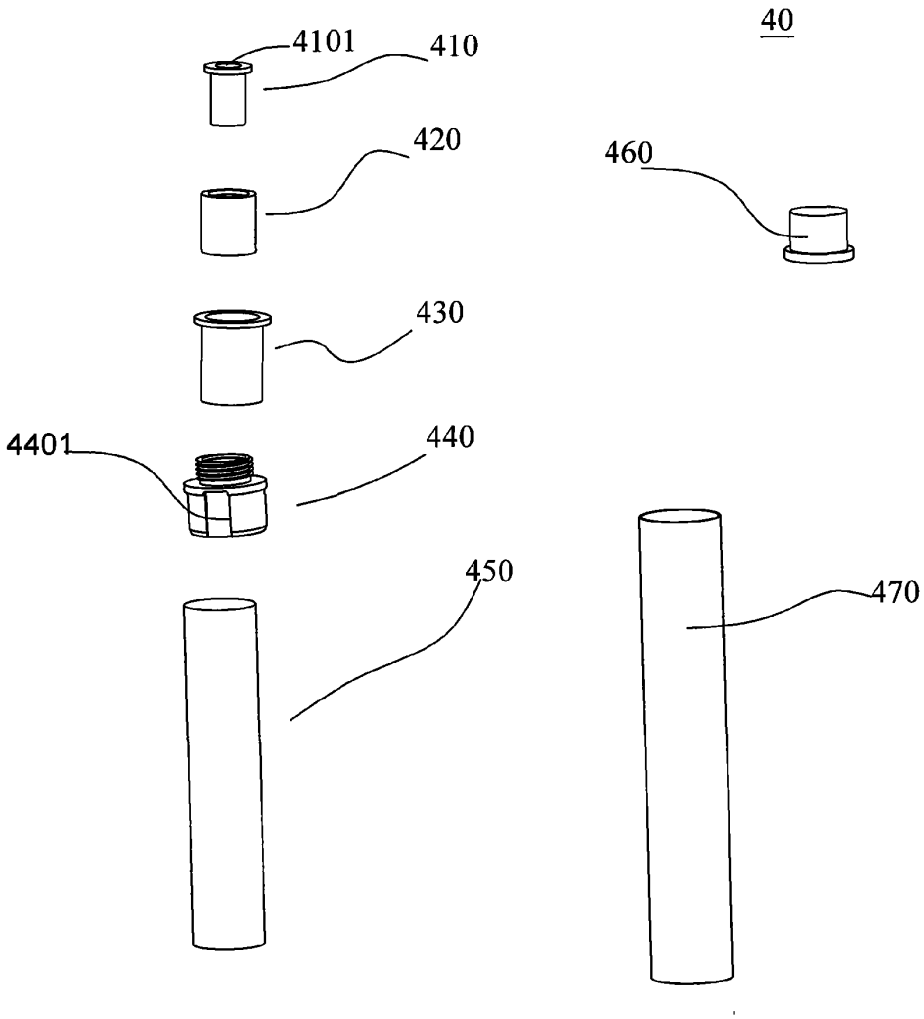


图 4

NJOY Exhibit 1002.430

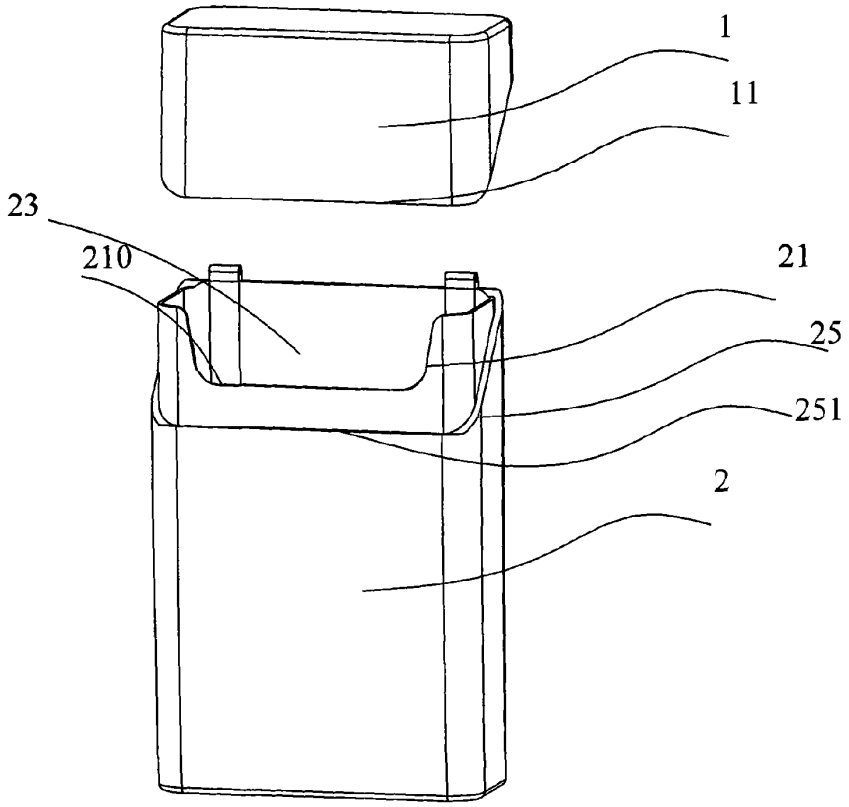


图 6

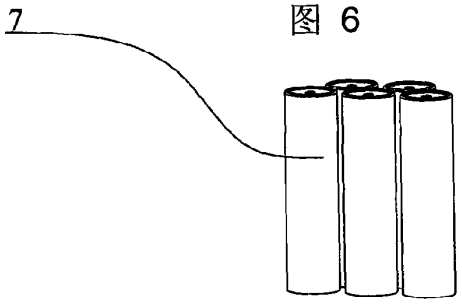


图 8

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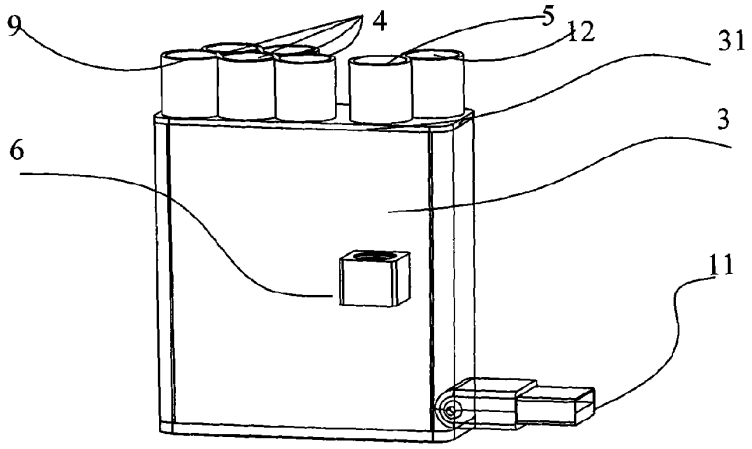


图 7

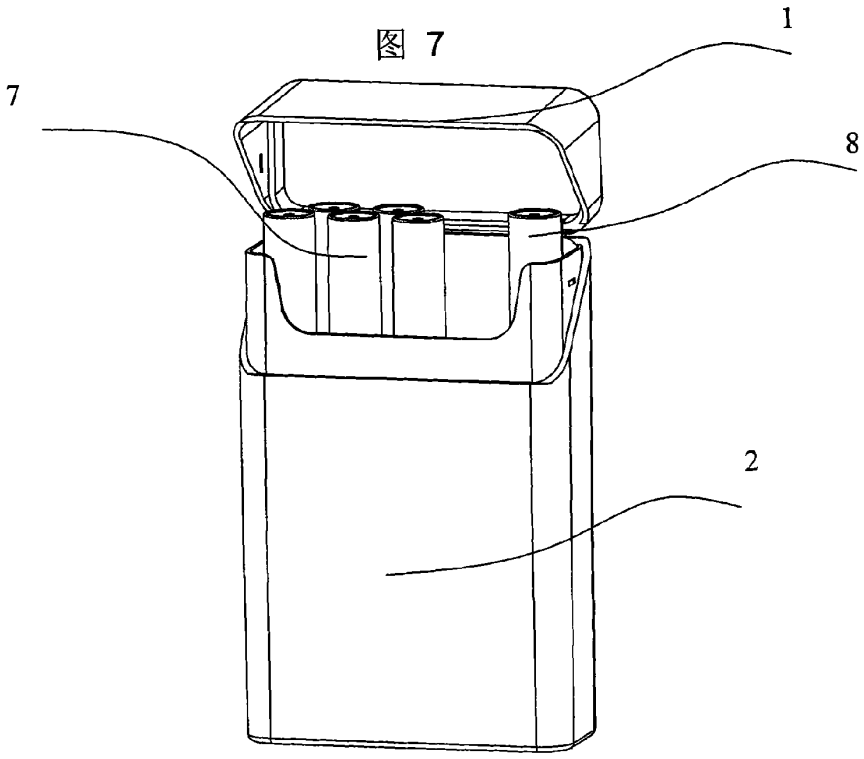


图 9

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Espacenet

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Control method for atomizers

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Classification: **- international:** ***A61M11/04; G05B19/042***
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Application number: CN201210142180 20101101 Global Dossier

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Abstract of CN102727969 (A)

The invention discloses a control circuit for atomizers, and the control circuit comprises a key switch, a single chip and a transistor, wherein the key switch is used for sending a switch signal which is used for connecting or disconnecting the control circuit; the single chip is connected with the key switch and has a locking function; after receiving the signal from the key switch, the single chip enters into a self locking state without an output signal or is unlocked; and the transistor is connected with an output end of the single chip and has a signal amplification function. Through the control circuit for atomizers, misoperation can be avoided to ensure that the key switch is connected.

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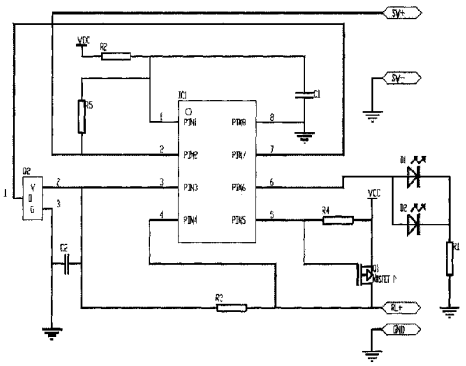
权利要求书1页 说明书6页 附图4页

(54)发明名称

用于雾化器的控制方法

(57)摘要

本发明公开了一种用于雾化器的控制电路，所述控制电路包括按键开关，该按键开关用于发出接通或断开控制电路的开关信号；以及与按键开关连接的具有锁定作用的单片机，该单片机接收来自于按键开关的信号后，单片机自身进入锁定状态而无输出信号，或者解除锁定；以及与单片机输出端连接的具有信号放大作用的晶体管。本发明可避免误操作而使按键开关接通。



CN 102727969 B

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1. 一种雾化器的控制方法，其特征在于，包括以下步骤：步骤（1），初始化系统：单片机设置电路进入锁定的时间，以及设置解除电路锁定的时间；

步骤（2），单片机检测来自于按键开关输出的信号：在锁定状态下的单片机在Q秒接收来自于按键开关的Y次的开关信号，单片机解除锁定；解除锁定后，单片机再次接收来自于按键开关的信号，电路接通单片机向晶体管输出电信号；

步骤（3），晶体管将来自于单片机的信号进行放大后向负载供电，当不再使用时，单片机在P秒内接收的是来自于按键开关的X次的开关信号，单片机进入锁定状态，无输出信号。

2. 一种如权利要求1所述的雾化器的控制方法，其特征在于，提供一个分别与单片机进行连接的检测器和发光二极管，在步骤（2）和步骤（3）之间还包括以下步骤：

步骤（20）检测电路是否接通；

步骤（21），如果步骤（20）检测电路到为接通状态，则单片机将获取的电池的电压输出到检测器，通过检测器判断电池电压是否低于3.3V，并将判断结果输送到单片机；

步骤（210），如果步骤（21）连续二次判断电池电压均低于3.3V，则单片机进入低压保护状态，同时单片机控制发光二极管闪灯40次。

3. 一种如权利要求2述的雾化器的控制方法，其特征在于：

步骤（22），如果步骤（21）的判断结果为否，则通过检测器判断是否短路，并将判断结果输送到单片机；

步骤（220），如果步骤（22）的判断结果为是，单片机则进入短路保护状态，同时控制发光二极管闪灯3次；如果步骤（22）的判断结果为否，单片机输出信号到发光二极管，使发光二极管逐渐增亮，同时进入步骤（3）向负载供电。

4. 一种如权利要求3所述的雾化器的控制方法，其特征在于：

步骤（4），单片机检测按键开关是否断开；

步骤（41），如果步骤（4）的检测结果为否，则单片机检测电路是否连续导通10秒；如果电路是否连续导通10秒的检测结果为否，则返回步骤（4）继续检测；

步骤（42），如果步骤（41）的检测结果为是，则控制发光二极管闪灯10次，闪灯结束后进入待机状态；

步骤（43），如果步骤（4）的检测结果为是，则单片机无信号输出到晶体管，进入待机状态。

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用于雾化器的控制方法

[0001] 本发明专利申请是分案申请。原案的申请号为201010527480.9，申请日是2010年11月1日，发明名称是：口吸式便携雾化器。

技术领域

[0002] 本发明涉及电子烟的雾化装置，具体涉及一种用于雾化器的控制电路及方法。

背景技术

[0003] 现在人们的生活及社会活动的加强，人与人之间的交往也越来越重要，而口腔异味等问题另许多人困惑不堪，虽然也有口香糖、润喉片等物品可以解决一时之需，但其废弃物又随之产生新的环境污染，如吃过的口香糖，包装锡板等。

[0004] 早期有人提出将药液经过机械装置加热供使用者使用，虽然使用者在使用习惯上易于接受，但由于传统的机械结构性能不稳定，极易损坏，操作烦琐。使使用者造成损失。随着科技的发展，出现了超声雾化器。与机械装置加热实现液体雾化不同的是，基于特定频率下超声波对液体的振荡激发作用，可以产生对应的雾化微滴，从而输送到人体口腔内产生吸烟的感觉。这种雾化方案有些类似与家庭中常见的超声加热器，但超声雾化器存在雾化量偏小，而且能量利用不充分的问题。

[0005] 目前市场上现有的一些雾化器，存在问题有：第一、药液是注射到吸嘴腔体内的填充层里，由此可见药液不够新鲜，而且药液存储容量小，药液用完了使用者必须往雾化器里滴药液，才能继续使用，这样一来使用者如果想在户外或上班时使用美容，就得带上一瓶药液，才能保证使用。身上带上一瓶而且还要使用者自己滴液。第二、市场现有的雾化器的结构都是螺纹连接，使用者在使用的时候，先要拧好电池才能使用，这样极不方便、雅观、而且还有点不卫生。第三、使用者在使用雾化器时，储存在填充层中的药液不能均匀地到达加热器上，因此导至药液被加热时不能形成直径很小的微滴，大直径的微滴无法伴随人口的负压作用进入到人的口中，大直径的微滴在重力的作用下落到加热器附近无法进行加热。

发明内容

[0006] 本发明的目的是：为了避免误操作而使按键开关接通，提供了一种用于雾化器的控制电路和雾化器的控制方法，其技术方案如下：

[0007] 用于雾化器的控制电路，所述控制电路包括按键开关，该按键开关用于发出接通或断开控制电路的开关信号；

[0008] 以及与按键开关连接的具有锁定作用的单片机，该单片机接收来自于按键开关的信号后，单片机自身进入锁定状态而无输出信号，或者解除锁定；

[0009] 以及与单片机输出端连接的具有信号放大作用的晶体管。

[0010] 雾化器的控制方法，包括以下步骤：

[0011] 步骤(1)，初始化系统：单片机设置电路进入锁定的时间，以及设置解除电路锁定的时间；

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[0012] 步骤 (2)，单片机检测来自于按键开关输出的信号；在锁定状态下的单片机在 Q 秒接收来自于按键开关的 Y 次的开关信号，单片机解除锁定；解除锁定后，单片机再次接收来自于按键开关的信号，电路接通单片机向晶体管输出电信号；

[0013] 步骤 (3)，晶体管将来自于单片机的信号进行放大后向负载供电，当不再使用时，单片机在 P 秒内接收的是来自于按键开关的 X 次的开关信号，单片机进入锁定状态，无输出信号。

[0014] 雾化器的控制方法，包括以下步骤：

[0015] 步骤 (1)，初始化系统：单片机设置电路进入锁定的时间，以及设置解除电路锁定的时间；

[0016] 步骤 (2)，单片机检测来自于按键开关输出的信号；在锁定状态下的单片机在 N 秒接收来自于按键开关输出的第一连续信号，单片机解除锁定，解除锁定后，单片机再次接收来自于按键开关的信号，电路接通单片机向晶体管输出 电信号；

[0017] 步骤 (3)，晶体管将来自于单片机的信号进行放大后输出到负载，当不再使用时，若单片机在 M 秒接收的是来自于按键开关输出的第二连续信号，单片机进入锁定状态，无输出信号。

[0018] 采用了上述方案，由于在使电路正常导通前，需要经过操作按键开关进行解锁才能使电路正常导通，即使用户进行了误操作，通过单片机对电路的锁定作用，不能使电路导通，因此不会发生意外事故，增加了用户的安全性。

附图说明

[0019] 图 1 为本发明的雾化器的结构示意图；

[0020] 图 2 为本发明中雾化装置的结构示意图；

[0021] 图 3 为本发明的雾化器与供电装置的装配结构示意图；

[0022] 图 4 为本发明中的控制电路的原理图；

[0023] 图 5 为控制电路的流程图；

[0024] 附图中，10 为壳体，11 为吸嘴前盖，12 为吸嘴后盖；

[0025] 20 为储液盒，21 为盒体，22 为盒盖，23 为液体隔离膜，24 为气流通道；

[0026] 30 为雾化装置，310 为吸液嘴座，311 为发热装置，312 为套管，313 为雾化腔，314 为通气孔，315 为导液孔；320 为导液绳，321 为导液套，322 为导液管，323 为座体；330 为雾化器主体，331 为接触导体，332 为接触导体底座，333 为进气孔；

[0027] 41 为外壳，42 为电池，43 为控制电路，44 为接触顶针。

具体实施方式

[0028] 下面结合附图和具体实施方式对本发明作进一步说明。

[0029] 参照图 1 至图 3，本发明的口吸式便携雾化器。本发明的雾化器与供电装置连接后，对存储的药液进行加热而形成雾气的状态，进而进入到人的口中，药液可以是保健类型的，也可以是用于除去口腔异味的，还可以是对人体有利的其它类型的药液。本发明的雾化器主要由壳体 10、储液盒 20、雾化装置 30 三 个部分构成，下面通过具体的结构和功能的详细描述对本发明作进一步说明。

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[0030] 参照图1，壳体10采用金属材料制成，壳体10纵截面的形状为椭圆形，当然也可以是圆或者矩形等形状。壳体10的一端通过插接的方式固定连接吸嘴，吸嘴由吸嘴前盖11和吸嘴后盖12组成。在吸嘴前盖11和吸嘴后盖12上均设置有通气孔，这些通气孔用于传递人嘴发生的负压作用力，以及使雾化的药液通过通气孔到达人的口中。

[0031] 参照图1，具有储液空腔的储液盒20设置在壳体内部，储液盒20是用于存储药液的。储液盒20包括盒体21以及与盒体连接的盒盖22，盒盖上设有供吸液嘴插入的通孔，该通孔处设有可被刺破的液体隔离膜23，液体隔离膜23被吸液嘴刺破后与吸液嘴之间形成液密封。本发明的储液盒的空腔中没有设置任何填充层，药液直接存在空腔中，这样可以避免药液长时间存留在填充层内不新鲜，使用者使用的药液较为新鲜。盒体21的截面形状与壳体的截面形装相同，盒体21与壳体10可以是间隙配合，也可以是过渡配合，但采用过渡配合的方式时，在储液盒21的侧壁面上设置有供气体通过的气流通道24。

[0032] 参照图1和图2，储液盒一端连接一个雾化装置30，储液盒中的烟液在负压作用下输出到雾化装置中。雾化装置由雾化组件、导液组件和连接组件三部分组成。

[0033] 参照图2，雾化组件由吸液嘴座310、发热装置311以及套管312组成。吸液嘴座310采用陶瓷材料制成，吸液嘴座310一端设有雾化腔313；吸液嘴座310的另一端设有与雾化腔连通的通气孔314，通气孔314主要是与人气相互连通，以达到吸气时形成负压的目的，通过通气孔与雾化腔连通，在人口吸气产生负压时能轻使地形成负压，使雾化的药液进入到人的口中。吸液嘴座的侧壁上还设有与雾化腔连通的导液孔315，导液孔315在吸液嘴座外侧壁面上的孔口，小于导液孔315在吸液嘴座内侧壁面上的孔口。发热装置311固定在该雾化腔313中，本实施例中，发热装置是通过电流的作用产生热量，因此，发热装置311可以采用铂丝或镍铬合金或含有稀土元素的铁铬铝合金丝制成，也可制成片 状体或环状。套管312套在吸液嘴座310的外壁面上，套管312可以吸收吸液嘴座310传来的一部分热量，减小吸液嘴座310上的热量直接传递到外壳上。

[0034] 参照图2，导液组件包括吸液嘴、导液绳320以及导液套321。吸液嘴包括导液管322以及座体323，导液管322的一端与座体连接，导液管的另一端为自由端，该自由端的端面为斜坡面或者三角形，本实施例中，自由端的端面为斜坡面。自由端的端面为斜坡面或三角形，有利于轻松地刺破盒盖22上的液体隔离膜23。吸液嘴与储液盒的接触部位形成液密封，即：导液管的自由端刺破盒盖22上的液体隔离膜23后，插入到盒体21的储液空腔中，由于液体隔离膜23采用橡胶制成，因此，导液管与液体隔离膜23的接触部位形成液密封。吸液嘴的另一端与吸液嘴座的雾化腔连通，由于座体323位于雾化腔313的腔口上方或者与雾化腔313的腔口接触（由于座体的表面积小于雾化腔313的腔口的面积，因此不会堵死雾化腔的腔口），座体即可与吸液嘴座连通。

[0035] 参照图2，对于导液组件中的导液绳320：导液绳320的中部缠绕在发热装置311上，导液绳的两个端部被引入到吸液嘴中，即导液绳的两个端部被引入到导液管322中。导液绳不但可以封住盒体21中的药液，使药液在重力的作用下不会顺着吸液嘴流动到雾化腔313中，而且在负压作用下还能将盒体21中的药液引导到发热装置上，由于导液绳是以缠绕的方面布置在发热装置上，因此，通过导液绳的作用能使药液均匀地到达发热装置处，使得药液被加热时均能形成直径很小的微滴，而大直径的微滴减少到几乎没有，从而在正常负压作用力的范围内，被吸出的药液均能被加热后形成雾气到达人的口中。

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[0036] 参照图 2，对于导液组件中的导液套 321：可以存储大直径悬浮液滴的导液套 321 套在吸液嘴座的外壁面上，从而导液套 321 位于吸液嘴座与套管 312 之间。导液套采用具有多层泡沫的镍网制成。当药液在很大的负压作用力下被吸出时，部分药液不会被加热，而伴随着负压气流进行流动，这些药液在流动的过程中由于重力的作用而落至导液套 321 上；或者加热装置温度不高对药液加热不完全，导至形成的雾气中含有过多的大直径的微滴，这些大直径的微滴伴 随负压气流流动时，同样也由于重力的作用而落至导液套 321 上，通过导液套可以将这些未被加热的药液进行吸附，药液经导液套以及导液孔 315 到达雾化腔中的加热装置附近，从而被加热装置加热雾化。因此，导液套 321 起到了回收药液，并将回收的药液引导到加热装置处的作用。并且，通过导液套 321 的方式，是全完在药液重力的作用下来完成的，无须人为使用负压作用力将回收的药液进行加热雾化，有省力的好处。

[0037] 参照图 2，雾化装置 30 的固定在壳体 10 另一端的连接组件：该连接组件包括雾化器主体 330、通过导线连接发热装置 311 的接触导体 331 以及接触导体底座 332。雾化器主体 330 的位于壳体中的一端形成有容纳并保持雾化组件的腔体，套管 312 及其他雾化组件的零件固定在这个腔体中，套管 312 与腔体采用过盈的方式进行配合。雾化器主体的侧壁上设有与腔体连通的进气孔 333，这个进气孔是用来导通大气的。接触导体底座 332 固定在雾化器主体的外露于壳体 10 的另一端，接触导体 331 固定在接触导体底座 332 上，接触导体 331 为两个，分别用于连接电源的正极和负极，每个接触导体上均设有供接触顶针接入的孔。另外，雾化器主体 330 的外侧面设有一个台阶，雾化器主体 330 第一是用于支撑雾化组件，第二是用于连接供电装置。

[0038] 参照图 3，雾化器主体 330 的外露于壳体 10 的端部连接一个供电装置，该供电装置包括外壳 41，以及设置在外壳中的电池 42、控制电路 43 以及接触顶针 44。外壳 41 的一端留有供雾化器主体 330 插入的空间，雾化器主体 330 与外壳 41 形成插拔形式的连接，雾化器主体 330 插入到外壳 41 中以后，接触顶针插入到接触导体的孔中。控制电路与电池连接，控制电路的输出端连接接触顶针。

[0039] 参照图 4，所述控制电路包括按键开关 SW，用于发出接通或断开控制电路的开关信号；与按键开关连接的具有锁定作用的单片机 IC1，该单片机接收来自于按键开关的信号后，单片机自身进入锁定状态而无输出信号，或者解除锁定；与单片机输出端连接的具有信号放大作用的晶体管 Q1。控制电路还包括一个用 于检测电池电压和输出是否短路的检测器 Q2，以及用于指示控制电路工作状态的发光二极管 Q2，检测器 D1 及发光二极管 D1 分别与单片机连接。

[0040] 本发明的雾化器的工作过程为（图 1 中的箭头表示了气流及形成的气溶胶的流动方向）：使用者将口吸式便携雾化器与供电装置连接，启动按键开关，解除电路锁定。再次按下按键开关，电流流过接触导体 331，使雾化组件中的发热装置 311 导通而发热。由于负压作用力，使储液盒腔体内的药液通过吸液嘴、导液绳 320 将药液引导到发热装置 311 上，在电加热装置 311 的高温作用下，使药液瞬间雾化。小直径微滴悬浮在负压气流中形成的气溶胶经气流通道 24 流入吸嘴前盖 11，再流入吸嘴后盖 12，最终被使用者吸入到口中。当药液使用完之后，可根据使用者的本人的意愿，拔开吸嘴，向储液盒内加药液，用完之后如果使用者不想继续使用这种口味的药液的时候，可以换一个新的储液装置继续使用，旧的一次性雾化器可以丢入可回收的垃圾箱中，回收后可以分解，无环境污染。

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[0041] 参照图 4 和图 5，本发明还提供一种专利用于雾化器的控制电路，所述控制电路包括按键开关 SW，用于发出接通或断开控制电路的开关信号；与按键开关连接的具有锁定作用的单片机 IC1，该单片机接收来自于按键开关的信号后，单片机自身进入锁定状态而无输出信号，或者解除锁定；与单片机输出端连接的具有信号放大作用的晶体管 Q1。控制电路还包括一个用于检测电池电压和输出是否短路的检测器 Q2，以及用于指示控制电路工作状态的发光二极管 Q2，检测器 D1 及发光二极管 D1 分别与单片机连接。

[0042] 本发明还提供了以下两种实施方式的雾化器的控制方法，这两种控制方法主要是防止使用者在日常生活中会无意中碰到开关按键，从而使雾化器开始工作。

[0043] 实施方式一：

[0044] 包括以下步骤：

[0045] 步骤 1，初始化系统：单片机设置电路进入锁定的时间，以及设置解除电路锁定的时间；

[0046] 步骤 2，单片机检测来自于按键开关输出的信号：在锁定状态下的单片机在 1.5 秒内接收来自于按键开关的 5 次的开关信号，单片机解除锁定。由于锁定和解锁均是在 1.5 秒内接通按键开关 5 次，因此，如果用户因为误操作使开关接通 1 次或者两次，单片机则不会解锁。并且由于时间短，由于误操作而在 1.5 秒内接通按键开关 5 次的这种情况不会有，因此，这种设置比较保险。

[0047] 解除锁定后，单片机再次接收来自于按键开关的信号，电路接通单片机向晶体管输出电信号。

[0048] 步骤 20，检测电路是否接通，即单片机判断其第 2 号引脚上的电平是否为低电平。

[0049] 步骤 21，如果步骤 20 检测结果为是，则单片机将获取的电池的电压输出到检测器，通过检测器 Q2 判断电池电压是否低于 3.3V，并将判断结果输送到单片机；

[0050] 步骤 210，如果步骤 21 连续三续的判断结果均为是，则单片机进入低压保护状态，同时单片机控制发光二极管闪灯 40 次，频率为 2Hz；

[0051] 步骤 22，如果步骤 21 的判断结果为否，则通过检测器 Q2 判电路是否短路，并将判断结果输送到单片机；

[0052] 步骤 220，如果步骤 22 的判断结果为是，单片机则进入短路保护状态，同时控制发光二极管闪灯 3 次，频率为 3Hz；

[0053] 如果步骤 22 的判断结果为否，单片机输出信号到发光二极管，使发光二极管逐渐增亮，0.6 秒内达到最亮，同时单片机的第 5 号引脚变为低电平，单片机 IC1 向晶体管 Q1 输出信号；

[0054] 步骤 3，晶体管 Q1 将来自于单片机的信号进行放大后向负载供电。如果无需使用，则使单片机在 1.5 秒内接收的是来自于按键开关的 5 次的开关信号，单片机进入锁定状态，无输出信号。电路锁定后，即可避免因误操作使电路立即接通，因此雾化器不会因为误操作而工作，避免烫伤使用者。若继续使用，则进入步骤 4。

[0055] 步骤 4，在执行步骤 3 的过程中，单片机 IC1 时刻检测按键开关 SW 是否断开；

[0056] 步骤 41，如果步骤 4 的检测结果为否，则单片机检测电路是否连续导通 10 秒；如果检测结果为否，则返回步骤 4 继续检测；

[0057] 步骤 42，如果步骤 41 的检测结果为是，则控制发光二极管闪灯 10 次，闪灯结束后

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进入待机状态；

[0058] 步骤43，如果步骤4的检测结果为是，则单片机无信号输出到晶体管Q1，晶体管Q1关闭进入待机状态。进入待机状态后可以选择接通按键开关SW继续使电路导通，如果不使用，则在1.5秒内使按键开关连续接通5次，使电路进入锁定状态。

[0059] 步骤5，单片机检测第5号引脚是否有电流输入，如果有电流输入，则说明外部电源向电池进行充电，这时单片机的第5号引脚输出信号使晶体管Q1导通，给电池充电，每6秒种检测一次是否有电流输入，一直检测到没有电流流入即可进入待机状态，或者返回步骤20。

[0060] 实施方式二：

[0061] 这种实施方式在解除电路锁定和锁定电路与上面一种实施方式有所区别外，其余方式与上面的实施方式完全相同。

[0062] 单片机检测来自于按键开关输出的信号：在锁定状态下的单片机在4秒接收来自于按键开关输出的第一连续信号，单片机解除锁定，解除锁定后，单片机再次接收来自于按键开关的信号，电路接通单片机向晶体管输出电信号。晶体管将来自于单片机的信号进行放大后输出到负载。若单片机在8秒接收的是来自于按键开关输出的第二连续信号，单片机进入锁定状态，无输出信号；即长按按键开关8秒，使其在该时间内连续输出开关闭合的信号到单片机，单片机即可做出锁定电路的决定。

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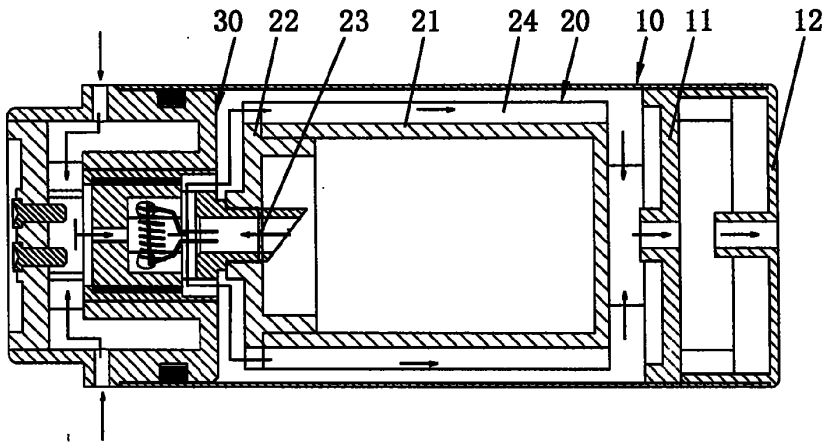


图 1

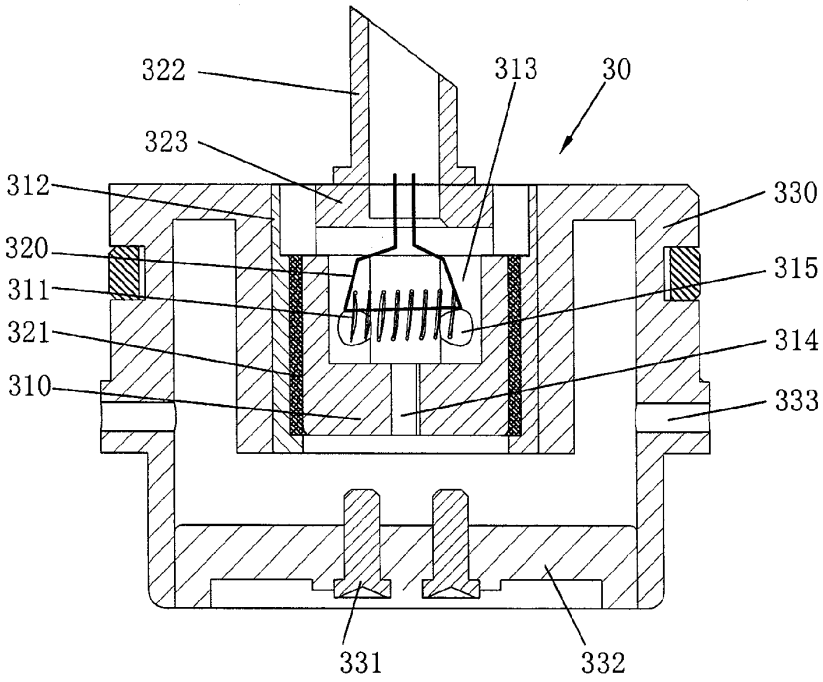


图 2

NJOY Exhibit 1002.442

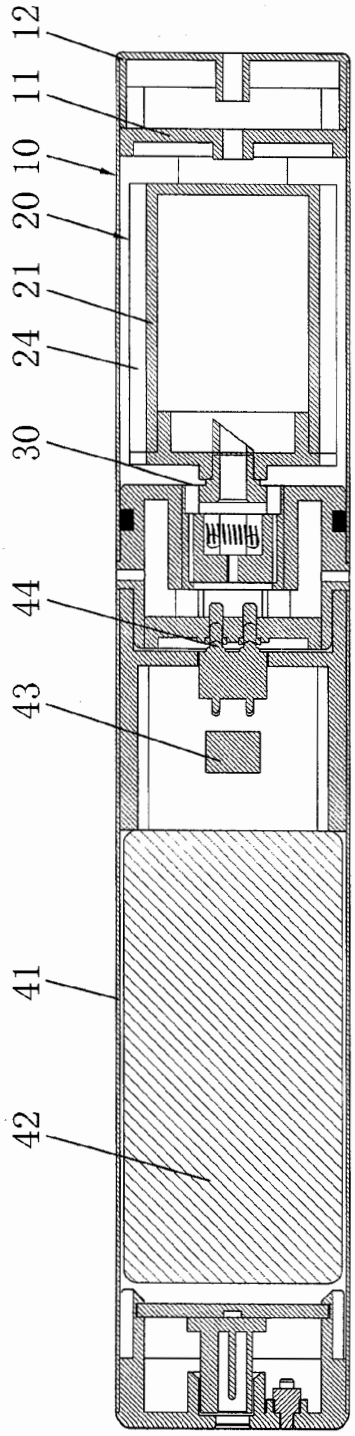


图 3

NJOY Exhibit 1002.443

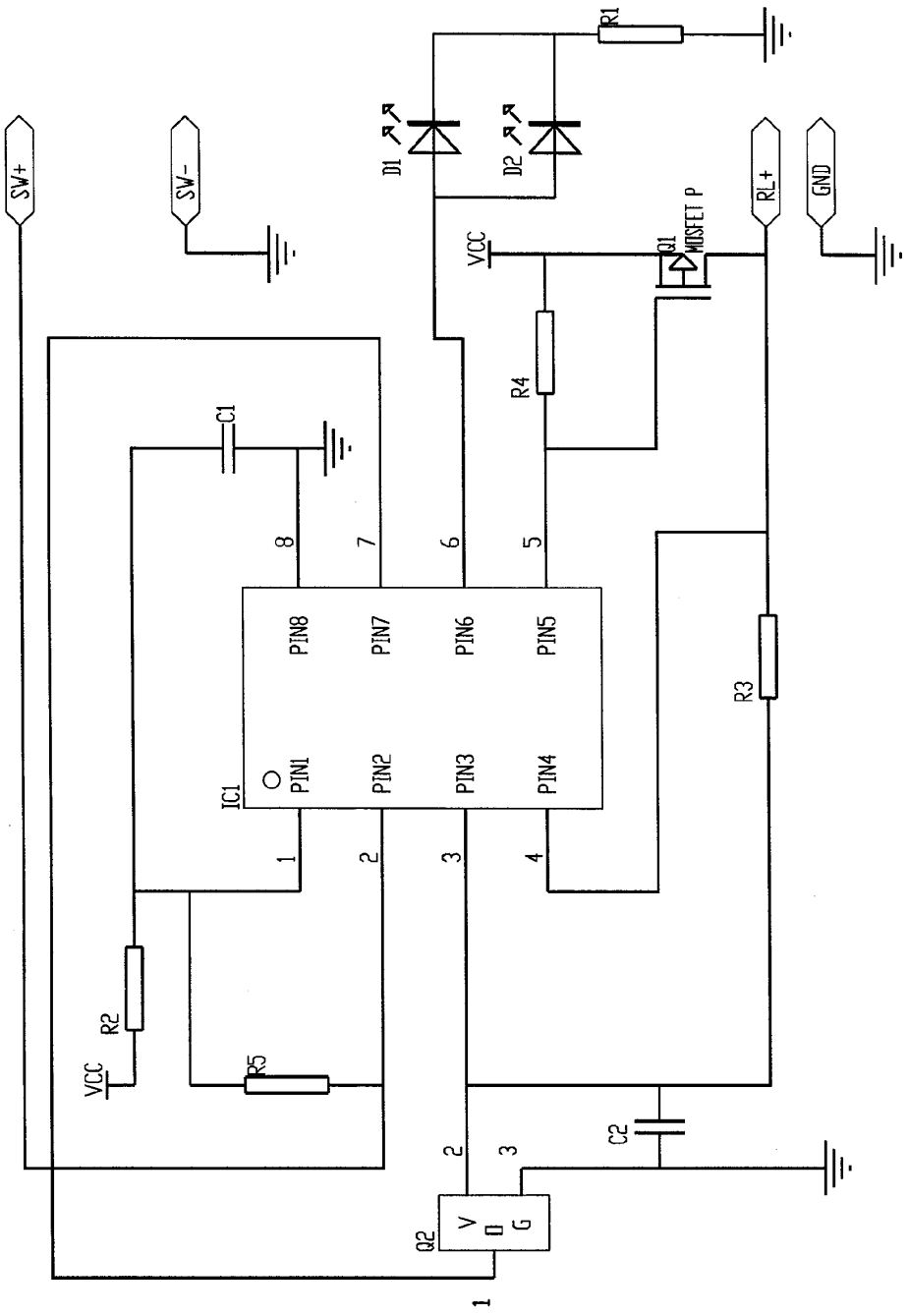


图 4

NJOY Exhibit 1002.444

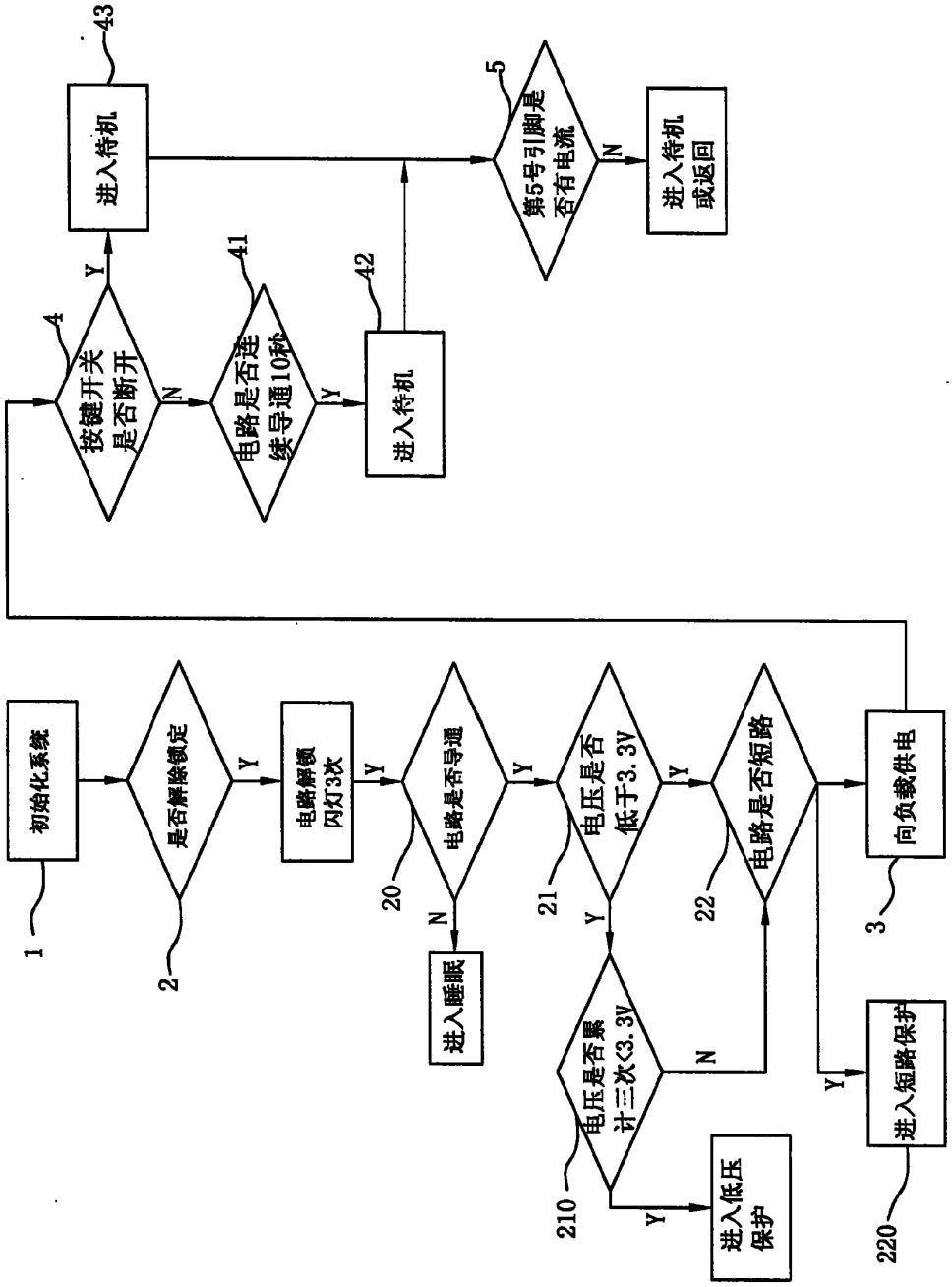


图 5

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Espacenet

Bibliographic data: CN201104488 (Y) — 2008-08-27

Non-ignitability atomizing electric cigarette

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Classification: **- international:** *A24F47/00*
- cooperative:

Application number: CN20072057873U 20070930

Priority number (s): CN20072057873U 20070930

Abstract of CN201104488 (Y)

The utility model discloses a noncombustible spray electronic cigarette, which comprises a controller and a generator; wherein, an instructor cover, a power supply device, an integration circuit board, a miniature gas drive switch and a connection conductor are arranged in turn in the controlling components; a connection conductor, a secondary pressure keeping room, a liquid-resisting plate, a secondary liquid-storing room, a heater, a liquid-guide mechanism, a liquid storing room and a suction nozzle are arranged in turn in the generator; an air inlet hole is arranged at one side of the connection conductor; a through hole is arranged at central section of the connection conductor for the controller and the generator. The noncombustible spray electronic cigarette has the advantages that: no harmful substance such as tar and carbon monoxide exists for smoking; risk of causing cancer is greatly lowered; users still have feeling of smoking without needing lighting a smoke and without fire accident danger; in fact, aspirated fume is water steam from medical solution gasifying without environmental pollution.

NJOY Exhibit 1002.446

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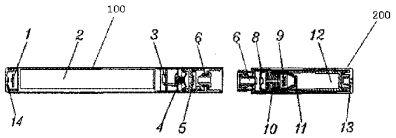
权利要求书 2 页 说明书 9 页 附图 4 页

[54] 实用新型名称

一种非可燃性喷雾电子香烟

[57] 摘要

本实用新型公开了一种非可燃性喷雾电子香烟，包括控制器与发生器，所述控制组件内依次设有指示灯盖、电源装置、集成线路板、微型气体传动开关和连接导体，所述发生器内依次设有连接导体、次级气压保压室、阻液片、次级贮液室、加热器、导液机构、贮液室和吸嘴，所述连接导体一侧上开有进气孔，所述控制器与发生器的连接导体中间开有通孔。 本实用新型的技术效果在于：吸烟无焦油、一氧化碳等有害物，大大降低致癌风险，使用者仍然有吸烟的感觉，无需点燃，无火灾危险，其吸出的烟雾其实是药液气化的水蒸气，无环境污染。



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1、一种非可燃性喷雾电子香烟，其特征在于：包括控制器与发生器，所述控制组件内依次设有指示灯盖、电源装置、集成线路板、微型气体传动开关和连接导体，所述发生器内依次设有连接导体、次级气压保压室、阻液片、次级贮液室、加热器、导液机构、贮液室和吸嘴，所述连接导体一侧上开有进气孔，所述控制器与发生器的连接导体中间开有通孔。

2、如权利要求 1 所述的非可燃性喷雾电子香烟，其特征在于：所述指示灯盖侧边开有一对隐蔽的通气孔，指示灯盖下面设有发光 LED。

3、如权利要求 1 或 2 所述的非可燃性喷雾电子香烟，其特征在于：所述指示灯盖、电源装置、集成线路板、微型气体传动开关和连接导体外侧设有不锈钢壳体，所述连接导体、阻液片、次级贮液室、加热器、导液机构、贮液室和吸嘴外侧设有隔热层和不锈钢外壳。

4、如权利要求 1 所述的非可燃性喷雾电子香烟，其特征在于：所述微型气体传动开关内部设有弹性圆环，将微型气体传动开关开成两个独立的腔室。

5、如权利要求 4 所述的非可燃性喷雾电子香烟，其特征在于：所微型气体传动开关还包括定接触片、塑料底座和动接触片，所述动接触片通过塑料棒连接弹性圆环，弹性圆环固定于塑料底座内，定接触片固定于塑料底座外。

6、如权利要求 1 所述的非可燃性喷雾电子香烟，其特征在于：所述连接导体的右侧还设有一个次级开关气阀，以及由此形成的次级

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气压保压室，侧边设有进气孔。

7、如权利要求 6 所述的非可燃性喷雾电子香烟，其特征在于：所述连接导体包括两个中空的柱形导体、内螺纹与外螺纹，所述中空的柱形导体连接加热器的引入导线的正极，所述内螺纹与外螺纹连接加热器的引入导线的负极。

8、如权利要求 1 所述的非可燃性喷雾电子香烟，其特征在于：所述加热器包括加热丝和其外面的隔热座，在隔热座底部和侧面分别开有喷射孔和溢流孔。

9、如权利要求 1 所述的非可燃性喷雾电子香烟，其特征在于：所述吸嘴外侧延长至阻液器底部，在吸嘴的内侧还开有阻液槽。

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一种非可燃性喷雾电子香烟

技术领域

本实用新型涉一种非可燃性喷雾电子香烟。

背景技术

当今“吸烟有害健康”，已成为人所共知的常识，全世界仍然有10 亿以上的烟民，美国环境保护署目前将空气中的烟草雾宣布为 A 级致癌物。据世界卫生组织等部门公布的数字，全球每年约有 490 万人死于与吸烟有关的疾病；但是由于种种原因，要吸烟者完全戒烟是一件极其困难的事。

烟碱是小分子生物碱，它能使人吸烟成瘾，在小剂量下对人体基本无害，而且在血液中的半衰期极短。烟草中的有害物质如：烟焦油，一氧化碳，苯并芘，多环芳烃，亚硝胺、偶氮杂质等都是强致癌物，对人类的生存和健康造成了巨大的危害，而二手烟对周围人群的危害则更大！而烟草对环境的污染亦不能忽视，意大利科学家的最新研究表明，吸烟冒出的烟雾造成的污染可能超过某些汽车发动机尾气造成的污染！

为了寻找即能满足吸烟对烟瘾的需求，而又将烟草的危害降到最低，最终戒烟。许多实用新型都是将小剂量的烟碱做成诸如：“戒烟贴”、“烟碱嗽口水”、“烟碱口香糖”等产品，这些产品虽然有其

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一定的功效，没有烟焦油等其它有害物质的危害，但与吸烟都多年养成的习惯“抽吸”习惯格格不入，很难为烟民所接受。

发明内容

本实用新型的目的在于提供一种具有香烟代用品作用的环保型非可燃性喷雾电子香烟，避免了上述缺点，更接近真实的人性化香烟，没有环境污染。

本实用新型的目的是通过以下技术方案来实现的：一种非可燃性喷雾电子香烟，包括控制器与发生器，所述控制组件内依次设有指示灯盖、电源装置、集成线路板、微型气体传动开关和连接导体，所述发生器内依次设有连接导体、次级气压保压室、阻液片、次级贮液室、加热器、导液机构、贮液室和吸嘴，所述连接导体一侧上开有进气孔，所述控制器与发生器的连接导体中间开有通孔。

本实用新型的技术方案还包括：所述指示灯盖侧边开有一对隐蔽的通气孔，指示灯盖下面设有发光LED。

本实用新型的技术方案还包括：所述指示灯盖、电源装置、集成线路板、微型气体传动开关和连接导体外侧设有不锈钢壳体，所述连接导体、阻液片、次级贮液室、加热器、导液机构、贮液室和吸嘴外侧设有隔热层和不锈钢外壳。

本实用新型的技术方案还包括：所述微型气体传动开关内部设有弹性圆环，将微型气体传动开关开成两个独立的腔室。

本实用新型的技术方案还包括：所微型气体传动开关还包括定接触片、塑料底座和动接触片，所述动接触片通过塑料棒连接弹性圆环，

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弹性圆环固定于塑料底座内，定接触片固定于塑料底座外。

本实用新型的技术方案还包括：所述连接导体的右侧还设有一个次级开关气阀，以及由此形成的次级气压保压室，侧边设有进气孔。

本实用新型的技术方案还包括：所述连接导体包括两个中空的柱形导体、内螺纹与外螺纹，所述中空的柱形导体连接加热器的引入导线的正极，所述内螺纹与外螺纹连接加热器的引入导线的负极。

本实用新型的技术方案还包括：所述加热器包括加热丝和其外面的隔热座，在隔热座底部和侧面分别开有喷射孔和溢流孔。

本实用新型的技术方案还包括：所述吸嘴外侧延长至阻液器底部，在吸嘴的内侧还开有阻液槽。

本实用新形的技术效果在于：吸烟无焦油、一氧化碳等有害物，大大降低致癌风险，使用者仍然有吸烟的感觉，无需点燃，无火灾危险，其吸出的烟雾其实是药液气化的水蒸气，无环境污染。

本实用新型的特征及优点将通过实施例结合附图进行详细说明。

附图说明

图 1 是本实用新型实施例的非可燃性喷雾电子香烟拆分结构示意图；

图 2 是本实用新型实施例的非可燃性喷雾电子香烟整体结构示意图；

图 3 是本实用新型实施例非的可燃性电子喷雾香烟中微型气体

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传动开关结构示意图；

图 4 是本实用新型实施例非的可燃性电子喷雾香烟中导液机构与雾化室及与贮液芯的连接结构图；

图 5 是本实用新型实施例的非可燃性喷雾电子香烟中气压传动开关的结构示意图；

图 6 是本实用新型实施例的非可燃性喷雾电子香烟中加热器和导液机构结构示意图；

图 7 是本实用新型实施例的非可燃性喷雾电子香烟中集成线路板电路图。

具体实施方式

请参阅图 1，本实施例的非可燃性喷雾电子香烟包括控制器 100 与发生器 200。

如图 1 所示，在控制器 100 的一端设有一透明信号指示灯盖 14，并在指示灯盖 14 侧边开有一对隐蔽的通气孔，在另一端设有连接导体 6 用于和发生器 200 连成一个整体；在指示灯盖 14 下面有一个发光 LED；在指示灯盖 14 至连接导体 6 依次设有可充电锂电池 2、集成线路板 3、微型气体传动开关 4 、负压腔室 5，控制器 100 外面是不锈钢壳体。可充电锂电池 2 是内置的，控制器 100 的连接导体 6 连入充电器即可实现充电，而与发生器 200 连接后可组成一环保型非可燃性喷雾电子香烟。

发生器 200 的一侧也设有连接导体 6，另一侧设有烟嘴 13，从烟

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嘴 13 一侧起依次设有贮液室 12、导液机构 11、加热器 9、次级贮液室 10、阻液片 8 和次级气压保压室 7；发生器 200 外面分别有隔热层和不锈钢外壳，而吸嘴 13 的延长部份将发生器 200 外包括在其中，在发生器 200 的连接导体 6 的一侧上也开有进气孔，在吸嘴 13 与贮液器 12 中间有气流通道，在吸嘴 13 的底部开有阻液槽。控制器 100 与发生器 200 之间通过边接导体 6 相连，中间开有通气孔，连接着负压腔 5 与次级气压保压室 7；在控制器与发生器连接的侧边开有进气孔；阻液片 8 防止液体倒流；次级贮液室 10 暂存药液，导液机构 11 与药液相接触，在导液机构 11 内部设有雾化工作室；药液芯外围四周开有雾气通道，中间装有药液。

如图 3 所示，微型气体传动开关 4 内部有一弹性圆环 401，弹性圆环 401 剖面呈 W 形，将微型气体传动开关开成两个独立的腔室，在所述弹性圆环 401 上连有一伸出软胶片，软胶片内装有一塑料棒 402 用于连接弹性圆环 401 与动接触片 406。弹性圆环 401 固定于塑料底座 405 内。集成线路板 3 上设有两片伸向弹性圆环 401 的定接触片 403 和 404，定接触片 403 和 404 固定于塑料底座 405 外。

如图 4 所示，在连接导体 6 的右侧还设有一个次级开关气阀 701，侧边设有进气孔 702，在使用者抽吸时，气流从进气孔 702 进入，次级开关气阀 701 被气流打开，在气流的作用下，在弹性圆环 401 的右侧与连接导体 6 之间形成一个负压腔室 5；在负压的作用下弹性圆环 401 向右移动，同时带动连接在塑料棒 402 上的动接触片 406 向右移动，从而与连接在集成线路板 3 上的定接触片 403 导通；而当使用者

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吸力减小时，次级开关气阀 701 关闭，挡住进气孔 702，从而使负压腔室 5 维持一定时间，只有当使用者停止抽吸时，气流从连接导体 6 的中空通道 606 迅速进入负压腔室 5，负压立即消失，弹性圆环 401 在弹力作用下回复原位，塑料棒 402 左移，动接触片 406 与定接触片 403 断开，即可实现在小气流的作用下接通和断开开关，从而控制加热器 9 的实时加热。其中，弹性圆环 401 可用橡胶或硅胶制成。

连接导体 6 分别由内螺纹 603 与外螺纹 604 组成连接的外圈，用于连接加热器的引入导线的负极，由两个中空的柱形导体 601、603 连接加热器的引入导线的正极；在两个连接导体中间用绝缘材圈 605 隔开。控制器 100 与发生器 200 通过螺纹与中通的接触铜帽连接。

如图 5 所示，加热器 9 包括加热丝 901 和其外面的隔热座 902，在隔热座 902 底部和侧面分别开有喷射孔 904 和溢流孔 903，在加热器 9 右侧设有导液机构 11，导液机构 11 由支撑架 1101 与导液体 1102 组成，其支撑架 1101 起固定作用，导液体 1102 由多层泡沫镍网或其它金属多孔体制成，加热器 9 的左侧是次级贮液室 10、阻液片 8，加热丝 901 可用铂丝、镍铬合金或含有稀土元素的铁铬铝合金丝制成，也可制成片状体或环状，隔热座 902 可用陶瓷等制成。次级贮液室 10 为多层泡沫镍网填充在隔热座 902 底部与周边构成，导液机构 11 的一端通过导液体 1101 与次级贮液室 10 相连，另一端与贮液室 12 接触，贮液室 12 是一一端开口的筒状物，中间置入药用棉纤，然后装入药原液，通过导液机构 11 的毛细作用，装存在贮液室 12 内的药液导入次级贮液室 10。在气流的作用下，将小液滴通过隔热座 902

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中的喷射孔 904 吸入隔热座 902 的另一侧，在加热丝 901 的作用下，液体瞬间雾化，然后由开在贮液室 12 外侧的通孔经吸嘴 13 吸出。阻液器 8 可防止次级贮液室内 12 中的液体意外溢出。所述的液导液体 1102 还可用不锈钢纤维毡、高分子多聚物发泡体及泡沫陶瓷制成。

请一并参阅图 6，所述吸嘴 13 外侧的烟嘴套 1301 延长至阻液器 8 底部，其材料可用聚丙烯 PP 等环保材料制成，可有效防止内部热量的传出。在吸嘴 13 的内侧还开有通气孔 1302，在吸嘴孔 1304 的内侧还开有阻液槽 1303 以防止液体吸入口中。

如图 7 所示，所述集成线路板 3 使用 IC 控制，用 3.7V 锂离子电池供电，VCC 接电池正极，GND 接电池负极，S1 为连接微型气体传动，属常开开关，IC1 为核心智能控制单元，主要负责接收并判别输入信号，同时对信号指示灯与加热器进行控制。当 S1（与前面所述微型气体传动开关相连）闭合时，IC1 接收到此信号，首先判断此时电源电压是否高于 3.3V，如果是，则输出控制信号给加热电路，使场效应管导通，发热丝接通电源发热，加热器 9 工作，把液态的烟碱液瞬间加热，同时输出显示信号使 LED 发出红色或橙色光，模拟香烟的火头，也可输出延时信号使 LED 灯渐亮或渐灭。使模拟烟头更加形像；如果电池电压低于 3.3V，则不对加热电路输出信号，此时加热室不产生任何动作，同时 LED 输出闪烁信号，使 LED 发出 1Hz 的闪烁并连续闪烁 20 秒钟，提示电池电量不足，需要充电。当整机无动作时，IC1 进入休眠状态，整机功耗＜5uA，使整机待机时间尽可能延长（理论待机时间 6 年半）；当使用都在一分钟内连续使用本

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装置十五次时，IC1 将发出信号，切断加热电路输出，同时输出信号给 LED 指示灯，连续闪烁 10 秒；当 S1 连续接通 6 秒以上时，则自动切断加热电路，同时输出信号给 LED 等。此单片还可写入其它程序以实现更多的功能和为后序的更新改善提供便利。也可以在信号输出端接一 LCD 显示屏来显示更多的信息。

本实用新型用 IC 来控制其工作过程，保证电子烟工作可靠，吸烟方式更加形象。其吸出的“烟”其实是药液气化后的“水蒸气”，不含烟焦油，一氧化碳，苯并芘，多环芳烃，亚硝胺、偶氮杂质等都是强致癌物，“水蒸气”在空气中很快会液化，不污染环境。其加热部份是低电压低电流下瞬间加热，不燃烧，没有火灾隐患。其外壳用特种不锈钢制成，可有效屏蔽电磁波。

本实用新型的非可燃性喷雾电子香烟工作过程如下：控制器100与发生器200通过连接导体6连接后组成一环保型非可燃性喷雾电子香烟；当使用都抽吸时，气流经连接导体6侧的进气孔进入发生器200，经过次级气压保压室，阻液片8，加热器9，最后由吸嘴13吸出；而控制器100与发生器200的连接导体6中间开有通孔，在使用者抽吸时，控制器100内部的气流流向发生器200，从而带动控制器100的弹性圆环401右侧独立形腔部份低于正常大气压，而在控制器200的另一侧在指示灯盖侧也开有通气孔，使电池部份型腔与大气压相通，这样在控制器200一侧负气压的作用下，开关气嘴向连接导体6一侧拉伸，从而带动其上面的动接触片与静接触片导通，导通电流，此时指示灯IC控制下慢慢变亮，同时电流通过连接导体使加热器工作；在加热室由

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于气流作用药液以微滴形式喷射进雾化室，药液通过加热器9的作用瞬间雾化，雾化后的大直径微滴在涡流的作用下附壁经溢流孔被导液机构11重吸收，小直径微滴悬浮在气流中形成水蒸气经雾汽通道和吸嘴吸出。

以上所述，仅为本实用新型的较佳实例而已，并非用于限制本实用新型的保护范围。任何熟悉本技术领域的技术人员在本实用新型揭露的技术范围内，可轻易想到的变化，都应涵盖在本实用新型的保护范围之内。

NJOY Exhibit 1002.458

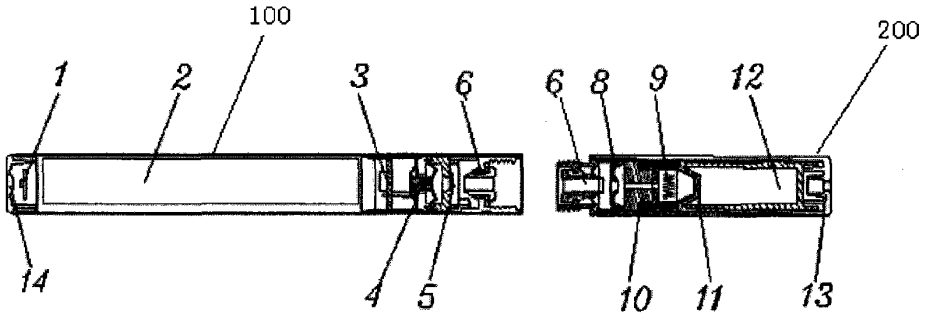


图 1

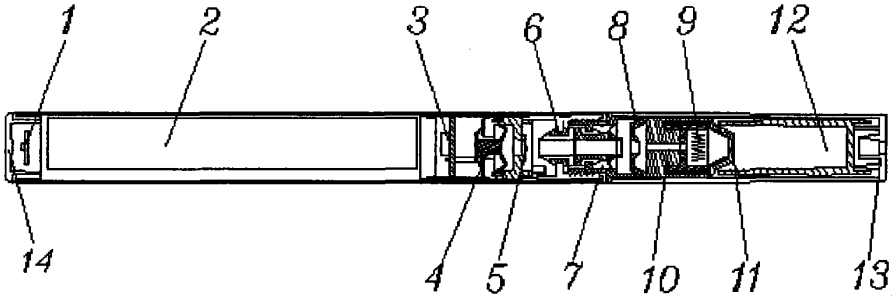


图 2

NJOY Exhibit 1002.459

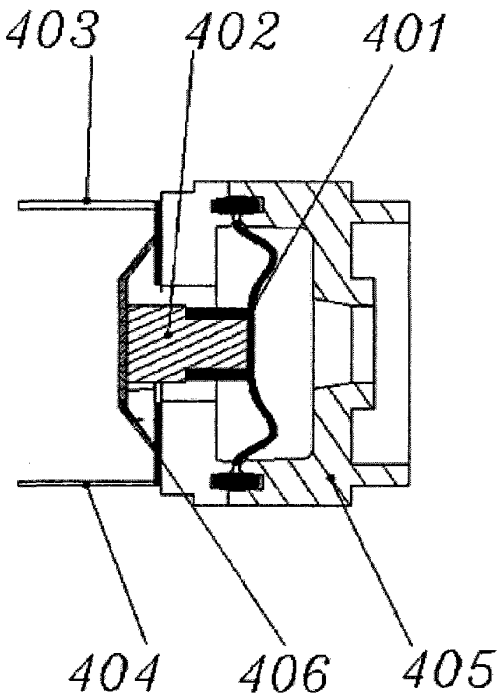


图 3

NJOY Exhibit 1002.460

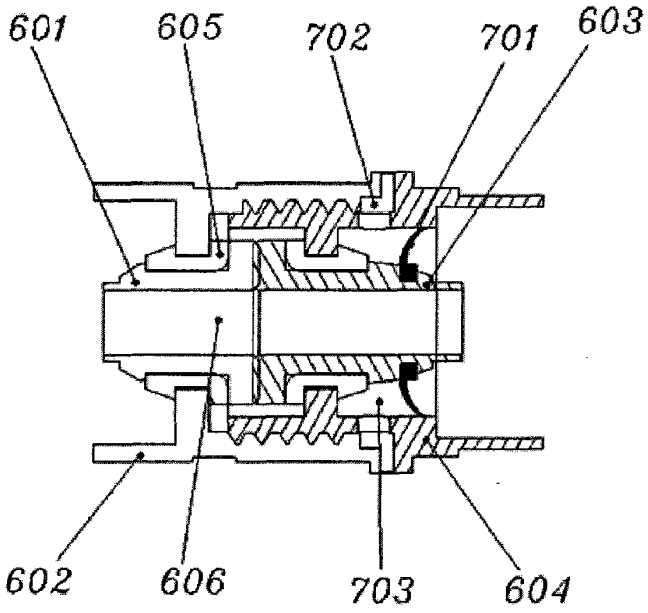


图 4

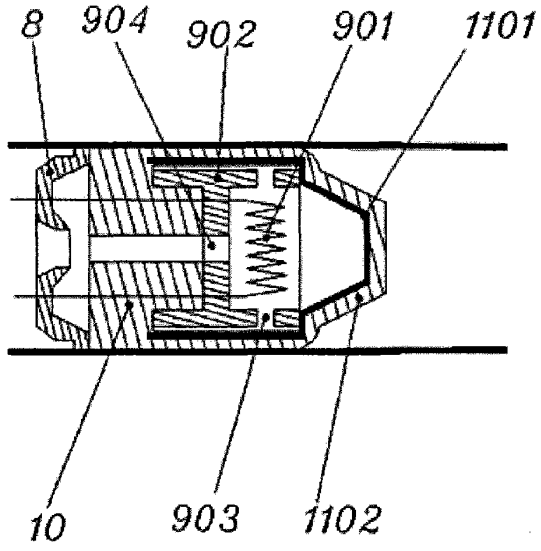


图 5

NJOY Exhibit 1002.461

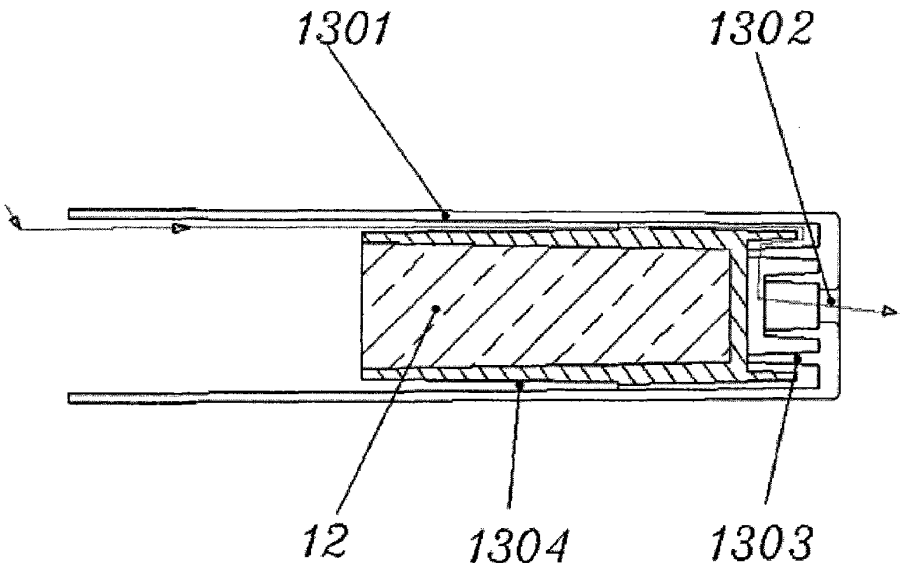


图 6

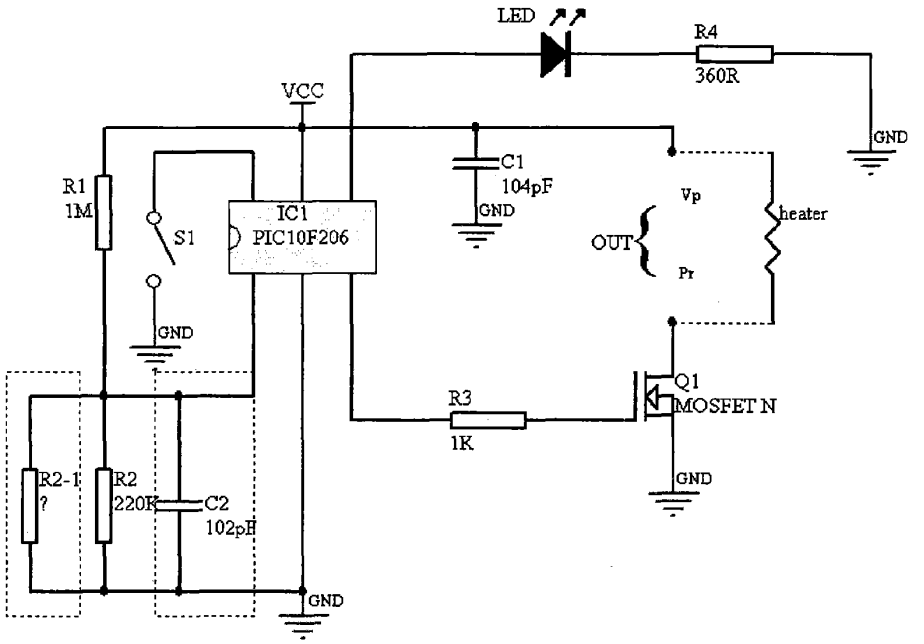


图 7

NJOY Exhibit 1002.462

Espacenet

Bibliographic data: CN201408820 (Y) — 2010-02-17

Charging device for electronic cigarette

Inventor(s): SIHUI HAN; GAOLIAN CHEN ± (HAN SIHUI, ; CHEN GAOLIAN)

Applicant(s): CIXI E CIG ELECTRONIC TECHNOLOGY CO LTD ± (CIXI E-CIG ELECTRONIC TECHNOLOGY CO., LTD)

Classification: **- international:** ***A24B15/00; A24F47/00; H01M10/44***
- cooperative: A24F47/008 (EP)

Application number: CN200920118577U 20090428

Priority number (s): CN200920118577U 20090428

Abstract of CN201408820 (Y)

The utility model relates to a charging device for an electronic cigarette, which comprises a main body, wherein a USB plug is arranged at one end of the main body, a connection port matched with an electronic cigarette charging port is arranged at the other end of the main body, and the connection port is electrically connected with the USB plug. The plug of the charging device adopts the USB plug, so that the electronic cigarette can be directly charged on a computer or other places with a USB interface, thereby providing convenience for users who often use computers; the device has small volume and is convenient for carrying; and in addition, an ordinary power plug with a USB interface is also configured, so that the charging device can realizing charging through the power plug when equipment with a USB interface is not available.

NJOY Exhibit 1002.463

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.
H01M 10/44 (2006.01)
A24F 47/00 (2006.01)
A24B 15/00 (2006.01)

[12] 实用新型专利说明书

专利号 ZL 200920118577.7

[45] 授权公告日 2010 年 2 月 17 日

[11] 授权公告号 CN 201408820Y

[22] 申请日 2009.4.28

[21] 申请号 200920118577.7

[73] 专利权人 慈溪市依赛格电子科技有限公司

地址 315300 浙江省慈溪市担山北路 145 号高科大楼 4 层

[72] 发明人 韩思慧 陈高联

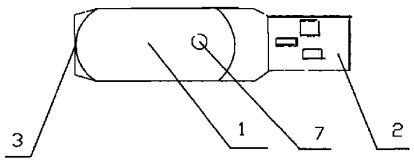
权利要求书 1 页 说明书 3 页 附图 2 页

[54] 实用新型名称

一种用于电子烟的充电装置

[57] 摘要

本实用新型涉及一种用于电子烟的充电装置，包括本体，本体一端为 USB 插头，另一端设有与电子烟充电端口相匹配的连接端口，连接端口与 USB 插头之间电连接。 本实用新型将充电装置的插头设置成 USB 插头，可直接在电脑或其它具有 USB 接口地方充电，方便了一些经常使用电脑的用户，且该充电装置体积小、携带方便。 另外还配有带 USB 接口的普通电源插头，在没有 USB 接口的设备下可通过电源插头充电。



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1. 一种用于电子烟的充电装置，包括本体，其特征在于所述的本体（1）一端为 USB 插头（2），另一端设有与电子烟充电端口相匹配的连接端口（3），所述的连接端口与所述的 USB 插头之间电连接。

2. 根据权利要求 1 所述的一种用于电子烟的充电装置，其特征在于所述的连接端口（3）直接设置在本体（1）上。

3. 根据权利要求 1 所述的一种用于电子烟的充电装置，其特征在于所述的连接端口（3）与本体（1）通过连接线（4）连接。

4. 根据权利要求 1 或 2 或 3 所述的一种用于电子烟的充电装置，其特征在于所述的本体（1）上设有指示灯（7）。

5. 根据权利要求 4 所述的一种用于电子烟的充电装置，其特征在于还包括一电源插头（5），电源插头（5）上直接设有 USB 接口（6），电源插头（5）与 USB 接口电连接。

6. 根据权利要求 4 所述的一种用于电子烟的充电装置，其特征在于还包括一电源插头（5），电源插头通过连接线连接一 USB 接口（6），电源插头（5）与 USB 接口电连接。

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一种用于电子烟的充电装置

（一）技术领域

本实用新型涉及一种电子烟装置，特别涉及电子烟的充电装置。

（二）背景技术

随着科学技术的不断发展和人类生活水平的不断提高，人们越来越意识到吸烟对人类健康及社会环境可造成的巨大危害。尽管吸烟可导致严重的呼吸系统疾病和癌症，让吸烟者完全戒烟是及其困难的事。电子烟与普通香烟某些特征相似，能够提神，满足吸烟者的欣快感和多年养成的吸烟习惯。但是，电子烟又与普通香烟有着本质的区别：电子烟无燃烧，无焦油，不含普通香烟中的可导致呼吸系统与心血管系统疾病的许多化学物质，去除了普通香烟中的致癌物。因此，电子烟越来越成为新型健康的香烟替代品。

目前电子烟中需要使用电池及充电器，如公告日为 2008 年 5 月 7 日专利号为 200720003182.3 的中国实用新型专利一种新型雾化电子烟，该种电子烟由进气通道、电池仓、电子线路板、气流传感器、雾化器、贮液瓶、雾气通道、烟嘴等组成，雾化器内设有加热体。其电池仓中即是放入充电电池，使用一段时间后，需要对其充电，目前的充电器为普通的二脚插头或三脚插头，体积较大，携带不方便。

（三）发明内容

为了克服上述技术问题的不足，本实用新型提供一种体积小、充电方便的用于电子烟的充电装置。

本实用新型解决其技术问题的技术方案是：

一种用于电子烟的充电装置，包括本体，本体一端为 USB 插头，

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另一端设有与电子烟充电端口相匹配的连接端口，所述的连接端口与所述的 USB 插头之间电连接。

该充电装置不同于现有的充电器，而是采用 USB 插头，体积小，携带方便。由于电脑的普及以及标准的统一，USB 接口在很多场合可以看到。使用时，将充电装置上的连接端口与电子烟的充电端口相连接，将 USB 插头插入电脑或其它装置的 USB 接口上，对电子烟内的充电电池进行充电。

连接端口直接设置在本体上。连接端口直接设置在本体上，结构小巧，携带方便，如同一移动 U 盘。

连接端口与本体通过连接线连接。连接端口与本体也可通过连接线连接。

本体上设有指示灯。指示灯用来显示是否在对电子烟进行充电，在充电状态下，指示灯亮。

还包括一电源插头，电源插头上直接设有 USB 接口，电源插头与 USB 接口电连接。还设置一电源插头，在没有 USB 接口状况下，仍采用电源插头充电以满足不同的需要，将 USB 插头插入电源插头的 USB 接口上，再将电源插头插入插座内进行充电，USB 接口可直接设置在电源插头上。

还包括一电源插头，电源插头通过连接线连接一 USB 接口，电源插头与 USB 接口电连接。还设置一电源插头，在没有 USB 接口状况下，采用电源插头充电以满足不同的需要，将 USB 插头插入电源插头的 USB 接口上，再将电源插头插入插座内进行充电，USB 接口通过连接线连接电源插头。

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本实用新型的有益效果在于：本实用新型将充电装置的插头设置成USB 插头，可直接在电脑或其它具有 USB 接口地方充电，方便了一些经常使用电脑的用户，且该充电装置体积小、携带方便。另外还配有带USB接口的普通电源插头，在没有USB接口的设备下可通过电源插头充电。

（四）附图说明

图 1 是本实用新型实施例一的结构示意图；

图 2 是本实用新型实施例一的侧视结构示意图；

图 3 是本实用新型实施例二的结构示意图；

图 4 是本实用新型的电源插头的结构示意图。

（五）具体实施方式

下面结合附图和具体实施方式对本实用新型作进一步详细说明。

实施例一：如图 1 所示，一种用于电子烟的充电装置，包括本体 1，本体 1 一端为 USB 插头 2，本体 1 另一端为与电子烟充电端口相匹配的连接端口 3，连接端口 3 与 USB 插头 2 之间电连接，且连接端口 3 直接设置在本体 1 上，充电装置上还设有指示灯 7。还设有一电源插头 5，如图 4 所示，电源插头上设有 USB 接口 6，USB 接口 6 可直接设置在电源插头 5 上或通过连接线连接。对电子烟进行充电时，将电子烟插入充电装置的连接端口 3，USB 插头 2 插入电脑的 USB 接口，用电脑上的电源对电子烟进行充电。在没有电脑的情况下，将充电装置的 USB 插头插入电源插头的 USB 接口内，再将电源插头插入插座上进行充电。

实施例二：如图 3 所示，一种用于电子烟的充电装置，充电装置的连接端口 3 通过连接线 4 与本体相连接，其它部分与实施例一相同。

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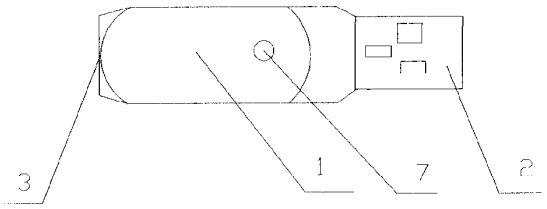


图 1

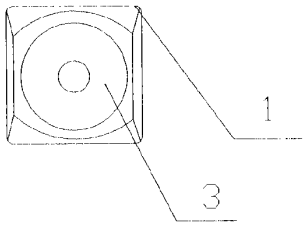


图 2

NJOY Exhibit 1002.469

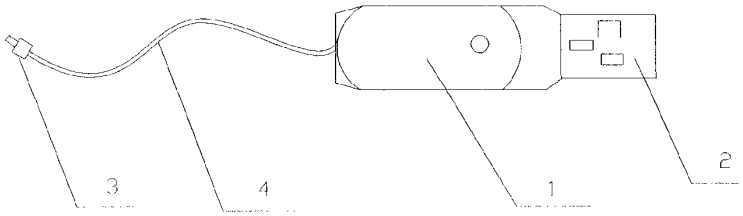


图 3

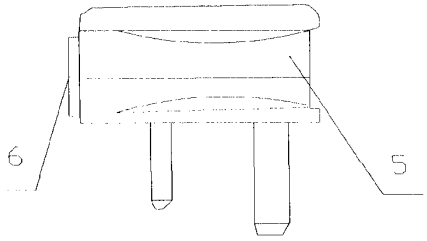


图 4

NJOY Exhibit 1002.470

Espacenet

Bibliographic data: CN201430916 (Y) — 2010-03-31

Simulated electric cigarette

Inventor(s):	ZHEQI LIU ± (LIU ZHEQI)
Applicant(s):	ZHEQI LIU ± (LIU ZHEQI)

Classification:	**- international:** ***A24F47/00*** **- cooperative:**
Application number:	CN200920130902U 20090423
Priority number(s):	CN200920130902U 20090423
Also published as:	JP3160708 (U)

Abstract of CN201430916 (Y)

The utility model provides a simulated electric cigarette, which comprises a cigarette holder, a liquid loader, an atomizer and a cigarette stem. The atomizer consists of an atomizer sleeve, a high-temperature resistant insulation body, an atomizing head, a porous permeating piece, an electric heating wire and an absorption body, wherein the atomizer sleeve is provided with a hollow cavity body and placed inside a casing body of the cigarette holder; the high-temperature resistant insulation body is arranged inside the atomizer sleeve and provided with an atomizing cavity inside; the atomizinghead connected onto the outer circumference of the high-temperature resistant insulation body is connected with the liquid loader and can guide liquid; the electric heating wire contained inside theatomizing cavity is electrically connected onto a battery inside a cigarette stem pipe and connected to a control circuit; the absorption body is contained inside the atomizing cavity, wound on the electric heating wire and is connected with the porous permeating piece; the atomizer sleeve, the high-temperature resistant insulation body, the atomizing head and the cigarette stem pipe are all equipped with ventilation holes for forming a gas passage with a vent hole. Accordingly, atomized liquid using efficiency is improved, the atomized liquid is prevented from leaking, and working control andcharging mode of a rechargeable battery are simplified.

NJOY Exhibit 1002.471

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.
A24F 47/00 (2006.01)

[12] 实用新型专利说明书

专利号 ZL 200920130902.1

[45] 授权公告日 2010 年 3 月 31 日

[11] 授权公告号 CN 201430916Y

[22] 申请日 2009.4.23

[21] 申请号 200920130902.1

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[72] 发明人 柳哲琦

权利要求书 2 页 说明书 7 页 附图 3 页

[54] 实用新型名称

仿真电子烟

[57] 摘要

本实用新型提供了一种仿真电子烟，其包括：烟嘴、液体承载器、雾化器以及烟杆，雾化器包括：雾化器套管，具有中空腔体且设置于烟嘴的壳体中；耐高温绝缘体，设置于雾化器套管内且内设置有雾化腔；雾化头，连接于所述耐高温绝缘体的外周面上，与液体承载器相连接并导流液体；多孔渗透件，设置于雾化头以及所述耐高温绝缘体的外周面上；电热丝，容置于雾化腔内，电连接于烟杆管内的电池及控制电路；以及吸附体，容置于所述雾化腔内，缠绕于电热丝上且与多孔渗透件连接；雾化器套管、耐高温绝缘体、雾化头及烟杆管均设置有与出烟孔形成气体通路的通气开孔。 由此，提高了雾化液使用效率并防止泄露、简化工作控制及充电电池的充电方式。



NJOY Exhibit 1002.472

1．一种仿真电子烟，其包括：

烟嘴，包括壳体并设有出烟孔；

液体承载器，设置于所述烟嘴内并承载有液体，且所述液体承载器与所述出烟孔气体连通；

雾化器，可拆装地连接于所述液体承载器；以及

烟杆，包括可拆卸地连接于所述雾化器上的烟杆管以及设置在所述烟杆管内的电池及控制电路；

其特征在于，所述雾化器包括：

雾化器套管，具有中空腔体且设置于所述烟嘴的壳体中；

耐高温绝缘体，设置于所述雾化器套管内且内设置有雾化腔；

雾化头，连接于所述耐高温绝缘体的外周面上，并与所述液体承载器相连接并导流所述液体；

多孔渗透件，设置于所述雾化头以及所述耐高温绝缘体的外周面上；

电热丝，容置于所述雾化腔内，且电连接于所述电池和所述控制电路；以及

吸附体，容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接；

其中，所述雾化器套管、所述耐高温绝缘体、所述雾化头以及所述烟杆管均设置有与所述出烟孔形成气体通路的通气开孔。

2．如权利要求 1 所述的仿真电子烟，其特征在于，所述烟杆设置有与外界空气连通并与所述雾化器套管的通气开孔连通的开孔，所述控制电路包括有可选择地与所述电池电连通的气压电子开关。

3．如权利要求 1 所述的仿真电子烟，其特征在于，所述的雾化头形成有可刺穿所述液体承载器以使所述多孔渗透件与所述液体形成液体连通的突出部。

4．如权利要求 1 所述的仿真电子烟，其特征在于，所述仿真电子烟还包括有设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述电池电连接的灯。

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5．如权利要求 2 所述的仿真电子烟，其特征在于，所述电池为充电电池。

6．如权利要求 5 所述的仿真电子烟，其特征在于，所述烟杆还包括与所述控制电路以及所述充电电池的正负极分别电连接的正极顶杆以及负极顶杆，所述正极顶杆以及负极顶杆在所述仿真电子烟工作时电连接于所述加热丝的正负极而在所述仿真电子烟充电时与外部电源的正负极电连接。

7．如权利要求 5 所述的仿真电子烟，其特征在于，所述仿真电子烟还包括设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述电池电连接的充电指示灯。

8．如权利要求 6 所述的仿真电子烟，其特征在于，所述雾化器还包括与所述电热丝以及所述电池和控制电路形成电连接的且固定于所述雾化器套管内的正极弹簧和负极弹簧。

9．如权利要求 1 所述的仿真电子烟，其特征在于，所述多孔渗透件为镍网，所述吸附体为玻纤绳。

10．如权利要求 1 所述的仿真电子烟，其特征在于，所述烟杆还包括有与所述电池电连接的且在吸烟时与所述电热丝电连接的插头或 USB 插口。

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仿真电子烟

技术领域

本实用新型涉及一种电子烟，特别涉及一种提高雾化液的使用效率并有效地防止泄露的仿真电子烟。

背景技术

吸烟有害健康是一种公知常识，吸烟每年造成数百万人的死亡，并引发多种疾病，戒烟是一种全球化的趋势，各国政府都在积极倡导戒烟，但让吸烟者戒烟是一种非常困难的事情，且烟民的数量在全球呈增长的趋势，首次吸烟烟民的年龄越来越小。另外，随着烟民数量的增加，全球每年需要的烟叶量也在增长，需要使用大量的耕地来种植烟叶，满足烟厂生产卷烟的需求，虽然烟草行业能够为政府带来巨额的税收，但对全民健康会造成巨大的隐患，特别是对于非烟民来说，二手烟造成的危害更大。

香烟中含有烟碱和焦油，烟碱就是我们俗称的尼古丁，吸烟时烟碱随着香烟的燃烧产生焦油进入肺部而被吸收，作用于人的中枢神经系统，使吸烟者产生兴奋。烟碱在小剂量时对人体无害，其在血液里的半衰期很短，一般情况下都能够很快被降解，香烟中主要的有害物质是焦油，焦油的组成非常复杂，经过研究得知，焦油是导致吸烟者产生各种疾病的罪魁祸首，也是导致吸烟者肺癌发病率高的主要原因。

为了避免吸烟造成的危害，世界各国的研究人员都在努力寻找香烟的替代品，首先制造出了低烟碱含量和低焦油含量的卷烟，但低烟碱含量和低焦油含量的卷烟对于吸烟者来说，口感淡没有味道，烟民不喜欢；其次，研究人员研发了很多卷烟的替代品，如戒烟贴、烟碱口香糖、烟碱饮料等，这些产品虽然不包含焦油，又具有烟的口感，但这些产品改变了吸烟者的习惯，也解决不了烟瘾上来时烟民过瘾的问题，因此，不能够被称为真正的香烟替代品；第三，研究人员推出了电子烟产品，依靠其设计的电路，瞬间将放置于烟嘴中的液体雾化，产生烟雾，而烟嘴中液体的配方可以按照需求和口感

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的要求进行配制，能够解决烟民的需求。目前电子烟产品存在的主要问题是：1、产品结构复杂，如 CN201197839Y 和 CN201079011Y 的结构；2、采用电池充电或电网的 220v 交流电来进行充电，电池的更换会给使用者带来不便，交流电属于强电，对于电子烟的限压、稳压要求高，并可能造成短路，使电子烟产品不能使用；3、液体的雾化采用的是喷射雾化和超声波雾化，这种雾化方式对烟嘴中液体的流出不易控制，会产生漏液的问题，例如 CN201197839Y 和 CN201079011Y 就可能存在着这个问题；4、在现有的电子烟产品中，采用的是气动膜指南针式点火开关，该开关结构复杂，采用金属片进行接触，使用一段时间后会造成接触效果不好，影响使用。

发明内容

鉴于现有技术存在的上述缺陷，本实用新型的目的在于提高雾化液的使用效率并有效地防止泄露。

本实用新型的另一个目的在于，电子烟的使用更简捷，易于控制，效果更佳。

本实用新型还有的目的在于，改变电子烟的充电模式，以可使用弱电进行充电，从而提高安全可靠性。

为了实现本实用新型的上述目的，本实用新型提供了一种仿真电子烟，其包括：烟嘴，包括壳体并设有出烟孔；液体承载器，设置于所述烟嘴内并承载有液体，且所述液体承载器与所述出烟孔气体连通；雾化器，可拆装地连接于所述液体承载器；以及烟杆，包括可拆卸地连接于所述雾化器上的烟杆管以及设置在所述烟杆管内的电池及控制电路。其中，所述雾化器包括：雾化器套管，具有中空腔体且设置于所述烟嘴的壳体中；耐高温绝缘体，设置于所述雾化器套管内且内设置有雾化腔；雾化头，连接于所述耐高温绝缘体的外周面上，并与所述液体承载器相连接并导流所述液体；多孔渗透件，设置于所述雾化头以及所述耐高温绝缘体的外周面上； 电热丝，容置于所述雾化腔内，且电连接于所述电池和所述控制电路；以及吸附体，容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接。其中，所述雾化器套管、所述耐高温绝缘体、所述雾化头以及所述烟杆管均设置有与所述出烟孔形成气体通路的通气开孔。

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针对实用新型的上述目的，优选地，所述烟杆设置有与外界空气连通并与所述雾化器套管的通气开孔连通的开孔，所述控制电路包括有可选择地与所述充电电池电连通的气压电子开关。

针对实用新型的上述目的，所述电池优选为充电电池。优选地，所述烟杆还包括与所述控制电路以及所述充电电池的正负极分别电连接的正极顶杆以及负极顶杆，所述正极顶杆以及负极顶杆在所述仿真电子烟工作时电连接于所述加热丝的正负极而在所述仿真电子烟充电时与外部电源的正负极电连接。

在本实用新型的仿真电子烟中，优选地，所述的雾化头形成有可刺穿所述液体承载器以使所述多孔渗透件与所述液体形成液体连通的突出部。

在本实用新型的仿真电子烟中，优选地，所述仿真电子烟还包括有设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述电池电连接的灯。

在本实用新型的仿真电子烟中，优选地，所述仿真电子烟还包括设置于所述烟杆端部的可拆装的透光灯帽，所述烟杆内设置有与所述控制电路以及所述电池电连接的充电指示灯。

在本实用新型的仿真电子烟中，优选地，所述雾化器还包括与所述电热丝以及所述电池和控制电路形成电连接的且固定于所述雾化器套管内的正极弹簧和负极弹簧。

在本实用新型的仿真电子烟中，优选地，所述多孔渗透件为镍网，所述吸附体为玻纤绳。

在本实用新型的仿真电子烟中，优选地，所述烟杆还包括有与所述电池电连接的且在吸烟时与所述电热丝电连接的插头或 USB 插口。

基于本实用新型的仿真电子烟，提高了雾化液的使用效率并有效地防止泄露；电子烟的使用更简捷，易于控制，效果更佳；改变电子烟的充电模式，以可使用弱电进行充电，从而提高安全可靠性。

此外，使用本实用新型的产品具有逼真的仿真效果，该烟既对吸烟者无害，又具有吸烟时吞云吐雾的效果，由于液体是按照需要配制的，对人体和环境无害，该烟无需点燃，安全性很高，能够为消费者所接受。另外，该产品的推广使用，会减少社会对烟叶的需求，能够保护耕地。

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附图说明

图 1 为依据本实用新型的仿真电子烟的整体结构图；

图 2 为依据本实用新型的仿真电子烟的烟嘴和液体承载器的结构示意图；

图 3 是依据本实用新型一实施方式的雾化器的构件的分解图；

图 4 是依据本实用新型一实施方式的烟杆的构件的分解图；

图 5 是依据本实用新型的仿真电子烟的灯帽的结构示意图。

具体实施方式

下面参照附图来详细说明依据本实用新型的仿真电子烟。

参照图 1 至图 5，依据本实用新型的仿真电子烟包括：烟嘴 10，包括壳体 101 并设有出烟孔 102；液体承载器 20，设置于烟嘴 10 的壳体 101 内并承载有液体（图未示出），且液体承载器 20 与出烟孔 102 气体连通；雾化器 30，可拆装地连接于液体承载器 20；以及烟杆 40，包括可拆卸地连接于所述雾化器 30 上的烟杆管 470 以及设置在所述烟杆管 470 内的电池 450 及控制电路 460。

其中，烟雾化器 30 包括：雾化器套管 310，具有中空腔体且设置于烟嘴 10 的壳体 101 中；耐高温绝缘体 320，设置于雾化器套管 310 内且内设置有雾化腔；雾化头 330，连接于耐高温绝缘体 320 的外周面上，并与液体承载器 20 相连接，以导流液体；多孔渗透件（图未示出），设置于雾化头 330 以及耐高温绝缘体 320 的外周面上；电热丝（图未示出），容置于所述雾化腔内，且电连接于所述电池和所述控制电路；以及吸附体（图未示出），容置于所述雾化腔内，缠绕于所述电热丝上且与所述多孔渗透件连接。其中，雾化器套管 310、耐高温绝缘体 320、雾化头 330、以及所述烟杆管 470 均设置有与出烟孔 102 形成气体通路的通气开孔或开口（例如附图标记 3101、3301、3201 所示）。

在上述实施方式中，则当雾化头 330 与液体承载器 20 相连接时，则液体承载器 20 内的液体将被引导并保留在所述多孔渗透件上，而由于在所述雾化腔内设置有缠绕于所述电热丝上且与所述多孔渗透件 330 连接的吸附体，所述液体将通过渗流作用被吸附到所述吸附体上，以在电热丝加热时将

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所述液体雾化，从而形成烟雾。这样就可以避免直接对保留在所述多孔渗透件上的液体进行时导致的雾化量过大、液体承载器 20 中的液体使用时间短的缺陷。此外，由于吸附体和所述多孔渗透件之间的连接，通过它们二者之间的渗透所用，可以防止所述多孔渗透件上保留的液体通过雾化器套管 310 和烟嘴 10 的壳体 101 之间的间隙泄露出，从而进一步提高了液体承载器 20 的使用效率。

在上述实施方式中，所述耐高温绝缘体 320 可以为陶瓷绝缘材料，以承受所述加热丝工作时所产生的高温。

在上述实施方式中，所述多孔渗透件可以为镍网，所述吸附体可以为玻纤绳。

在上述实施方式中，液体承载器所含的液体可包含各种符合要求的成分，以满足不同口感和各种治疗的需求，例如加入各种治疗口腔疾病和提神醒脑作用的中医成分。

在上述实施方式中，雾化头 330 形成有突出部 3302，其可刺穿液体承载器 20 以使所述多孔渗透件与所述液体形成液体连通，如图 3 所示。此时液体承载器 20 可在相应部位设置有可被突出部 3302 穿破、以使液体流出的铝箔（图未示出）。

在上述实施方式中，在雾化器套管 310、耐高温绝缘体 320 以及雾化头 330 设置的与出烟孔 102 形成气体通路的通气开孔或开口，由于其与外界空气连通，使得抽吸本实用新型的仿真电子烟时更容易，从而与抽吸普通香烟时的抽吸阻力大体相当。

针对本实用新型的仿真电子烟，为了使电子烟的使用更简捷，易于控制，效果更佳，控制电路 460 还可设置有气压电子开关，其通过感测烟杆管内的气流变化来导通电池 450、控制电路 460 以及加热丝之间的电连通。此时烟杆 40 设置有与外界空气连通并与所述套管的通气开孔连通的开孔（图未示出）。在吸仿真电子烟时，通过这些开孔实现了将外部空气导入并引导至出烟孔 102，同时致动气压电子开关以启动雾化操作，所述空气与雾化产生的气体一起被从出烟孔 102 吸出。

为了更进一步地逼近抽吸普通香烟时的视觉，所述仿真电子烟还可包括有设置于烟杆 40 端部的可拆装的透光灯帽 50，烟杆 40 内设置有与控制电路

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460 以及电池 450 电连接的灯（未示出）。所述灯发出红光，以模拟普通香烟点燃的烟头部分。

此外，为了实现将外部空气引入到烟杆管 470 中，灯帽 50 的周边缘可可设置有通气孔 501。

在依据本实用新型的仿真电子烟中，电池 450 可以为充电电池。优选地，为了能无需将充电电池拆下而直接进行充电，烟杆 40 还包括与控制电路 460 以及充电电池的正负极分别电连接的正极顶杆 410 以及负极顶杆 420，正极顶杆 410 以及负极顶杆 420 在所述仿真电子烟工作时电连接于所述加热丝的正负极、而在所述仿真电子烟充电时与外部电源（图未示出）的正负极电连接。正极顶杆 410 以及负极顶杆 420 之间的绝缘可以采用各种方式，在一个实施方式中，如图 4 所示的形式，具体而言，正极顶杆 410 置于绝缘套管 430 的腔体内，而绝缘套管 430 置于负极顶杆 420 的腔体内，或者采用相反的顺序进行套装。此外，为了降低吸烟时的阻力，可使得安装在最里面的相应顶杆设置有通孔（例如附图标记 4401 所示），以与雾化头 330 的开口及出烟孔 102 气体连通。此时，控制电路中设置有相应的与吸烟操作匹配的工作电路以及与给充电电池进行充电相匹配的充电控制电路。

此外，可替代地，可以在电池上设置有一个与其相连接的插头或 USB 插口（图未示出），所述插头或 USB 插口可以与外部电源或电热丝实现电连接。

此外，为了显示充电状态，还可在烟杆 40 的烟杆管 470 的端部设置可拆装的透光灯帽 50，所述烟杆内 40 内设置与控制电路 460 以及电池 450 电连接的充电指示灯。此时，吸烟时的模拟点燃烟头的灯和充电时的充电指示灯可以为同一灯，或者为具有不同颜色的灯。当吸烟时的模拟点燃烟头的灯和充电时的充电指示灯为同一灯时，需要对控制电路进行改变，以实现吸烟和充电时不同电路之间的切换，这个属于本领域的公知常识，在此不再赘述。

在依据本实用新型的仿真电子烟中，为了克服公知电子烟在电热丝电连接时由于采用硅胶所带来的老化问题，雾化器 30 还可包括与所述电热丝以及所述电池和控制电路形成电连接的且固定于雾化器套管 310 内的正极弹簧 340 和负极弹簧 350，如图 3 所示。在此所述电连接可以通过正极弹簧 340 和负极弹簧 350 锡焊、钎焊、缠结等方式来实现。

NJOY Exhibit 1002.480

此外，在依据本实用新型的仿真电子烟中，雾化器 30 与烟杆 40 之间的结合方式可以为插接、螺接等。在一优选实施方式中，如图 3 和图 4 所示，可采用螺接方式，通过设置在雾化器套管 310 内的螺套 360 以及设置在烟杆管 470 中并置于烟杆管 470 一端的螺杆 440 来实现雾化器 30 与烟杆 40 之间的结合。当然，也可以反过来，螺套可以设置在烟杆中而螺杆设置在雾化器套管中。

此外，当采用螺杆和螺套连接时，可在螺杆或螺套的边缘设置与外界空气连通的开口，以与雾化头 330 的开口及出烟孔 102 气体连通；或者如图 4 中所示，在螺杆 440 的本体凸缘上设置与外界空气连通的开口 4401，以与安装在烟杆管 470 中的各相应部件设置的开口或孔形成气体连通。同时，安装在烟杆管 470 中的螺杆或螺套还可以与外部的充电器的相应部件连接，以实现普通插头式的电连接或 USB 式的电连接，从而在不同电压进行不同模式的充电。

此外，为了增加雾化头的稳定性，还可设置有固定座 370，如图 3 所示。此时前述设置在耐高温绝缘件 320 的雾化头 310 卡在固定座 370 的两个凸部 3701 上。同时固定座 370 中间设置有上下贯通孔 3702，以与雾化头 310 的开孔 3301 气体连通。

NJOY Exhibit 1002.481



图 1

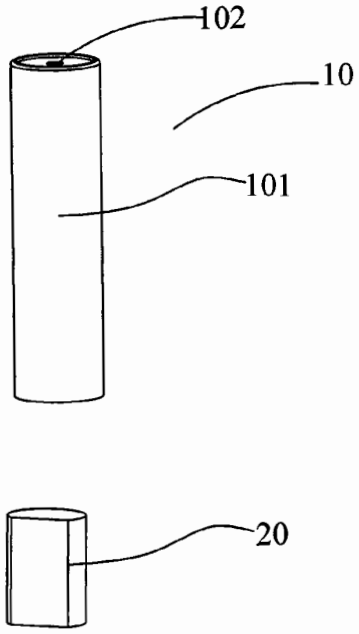


图 2

NJOY Exhibit 1002.482

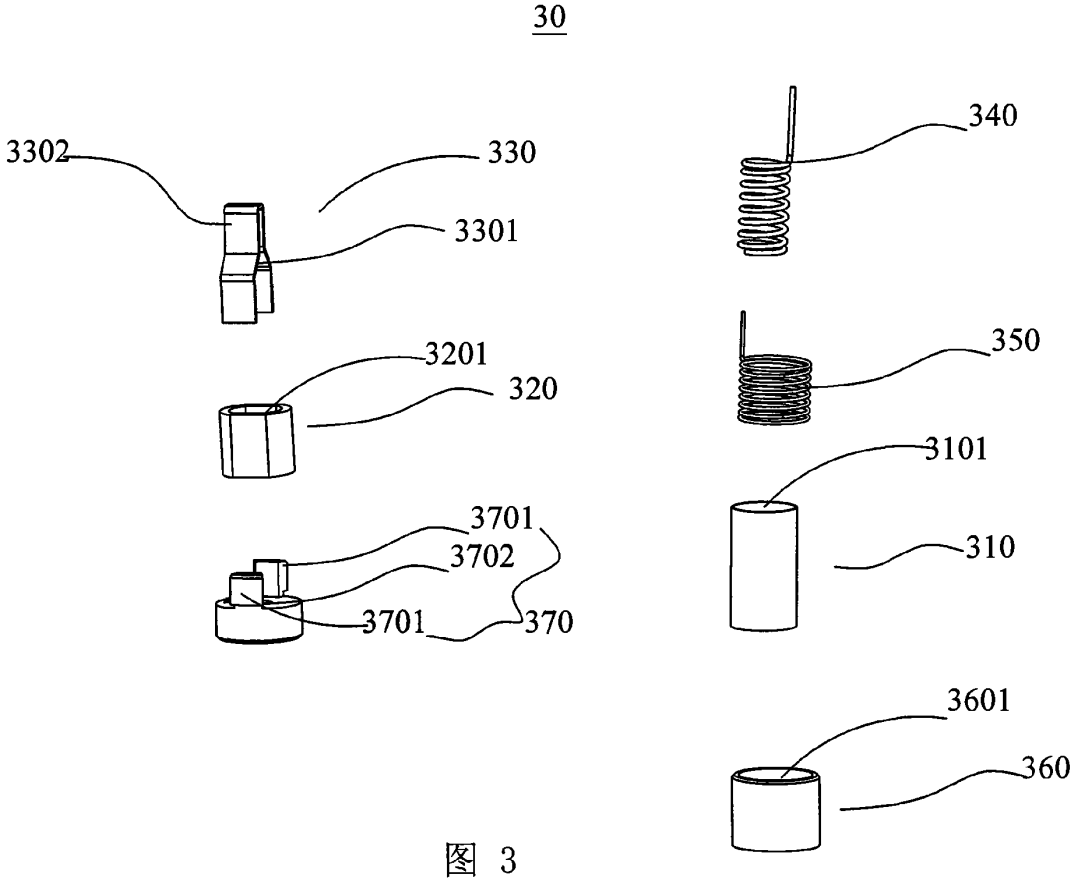


图 3

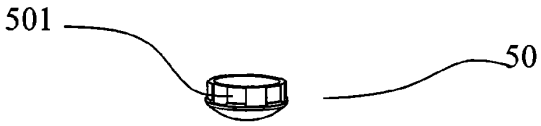


图 5

NJOY Exhibit 1002.483

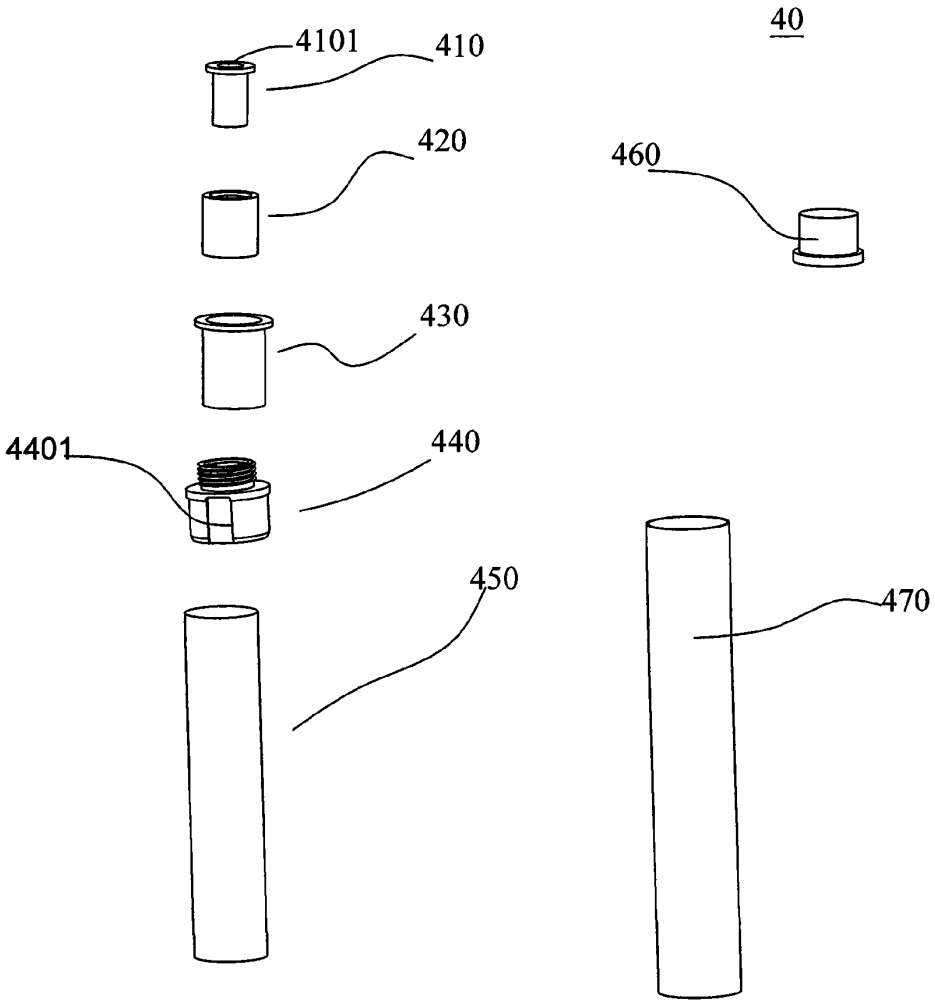


图 4

NJOY Exhibit 1002.484

Espacenet

Bibliographic data: CN201781984 (U) — 2011-04-06

Electronic cigarette atomizer and electronic cigarette

Inventor(s):	ZHENLAI CHEN ± (CHEN ZHENLAI)
Applicant(s):	ZHENLAI CHEN ± (CHEN ZHENLAI)

Classification:	**- international:**	***A24F47/00***
	- cooperative:	**A24F47/008 (EP)**
Application number:	CN201020296330U 20100818	
Priority number(s):	CN201020296330U 20100818	

Abstract of CN201781984 (U)

The utility model discloses an electronic cigarette atomizer and an electronic cigarette. The electronic cigarette atomizer comprises a casing, an electric heating wire and oil guide cotton, wherein one end of the casing comprises a cigarette pole connector, and the other end of the casing comprises a cigarette holder connector; the inner part of the casing comprises an atomization cavity; the electric heating wire and oil guide cotton are arranged inside the atomization cavity; a projection that protrudes outwards is formed at the cigarette holder connector end of the casing; an axial hole communicated with the atomization cavity is formed on the projection; and oil guide cotton passes through the axial hole. An oil outlet is formed on the end surface of one end of an oil cup of a cigarette holder of the electronic cigarette, and the end provided with the oil outlet faces to the atomizer; and the oil outlet adapts to the projection formed on the atomizer. The electronic cigarette atomizer has the advantages of high oil guide speed and great produced smoke, the oil cup of the electronic cigarette is not easy to leak oil, and tobacco tar cannot be sucked out; in addition, the oil cup does not need oil absorbent sheets, the oil cup with the same volume contains great oil content, more smoking times can be achieved, and the product cost is lower.

NJOY Exhibit 1002.485

(19)中华人民共和国国家知识产权局

(12)实用新型专利

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A24F 47/00(2006.01)

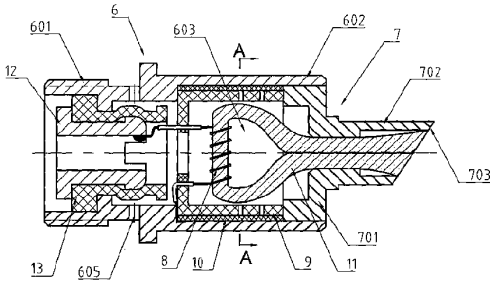
权利要求书 1 页 说明书 3 页 附图 3 页

(54)实用新型名称

一种电子烟雾化器和电子烟

(57)摘要

本实用新型公开了一种电子烟雾化器和电子烟。电子烟雾化器包括壳体、电热丝和导油棉，所述壳体的一端包括烟杆接头，另一端包括烟嘴接头；所述壳体的内部包括雾化腔，所述的电热丝和导油棉布置在雾化腔中，所述壳体在所述烟嘴接头的一端包括 1 个向外突出的突起，所述的突起包括 1 个与雾化腔连通的轴向孔，所述的导油棉穿入所述的轴向孔。电子烟烟嘴的油杯朝向雾化器的一端的端面包括出油孔，所述的出油孔与所述的雾化器的突起相适配。本实用新型的电子烟雾化器导油速度快，产生的烟量大，电子烟的油杯不易漏油，不会吸出烟油；油杯不用吸油棉，同体积的油杯内含油量多，吸烟口数多，产品成本较低。



CN 201781984 U

NJOY Exhibit 1002.486

1. 一种电子烟雾化器，包括壳体、电热丝和导油棉，所述的壳体的一端包括烟杆接头，另一端包括烟嘴接头；所述壳体的内部包括雾化腔，所述的电热丝和导油棉布置在雾化腔中，其特征在于，所述壳体在所述烟嘴接头的一端包括 1 个向外突出的突起，所述的突起包括 1 个与雾化腔连通的轴向孔，所述的导油棉穿入所述的轴向孔。

2. 根据权利要求 1 所述的电子烟雾化器，其特征在于，所述壳体包括本体和前突部，所述的本体包括所述的雾化腔，所述的前突部包括突缘和所述的突起；所述的突缘固定在本体的端部，部分封闭雾化腔。

3. 根据权利要求 2 所述的电子烟雾化器，其特征在于，所述的突起是圆柱形的突起，所述突起的前端包括 1 个斜切面。

4. 根据权利要求 2 所述的电子烟雾化器，其特征在于，所述的导油棉是导油棉线，所述的电热丝缠绕在导油棉线的外周。

5. 根据权利要求 1 至 4 中任一权利要求所述的电子烟雾化器，其特征在于，包括陶瓷杯，所述的陶瓷杯镶嵌在雾化腔中，陶瓷杯的底部包括 1 个通气孔；所述的电热丝布置在所述的陶瓷杯中。

6. 根据权利要求 1 至 4 中任一权利要求所述的电子烟雾化器，其特征在于，包括中央电极和橡胶套，所述的中央电极包括 1 个轴向通孔；所述的中央电极通过橡胶套固定在所述壳体的烟杆接头端；所述的电热丝一端与所述的中央电极电连接，另一端与所述的壳体电连接。

7. 一种电子烟，包括烟杆、雾化器和烟嘴，所述的烟嘴中包括油杯，所述的烟杆包括电源和雾化器接头，其特征在于，所述的雾化器是权利要求 1 所述的电子烟雾化器，所述的油杯朝向雾化器的一端的端面包括出油孔，所述的出油孔与所述的雾化器的突起相适配。

8. 根据权利要求 7 所述的电子烟，其特征在于，所述的油杯包括端盖，所述的端盖包括所述的出油孔，所述的出油孔是圆孔，所述的出油孔包括封闭膜，所述的突起是圆柱形突起，所述突起的前端包括 1 个斜切面。

9. 根据权利要求 7 所述的电子烟，其特征在于，所述油杯的侧面与烟嘴内壁之间包括轴向的气道。

10. 根据权利要求 7 所述的电子烟，其特征在于，所述的雾化器包括中央电极和橡胶套，雾化器的中央电极包括 1 个轴向通孔；雾化器的中央电极通过橡胶套固定在所述壳体的烟杆接头端；所述的电热丝一端与雾化器的中央电极电连接，另一端与雾化器的壳体电连接；所述烟杆包括中央电极，烟杆中央电极包括 1 个轴向通孔，烟杆中央电极固定在烟杆雾化器接头的底部，烟杆中央电极与烟杆雾化器接头绝缘；所述的电源的一端与烟杆中央电极电连接，另一端与烟杆雾化器接头电连接；雾化器的壳体与烟杆雾化器接头电连接，雾化器的中央电极与烟杆中央电极电连接。

NJOY Exhibit 1002.487

一种电子烟雾化器和电子烟

[技术领域]

[0001] 本实用新型涉及一种传统烟草的替代品，尤其涉及一种电子烟雾化器和电子烟。

[背景技术]

[0002] 吸烟有害健康，而且容易引起火灾。为了克服传统烟草的缺点，人们发明了电子烟，申请号为 2009101408807.6 的中国发明专利申请公开了一种电子烟，可以作为香烟的替代品，长期使用可有效避免香烟对人体的危害，同时可以降低吸烟成本，无烟灰、无明火，环保而且无消防隐患。

[0003] 电子烟主要分三部分结构：电池杆（烟杆）、雾化器和烟嘴。电池杆提供电力和工作程序方案，雾化器是产生烟雾的发动机，烟嘴储存烟油并提供烟雾的通道。当吸烟者吸气时电池杆中产生负压将空气开关打开，电路接通，雾化器开始工作产生烟雾，雾化过程中烟油蒸发，蒸发动力带动油杯（烟弹）供油；当吸烟者吐烟时（呼气），空气开关自动关闭电源，雾化器停止工作。

[0004] 申请号为 2009101408807.6 的中国发明专利申请公开的电子烟和其他现有电子烟的缺点是：

[0005] 1. 雾化器采用金属网导油和储油，结构松散．导油速度慢，产生的烟量小；

[0006] 2. 烟嘴油杯采用开放式，要用油棉阻油，硅胶塞．锡箔纸封口，使用过程会漏油，容易吸出烟油；

[0007] 3. 物料多，加工繁琐，耗时．增加生产成本。

[发明内容]

[0008] 本实用新型要解决的技术问题是提供一种导油速度快，产生的烟量大的电子烟雾化器。

[0009] 本实用新型另一个要解决的技术问题是提供一种油杯不易漏油、烟量大的电子烟。

[0010] 为了解决上述技术问题，本实用新型采用的技术方案是，一种电子烟雾化器，包括壳体、电热丝和导油棉，所述壳体的一端包括烟杆接头，另一端包括烟嘴接头；所述壳体的内部包括雾化腔，所述的电热丝和导油棉布置在雾化腔中，所述壳体在所述烟嘴接头的一端包括 1 个向外突出的突起，所述的突起包括 1 个与雾化腔连通的轴向孔，所述的导油棉穿入所述的轴向孔。

[0011] 所述壳体包括本体和前突部，所述的本体包括所述的雾化腔，所述的前突部包括突缘和所述的突起；所述的突缘固定在本体的端部，部分封闭雾化腔。

[0012] 所述的突起是圆柱形的突起，所述突起的前端包括 1 个斜切面。

[0013] 所述的导油棉是导油棉线，所述的电热丝缠绕在导油棉线的外周。

[0014] 以上所述的电子烟雾化器，包括陶瓷杯，所述的陶瓷杯镶嵌在雾化腔中，陶瓷杯的底部包括 1 个通气孔；所述的电热丝布置在所述的陶瓷杯中。

NJOY Exhibit 1002.488

[0015] 以上所述的电子烟雾化器，包括中央电极和橡胶套，所述的中央电极包括 1 个轴向通孔；所述的中央电极通过橡胶套固定在所述壳体的烟杆接头端；所述的电热丝一端与所述的中央电极电连接，另一端与所述的壳体电连接。

[0016] 一种电子烟的技术方案是，包括烟杆、雾化器和烟嘴，所述的烟嘴中包括油杯，所述的烟杆包括电源和雾化器接头，所述的雾化器是上述的电子烟雾化器，所述的油杯朝向雾化器的一端的端面包括出油孔，所述的出油孔与所述的雾化器的突起相适配。

[0017] 所述的油杯包括端盖，所述的端盖包括所述的出油孔，所述的出油孔是圆孔，所述的出油孔包括封闭膜，所述的突起是圆柱形突起，所述突起的前端包括 1 个斜切面。

[0018] 所述油杯的侧面与烟嘴内壁之间包括轴向的气道。

[0019] 所述的雾化器包括中央电极和橡胶套，雾化器的中央电极包括 1 个轴向通孔；雾化器的中央电极通过橡胶套固定在所述壳体的烟杆接头端；所述的电热丝一端与雾化器的中央电极电连接，另一端与雾化器的壳体电连接；所述烟杆包括中央电极，烟杆中央电极包括 1 个轴向通孔，烟杆中央电极固定在烟杆雾化器接头的底部，烟杆中央电极与烟杆雾化器接头绝缘；所述的电源的一端与烟杆中央电极电连接，另一端与烟杆雾化器接头电连接；雾化器的壳体与烟杆雾化器接头电连接，雾化器的中央电极与烟杆中央电极电连接。

[0020] 本实用新型的电子烟雾化器导油速度快，产生的烟量大，电子烟的油杯不易漏油，不会吸出烟油；油杯不用吸油棉，同体积的油杯内含油量多，吸烟口数多，产品成本较低。

[附图说明]

[0021] 下面结合附图和具体实施方式对本实用新型作进一步详细的说明。

[0022] 图 1 是本实用新型电子烟实施例雾化器主视方向的剖面图。

[0023] 图 2 是本实用新型电子烟实施例雾化器的右视图。

[0024] 图 3 是图 1 中的 A 向剖视图。

[0025] 图 4 是本实用新型电子烟实施例烟杆的主视图。

[0026] 图 5 是本实用新型电子烟实施例烟嘴主视方向的剖面图。

[0027] 图 6 是本实用新型电子烟实施例烟嘴的左视图。

[0028] 图 7 是图 5 中的 B 向剖视图。

[0029] 图 8 是本实用新型电子烟实施例的主视图。

[0030] 图 9 是图 8 中 C 部位的局部放大图。

[具体实施方式]

[0031] 在图 1 至图 9 所示的本实用新型电子烟的实施例中，电子烟包括烟杆 1、雾化器 2 和烟嘴 3。烟嘴 3 中有油杯 4，烟杆 1 中有电源和雾化器接头 5。

[0032] 如图 1 至图 3 所示，雾化器 2 包括由本体 6 和前突部 7 组成的壳体、电热丝 8、陶瓷杯 9、高温导管 10 和导油棉线 11，本体 6 的左端有外螺纹的烟杆接头 601，右端有外圆柱面的烟嘴接头 602；本体 6 的内部是雾化腔 603，电热丝 8 和导油棉线 11 布置在雾化腔 603 中。

[0033] 前突部 7 包括突缘 701 和圆柱形的突起 702，突起 702 的前端有 1 个斜切面 703，形成 1 个锐利的尖端。突起 702 的中心有 1 个与雾化腔 603 连通的轴向孔，导油棉线 11 穿

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入轴向孔中。突缘 701 通过过盈固定在本体 6 的左端的内孔中，突缘 701 为非圆结构，仅部分封闭雾化腔 603，两侧形成烟雾的通道 604。

[0034] 陶瓷杯 9 通过高温导管 10 镶嵌在本体 6 的雾化腔 603 中，陶瓷杯 9 的底部有 1 个通气孔用以连通烟杆 1 的气道。电热丝 8 和导油棉线 11 的主体布置在陶瓷杯 9 中，电热丝 8 缠绕在导油棉线 11 主体部分的外周。

[0035] 雾化器 2 的左端布置有中央电极 12 和硅胶套 13，中央电极 12 有 1 个轴向通孔以连通烟杆 1 的气道。中央电极 12 通过硅胶套 13 固定在本体 6 的左端。电热丝 8 一端的导线焊接在中央电极 12 上，另一端的导线由高温导管 10 压在本体 6 上形成电连接。

[0036] 烟嘴 3 的结构如图 5 至图 7 所示，烟嘴本体 17 内装有油杯 4，油杯 4 朝向雾化器 2 的一端的端面有端盖 401，端盖 401 的中央有出油孔 402，出油孔 402 是圆孔，出油孔 402 中有封闭薄膜 403 将出油孔 402 封闭。

[0037] 油杯 4 出油孔 402 的直径与雾化器 2 左端圆柱形的突起 702 的直径相同，当烟嘴 3 与雾化器 2 组合时，突起 702 前端斜切面 703 形成的锐利尖端可以轻易刺破封闭薄膜 403，圆柱形的突起 702 插入油杯 4 的储油腔 404 中，突起 702 轴向孔中的导油棉线 11 浸在油杯 4 的储油腔 404 的烟油中，烟油顺着导油棉线 11 进入雾化器 2 的雾化腔 603。突起 702 的直径与油杯 4 出油孔 402 的直径相同，突起 702 插入出油孔 402 后，即将出油孔 402 封闭，出油孔 402 不会向外漏油。

[0038] 油杯 4 的侧面有 1 平面，与烟嘴本体 17 内壁之间形成轴向的气道 1701，道 1701 与烟嘴本体上的吸气口 1702 相通。

[0039] 在图 4 中，烟杆 1 的最左端压装有雾化器接头 5，雾化器接头 5 的内孔有内螺纹与雾化器本体 6 左端的外螺纹连接。雾化器接头 5 的底部安装有中央电极 14，中央电极 14 通过硅胶套 15 与烟杆雾化器接头 5 绝缘。烟杆 1 中的电源包括电池和空气开关，电源的导线之一焊接在中央电极 14 上，电源的另一根导线与烟杆雾化器接头 5 电连接。当雾化器 2 与烟杆 1 的螺纹旋合后，雾化器 2 的本体 6 与烟杆雾化器接头 5 电连接，雾化器的中央电极 12 与烟杆中央电极 14 电连接，构成完整的电路。

[0040] 雾化器本体 6 的外螺纹的空刀处有进气孔 605，烟杆雾化器接头 5 的头部有进气道 501，进气孔 605 与进气道 501，吸烟者吸气时，外部空气经过进气孔 605、进气道 501 进入雾化腔 603。

[0041] 本实用新型以上的实施例与现有技术相比有以下优点：

[0042] 1. 采用高导油棉偿还直接导油，导油速度快。而现有技术是采用镍网导油，导油速度慢。2. 采用管道密封式输油，不漏油。而现有技术是采用开放式网格输油有漏油现象。3. 油杯里不用吸油棉，同体积内含油量多，吸烟口数多。4. 采用密封式供油不易损坏，使用寿命长现有技术采用组合，开放式易损坏。5。结构简单，简化工序，生产成本较低。

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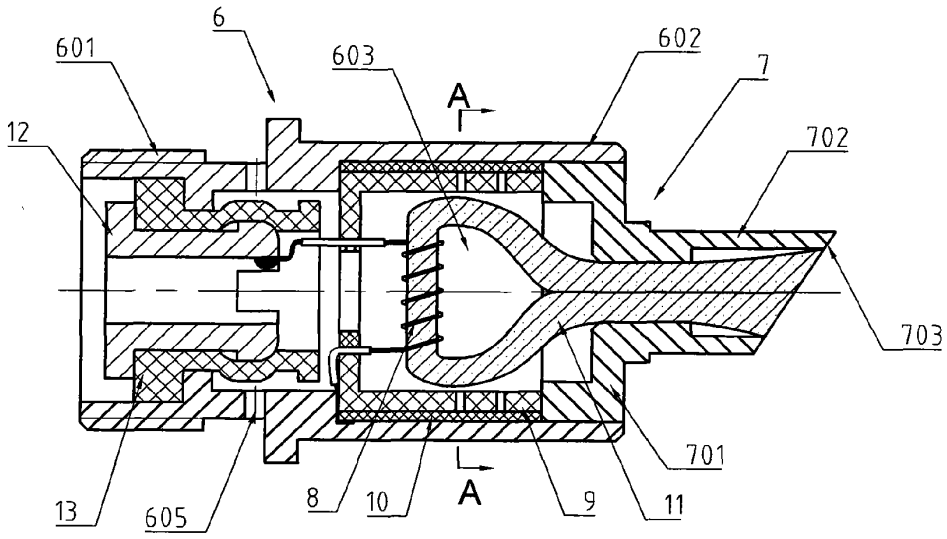


图 1

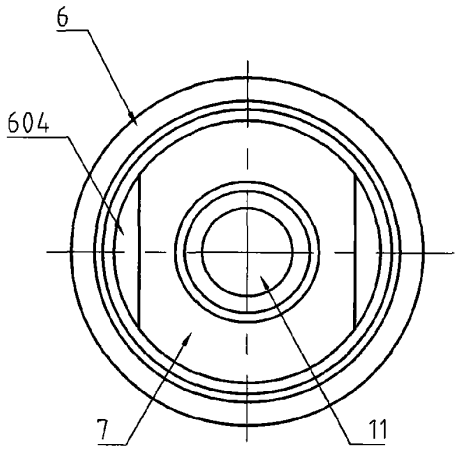


图 2

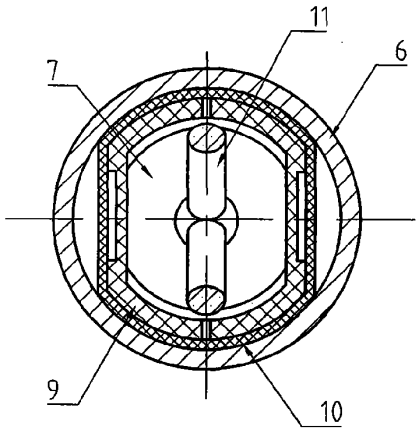


图 3

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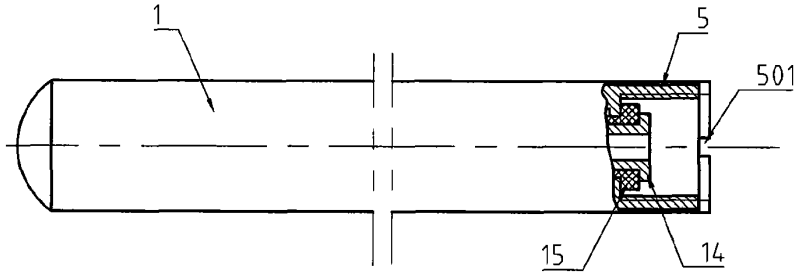


图 4

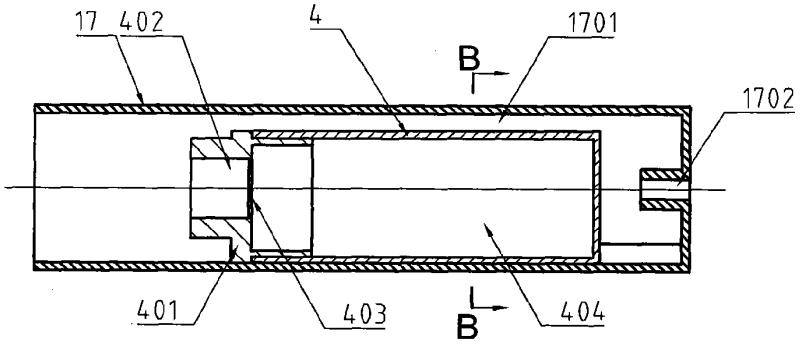


图 5

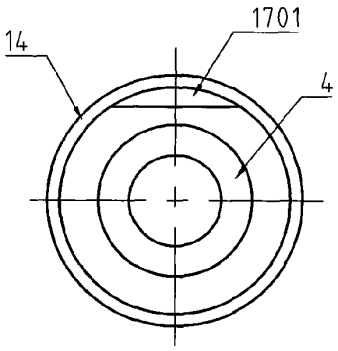


图 6

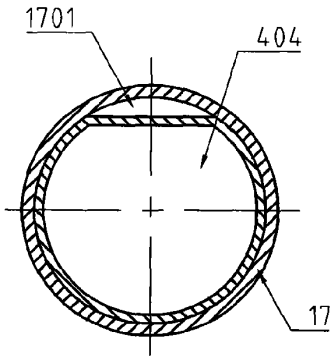


图 7

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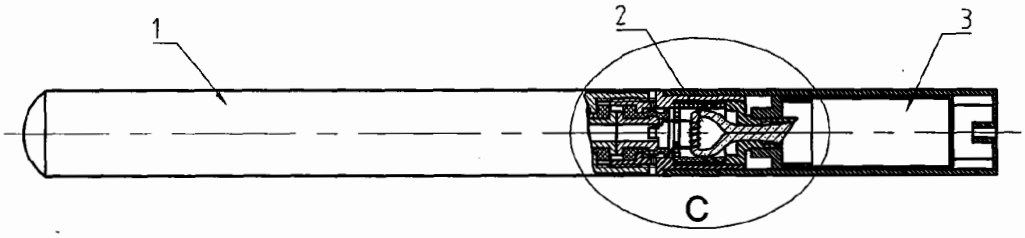


图 8

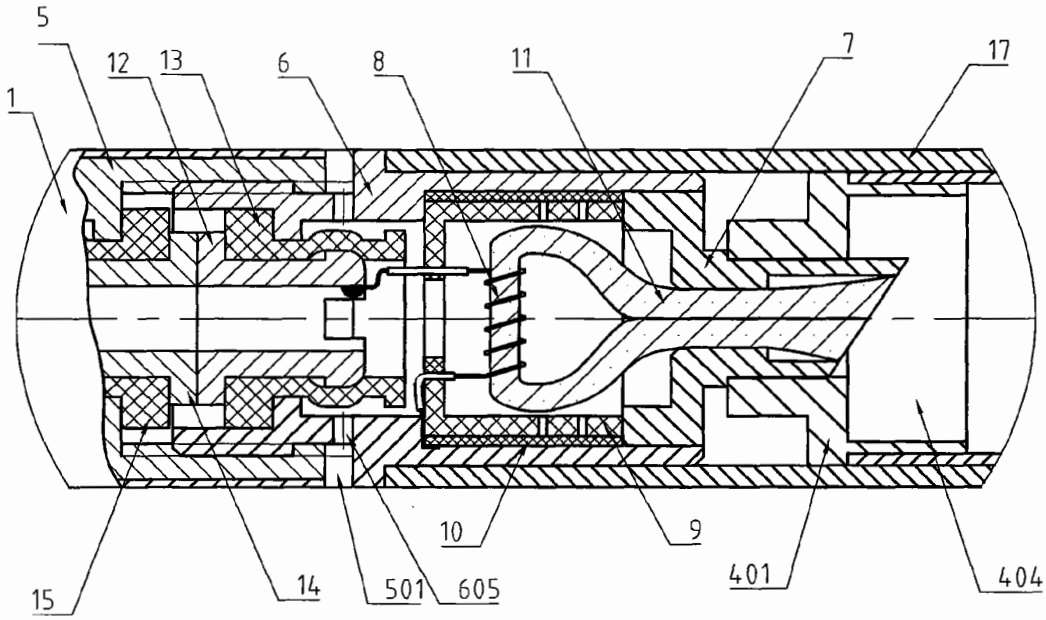


图 9

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Espacenet

Bibliographic data: CN202004499 (U) — 2011-10-05

Bluetooth vertical holder charger with rotary USB (universal serial bus) interface

Inventor(s): QIAN HE ± (HE QIAN)

Applicant(s): QIAN HE ± (HE QIAN)

Classification: **- international:** ***H01R13/46; H01R13/62; H02J7/00***
- cooperative:

Application number: CN201120138339U 20110504

Priority number(s): CN201120138339U 20110504

Abstract of CN202004499 (U)

The utility model discloses a bluetooth vertical holder charger with a rotary USB (universal serial bus) interface, which comprises a charging holder and a USB charging interface which are adaptively installed. A charging socket which is matched with a bluetooth electric device charging plug is arranged on the charging holder. Charging contact pins are arranged in the charging socket. The charging holder is rotatably hinged on the USB charging interface. The charging holder is a holder body which can rotate up and down within 180 degrees on the USB charging interface. The charging holder and the USB charging interface 2 form a split hinged structure which can rotate flexibly. When the bluetooth vertical holder charger is used, the charging holder can rotatably swing up and down within 180 degrees on the USB charging interface, the use process is very flexible and convenient, and people do not need to pull out and inversely install a USB charging structure in order to adjust a charging direction. Moreover, the structure of the product is very simple, a display function can be greatly improved, and the practicability is high.

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(12)实用新型专利

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H01R 13/46(2006.01)
H01R 13/62(2006.01)

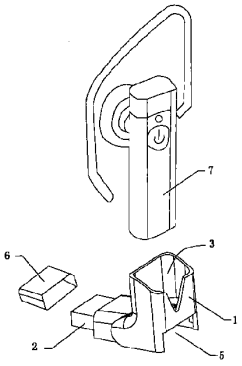
权利要求书 1 页 说明书 2 页 附图 3 页

(54)实用新型名称

一种可旋转式USB接口蓝牙垂直座充

(57)摘要

本实用新型公开了一种可旋转式USB接口蓝牙垂直座充，它包括相配安装的充电座及USB充电接口，充电座上开有与蓝牙电器充电插头相配的充电插口，充电插口内设有充电接触脚，所述充电座旋转铰接在USB充电接口上，该充电座为可在USB充电接口上180度上下摆幅旋转的座体。本实用新型使得充电座和USB充电接口2成为灵活可转的分体铰接结构，在使用过程中，充电座可在USB充电接口上作上下180度上下旋转摆动，使用过程十分灵活方便，人们无需为了调转充电方向而将USB充电结构拔出而倒反安装，而且，该产品结构十分简单，能大大的提高展示功能、实用性强。



CN 202004499 U

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1. 一种可旋转式 USB 接口蓝牙垂直座充它包括相配安装的充电座 (1) 及 USB 充电接口 (2)，充电座 (1) 上开有与蓝牙电器充电插头相配的充电插口 (3)，充电插口 (3) 内设有充电接触脚 (31)，其特征在于：所述充电座 (1) 旋转铰接在 USB 充电接口 (2) 上，该充电座 (1) 为可在 USB 充电接口 (2) 上 180 度上下摆幅旋转的座体。

2. 根据权利要求 1 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述充电插口 (3) 内设有用于吸附蓝牙电器的充电插头的磁吸附装置 (4)。

3. 根据权利要求 2 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述磁吸附装置 (4) 设置在充电接触脚 (31) 上。

4. 根据权利要求 2 或 3 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述磁吸附装置 (4) 为磁铁。

5. 根据权利要求 1 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述充电座 (1) 上开有与 USB 充电接口 (2) 相配的防干涉空腔 (5)。

6. 根据权利要求 1 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述充电插口 (3) 为 U 形开口。

7. 根据权利要求 1 所述的可旋转式 USB 接口蓝牙垂直座充，其特征在于：所述 USB 充电接口 (2) 上设有接口盖 (6)。

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一种可旋转式 USB 接口蓝牙垂直座充

技术领域

[0001] 本实用新型涉及充电器技术领域，具体地说，它是将立式充电功能以及产品展示功能集于一体，可有效减小充电的使用台面，并且插拔方便的可旋转式 USB 接口蓝牙垂直座充。

背景技术

[0002] 目前，随着商品经济的不断深入与发展，各种功能的电子、通讯产品得到了蓬勃发展，譬如：手机、数码相机、MP3、MP4、MP5 等电子产品的使用已相当普及，尤其是手机及其配套的蓝牙装置也相应得到了快速的发展，尤其包括蓝牙充电器，而现有的蓝牙充电器普遍采用横向或卧式的结构形式，并以其体积小，携带、使用方便的特点而受到广大消费者的普遍认可。但是，鉴于现有的蓝牙充电器还存在结构单一、构造缺乏创新的不足，插拔不方便，更不具备展示功能等缺点，后来，在中国专利 ZL200920238299.9 公开的一种 USB 接口蓝牙垂直座充，该技术方案中的 USB 充电接口与充电座为一体化的 90 度垂直结构，充电座上的充电插口向上。然而，在实际使用或产品展示展示中，充电插口的方向单一，人们要想改变充电插座的方向，只能把 USB 充电结构拔出而倒反安装，这给实际使用带来很大的不便之处，而且，未能最大限度的显示产品的展示功能，产品的实用性仍有待提高。

发明内容

[0003] 本实用新型的目的在于克服现有技术的不足，提供一种使用灵活方便、更能提高展示功能、实用性强且结构简单的可旋转式 USB 接口蓝牙垂直座充。

[0004] 本实用新型的发明目的是这样实现的：一种可旋转式 USB 接口蓝牙垂直座充，它包括相配安装的充电座及 USB 充电接口，充电座上开有与蓝牙电器充电插头相配的充电插口，充电插口内设有充电接触脚，其特征在于：所述充电座旋转铰接在 USB 充电接口上，该充电座为可在 USB 充电接口上 180 度上下摆幅旋转的座体。

[0005] 对于本实用新型所述的可旋转式 USB 接口蓝牙垂直座充，其作为技术方案的进一步改进，所述充电插口内设有用于吸附蓝牙电器的充电插头的磁吸附装置。

[0006] 进一步来说，本实用新型所述的可旋转式 USB 接口蓝牙垂直座充，所述磁吸附装置设置在充电接触脚上。

[0007] 对于本实用新型所述的可旋转式 USB 接口蓝牙垂直座充，其具体来说，所述磁吸附装置为磁铁。

[0008] 期间，在所述可旋转式 USB 接口蓝牙垂直座充的制备过程中，所述充电座上开有与 USB 充电接口相配的防干涉空腔。

[0009] 同时，作为上述可旋转式 USB 接口蓝牙垂直座充的进一步细化，所述充电插口为 U 形开口。

[0010] 另外，作为上述可旋转式 USB 接口蓝牙垂直座充的进一步细化，所述 USB 充电接口上设有接口盖。

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[0011] 本实用新型与现有技术中的USB接口蓝牙垂直座充相比，具有以下优点：

[0012] 本实用新型将充电座旋转铰接在USB充电接口上，该充电座为可在USB充电接口上180度上下摆幅旋转的座体，在使用过程中，根据人们的具体使用要求，充电座可在USB充电接口上作上下180度上下旋转摆动，使用过程十分灵活方便，人们无需为了调转充电方向而将USB充电结构拔出而倒反安装，而且，该产品结构十分简单，能大大的提高展示功能、实用性强。

附图说明

[0013] 附图1为本实用新型最佳实施例在使用状态的连接关系图。

[0014] 附图2为本实用新型最佳实施例在向上充电方向的结构示意图。

[0015] 附图3为本实用新型最佳实施例在水平充电方向的结构示意图。

[0016] 附图4为本实用新型最佳实施例在向下充电方向的结构示意图。

具体实施方式

[0017] 下面结合附图对本实用新型作进一步的描述。

[0018] 根据图1所示，本实施例所述的可旋转式USB接口蓝牙垂直座充，它包括相配安装的充电座1及USB充电接口2，充电座1上开有与蓝牙电器7充电插头相配的充电插口3，该蓝牙电器7多为蓝牙耳机，充电插口3内设有充电接触脚31，所述充电座1旋转铰接在USB充电接口2上，该充电座1为可在USB充电接口2上180度上下摆幅旋转的座体。作为技术方案的进一步改进，所述充电插口3内设有用于吸附蓝牙电器7的充电插头的磁吸附装置4，该磁吸附装置4设置在充电接触脚31，如图2所示，其具体来说，所述磁吸附装置4为磁铁。

[0019] 期间，在所述可旋转式USB接口蓝牙垂直座充的制备过程中，所述充电座1上开有与USB充电接口2相配的防干涉空腔5，放置充电座1在进行旋转后与USB充电接口2产生相阻的干涉。同时，所述充电插口3为U形开口，所述USB充电接口2上设有接口盖6，该结构盖是对USB充电接口2的保护，在实际产品中，该接口是非必要结构，可以不需配设。

[0020] 图1所示为蓝牙耳机在向上充电位置的结构示意图，当人们需要调整充电位置，可以将充电座1旋转成水平状态，如图3所示，或者将充电座1调整到向下的状态，如图4所示，充电工作灵活方便。

[0021] 为此，本实用新型由于将充电座1旋转铰接在USB充电接口2上，并将充电座1为可在USB充电接口2上180度上下摆幅旋转的座体，使得充电座1和USB充电接口2成为灵活可转的分体铰接结构，在使用过程中，充电座1可在USB充电接口2上作上下180度上下旋转摆动，使用过程十分灵活方便，人们无需为了调转充电方向而将USB充电结构拔出而倒反安装，而且，该产品结构十分简单，能大大的提高展示功能、实用性强。

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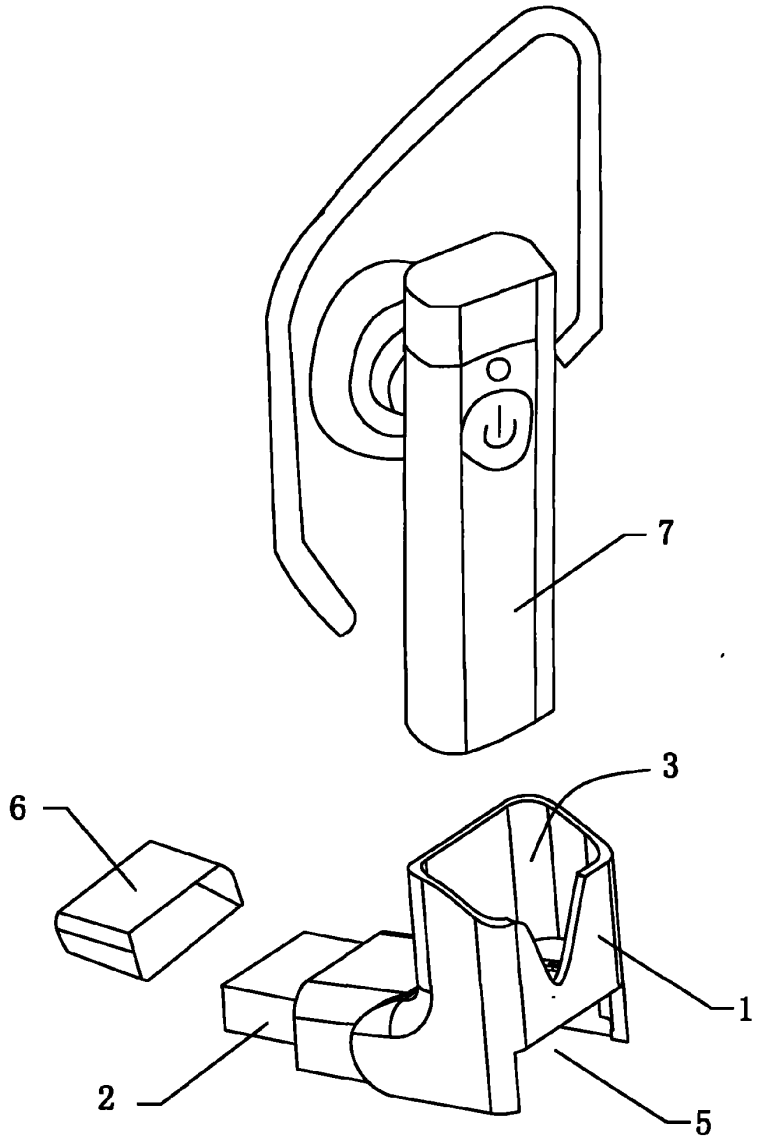


图 1

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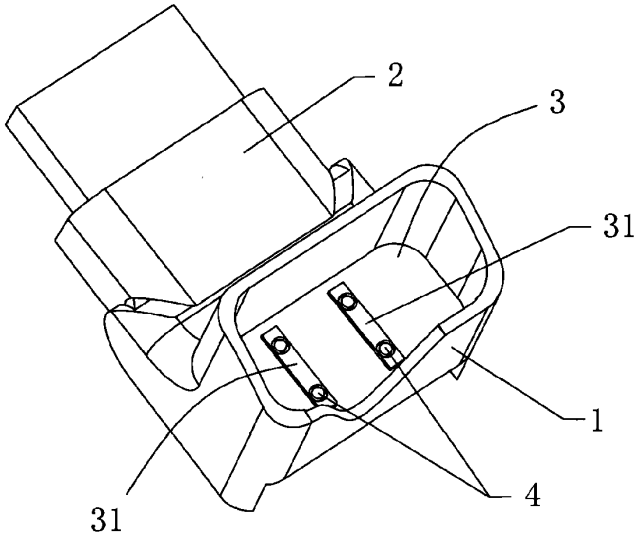


图 2

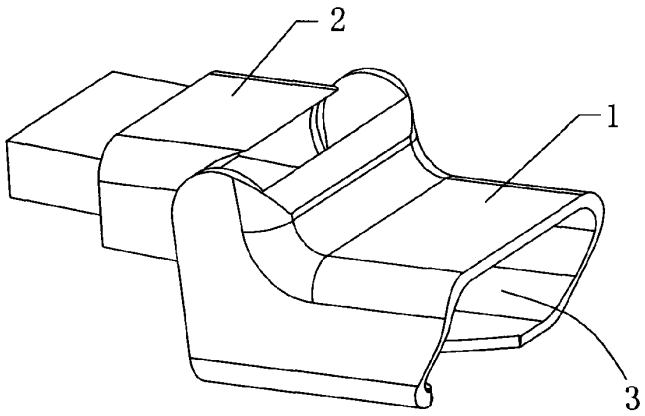


图 3

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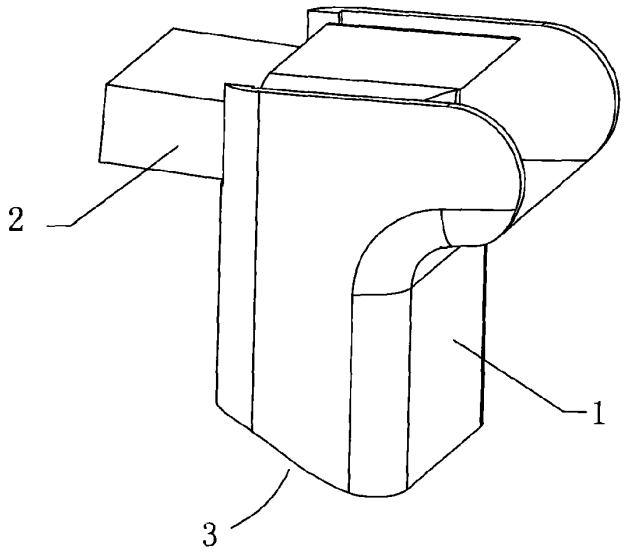


图 4

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Espacenet

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Inhalier-Vorrichtung

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Abstract of DE19619536 (A1)

An inhaler having an inhaler body extending between two ends, an outlet at one of said two ends, a succion tube at the other of said two ends and an inhalation channel within the body providing fluid connection between the suction tube and the outlet, the suction tube being shaped and dimensioned for insertion into a blister containing powder such that the drawing of air through the inhaler body will draw powder from the blister through the suction tube and inhalation channel and out of the outlet, a channel inlet being provided in the suction tube and a cutter being provided around only part of the channel inlet to cut a film cover of a blister around only part of the channel inlet, at least one inlet passage extending between a passage inlet at a position along the length of the suction tube and a passage outlet adjacent the channel inlet to allow air into a blister and blister packs which are distinguishable according to their orientation and/or contents.

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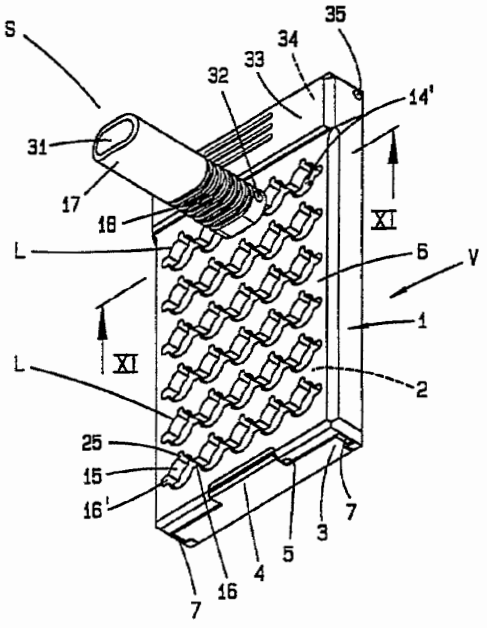
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(54) Inhalier-Vorrichtung

(57) Die Erfindung betrifft eine Vorrichtung (V) zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers (9), durch Aussaugen desselben aus einer napfförmigen Vertiefung (8) einer Verpackungsplatte (2) und schlägt zur Erzielung einer einfachen und insbesondere gebrauchsvorteilhaften Lösung vor, daß der Oberseite einer Abdeckfolie (14) im Bereich eines gespannten Abschnittes (14') eine rahmenförmig umfassende Führung (L) zugeordnet ist zum Einstecken eines mit seinem freien Ende die Abdeckfolie (14) unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels (18).



DE 196 19 536 A1

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

BUNDESDRUCKEREI 09. 97 702 044/291 19/25

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Beschreibung

Die Erfindung bezieht sich auf eine Vorrichtung zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers, durch Aussaugen desselben aus einer napfförmigen Vertiefung einer Verpackungsplatte mit die napfförmige Vertiefung als frei gespannter Abschnitt verschließender Abdeckfolie.

Durch die DE-OS 41 06 379 ist eine Vorrichtung zur Entnahme pulverförmigen Medikaments aus napfförmigen Vertiefungen bekannt. Diese im Wege der Inhalation an den Zielort verbringbare, saugluftgetragene Substanz befindet sich in in einer Reihe angeordneten napfförmigen Vertiefungen. Es liegt so eine bandförmige, aufrollfähige Verpackung vor, mit entsprechend bandförmig gestalteter, die frei gespannten Abschnitte verschließender, aufgesiegelter Abdeckfolie. Letztere wird für die sauggerechte Zugänglichkeit abgezogen. Eine solche Vorrichtung ist baulich aufwendig, zufolge der gleich vollständigen Freilegung der Napföffnung nicht schwundfrei und handhabungstechnisch sehr kompliziert.

Aus der US-PS 5 042 472 existiert der Vorschlag, das Pulver in einer leistenartigen Verpackungsplatte in gleichen Einzelmengen bereitzuhalten. Ihre von Sackbohrungen gebildeten Vertiefungen sowie je ein als bodennaher Querkanal realisierter Lufteinlaß sind von einer Abdeckfolie zugehalten. Nach Entfernen derselben kann man die Substanz aussaugen. Das geschieht durch unmittelbares Ansetzen dieser Vorrichtung an den Mund des Benutzers. Es besteht die Gefahr, daß die Lippe den nahen Lufteinlaß zuhält. Die Handhabung bedarf überdurchschnittlichen Geschicks.

Aufgabe der vorliegenden Erfindung ist es, eine gattungsgemäße Vorrichtung einfacher und gebrauchszuverlässiger auszugestalten.

Gelöst ist diese Aufgabe durch die in den Ansprüchen angegebene Erfindung.

Zufolge solcher Ausgestaltung ist eine Vorrichtung erhöhten Gebrauchswert erzielt: Dazu wird zunächst vorgeschlagen, daß der Oberseite der Abdeckfolie im Bereich des frei gespannten Abschnitts eine rahmenförmig umfassende Führung zugeordnet ist zum Einstekken eines mit seinem freien Ende die Abdeckfolie unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels. Neben dem Vorteil einer einwandfreien Einzeldosen-Entnahme liegt der eines korrekten Andockens des Saugrüssels vor zufolge der Führung. Die Steckzuordnung ist praktisch verkippungsfrei. Aufgrund der rahmenförmig umfassenden Anordnung einer solchen Führung ergibt sich zudem ein definierter Gegenhalt. Das Durchstoßen des frei gespannten Abschnitts der Abdeckfolie geschieht im Zuge des Aufsetzens des Saugrüssels aufsatzrandgedichtet und über die Gebrauchsphase anhaltend, so daß Verluste vermieden sind. Die Lufteintrittsquerschnitte garantieren die Austragsströmung. Daher liegt eine exakte, d. h. vollständige Ausbringung der Medikamentenmenge vor. Dabei ist es vorteilhaft, daß die beim Einstecken gebildeten Lufteintrittsquerschnitte innerhalb des Saugrüsselumfangs liegen. Sie werden so durch den eigenen Saugrüsselquerschnitt erzeugt. Das Durchstoßen läßt sich fraktionsfrei erreichen zufolge entsprechender Gestalt einer Art Ringmessers. Zweckmäßig erfolgt ein ventilklappenschneidendes Durchstoßen der Abdeckfolie, indem einfach am Ringmesser eine entsprechende Aussparung belassen wird. Über diesen Rahmen einer Einzel-Dosen-Wegwerfpackung respektive -Vorrichtung hinaus kann

bei gleichem Grundprinzip eine Mehr-Dosen-Wegwerfpackung bzw. -Vorrichtung erreicht werden, indem die Verpackungsplatte mehrere napfförmige Vertiefungen und entsprechende Führungen zum nacheinander folgenden Einstecken des Saugrüssels aufweist. Weiter erweist es sich als vorteilhaft, daß die Führungen vom Rand einzelner Löcher einer Deckplatte gebildet sind, unter welche die Verpackungsplatte schubladenartig schiebbar ist. So sind die Führungen einstückig zu einem Bauteil zusammengefaßt. Die Deckplatte kann praktisch als Siebplatte realisiert sein. Eine solche Lochmaske läßt sich fertigungstechnisch bestens beherrschen. Sie verleiht der Vorrichtung zudem eine Flächenversteifung. Es liegt eine Refill-Vorrichtung vor. Eine besonders einfache Lösung besteht darin, daß die Führungen von Wänden einzelner Löcher eines auf der Abdeckfolie angeordneten Gitters gebildet sind. Es liegt so eine erweiterte/stabilisierte Blisterpackung vor. Das Gitter wird zweckmäßig aufgesiegelt, wobei auf eine kongruente Ausrichtung der Löcher zu den napfförmigen Vertiefungen der Vorrichtung zu achten ist. Um trotz Dünnwandigkeit eines entsprechenden Gitters zu großen radialen Führungslängen zu kommen, sind die Löcher realiter als Stutzen gestaltet. Eine Ausgestaltung von sogar eigenständiger Bedeutung ergibt sich durch Individualisierungs-Merkmale zur Abstimmung zwischen Verpakkungsplatte und Deckplatte/Boden der Vorrichtung. Auf diese Weise wird mit einfachsten Mitteln eine Art Schlüsselfunktion erreicht. Das kann in Richtung einer erhöhten Narrensicherheit genutzt werden, indem sich unterschiedliche Medikamente entnahmemäßig ausschließen oder aber im Sinne einer Erzielung einer bestimmten Ausstanzstellung im frei gespannten Abschnitt. Eine baulich einfache Maßnahme besteht dabei darin, daß die Individualisierungs-Merkmale durch unrunde Gestalt der napfförmigen Vertiefungen der Verpackungsplatte und/oder des Verlaufs der Führungen und/oder der Napf-Aufnahmehöhlen der Schubladenplatte gebildet sind. Abweichungen der entsprechenden Umrisse wirken daher ebenfalls aussperrend. Entspricht die Napf-Aufnahmehöhlung nicht der Außenkontur der napfförmigen Vertiefungen, so läßt sich gemäß Schubladenlösung die entsprechende Blisterpackung überhaupt nicht zuordnen. Überdies wird vorgeschlagen, daß die Individualisierungs-Merkmale aus einander durchdringenden Öffnungen und Vorsprüngen bestehen. Um das restfreie Ausheben respektive Aussaugen des pulvrigen Medikaments mit baulich einfachsten Mitteln sicherzustellen, wird eine Maßnahme vorgeschlagen, welche gekennzeichnet ist durch Lufteinlaßkanäle als Lufteintrittsquerschnitte im Bereich der Steckverbindung zum Saugrüssel und Lochrand. Letztere Kanäle können von peripher offenen Längsschächten des Ringmessers gebildet sein. Denkbar und vorteilhaft ist auch eine Lösung dahingehend, die Kanäle in die Ringwand des Saugrüssels zu legen und in der Schneidenwate austreten zu lassen sowie einem Lufteinlaß oberhalb der Durchstoßstelle der Abdeckfolie. Weiter ist die entsprechende Ausgestaltung noch gekennzeichnet durch Querbelüftungslöcher am Saugrüssel, und zwar quer zum Saugkanal desselben liegend. Das führt zu einem hochgradigen Vermischen von pulvriger Substanz und Tragluft. Die pulvergeladene Napf-/Ausräumströmung schließt so an eine Transportströmung an, in der die Feinverteilung der Pulverpartikel an eine größere Luftmenge stattfindet. Baulich verwirklicht sind die Individualisierungs-Merkmale konkret dadurch, daß das Einsteckende des Saugrüssels durch unrunde Gestalt schlüsselartig auf die

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Gestalt der Führungen angepaßt ist. An einer Verpakkungsplatte, insbesondere Blister-Packungsplatte erweist es sich sodann als vorteilhaft, daß diese in Bereichen zwischen den napfförmigen Vertiefungen eine oder mehrere Öffnungen besitzt zum Durchgriff von am Boden der Vorrichtung vorgesehener Vorsprünge. Hierüber läßt sich ein hoher Variationsreichtum einer Schlüsselfunktion erzielen. Dabei ist so vorgegangen, daß die Öffnungen der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung zugeordnet sind. Eine Variante ergibt sich dabei, wenn die Öffnungen von Schlitzen gebildet sind, welche vom Rand der Verpakkungsplatte ausgehen. Die passenden Vorsprünge sind dann in Form verlaufsentsprechender Stege oder Schneiden realisiert. Eine partielle Abtrennung der verschlüsselten Zonen führt zum Zerfall der Packung. Dementsprechend ist es von Vorteil, daß die Schlitze sich im Mittelbereich der Verpackungsplatte übergreifen.

Der Gegenstand der Erfindung ist nachstehend anhand zweier zeichnerisch veranschaulichter Ausführungsbeispiele näher erläutert. Es zeigt:

Fig. 1 die erfindungsgemäße Vorrichtung in Vorderansicht, und zwar gemäß erstem Ausführungsbeispiel,

Fig. 2 eine Seitenansicht hierzu,

Fig. 3 eine Stirnansicht der Vorrichtung, von unten gesehen,

Fig. 4 diese Vorrichtung in die benutzungsgerechte Position überführt mit angedocktem Saugrüssel,

Fig. 5 den Saugrüssel in Seitenansicht,

Fig. 6 denselben in Draufsicht,

Fig. 7 den Schnitt gemäß der Linie VII-VII in **Fig.** 6,

Fig. 8 den Saugrüssel mit Ansicht gegen das Mundstück desselben,

Fig. 9 denselben mit Ansicht gegen das die Abdeckfolie durchstoßende Ende, hier eine Art Ringmesser bildend,

Fig. 10 die **Fig.** 9 in Vergrößerung,

Fig. 11 den Schnitt gemäß Linie XI-XI in **Fig.** 4, und zwar in vergrößerter Darstellung,

Fig. 12 den Schnitt gemäß Linie XII-XII in **Fig.** 6, vergrößert,

Fig. 13 den Schnitt gemäß Linie XIII-XIII in **Fig.** 5, vergrößert,

Fig. 14 eine Herausvergrößerung der **Fig.** 11,

Fig. 15 eine der **Fig.** 11 entsprechende Schnittdarstellung, jedoch in einer um 90° versetzten Schnittebene,

Fig. 16 den oberen Abschnitt der Vorrichtung gemäß erstem Ausführungsbeispiel in Darstellung einer Variante bzgl. vorhandener Individualisierungs-Merkmale,

Fig. 17 die Vorrichtung gemäß zweitem Ausführungsbeispiel der Erfindung in perspektivischer Darstellung, mit angedocktem Saugrüssel,

Fig. 18 in perspektivischer Darstellung den Vorratsträger dieser Vorrichtung in isolierter Wiedergabe,

Fig. 19 die komplettierte Vorrichtung durch deckfolienseitig vorgenommener Anordnung eines Gitters zur Bildung der Führungen,

Fig. 20 den Schnitt gemäß Linie XX-XX in **Fig.** 19, vergrößert, als Abschnitt,

Fig. 21 die Draufsicht auf diesen Abschnitt,

Fig. 22 eine Variante hinsichtlich der Individualisierungs-Merkmale des Gegenstandes gemäß zweitem Ausführungsbeispiel, auch hier als Auszug wiedergegeben,

Fig. 23 den Schnitt gemäß der Linie XXIII-XXIII in **Fig.** 22,

Fig. 24 die Draufsicht auf eine Verpackungsplatte, außerhalb der napfförmigen Vertiefungen Individualisierungs-Merkmale aufweisend,

Fig. 25 die Draufsicht auf einen solchen Bereich der Verpackungsplatte, und zwar als vergrößerter Auszug der **Fig.** 24,

Fig. 26 den Schnitt gemäß der Linie XXVI-XXVI in **Fig.** 25,

Fig. 27 eine der **Fig.** 24 entsprechende Darstellung, jedoch bei abgewandelter Art der Individualisierungs-Merkmale,

Fig. 28 eine Schnittdarstellung wie **Fig.** 14, als Schnitt gemäß Linie XXVIII-XXVIII in **Fig.** 29, jedoch mit verändertem Saugrüssel und

Fig. 29 die Unteransicht gegen den Saugrüssel gemäß **Fig.** 28.

Die Vorrichtung V gemäß erstem Ausführungsbeispiel umfaßt ein Gehäuse **1**, enthaltend eine Verpakkungsplatte **2**. Die ist von einem Boden **3** unterfangen.

Zur lagegerechten Bestückung des Gehäuses **1** läßt sich die Verpackungsplatte **2** schubladenartig in dasselbe einschieben. Die entsprechende Schubladenplatte kann mit dem Boden **3** identisch sein. Sie ist in Schließstellung rastgesichert und weist eine Zughandhabe **4** auf, die in eine Nische **5** überstandsfrei eintaucht. Gebildet ist die Nische **5** im schmalwandseitigen Randbereich einer Deckplatte **6** des Gehäuses **1**.

Realisiert ist die besagte Deckplatte **6** an einer Breitseite der Vorrichtung V.

Die Führung der Schubladenplatte respektive des Bodens **3** geschieht über an den Längsrändern der Schubladenplatte realisierte Führungen **7**. Es handelt sich um Nutführungen, erreicht aufgrund einer marginalen C-Profilierung des Gehäuses **1**.

Die Deckplatte **6** der Vorrichtung V ist zur Entnahme des in der Verpackungsplatte **2** bereitgehaltenen Inhalts durchbrochen. Bezüglich des Inhalts handelt es sich um in einzelnen napfförmigen Vertiefungen **8** der Verpakkungsplatte **2** befindliches Pulver. Das ist rieselfähig, neigt also nicht zu Blockbildung. Es handelt sich um Medikamenten-Pulver, bspw. zur Linderung von Asthmabeschwerden. Auch andere in dieser Darreichungsform applizierbare Medikamente sind denkbar. Das Medikamenten-Pulver ist durch Punktraster deutlich gemacht und trägt das Bezugszeichen **9**.

Die Näpfe der napfartigen Vertiefungen **8** ergeben sich in besonders deutlicher Wiedergabe aus den Vergrößerungen, bspw. aus **Fig.** 14. Der Napf ist dort in seiner Gesamtheit mit **10** bezeichnet. Sein Plattenkörper **11** ist dünnwandig und ebenflächig. Die in Richtung des unteren Zeichnungsrandes auswölbenden Näpfe **10** ragen in Napf-Aufnahmehöhlen **12** der Schubladenplatte bzw. des Bodens **3**. Die Napf-Aufnahmehöhlen **12** entsprechen zumindest umrißmäßig dem im plattennahen Ansatz zylindrischen Napf **10**.

Die Napf-Aufnahmehöhlen **12** stellen eine kreuz wie quer reihenförmig geordnete Kraterstruktur dar. Zwischen den Napf-Aufnahmehöhlen **12** verbleibende Scheidewände **13** stützen mit ihrer dem oberen Zeichnungsrand zugewandten Stirnseite den aufliegenden Plattenkörper **11** ab.

Geschützt werden die abgeteilten Mengen an Medikamenten-Pulver **9** durch einen frei gespannten Abschnitt **14'** einer den Eingang der napfförmigen Vertiefung **8** mit überdeckenden, d. h. deckelbildenden Abdeckfolie **14**. Insoweit liegt bzgl. der Verpackungsplatte **2** eine Art Blisterpackung vor. **14** ist eine Alu-Folie. Ihre Zuordnung geschieht durch ansiegeln.

Die Näpfe **10** und die Napf-Aufnahmehöhlungen **12**

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erstrecken sich selbstredend kongruent. In entsprechend koaxialer Ausrichtung liegen die ein Öffnen der freigespannten Abschnitte **14'** erlaubenden Zugänge der Deckplatte **6**.

Diesbezüglich ist baulich so vorgegangen, daß der Oberseite, also zugangsseitig, der Abdeckfolie **14**, im Bereich der frei gespannten Abschnitte **14'** Führungen L zugeordnet sind. Letztere umfassen die Abschnitte **14'** etwa rahmenförmig. Es handelt sich gemäß Darstellung in **Fig. 1** um Reihen von Löchern **15**, welche in der Horizontalen über Durchbrechungsbrücken **16** miteinander in offener Verbindung stehen. Die Durchbrechungsbrücken **16** verlaufen in der Diametralen der Löcher **15** und setzen sich auch noch bei den endständigen, d. h. randnahen Löchern **15** in dieser Richtung in senkrecht zur Deckplatte **6** stehende Nuten **16'** fort. Es sind sechs mal fünf Löcher **15** in kreuzender Reihenanordnung realisiert.

Über Lochränder der Führungen L wird eine geführte Steckzuordnung für ein andockbares Saugsteckteil S gewonnen. Die Andockstellung geht anschaulich aus den **Fig. 4** und 17 hervor. Es (S) fungiert als Inhalations-Strömungsbrücke.

Das baulich einstückige Saugsteckteil S ist funktionsmäßig in vier Bereiche aufgeteilt und rohrförmiger Gestalt. Es beginnt mit einem Mundstück **17**, geht sodann in ein gerauhtes Griffstück **18** über, um sich in einen Saugrüssel **19** fortzusetzen, der schließlich an seinem freien Ende mit einem die Abdeckfolie **14** durchstoßenden Ringmesser **20** versehen ist. Die vier Funktions-Bereiche liegen linear.

Der Saugrüssel **19** ist querschnittsmäßig auf die Form des Loches **15** abgestimmt. Es kann sich um einen kreisrunden Querschnitt handeln, so daß eine unterbrechungsfreie gut tragende Anlage an der Deckplatte **6** erzielt ist. Hinzukommt noch die Funktion einer in Steckrichtung liegenden Stützschulter **21** des entsprechend querschnittsgrößeren bzw. unrunden Abschnitts des Griffstückes **18**. Die Stützschulter **21** ruht verkippungssichernd auf der Oberseite der ebenen Deckplatte **6**.

Die Steckverbindung ist reibungsschlüssig. Die Rauhung des Griffstückes **18** ergibt sich aufgrund einer vorgenommenen Radialrippung des im Querschnitt insgesamt mehr flach gehaltenen Abschnitts des Saugsteckteils S. Auf der Flachseite ist Platz für je eine Fingerkuppe der Greifhand. Das Mundstück **17** ist flach oval und daher mundgerecht geformt.

Eine zweite Stützschulter **22** befindet sich axial versetzt zur ersten Stützschulter **21** im Übergangsbereich zwischen dem Saugrüssel **19** und dem demgegenüber abgesetzten Ringmesser **20**. Gebildet ist besagte zweite Stützschulter **22** von den in Steckrichtung weisenden Stirnflächen zweier in Steckrichtung liegender Längsrippen **23** im Bereich der Steckverbindung. Die Wurzeln in der Mantelwand des vom Saugrüssel **19** gebildeten Steckvorsprungs. Das andere Stirnende von **23** wurzelt in der Stützschulter **21**. Die Längsrippen **23** fungieren damit zugleich als Steckbegrenzungsanschläge, wenn die erste Stützschulter **21**, bspw. aus Toleranzgründen, nicht satt aufsetzen würde. Es kommt damit zu einer definierten Durchstoßtiefe in der Vertiefung **8**. Das dortige Stirnende der Längsrippen **23** tritt gegen den Lochrand der Abdeckfolie **14** und hält diese unter Zwischenfassen des Plattenkörpers **11** sicher und schneidbegünstigend fest. Das endliche Widerlager bildet die Oberseite der die Napf-Aufnahmehöhle **12** umschreibenden Scheidewand **13**.

Die Längsrippen **23** haben zugleich Schlüsselfunktion. Sie sind querschnittsmäßig auf die diametral verlaufenden Durchbrechungsbrücken **16** bzw. die endseitigen Nuten **16'** abgestimmt. In dieser Richtung liegt auch die längere Achse des flachovalen Mundstücks **17**. Demgemäß kann das Saugsteckteil S nur mundgerecht zugeordnet werden. Die Vorrichtung V nimmt dabei eine vertikale Lage ein (vgl. **Fig. 4** und 17).

Im Bereich der Steckverbindung befindet sich eine weitere Längsrippe **24**. Diese wirkt mit einer deckungsgleich liegenden, oberen Nut **25** der Deckplatte **6** zusammen. Auch die zusätzliche Längsrippe **24** tritt gegen die Oberseite der Abdeckfolie **14**.

Ein Blick auf **Fig. 12** macht deutlich, daß das Ringmesser **20** Lücken **26** aufweist, ferner, daß die eigentlichen Schneiden so verteilt sind, daß beim Durchstoßen des frei gespannten Abschnitts **14'** der Abdeckfolie **14** zunächst eine Art Perforationsschnitt erzeugt wird, wobei im Bereich der Lücken **26** schließlich reißende Stege gebildet werden. Die schneidaktive Zone erstreckt sich über gut 270° eines zusammenhängenden, schließlich lückenlos getrennten Teil-Umfanges. Die restlichen ca. 90° sind ungemessen. Sie belassen daher eine praktisch scharnierbildende Brücke zwischen dem ventilklappenartig freigestanzten Lappen des frei gespannten Abschnitts **14'** und der Randzone des frei gespannten Abschnittes **14'** zur Restgitter-Abdeckfolie **14** hin. Das entsprechende Scharnier ist mit **27** bezeichnet (vgl. **Fig. 15**). Es liegt in Gebrauchsstellung der Vorrichtung V oben. Die sich so wandseitig sammelnde Substanz liegt absaugfrei (vgl. auch **Fig. 23**).

Die radial einwärts gerichtet hinterschnittene Schneide **28** des Ringmessers **20** ist ferner zur Erzielung peripherer, längs gerichteter, nicht durch das Abdeckfolienmaterial zusetzbare Lufteinlaßkanäle **29** als Lufteintrittsquerschnitte unterbrochen. Deren napfseitigen Eingänge bilden die Lücken **26**. Die Lufteinlaßkanäle **29** setzen sich bis in den Bereich der Mantelwand des Saugrüssels **19**, also den Bereich der Steckverbindung zwischen Saugrüssel **19** und dem geschnittenen Lochrand **30** der Abdeckfolie **14** fort. Über so erzielte, mit dem Innenraum der napfförmigen Vertiefung **8** kommunizierende Luftschächte wird das Medikamenten-Pulver **9** unter der Mitschleppwirkung der Strömung restfrei ausgetragen. Die Applikation ist dadurch Napf für Napf exakt reproduzierbar. Der im Zuge des Saugens sich vor dem Saugrüssel **19** ergebende Unterdruck trägt, in die Luftströmung eingebettet, die Pulverpartikel aus. Austragsfördernd wirkt überdies die an den zylindrischen Abschnitt anschließende, konkav gehöhlte, umgekehrt kuppelförmige Innenkontur des Napfes **10**.

Die mit Pulver angereicherte Luft passiert längs einen zentralen Saugkanal **31** des Saugsteckteils S. Im Fußbereich des Saugsteckteils S befinden sich sodann Querbelüftungslöcher **32**. Letztere kreuzen den Querschnitt des Saugkanales **31**. Die Querbelüftungslöcher **32** liegen kurz hinter der Stützschulter **21**. Diese Nähe hat den Vorteil, daß deren Einlaßöffnungen nicht von den Fingern der am Griffstück **18** ansetzenden Haltehand zugehalten werden können. Der Querschnitt der beiden Querbelüftungslöcher **32** zusammen entspricht etwa dem kreisrunden Querschnitt des Saugkanals im Fußbereich. Von dort ab weitet sich der Saugkanal **31** kontinuierlich im lichten Querschnitt auf.

Eine hinsichtlich der Lufteintrittsquerschnitte abgewandelte Ausgestaltung des Saugrüssels **19** ergibt sich aus den **Fig. 28** und 29. Dort sind die gleichfalls mit **29** bezeichneten Lufteinlaßkanäle in die Ringwand des

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Saugrüssels 19 gelegt. Sie verlaufen in Steckrichtung. Es handelt sich um drei Ringsektoren-Abschnitte, bezeichnet mit a, b und c.

Die Ringsektoren-Abschnitte passieren den Bereich des Ringmessers 20. Wie Fig. 28 entnehmbar, treten die Lufteinlaßkanäle 29 innenseitig der hinterschnittenen Schneide 28 des Ringmessers aus. Sie münden also in der Schneidenwate.

Die in Gegenrichtung liegende Fortsetzung der Lufteinlaßkanäle 29 geht deutlich bis oberhalb der Durchstoßstelle der Abdeckfolie 14, so daß der freie Luftzugang gewährleistet ist. Sie münden dort in einen radial auswärts gerichteten Lufteinlaß 29'. Der kann sich über die sektorale Breite der geschaffenen Lufteinlaßkanäle 29 erstrecken. Hier wird also die Mantelwand des Saugrüssels durchbrochen.

Der Mund der Ringsektoren-Abschnitte ist leicht exponiert. Dadurch entstehen auch hier im schneidaktiven Bereich des Ringmessers Lücken 26 mit der dazu beschriebenen Perforationsschnitt-Wirkung. Die schneidaktive Zone geht überdies auch hier gut 270° des Ringmesserumfangs. Das führt zu einem zusammenhängenden, schließlich lückenlos getrennten Teil-Umfang, der eine scharnierbildende Brücke zwischen dem ventilklappenartig frei gestanzten Lappen des Abschnittes 14' und der Randzone des frei gespannten Abschnitts 14' zur Restgitter-Folie 14 hin beläßt. Das entsprechende Scharnier ergibt sich aus Fig. 15.

Das Einsaugen von Luft führt gemäß den Pfeilen in Fig. 28 auch hier zum Mitschleppen des entnahmezugänglich gemachten Pulvers 9.

Das Saugsteckteil S weist eine Länge auf, die etwa dem kleinen Finger einer erwachsenen menschlichen Hand entspricht. Das Gehäuse 1 weist ein Format auf, welches im wesentlichen einer Taschenpackung bzw. Zigarettenpackung entspricht. Es (1) ist in einen Vorratsbereich für die Verpackungsplatte 2 und in einen Unterbringungsbereich für das Saugsteckteil S aufgeteilt. Die hierzu hinter einer Verschlußklappe 33 liegende Aufnahmekammer 34 läßt sich willensbetont bequem öffnen. Das Saugsteckteil S, welches längs der oberen kürzeren Querseite des Gehäuses 1 untergebracht ist, kann dann entnommen, respektive in die Hand geschüttelt werden. Bezüglich der Verschlußkappe 33 handelt es sich um eine Schwenkkappe, die um eine randnahe Scharnierachse 35 des Gehäuses 1 klappt. Die Schließfuge ist schräg verlaufend, so daß mehr Greiffläche an der Verschlußkappe 33 verbleibt, mit entsprechendem deckwandseitigen Überstand zum besseren Erfassen. Die Schrägung liegt bei 45° zur ebenen Gehäuseerstreckung.

Die Vorrichtung gemäß zweitem Ausführungsbeispiel (ab Fig. 17) ist prinzipiell gleichen Aufbaues. Die Bezugsziffern sind, soweit zum Verständnis erforderlich, sinngemäß angewandt, dies zum Teil ohne textliche Wiederholungen. Das Gehäuse 1 ist nur partiell verwirklicht, und zwar im Rahmen der die Steckführung bringenden Deckplatte 6 als zusätzliche Lage. Erkennbar sind dort die Führungen L wiederum von Löchern 15 realisiert. Bezüglich dieser Löcher 15 handelt es sich um kurze, den Saugrüssel 19 verkippungsfrei aufnehmende Stutzen 36. Die sind gemäß Fig. 17 im wesentlichen zylindrisch.

Bezüglich der Deckplatte 6 handelt es sich hier um ein auf der Oberseite der Abdeckfolie 14 angeordnete s Gitter G. Es läßt sich wie der die Näpfe 10 aufweisende Plattenkörper 11 aus Kunststoff herstellen. Das Gitter G ist aufgesiegelt. Es liegt bezüglich der Stutzen 36 das gleiche, wabenbildende Raster zugrunde, wie es auch der Plattenkörper 11 aufweist, also deckungsgleiche Ausrichtung der zur Entnahme des Medikamenten-Pulvers 9 besetzten Querschnitte. Die gitter-unbestückte Grundausstattung der Vorrichtung, die Verpackungsplatte 2 also, ergibt sich aus Fig. 18, die mit dem Gitter G vereinigte aus Fig. 19.

Wie Fig. 20 entnehmbar, erstrecken sich die Stutzen 36 auch hier wie Führungsschächte über dem frei gespannten Abschnitt 14' der Abdeckfolie 14.

Auch die Vorrichtung V gemäß zweitem Ausführungsbeispiel weist Individualisierungs-Merkmale auf. Es sei auf die Fig. 22 und 23 verwiesen. Dort sind die Löcher 15 respektive Stutzen 36 innen sekantenförmig abgeflacht. Die (außen nicht erforderliche) Abflachung trägt das Bezugszeichen 37. Das entsprechende Patrizenteil, realisiert vom Steckverbindungsbereich des Saugrüssels 19 weist eine entsprechende Abflachung auf. Gleiches gilt bzgl. des Umfangverlaufs des Ringmessers 20. So können nur paßgerechte Saugsteckteile S Verwendung finden bzw. die diesem Schlüssel entsprechende Querschnittskontur besitzende Verpakkungsplatten 2 zum Einsatz kommen.

Die erläuterte Individualisierung ist in dieser Form auch an der Vorrichtung V gemäß erstem Ausführungsbeispiel verwendbar. Es wird auf die entsprechende Variante Fig. 16 verwiesen. Darin ist die im Lochbereich liegende Abflachung gleichfalls mit 37 bezeichnet. Dort nicht mehr dargestellt und gleichwohl vorhanden ist eine entsprechende Abflachung der Näpfe 10 an der Verpackungsplatte 2 und eine solche am Schubladenboden 3. Die deckungsgleiche Abflachung des Napfes 10 ergibt sich jedoch aus Fig. 23 und trägt das Bezugszeichen 38.

Die Abflachung 37 und alle anderen liegen an der dem Filmscharnier 27 diametral gegenüberliegenden Seite, und zwar parallel dazu. Das führt sogar zu einem kürzeren ventilklappenartigen Freischnitt. Der stirnseitige Öffnungsbereich des Saugrüssels 19 wird so noch mehr freigehalten. Der Stoff sammelt sich überdies schwerkraftabhängig vor dem freien Ende dieser Klappe. Das Pulver 9 nimmt nur einen recht kleinen Anteil des Napfvolumens ein.

Ab Fig. 24 sind Vorrichtungen V angegeben, bei denen die Individualisierungs-Merkmale außerhalb des unmittelbaren Bereichs der topfförmigen Vertiefungen 8 liegen. Hierzu sind die Zwischenzonen 39 der auf den Ecken eines Quadrates oder Rechtecks mittelpunktmäßig plazierten, kreisrunden, napfförmigen Vertiefungen 8 genutzt. Es handelt es sich dort um einander durchdringende Öffnungen 40 und Vorsprünge 41. Sie sind pastillenförmigen bzw. quadratischen Umrisses und passen satt ineinander. Solche Individualisierungs-Merkmale können an der Vorrichtung V gemäß erstem Ausführungsbeispiel ebenso realisiert sein, wie auch an der gemäß zweitem Ausführungsbeispiel.

Gemäß dargestellter Variante Fig. 24 bis 26 ist die Individualisierung an einer Verpackungsplatte 2, insbesondere Blister-Packungsplatte realisiert und dadurch gekennzeichnet, daß diese in Bereichen zwischen den napfförmigen Vertiefungen 8 eine oder mehrere Öffnungen 40 besitzt, in die vom Boden 3 der Vorrichtung V ausgehende Vorsprünge 41 schlüsselartig eingreifen.

Wie den Zeichnungen entnehmbar, sind die Öffnungen 40, hier drei, auf der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung angeordnet. Insgesamt sind beim dargestellten Ausführungsbeispiel zwanzig Zwischenzonenbereiche 39 vorhanden, so daß eine große Kombinationsmöglichkeit vorliegt.

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Im übrigen sind die Individualisierungs-Merkmale der Sicht entzogen, durch die auch dort die Verpackungsplatte **2** überdeckende Abdeckfolie **14**.

Statt die Vorsprünge **41** vom Boden **3**, bspw. dem Boden einer Schubladenplatte ausgehen zu lassen, kann im Gegenzug zur Erzielung durchdringender Öffnungen und Vorsprünge der Vorsprung auch am Plattenkörper **11** der Verpackungsplatte **2** realisiert sein, um in dekkungsgleich liegende Öffnungen des Bodens paßgerecht einzutreten. Die Vorsprünge können als Tiefziehvorsprünge wie die Näpfe **10** am Plattenkörper **11** realisiert sein.

Bei einer Schubladenplatte als diesbezügliches Matrizenteil würde bei nicht passender Blister-Packungsplatte der Einschub in das Gehäuse der Vorrichtung ebenso nicht möglich sein. Es kommt keine funktionskorrekte Perforation zustande.

Die Variante gemäß **Fig.** 27 zeigt noch eine Möglichkeit dahingehend, die Öffnungen **40** in Form von Schlitzen auszubilden. Die gehen vom Rand **42** der Verpakkungsplatte **2** aus, sind also nach dorthin offen. Gemäß Darstellung sind solche Schlitze gegenläufig ausgerichtet. Sie erstrecken sich parallel zu den Schmalseiten des auch hier lang rechteckigen Grundrisses der Verpakkungsplatte **2**. Die Schlitzlänge ist größer als die halbe Länge der Schmalseiten. Dementsprechend übergreifen die Schlitze im Mittelbereich der Verpackungsplatte **2** einander. Die Schlitzanordnung ist parazentrisch.

Die der dortigen Art der Öffnungen **40** zugeordneten Patrizenteile sind entsprechend stegartiger Gestalt oder schneidenartiger Form und gehen auch hier vom Boden **3** der Vorrichtung V aus.

Gemäß letzter Variante ist auch die Abdeckfolie **14** schlitzkonturentsprechend durchbrochen.

Schließlich bleibt noch festzuhalten, daß das Einsteckende des Saugrüssels **19** auch hier durch unrunde Gestalt schlüsselartig auf die Gestalt der Führungen L angepaßt ist. Das ist auch auf die Maßnahme gemäß **Fig.** 28 und 29 anwendbar; strichpunktiert eingezeichnet sind die Mittel gemäß **Fig.** 14, also Führungen L, Längsrippen **23** und Durchbrechungsbrücken **16**.

Die Funktion der Vorrichtung V ist, kurz zusammengefaßt, wie folgt: Durch willensbetontes Andocken des Saugsteckteils S öffnet das dem Saugrüssel **19** vorgelagerte Ringmesser **2a** den das Medikamenten-Pulver **9** enthaltenden Napf **10**. Durch Ausübung einer Saugwirkung am Mundstück **17** entsteht Unterdruck im Napf. Die fraktionsfreie, luftgetragene Substanz gelangt an den Zielort. Da der Kopf des Saugrüssels **19** an seiner Peripherie oder in seiner Wandung die beschriebenen Luftzugangsschächte **29** relativ kleinen Querschnitts aufweist, ergibt sich eine ein äußerst wirksames, restfreies Ausheben der pulvrigen Substanz sicherstellenden Funktion. Neben diesen Luftzugängen ergibt sich dahinterliegend noch ein hochgradiger Mischeffekt aufgrund der Querbelüftungslöcher **32**, hier einen Kreuzkanal bildend.

Die Vorrichtung V kann in den Zeiten des Nichtgebrauchs in einer Schutzhülle (nicht dargestellt) stecken.

Alle offenbarten Merkmale sind erfindungswesentlich. In die Offenbarung der Anmeldung wird hiermit auch der Offenbarungsinhalt der zugehörigen/beigefügten Prioritätsunterlagen (Abschrift der Voranmeldung) vollinhaltlich mit einbezogen, auch zu dem Zweck, Merkmale dieser Unterlagen in Ansprüche vorliegender Anmeldung mit aufzunehmen.

Patentansprüche

1. Vorrichtung (V) zur Entnahme eines Pulvers, insbesondere Medikamenten-Pulvers (**9**), durch Aussaugen desselben aus einer napfförmigen Vertiefung (**8**) einer Verpackungsplatte (**2**) mit die napfförmige Vertiefung (**8**) als frei gespannter Abschnitt (**14'**) verschließender Abdeckfolie (**14**), **dadurch gekennzeichnet,** daß der Oberseite der Abdeckfolie (**14**) im Bereich des frei gespannten Abschnittes (**14'**) eine rahmenförmig umfassende Führung (L) zugeordnet ist zum Einstecken eines mit seinem freien Ende die Abdeckfolie (**14**) unter Bildung von Lufteintrittsquerschnitten durchstoßenden Saugrüssels (**18**).

2. Vorrichtung nach Anspruch 1 oder insbesondere danach, dadurch gekennzeichnet, daß die beim Einstecken gebildeten Lufteintrittsquerschnitte innerhalb des Saugrüsselumfangs liegen.

3. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Verpakkungsplatte (**2**) mehrere napfförmige Vertiefungen (**8**) und entsprechende Führungen (L) zum nacheinander folgenden Einstecken des Saugrüssels (**18**) aufweist.

4. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Führungen (L) vom Rand einzelner Löcher (**15**) einer Deckplatte (**6**) gebildet sind, unter welche die Verpakkungsplatte (**2**) schubladenartig schiebbar ist.

5. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Führungen (L) von Wänden einzelner Löcher (**15**) bzw. Stutzen (**36**) eines auf der Abdeckfolie (**14**) angeordneten Gitters (G) gebildet sind.

6. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Individualisierungs-Merkmale zur Abstimmung zwischen Verpakkungsplatte (**2**) und Deckplatte (**6**)/Boden (**3**) der Vorrichtung (V).

7. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Individualisierungs-Merkmale durch unrunde Gestalt der napfförmigen Vertiefungen (**8**), der Verpackungsplatte (**2**) und/oder der Gestalt der Führungen (L) und/oder der Napf-Aufnahmehöhlen (**12**) der Schubladenplatte (**3**) gebildet sind.

8. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Individualisierungs-Merkmale aus einander durchdringenden Öffnungen (**40**) und Vorsprüngen (**41**) bestehen.

9. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Lufteinlaßkanäle (**29**) im Bereich der Steckverbindung zu Saugrüssel (**19**) und Lochrand (**30**).

10. Vorrichtung nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, gekennzeichnet durch Querbelüftungslöcher (**32**) am Saugrüssel (**19**), quer zum Saugkanal (**31**) desselben liegend.

11. Vorrichtung nach einem oder mehreren der vor-

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hergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß das Einsteckende des Saugrüssels (19) durch unrunde Gestalt schlüsselartig auf die Gestalt der Führungen (L) angepaßt ist.

12. Verpackungsplatte, insbesondere Blister-Pakkungsplatte, dadurch gekennzeichnet, daß diese in Bereichen (Zwischenzone 39) zwischen den napfförmigen Vertiefungen (8) eine oder mehrere Öffnungen (40) besitzt zum Durchgriff von am Boden (3) der Vorrichtung (V) vorgesehener Vorsprünge (41).

13. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Öffnungen (40) der gesamten Verpackungsplatten-Fläche in bestimmter Verteilung zugeordnet sind.

14. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Öffnungen (40) von Schlitzen gebildet sind, welche vom Rand (42) der Verpackungsplatte (2) ausgehen.

15. Verpackungsplatte nach einem oder mehreren der vorhergehenden Ansprüche oder insbesondere danach, dadurch gekennzeichnet, daß die Schlitze sich im Mittelbereich der Verpackungsplatte (2) übergreifen.

Hierzu 13 Seite(n) Zeichnungen

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Offenlegungstag: 30. Oktober 1997

Fig. 2

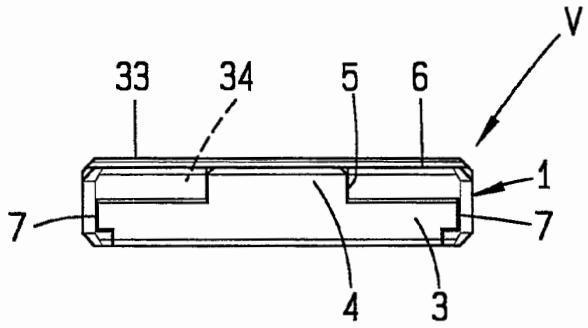


Fig. 1

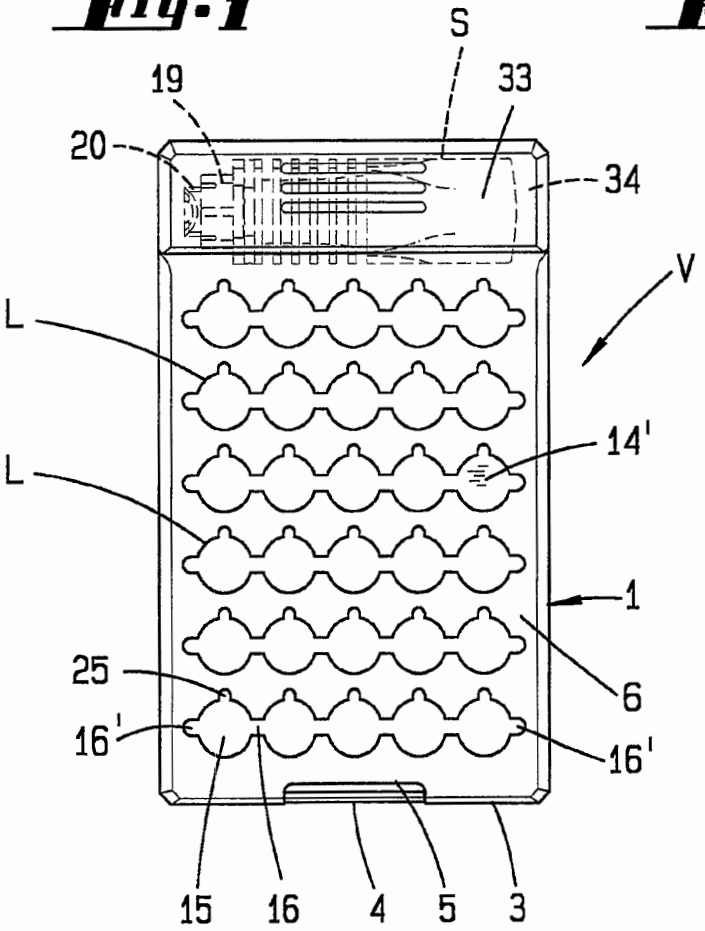
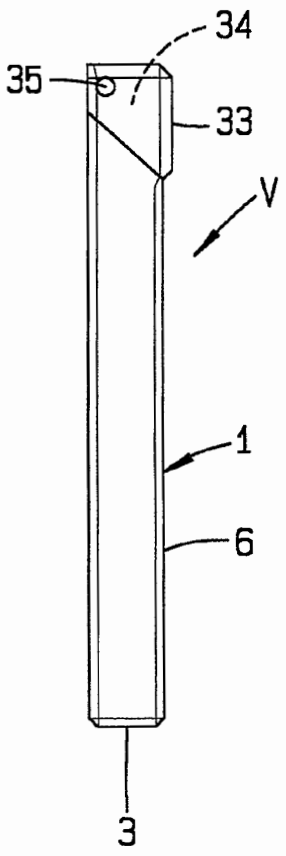


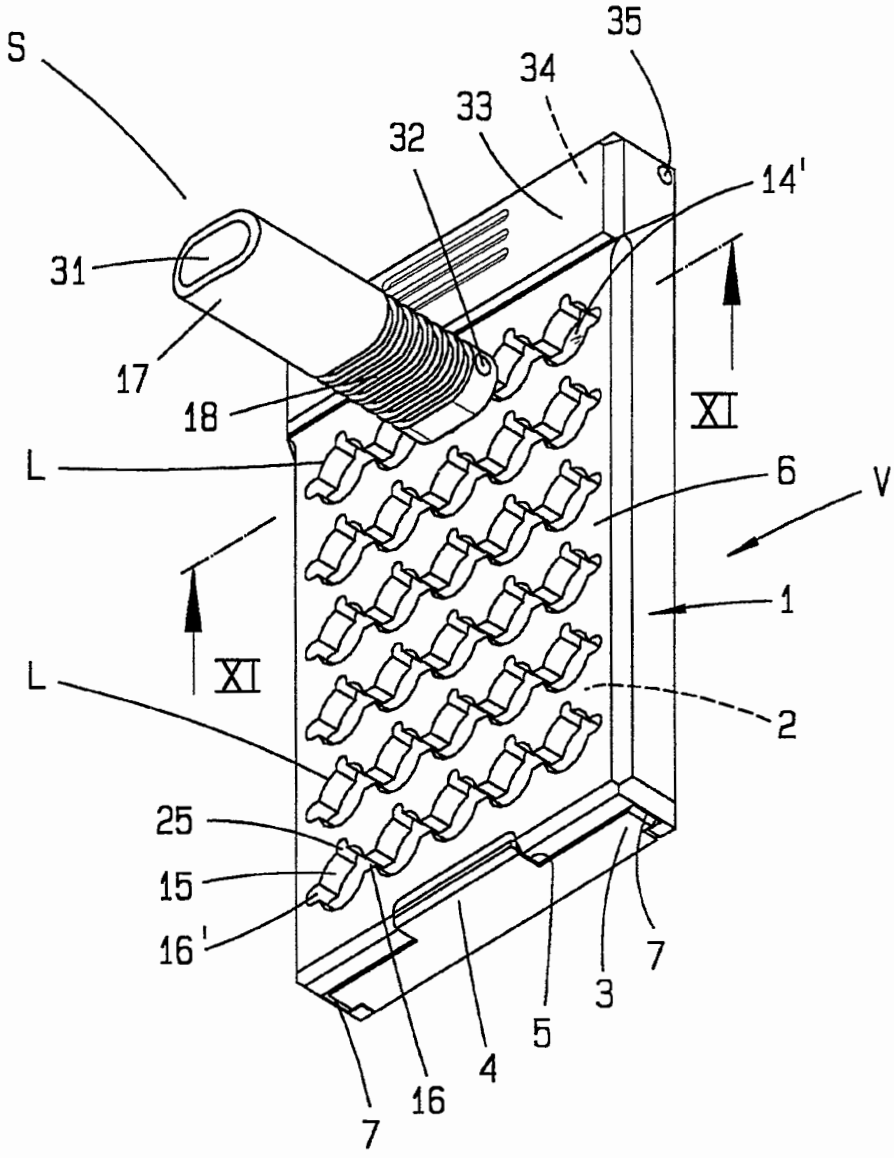
Fig. 3



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Fig. 4



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Fig. 9

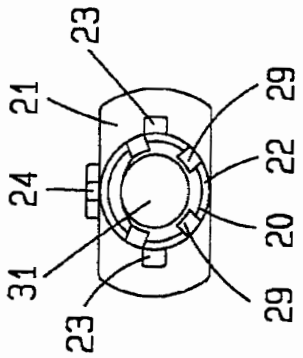


Fig. 5

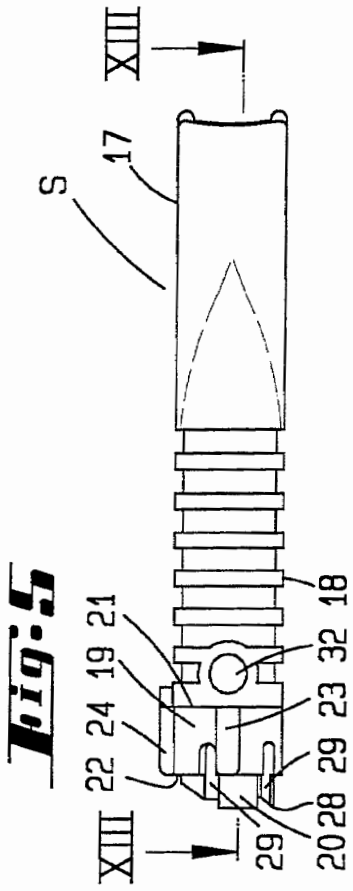


Fig. 6

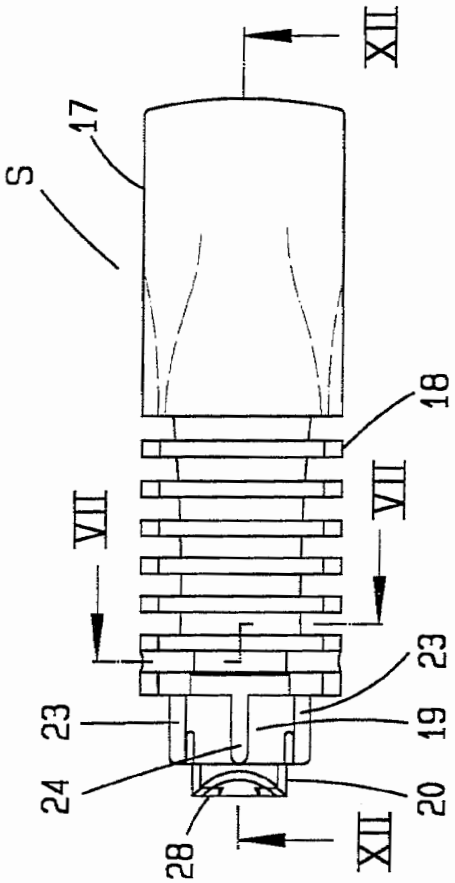


Fig. 8

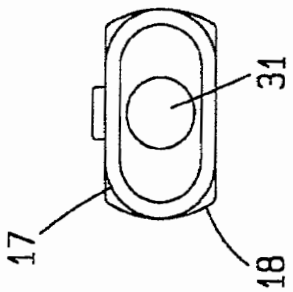
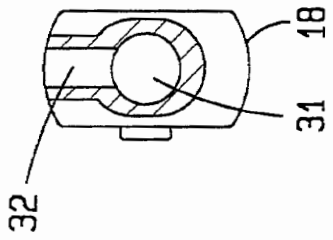


Fig. 7



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Fig. 10

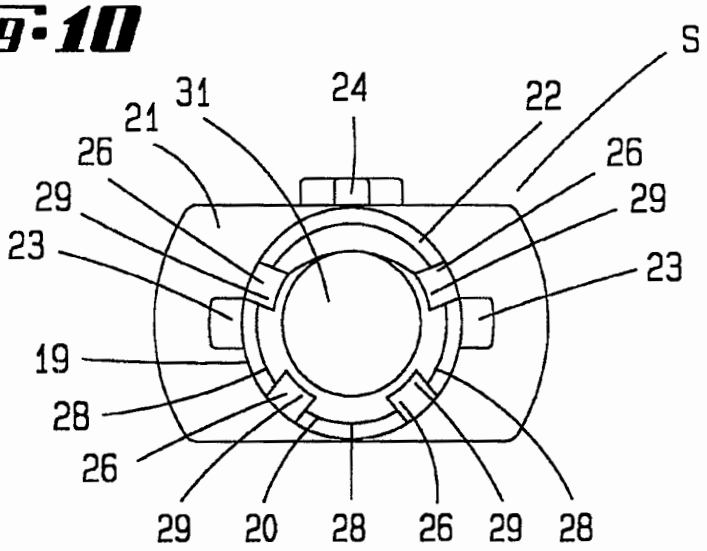
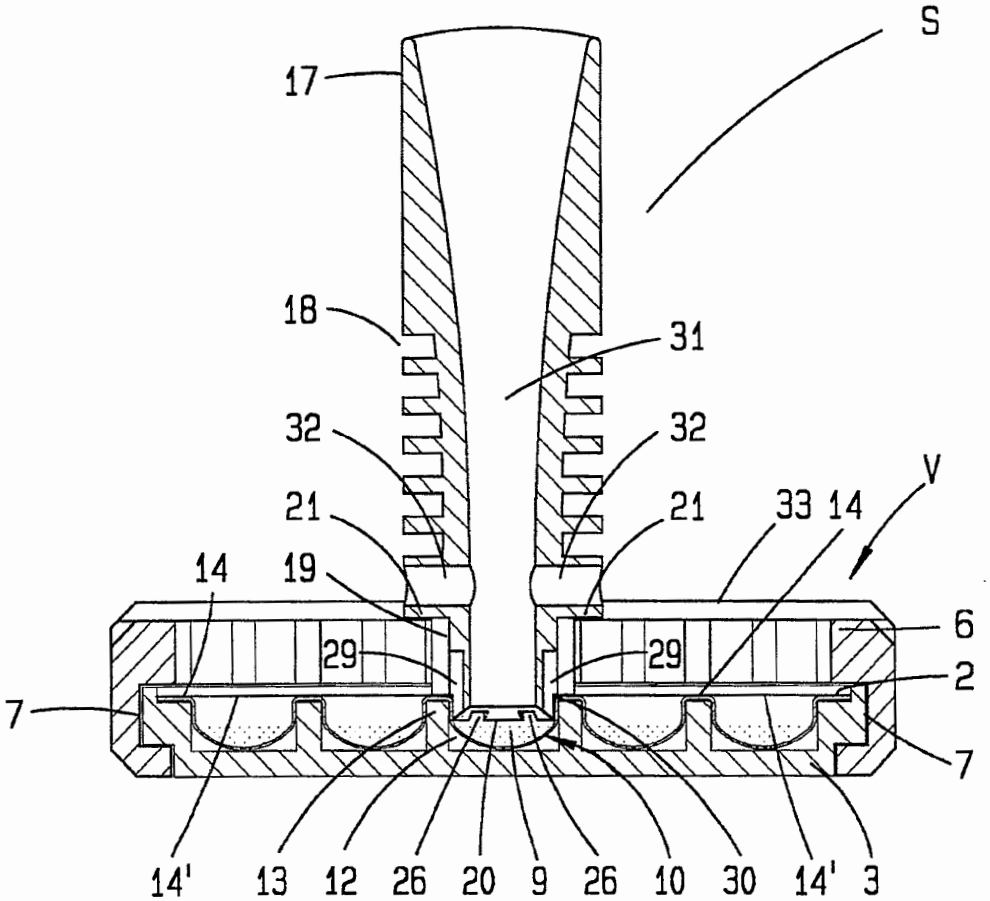


Fig. 11



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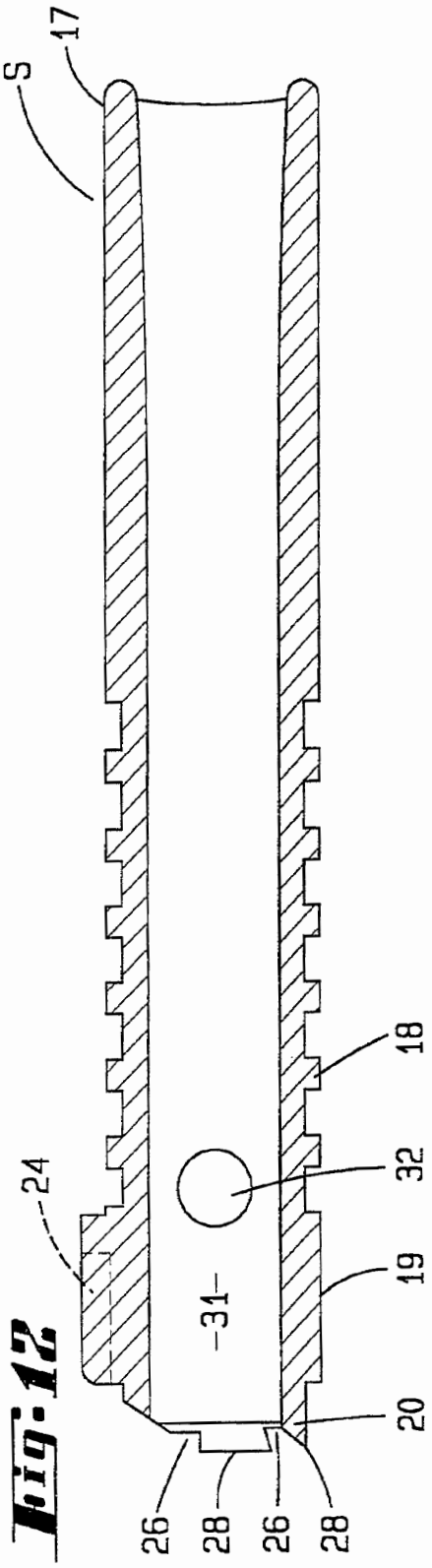


Fig. 12

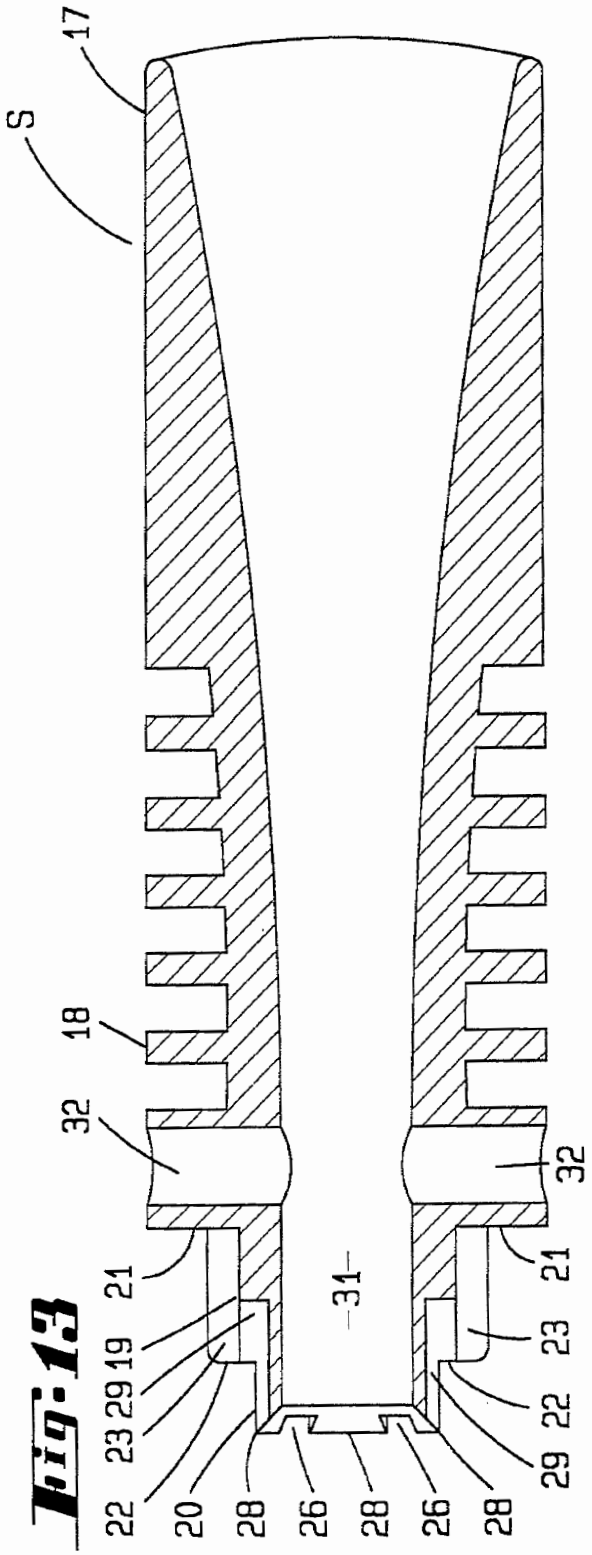
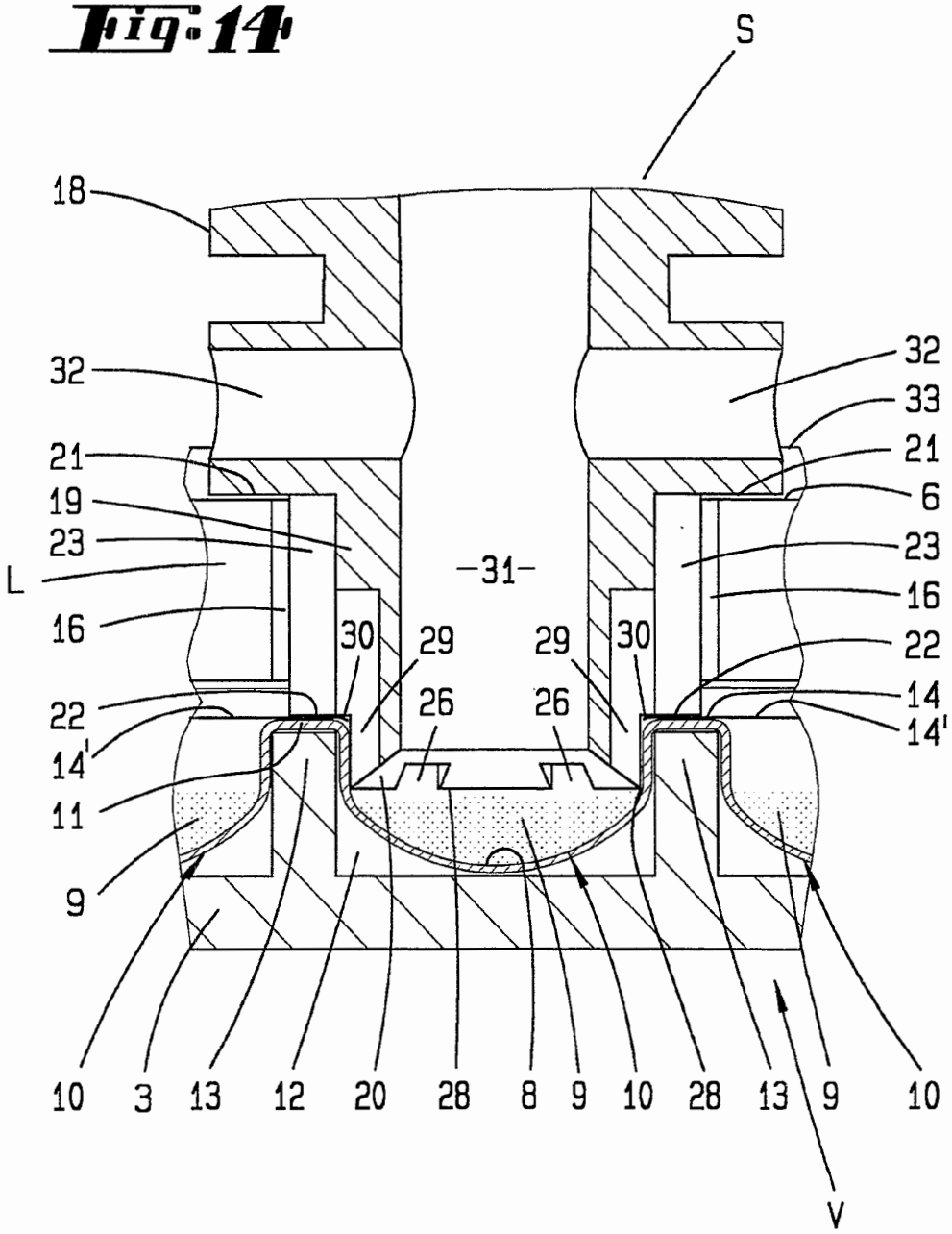


Fig. 13

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Fig. 14



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Fig. 15

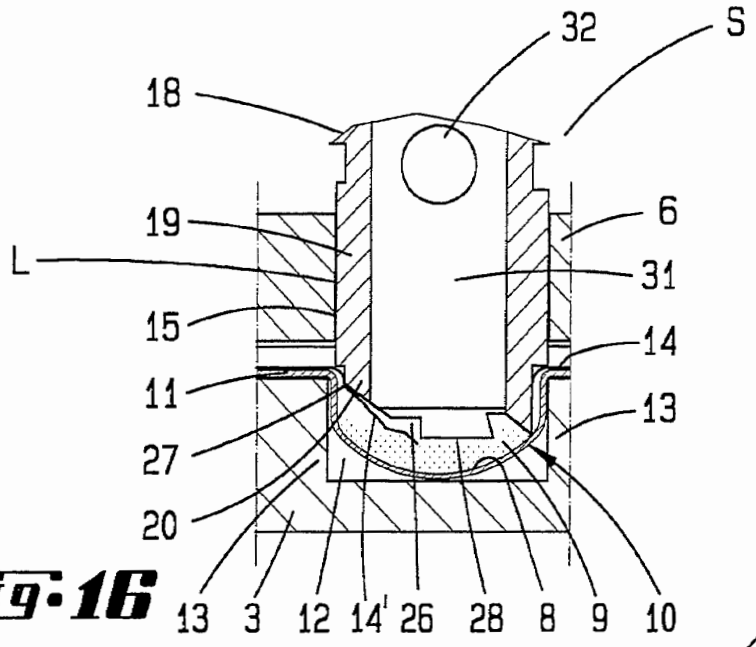
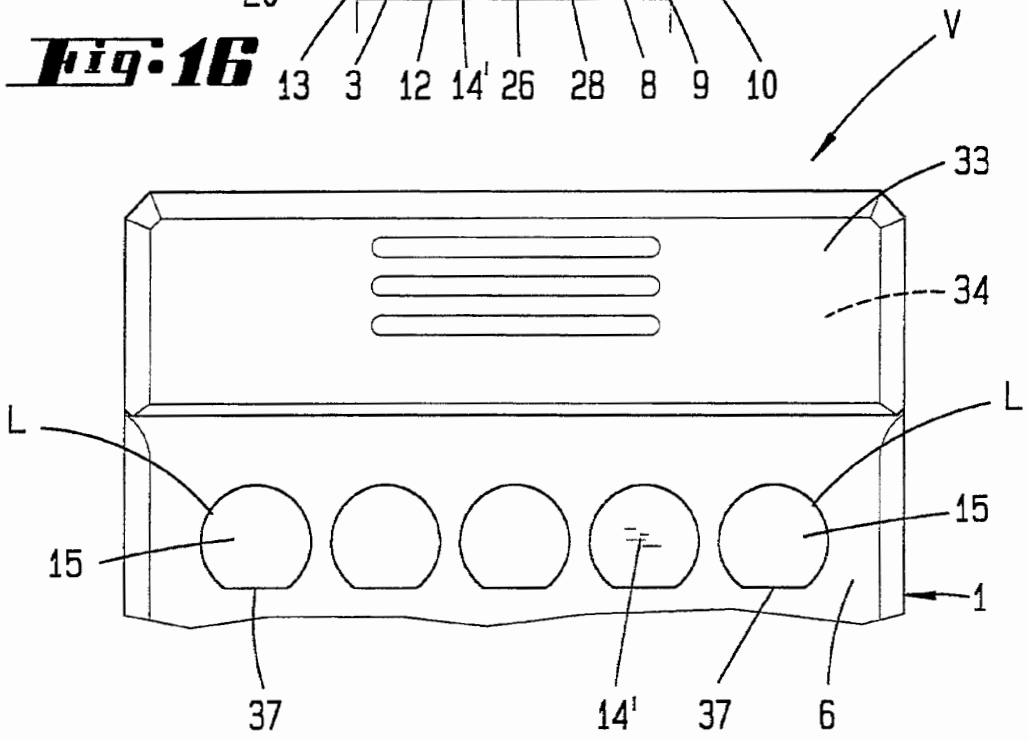


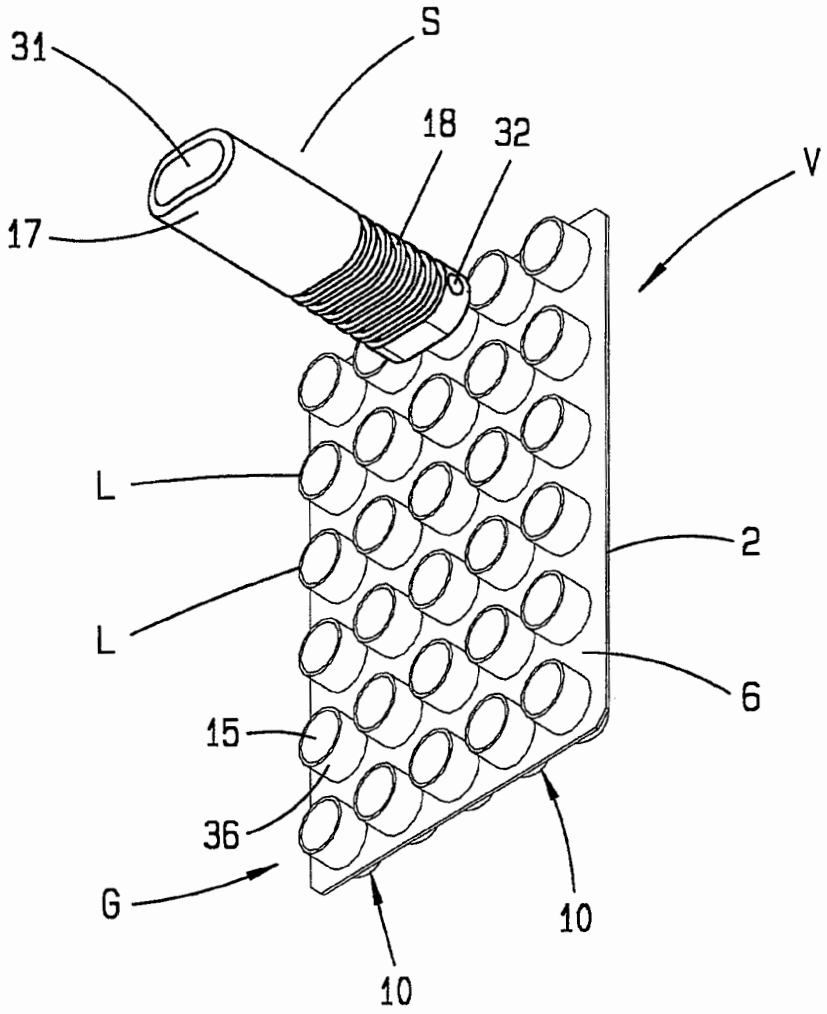
Fig. 16



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Fig. 17



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Offenlegungstag: 30. Oktober 1997

Fig. 18

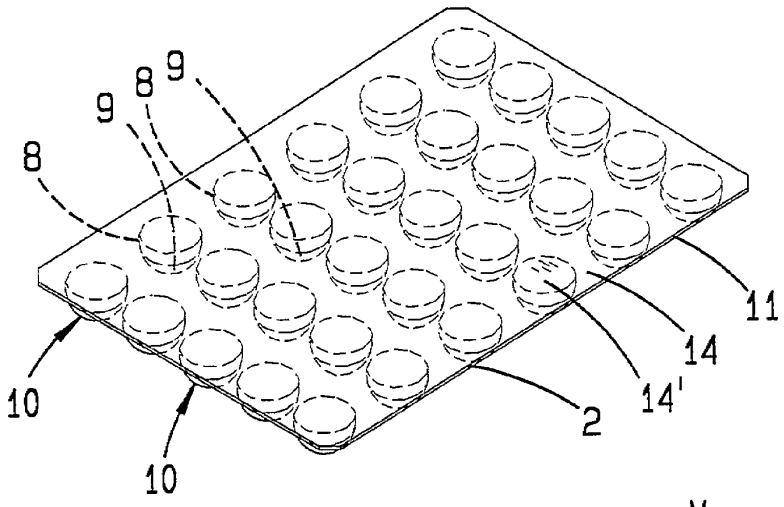
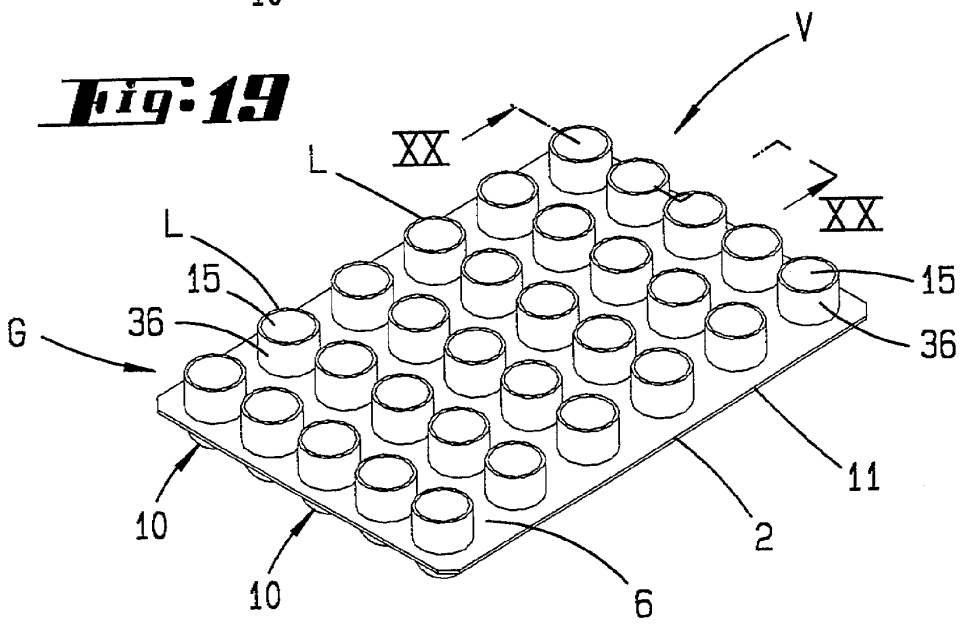


Fig. 19



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Fig. 20

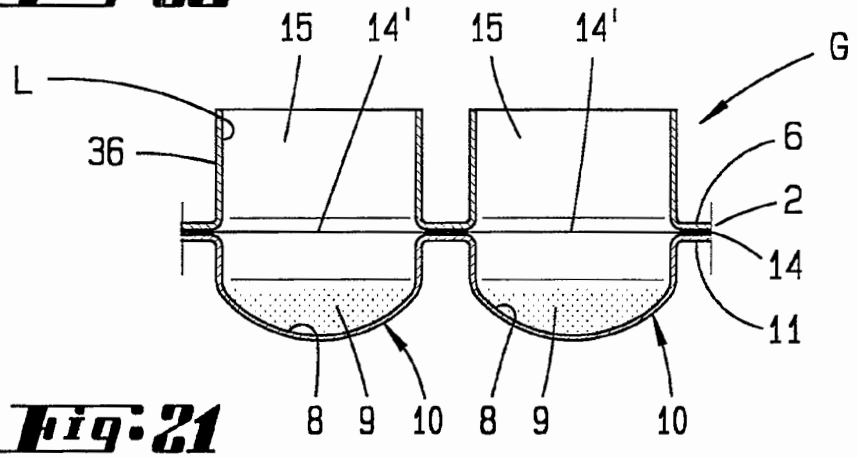


Fig. 21

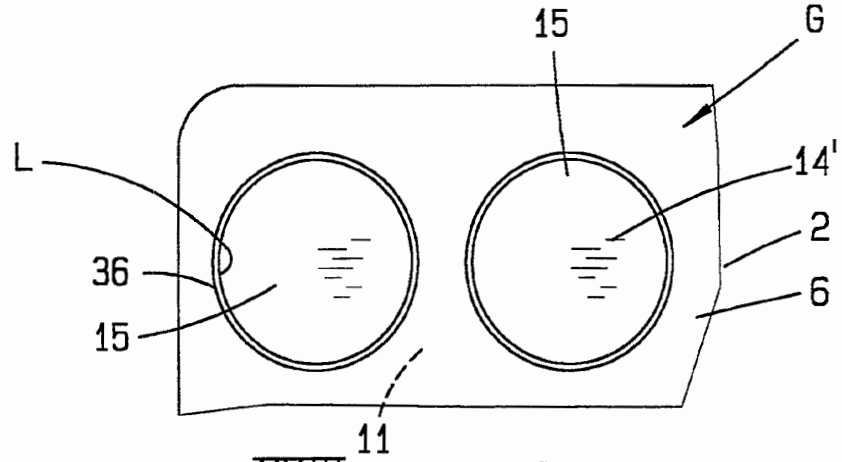


Fig. 22

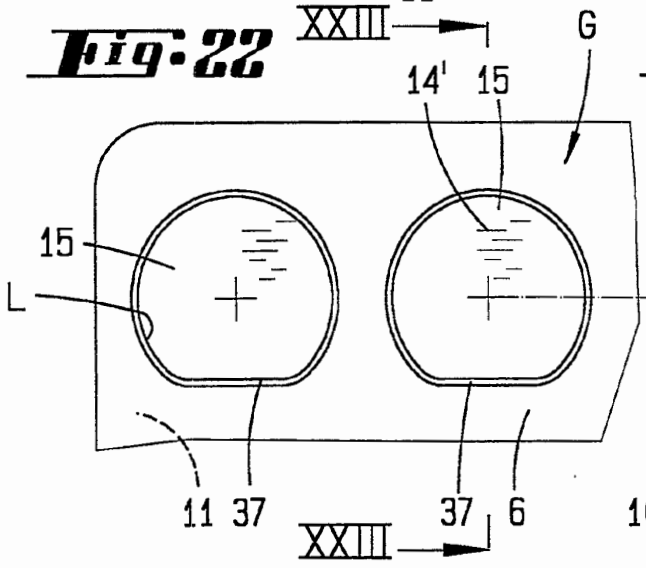
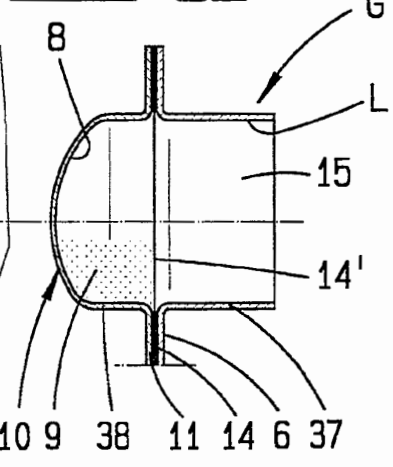


Fig. 23



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Fig. 24

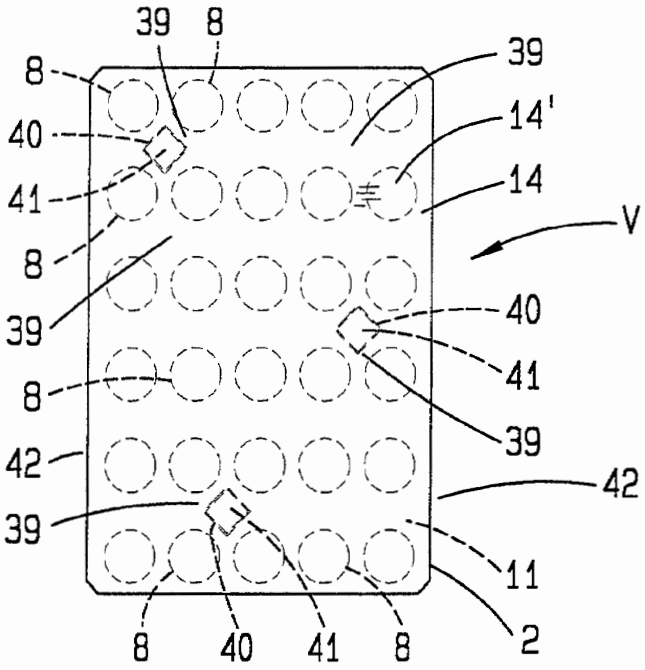


Fig. 25

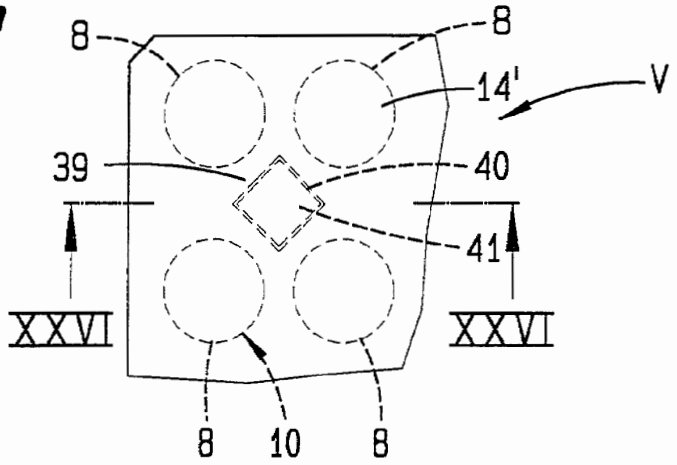
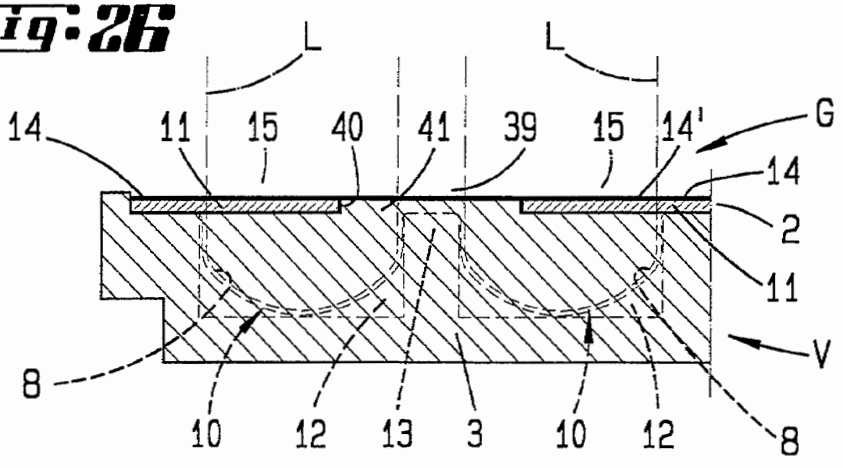


Fig. 26

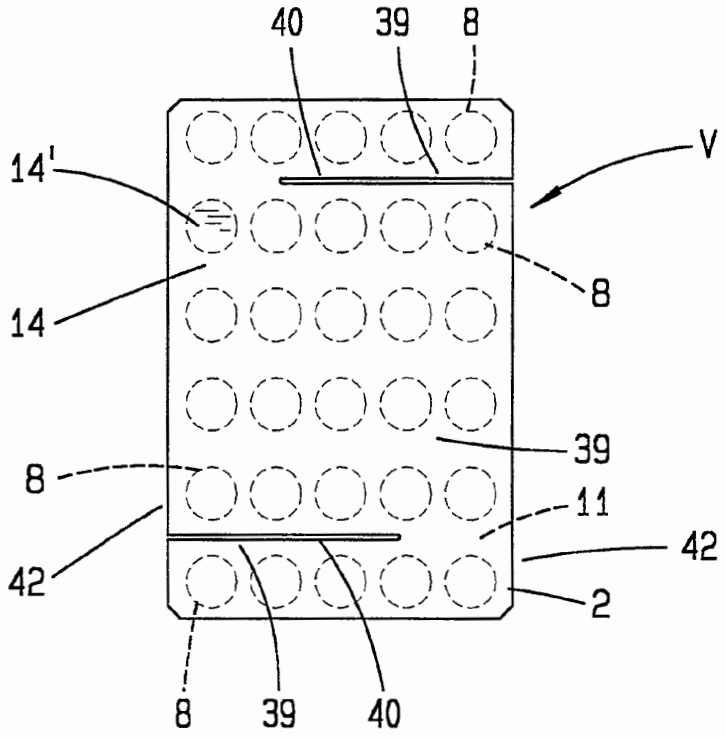


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Fig. 27



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Fig. 28

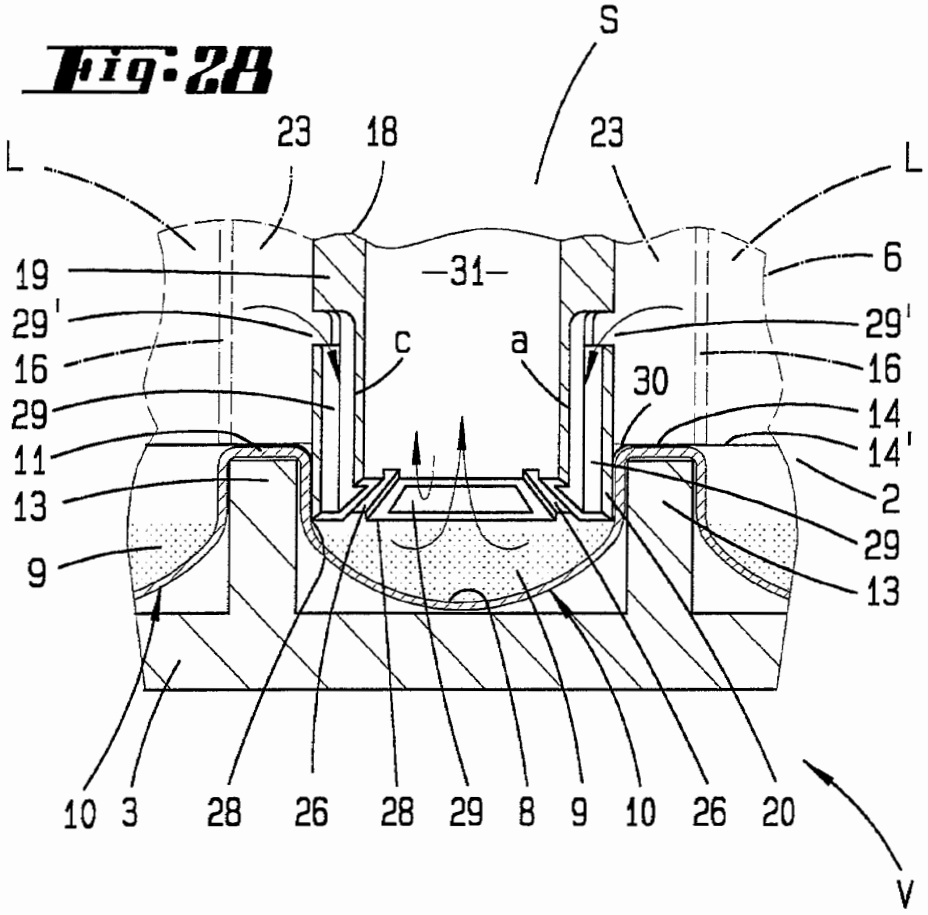
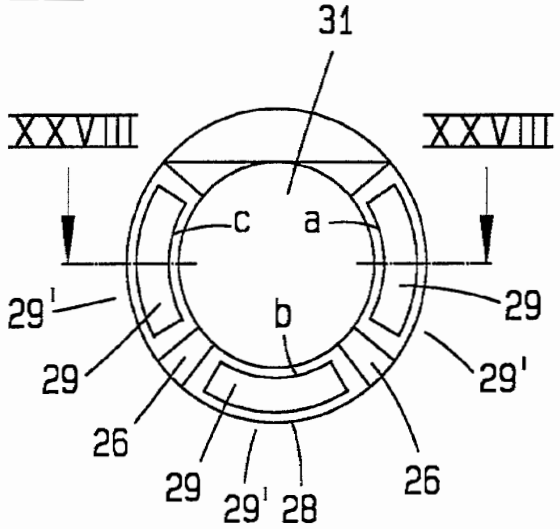


Fig. 29



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Espacenet

Bibliographic data: DE102006004484 (A1) — 2007-08-09

Re-usable part for smoke-free cigarette, has filament preheated by attaching filter, where filament is brought to operating temperature, when pulling on entire construction of cigarette

Inventor(s): SCHMIDT KARSTEN [DE]; BAECKSTROEM MATS [DE]; MELCHIOR-LEHMANN MONIKA [DE] ± (SCHMIDT, KARSTEN, ; BAECKSTROEM, MATS, ; MELCHIOR-LEHMANN, MONIKA)

Applicant(s): SCHMIDT KARSTEN [DE] ± (SCHMIDT, KARSTEN)

Classification: **- international:** ***A24D1/18***
- cooperative: **A24F47/008 (EP)**

Application number: DE20061004484 20060129

Priority number (s): DE20061004484 20060129

Abstract of DE102006004484 (A1)

The part has a storage battery (11), a filter sensor, an air flow sensor (13), a filament (14), timing, vent holes and charging contact, where the filament is preheated by attaching a filter. The filament is brought to the operating temperature, when pulling on an entire construction of the cigarette. The air flow sensor detects the pulling of the smoker and bringing of the filament to the operating temperature, in such a manner that the desired effect of heating of the airflow occurs for releasing contents of active depots in filter.

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(19) Bundesrepublik Deutschland
Deutsches Patent- und Markenamt

(10) **DE 10 2006 004 484 A1** 2007.08.09

(12) # Offenlegungsschrift

(21) Aktenzeichen: **10 2006 004 484.3**
(22) Anmeldetag: **29.01.2006**
(43) Offenlegungstag: **09.08.2007**

(51) Int Cl.[8]: ***A24D 1/18*** (2006.01)

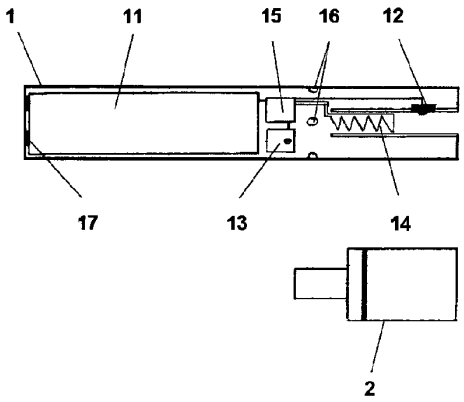
(71) Anmelder:
Schmidt, Karsten, 14471 Potsdam, DE

(72) Erfinder:
Schmidt, Karsten, 14471 Potsdam, DE;
Bäckström, Mats, 12435 Berlin, DE;
Melchior-Lehmann, Monika, 12305 Berlin, DE

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

(54) Bezeichnung: **Technische Lösung zum Betreiben von rauchfreien Zigaretten**

(57) Zusammenfassung: Die Erfindung beschreibt verschiedene Lösungswege zur technischen Ausgestaltung des wiederverwendbaren Teils einer rauchfreien Zigarette nach Patent DE10321379. In diesem befinden sich unter anderem ein Akku (11), ein Glühfaden (14), ein Luftstromsensor (13) und ein Filtersensor (12), der das Vorheizen des Glühfadens (14) veranlasst, sobald ein Filter (2) eingesteckt wird. Der Luftstromsensor (13) detektiert das Ziehen des Rauchers an der Zigarettennachbildung und bringt den Glühfaden auf Betriebstemperatur, so dass der gewünschte Effekt des Aufheizens des Luftstroms zur Freisetzung der Inhaltsstoffe des Wirkstoffdepots im Filter (2) eintritt.



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Beschreibung

[0001] Die hier dargestellte technische Lösung beschreibt einen alternativen Weg zur Umsetzung der gewünschten Eigenschaften einer rauchfreien Zigarette, wie sie in der Patentanmeldung WO 2004098324 (DE 10321379) beschrieben wird.

[0002] Der Lösungsansatz obigen Bezugspatents beruht auf einem wiederverwendbaren Teil (Patentanspruch 1), der als Wärmespeicher zur Erwärmung der durch den Raucher inhalierten Luft dienen soll. Dem Wärmespeicher selbst wird Wärme entweder wie in Patentanspruch 2 oder wie in Patentanspruch 5 beschrieben zugeführt.

[0003] Der Wärmespeicher soll die notwendige Wärme für 1...3 Minuten vorhalten, die benötigt wird, um die vom Raucher inhaliert Luft zu erwärmen.

[0004] Die spezifische Wärmekapazität der Luft beträgt 1,01 $kJ \cdot kg^{-1}\ grd^{-1}$.

[0005] Mit einem Zigarettenzug nimmt der Raucher etwa 300ml Luft auf.

[0006] Wird diese Luftmenge von z.B. 20°C auf 70°C (bei dem sich das Nikotin aus dem Depot löst) erwärmt, speichern 300ml Luft eine Wärmemenge von ca. 20J.

[0007] Geht man von mindestens 5 Zigarettenzügen aus, die ein Raucher für das Rauchen einer Zigarette benötigt, so muss der Luftmenge von 1500ml eine Energiemenge von ca. 100J zugeführt werden, die ohne größeren technischen Aufwand in einem zigarettengroßen Wärmespeicher vorgehalten werden kann.

[0008] Bei der Erfindung wurde jedoch nicht bedacht, dass Luft eine extrem schlechte Wärmeleitfähigkeit besitzt, d.h. der Energieaufwand um ein vielfaches höher ist, um der Luft die notwendige Energiemenge zuzuführen.

[0009] Die spezifische Wärmleitfähigkeit eines Stoffes schlägt sich in der spezifischen Wärmeleitzahl wieder.

[0010] Diese beträgt für Luft 0,025 W/mK, für Kupfer 402 W/mK.

[0011] D.h. die Energiemenge muss um 4 Zehnerpotenzen höher als die des hier benannten Metalls sein, um den Widerstand auszugleichen, den die Luft der Erwärmung durch einem anderen Stoff entgegensetzt.

[0012] Dies ist auch der Grund dafür, warum die Luft, die durch eine echte Zigarette strömt, überhaupt eingeatmet werden kann, obwohl die Gluttemperatur zwischen 700°C und 1000°C beträgt.

[0013] Setzt man voraus, dass man eine Temperatur von mindestens 700°C erzeugen muss, um mindestens 1500ml Luft auf „Betriebstemperatur" zu bringen, so müsste man den Wärmespeicher auf mehrere 1000°C aufheizen, damit dieser für 1...3 Minuten genügend Wärmeenergie vorrätig hat, um insgesamt 1500ml Luft auf 70°C zu erwärmen.

[0014] Eine gleichmäßige Wärmeabgabe, wie unter Absatz 4. des Bezugspatents erläutert, erscheint unter Verwendung eines Wärmespeichers im wiederverwendbaren Teil einer rauchfreien Zigarette nicht realisierbar.

[0015] Die im Folgenden beschriebene Alternativlösung A lehnt sich möglichst nah an der Funktionsfähigkeit einer echten Zigarette an.

[0016] D.h. der wiederverwendbare Teil einer rauchfreien Zigarette (**1**) Abb. I dient nicht als Wärmespeicher sondern beherbergt einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**) und Luftlöcher (**16**). Eine aufwendige Gestaltung von Luftströmungskanälen oder die Anbringung einer aufgedampften rückstrahlenden Beschichtung sind nicht erforderlich.

[0017] Der Glühfaden (**14**) befindet sich unmittelbar vor dem auswechselbaren Filter (**2**), so dass die durch den Glühfaden zu erzeugende Temperatur und damit der Energieverbrauch geringer ausfällt, als dies am Ende der Zigarette der Fall wäre. Wird der Filter (**2**) in den wiederverwendbaren Teil der Zigarette (**1**) eingesteckt, registriert dies der Filtersensor (**12**) und schaltet den Glühfaden (**14**) zu, der damit zum Vorglühen gebracht wird. Diese Funktion ist vergleichbar mit der Glut einer Zigarette ohne Inhalation und dient einem schnelleren Erreichen der Arbeitstemperatur des Glühfadens bei der Inhalation. Erst beim Zigarettenzug, der eine Luftströmung erzeugt und vom Luftstromsensor (**13**) erfasst wird, wird der Glühfaden (**14**) auf Betriebstemperatur gebracht. Dies spart zum Einen Energie und verhindert zum Anderen die bei echten Zigaretten bekannten Gefährdungen durch Überhitzung/Verbrennungen.

[0018] Vergisst der Raucher nach Nutzung der Zigarette den Filter (**2**) zu entfernen, übernimmt die Zeitsteuerung (**15**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0019] Der Filtersensor (**12**) ist als normaler elektromechanischer Kontakt auslegbar.

[0020] Als Luftstromsensor (**13**) ist ein herkömmlicher Luftdrucksensor verwendbar, der auf einen

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plötzlichen Druckabfall innerhalb des wiederverwendbaren Teils der Zigarette (**1**) reagiert.

[0021] Akkus (**11**) in Li-Ion-Technologie haben eine Leistungsdichte von bis zu 350Wh/l und können in individuellen Bauformen gefertigt werden. Sie kommen heute mit sehr kleinen Abmessungen z.B. in Bluetooth-Headsets zum Einsatz.

[0022] Geht man davon aus, dass man 2/3 des Volumens des wiederverwendbaren Teils der Zigarette (**1**) für den Akku (**11**) zur Verfügung hat, so entspricht dies einem Volumen von etwa 2ml und damit einer theoretischen Kapazität von 0,2Ah bei einer Nennspannung von 3,6V.

[0023] Verwendet man einen wenige µm dicke Glühfaden, so lassen sich bei 3,6V mit weniger als 100mA Stromverbrauch Glühtemperaturen von 1000°C und mehr erreichen.

[0024] Die Akkukapazität reicht somit für einen mehrfachen Zigarettengebrauch (mehrere Filter), wenn man von einer durchschnittlichen Nutzungsdauer von 3 Minuten pro Zigarette (Filter) ausgeht.

[0025] Ist die Kapazität des Akkus (**11**) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (**17**) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0026] Die nun beschriebene Alternativlösung B zeigt eine weitere Möglichkeit, die im Bezugspatent unter Verzicht des Anspruches auf Schaffung des beim Inhalieren entstehenden Wärmegefühls gesteckten Ziele zu erreichen.

[0027] Dies erfolgt ohne den Umweg der Erwärmung der Luft auf etwa 70°C, bei der die Inhaltsstoffe des Wirkstoffdepots gelöst werden, in dem das Wirkstoffdepot im Filter direkt erwärmt wird. Hat das Wirkstoffdepot die Arbeitstemperatur erreicht, so reißt der durch den Raucher erzeugte Luftstrom die Inhaltsstoffe mit sich, die dann von ihm inhaliert werden.

[0028] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (**3**) Abb. II und einem austauschbaren Filter mit Wirkstoffdepot (**4**). Der wiederverwendbare Teil (**3**) beherbergt einen Akku (**31**), Ladekontakte (**32**), eine Zeitsteuerung (**33**), Luftlöcher (**34**) und zwei elektrische Filterkontakte (**35**).

[0029] Diese elektrischen Filterkontakte (**35**) stellen eine elektrische Verbindung zum Filter mit Wirkstoffdepot (**4**) her. In diesem ist ein elektrisches Heizelement (**41**) eingebaut, welches über die elektrischen Filterkontakte (**42**) mit den elektrischen Filterkontakten (**35**) des wiederverwendbaren Teils (**3**) verbunden wird. Nach Anstecken des Filters mit Wirkstoffdepot (**4**) wird dieses auf Betriebstemperatur gebracht.

[0030] Vergisst der Raucher nach Nutzung der Zigarette den Filter (**4**) zu entfernen, übernimmt die Zeitsteuerung (**33**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0031] Ist die Kapazität des Akkus (**31**) erschöpft, kann er über ein externes Ladegerät an den Ladekontakten (**32**) wieder aufgeladen werden. Die notwendige Ladeintelligenz steckt im Ladegerät.

[0032] Aufgrund der geringeren Arbeitstemperatur des Heizelements (**41**) sinkt der Energieverbrauch und die Nutungsdauer bis zur nächsten Ladung des Akkus (**31**) erhöht sich.

[0033] Möchte man die Nachteile einer kontaktbehafteten Wärmeerzeugung im Wirkstoffdepot des Filters vermeiden, kann folgende Bauform gewählt werden.

[0034] Die Zigarette besteht wiederum aus einem wiederverwendbaren Teil (**5**) Abb. III und einem austauschbaren Filter mit Wirkstoffdepot (**6**). Der wiederverwendbare Teil (**5**) beherbergt einen Akku (**51**), Ladekontakte (**52**), eine Zeitsteuerung (**53**), Luftlöcher (**54**), eine elektronische Schwingungserzeugungseinheit (**55**), eine Spule (**56**) und einen Filtersensor (**57**).

[0035] Den Wirkstoffen des Wirkstoffdepots (**61**) im Filters (**6**) wird feines Metallpulver, vornehmlich eisenhaltig, beigemengt. Dieses kann das Wirkstoffdepot nicht verlassen.

[0036] Wird der Filter (**6**) in den wiederverwendbaren Teil der Zigarette (**5**) eingesteckt, registriert dies der Filtersensor (**57**) und schaltet die Schwingungserzeugungseinheit (**55**) zu. Die erzeugte niederfrequente Schwingung wird an die Spule (**56**) geleitet und ruft durch die in dem Metallpulver induzierten Wirbelströme eine Erwärmung des Metallpulvers und damit des gesamten Wirkstoffdepots hervor. Die erzeugte Temperatur lässt sich durch die Auswahl der Größe, Form und Materialbeschaffenheit des beigemengten Metalls sowie durch die zugeführte Energie steuern.

[0037] Wird der auswechselbare Filter (**6**) entnommen, so trennt der Filtersensor (**57**) den Stromkreis zur elektronischen Schwingungserzeugungseinheit (**55**).

[0038] Vergisst der Raucher dies nach Nutzung der Zigarette, übernimmt die Zeitsteuerung (**53**) die Trennung des Stromkreises, z.B. nach 3 Minuten.

[0039] Diese Methode ist besonders energieeffizient, da die Leistungsübertragung durch Induktion etwa um das 1.000fache effektiver ist, als die Leistungsübertragung durch Berührung mit einer Heiz-

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quelle.

Patentansprüche

1. Wiederverwendbarer Teil für eine rauchfreie Zigarette, **dadurch gekennzeichnet**, dass dieser einen Akku (**11**), einen Filtersensor (**12**), einen Luftstromsensor (**13**), einen Glühfaden (**14**), eine Zeitsteuerung (**15**), Luftlöcher (**16**) und Ladekontakte (**17**) enthält, bei der durch Anstecken eines Filters der Glühfaden vorgeheizt wird und beim Ziehen an der Gesamtkonstruktion der Zigarette der Glühfaden auf Arbeitstemperatur gebracht wird.

2. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**31**), Ladekontakte (**32**), eine Zeitsteuerung (**33**), Luftlöcher (**34**) und zwei elektrische Filterkontakte (**35**) enthält sowie ein Filter mit Wirkstoffdepot (**4**), dadurch gekennzeichnet, dass dieser ein elektrisches Heizelement (**41**) und elektrische Filterkontakte (**42**) enthält, so dass durch Zusammenstecken beider Teile ein elektrischer Kontakt hergestellt und das Heizelement und somit der Wirkstoff auf Arbeitstemperatur gebracht wird.

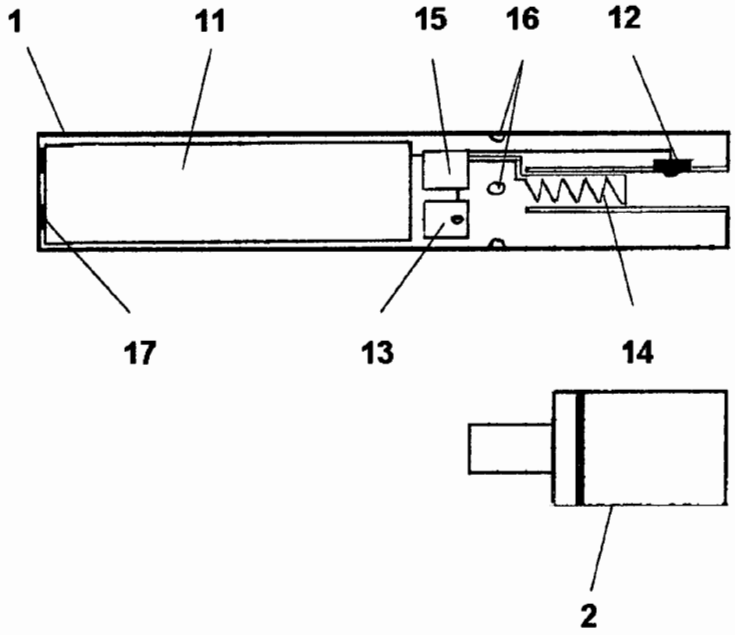
3. Wiederverwendbarer Teil für eine rauchfreie Zigarette, dadurch gekennzeichnet, dass dieser einen Akku (**51**), Ladekontakte (**52**), eine Zeitsteuerung (**53**), Luftlöcher (**54**), eine elektronische Schwingungserzeugungseinheit (**55**), eine Spule (**56**) und eine Filtersensor (**57**) enthält sowie ein Filter mit Wirkstoffdepot, dadurch gekennzeichnet, dass diesem feines Metallpulver beigemengt ist, so dass bei Anstecken des Filters eine niederfrequente Spannung erzeugt wird, die – übertragen durch die Spule (**56**) – Wirbelstromverluste in dem beigemengten Metallpulver hervorruft und somit den Wirkstoff im Wirkstoffdepot (**61**) des Filters (**6**) auf Betriebstemperatur bringt.

Es folgen 3 Blatt Zeichnungen

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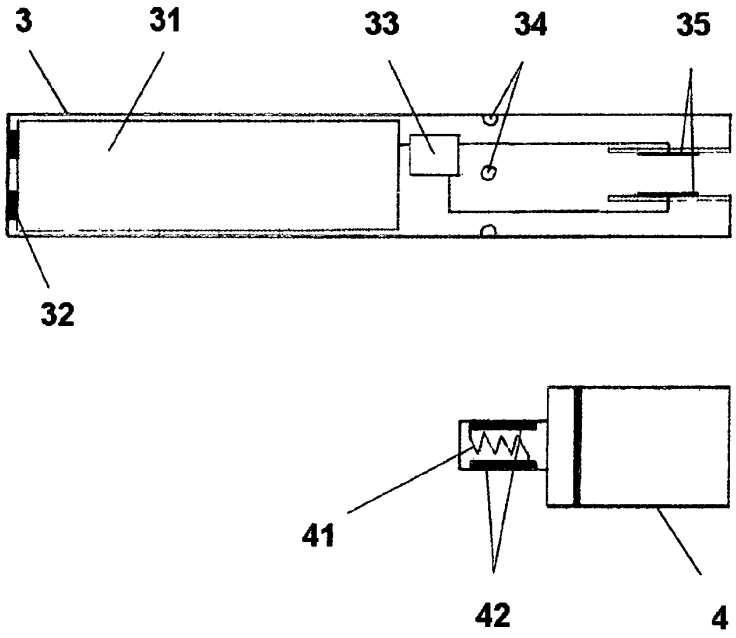
Anhängende Zeichnungen

Abbildung I



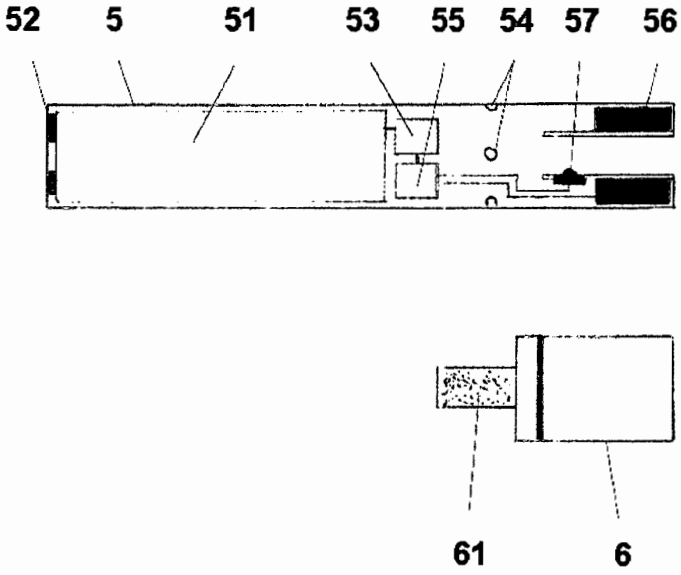
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Abbildung II



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Abbildung III



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(54) Aerosol delivery articles utilizing electrical energy.

(57) Aerosol delivery articles employ an electrical resistance heating element and an electrical power source to provide an aerosol. The articles advantageously comprise a disposable portion and a reusable controller. The disposable portion normally includes a drug or flavor substance and an air permeable resistance heating element having a surface area greater than 1 m^2/g, which usually carries an aerosol forming substance. The reusable controller normally includes a puff-actuated current actuation means, a time-based current regulating means to control the temperature of the heating element, and a battery power supply.

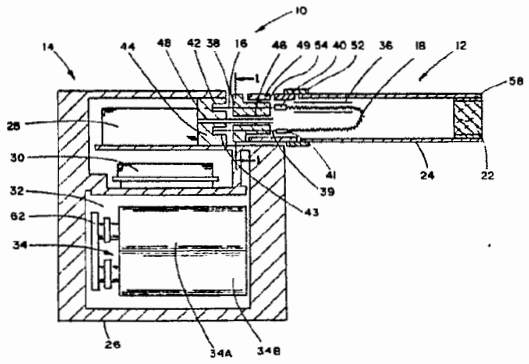


FIG. 1

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AEROSOL DELIVERY ARTICLES UTILIZING ELECTRICAL ENERGY

BACKGROUND OF THE INVENTION

The present invention relates to aerosol delivery articles which employ an electrical resistance heating element and an electrical power source to produce an aerosol. Articles of the present invention can deliver a flavored aerosol or a drug in aerosol form.

Over the years, there have been proposed numerous smoking products, flavor generators and medicinal inhalers which utilize electrical energy to vaporize or heat a volatile material for delivery to the mouth of the user.

U.S. Patent No. 2,057,353 to Whittemore, Jr. proposed a vaporizing unit. In particular, a wick reportedly carried liquid medicament by capillary action to a point where the liquid was vaporized by an electrical resistance heating element.

U.S. Patent No. 2,104,266 to Mccormick proposed an article having a pipe bowl or cigarette holder which included a resistance coil (i) wound on an insulating and heat resisting material, and (ii) contained in an insulated chamber. Prior to use of the article, the pipe bowl was filled with tobacco or the holder was fit with a cigarette. Current then was passed through the resistance coil. Heat produced by the resistance coil was transmitted to the tobacco in the bowl or holder, resulting in the volatilization of various ingredients from the tobacco. A thermostatic switch was employed to maintain a predetermined temperature range to which the tobacco was heated.

U.S. Patent No. 3,200,819 to Gilbert proposed a smokeless, non-tobacco cigarette having a flavor cartridge, such as a porous substrate impregnated with mentholated water. The article included a battery for powering a tube or bulb which was illuminated before assembly. The bulb was placed in a tubular liner, which was in turn located within a tube of plastic having the size, color and form of a cigarette. In use, the illuminated bulb reportedly heated the flavored air drawn through passages formed between the bulb and the tubular liner. As such, warm, moist, flavored air was delivered to the user.

French Patent Publication No. 2,128,256 to Ribot et al proposed an article for delivering denicotinized smoke. The proposed article included a sealed ampule which contained pressurized denicotinized smoke. An electric resistor was immersed in the smoke. In use, the terminals of the resistor were pushed into contact with a microbattery causing the resistor to generate heat and heat the smoke within the ampule. Draw by the user reportedly caused warm smoke to exit a valve near the mouthend of the article.

Japanese Patent Publication 8231/73 to Takeda proposed a cigar-shaped inhaler which included a battery powered Nichrome wire to heat air that, in turn, evaporated an essence from an essence container. The Nichrome wire was energized by either a manually-actuated or a draw actuated "on-off" switch.

West German Patent Application No. 2,653,133 to Kovacs proposed a smoking simulator having an internal battery which could accelerate or control the vaporization or emission of aromatic substances for delivery to the user. In supplemental West German Patent Application No. 2,704,218, Kovacs described the use of a vacuum or draw-actuated switch to switch "on" the battery operated heating coil.

A draw actuated, pressure transducer switch was described in U.S. Patent No. 4,246,913 to Ogden et al, as part of a smoke aversion therapy article which delivered a small electrical shock to a smoker whenever the smoker drew on a cigarette.

U.S. Patent No. 4,141,369 to Burruss proposed an article similar to the previously discussed McCormick articles. Burruss proposed a container which was electrically heated to a temperature sufficient to volatilize desired components from smoking material inserted therein. Heated air passing through the container during draw reportedly carried volatilized materials to the mouth of the user.

U.S. Patent No. 4,303,083 to Burruss proposed a pipe having an electrical resistance heating element, a manually operated "on-off" power switch, and an opening above the resistance element for the addition of volatile compound. During use, the volatile compound was applied, using a squeeze tube or eye dropper, to a heated surface within the pipe, apparently on a puff-by-puff basis. The volatile compounds reportedly were vaporized, mixed with air drawn into the pipe, and inhaled by the user.

PCT Publication No. WO 86/02528 to Nilsson et al proposed an article similar to that described by McCormick. Nilsson et al proposed an article for releasing volatiles from a tobacco material which had been treated with an aqueous solution of sodium carbonate. The article resembled a cigarette holder and reportedly included a battery operated heating coil to heat an untipped cigarette inserted therein. A switch was activated to supply current to the heating coil. A temperature sensor reportedly disconnected and reconnected the battery in order to maintain the temperature generated by the device in a narrow temperature range. Air drawn through the device reportedly was subjected to

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elevated temperatures below the combustion temperature of tobacco and reportedly liberated tobacco flavors from the treated tobacco contained therein.

U.S. Patent No. 4,735,217 to Gerth et al proposed a "cigarette-shaped" medicament dosing article having a pellet of vaporizable medicament and a Nichrome resistance heating element connected in series with a battery power source and a draw actuated switch. In their only working example, the Nichrome heating element allegedly achieved a temperature in the range of 190°F to 220°F (90°C to 105°C) within a two second puff, which apparently was sufficient to volatilize menthol from a menthol pellet. At Column 8, lines 43-63, Gerth et al. went on to speculate that their article could be used to vaporize nicotine from a nicotine-containing pellet and that they believed it feasible to coat the heating element with a nicotine-containing compound in lieu of using a vaporizable pellet.

However, it is believed that it would not be possible to coat a Nichrome heating element, of the type described by Gerth et al, with enough vaporizable liquid material to deliver sufficient volatile material to the user, over a 6 to 10 puff life. It also is believed that the article of Gerth et al would not be able to provide enough electrical energy to (i) vaporize volatile material until near the end of a typical two second puff, or (ii) provide a high enough temperature (e.g., 150°C to 350°C) to vaporize many volatile materials within a two second puff, including many desirable aerosol forming substances and many volatile flavor components. In addition, even with only a single AA battery, the article described by Gerth et al. is more than 3 times the diameter and many times heavier than a typical cigarette and is provided with a relatively imprecise draw actuated control switch and with no means of regulating the current or heat during the puff.

Despite many years of interest and effort, none of the foregoing articles employing electrical energy has ever realized any significant commercial success, and it is believed that none has ever been widely marketed. Moreover, it is believed that none of the foregoing electrical energy articles is capable of effectively providing acceptable drug or flavor delivery to the user, especially a 6 to 10 puff, or greater, product life.

Thus, it would be desirable to provide an aerosol delivery article which utilizes electrical energy and which is capable of delivering acceptable quantities of aerosol over at least 6 to 10 puffs.

SUMMARY OF THE INVENTION

The present invention relates to drug and flavor delivery articles which employ an electrical resistance heating element and an electrical power source to provide an aerosol. Preferred articles can produce aerosol almost immediately upon commencement of a puff, as well as provide the controlled production of aerosol throughout the puff and over a 6 to 10 puff product life.

In one aspect of the invention, the aerosol delivery article includes a disposable portion (eg., a cartridge) which utilizes an air permeable high surface area electrical resistance heating element that normally carries aerosol forming substances prior to use. This resistance heating element typically is a porous material having a surface area greater than 1 m^2/g, as determined using the Brunaver, Emmett and Teller (BET) method described in J. Am. Chem. Soc., Vol. 60, p. 309 (1968); and Adsorption Surface Area and Porosity, Gregg et al, Academic Press, NY (1967). Preferably, the heating element is a fibrous carbon material, most preferably having a surface area greater than about 1,000 m^2/g. (In contrast, the surface area of the Nichrome metal resistance element of Gerth et al is believed to be about 0.01 m^2/g.) Preferably, such porous heating elements are impregnated with (i) liquid aerosol forming substances, such as glycerin, and (ii) a flavor such as a coffee extract or menthol, or a drug constituent. Such heating elements are particularly advantageous in that they are capable of holding and efficiently releasing relatively large quantities of liquid aerosol forming substances as well as drug or flavor substances. For example, such heating elements can carry enough aerosol forming substances to provide aerosol for 6 to 10 puffs, or more.

Another important aspect of the invention relates to the various configurations of the disposable portions described herein. For example, in certain preferred embodiments, the disposable portion advantageously is provided with an electrical connection means at one end thereof. This electrical connection means includes means for connecting the resistance element to a battery or other external power source, and preferably includes an air passageway used in conjunction with the preferred puff actuated current actuation means. In other preferred embodiments, the disposable portion is adapted for connection to the external power source via connectors located on the reusable controller. In certain preferred embodiments, the resistance heating element is located centrally in the disposable portion and/or does not occupy a significant portion of the cross-sectional area of the disposable portion. In other preferred embodiments, the resistance heating element is located adjacent an end of the disposable portion, and/or at least substantially fills the cross-sectional area of the disposable portion or the air passageway there-

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through.

A reusable controller can be used with the disposable portions of the invention. This reusable controller normally includes a current actuation means, a separate current regulating means to control the temperature of the heating element, and a battery power supply. Alternatively, the electrical power supply can be provided separately from the current actuation and current regulating means; e.g., as a separate battery pack or as normal household current stepped down by an appropriate transformer. The reusable controller can be in the form of a pipe, a reusable mouthpiece, a hand-held unit or other portable form into which the disposable portion can be inserted. The use of such a reusable article with the disposable portions of the invention is particularly advantageous in that it permits the use of (i) relatively large power sources, capable of generating 10 to 40 watts of power or more, and (ii) accurate and sophisticated current actuation and current regulating means that normally would be too costly to incorporate into a single use, disposable article.

Preferably, the current actuation means is puff actuated, so that current flows through the resistance heating element to produce aerosol only during draw by the user.

To use the articles of the invention, the user simply inserts the disposable portion containing the drug or flavor substance into the controller, to electrically connect the heating element to a circuit including the current actuation and current regulating means and to the battery. When the user draws on the mouthend of the article, the preferred current actuation and current regulating means permit unrestricted or uninterrupted flow current through the resistance heating element to generate heat rapidly. This heating volatilizes the aerosol forming substances and/or drug or flavors, which in turn form an aerosol and pass through the article and into the mouth of the user. At the same time, the current regulating means (i) regulates current flow through the heating element to control heating of the resistance element and the temperature experienced thereby, and (ii) prevents overheating and degradation of the aerosol former. When the user stops drawing on the article, the current actuation means prevents further current flow through the heating element and disables the current regulating means. This process continues, puff after puff, until the user decides to stop drawing on the article (i.e., flavor generation is depleted or the dose of the drug is complete). At that point, the reusable portion can be removed and discarded, and a new one inserted in its place.

In another aspect of the invention, the current actuation means, the current regulating means, and/or the electrical power source may be incorporated into the portion of the article containing the electrical resistance heating element, so that the reusable controller may be reduced in size or even eliminated.

Preferred aerosol delivery articles of the invention are capable of delivering an average of at least 0.5 mg, more preferably at least 0.8 mg, of aerosol and/or drug or flavor substance per puff, measured as wet total particulate matter (WTPM), under conditions of 2 second, 35 ml puffs, taken once every 60 seconds. Preferred articles of the invention can deliver such material, preferably in visible form, for a plurality of puffs, preferably at least about 6 puffs, more preferably at least about 10 puffs, under such conditions.

As used herein, and only for the purposes of this application, "aerosol" is defined to include vapors, gases, particles, and the like, both visible and invisible, generated by action of heat from the resistance heating element upon aerosol forming substances and/or drug or flavor substances located on the resistance element or elsewhere in the article.

The articles of the present invention are described in greater detail in the accompanying drawings and in the detailed description of the invention which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a longitudinal, partial sectional view of an article of this invention;

Figure 1A is a sectional view of a portion of the embodiment shown in Figure 1 taken along lines 1-1;

Figure 2 is a longitudinal, partial sectional view of an article of this invention;

Figure 3 is a perspective of an article of this invention including an exposed inner view of the reusable portion thereof;

Figures 4, 5, and 6 are longitudinal, partial sectional views of preferred articles of this invention showing the disposable portions and cut-away views of the controllers;

Figures 7 and 8 are longitudinal sectional views of additional articles of the invention;

Figures 9 and 10 are representative schematic diagrams of time-based control circuits and related wiring for preferred controllers useful in this invention; and

Figure 11 depicts the temperature, average current voltage profiles experienced by a resistance heating element during heating controlled by the preferred current regulating means.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Referring to Figure 1, aerosol delivery article 10 includes a disposable cartridge 12 and a reusable, hand-held controller 14. The disposable cartridge 12 includes electrical connection plug 16, resistance heating element 18 carrying an aerosol forming substance, mouth end filter 22, and a resilient overwrap 24. The preferred controller 14 includes a case 26, a puff actuated current actuation mechanism 28 having the form of a pressure sensitive switch, a time-based current control circuit 30, and a chamber 32 into which battery power supply 34 (shown as batteries 34A and 34B) is inserted.

The resistance heating element 18 employed in cartridge 12 preferably is a fibrous material having a high surface area and an adsorbant, porous, wettable character, in order to carry a suitable amount of aerosol forming substance for effective aerosol formation. Suitable heating elements preferably have surface areas above about 50 m^2/g, more preferably above about 250 m^2/g, and most preferably above about 1,000 m^2/g.

Preferred heating elements normally have low mass, low density, and moderate resistivity, and are thermally stable at the temperatures experienced during use. Such heating elements heat and cool rapidly, and thus provide for the efficient use of energy. Rapid heating of the element also provides almost immediate volatilization of the aerosol forming substance. Rapid cooling prevents substantial volatilization (and hence waste) of the aerosol forming substance during periods when aerosol formation is not desired. Such heating elements also permit relatively precise control of the temperature range experienced by the aerosol forming substance, especially when the preferred time based current control means described herein is employed.

Preferred resistance heating elements include carbon filament yarns available from American Kynol, Inc., New York, NY, as Catalog Nos. CFY-0204-1, CFY-0204-2, and CFY-0204-3. Such yarns reportedly have surface areas of about 1,500 m^2/g and resistivities of about 10 to about 30 milliohm-cm. See, Kirk-Othmer: Encyl. Chem. Tech., Vol. 16, 3rd Ed., pp 135-136 (1981). Representative lengths of such yarns range from about 15 to about 50 mm. Other preferred heating elements include carbon felts and activated carbon felts available from American Kynol, Inc., as Catalog Nos. CN-157(HC), CN-210(HC), ACN-211-10, ACN-210-10, and ACN-157-10. Such felts typically have surface areas of about 1,500 m^2/g and resistivities of about 5 to about 30 milliohm-cm. Such felts can be used in the form of circular discs having diameters of about 4 to 8 mm, as described in greater detail hereinafter with reference to Figures 4-6. Other suitable heating elements include porous metal wires or films; carbon yarns, cloths, fibers, discs or strips; graphite cylinders, fabrics or paints; microporous high temperature polymers having moderate resistivities; porous substrates in intimate contact with resistance heating components; and the like.

Preferably, the heating element 18 is impregnated with or otherwise carries one or more aerosol forming substances in order that the aerosol forming substances are in a heat exchange relationship with the electrical heating element. The aerosol forming substances used in this invention are capable of forming aerosol during periods when the heating element generates heat. Such substances preferably are composed of carbon, hydrogen and oxygen, although other material such as water can be employed. The aerosol forming substances can have a solid, semi-solid, or liquid form. Examples of suitable aerosol forming substances include water; ethanol; polyhydric alcohols such as glycerin, propylene glycol and triethylene glycol; aliphatic esters of mono-,di-, or poly-carboxylic acids such as methyl stearate, dimethyl dodecandioate, dimethyl tetradecandioate; a flavor such as menthol, chocolate, coffee, fruit or artificial fruit; and the like, as well as mixtures thereof; as well as a drug or a mixture of a drug with any of the foregoing aerosol forming substances.

While the loading of the aerosol forming substance can vary from substance to substance and from heating element to heating element, the amount of liquid aerosol forming substance used typically will be greater than about 15 mg and preferably ranges from about 25 mg to about 50 mg.

The flavor substances useful herein are those which are capable of being delivered to the user in aerosol form. Such flavors include menthol, peppermint, spearmint, cinnamon, vanilla, licorice, ginger, mouth fresheners, chocolate, coffee and coffee flavors, liqueurs, root beer, spice, nut, pepper, pizza, bacon, sausage, cereal, popcorn, cookie, strawberry, citrus, raspberry, cherry, tooty fruity, and the like.

Drugs useful herein are those which can be administered in an aerosol form directly into the respiratory system of the user. As used herein, the term "drug" includes articles and substances intended for use in the diagnosis, cure, mitigation, treatment or prevention of disease; and other substances and articles referred to in 21 USC 321(g)-(1). Typical of such drugs are those which are used in the treatment of asthma, emphysema, bronchitis, epilepsy, shock, hypertension, cardiac arrhythmia, sinus congestion, allergies, convulsions, anxiety, schizophrenia, and the like. Examples of suitable drugs include ephedrine, metaproterenol, terbutaline, dopamine, phenytoin, diazepam, pro-

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pranolol, diphenhydramine, and the like.

Such drug and flavor substances can be used as aerosol forming substances, and can be carried by the resistance heating element. Such substances also can be placed between the resistance heating element and the mouthend of the cartridge, such as in mouthend filter 22 or in a separate flavor chamber or cartridge located between the resistance heating element and the filter. In such instances, the substance can either form an aerosol or be eluted by the aerosol forming material. As with the aerosol forming substance, the loading of the flavor substance can vary from substance to substance, and depends upon the taste desired; and the loading of each drug can vary depending upon the particular drug and the particular dose required.

Although drugs can be employed to form an aerosol with or without the other aforementioned aerosol forming substances (e.g., glycerin), it is desirable to employ such aerosol forming substances with drugs in order that an identifiable, visible aerosol is provided. As such, the user readily can identify when a dose of the drug is complete.

A heat resistant, electrically insulative strip, tube or spacer 36, preferably is provided in order to maintain the heating element in place and to prevent the heating element from contacting itself. The insulative spacer 36 can be a cellulosic sheet treated with fire retardant, an aluminum foil having a surface coating of aluminum oxide, an insulative ceramic material, a heat resistant plastic material such as a polyimide, or the like.

The electrical connection plug 16 preferably is manufactured from a resilient, electrically insulative material such as a thermoplastic material. The plug 16 includes two electrical connector pins or prongs 38, 39 connected to the ends of heating element 18 via connectors 40, 41. The pins 38, 39 engage with electrical terminals 42, 43 located in electrical connection receptacle 44 of the controller 14. Plug 16 also includes a passageway 46 through which tube 48 from pressure sensing switch 28 extends. As shown in Figure 1A, pins 38, 39 and passageway 46 are offset with respect to the longitudinal axis of plug 16.

A portion of the length of the electrical connection plug 16 preferably is circumscribed by a collar 49 having the form of a thermoplastic tube, which preferably is friction fit around a portion of the length of the plug. The collar 49 in turn is secured to the remaining portion of the cartridge via overwrap 24 using tipping paper 52 or other appropriate means such as adhesive, a friction fit, or the like. Preferably, the collar 49 includes one or more peripheral air inlet openings 54 which provide a flow of ambient air through the cartridge during draw. Alternatively, the air inlet can be positioned through the extreme inlet end of the cartridge or elsewhere through the periphery of the cartridge, such that drawn ambient air passing through the cartridge to the mouth of the user passes the resistance element.

The mouthend filter 22 is provided for aesthetic purposes. It preferably is a low efficiency filter made from a melt blown thermoplastic such as polypropylene. For example, the filter can be manufactured by pleating a web of nonwoven polypropylene available from Kimberly-Clark Corp. as experimental melt blown, macrofiber polypropylene PP-100-F. Alternatively, the mouthend filter 22 can be manufactured from cellulose acetate tow, or the like. Preferably, the filter material is overwrapped with a paper plug wrap 58.

To maximize aerosol delivery which otherwise would be diluted by radial (i.e., outside) air infiltration through the overwrap 24, one or more layers of non-porous paper can be used to envelop the cigarette. Examples of suitable non-porous papers are cigarette papers commercially available from Kimberly-Clark Corp. as KC-63-5, F878-5, P878-16-2 and 780-63-5. If desired, the overwrap can be a resilient paperboard material, foil-lined paperboard, or the like; and the paperboard can be circumscribed by a cigarette paper wrap.

The reusable controller 14 includes a case 26 or outer housing which provides a convenient and aesthetic holder for the user. The outer housing 26 can have a variety of shapes and can be manufactured from plastic, metal, or the like. Controller 14 includes an insulative receptacle 44 which includes plug-in connectors 42, 43 for engagement with prongs 38, 39 of plug 16. Receptacle 44 also includes tube 48 which is inserted into passageway 46 of plug 16 to be in airflow communication with the internal region of the cartridge. The other end of tube 48 is in airflow communication with pressure sensing switch 28, so that changes in air pressure which occur within the cartridge during draw can be sensed by the switch.

Controller 14 also preferably includes a control circuit 30, which is connected to a puff actuated, differential pressure sensitive switch 28 by electrically conductive wires (not shown), as well as to batteries 34A and 34B via battery terminal 62. The control circuit 30 preferably is time based. That is, the preferred current control circuit preferably is based on controlling the time period during draw during which current passes through the resistance element. This time based control, in turn, controls the temperature experienced by the resistance element and by the aerosol forming substances. Preferred pressure sensitive switches and control circuits, and their connection power source 34 and resistance element 18, are described in greater

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detail hereinafter with reference to Figures 9 and 10.

While the heat needed to volatilize the aerosol forming substance (and the drug or flavor substance in appropriate cases) during a puff varies for each particular substance, sufficient heat usually is necessary, during a puff, to heat the aerosol forming substance to a temperature above about 120 ° C in order to volatilize an appropriate amount of the aerosol forming substance. More typically, a temperature above about 150 ° C, often above about 200 ° C, and sometimes as high as about 300 ° C to about 350 ° C, is necessary to volatilize adequate amounts of the aerosol forming substance during a puff. However, it is desirable to avoid heating the aerosol forming substance to temperatures substantially in excess of about 550 ° C in order to avoid degradation and/or excessive, premature volatilization of the aerosol forming substance.

For a particular resistance heating element and a particular aerosol forming substance, a sufficient current is required, during each puff, to generate the heat necessary to volatilize enough aerosol forming substance to provide an adequate amount of delivered aerosol. For the preferred aerosol forming substances and the preferred carbon heating elements described herein, an 18 volt battery usually generates sufficient power (i.e., about 18 watts) to heat the aerosol forming substance to a suitable temperature to volatilize the aerosol forming material almost immediately after current actuation, i.e., within about 0.5 second, preferably within about 0.1 second. The 18 volt battery can be provided using two fully charged 9 volt manganese dioxide-zinc transistor batteries (as shown in Figure 1) or three 6 volt lead acid batteries. Also useful is a silver-zinc alkaline battery using potassium hydroxide as an electrolyte and having about 12 to about 15 single cells connected in series, wherein the surface area of each positive electrode is about 3.25 cm^2. Other batteries can include nickel-zinc or nickel-cadmium batteries.

In use, the user inserts the plug 16 of the cartridge 12 into the receptacle 44 of the controller 14. Such action provides electrical connection of the resistance heating element 18 with the switch 28, the control circuit 30 and the batteries 34A and 34B. Such action also provides for airflow communication between the switch 28 and the inner portion of the cartridge. When the user puffs on the mouthend of the cartridge, ambient air enters the cartridge through air inlet 54. The pressure actuated switch 28 responds to a sensed change in air pressure within the cartridge during draw and permits current flow through the heating element 18. As a result, the heating element experiences an increase in temperature which in turn heats and volatilizes the aerosol forming substance. The volatilized aerosol forming substance mixes with the drawn air and forms an aerosol. The volatilized aerosol forming substance (in aerosol or vapor form) exits the mouthend filter 22 into the mouth of the user. During the puff, the preferred current control circuit (described in detail hereinafter) regulates the flow of current to control the temperature experienced by the heating element and the amount of aerosol forming substance which is volatilized.

If the drug or flavor substance is carried by the resistance heating element, it normally volatilizes and passes to the mouth of the user in a manner similar to the aerosol forming substance. If not carried by the resistance heating element, the drug or flavor substance is either volatilized by heat generated by the resistance heating element or eluted by the aerosol forming material as the aerosol forming material passes through the article.

When the user stops drawing on the cartridge, the pressure actuated switch 28 again responds to the sensed change in air pressure within the cartridge, and further current flow through the heating element ceases. As a result, the temperature of the heating element and the aerosol former quickly drop below the volatilization temperature of the aerosol former, and aerosol formation ceases. This process continues, puff after puff, normally for at least about 6 puffs, until aerosol delivery drops below (i) the level desired by the user, or (ii) the dosing level required by the user. Then, the user can remove the cartridge 12 from the control pack 14, and dispose of the cartridge. The user then can select a new cartridge, insert the new cartridge into the reusable controller, and repeat the aerosol delivery process.

The embodiment illustrated in Figure 2 is generally similar to the embodiment of Figure 1, except that the heating element 18 is positioned within a heat resistant, insulative tube 66. The insulative tube 66 preferably is manufactured from a ceramic, a heat resistant cellulosic, an aluminum tube having a surface coating of aluminum oxide, a high temperature plastic such as a polyimide, or the like. Preferably, a plasticized cellulose acetate tube 68 circumscribes the insulative tube 66, and is itself circumscribed by paper overwrap 24. This embodiment also includes tipping overwrap 70 circumscribing the mouthend of the cartridge in order to attach filter element 22 to the remaining portion of the cartridge.

Referring to Figure 3, the illustrated embodiment is generally similar to the embodiment of Figure 2, except that the controller or power pack 14 includes a flexible, cord-like connector 72 which terminates in a plug 74 having prongs 76, 77 for electrical connection into a receptacle 79 at one

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end of cartridge 12. A needle-like tube 48 extends from switch 28 and extends through resilient overwrap 24 in order that changes in air pressure within the cartridge during draw can be sensed by the switch. If desired, the tube 48 can be incorporated into the cord-like connector 72 and extend into the cartridge through the recepticle 79. With such a design, it is possible for the user to place the control pack in a shirt pocket or on a table, and hold the cartridge in a normal fashion, without holding the added weight of the control pack in his/her hands. A light emitting diode 81 is positioned near the differential switch 28. The diode 81 is electrically connected to the electrical circuitry (as described hereinafter) such that it emits light during draw. As such, the user has a visual means for identifying periods when current passes through the resistance heating element 18.

Referring to Figure 4, the illustrated embodiment is generally similar to the embodiment of Figure 1, except that the heating element 18 is a circular disc or pad, preferably formed from an American Kynol carbon felt. The pad is permeable to airflow, and is disposed across an air passageway 83 in tubular collar 49 so that drawn air entering the cartridge 12 through opening 54 passes through the heating element 18. Electrical connection pins 85, 86 from plug 74 contact the heating element and help hold it in place against collar 49. In this embodiment, the collar 49 can be a thermoplastic material, a thermally stable plastic material, a ceramic, or the like.

The embodiment illustrated in Figure 5 is generally similar to the embodiment of Figure 1. In this embodiment, the heating element 18 is a circular disc or pad of carbon felt disposed across an air passageway 83 extending through tubular collar 49. The pad is held in place by shoulder 84 on the collar 49. In addition, the cartridge does not have an electrical connect plug. Instead, electrical connection pins 85, 86 for the heating element extend from a plug 74 located on the controller 14. The cartridge 12 is held in place relative to the controller 14 via a clip 89 extending from the controller, or other suitable connection means.

The embodiment illustrated in Figure 6 is generally similar to the embodiment of Figure 5, except that the pressure sensing tube 48 also is used as one of the connecting pins (e.g., in lieu of connection pin 86 of Figure 5).

Referring to Figure 7, aerosol delivery article 10 has the form of a pipe. The pipe includes a stem 90 having an air passageway 91 and a bowl 92 into which a disposable cartridge 94 is inserted. The bowl and stem can be manufactured from briarwood, or the like. The pipe 10 includes power source 34, such as one or more batteries, pressure sensing switch 28, pressure sensing passageway 93, current control circuit 30, and electrical pins 85, 86 extending from the bottom of the bowl. Preferred pressure sensing current control circuits and their connection to power source 34 and heating element 18 are described in greater detail hereinafter with reference to Figures 9 and 10.

The cartridge 94 includes an outer tubular housing 96 connected to a collar 98 which in turn supports resistance element 18 and the aerosol forming and drug or flavor substances at one end of the cartridge. The resistance element 18 can be a carbon fiber felt pad which extends perpendicularly to the longitudinal axis of the cartridge so that drawn air passes through the resistance element. The disposable cartridge 94 is positioned within the bowl 90, with the resistance heating element 18 positioned near the bottom of the bowl so that the electrical connection pins 85, 86 extending from the bowl contact the resistance element.

Referring to Figure 8, the illustrated embodiment is generally similar to the embodiment of Figure 7. In this embodiment, the resistance element 18 is positioned towards the air inlet end of the cartridge (i.e., remote from the bottom of the bowl) rather than near the air outlet end of the cartridge. In this case, the electrical connection pins 85, 86 extend from the bottom of the bowl to contact the resistance element 18.

The foregoing embodiments preferably incorporate the preferred circuit shown schematically in Figure 9. In particular, the circuit of Figure 9 includes a power source 34, the electrical resistance heating element 18, a current actuation mechanism 28, and a preferred current regulating circuit or means for controlling the passage of current through the resistance element during periods of current actuation.

The circuit includes a puff actuated control switch 28, or some other suitable current actuation/deactuation mechanism, such as a manually actuated on-off switch, a temperature actuated on-off switch, or a lip pressure actuated switch. The preferred puff actuated switch 28 enables current to pass through the heating element 18 only during draw on the article. A typical puff actuated switch includes a means for sensing the difference in air pressure in a region within the previously described cigarette or disposable cartridge and an "on-off" switch responsive thereto.

A preferred puff actuated switch 28 is a pressure differential switch such as Model No. MPL-502-V, range A, from Micro Pneumatic Logic, Inc., Ft. Lauderdale, Florida. Another suitable puff actuated mechanism is a sensitive pressure transducer (eg., equipped with an amplifier or gain stage) which is in turn coupled with a comparator for detecting a predetermined threshold pressure. Yet another suitable puff actuated mechanism is a

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vane which is deflected by airflow, the motion of which vane is detected by a movement sensing means. Yet another suitable actuation mechanism is a piezoelectric switch. Also useful is a suitably connected Honeywell Microswitch Microbridge Airflow Sensor, Part No. AWM 2100V from Microswitch Division of Honeywell, Inc., Freeport, Ill. Other suitable differential switches, analog pressure sensors, flow rate sensors, or the like, will be apparent to the skilled artisan.

The current regulating circuit preferably is time based. Normally, such a circuit includes a means for permitting uninterrupted current flow through the heating element for an initial time period during draw, and a timer means for subsequently regulating current flow until draw is completed. Preferably, the subsequent regulation involves the rapid on-off switching of current flow (eg., on the order of about every 1 to 50 milliseconds) to maintain the heating element within the desired temperature range. Alternatively, the subsequent regulation involves the modulation of current through the heating element to maintain the heating element within a desired temperature range.

One preferred time-based current regulating circuit preferably includes a transistor 110, a timer 112, a comparator 114, and a capacitor 116. Suitable transistors, timers, comparators and capacitors are commercially available and will be apparent to the skilled artisan. Exemplary timers are those available from NEC Electronics as C-1555C and from General Electric Intersil, Inc. as ICM7555, as well as various other sizes and configurations of so-called "555 Timers". An exemplary comparator is available from National Semiconductor as LM311.

In the preferred circuit of Figure 9, the means for determining the length of the initial time period of uninterrupted current flow includes resistors 118, 120, 122 and 124; capacitor 116; and comparator 114. The comparator 114 is powered by connection to entrance pin 128 and to ground pins 130, 132. Resistors 122 and 120 constitute a voltage divider which provides a predetermined reference or threshold voltage at the voltage divider tap 134 (i.e., the common point between resistors 122 and 120). The voltage divider tap 134 is connected to the negative entrance pin 136 of comparator 114. Capacitor 116 is connected in parallel with resistor 124. The parallel combination of capacitor 116 and resistor 124 is connected in series with resistor 118 at one end and to the ground reference point of the power source 34 at the other end. The other end of resistor 118 is connected to power source 34 via switch 28. The common node point between the resistor 118 and the parallel combination of capacitor 116 and resistor 124 is connected to the positive entrance pin 138 of comparator 114.

Resistors 118 and 124 and the capacitance of capacitor 116 are chosen so that the charge rate of capacitor 116 approximates the heating and cooling rate of the resistance heating element 18. The ratio of the resistance of resistor 124 to the sum of the resistances of resistors 118 and 124 sets the maximum voltage to which capacitor 116 can charge. Preferably, the resistances of voltage divider resistors 120 and 122 provide a voltage which is slightly below the maximum capacitor voltage set by resistors 118 and 124.

The timer means for regulating (or interrupting) current flow after the initial time period includes timer 112, diodes 140, 141, resistors 143, 145, and capacitor 147. This timer means generates a periodic digital wave having a preset on-off duty cycle, which is used to rapidly switch the current "on" and "off" at transistor 110 after the passage of the initial time period, to control the temperature range experienced by the resistance heating element.

Timer 112 is powered by connection through entrance pin 149 and ground pin 151. The reset pin 153 of timer 112 is connected to output pin 155 of comparator 114. As a result, the comparator 114 disables the timer during the initial period of uninterrupted current flow. A resistor 157 provides a so-called "pull-up" function for the reset pin 153 of timer 112.

Timer 112 also is connected to diodes 140, 141 at discharge pin 166. Diodes 140, 141 are in turn connected to resistors 145 and 143, respectively. In addition, timer 112 is connected to resistors 143 and 145, and capacitor 147 through trigger pin 168 and threshold pin 169. Capacitor 147 is provided to set the overall time period of the duty cycle. Preferably capacitor 147 is one which charges and discharges at a rapid rate in order that a relatively rapid duty cycle (e.g., in the order of 1 to 50 milliseconds) is provided.

Resistor 145 determines the charge rate of capacitor 147, and thus the "off" period of the duty cycle, while resistor 143 determines the discharge rate of the capacitor and thus the "on" period of the duty cycle. Diode 140 acts to allow current flow from the timer 112 through resistor 145 and to capacitor 147 during periods when the capacitor is charging, and prevents current passage through resistor 145 when the capacitor is discharging. Diode 141 acts to allow current flow from the capacitor 147 through resistor 143 and to the timer during periods when the capacitor is discharging, and prevents current passage through resistor 143 when the capacitor is charging. Thus, the relative on-off duty cycle of the wave form can be varied by selection of the resistances of resistors 143 and 145.

The output pin 159 of timer 112 is connected to resistor 161. The resistor 161 is in turn con-

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nected to the base of transistor 110 in order to limit "on" current through the base-emitter (BE) junction of the transistor. The transistor 110 acts to control the relatively large current which passes through the resistance element 18 from the power source 34 by switching "on" and "off" in response to current flow from the timer.

When draw commences, the puff actuated switch 28 closes to allow current flow through the circuit. The normally "off" transistor switches "on" in response to current flow through the timer 112. This allows current to flow through the resistance heating element 18.

Simultaneously, capacitor 116 begins to charge. When capacitor 116 is charged to the predetermined threshold voltage determined by resistors 120 and 122, which typically occurs in about 1 second, comparator 114 activates timer 112 through reset pin 153. This terminates the uninterrupted current flow to the transistor 110 by switching the transistor "off." At the same time, the timing means begins generating the periodic digital wave form having a preset on-off duty cycle at output pin 159. Such action of the timing means in turn causes the transistor to switch "on" and "off" rapidly, thus rapidly enabling and disabling current flow through the heating element 18. This rapid switching acts to control the average current flow through the heating element, thus controlling the temperature range experienced by the heating element during the balance of a puff.

As described above, the capacitance of capacitor 147 determines the overall time period of the preset duty cycle, while the relative "on" and "off" periods of the duty cycle are determined by the relative resistances of resistors 143 and 145. By varying these resistances, it is possible to closely control the temperature range experienced by the heating element 18, so as to provide a relatively steady state temperature range, or a controlled decrease or increase in the temperature range during the latter portion of a puff.

When draw ceases, puff actuated switch 28 opens to prevent further current flow through the circuit. As a result, the transistor 110 switches to its normally "off" position, thus preventing further current flow through the heating element 18. As a result, the heating element begins to cool, and volatilization of the aerosol forming and/or flavor substance ceases. At the same time, capacitor 116 begins to discharge, preferably at about the same rate at which the heating element cools.

When a subsequent draw commences, the puff actuated switch again closes, thus allowing current to flow through the circuit. If the subsequent draw is taken before the capacitor 116 has discharged completely (i.e., before the heating element has cooled completely), the capacitor 116 preferably recharges to the predetermined threshold voltage at about the same rate at which the heating element heats. This activates timer 112 and terminates the period of uninterrupted current flow at about the same time that the heating element 18 reaches the preferred temperature range. As such, the heating element is prevented from overheating during periods of rapid puffing by the user.

Controllers and aerosol delivery articles of the invention also can incorporate the alternate time-based circuit shown schematically in Figure 10. In particular, the circuit of Figure 10 includes a power source 34, the electrical resistance heating element 18, a current actuation mechanism 28, and a current regulating circuit or means for controlling the passage of current through the resistance element during current actuation.

The preferred current actuation mechanism 28 is a puff actuated control switch of the type described previously.

The current regulating circuit shown in Figure 10 is time based. This circuit includes timer 112, resistors 161, 176, 178 and 180, capacitor 190, and transistor 110.

Exemplary timers have been described previously. The timer 112 is powered by connection through entrance pin 149 and ground pin 151. The output pin 159 of the timer 112 is connected to the base of transistor 110 through resistor 161. The timer 112 is connected to resistor 180 through threshold pin 169; to the node point between resistors 180 and 178 through trigger pin 168; and to the node point between resistors 178 and 176 through discharge pin 166. The node point between resistors 180 and 178 is in turn connected to capacitor 190 which is connected to ground reference point of the power source 34.

The sum of the resistances of resistors 178 and 176 determines the period of uninterrupted current flow through resistance element 18, while the resistance of resistor 176 determines the period during which current flow is prevented from passing through the resistance element. Resistor 180 limits the voltage discharge rate of capacitor 190 so as to limit the initial heating time of the resistance element during a subsequent puff taken a short time after the preceeding puff.

If desired, light emitting diode 81 and resistor 192 can be employed. The light emitting diode 81 is connected in series with resistor 192. The series combination of diode 81 and resistor 192 is connected in parallel with the resistance element 18. The light emitting diode thus illuminates during draw, and the user then can have a visual means for identifying periods when current passes through the resistance element for heat generation. Such light emitting diodes also can be employed in the preferred circuit illustrated in Figure 9.

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When draw commences, the puff actuated switch 28 closes to allow current flow through the circuit of Figure 10. The normally "off" transistor switches "on" in response to current flow through the timer 112, and in turn allows current to flow through the resistance heating element 18.

Simultaneously, capacitor 190 begins to charge. When capacitor 190 is charged to the predetermined voltage determined by resistors 178 and 176, timer 112 acts to switch the transistor 110 and current flow through heating element 18 "off." However, after a further period of time determined by resistor 176, the timer 112 again is turned "on." This process repeats itself until draw ceases. As such, the temperature experienced by the resistance element can be controlled so as to not overheat during a relatively long draw period. For example, a duty cycle can consist of an "on" period of uninterrupted current flow immediately upon draw for about 1.5 to about 2 seconds, followed by an "off" period of about 0.5 to about 1 second. When draw ceases, puff actuated switch 28 opens to prevent further current flow through the circuit. As a result, the transistor 110 returns to its normally "off" position, thus preventing further current flow through the resistance element 18. The resistance element cools, and volatilization of the aerosol forming and/or drug or flavor substance ceases. At the same time, capacitor 190 discharges.

Current regulating means which modulate current flow through the heating element can be employed in place of the previously described on-off time-based circuits. In addition, on-off and current modulating means can be connected to temperature sensors or other sensing means, rather than to a time-based circuit, in order to control the passage of current through the resistance heating element. Such sensors can be temperature sensors such as infrared sensors, piezoelectric films or the like, or thermostats such as bimetallic strips. Such temperature sensors can sense either the temperature of the resistance element directly or the temperature of the air passing the heating element. Alternatively, the temperature sensors can sense the temperature of a second "model" resistance heating element having a heating and cooling character related to that of the aerosol carrying heating element. Another type of sensor which can be employed is a dynamic resistance sensor which senses the change in electrical resistance of the heating element during the heating period.

The following examples are provided in order to further illustrate the invention but should not be construed as limiting the scope thereof. Unless otherwise noted, all parts and percentages are by weight, and all sizes are approximate.

EXAMPLE 1

A flavor delivery article substantially as shown in Figure 2 is prepared as follows:

A. Preparation of the Disposable Portion

End plug 16 is formed from a Delrin plastic cylinder to have a 2 mm long section of 8 mm diameter and a 3 mm long section of 7 mm diameter. The plug is provided with a passageway 46 of sufficient size to receive an 18 gauge needle 48 and two smaller passageways to receive electrical connector pins 38, 39.

The electric resistance heating element 18 is formed from a 32 mm length of carbon filament yarn obtained from American Kynol, Inc., under Catalogue No. CFY-0204-1. This heating element has a resistance of about 20 ohms and a reported surface area of about 1,500 m^2/g. The heating element is impregnated, dropwise, with 25 ul of a liquid aerosol forming substance comprising a mixture of glycerin, propylene glycol and triethylene glycol, and 30 ul of an artificial coffee flavor. The polyhydric alcohol mixture consists primarily of glycerin.

Two 15 mm long crimp connectors 40, 41, including pins 38, 39, are obtained from Black Box Corp., Pittsburgh, PA under Catalog No. GH-FA810. Crimp connectors 40, 41 are attached to each end of the heating element 18. Pin 38 of the first connector 40 is inserted through one of the smaller passageways in the plug 16. The heating element then is folded over a 20 mm long, 5 mm wide strip of Kapton polyimide film 36, to keep the heating element from contacting itself, and pin 39 of the second connector 41 is then inserted through the second small passageway of the plug 16.

A 9 mm long Delrin tube 49 is fabricated from an 8 mm diameter cylinder. One section, 6 mm long, has a 7 mm inner diameter (I.D.), and a second section, 3 mm long, has a 4 mm I.D. A single air inlet hole 54 is made about 4 mm from the 4 mm I.D. end of the tube using a No. 64 drill bit. The 7 mm I.D. end of the tube 49 is then friction fit over the 7 mm end of plug 16.

A 39 mm long, 4 mm outer diameter Kapton polyimide tube 66 is slipped over the resistance element 18 and inserted about 4 mm into the 4 mm I.D. end of the Delrin tube 49. A 36 mm length of a 8 mm O.D. plasticized cellulose acetate tube 68, SCS-1 from American Filtrona Corp., is slipped over the polyimide tube. This tube 68 then is overwrapped with a layer of Kimberly-Clark P-850-192-2 paper 24.

A 10 mm long, low efficiency cellulose acetate

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filter 22 (8 denier per filament, 40,000 total denier) is fastened to the open end of the wrapped tubes with a layer of tipping paper 70. The overall length of the disposable portion 12 is about 55 mm.

B. Assembly of the Controller

A polystyrene housing for the controller is formed to provide chambers for a pressure sensitive switch, a current control circuit, and a battery power supply.

The pressure sensitive switch is the switch portion of a Model No. MPL-502-V, range A, differential switch obtained from Micro Pneumatic Logic, Inc. A 20 mm long 18 gauge steel needle 48 is inserted into the appropriate opening in the switch. A polymethylmethacrylate receptacle 44 having a length of 26 mm, a height of 12 mm and a width of 9 mm is formed with a hole for the gauge needle and fitted with two Black Box Model No. GH-FA820 plug-in connectors 42, 43. The receptacle is slipped over the needle and inserted into an appropriately sized opening in the case.

The control circuit employed is schematically illustrated in Figure 9. It is designed to provide uninterrupted current flow through the heating element for 1 second after the commencement of a puff. During the balance of the puff, the control circuit is designed to alternately switch off for 5 milliseconds and then on for 5 milliseconds (a 50 percent duty cycle), until the pressure actuated control switch opens Comparator 114 is a Model LM 311 obtained from National Semiconductor. As shown in Figure 9, connections are made at entrance pin 128, ground pins 130 and 132, negative entrance pin 136, positive entrance pin 138, and output pin 155. Timer 112 is a Model C-1555C obtained from NEC Electronics. Connections to timer 112 are made at trigger pin 168, threshold pin 169, output pin 159, discharge pin 166, entrance pin 149 and ground pin 151. Transistor 110 is a Model MJE 2955 from Motorola Semiconductor Products. Diodes 140 and 141 are Type IN914 diodes from Fairchild Semiconductor Corp. Capacitor 116 has a capacitance of 2.2 uF. Capacitor 147 has a capacitance of 0.1 uF. The resistances of the resistors 118, 120, 122 and 124 are 1,000,000 ohm; 180,000 ohm; 1,000,000 ohm; and 820,000 ohm, respectively. The resistances of resistors 157, 143, 145 and 161 aze 120,000 ohm; 39,000 ohm; 100,000 ohm; and 1,000 ohm, respectively.

The control circuit is connected to the switch, the receptacle for the plug on the disposable portion, and the battery terminals, as schematically illustrated in Figure 9. The battery supply consists of two 9 volt alkaline transistor batteries connected in series.

C. Use

The end plug 16 is placed against receptacle 44 to electrically connect the disposable portion to the controller and insert the needle into the disposable portion. The mouthend of the disposable portion is placed in the mouth of the user, and the article is drawn upon. The article produces visible aerosol and flavor on all puffs for 8 consecutive puffs.

EXAMPLE 2

An article similar to the article described in Example 1 is prepared, except that (i) the resistance element is a length of Kynol Catalogue No. CFY-0204-1 carbon fiber yarn having a resistance of 28.1 ohms, and (ii) the heating element is impregnated with 35.9 mg of glycerin.

The article is tested under conditions of 2 second, 35 ml puffs, taken every 30 seconds. The article produces visible aerosol on all puffs for a total of 10 puffs, and yields 21.3 mg WTPM.

EXAMPLE 3

Kynol Catalogue No. CFY-0204-2 carbon fiber yarn having a length of about 32 mm has a resistance of 18 ohms, and is used to prepare a heat generating electrical resistance element. The yarn has 18 ul of glycerin applied thereto. Each end of the yarn is electrically connected to an 18 volt/1 ampere limited power source. The arrangement is equipped with the control circuit described in Example 1.

The assembly is actuated such that the resistance element generates heat for a 2 second interval once every 30 seconds. During each puff, the timing mechanism begins to control current flow 1 second after current flow through the resistance element is commenced. The duty cycle provided by the timing mechanism is 10 milliseconds. Maximum current is allowed to flow through the resistance element over one half the duty cycle, and no current is allowed to flow through the resistance element over the other half of the duty cycle. As such, the average current experienced during the timer cycle period is about one half of the maximum current.

Voltage and current levels are measured over time, and the temperature of the resistance element is monitored over time using a Wahl Model HSM-672 IR Spy focused onto the resistance element. Values of the measured and monitored data are recorded, and are presented in Figure 11.

As shown in Figure 11, the maximum tempera-

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ture reached on the first puff is about 200° C, on the second puff about 350° C, and thereafter about 500° C. Moreover, on each puff, the heating element rapidly achieves the maximum temperature and thereafter maintains that temperature during the balance of the puff, after which the element cools to ambient temperature over about a 5 second period.

EXAMPLE 4

A flavor delivery article substantially as shown in Figure 3 is prepared as follows:

A. Preparation of the Disposable Portion

Ceramic receptacle 79 is formed from a 7 mm long, 4 mm diameter section of a ceramic cylinder having two longitudinal, 1.5 mm diameter passageways.

The electric resistance heating element 18 is formed from a length of carbon filament yarn obtained from American Kynol, Inc., under Catalogue No. CFY-0204-2 sufficient to provide a measured resistance of 18 ohms when incorporated into the disposable portion. This element is impregnated with 38 mg of a liquid aerosol forming substance comprising 20 ul of a mixture of glycerin, propylene glycol and triethylene glycol, and 5 ul of an artificial coffee flavor. The ends of the heating element are inserted through the passageways of the receptacle 79 form a loop, and the ends of the element are folded back over the receptacle. A strip of polyimide film 36 is positioned within the loop to prevent the heating element from contacting itself.

Over the resistance element loop and the receptacle 79 is friction fit a Kapton tube of 4 mm O.D. and a length of 80 mm. The length of the polyimide tube then is enveloped to a diameter of about 8 mm with insulative glass fibers 68 obtained from Owens Corning, Toledo, Ohio, as Glass No. 6437. The glass fibers 68 are enveloped by a nonporous cigarette paper wrap 24, available as P-850-192-2 paper from Kimberly-Clark Corp. The diameter of the resulting rod is 8 mm.

At the end of the rod remote from the ceramic receptacle is positioned a low efficiency cellulose acetate tow (8 denier per filament, 40,000 total denier) filter element 22 having a length of about 10 mm and a diameter of about 8 mm. The rod and filter element are held together using tipping paper.

About 1 mm behind the insulative receptacle 79 are pierced several openings 54 through the paper wrap 24 and the polyimide tube 66 to provide air inlet openings for aerosol formation. The perforations are of about 0.8 mm diameter, which is sufficient to provide the disposable portion with a draw resistance of about 100 mm H_2O pressure drop as determined using a Model No. FTS-300 pressure drop tester from Filtrona Corp.

B. Assembly of the Controller

The controller includes a pressure sensitive switch 28, a current control circuit 30, a battery power supply 34A, 34B and a flexible, electric cord 72 which terminates in a cylindrical plug 74.

The cord 72 is a 50 mm length of insulated copper wire. The plug 74 includes a ceramic cylinder, having a length of 10 mm and a diameter of 4 mm with two small passageways extending longitudinally therethrough; and a heat resistant bushing made from Zydar from Dartco Mfg., Inc., Augusta, Georgia. The cylindrical plug has a diameter of about 8 mm. Copper pins 76, 77 connected to cord 72 are inserted through the passageways in the ceramic cylinder to extend 10 mm beyond the face of the plug.

The pressure sensitive switch 28 is a Model No. MPL-502-V, range A, differential switch obtained from Micro Pneumatic Logic, Inc. A 12 mm long, 18 gauge steel needle is inserted into the appropriate opening in the switch.

The control circuit employed is schematically illustrated in Figure 10. It is designed to provide uninterrupted current flow through the heating element for 2 seconds after the commencement of a puff. During the balance of the puff, the control circuit is designed to alternately switch off for 1 second and then on for 2 seconds, until the pressure actuated control switch opens. Timer 112 is a Model C-1555C obtained from NEC Electronics. Connections to timer 112 are made at trigger pin 168, threshold pin 169, output pin 159, discharge pin 166, entrance pin 149 and ground pin 151. Transistor 110 is a Model MJE 2955 from Motorola Semiconductor Products. Capacitor 190 has a capacitance of 22 uF. The resistances of the resistors 176, 178 and 180 are 20,000 ohm; 120,000 ohm; and 68,000 ohm, respectively. Resistors 161 and 192 each have resistances of 1,000 ohm.

The control circuit is connected to the switch, the cord 72, and the battery terminals, as schematically illustrated in Figure 10. The battery supply consists of two 9 volt alkaline transistor batteries connected in series.

C. Use

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The pins 76, 77 of plug 74 are inserted into receptacle 79 to contact the heating element 18 and hence electrically connect the disposable portion to the controller by contacting each end of the resistance element 18. The needle 48 is pierced through the outer wrap 24 and the polyimide tube 66 of the disposable portion. The mouthend of the disposable portion is placed in the mouth of the user, and the article is drawn upon. Visible, flavored aerosol is provided during each puff, and during each puff period, the indicator light illuminates.

EXAMPLE 5

A flavor delivery article substantially as shown in Figure 4 is prepared as follows:

A. Preparation of the Disposable Portion

Electrically insulative plug 16 is formed from a Delrin cylinder to have a 2 mm long section of 8 mm diameter and a 3 mm long section of 7 mm diameter. The plug is provided with a passageway 46 of sufficient size to receive an 18 gauge needle and two smaller passageways to receive electrical connector pins 38, 39.

The pins 38, 39 are gold plated copper pins which extend through the passageways in the plug, beyond the 8 mm O.D. end of the plug, and 3 mm beyond the 7 mm O.D. end. The pins have a flattened bead of silver solder applied at the ends which extend beyond the 7 mm O.D. end.

An insulative collar 49 is formed from a Delrin cylinder having a length of 9 mm and a diameter of 8 mm to a tubular form having a 3 mm segment of 4.5 mm I.D. and a 6 mm segment of 6 mm I.D. A single air inlet 54 is made about 4 mm from the 6 mm I.D. end of the collar.

The electric resistance heating element 18 is formed from a 6 mm diameter circular disc of carbon filament felt obtained from American Kynol as Kynol Activated Carbon Felt ACN-211-10. The resistance element weighs about 8 mm and had a reported resistivity of 20 to 30 ohms-cm. The felt has a liquid, flavored aerosol forming substance applied thereto in a dropwise manner. The aerosol forming substance is 25 ul of a mixture of glycerin, triethylene glycol and propylene glycol, and 20 ul of an artificial coffee flavor.

The resistance element 18 is inserted into the 6 mm I.D. end of the collar 49 to abut against the 4.5 mm I.D. portion of the collar.

The 6 mm I.D. end of the collar 48 then is fit over the narrow end of plug 16 such that the flattened silver solder ends of pins 38 and 39 each contact the resistance element 18.

A resilient paperboard tube having an 8 mm O.D. and a length of 75 mm is abutted against the end of collar 49 opposite plug 16, and the two tubes are held in place using adhesive tape 52.

B. Use

The plug 16 is placed against receptacle 88 of the controller described in Example 1 to electrically connect the disposable portion to the controller and insert the needle 48 into the disposable portion. The mouthend of the disposable portion is placed in the mouth of the user, and the article is drawn upon. Visible aerosol having a coffee flavor is provided on all puffs for 8 puffs.

EXAMPLE 6

A drug delivery article substantially as shown in Figure 2 is prepared using the article described in Example 1, except that the artificial coffee flavor is replaced by 1.25 mg of epinephrine.

EXAMPLE 7

A drug delivery article substantially as shown in Figure 3 is prepared using the article described in Example 3, except that the artificial coffee flavor is replaced by 1 mg of epinephrine.

EXAMPLE 8

A drug delivery article substantially as shown in Figure 4 is prepared using the article described in Example 4, except that the aerosol forming substance is 35 ul of a mixture of 20 parts glycerin and 1 part epinephrine.

Claims

1. A disposable portion of an aerosol delivery article containing a drug or flavor substance for use with a source of electrical power comprising:

a) an electrical resistance heating element having a surface area greater than 1 m^2/g; and

b) aerosol forming substance carried by the heating element prior to use.

2. The disposable article of Claim 1, wherein the heating element has a surface area greater than 50 m^2/g.

3. The disposable article of Claim 1 or 2, wherein the heating element is a fibrous material.

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4. The disposable article of Claim 1 or 2, wherein the disposable article includes an air passageway at least partially therethrough, and the electrical resistance element comprises an air permeable heating element positioned in the passageway.

5. The disposable article of Claim 4, wherein the heating element is positioned substantially perpendicularly to the longitudinal axis of the air passageway.

6. The disposable article of Claim 1, wherein the heating element is adapted for connection to an external source of electrical power.

7. The disposable article of Claim 1, including means for connecting the heating element to an external source of electrical power.

8. The disposable article of Claim 1, including an air outlet for delivering aerosol to the user, and wherein the air outlet and the means for connecting the heating element to the external source of electrical power are at opposite ends of the disposable article.

9. The disposable article of Claim 1, including an air outlet for delivering aerosol to the user and wherein the air outlet and the means for connecting the heating element to the external source of electrical power are at the same end of the disposable article.

10. A disposable portion of an aerosol delivery article containing a drug or flavor substance for use with a source of electrical power comprising:

a) an air passageway at least partially through the disposable portion;

b) an air permeable electrical heating element located in the air passageway; and

c) an aerosol forming substance.

11. The disposable article of Claim 10, wherein the heating element is positioned substantially perpendicularly to the longitudinal axis of the air passageway.

12. The disposable article of Claim 10 or 11, wherein the aerosol forming substance is carried by the heating element prior to use.

13. The disposable article of Claim 10, wherein the heating element is adapted for connection to an external source of electrical power.

14. An aerosol delivery article containing a drug or flavor substance for use with a source of electrical power comprising:

a) an electrical resistance heating element having a surface area greater than 1 m^2/g;

b) aerosol forming substance carried by the heating element prior to use; and

c) puff actuated control means for permitting current flow through the heating element during draw by the user.

15. The article of Claim 14, further including means for regulating current flow through the heating element during draw.

16. The flavor delivery of Claim 14 or 15, further comprising a source of electrical power.

17. The article of Claim 14 or 15, wherein the heating element comprises a porous material and the aerosol forming substance comprises a liquid impregnated within the heating element.

18. The article of Claim 14 or 15, wherein the heating element has a surface area greater than 50 m^2/g.

19. The article of Claim 14, wherein the aerosol forming substance includes a drug or flavor substance.

20. The article of Claim 15, wherein the means for regulating current flow during draw comprises a timer.

21. The article of Claim 15, wherein the means for regulating current flow during draw includes means for controlling the average current flow through the heating element during a portion of the draw.

22. An aerosol delivery article containing a drug or substance for use with a source of electrical power comprising:

a) an electrical resistance heating element;

b) aerosol forming substance;

c) switch means for actuating and deactuating current flow through the heating element; and

d) time based means for (i) permitting unrestricted current flow through the heating element for an initial predetermined time period upon current actuation, and (ii) for subsequently regulating current flow until current deactuation.

23. The article of Claim 22, wherein the aerosol forming substance is carried by the heating element prior to use.

24. The article of Claim 23, wherein the heating element has a surface area greater than 1 m^2/g.

25. The article of Claim 22, further comprising a source of electrical power.

26. The article of Claim 22, wherein the aerosol forming substance includes a drug or flavor substance.

27. An aerosol delivery article containing a drug or flavor substance for use with a source of electrical power comprising:

a) an air passageway at least partially through the article;

b) an air permeable electrical resistance heating element located in the air passageway;

c) an aerosol forming substance;

d) puff actuated control means for permitting current flow through the heating element during draw by the user; and

e) a mouth end.

28. The article of Claim 27, wherein the aerosol forming substance is carried by the heating ele-

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ment.

29. The flavor delivery article of Claim 27, further comprising means for regulating current flow through the heating element during draw.

30. The article of Claim 27, wherein the means for regulating current flow during draw comprises a timer.

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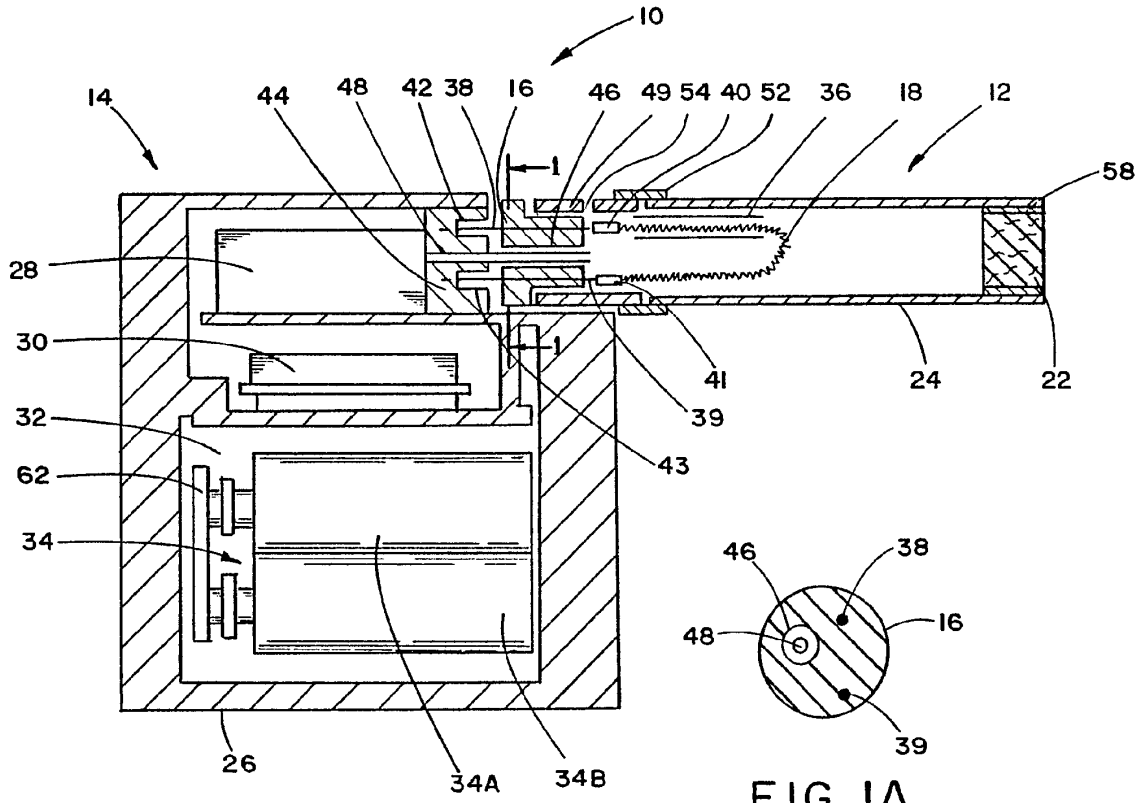


FIG. 1

FIG. 1A

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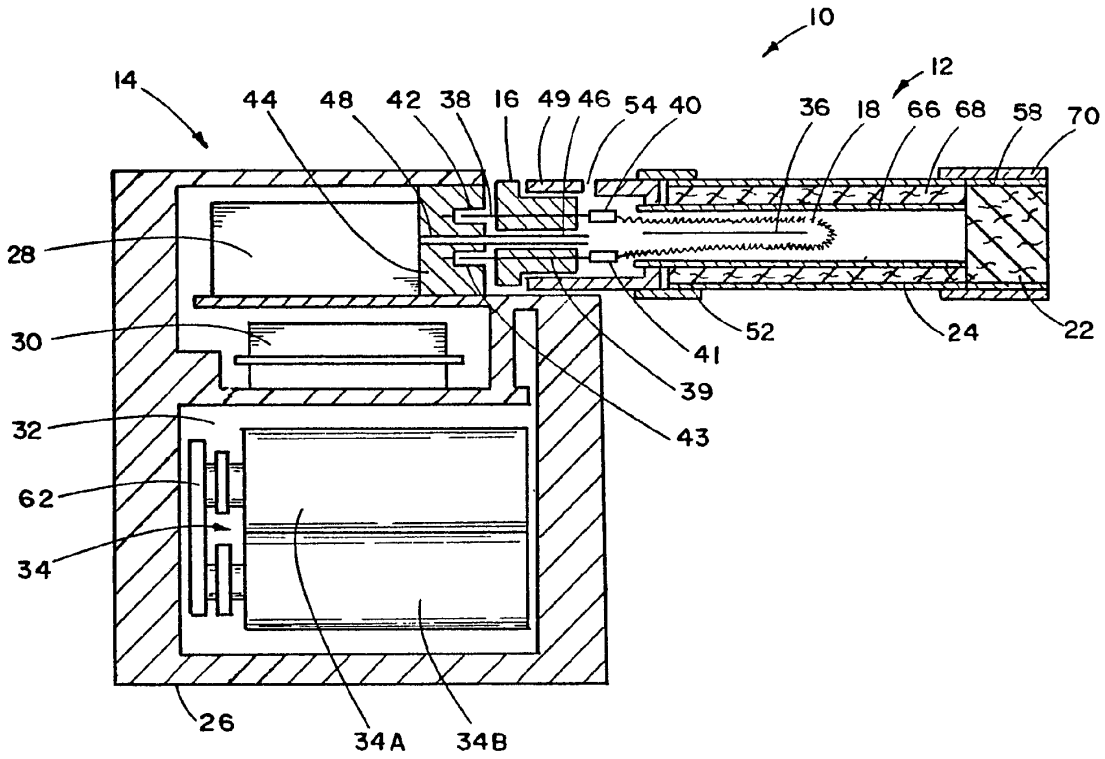


FIG. 2

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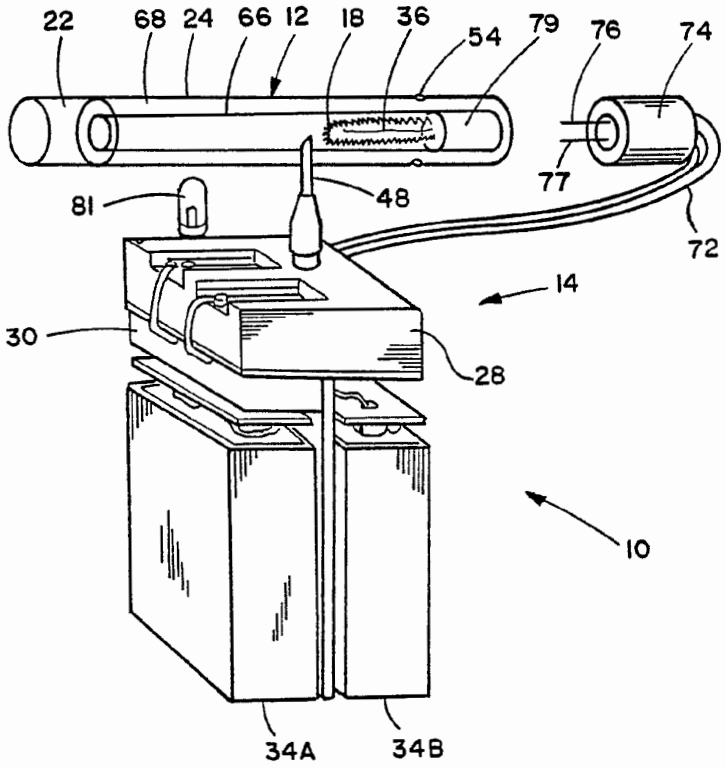


FIG. 3

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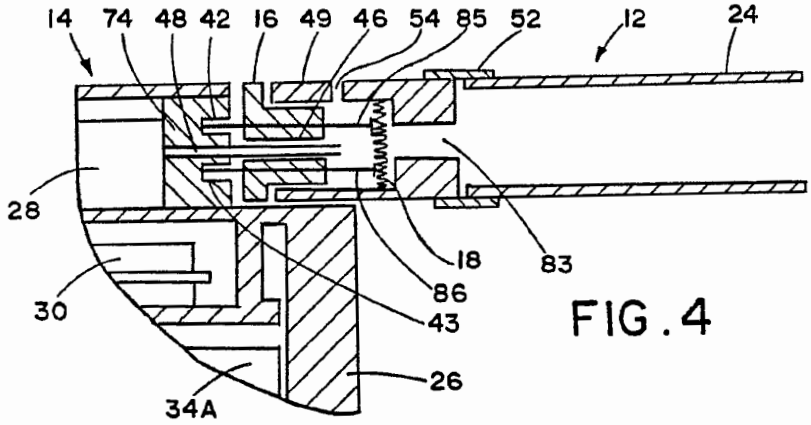


FIG. 4

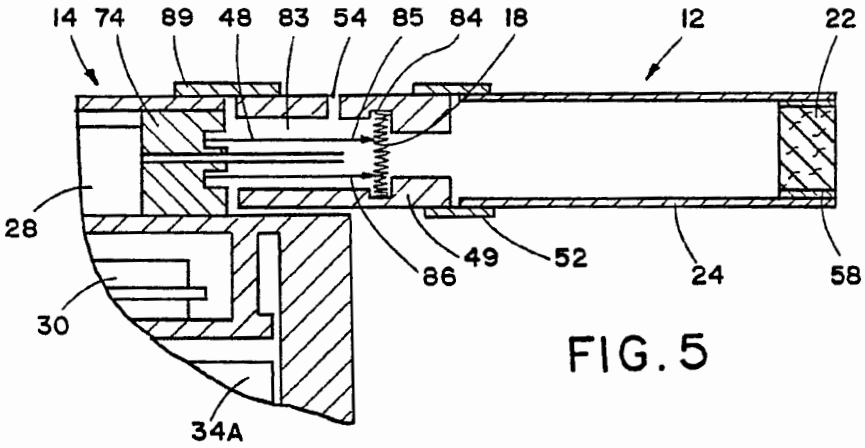


FIG. 5

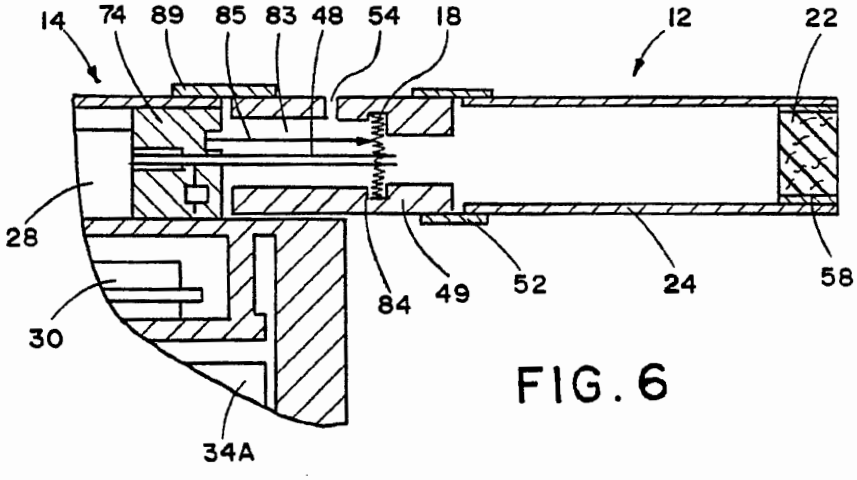


FIG. 6

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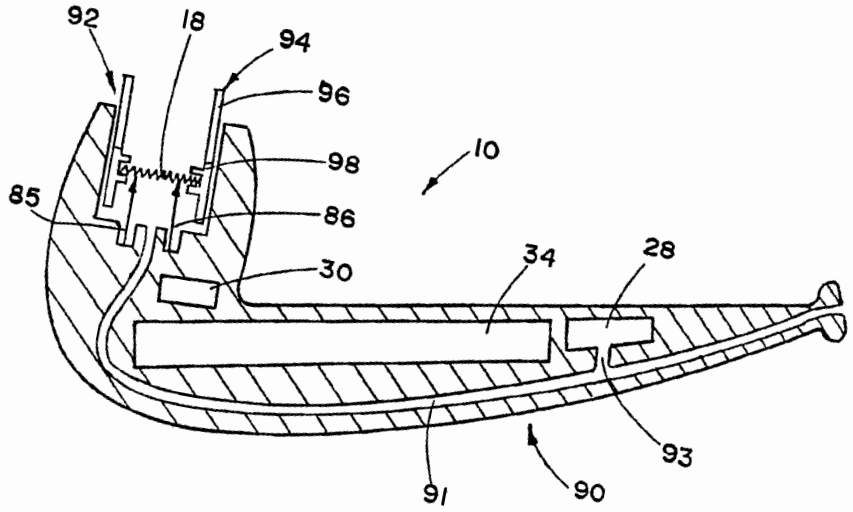


FIG. 7

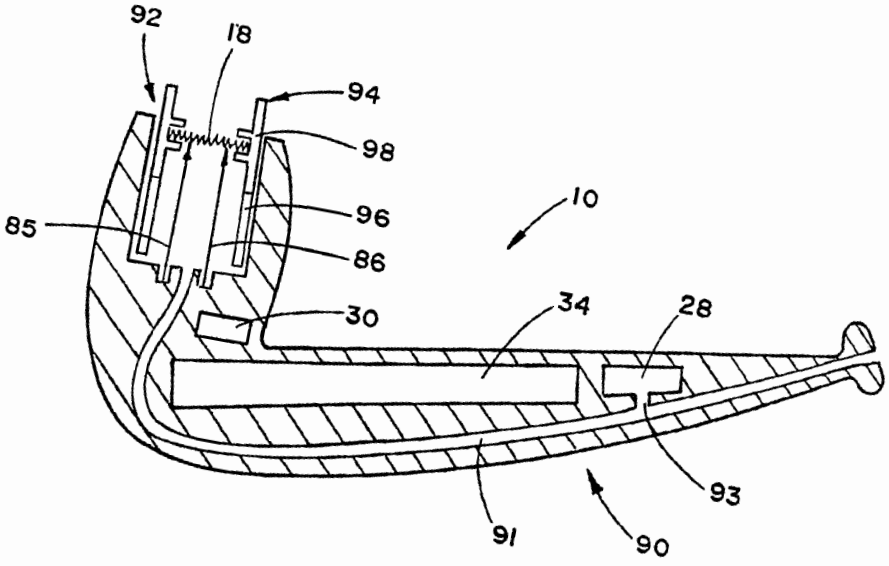


FIG. 8

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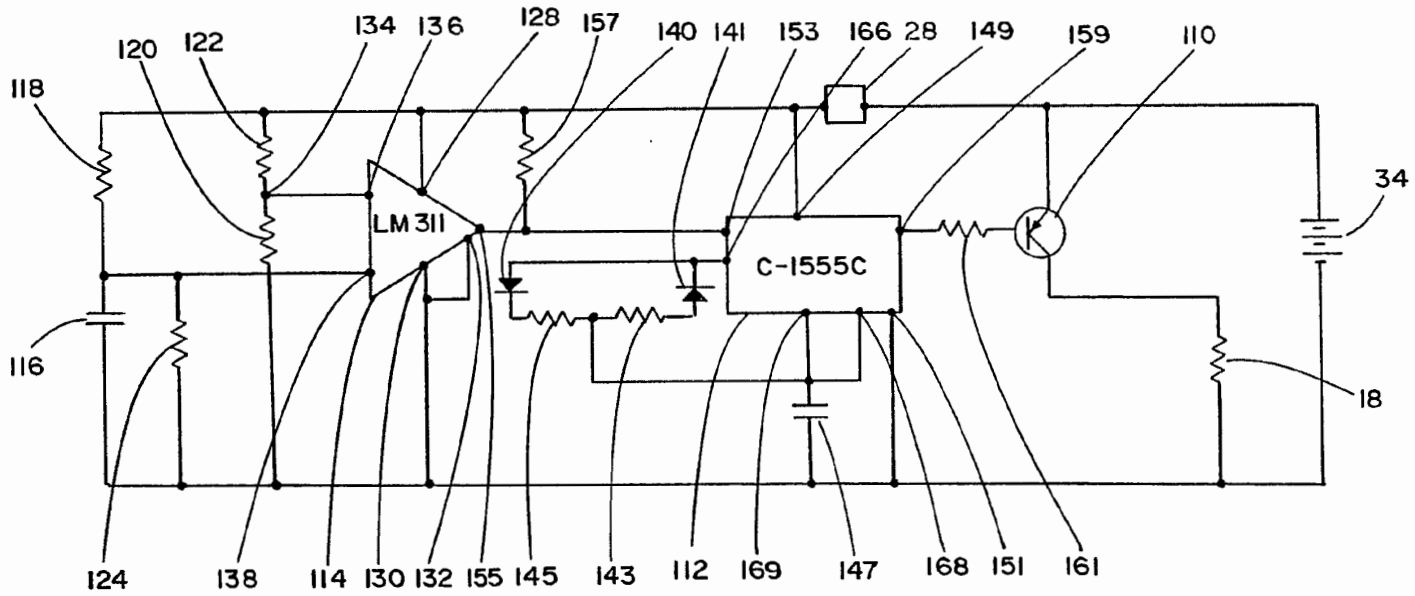


FIG. 9

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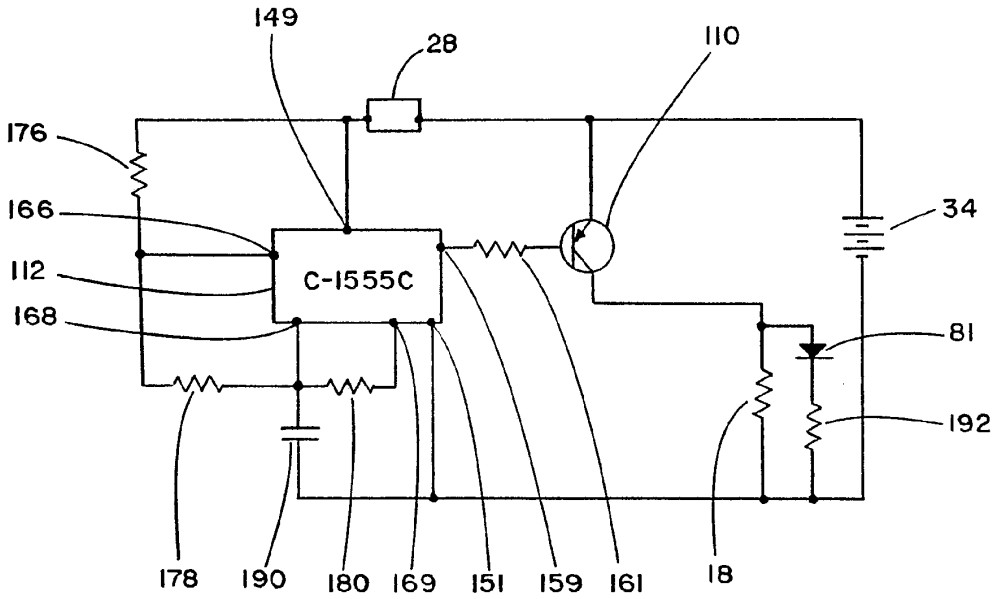
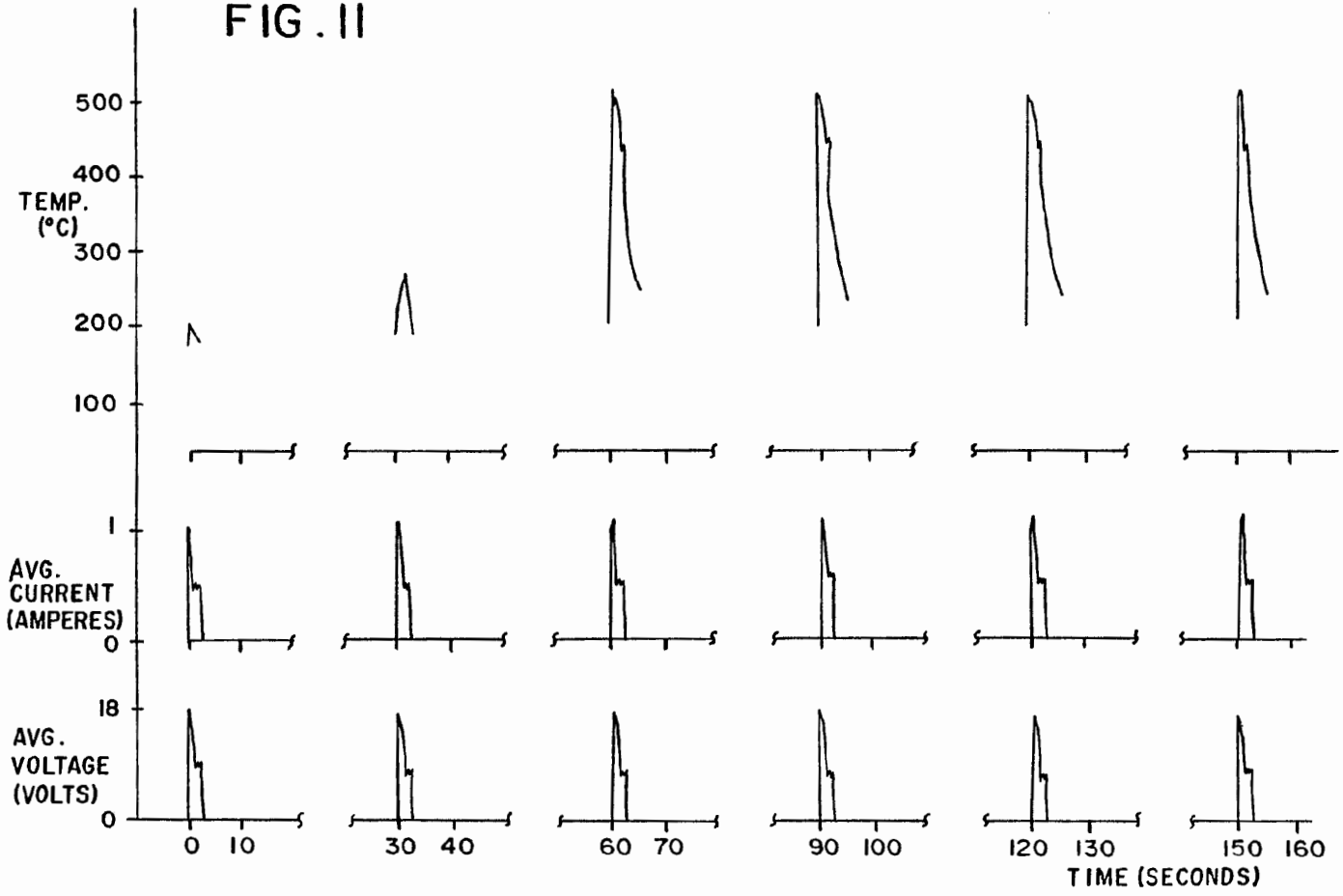


FIG. 10

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FIG. 11



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(54) **FLAVOR PRODUCING ARTICLE**

AROMAERZEUGENDER ARTIKEL

PARFUMEUR D'AMBIANCE

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Description

Technical Field

[0001] The present invention relates to a flavor generation article employed for enjoying inhalation of a flavor and simulated smoking and, more particularly, to a flavor generation article used for generating the flavor as an inhalation target by heating a liquid material with an electric heater.

Background Art

[0002] A simulated smoking article employed for enjoying the flavor and smoke of tobacco without burning tobacco is already known, and various types of simulated smoking articles have been proposed.

[0003] Jpn. Pat. Appln. KOKAI Publication No. 3-232481 discloses a typical concept of a conventional simulated smoking article. The article of this reference uses, e.g., a rod-like solid material. When the solid material is heated by a heating element, an inhalation target, e.g., a flavor, is generated. The drawbacks of the article of this type are as follows. When the solid material is continuously heated, the material is largely wasted. Inversely, when the solid material is heated in accordance with inhalation of the user, a large time lag occurs between the start of inhalation (one puffing operation) of the user and generation of the flavor.

[0004] As an example of an article that copes with the above drawbacks, Jpn. Pat. Appln. KOKAI Publication No. 3-277265 discloses a flavor emitting article having a solid material divided into a large number of portions. In the article of this reference, the respective portions of the solid material are sequentially heated in units of puffing operations of the user to generate an inhalation target, e.g., a flavor or the like. The drawback of this article is that the solid material and a heating element constitute an integral flavor generation medium. Therefore, when the material is consumed, the heating element must be exchanged or disposed of together with the material, which is not preferable both in terms of economy and environment.

[0005] Jpn. Pat. Appln. KOKAI Publication No. 5-212100 discloses an example of a mechanism that detects one puffing operation of the user. In the article of this reference, the driving operation of a heating element for heating the flavor material is controlled by a signal obtained from the motion of the lips of the user.

[0006] U.S.P. No. 4,945,931 discloses a simulated smoking article using a pressurized aerosol container. In the article of this reference, the puffing operation of the user swings the vanes to mechanically open the outlet port of the container, and the aerosol is emitted. As a modification, this reference also discloses an article in which a heating element for heating aerosol cooled by the heat of evaporation is disposed in the outlet port of the container. The drawback of this reference is as follows. Since the pressurized aerosol is closed in the container with a valve which is opened/closed merely by the puffing operation of the user, once the valve is opened, a large amount of aerosol leaks undesirably. More specifically, in the article of this reference, a predetermined amount of aerosol appropriate for one puffing operation cannot be continuously emitted, and rather all of the pressurized flavor gas may undesirably be emitted until a puffing operation is complete twice or three times.

[0007] WO 9501137 provides a dispenser which comprises a reservoir of a physiologically active substance and a droplet ejection device, for example a bubble jet or piezoelectric device, which is controlled to issue a predetermined number of discrete droplets of the substance from ejection orifices upon actuation. Device may be actuated by a pressure transducer responsive to inhalation and issue the droplets into an airstream (A) which enters at slot and is then inhaled via mouthpiece. In other embodiments (Fig. 5) the dispenser is finger actuated and directed by hand for topical application. The number and/or frequency of droplets issued is programmatically controlled by a control circuit whereby average and total dose of the substance are predetermined.

DISCLOSURE OF INVENTION

[0008] According to a first aspect of the present invention, there is provided a flavor generation article characterized by comprising:

a casting having an air intake port for taking in air therein and a suction port through which a user inhales a flavor, and forming a gas flow path between said intake port and said suction port;

a material container for storing a liquid material which contains at least a flavor substance and having a discharge port for said material, said material container being mounted on said casing;

discharge driving means electrically operable for discharging said material from said container through said discharge port in the form of a liquid drop;

gasifying means disposed in said gas flow path to receive the liquid drop of said material discharged from said container by said discharge driving means and gasify said material by electrically heating the liquid drop;

a power supply for supplying electric energy to said discharge driving means and said gasifying means; and

control means responsive to suction applied to the suction part for selectively forming a state where said discharge driving means and said gasifying means operate in response to the suction by electric energy from said power supply.

[0009] According to a second aspect, there is a pro-

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vide a flavor generation article in the first aspect, characterized by further comprising a sensor for detecting an inhaling operation of the user, wherein said control means controls, based on a signal from said sensor, said discharge driving means and said gasifying means so as to discharge said material from said container and to generate heat by said gasifying means.

[0010] According to the third aspect of the present invention, there is provided a flavor generation article in the second aspect, characterized in that the sensor comprises a pressure-sensitive sensor mounted on the casing around the suction port.

[0011] According to the fourth aspect of the present invention, there is provided a flavor generation article in the second or third aspect, characterized in that the control means controls the gasifying means based on the signal from the sensor so that the gasifying means generates heat.

[0012] According to the fifth aspect of the present invention, there is provided a flavor generation article in the fourth aspect, characterized in that the control means controls the gasifying means and the discharge driving means so as to preheat the gasifying means prior to discharge of the material.

[0013] According to the sixth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized in that the power supply is disposed in the casing.

[0014] According to the seventh aspect of the present invention, there is provided a flavor generation article in the sixth aspect, characterized in that the casing is constituted by first and second portions that are electrically connected to each other through a cable, the gas flow path, the container, the discharge driving means, and the gasifying means being disposed in the first portion, and the power supply being disposed in the second portion.

[0015] According to the eighth aspect of the present invention, there is provided a flavor generation article in the seventh aspect, characterized in that the first and second portions of the casing are detachably connected to each other through a connecting portion.

[0016] According to the ninth aspect of the present invention, there is provided a flavor generation article in the first aspect, characterized by further comprising an operation lever for manually operating the discharge driving means.

[0017] According to the 10th aspect of the present invention, there is provided a flavor generation article in any one of first to ninth aspects, characterized in that the gasifying means comprises a porous layer, and the liquid drop of the material is supplied onto the porous layer.

[0018] According to the 11th aspect of the present invention, there is provided a flavor generation article in any one of the first to 10th aspects, characterized in that the gasifying means is arranged to oppose the discharge port, and a throttle hole for directing air flowing from the air intake port toward a gap between the discharge port and the gasifying means is disposed in the gas flow path.

[0019] According to the 12th aspect of the present invention, there is provided a flavor generation article in any one of first to 11th aspects, characterized in that the casing is formed with an outer air inlet hole to supply an outer air into the gas flow path between the gasifying means and the suction port.

[0020] According to the 13th aspect of the present invention, there is provided a flavor generation article in any one of first to 12th aspects, characterized by further comprising a formed body of a solid material containing at least a flavor substance and disposed in the gas flow path so as to be located between the gasifying means and the suction port.

[0021] According to the 14th aspect of the present invention, there is provided a flavor generation article in the 13th aspect, characterized by further comprising heating means for heating the formed body.

[0022] According to the present invention, a flavor generation article can be provided in which waste of a flavor material does not occur easily and the timing of one puffing operation of the user and that of generation of a flavor can be matched easily. In particular, when the discharge driving means is controlled based on a signal from a sensor that detects the inhaling operation of the user, not only waste of the material is eliminated, but also a stable flavor can constantly be provided. When the casing is divided into a portion incorporating a power supply and a portion to be held by the mouth such that the two portions are detachable from each other, the flavor generation article can be used more conveniently.

Brief Description of Drawings

[0023]

FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention;

FIG. 2 is a plan view showing the discharge head of the flavor generation article shown in FIG. 1;

FIG. 3 is an enlarged schematic view showing the discharge head and discharge drive portion taken along the line III - III of FIG. 2;

FIG. 4 is a diagram showing the control system of the flavor generation article shown in FIG. 1;

FIG. 5 is a view showing the state of use of the flavor generation article shown in FIG. 1;

FIG. 6 is a graph showing an example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

FIG. 7 is a graph showing another example of operation timing of energization of the ceramic heater and that of actuation of the discharge drive portion, of the flavor generation article shown in FIG. 1;

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FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention;
FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 14 is a schematic view showing a flavor generation article according to still another embodiment of the present invention;
FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention; and
FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

Best Mode of Carrying Out the Invention

[0024] FIG. 1 is a schematic view showing a flavor generation article according to an embodiment of the present invention.

[0025] A flavor generation article 10 has a cylindrical casing 12 having such an outer diameter that the user can hold the casing 12 in his mouth. The casing 12 comprises a first portion 12a to be held by the user's mouth, and a second portion 12b for incorporating a power supply and the like. The two portions 12a and 12b are detachably connected to each other through a connecting portion 13 formed on a casing main body 14. The two portions 12a and 12b are electrically connected to each other through a cable 15 stored in a space formed in the casing main body 14 to correspond to the connecting portion 13. As the connecting portion 13, a known structure, e.g., a screw or a fitting pair, can be employed. The main body 14 of the casing 12 is made of a material, e.g., a plastic, metallic, ceramic, or wooden material.

[0026] A suction port 22 through which the user inhales the flavor is formed in the end portion of the first portion 12a of the casing 12. In contrast to this, a plurality of air intake ports 24 for taking in air into the casing 12 are formed in the intermediate portion of the first portion 12a. A gas flow path 26 is defined in the casing 12 between the air intake ports 24 and the suction port 22. The air intake ports 24 can be formed to have an open area corresponding to a predetermined air intake amount. As shown in FIG. 1, an adjusting ring 28 having a plurality of openings can be disposed on the casing 12 around the air intake ports 24. In this case, the amount of air flowing into the casing 12 can be adjusted by adjusting the position of the adjusting ring 28 with respect to the air intake ports 24.

[0027] A throttle plate 21 having a throttle hole 20 at its center is disposed in the casing 12 to be located in the gas flow path 26. The throttle hole 20 serves to regulate air from the air intake ports 24 to flow along the surface of a ceramic heater 42 (to be described later).

[0028] A material container 32 for storing a liquid material 36 for generating a flavor or the like to be inhaled by the user is detachably fixed in a space which is deep in the first portion 12a of the case and partitioned from the gas flow path 26 by a wall 31. The material container 32 stores the liquid material 36 in an amount corresponding to the discharge amount of a plurality of puffing operations of the user. The material container 32 can be mounted on the outer side of the casing main body 14. In this case, the head portion of the material container 32 may be inserted in the casing main body 14, or only discharge ports 35 (to be described later) may be inserted in the casing main body 14.

[0029] The liquid material 36 contains at least a flavor substance. For example, if the liquid material 36 is an article used for enjoying only the flavor, e.g., menthol or caffeine, it can be a material that generates only the flavor. Also, in order to add smoke to the flavor, the liquid material 36 can contain a material which generates aerosol when heated. As the material that generates aerosol, alcohols, saccharide, or water, or a mixture of at least two of these components can be used. The alcohols used in this case are, e.g., glycerin or propylene glycol, or their mixture.

[0030] More specifically, the liquid material 36 can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. For example, if this article is used as a simulated smoking article, a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component, may be contained in the liquid material 36.

[0031] The material container 32 is formed with a discharge head 34 having the plurality of discharge ports 35 for discharging the liquid material 36 in a transverse direction of the casing 12. The discharge head 34 is arranged to be located closer to the suction port 22 than the throttle hole 20. A discharge drive portion 38 is disposed adjacent to the discharge ports 35 to discharge the liquid material 36 from the material container 32 through the discharge ports 35. The discharge head 34 and the discharge drive portion 38 comprise a liquid discharge mechanism (having the same principle as that of the method shown in Jpn. Pat. Appln. KOKOKU Publication No. 53-45698 and U.S.P. No. 3,596,275) utilizing a piezoelectric element.

[0032] For example, as shown in FIG. 2, 10 discharge ports 35 are arranged for two rows, leading to a total of

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20 discharge ports 35 in a region with a width W of about 2 mm and a length L of about 5 mm of the upper surface of the discharge head 34. The center of arrangement of the discharge ports 35 almost coincides with the center of the ceramic heater 42 (to be described later).

[0033] FIG. 3 is an enlarged schematic view showing the discharge head 34 and discharge drive portion 38 taken along the line III - III of FIG. 2. More specifically, FIG. 3 shows a section corresponding to one row of the discharge ports 35. A section corresponding to the other row of the discharge ports 35 and the section shown in FIG. 3 are horizontally symmetrical.

[0034] As shown in FIG. 3, a frame 134 constituted by a plurality of components is stacked on a wiring board 132 to form recessed portions and holes to be filled with the liquid material 36. The recessed portions formed by the frame 134, excluding the plurality of discharge ports 35, are covered with a film 136. A liquid reservoir 146 is formed under the discharge ports 35 to temporarily store the liquid material 36. The bottom plate of the liquid reservoir 146 is constituted by an electrode 138 that serves as a vibration plate.

[0035] The liquid material 36 from the material container 32 is supplied first through a narrow flow path 142, and flows from a plurality of suction holes 144, having a smaller diameter than that of the discharge ports 35, to reach the liquid reservoir 146. Under the control of a control circuit 72, when the electrode 138 is operated to vibrate, the liquid material 36 is selectively discharged through the discharge ports 35 having a low resistance against the flow. The discharged liquid material 36 is supplied onto the ceramic heater 42 as a liquid drop LD.

[0036] Other than this, as the discharge mechanism of the liquid material 36, a known printer ink discharge mechanism can be modified and employed, e.g., a method disclosed in Jpn. Pat. Appln. KOKOKU Publication No. 61-59911 and the like wherein the process liquid is injected by bubbles generated by heating it, or a method disclosed in U.S.P. No. 3,060,429 and the like wherein the particles of the process liquid are electrified to perform electric field control. Alternatively, a discharge mechanism in which a liquid material 36 is a pressurized liquid and is controlled by opening/closing a valve disposed in a discharge ports 35 may be employed.

[0037] The ceramic heater 42 is disposed in the gas flow path 26 to oppose the discharge ports 35. The ceramic heater 42 is fixed on the inner surface of the casing main body 14 through a support member 44. A gap 27 between the discharge ports 35 of the discharge head 34 and the ceramic heater 42 is set such that air from the throttle hole 20 can flow through it. Accordingly, air from the air intake ports 24 is directed by the throttle hole 20 to the gap 27 between the discharge ports 35 and ceramic heater 42.

[0038] A material corresponding to one puffing operation, which is driven by the discharge drive portion 38 and emitted from the discharge ports 35 is supplied onto the ceramic heater 42 in the form of a liquid splash or liquid drop. The ceramic heater 42 is constituted by a ceramic plate and a coated resistance heater on the ceramic plate, and is accordingly an integral member of a catch pan for receiving the splash of the material and a heating means for heating the catch pan. However, the catch pan and the heating means can be disposed as separate components.

[0039] A liquid-absorbing porous layer 46 having a thickness of 0.01 mm to 2.0 mm, e.g., an activated carbon layer having a thickness of about 0.5 mm, is formed on a surface of the ceramic heater 42 that receives the liquid splash of the material, i.e., a surface of the ceramic heater 42 that serves as the catch pan. The porous layer 46 not only protects the surface of the ceramic heater 42 but also relaxes heat conduction from the ceramic heater 42, thereby stabilizing gasification of the splash of the material. The porous layer 46 can be formed of an organic compound, e.g., natural cellulose, a cellulose derivative, or an aramid resin, or an inorganic compound, e.g., carbon (including activated carbon), alumina, or silicon carbide. The porous layer 46 can have an arbitrary shape. For example, the compound mentioned above may be formed as a formed body in advance, e.g., a film, a sheet, a plate, fabric, or unwoven fabric, and be used as the porous layer 46. Alternatively, the porous layer 46 may be formed by directly applying the powder of the component mentioned above on the ceramic heater 42.

[0040] A cooling chamber 52 is formed between the ceramic heater 42 and the suction port 22 to constitute part of the gas flow path 26. Outer air inlet holes 54 are formed in the side wall of the casing main body 14 defining the cooling chamber. The gas heated by the ceramic heater 42 and containing a flavor is mixed with the outer air and cooled in the cooling chamber 52, and reaches the suction port 22. The outer air inlet holes 54 can be formed to have an open area corresponding to a predetermined air inlet amount. As shown in FIG. 1, an adjusting ring 55 having a plurality of openings can be disposed on the casing 12 around the outer air inlet holes 54. In this case, the amount of outer air flowing into the cooling chamber 52 can be adjusted by adjusting the position of the adjusting ring 55 with respect to the outer air inlet holes 54.

[0041] A filter 58 is disposed in the gas flow path 26 between the cooling chamber 52 and suction port 22 to cover the suction port 22. When the filter 58 is disposed, the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. The filter 58 can be made of a normal tobacco filter material made of cellulose acetate, pulp, or the like.

[0042] A power supply 62 is detachably fixed in the second portion 12b of the casing 12. The power supply 62 is used to supply electric energy to the discharge drive portion 38, the ceramic heater 42, and the control circuit 72 (to be described later). The power supply 62 can be mounted in and removed from the casing main body 14 by opening/closing a cap 64 that closes the rear

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opening of the casing main body 14. The power supply 62 is preferably a DC power supply, e.g., a commercially available dry cell or rechargeable cell. However, the power supply 62 can be an AC power supply. The power supply 62 can be mounted on the outer side of the casing main body 14, or can be provided separately and connected to the casing main body 14 with a wire.

[0043] The control circuit 72 for controlling the driving operation of the discharge drive portion 38 and the ceramic heater 42 is arranged between the power supply 62 and material container 32. As shown in FIG. 4, the control circuit 72 has a signal processing circuit 72a, a drive circuit 72b, and a power circuit 72c. The signal processing circuit 72a is connected to a sensor 73 for detecting the inhaling operation of the user and a manual ON/OFF switch 74. The drive circuit 72b is connected to the discharge drive portion 38 and the ceramic heater 42. The power circuit 72c is connected to the power supply 62.

[0044] The sensor 73 for detecting the inhaling operation of the user is disposed around the casing main body 14 to be adjacent to the suction port 22. The sensor 73 has the same principle as that of a general strain type pressure-sensitive sensor for detecting a change in resistance or capacitance, a piezoelectric electromotive force, or the like, and generates an electrical signal upon detection of a pressure with which the user holds the casing 12 in his mouth. Alternatively, as the sensor 73, a swing vane type sensor (to be described later), a contact type sensor, a lip sensor disclosed in Jpn. Pat. Appln. KOKAI Publication No. 5-212100, or the like can be used.

[0045] Upon reception of a signal from the manual ON/OFF switch 74, or based on a signal from the sensor 73, the control circuit 72 starts the discharge drive portion 38 and the ceramic heater 42 at a timing to match the inhaling operation of the user, so that the liquid material is discharged and gasified. For example, signal processing of the control circuit 72 and the way of control of the control circuit 72 can be known as analog control or two-position control, or their combination.

[0046] The manual ON/OFF switch 74 is disposed on the side surface of the first portion 12a of the casing 12. When this article is not in use, the switch 74 may be manually switched to the OFF state, thereby forcibly stopping the discharge drive portion 38 and the heater 42. The manual switch 74 has the same mechanism as that of a general compact push switch, e.g., a micro limit switch having an electric contact.

[0047] How the flavor generation article 10 shown in FIG. 1 is operated will be described.

[0048] When the user performs simulated smoking or inhales the flavor by using the flavor generation article 10 shown in FIG. 1, first, the user turns on the manual switch 74, holds the first portion 12a of the casing 12 with his mouth, and performs an inhaling operation through the suction port 22. By this operation, the sensor 73 outputs an inhaling operation signal to the control circuit 72. Accordingly energization of the ceramic heater 42 is started under the control of the control circuit 72. Simultaneously, or with a lapse of a predetermined period after the start of energization, the discharge drive portion 38 is actuated.

[0049] The liquid material 36 is then discharged from the discharge ports 35 and gasified as it is heated by the ceramic heater 42. As the user performs an inhaling operation, the gasified material is mixed with main suction air which has been taken in from the air intake ports 24, passed through the throttle hole 20, and guided to a portion between the discharge ports 35 and ceramic heater 42, and is guided to the suction port 22.

[0050] Energization of the ceramic heater 42 and actuation of the discharge drive portion 38 are performed, e.g., at the operation timings shown in FIG. 6 or 7. FIG. 6 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and heated and the liquid material 36 is discharged simultaneously. FIG. 7 shows a case wherein, in response to a signal from the sensor 73, the ceramic heater 42 is energized and preheated in advance, and with a lapse of a predetermined period of time, i.e., when the heater temperature has increased to a certain degree, the liquid material 36 is discharged.

[0051] If necessary, the amount of main suction air taken in from the air intake ports 24 and the amount of inlet air supplied from the outer air inlet holes 54 can be changed by adjusting the adjusting rings 28 and 60 during inhalation. Then, the taste of air containing the flavor and reaching the suction port 22 can be changed, so that the user can perform simulated smoking or inhalation of the flavor in accordance with the taste of his inhalation feeling.

[0052] As described above, the casing 12 has a structure in which the first portion 12a storing the liquid material 36, the discharge head 34, the ceramic heater 42, and the like, and the second portion 12b storing the control circuit 72, the power supply 62, and the like are detachably connected to each other through the connecting portion 13. The first and second portions 12a and 12b are electrically connected to each other through the cable 15. Therefore, this flavor generation article 10 may be used with its first and second portions 12a and 12b being integrally connected to each other through the connecting portion 13, or may be used with its first and second portions 12a and 12b being separated from each other, as shown in FIG. 5. In the state shown in FIG. 5, since the first and second portions 12a and 12b can be separated within a range allowed by the cable 15, for example, the user can place the second portion 12b in his pocket and hold only the first portion 12a in his mouth. Alternatively, the second portion 12b separated from the first portion 12a may be connected to an existing power supply, i.e., may be installed.

[0053] Several experiments using the flavor generation article 10 shown in FIG. 1 will be described.

[0054] First, as the flavor substance, some natural

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peppermint oil was used, and as the aerosol generation material to add smoke to the flavor, glycerin was used. Water was added to the natural peppermint oil and glycerin, thereby preparing a plurality of liquid materials 36 in which the water to glycerin concentration ratio changed in a range of about 2 : 98 to about 90 : 10. Aerosol containing a flavor substance obtained by heating each liquid material 36 was inhaled, by using the flavor generation article shown in FIG. 1, with a standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one inhaling operation for about 2 seconds with an interval of about 58 seconds.

[0055] As a result, when a liquid material having a water to glycerin concentration ratio of 50 : 50 and prepared by adding some natural peppermint oil was employed as the liquid material 36, sufficiently high discharge stability was ensured, and physical satisfaction and requirement for a visually observed smoke amount upon inhalation were achieved to a certain degree. Therefore, in the following experiments, this liquid material was used as the liquid material 36. In the following experiments as well, inhalation was performed with the standard smoking condition of one cycle for about one minute in which 35 cc to 50 cc of aerosol were inhaled in one inhaling operation for about 2 seconds with an interval of about 58 seconds, and a discharge speed of about 2.5 mg/second was employed.

[0056] With this condition, the operation timings shown in FIGS. 6 and 7 were compared. First, at the timing shown in FIG. 6, the heater was heated from room temperature to about 400°C within 2 seconds. In this case, the liquid material 36 accumulated on the heater surface while the heater increased to the temperature that enabled gasification was gasified at once, and was condensed near the discharge ports 35 because of rapid expansion or flied in the form of a liquid drop because of bumping, thus decreasing the yield. Subsequently, the heater was preheated to about 140°C to 220°C during the preheat time at the timing shown in FIG. 7, and was thereafter heated to 420°C to 440°C within 2 seconds. In this case, the liquid material 36 was effectively gasified in an interlocked manner with discharge.

[0057] The inhalation time of the user should correspond to a time period between the start and end of energization of the heater and discharge in FIG. 6, and should correspond to a time period between the start and end of energization of the heater, including the preheat time, in FIG. 7. Accordingly, the preheat time is preferably set within a range of about 0.1 second to 1 second in the standard smoking time, so that the user will not feel discomfort during inhalation, and it is required that the preheat time is not so high.

[0058] For example, when the heater was preheated to about 400°C with a preheat time of 2 seconds, the material discharged after that was rapidly gasified and expanded. Then, the proportion of the material that was condensed near the discharge ports 35 increased, inversely decreasing the yield. Also, since the inhalation operation was allowed with the lapse of 2 seconds after the user held the sensor 73 of the suction port 22 in his mouth, a time lag occurred to make the user feel discomfort. In this experiment, with the operation timings shown in FIG. 7, preheat from room temperature to 140°C spent a preheat time of about 0.5 second, and preheat to 220°C spent a preheat time of about 1 second.

[0059] When the surface of the ceramic heater 42 had no porous layer 46 but was flat, a phenomenon in which the liquid material 36 was not easily caught by the heater surface but was bounded was observed. In this case, at either timings shown in FIG. 6 or 7, the yield tended to decrease.

[0060] Regarding the main inhalation air which flowed through the throttle hole 20 and passed through the gap 27, the higher the flow velocity to a certain degree, the better the gasification efficiency of the liquid material. Concerning this, under the standard smoking condition of 35 cc to 50 cc per inhalation for 2 seconds, a desired result was obtained when the position of the throttle hole 20 was within about 30 mm from the center of the gap 27 and the velocity of air passing through the throttle hole 20 was equal to or higher than about 6 m/second. This corresponds to the sectional area of the opening of the throttle hole 20 of about 3 mm^2 or less. However, it is nonsense to decrease the sectional area of the opening (to increase the flow velocity) to such a degree that it becomes impossible for the user to perform inhalation with his mouth. Considering the above respects, the lower limit of the sectional area of the opening of the throttle hole 20 is supposed to be preferably about 0.6 mm^2.

[0061] The size of the gap 27, i.e., the vertical distance between the discharge ports 35 and ceramic heater 42 also influenced the gasification efficiency of the liquid material 36. In order to suppress a decrease in yield caused by condensation of the gas near the discharge ports 35, the ceramic heater 42 and discharge ports 35 must oppose each other through a distance equal to or larger than about 2 mm.

[0062] Several flavor generation articles according to other embodiments of the present invention will be described. In the drawings indicating these embodiments, portions that are common to the preceding drawings are denoted by the same reference numerals, and a detailed description thereof will be omitted.

[0063] FIG. 8 is a schematic view showing a flavor generation article according to another embodiment of the present invention.

[0064] The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 1, but the orientation of discharge ports 35 of a discharge head 34 is different from that of the structure shown in FIG. 1 by 90° , so that the discharge ports 35 may be directed to a suction port 22. Accordingly, a ceramic heater 42 opposing the discharge ports 35 is set

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such that its direction is different from that of the structure shown in FIG. 1 by 90° . Since the discharge head 34 is arranged in a throttle hole 20, the substantial opening of the throttle hole 20 that serves as a gas flow path 26 is regulated by the size of both the throttle hole 20 and discharge head 34.

[0065] FIG. 9 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0066] The characteristic feature of the flavor generation article of this embodiment resides in that, first, a casing 12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, a discharge head 34, a ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14. However, a mouthpiece 16 is detachably mounted on the casing main body 14 through a connecting portion 18, and a suction port 22 is formed in the mouthpiece 16. The mouthpiece 16 is made of a material, e.g., a plastic or wood. As the connecting portion 18, a known structure, e.g., a screw or a fitting pair can be employed. In place of the mouthpiece 16, a filter may be inserted in the casing main body 14 and served for use.

[0067] The discharge head 34 provided to a material container 32 has one discharge port 35 which is oriented to discharge the liquid material 36 toward the suction port 22. Accordingly, the ceramic heater 42 opposing the discharge port 35 is oriented in the same direction as that of the structure shown in FIG. 8. No throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26. Air that has flowed into the article flows on the ceramic heater 42 because it is regulated by a support member 44 supporting the ceramic heater 42.

[0068] FIG. 10 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0069] The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 9 but is largely different from it in that its material container 32 is manually operated to discharge. For this reason, the material container 32 is connected to an operation lever 76 projecting outside a casing main body 14. When the lever 76 is depressed, a material corresponding to one puffing operation is emitted from a discharge port 35, and is supplied onto a ceramic heater 42 in the form of a liquid splash or liquid drop. A control circuit 72 receives a signal indicating a depressing operation of the lever 76, and supplies power to the ceramic heater 42 based on this signal to heat it, thereby gasifying the material splash. In fine, the lever 76 serves as both the discharge drive portion 38 for the flavor generation article and the sensor 73 for detecting the inhaling operation of the user that are shown in FIG. 1.

[0070] In the flavor generation article shown in FIG. 10, the material container 32 is also connected to an injection port 82 for replenishing the material container 32 with a liquid material 36. The end portion of the injection port 82 is exposed outside the casing main body 14, and the liquid material can be injected and replenished to the material container 32 through this end portion. As described above, the material container 32 has a capacity sufficient for storing the liquid material 36 in an amount corresponding to the total discharge amount of a plurality of puffing operations of the user. However, if the material can be replenished, the material container 32 need not be exchanged, but this flavor generation article can be used further continuously.

[0071] In order to observe the remaining amount in the material container 32, a transparent inspection window 84 is formed in the side wall of the casing main body 14 to correspond to the material container 32. Accordingly, in this case, the material container 32 itself is also a transparent or translucent container. When the remaining amount of the liquid material 36 in the material container 32 is monitored through the inspection window 84, the user can know the timing at which the container should be replenished with the material.

[0072] In place of the arrangement shown in FIG. 10, a combination of an electric remaining amount detection means and an electric display means can be used to monitor the remaining amount in the material container 32. An example of the electric remaining amount detection means includes a means for detecting a change in conductivity of the material container 32, and an example of the electric display means includes a means for using a light-emitting diode disposed on the outer surface of the casing main body 14. As the mechanism for monitoring the remaining amount in the material container 32, a method that optically detects the remaining amount by using a prism may also be employed.

[0073] In the flavor generation article shown in FIG. 10, furthermore, a power supply 62 is stored in a power supply holder 66 which is detachably mounted on the casing main body 14 through a connecting portion 68. As the connecting portion 68, a known structure, e.g., a screw or a fitting pair, can be employed. When the power supply holder 66 having a length corresponding to the size of the power supply 62 is used, exchange of the power supply 62 is facilitated, and repair and exchange of members in the casing main body 14 are also facilitated.

[0074] FIG. 11 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0075] The flavor generation article of this embodiment is similar to the flavor generation article shown in FIG. 10 but is different from it in that a discharge operation lever 76 is connected to an atomizer 86 provided to a discharge port 35. The atomizer 86 can supply a material corresponding to one puffing operation onto a ceramic heater 42 in the form of a liquid splash or liquid drop.

[0076] In the flavor generation article shown in FIG. 11, a filler 56 is disposed in a cooling chamber 52. When the filler 56 is disposed, the cooling effect of the gasified

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flavor component can be promoted, and the pressure loss can be adjusted so that the flavor component can be inhaled with an appropriate pressure. As the filler 56, for example, a fiber formed body made of cellulose acetate or pulp, or a particulate matter, e.g., glass or aluminum particles, can be used.

[0077] FIG. 12 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0078] The characteristic feature of the flavor generation article of this embodiment resides in that a formed body 92 of a solid material that generates a flavor or the like to be inhaled by the user is detachably disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52.

[0079] The formed body 92 of the solid material can contain an extracted material and/or the constituent components of various types of natural materials in accordance with the application purpose. As the flavor material to be contained by the formed body 92, for example, menthol, caffeine, or a tobacco component, e.g., a tobacco extracted component or a tobacco smoke condensate component can be employed.

[0080] If the formed body 92 of the solid material has such a size that no gap is formed between it and the inner surface of a casing main body 14, a formed body 92 having good air permeability is used as the formed body 92. In this case, the gas flow path 26 between air intake ports 24 and a suction port 22 is formed to extend through the formed body 92. On the other hand, if the size of the formed body 92 is set such that a gap is formed between the formed body 92 and the inner surface of the casing main body 14, a formed body 92 having poor or no air permeability can be used. In this case, the gas flow path 26 between the air intake ports 24 and suction port 22 is formed to extend through the gap between the formed body 92 and the inner surface of the casing main body 14.

[0081] FIG. 13 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0082] The flavor generation article of this embodiment is different from the flavor generation article shown in FIG. 12 in that a coil heater 94 for heating a formed body 92 is disposed around the formed body 92. The heater for heating the formed body 92 may be arranged in a hole formed in the formed body 92.

[0083] The coil heater 94, together with a ceramic heater 42, can be controlled by a control circuit 72 so that power is supplied to them in accordance with the inhaling operation of the user. When the formed body 92 has a large heat capacity, however, even if power is supplied to the coil heater 94 in accordance with the start of the inhaling operation of the user, generation of the flavor may be retarded considerably. In such a case, the coil heater 94 may be kept heated when this article is in use, i.e., while a switch 74 is set in the ON state.

[0084] The formed body 92 has such a size that a sufficiently large gap is formed between it and the inner surface of a casing main body 14. Accordingly, the major portion of a gas flow path 26 between air intake ports 24 and a suction port 22 extends through this gap.

[0085] FIG. 14 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0086] The characteristic feature of the flavor generation article according to this embodiment resides in that a swing vane type sensor is used to detect the inhaling operation of the user. More specifically, a swing vane 102 is disposed in a gas flow path 26 between a ceramic heater 42 and a cooling chamber 52. An orifice 112 having an opening 114 opposing the vane 102 is disposed in the gas flow path 26 between the ceramic heater 42 and the vane 102. The vane 102 is integrally connected to a conductive lever 104 which serves as the switch lever of the sensor circuit. An electric contact 108 of the sensor circuit is disposed on the inner surface of a casing main body 14 to oppose the conductive lever 104.

[0087] The vane 102 and lever 104 are integrally, swingably, and axially supported on a support 106 on the inner surface of the casing main body 14, and is biased counterclockwise in FIG. 14 by a spring incorporated in the support 106. Accordingly, in an ordinary state, the vane 102 abuts against the orifice 112, and the lever 104 and contact 108 are not in contact with each other. However, when the user starts an inhaling operation, the gas flow, the flow velocity of which is increased by the orifice 112, pivots the vane 102 clockwise in FIG. 14, so that the lever 104 and contact 108 come into contact with each other. The inhaling operation signal of the user which is detected in this manner by the swing vane type sensor is transmitted to a control circuit 72. Based on this detection signal, a discharge drive portion 38 and the ceramic heater 42 can be controlled.

[0088] FIG. 15 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0089] The characteristic feature of the flavor generation article according to this embodiment resides in that a contact sensor is used in order to detect the inhaling operation of the user. More specifically, electric contacts 122 and 124 each made of an annular conductive plate are disposed at the center and the suction port-side end portion, respectively, of the outer surface of a casing 12. The electric contacts 122 and 124 constitute the switch of a sensor circuit. When the electric contacts 122 and 124 are connected to each other through a conductor, the sensor generates a detection signal. This state occurs when, e.g., two conditions that the user holds the electric contact 122 at the center with his hand and holds the suction port-side electric contact 124 in his mouth are satisfied simultaneously. The inhaling operation signal of the user which is detected by the contact sensor in this manner is transmitted to a control circuit 72. A discharge drive portion 38 and a ceramic heater 42 can

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be controlled based on this detection signal.

[0090] FIG. 16 is a schematic view showing a flavor generation article according to still another embodiment of the present invention.

[0091] The flavor generation article of this embodiment has discharge ports 35 of a discharge head 34 that are oriented in the same direction as that of the flavor generation article shown in FIG. 1, and a ceramic heater 42 opposing the discharge ports 35. However, a casing 12 cannot be separated into first and second portions 12a and 12b (see FIG. 1), and a liquid material 36, the discharge head 34, the ceramic heater 42, a power supply 62, a control unit 72, and the like are incorporated in one casing main body 14.

[0092] Although no throttle plate 21 (see FIG. 1) is disposed in a gas flow path 26, a support member 44 of the ceramic heater 42 is formed to have a slit only at its central portion corresponding to the discharge head 34. Accordingly, air flowing through air intake ports 26 entirely passes through the gap between the discharge port 35 and the ceramic heater 42.

[0093] The characteristic features of the respective portions of the present invention have been described divisionally by way of several embodiments in order to facilitate understanding of the present invention. These characteristic features can be appropriately combined in accordance with the object. More specifically, the present invention can be practiced in various embodiments other than those shown in the drawings within the scope of the invention, as defined by the appended claims.

Claims

1. A flavor generation article **characterized by** comprising:

   a casting (12) having an air intake port (24) for taking in air therein and a suction port (22) through which a user inhales a flavor, and forming a gas flow path (26) between said intake port and said suction port;
   a material container (32) for storing a liquid material which contains at least a flavor substance and having a discharge port (35) for said material, said material container being mounted on said casing;
   discharge driving means (38) electrically operable for discharging said material from said container through said discharge port in the form of a liquid drop;
   gasifying means (42) disposed in said gas flow path to receive the liquid drop of said material discharged from said container by said discharge driving means and gasify said material by electrically heating the liquid drop;
   a power supply (62) for supplying electric energy to said discharge driving means and said gasifying means; and
   control means (72) responsive to suction applied to the suction part (22) for selectively forming a state where said discharge driving means and said gasifying means operate in response to the suction by electric energy from said power supply.

2. A flavor generation article according to claim 1, **characterized by** further comprising a sensor (73) for detecting an inhaling operation of the user, wherein said control means (72) controls, based on a signal from said sensor, said discharge driving means (38) and said gasifying means (42) so as to discharge said material from said container (32) and to generate heat by said gasifying means.

3. A flavor generation article according to claim 2, **characterized in that** said sensor (73) comprises a pressure-sensitive sensor mounted on said casing (12) around said suction port (22).

4. A flavor generation article according to claim 2 or 3, **characterized in that** said control means (72) controls said discharge driving means (38) and said gasifying means (42) based on the signal from said sensor (73) so that said discharge driving means and said gasifying means start operation at the same time.

5. A flavor generation article according to claim 2 or 3, **characterized in that** said control means (72) controls said gasifying means (42) and said discharge driving means (38) based on the signal from said sensor (73) so as to preheat said gasifying means prior to discharge of said material.

6. A flavor generation article according to any one of claims 1 to 5, **characterized in that** said control means (72) controls said gasifying means (42) and said discharge driving means (38) so that said discharge driving means and said gasifying means stop operation at the same time.

7. A flavor generation article according to claim 1, **characterized in that** said power supply (62) is disposed in said casing (12).

8. A flavor generation article according to claim 7, **characterized in that** said casing (12) is constituted by first and second portions (12a, 12b) that are electrically connected to each other through a cable (15), said gas flow path (26), said container (32), said discharge driving means (38), said gasifying means (42) being disposed in said first portion (12a), and said power supply (62) being disposed in said second portion (12b).

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9. A flavor generation article according to claim 8, **characterized in that** said first and second portions (12a, 12b) of said casing (12) are detachably connected to each other through a connecting portion (13).

10. A flavor generation article according to any one of claims 1 to 9, **characterized in that** said gasifying means (42) comprises a porous layer (46), and the liquid drop of said material is supplied onto said porous layer.

11. A flavor generation article according to any one of claims 1 to 10, **characterized in that** said gasifying means (42) is arranged to oppose said discharge port (35), and a throttle hole (20) for directing air flowing form said air intake port (24) toward a gap between said discharge port and said gasifying means is disposed in said gas flow path (26).

12. A flavor generation article according to any one of claims 1 to 11, **characterized in that** said casing (12) is formed with an outer air inlet hole (54) in order to supply an outer air into said gas flow path (26) between said gasifying means (42) and said suction port (22).

13. A flavor generation article according to any one of claims 1 to 12, **characterized by** further comprising a formed body (92) of a solid material containing at least a flavor substance and disposed in said gas flow path (26) so as to be located between said gasifying means (42) and said suction port (22).

14. A flavor generation article according to claim 13, **characterized by** further comprising heating means (94) for heating said formed body (92).

Patentansprüche

1. Aromaerzeugender Gegenstand **gekennzeichnet durch**:

   ein Gehäuse (12) mit einer Lufteinlaßöffnung (24) zum Hereinlassen von Luft und einer Saugöffnung (22), **durch** welche ein Nutzer ein Aroma inhaliert, und die einen Gasströmungsweg (26) zwischen der Einlaßöffnung und der Saugöffnung bildet;
   einen Materialbehälter (32) zum Lagern eines zumindest eine Aromasubstanz enthaltenden flüssigen Materials, welcher eine Abgabeöffnung (35) für das Material aufweist, wobei der Materialbehälter auf dem Gehäuse befestigt ist;
   eine Abgabe-Antriebseinrichtung (38), welche elektrisch zur Abgabe des Materials aus dem Behälter **durch** die Abgabeöffnung in der Form eines flüssigen Tropfens betreibbar ist;
   eine Vergasungseinrichtung (42), welche in dem Gasströmungsweg zum Aufnehmen des flüssigen Tropfens des Materials, welches von dem Behälter **durch** die Entlade-Antriebseinrichtung abgebbar ist, und zum Vergasen des Materials **durch** elektrisches Heizen des flüssigen Tropfens angeordnet ist;
   eine Stromversorgung (62) zum Liefern von elektrischer Energie an die Entlade-Antriebseinrichtung und die Vergasungseinrichtung; und **durch**
   eine Steuereinrichtung (72), welche auf ein an der Saugöffnung (22) auftretendes Saugen zum selektiven Bilden eines Zustands anspricht, in welchem die Entlade-Antriebseinrichtung und die Vergasungseinrichtung in Abhängigkeit vom Saugen **durch** elektrische Energie von der Stromversorgung betreibbar ist.

2. Aromaerzeugender Gegenstand nach Anspruch 1, **gekennzeichnet durch** einen Sensor (73) zum Erfassen eines Inhalationsvorgangs des Nutzers, wobei die Steuereinrichtung (72) basierend auf einem Signal von dem Sensor die Abgabe-Antriebseinrichtung (38) und die Vergasungseinrichtung (42) derart steuert, daß das Material von dem Behälter (32) abgegeben und Hitze **durch** die Vergasungseinrichtung erzeugt wird.

3. Aromaerzeugender Gegenstand nach Anspruch 2, **dadurch gekennzeichnet, daß** der Sensor (73) einen drucksensiblen Sensor aufweist, welcher auf dem Gehäuse (12) um die Saugöffnung (22) herum befestigt ist.

4. Aromaerzeugender Gegenstand nach Anspruch 2 oder 3, **dadurch gekennzeichnet, daß** die Steuereinrichtung (72) die Abgabe-Antriebseinrichtung (38) und die Vergasungseinrichtung (42) basierend auf dem Signal von dem Sensor (73) derart steuert, daß die Abgabe-Antriebseinrichtung und die Vergasungseinrichtung den Betrieb gleichzeitig starten.

5. Aromaerzeugender Gegenstand nach Anspruch 2 oder 3, **dadurch gekennzeichnet, daß** die Steuereinrichtung (72) die Vergasungseinrichtung (42) und die Abgabe-Antriebseinrichtung (38) basierend auf dem Signal von. dem Sensor (73) derart steuert, daß die Vergasungseinrichtung vor dem Entladen des Materials vorgeheizt wird.

6. Aromaerzeugender Gegenstand nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, daß** die Steuereinrichtung (72) die Vergasungseinrichtung (42) und die Abgabe-Antriebseinrichtung (38) derart steuert, daß die Abgabe-Antriebseinrichtung

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und die Vergasungseinrichtung den Betrieb gleichzeitig stoppen.

7. Aromaerzeugender Gegenstand nach Anspruch 1, **dadurch gekennzeichnet, daß** die Stromversorgung (62) in dem Gehäuse (12) angeordnet ist.

8. Aromaerzeugender Gegenstand nach Anspruch 7, **dadurch gekennzeichnet, daß** das Gehäuse (12) aus einem ersten und einem zweiten Abschnitt (12a, 12b) besteht, welche elektrisch durch ein Kabel (15) miteinander verbunden sind, wobei der Gasströmungsweg (26), der Behälter (32), die Abgabe-Antriebseinrichtung (38), die Vergasungseinrichtung (42) in dem ersten Abschnitt (12a) angeordnet sind, und die Stromversorgung (62) in dem zweiten Abschnitt (12b) angeordnet ist.

9. Aromaerzeugender Gegenstand nach Anspruch 8, **dadurch gekennzeichnet, daß** der erste und zweite Abschnitt (12a, 12b) des Gehäuses (12) abnehmbar miteinander durch einen Verbindungsabschnitt (13) verbunden sind.

10. Aromaerzeugender Gegenstand nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** die Vergasungseinrichtung (42) eine poröse Schicht (46) aufweist, und der flüssige Tropfen des Materials auf die poröse Schicht lieferbar ist.

11. Aromaerzeugender Gegenstand nach einem der Ansprüche 1 bis 10, **dadurch gekennzeichnet, daß** die Vergasungseinrichtung (42) der Abgabeöffnung (35) gegenüberliegend angeordnet ist, und daß eine Drosselöffnung (20) zum Leiten von Luft von der Lufteinlaßöffnung (24) in Richtung eines Spalts zwischen der Abgabeöffnung und der Vergasungseinrichtung in dem Gasströmungsweg (26) angeordnet ist.

12. Aromaerzeugender Gegenstand nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, daß** das Gehäuse (12) mit einem äußeren Lufteinlaßloch (54) zum Liefern von Außenluft in dem Gasströmungsweg (26) zwischen der Vergasungseinrichtung (42) und der Saugöffnung (22) gebildet ist.

13. Aromaerzeugender Gegenstand nach einem der Ansprüche 1 bis 12, **gekennzeichnet durch** einen aus einem festen Material geformten Körper (92), welcher zumindest eine Aromasubstanz beinhaltet und in dem Gasströmungsweg (26) derart angeordnet ist, daß er zwischen der Vergasungseinrichtung (42) und der Saugöffnung (22) liegt.

14. Aromaerzeugender Gegenstand nach Anspruch 13, **gekennzeichnet durch** eine Heizeinrichtung (94) zum Erhitzen des geformten Körpers (92).

Revendications

1. Article de génération d'arôme **caractérisé en ce qu'**il comporte :

   un boîtier (12) ayant un orifice d'admission d'air (24) destiné à admettre de l'air dedans et un orifice d'aspiration (22) à travers lequel un utilisateur inhale un arôme, et formant un passage d'écoulement de gaz (26) entre ledit orifice d'admission et ledit orifice d'aspiration;
   un réservoir de matière (32) destiné à emmagasiner une matière liquide qui contient au moins une substance d'arôme et ayant un orifice de sortie (35) pour ladite matière, ledit réservoir de matière étant monté sur ledit boîtier;
   des moyens d'entraînement de refoulement (38) pouvant être actionnés électriquement afin de refouler ladite matière depuis ledit réservoir à travers ledit orifice de sortie sous la forme d'une goutte de liquide;
   des moyens de gazéification (42) disposés dans ledit passage d'écoulement de gaz afin de recevoir la goutte de liquide de ladite matière refoulée depuis ledit réservoir par lesdits moyens d'entraînement de refoulement et de gazéifier ladite matière en chauffant électriquement la goutte de liquide;
   une alimentation (62) destinée à délivrer de l'énergie électrique aux dits moyens d'entraînement de refoulement et aux dits moyens de gazéification; et
   des moyens de commande (72) sensibles à l'aspiration appliquée sur l'orifice d'aspiration (22) afin de former de manière sélective un état dans lequel lesdits moyens d'entraînement de refoulement et lesdits moyens de gazéification fonctionnent en réponse à l'aspiration grâce à l'énergie électrique provenant de ladite alimentation.

2. Article de génération d'arôme selon la revendication 1, **caractérisé en ce qu'**il comporte en outre un capteur (73) destiné à détecter une opération d'inhalation de l'utilisateur, lesdits moyens de commande (72) commandant, sur la base d'un signal provenant dudit capteur, lesdits moyens d'entraînement de refoulement (38) et lesdits moyens de gazéification (42) de façon à refouler ladite matière depuis ledit réservoir de matière (32) et à générer de la chaleur grâce aux dits moyens de gazéification.

3. Article de génération d'arôme selon la revendication 2, **caractérisé en ce que** ledit capteur (73) comporte un capteur sensible à la pression monté sur ledit boîtier (12) autour dudit orifice d'aspiration (22).

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4. Article de génération d'arôme selon la revendication 2 ou 3, **caractérisé en ce que** lesdits moyens de commande (72) commandent lesdits moyens d'entraînement de refoulement (38) et lesdits moyens de gazéification (42) sur la base du signal provenant dudit capteur (73) de telle sorte que lesdits moyens d'entraînement de refoulement et lesdits moyens de gazéification commencent à fonctionner en même temps.

5. Article de génération d'arôme selon la revendication 2 ou 3, **caractérisé en ce que** lesdits moyens de commande (72) commandent lesdits moyens de gazéification (42) et lesdits moyens d'entraînement de refoulement (38) sur la base du signal provenant dudit capteur (73) de façon à préchauffer lesdits moyens de gazéification avant de refouler ladite matière.

6. Article de génération d'arôme selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** lesdits moyens de commande (72) commandent lesdits moyens de gazéification (42) et lesdits moyens d'entraînement de refoulement (38) de telle sorte que lesdits moyens d'entraînement de refoulement et lesdits moyens de gazéification arrêtent de fonctionner en même temps.

7. Article de génération d'arôme selon la revendication 1, **caractérisé en ce que** ladite alimentation (62) est disposée dans ledit boîtier (12).

8. Article de génération d'arôme selon la revendication 7, **caractérisé en ce que** ledit boîtier (12) est constitué par des première et deuxième parties (12a, 12b) qui sont reliées électriquement l'une à l'autre par l'intermédiaire d'un câble (15), ledit passage d'écoulement de gaz (26), ledit réservoir (32), lesdits moyens d'entraînement de refoulement (38), lesdits moyens de gazéification (42) étant disposés dans ladite première partie (12a), et ladite alimentation (62) étant disposée dans ladite deuxième partie (12b).

9. Article de génération d'arôme selon la revendication 8, **caractérisé en ce que** lesdites première et deuxième parties (12a, 12b) dudit boîtier (12) sont reliées de façon démontable l'un à l'autre par l'intermédiaire d'une partie de raccordement (13).

10. Article de génération d'arôme selon l'une quelconque des revendications 1 à 9, **caractérisé en ce que** lesdits moyens de gazéification (42) comportent une couche poreuse (46), et la goutte de liquide de ladite matière est délivrée sur ladite couche poreuse.

11. Article de génération d'arôme selon l'une quelconque des revendications 1 à 10, **caractérisé en ce que** lesdits moyens de gazéification (42) sont disposés afin de faire face au dit orifice de sortie (35), et un trou d'étranglement (20) destiné à diriger un écoulement d'air depuis ledit orifice d'admission d'air (24) vers un espace entre ledit orifice de sortie et lesdits moyens de gazéification est disposé dans ledit passage d'écoulement de gaz (26).

12. Article de génération d'arôme selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** ledit boîtier (12) est formé avec un trou d'entrée d'air extérieur (54) afin de délivrer de l'air extérieur dans ledit passage d'écoulement de gaz (26) entre lesdits moyens de gazéification (42) et ledit orifice d'aspiration (22).

13. Article de génération d'arôme selon l'une quelconque des revendications 1 à 12, **caractérisé en ce qu'**il comporte en outre un corps formé (92) en matière solide contenant au moins une substance d'arôme et disposé dans ledit passage d'écoulement de gaz (26) de façon à être situé entre lesdits moyens de gazéification (42) et ledit orifice d'aspiration (22).

14. Article de génération d'arôme selon la revendication 13, **caractérisé en ce qu'**il comporte en outre des moyens de chauffage (94) destinés à chauffer ledit corps formé (92).

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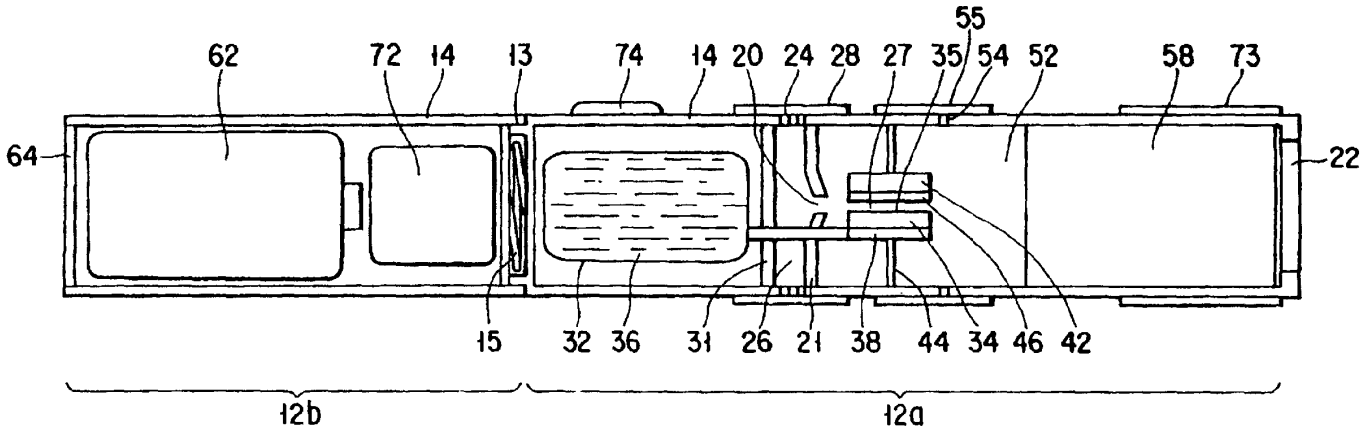


FIG. 1

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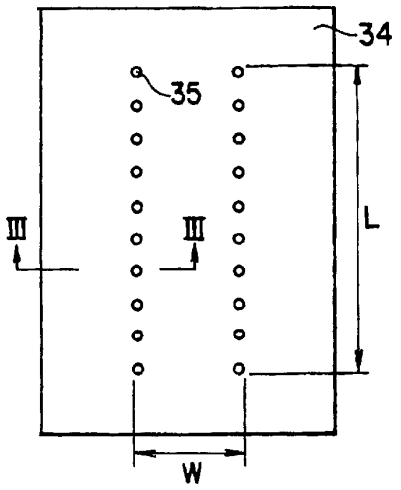


FIG. 2

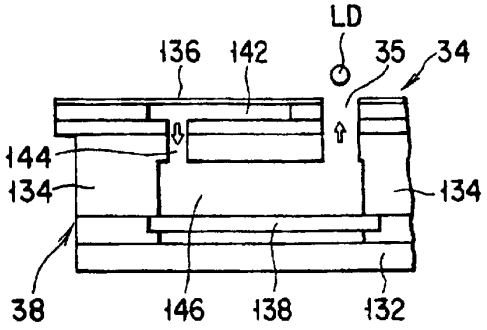


FIG. 3

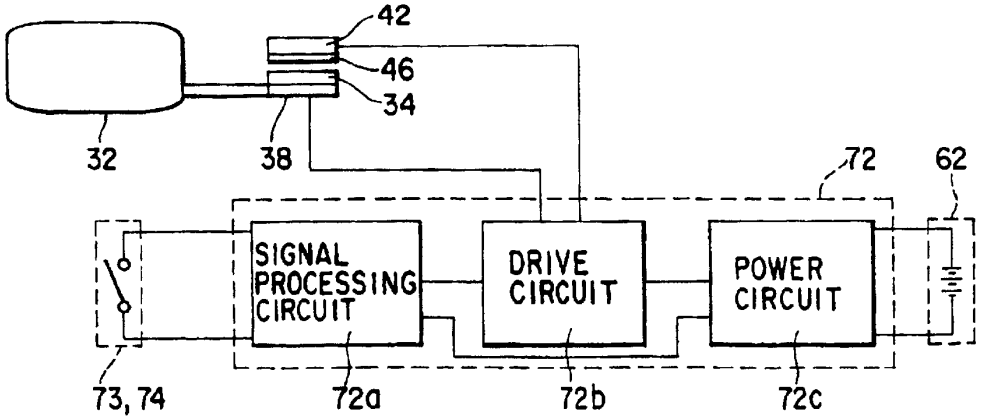


FIG. 4

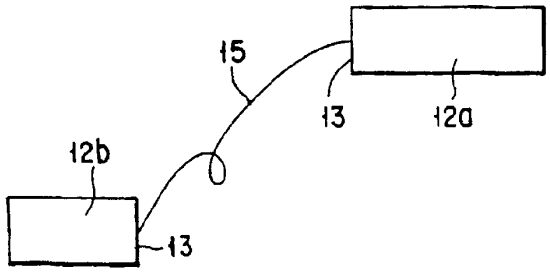


FIG. 5

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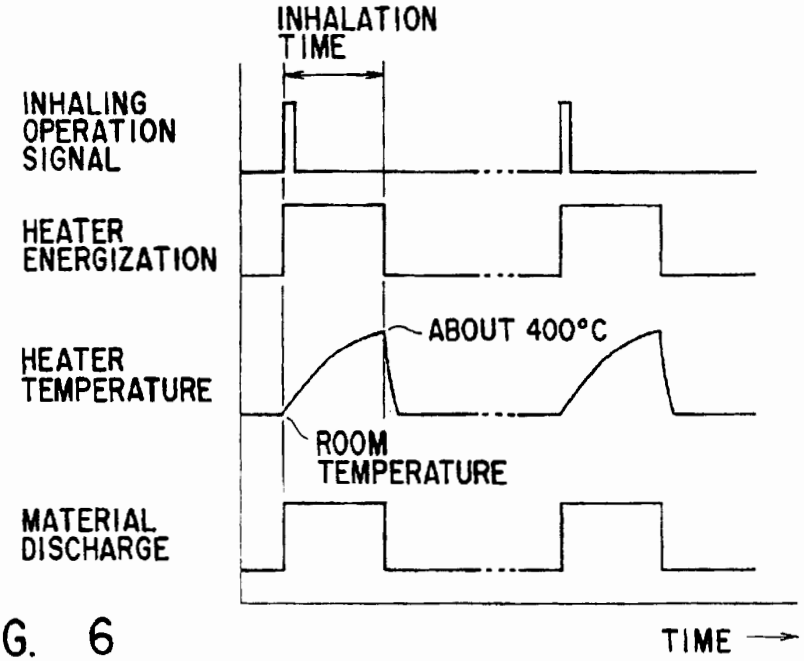


FIG. 6

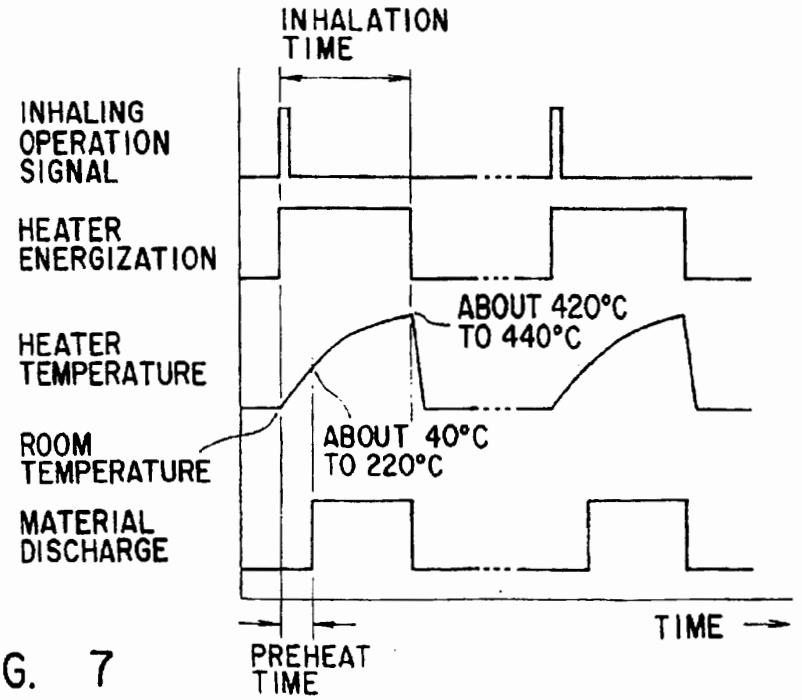


FIG. 7

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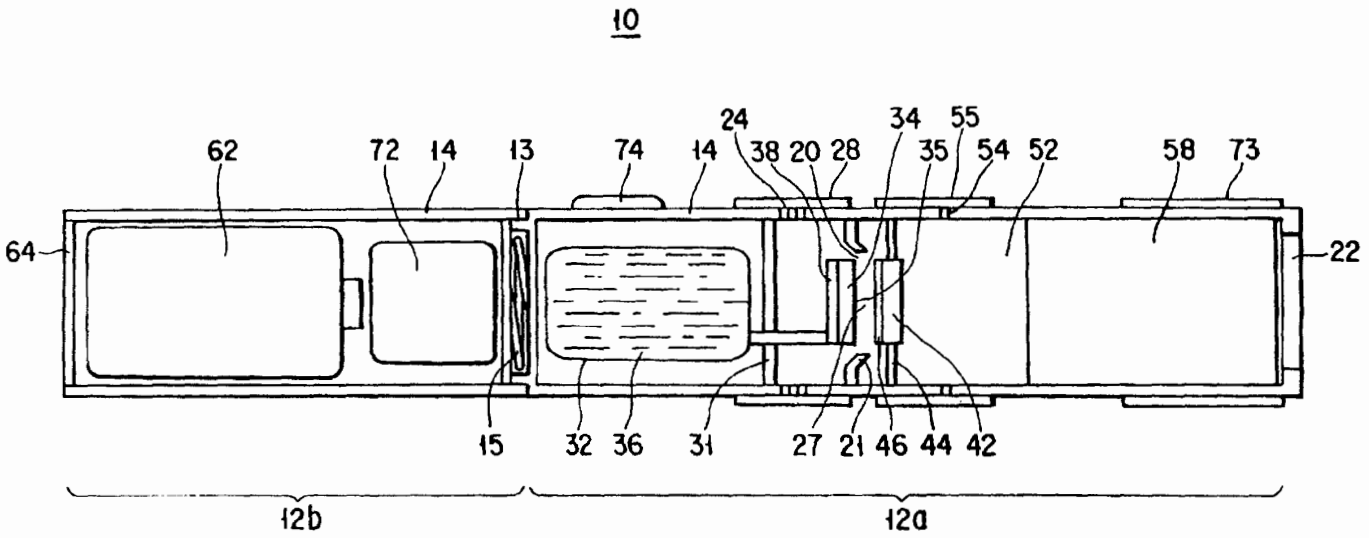


FIG. 8

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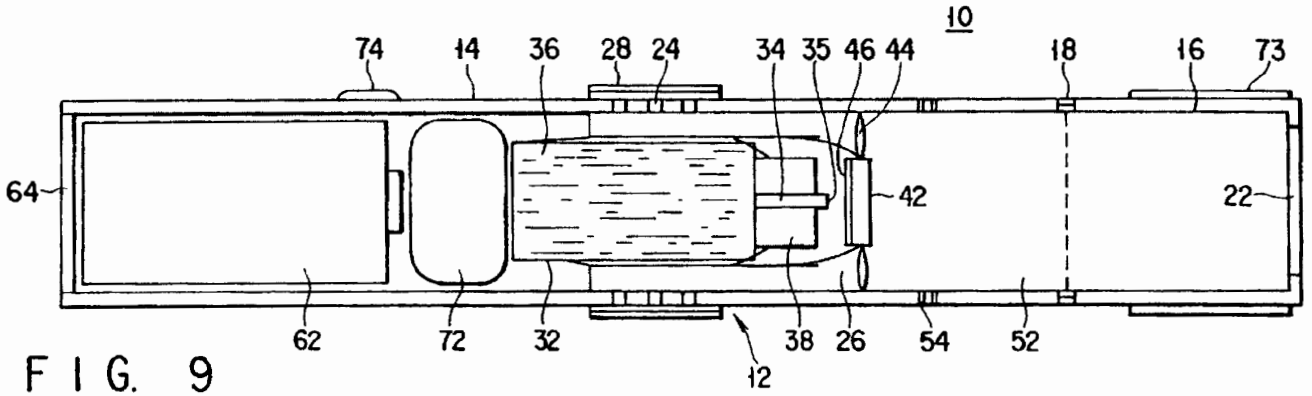


FIG. 9

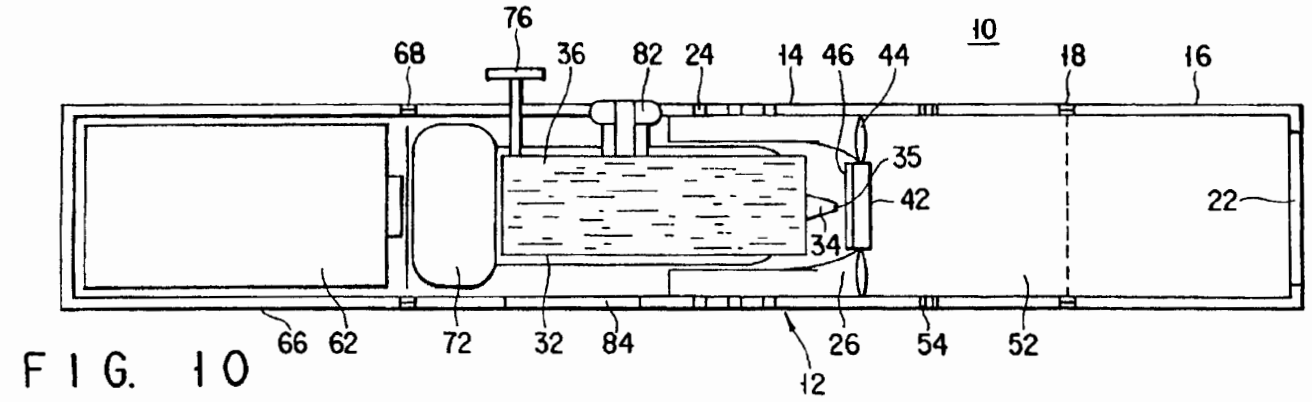


FIG. 10

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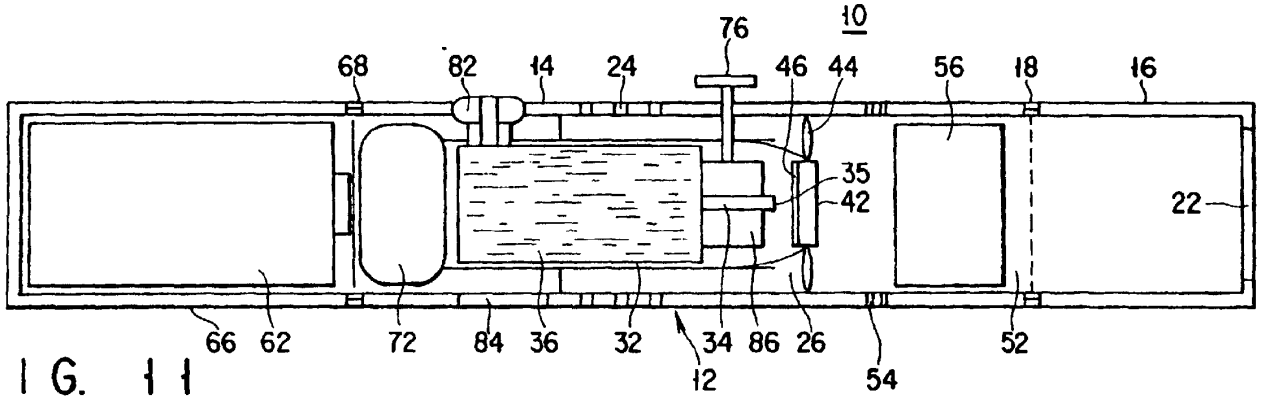


FIG. 11

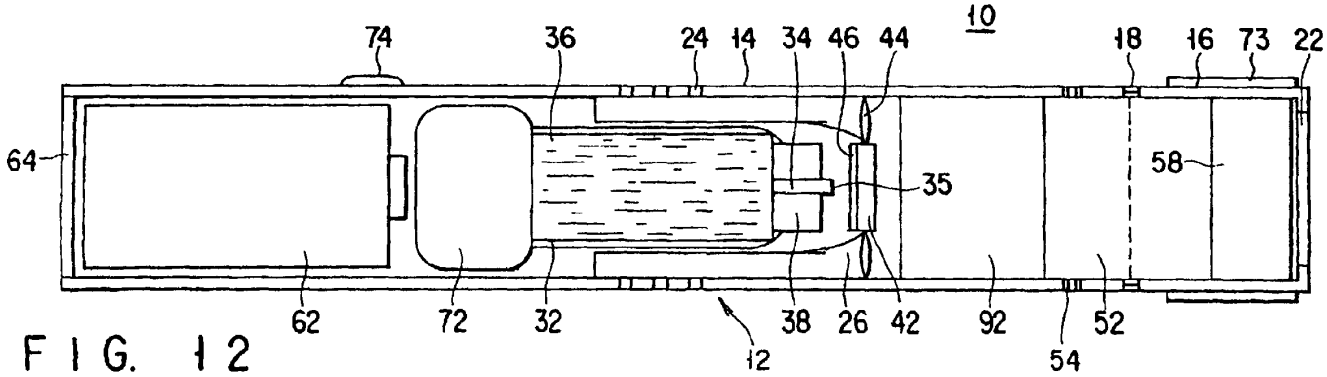


FIG. 12

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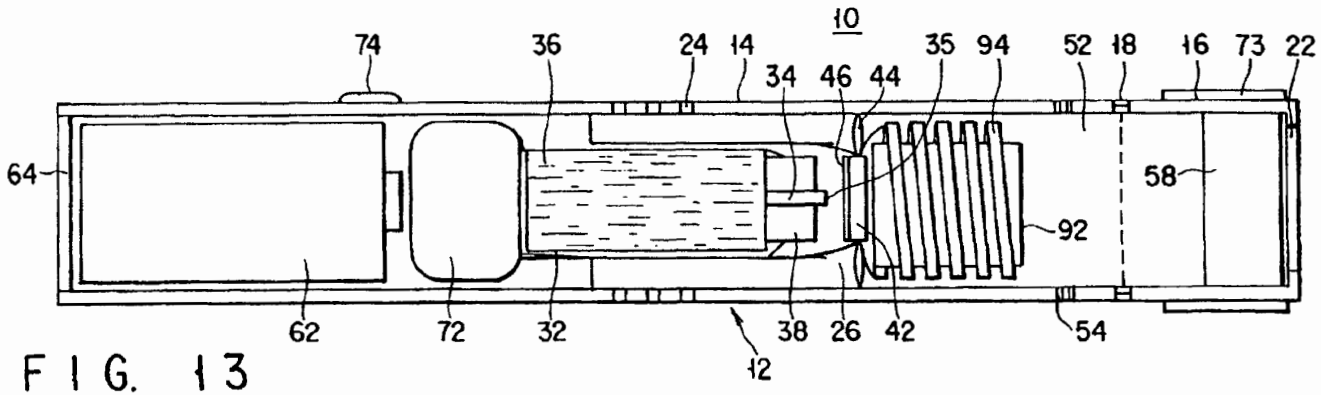


FIG. 13

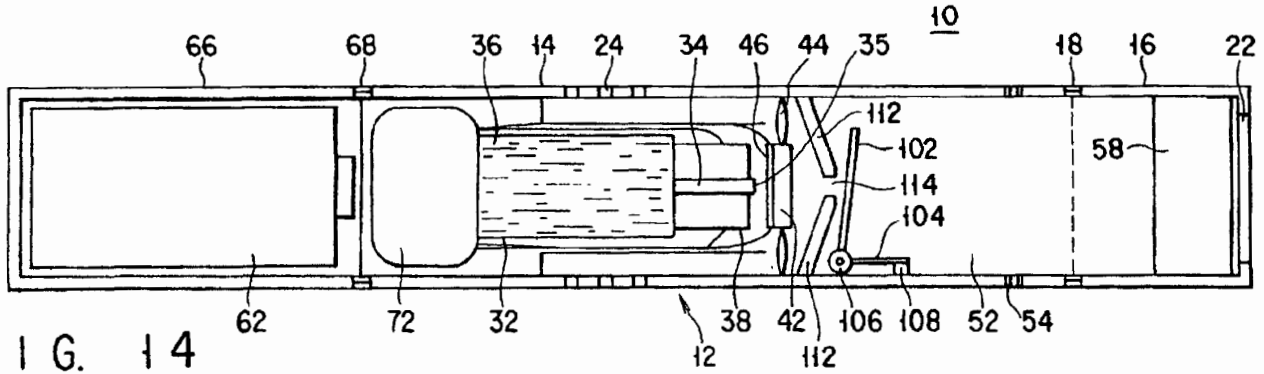


FIG. 14

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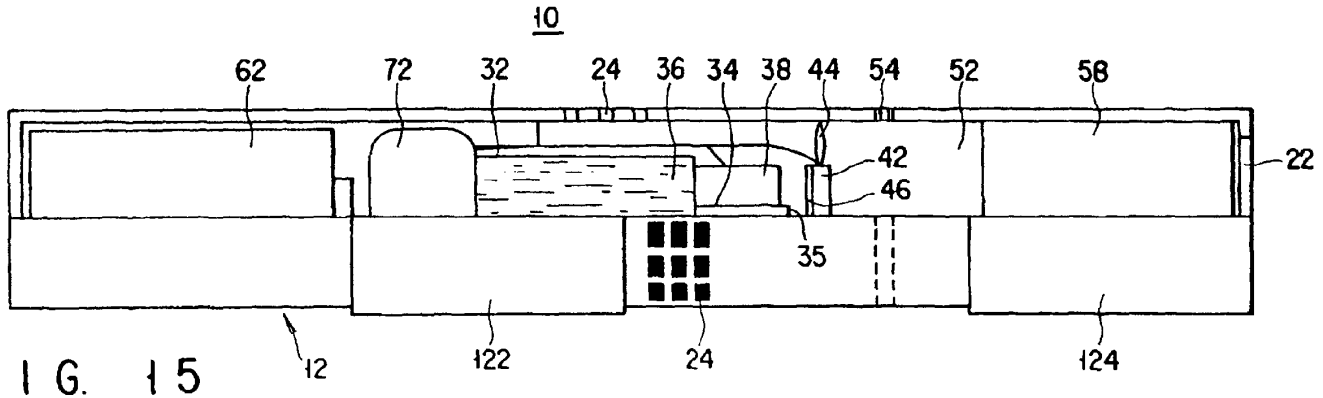


FIG. 15

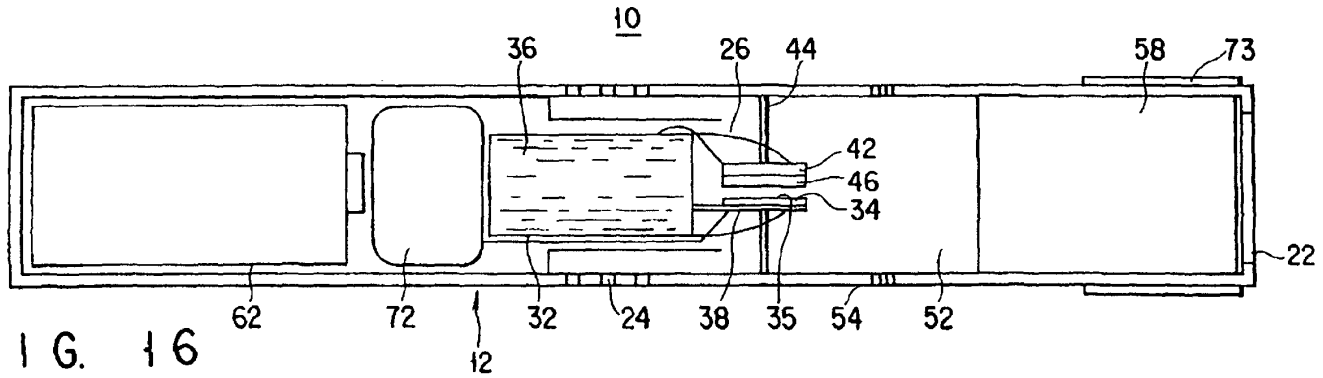


FIG. 16

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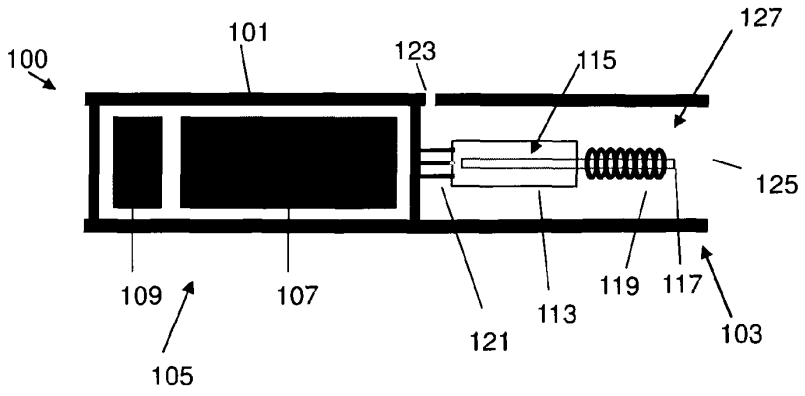
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(54) An improved aerosol generator and liquid storage portion for use with the aerosol generator

(57) A liquid storage portion (113) comprising an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) for distinguishing the storage portion (113) from other liquid storage portions is disclosed. The liquid storage portion (113) is configured for use in an aerosol generating system (100) having means for determining (309) an electrical characteristic of the electrical component and means for distinguishing (309) the liquid storage portion (113) from other liquid storage portions based on the determined electrical characteristic of the electrical component.

Figure 1



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Description

[0001] The present invention relates to an aerosol generator and to a smoking system. The aerosol generator or smoking system may have a liquid storage portion. More particularly, this invention relates to a liquid storage portion for use with an aerosol generator or a smoking system.

[0002] WO-A-2007/078273 discloses a smoking utensil. A liquid is stored in a container which communicates with a heater vaporiser, powered by a supply, via a series of small apertures. The liquid can be fed into the container via a one-way valve. In use, the heater is activated by the mouth of the user to switch on the battery power supply. Suction on a mouthpiece by the user causes air to be drawn through the apertures in the container, over the heater vaporiser, into the mouthpiece and subsequently into the mouth of a user.

[0003] One disadvantage of such a proposed smoking utensil is that there is no way to determine that the liquid fed into the container is suitable for use with the smoking utensil. In other words, there is no way of determining whether the liquid fed into the container it is suitable for vaporization by the heater in an appropriate manner.

[0004] It is therefore an object of the present invention to overcome this disadvantage and other disadvantages of the prior art.

[0005] According to a first aspect of the present invention, there is provided a liquid storage portion comprising an electrical component for distinguishing the storage portion from other liquid storage portions, the liquid storage portion being configured for use in an aerosol generating system having means for determining an electrical characteristic of the electrical component and means for distinguishing the liquid storage portion from other liquid storage portions based on the determined electrical characteristic of the electrical component.

[0006] The electrical component may be located on the exterior of the liquid storage portion or within the liquid storage portion.

[0007] The liquid storage portion may further comprise one or more further electrical components the components preferably being connected in series or parallel with each other.

[0008] The electrical component or components may comprise one or more resistors or one or more radio frequency identification microchips or one or more microchip memories.

[0009] The liquid storage portion may further comprise a plurality of electrical contacts for electrical connection to one or more of the electrical component or components.

[0010] The electrical contacts may be arranged in a substantially straight line or in a substantially triangular array or in a substantially square or in a substantially rectangular array.

[0011] The liquid storage portion may further comprise a heating element. Preferably, the heating element is integral to the liquid storage portion.

[0012] In this way, when the liquid storage portion is removed from the aerosol generating system, both the liquid storage portion and the heating element are removed. Then both the liquid storage portion and the heating element which has been removed from the aerosol generating system may be replaced or substituted with another liquid storage portion and heating element.

[0013] The material of the heating element may be chosen so that, in use, it heats up more than the electrical contacts or other electrically conductive portions of the liquid storage portion.

[0014] The heating element may be electrically connected at a first end to a first end of a first electrically conductive portion. The heating element may be electrically connected at a second end to a first end of a further electrically conductive portion.

[0015] The first electrically conductive portion may be electrically connected at a second end to an electrical contact. The second electrically conductive portion may be electrically connected at a second end to an electrical contact.

[0016] Usually the means for determining an electrical characteristic of the electrical component is a processor or controller. Further, the means for distinguishing one liquid storage portion from other liquid storage portions based on a determined characteristic of an electrical component is also usually a processor or controller, but a combination of resistors, transistors and other switches may be used.

[0017] Electrical components which may be used with embodiments of the invention are one or more resistors, capacitors, inductors, diodes, transistors, memory chips.

[0018] The electrical characteristic which may be determined by the processor are for example, the resistance, capacitance, inductance, break down voltage, switching speed or amplification, or in the case of a memory chips, the values stored in the memory.

[0019] According to a second aspect of the present invention, there is provided an aerosol generating system comprising the liquid storage portion according to the first aspect of the present invention.

[0020] According to a third aspect of the present invention, there is provided an aerosol generating system for receiving a liquid storage portion configured for use with the aerosol generating system, the system comprising: means for determining an electrical characteristic of an electrical component associated with the liquid storage portion; and means for distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined electrical characteristic of the electrical component associated with the liquid storage portion.

[0021] Preferably, the system further comprises transmission means arranged to transmit signals between the determining means and the electronic component.

[0022] The transmission means may be electrical one or more electrical connectors or electrical conductive por-

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tions for transmitting electrical signals between the distinguishing means and the electrical component. Alternatively, the transmission means may comprise a radio frequency identification antenna. The antenna may be electrically connected to a radio frequency identification reader or chip on the aerosol generating system. The transmission means may also comprise an antenna associated with a liquid storage portion. The liquid storage portion antenna may be electrically connected to a radio frequency identification chip also associated with the liquid storage portion.

[0023] Preferably, the system comprises a housing for at least partially receiving the liquid storage portion. Preferably, the system further comprises means for detecting the presence of the liquid storage portion in the housing.

[0024] The means for determining an electrical characteristic of the electrical component may further comprise one or more further electrical components. The one or more further components may be arranged in series with the one or more components associated with the liquid storage portion. The further electrical components on the aerosol generating system may be electrical resistors.

[0025] The aerosol generating system may further comprise one or more electrical contacts for electrical connection to the one or more of the further electrical component or components of the aerosol generating system. The aerosol generating system may further comprise one or more electrically conductive potions for electrically connecting the further electrical components or electrical contacts to the determining means and the distinguishing means.

[0026] The aerosol generating system may further comprise a memory for storing a look-up table, the look-up table comprising data representing one or more electrical characteristics of one or more electrical components, each characteristic associated with data identifying a liquid storage portion.

[0027] The aerosol generating system may further comprise a means for searching the look-up table.

[0028] The aerosol generating system may further comprise a means for determining a type of liquid storage portion by searching the look-up table for data identifying the type of liquid storage portion associated with data representing an electrical characteristic of the electronic component which matches data representing the determined characteristic of the electrical component.

[0029] The aerosol generating system may further comprise a heating element.

[0030] The aerosol generating system may further comprise a means for controlling one or more operational parameters of the heating element. The control means may control one or more of the operational parameters of the heating element in dependence upon the determined electrical characteristic of the electrical component or components associated with the liquid storage portion.

[0031] The control means may be arranged to supply electrical energy to the heating element in dependence upon the determined value of the electrical component or components associated with the liquid storage portion.

[0032] According to a fourth aspect of the present invention, there is provided a liquid storage portion comprising a 3-dimensional object for distinguishing the storage portion from other liquid storage portions, the liquid storage portion being configured for use in an aerosol generating system having means for determining a characteristic of the 3-dimensional object and means for distinguishing the liquid storage portion from other liquid storage portions based on the determined characteristic of the 3-dimensional object.

[0033] According to a fifth aspect of the present invention, there is provided an aerosol generating system for receiving a liquid storage portion configured for use with the aerosol generating system, the system comprising: means for determining a characteristic of a 3-dimensional object associated with the liquid storage portion; and means for distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined characteristic of the 3-dimensinoal object associated with the liquid storage portion.

[0034] The three dimensional object may comprise one or more bump, protrusions or recesses and the like. The characteristics of the 3-dimensional object may a spatial characteristic of the 3-dimensional object. The characteristic may be the position of the bump, protrusion or recess on the liquid storage portion, the height of a bump or protrusion from the surface of the liquid storage portion, the width of a bump or protrusion from the surface of the liquid storage portion, the depth of a trough or recess in the liquid storage portion. Further, if the 3-dimensional object comprises a plurality of protrusions or recesses, then the relative spacing of the protrusions or recesses may be determined as a characteristic of the 3-dimensional object.

[0035] Alternatively, the 3-dimensional object may be engraved or etched into the liquid storage portion. The 3-dimensional object may also be attached to the liquid storage portion by adhesive or other suitable means.

[0036] According to a sixth aspect of the present invention, there is provided a method for distinguishing between types of liquid storage portion used with an aerosol generating system, the method comprising the steps of: determining an electrical characteristic of an electrical component associated with the liquid storage portion; distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined electrical characteristic of the electrical component associated with the liquid storage portion.

[0037] Preferably, the method further comprises the step of comparing the determined electrical characteristic to a look-up table of electrical characteristics of one or more electrical components, each electrical characteristic associated with an identifier of a liquid storage

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portion. Preferably, the type of liquid storage portion inserted into the aerosol generating system is determined in dependence upon the result of the determination.

[0038] The step of determining the electrical characteristic may comprise the steps of: measuring a current flow through a resistor; measuring a voltage across the resistor; and determining the resistance value of the resistor from the determined voltage and current values.

[0039] The type of liquid storage portion may be determined as a liquid storage portion identifier which is associated with the electrical characteristic stored in the database which corresponds to the determined characteristic value of the electrical component.

[0040] The method may further comprise a step of searching the look-up table or a further look-up table for one or more operational parameters of a heating element which are associated with an electrical characteristic which correspond to the determined characteristic value of the electrical component.

[0041] The method may further comprise the step of energizing the heating element according to one or more of the operational parameters which correspond to the determined characteristic value of the electrical component.

[0042] The method may further comprise the step of energizing the heating element according to one or more of the operational parameters which correspond to the determined characteristic value of the electrical component.

[0043] The method may further comprise the step of energizing the heating element in proportion to the determined characteristic value of the electrical component.

[0044] The step of determining an electrical characteristic of an electrical component may be repeated a plurality of times For example, if the liquid storage portion comprises 4 resistors, then the step of determining the electrical characteristic is repeated 4 times.

[0045] Preferably, a heating element is energized according to one or more of the operational parameters, the value of each operation parameter applied to the heating element being proportional to the determined electrical characteristic of one or the components.

[0046] Preferably, one the characteristic value of one electrical component determines the value of one operational parameter applied to the heating element.

[0047] Preferably, the step of determining the electrical characteristic comprises the steps of: interrogating a chip; receiving a signal from the chip, the signal comprising electrical characteristic data of the chip; and determining the type of liquid storage portion from the received electrical characteristic data.

[0048] The chip may be a radio frequency identification chip which is interrogated by energizing it with a radio-frequency signal. The signal received from the chip may be a radio frequency signal.

[0049] Alternatively, the chip may be an electrically erasable programmable read only memory which is interrogated by wired electrical connection to a processor or controller. The signal may be received from the chip by a wired electrical connection.

[0050] The data may comprise a liquid storage portion identifier and optionally one or more operational parameters of the heating element which the system may use to energize the heating element.

[0051] Preferably, the electrical contacts may be made out of an electrically conductive material with low resistivity, such as copper, silver or gold.

[0052] The electrically conductive means may be an electrically conductive material with low resistivity, such as copper, silver or gold. This minimises energy loss in this portion of the smoking system.

[0053] According to a seventh aspect of the present invention, there is provided a method for distinguishing between types of liquid storage portion used with an aerosol generating system, the method comprising the steps of determining a characteristic of a 3-dimensional object associated with the liquid storage portion distinguishing the liquid storage portion from other liquid storage portions for use with the aerosol generating system based on the determined characteristic of the e3-dimensional object associated with the liquid storage portion (113).

When the liquid storage portion is new, it is filled with a suitable liquid for producing an aerosol. In use, the aerosol generating system uses liquid contained or held within the liquid storage portion to produce the aerosol. The aerosol generating system uses the liquid contained in the liquid storage portion until the liquid storage portion is empty or substantially empty. Therefore, the liquid storage portion may contain some liquid or may be empty so that no liquid is contained within the liquid storage portion.

[0054] In use, when the heater is activated, liquid provided by the liquid storage portion is vaporized by the heater to form a supersaturated vapour. The supersaturated vapour is mixed with and carried in the air flow from the at least one air inlet. During the flow, the vapour condenses to form an aerosol in the chamber, and the aerosol is carried towards the air outlet into the mouth of a user. In this specification, the upstream and downstream relative positions are described in relation to the direction of air flow as it is drawn from the air inlet to the air outlet.

[0055] The liquid may be provided by at least one portion of a capillary wick.

[0056] Alternatively or in addition to a heating element, the aerosol generating system may comprise an atomiser to create the aerosol. The atomiser may include one or more electromechanical elements such as piezoelectric elements. Additionally or alternatively, the atomiser may also include elements that use electrostatic, electromagnetic or pneumatic effects.

[0057] The smoking system according to embodiments of the invention provides a number of advantages.

[0058] The liquid has physical properties, for example a boiling point suitable for use in the smoking system: if the boiling point is too high, the at least one heater will not be able to vaporize liquid in the capillary wick, but, if the boiling point is too low, the liquid may vaporize even

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without the at least one heater being activated. The liquid preferably comprises a tobacco-containing material comprising volatile tobacco flavour compounds which are released from the liquid upon heating. Alternatively, or in addition, the liquid may comprise a non-tobacco material. The liquid may include water, solvents, ethanol, plant extracts and natural or artificial flavours. Preferably, the liquid further comprises an aerosol former. Examples of suitable aerosol formers are glycerine and propylene glycol.

[0059] Further, as known to those skilled in the art, an aerosol is a suspension of solid particles or liquid droplets in a gas, such as air. The aerosol may be a suspension of solid particles and liquid droplets in a gas, such as air.

[0060] In a preferred embodiment of the invention, the smoking system comprises a liquid storage portion. Preferably, the capillary wick is arranged to be in contact with liquid in the liquid storage portion. In that case, in use, liquid is transferred from the liquid storage portion towards the heater by capillary action in the capillary wick. In one embodiment, the capillary wick has a first end and a second end, the first end extending into the liquid storage portion for contact with liquid therein and the at least one heater being arranged to heat liquid in the second end. When the heater is activated, the liquid at the second end of the capillary wick is vaporized by the heater to form the supersaturated vapour.

[0061] Using a capillary wick extending between the liquid and the heater, allows the structure of the system to be relatively simple. The liquid has physical properties, including viscosity, which allow the liquid to be transported through the capillary wick by capillary action caused by surface tension of the liquid.

[0062] The liquid storage portion is preferably a container. Preferably, the liquid storage portion does not include any porous materials, so that there is only a single capillary mechanism, the capillary wick, in the smoking system. This keeps the structure of the smoking system simple and the entire system low-maintenance. Preferably, the container is opaque, thereby limiting degradation of the liquid by light. The liquid storage portion may not be refillable. Thus, when the liquid in the liquid storage portion has been used up, the liquid storage portion is replaced. Alternatively, the liquid storage portion may be refillable. In that case, the liquid storage portion may be replaced after a certain number of refills of the liquid storage portion. Preferably, the liquid storage portion is arranged to hold liquid for a pre-determined number of puffs.

[0063] The capillary wick may have a fibrous or spongy structure. For example, the capillary wick may comprise a plurality of fibres or threads. The fibres or threads may be generally aligned in the longitudinal direction of the smoking system. Alternatively, the capillary wick may comprise sponge-like material formed into a rod shape. The rod shape may extend along the longitudinal direction of the smoking system. The structure of the wick forms a plurality of small bores or tubes, through which the liquid can be transported to the heater, by capillary action. The capillary wick may comprise any suitable material or combination of materials. Examples of suitable materials are ceramic- or graphite-based materials in the form of fibres or sintered powders. The capillary wick may have any suitable capillarity and porosity so as to be used with liquids of different physical properties such as density, viscosity, surface tension and vapour pressure. The capillary properties of the wick, combined with the properties of the liquid, ensure that the wick is always wet in the heating area.

[0064] Preferably, the smoking system comprises an elongate housing and the longitudinal axis of the capillary wick and the longitudinal axis of the housing are substantially parallel.

[0065] The at least one heater may comprise a single heating element. Alternatively, the at least one heater may comprise more than one heating element, for example two, three, four, five, six or more heating elements. The heating element or heating elements may be arranged appropriately so as to most effectively vaporize liquid in the capillary wick.

[0066] The at least one heater preferably comprises an electrical heating element. The at least one heater preferably comprises an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically conductive ceramics such as molybdenum disilicide, carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel-, Constantan-, nickel-, cobalt-, chromium-, aluminium- titanium- zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal® and iron-manganese-aluminium based alloys. Timetal® is a registered trade mark of Titanium Metals Corporation, 1999 Broadway Suite 4300, Denver Colorado. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required.

[0067] The at least one heater may take any suitable form. For example, the at least one heater may take the form of a coiled heating element. For example, the heater may take the form of a wire wound coiled heating element. The coil of wire at least partially surrounds the wick. Other alternatives include a heating wire or filament, for example a Ni-Cr, platinum, tungsten or alloy wire.

[0068] In that embodiment, preferably the wire is a metal wire. Even more preferably, the wire is a metal alloy wire. The coil may extend fully or partially along the length

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of the capillary wick. The coil may extend fully or partially around the circumference of the capillary wick. In a preferred embodiment, the coil is in contact with the capillary wick.

[0069] Alternatively, the at least one heater may take the form of a casing or substrate having different electro-conductive portions, or an electrically resistive metallic tube. Alternatively, the at least one heater may be a disk or end heater or a combination of a disk heater with heating needles or rods. Alternatively, the at least one heater may take the form of a metallic etched foil insulated between two layers of an inert material. In that case, the inert material may comprise Kapton®, all-polyimide or mica foil. Kapton® is a registered trade mark of E.I. du Pont de Nemours and Company, 1007 Market Street, Wilmington, Delaware 19898, United States of America.

[0070] Alternatively, the at least one heater may take the form of a sheet of material, which may be rolled around at least a portion of the capillary wick. Alternatively, the at least one heater may take the form of an etched foil folded around at least a portion of the capillary wick. The etched foil may comprise a metal sheet cut by a laser or by electro-chemical process. The sheet may be made from any suitable material, for example an iron-aluminium based alloy, an iron-manganese-aluminium base alloy or Timetal®. The sheet may be rectangular in shape, or may have a patterned shape which may form a coil-like structure when rolled around the capillary wick.

[0071] The at least one heater may heat the liquid in the capillary wick by means of conduction or convection or conduction and convection. Alternatively, heat from the heater may be conducted to the liquid by means of a heat conductive element. Alternatively, the at least one heater may transfer heat to the incoming ambient air that is drawn through the smoking system during use, which in turn heats the liquid by convection. The ambient air may be heated before passing through the system. Alternatively, the ambient air may be first drawn through the wick and then heated.

[0072] In one embodiment, the aerosol generating system is a smoking system. Preferably, the aerosol generating system or the smoking system is an electrically heated aerosol generating system or electrically heated smoking system. In that embodiment, the smoking system may further comprise an electric power supply. Preferably, the electric power supply comprises a cell contained in a housing. The electric power supply may be a Lithium-ion battery or one of its variants, for example a Lithium-ion polymer battery. Alternatively, the power supply may be a Nickel-metal hydride battery, a Nickel cadmium battery, a Lithium-maganese battery, a Lithium-cobalt battery or a fuel cell. In that case, preferably, the electrically heated smoking system is usable by a smoker until the energy in the power cell is used up. Alternatively, the electric power supply may comprise circuitry chargeable by an external charging portion. In that case, preferably the circuitry, when charged, provides power for a pre-determined number of puffs, after which the circuitry must be reconnected to the external charging portion. An example of suitable circuitry is one or more capacitors or rechargeable batteries.

[0073] If the smoking system is an electrically heated smoking system, the smoking system may further comprise electric circuitry. In one embodiment, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff. The sensor may be an electro-mechanical device. Alternatively, the sensor may be any of: a mechanical device, an optical device, an opto-mechanical device, a micro electro mechanical systems (MEMS) based sensor and an acoustic sensor. In that case, preferably, the electric circuitry is arranged to provide an electric current pulse to the at least one heater when the sensor senses a user taking a puff. Preferably, the time-period of the electric current pulse is pre-set, depending on the amount of liquid desired to be vaporized. The electric circuitry is preferably programmable for this purpose.

[0074] Alternatively, the electric circuitry may comprise a manually operable switch for a user to initiate a puff. The time-period of the electric current pulse is preferably pre-set depending on the amount of liquid desired to be vaporized. The electric circuitry is preferably programmable for this purpose.

[0075] In one embodiment, the at least one air inlet comprises two air inlets. Alternatively, there may be three, four, five or more air inlets. Preferably, if there is more than one air inlet, the air inlets are spaced around the housing. In a preferred embodiment, the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, and the at least one air inlet upstream of the sensor.

[0076] Preferably, the smoking system further comprises a puff indicator for indicating when the at least one heater is activated. In the embodiment in which the electric circuitry comprises a sensor to detect air flow indicative of a user taking a puff, the indicator may be activated when the sensor senses air flow indicative of the user taking a puff. In the embodiment in which the electric circuitry comprises a manually operable switch, the indicator may be activated by the switch.

[0077] The electrically heated smoking system may further comprise an atomiser including the at least one heater. In addition to a heating element, the atomiser may include one or more electromechanical elements such as piezoelectric elements. Additionally or alternatively, the atomiser may also include elements that use electrostatic, electromagnetic or pneumatic effects.

[0078] Preferably, the smoking system comprises a housing. The housing may comprise a shell and a mouthpiece. In that case, all the components may be contained in either the shell or the mouthpiece. In the case of an electrically heated smoking system, preferably, the electric power supply and the electric circuitry are contained in the shell. Preferably, the liquid storage portion, the capillary wick, the at least one heater and the air outlet are contained in the mouthpiece. The at least one air inlet

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may be provided in either the shell or the mouthpiece. Preferably, the mouthpiece is replaceable. Having a shell and a separate mouthpiece provides a number of advantages. Firstly, if the replaceable mouthpiece contains the at least one heater, the liquid storage portion and the wick, all elements which are potentially in contact with the liquid are changed when the mouthpiece is replaced. There will be no cross-contamination in the shell between different mouthpieces, for example ones using different liquids. Also, if the mouthpiece is replaced at suitable intervals, clogging of the heater with liquid is avoided. Preferably, the shell and mouthpiece are arranged to releasably lock together when engaged.

[0079] The housing may comprise any suitable material or combination of materials. Examples of suitable materials include metals, alloys, plastics or composite materials containing one or more of those materials, or thermoplastics that are suitable for food or pharmaceutical applications, for example polypropylene, polyetheretherketone (PEEK) and polyethylene. Preferably, the material is light and non-brittle.

[0080] Preferably, the smoking system is portable. The smoking system may have a size comparable to a conventional cigar or cigarette. The smoking system may have a total length between approximately 30 mm and 130 mm. The smoking system may have an external diameter between approximately 5 mm and approximately 13 mm.

[0081] Features described in relation to one aspect of the invention may also be applicable to another aspect of the invention.

[0082] The invention will be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows an aerosol generator according to an embodiment of the invention having a liquid storage portion;
Figure 2 shows an enlarged portion of the aerosol generator of Figure 1;
Figure 3 shows a detailed sectional view of liquid storage portion embodying the invention;
Figure 4 shows a detailed sectional view of an the aerosol generator of Figure 2 with a liquid storage portion inserted into the aerosol generator;
Figure 5 shows a sectional view of a liquid storage portion embodying the invention;;
Figure 6 is a sectional view of another liquid storage portion embodying the invention;
Figure 7 is a schematic circuit diagram showing the wiring of components of one aerosol generator embodying the invention
Figure 8 is a flow chart of the main steps performed by an embodiment of the invention when detecting the presence of liquid storage portion;
Figure 9 is a flow chart of the mains steps performed by an embodiment of the invention when determining the type of liquid storage portion inserted into the aerosol generating system;
Figure 10 is a schematic circuit diagram showing the wiring of components of another aerosol generator embodying the invention;
Figure 11 is a schematic circuit diagram showing the wiring of components of a further aerosol generator embodying the invention;
Figure 12 is a sectional view of a further liquid storage portion embodying the invention;
Figure 13 is a schematic diagram of selected components of an aerosol generating system embodying the invention in which data is stored on a RFID chip; and
Figure 14 is a schematic diagram of selected components of an aerosol generating system embodying the invention in which data is stored on memory.

[0083] In the drawings, like features are given like reference numbers. Note that Figures 1 to 14 are schematic in nature. In particular, the components shown are not to scale either individually or relative to one another.

[0084] Referring now to Figure 1, this shows one example of an aerosol generating system having a liquid storage portion 113. The aerosol generating system 100 may be a smoking system having a liquid storage portion 113. The aerosol generating system 100 of Figure 1 is an electrically heated aerosol generating system 100 and comprises a housing 101 having a mouthpiece end 103 and a body end 105. In the body end 105, there is provided an electric power supply in the form of a battery 107 and electric circuitry in the form of circuitry 109 and a puff detection system, not shown. In the mouthpiece end 103, there is provided a liquid storage portion or cartridge 113 containing liquid 115, a capillary wick 117 and a heating element in the form of a heating coil 119. A first end of the capillary wick 117 extends into the cartridge 113 and a second end of the capillary wick 117 is at least partially surrounded by the heating coil 119. The heating element 119 may be in close proximity to the capillary wick 117. The heating coil 119 is connected to the electric circuitry via connections 121. The housing 101 also includes an air inlet 123, an air outlet 125 at the mouthpiece end and a chamber in the form of aerosol forming chamber 127.

[0085] In use, operation is as follows. Liquid 115 is transferred by capillary action from the cartridge 113 from one end of the wick 117 which extends from the cartridge to another end of the wick 117 which is surrounded by the heating coil 119. When a user draws on the device at the air outlet 125, ambient air is drawn through air inlet 123. In the arrangement shown in Figure 1, the puff detection system senses a puff and activates the heating coil 119. The battery 107 supplies electrical energy to the heating coil 119 to heat the end of the wick 117 surrounded by the heating coil. The liquid in that end of the wick 117 is vaporized by the heating coil 119 to create a supersaturated vapour. At the same time, the vaporized liquid is replaced by further liquid which is conveyed along

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the wick 117 by capillary action. This process is sometimes referred to as pumping action. The supersaturated vapour created is mixed with and carried in the air flow from the air inlet 123. In the aerosol forming chamber 127, the vapour condenses to form an inhalable aerosol, which is carried towards the outlet 125 and into the mouth of the user.

[0086] In the embodiment shown in Figure 1, the circuitry 109 and the puff detection system are preferably programmable. The circuitry 109 and puff detection system can be used to manage the device operation. This, in conjunction with the physical design of the electrically heated smoking system, can assist with control of the particle size in the aerosol.

[0087] The capillary wick can be made from a variety of porous or capillary materials and preferably has a known, pre-defined capillarity. Examples include ceramic- or graphite-based materials in the form of fibres or sintered powders. Wicks of different porosities can be used to accommodate different liquid physical properties such as density, viscosity, surface tension and vapour pressure. The capillary properties of the wick should be chosen so that the required amount of liquid can be delivered to portion of the wick adjacent to, or in contact with the heating coil.

[0088] Figure 1 shows an example of an aerosol generating system which may be used with the present invention. Many other examples are usable with the invention, however. For example, the aerosol generating system need not be electrically operated. Furthermore, a puff detection system need not be provided. Instead, the system may be manually operated, for example, the user may operate a switch to supply electrical energy to the coil when a puff is taken. The housing may also comprise a separable shell and mouthpiece. The overall shape and size of the housing may also be altered from that shown in Figure 1.

[0089] Referring now to Figure 2, this shows an enlarged portion of the aerosol generating system 100 of Figure 1, with the liquid storage portion 113 removed. Three electrical connectors 211, 213, 215 are provided. The electrical connectors are attached, either directly or indirectly to the housing 101. As explained in further detail below, the electrical connectors provide electrical signals to the liquid storage portion 113. The electrical connectors shown Figure 2 are mounted in a holder 209. This maintains the relative positions of the connectors, although the holder is optional.

[0090] A first electrically conductive element 201 is electrically connected at a first end to a first end of the first electrical connector 211. A second electrically conductive element 203 is electrically connected at a first end to a first end of the second electrical connector 213. A third electrically conductive element 205 is electrically connected at a first end to a first end of the third electrical connector 215. As described in further detail with reference to Figure 7 below, the electrically conductive elements 201, 203, 205 are electrically connected to the electronic circuitry 109, not shown in Figure 2. The electrically conductive elements 201, 203, 205 and electrical connectors 211, 213, 215 allow electrical signals to pass between the circuitry 109 and liquid storage portion 113. Further, the electrically conductive elements 201, 203, 205 are electrically connected to a controller or processor 309 which may be mounted in circuitry 109, not shown in Figure 2, as well as to a power source 107.

[0091] The electrical connectors 211, 213, 215 and electrically conductive elements 201, 203, 205 may be directly mounted on or within the housing 101, without the need for a holder 209.

[0092] Further, the electrical connectors 211, 213, 215 may be directly electrically connected to the controller or processor 309 and power source 107, without the need for electrically conductive elements 201, 203, 205.

[0093] As explained in further detail below, the processor 309 determines whether a liquid storage portion 113 is present in the system 100. The processor 309 may also determine what type of liquid storage portion is present in the system. The controller or processor 309 also controls when electrical power is provided to the coil 119, and this will be explained in further detail below with reference to Figure 7.

[0094] Referring now to Figure 3, this shows a detailed section taken through a liquid storage portion 113 according to an embodiment of the invention. The liquid storage portion 113 comprises first, second and third electrical contacts 221 or 421, 223 or 423, 225 or 425 at a first end of the liquid storage portion. The first, second and third electrical contacts 221 or 421, 223 or 423, 225 or 425 are physically mounted on the liquid storage portion 113. The first electrical contact 221 or 421 is electrically connected to a first end of a first electrically conductive portion 231. The second electrical contact 223 or 423 is electrically connected to a first end of a second electrically conductive portion 233. A second end of the first electrically conductive portion 231 is electrically connected to a first end of the heating element 119. A second end of the second electrically conductive portion 233 is electrically connected to a second end of the heating element 119. The electrical contacts 221 or 421, 223 or 423 and electrically conductive portions 231, 233 allow electrical energy to be supplied to the heating element 119 from a battery or other power source, not shown in Figure 2. The battery or power source 107 is usually mounted on or within the aerosol generating system 100.

[0095] A liquid storage portion identification subsystem 229 is mounted on or within the liquid storage portion 113. The subsystem may be mounted on the exterior of the liquid storage portion 113 to keep the subsystem and liquid contained within the liquid storage portion 113 separate. The subsystem 229 allows the aerosol generating system 100 to detect when a liquid storage portion 113 is present in the housing 101 of the aerosol generating system 100. Further, the subsystem 229 also allows the aerosol generating system 100 to distinguish between different types of liquid storage portions 113 inserted into

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the aerosol generating system 100. The subsystem 229 is described in further detail below.

[0096] The subsystem 229 is electrically connected to a first end of a third electrically conductive portion 235. The second end of the third electrically conductive portion 235 is electrically connected to a third electrical contact 225, 425 on the liquid storage portion 113.

[0097] The subsystem 229 is also electrically connected to the electrically conductive portion 231 with a fourth electrically conductive portion 230, and the purpose of this connection is described below with reference to Figure 7 below.

[0098] The electrically conductive portions 201, 203, 205, 230, 231, 233, 235, may be electrically conductive wire, such as a metallic wire, for example copper wire. Further, the electrically conductive portion may be a conductor of low resistivity, such as copper, or silver, or gold.

[0099] In the embodiment shown in Figure 3, there are 3 electrical contacts 221, 223, 225, mounted on the liquid storage portion. Further, as previously described, 3 electrical contacts 211, 213, 215, are also provided on the aerosol generating system 100. The electrical contacts 211, 213, 215, 221, 223, 225 may be made out of an electrical conductor. The conductor may have a low resistivity. The conductor may be copper, silver or gold.

[0100] When a liquid storage portion is inserted into the aerosol generating system, electrical contacts 221, 223 on the liquid storage portion and two electrical contacts 211, 213 on the aerosol generating system 100 allow electrical energy to be transmitted to the heating element 119. Further, an electrical contact 225 on the liquid storage portion 113 and an electrical contact 215 on the aerosol generating system 100 allow electrical signals to be exchanged between the liquid storage portion 113 and the aerosol generating system 100. This allows a controller 309, not shown in Figure 2, to detect whether a liquid storage portion 113 has been inserted into the aerosol generating system 100. It also allows the controller 309 to distinguish between different types of liquid storage portions 113. This is described in further detail below.

[0101] Figure 4 shows the liquid storage portion 113 of Figure 3 inserted into the aerosol generating system 100 of Figure 2. The electrical contacts 221 or 421, 223 or 423, 225 or 425, on the liquid storage portion 113 are arranged so that they contact corresponding electrical contacts 211, 213, 215, on the aerosol generating system 100 when the liquid storage portion 113 is inserted into the aerosol generating system 100. Furthermore, the cartridge or liquid storage portion 113 shown in Figure 4 is contained within the housing 101 of the aerosol generating system 100, however other configurations in which the liquid storage portion 113 is not contained within the housing 101 are possible. In the embodiment shown in Figure 4, the liquid storage portion 113 is replaceable.

[0102] As previously described, the electrical contacts 211, 213, 215 are attached to the aerosol generating system 100 to prevent relative movement of the housing 101 and the electrical contacts 211, 213, 215. Further, the electrical contacts 221, 223, 225 are attached to the to the liquid storage portion 113. When the liquid storage portion 113 is removed from the aerosol generating system 100, for example by pulling the liquid storage portion 113 and housing 101 in substantially opposite directions such that the liquid storage portion 113 moves away from the aerosol generating system 100, the electrical connection between contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 and the electrical contacts 211, 213, 215 on the aerosol generating system is broken. Conversely, when the liquid storage portion 113 is inserted in to the aerosol generating system 100, for example by pushing the liquid storage portion 113 and housing 101 in substantially opposite directions such that the liquid storage portion 113 moves towards the aerosol generating system 100, the electrical connection between contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 and the electrical contacts 211, 213, 215 on the aerosol generating system 100 is made. Therefore, the electrical connection between the liquid storage portion 113 and the aerosol generating is only made when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0103] The liquid storage portion 113, wick 117, heating element 119, contacts 221, 223, 225, 421, 423, 425 and electrically conductive portions 230, 231, 233, 235, and subsystem 229 may form a single unit which is disposable. The unit may also be replaceable.

[0104] Figures 5 and 6 show two alternative arrangements of the electrical contacts 221, 223, 225, 421, 423, 425 on the liquid storage portion 113.

[0105] In one embodiment shown in Figure 5, the electrical contacts 221, 223, 225 on the liquid storage portion are arranged in a row or substantially straight line. Figure 5 is a section through line 1-1 in Figure 4 of the drawings.

[0106] Figure 5 shows that the two electrical contacts 221, 223 which are furthest away from the longitudinal axis of symmetry of the liquid storage portion, shown by a dot marked 2 in Figure 5, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contact 225 which is closest to the longitudinal axis of symmetry of the aerosol generating system is the electrical contact which provides the electrical signals to the liquid storage portion recognition subsystem 229.

[0107] The electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion 113, shown in Figure 5. Therefore, the corresponding electrical contacts 211, 213, 215 on the aerosol generating system 100 are also arranged in a row or substantially straight line. In this embodiment, each electrical contact 211, 213, 215 is equidistant from its neighbouring contact.

[0108] Further, the two electrical contacts 211, 213 on the aerosol generating system 100 which are furthest away from the longitudinal axis of symmetry of the aer-

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osol generating system 100, shown by a dotted line marked 2-2 in Figure 4, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contact 215 which is closest to the longitudinal axis of symmetry of the aerosol generating system 100 is the electrical contact which provides the electrical signals to the liquid storage portion recognition subsystem 209.

[0109] In a further embodiment, the position of the electrical contacts 421, 423, 425 on the liquid storage portion 113 are in the form of a substantially triangular lattice. The upper two contacts 421, 423 shown in Figure 6 are electrical contacts which transmit electrical energy to the heating element 119, while the lower contact 425 transmits the electrical signals to the liquid storage portion recognition subsystem 229. In this embodiment, the spacing of the centre of each contact 421, 423, 425, from the central axis of symmetry, shown by the dot marked 3 in Figure 6, may be equal to each other or equidistant.

[0110] In this embodiment, the electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion 113 shown in Figure 6. The position of the electrical contacts 211, 213, 215 mounted on the aerosol generating system are also in the form of a substantially triangular lattice. The contacts 211, 213 shown in Figure 4 which are furthest away from the longitudinal axis of symmetry shown by the dotted line marked 2-2 in Figure 4 are electrical contacts which transmit electrical energy to the heating element 119, while the contact 215 closest to the longitudinal axis of symmetry shown by the dotted line marked 2-2 transmits the electrical signals to the liquid storage portion recognition subsystem 229. In this embodiment, the spacing of the centre of each contact 211, 213, 215 from the central axis of symmetry, shown by the dashed line shown 2-2 in Figure 4 may be equal to each other or equidistant.

[0111] Figure 7 shows an electrical circuit diagram of an embodiment of the invention. In Figure 7, the electrical contacts 211, 213, 215, 221, 223, 225, 421, 423, 425, also shown in Figures 2 to 6 are represented by solid dark circles.

[0112] Further, the components enclosed by the dashed line enclosure shown in Figure 7 are components which are located on or in the liquid storage portion 113. The components located outside the dashed line enclosure are components which are located on or in the aerosol generating system 100. Therefore, Figure 7 shows the situation where a liquid storage portion is inserted 113 aerosol generating system 100.

[0113] Therefore, the components within the enclosure may be replaced each time a liquid storage portion 113 is removed from the aerosol generating system 100 and replaced with a new liquid storage portion 113. The components outside the dashed line, as well as the aerosol generating system 100 itself may be reused a number of times with replacement liquid storage portions 113.

[0114] The electrical circuitry of Figure 7 may be divided into 2 separate parts, each of which has a separate function which may be used on its own or in conjunction with one or more of the other parts or other embodiments of the invention.

[0115] One part of the electrical circuitry is a liquid storage portion identification part, and this part comprises two electrical resistors, 504 and 505. Although the resistors 504, 505 shown in Figure 7 are connected in series, other configurations are possible, such as parallel connection. Alternatively, a single electrical resistor may be used.

[0116] In addition, embodiments of the invention may also use one or more other electrical components such as one or more capacitors, one or more inductors, one or more diodes or one or more transistors and the like, alternatively or in addition to the resistors 504, 505. This is described in further detail with reference to Figures 10 and 11 below.

[0117] In Figure 7, a first terminal of a first resistor 504 is electrically connected to a first terminal of the power source V+ via electrical contacts 211, 221, 421. A second terminal of a first resistor 504 is electrically connected to a first terminal of a second resistor 505. The second resistor 505 is electrically connected in series with the first resistor 504. A second terminal of the second resistor 505 is connected to a controller or processor 309 via electrical contacts 215, 225, 425.

[0118] When the liquid storage portion is inserted in to the aerosol generating system, the electrical contacts 221 or 421, 223 or 423, 225 or 425 on the liquid storage portion 113 come in to physical contact with the electrical contacts 211, 213, 215 on the aerosol generating system 100. The controller or processor 309 then detects that an electrical circuit has been made because an electrical current can flow through resistors 504, 505. This is because an electrical circuit is made between one terminal of the battery via the resistors 504, 505, and through the controller to the other terminal of the battery which is also connected to the controller. The controller 309 is also electrically connected to a negative terminal, V- of a battery or other power source via an electrically conductive element to complete the electrical circuit.

[0119] The detailed steps performed by an embodiment of the invention to detect the presence of a liquid storage portion 113 are shown in Figure 8.

[0120] At step 601, the aerosol generating device is switched on. At step 603, the controller applies a voltage or potential difference across contacts 211 and 215. Because the resistors 504, 505 are electrically connected to the contacts 225, 425 and contacts 221, 421, the same voltage is also applied across the resistors 504 and 505 assuming that the voltage drop across the contacts is negligible.

[0121] At step 605, the controller measures the current flow, if any, flowing through the resistors. At step 607, the controller determines whether the current is greater than a predetermined threshold current. If the measured

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current is greater than a predetermined value, then the controller determines that a liquid storage portion is present, and allows the heater to be energised at step 609.

[0122] By detecting this current, the processor determines that a liquid storage portion 113 has been inserted into the aerosol generating system 100. This is advantageous since the aerosol generating system 100 may be de-activated or switched of unless a liquid storage portion is inserted into the aerosol generating system 100. This saves power and also increases the safety of the system.

[0123] Preferably, the aerosol generating system 100 further comprises a puff detector, although this is not shown in Figure 7. The puff detector may be electrically connected to the controller such that the puff detector feeds an electrical signal into the processor or controller 309 which is indicative of when a user takes a puff. The controller 309 may be arranged to only energise the heater if a puff is detected and if the current flow through the resistors 504, 505 is greater than a predetermined threshold current.

[0124] Alternatively, the system may be manually operated. For example, the user may operate a switch to supply electrical energy to the heating element 119 when a puff is taken. In this case, the controller 309 may be arranged to only energise the heater if the user closes a switch and if the current flow through the resistors 504, 505 is greater than a predetermined threshold current.

[0125] In one embodiment, the controller 309 is able to distinguish between different liquid storage portions 113 inserted in to the aerosol generating system 100.

[0126] As will be known to those skilled in the art, the voltage drop V across a resistor of resistance R is proportional to the product of the resistance R and the current *I* flowing through the resistor. By measuring the magnitude or size of the electrical current passing through the resistors 504, 505 for a given potential difference applied across these resistors, the controller 309 is able to determine the value of the sum of the resistances 504, 505 using the relationship $R = V/I$. The detailed steps performed by an embodiment of the invention in determining the type of liquid storage portion 113 are shown in Figure 9. Steps 601, 603, and 605 are the same as those described with reference to Figure 8, and so will not be described again.

[0127] At step 707, the controller 309 uses the value of the potential difference applied across the resistors 504 and 505 as well as the measured current flowing through the resistors 504 and 505 to determine the value of the sum of the resistances 504, 505, as previously described.

[0128] Having determined the value of the sum of the resistors associated with the liquid storage portion, the controller 309 determines the liquid storage portion type from the determined resistance value by searching a look-up table using the determined resistance value.

[0129] The look-up table may comprise one or more different resistance values, each resistance value associated with an identifier of a liquid storage portion 113 which can be used with the aerosol generating system. The identifier may be indicative of the type of liquid 115 contained within the liquid storage portion 113.

[0130] The controller 309 determines the type of liquid storage portion 113 as the liquid storage portion identifier stored in the look-up table which is associated with the resistance value stored in the look-up table which is closest in value to the liquid storage portion resistance value determined by the controller 309, at step 709. The look-up table may be stored in a read only memory (ROM) incorporated into the processor or may be stored in a separate memory store.

[0131] Therefore the controller 309 is able to distinguish between different types of liquid storage portion 113 inserted into the aerosol generating system 100 in dependence on the determined electrical characteristic or value of the electrical component associated with the liquid storage portion 113.

[0132] Preferably, the look-up table may further comprise data representing one or more resistance values, each resistance value further associated with parameters representing a different energy profile to be applied to the heating element 119. Each resistance value is associated with a different liquid storage portion 113 identifier. This means that the aerosol generating system 100 can be configured to deliver a constant amount, for example volume or mass of aerosol to the user even when liquid storage portions 113 containing different liquids are inserted into the aerosol generating system 100.

[0133] For example, a particular liquid contained within one liquid storage portion 113 may require more energy to vaporise it than a different liquid contained within another liquid storage portion 113. By associating a resistance value or a particular liquid storage portion identifier with a heating profile stored in a look-up table, a constant amount of aerosol can be delivered to the user independent of the type of liquid stored in the liquid storage portion 113.

[0134] The controller may perform this additional optional step, shown as step 711 in Figure 9.

[0135] At step 713, the controller then applies a particular energy profile to heater 119 in dependence on the determined liquid storage portion type or identifier or independence on the determined characteristic resistance value. For example, the resistance values stored in the look-up table may be associated with an optimal voltage and current required by the heating coil to deliver to the user a particular quantity of aerosol for a particular liquid formula. In one embodiment, the liquid may comprise nicotine. The heat of vaporization of this particular liquid formula is different to the heat of vaporization required to vaporize a liquid not containing nicotine.

[0136] Therefore, the value of one or more electrical components associated with each liquid storage portion allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the

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controller 309 to deliver the appropriate heating profile to the heating element 119 based on the values stored in the look-up table which are associated with a particular value of electrical component.

[0137] The second portion of the electrical circuitry shown in Figure 7 is a heater circuit part, and this also shows the case when the liquid storage portion 113 is inserted into the aerosol generating system 100. The heater circuit comprises the heating element 119, one end of which is electrically connected via contacts 211 or 221, 421 to one terminal V+ of the power source. The other end of the heating element 119is electrically connected via contacts 213 or 223, 423 to a terminal of a transistor 555 or other switch having three terminals. The collector terminal of transistor 555 may be connected to the heating element, although other configurations are possible. The base terminal of the transistor 555 is electrically connected to the controller 309, while the emitter terminal of the transistor is electrically connected to the other V- terminal of the power source.

[0138] The energy supplied to the heating element 119 is controlled by the current being applied by the controller 309 to the base terminal of the transistor 555. This controls the amount of current flowing from one terminal of the battery via terminals 211 or 221, 421 through the heating coil 119 and through the collector and emitter terminals of transistor 555 via terminals 213 or 223, 423, to the other terminal of the battery.

[0139] In the electrical circuitry shown in Figure 7, one of the terminals of the battery may be a positive electrical voltage, V+, while the other terminal may be a negative electrical voltage, V-. However, this need not be the case, and it is sufficient for there to be a potential difference between the two battery terminals. Alternatively, the battery may be any current source such as a capacitor or other power supply.

[0140] Figure 10 shows an electrical circuit diagram of an aerosol generating system 100 according an alternative embodiment of the invention. In this embodiment, features in common with the embodiment shown in Figure 5, have been given like reference numerals. For the sake of clarity, the heating element 119 and transistor 555 have not been included in the circuit diagram of Figure 10. Once again, the features enclosed within the dashed line are components which are located on or within the liquid storage portion part 113. Figure 10 also shows the case when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0141] The embodiment shown in Figure 10 has 2 electrical contacts 221, 225 or 421, 425 located on or in the liquid storage portion part 113. A resistor 804 or other electrical component is mounted on or in the liquid storage portion 113. A first terminal of resistor 804 is electrically connected to electrical contact 225, 425 on the liquid storage portion 113. A second terminal of resistor 804 is electrically connected to contact 221, 421 on the liquid storage portion 113. As shown in Figure 10, when the liquid storage portion 113 is inserted into the aerosol generating system 100, electrical contact 221 or 421 comes in to contact with electrical contact 211 mounted on the aerosol generating system. Similarly, electrical contact 225 or 425 comes in to contact with electrical contact 215 when the liquid storage portion 113 is inserted into the aerosol generating system 100.

[0142] The electrical contacts 211, 215, 221, 225, 421, 425 allow electrical signals to pass between the liquid storage portion 113 and the rest of the aerosol generating system 100, whilst also allowing the liquid storage portion 113 to be removed and replaced with a new liquid storage portion 113, once the liquid within the storage portion 113 has been depleted.

[0143] One electrical contact 211 on the aerosol generating system 100 is electrically connected by an electrically conductive wire or other conductive means to a positive terminal of a battery or power supply means, V+. This electrical contact 211 is also electrically connected to one input of the micro controller, 309.

[0144] Further, electrical contact 215 is mounted on or in the aerosol generating system 100 and is connected by an electrically conductive means such as a wire to a first terminal of a resistor, 834. The electrical contact 215 is also electrically connected to an input of a micro controller 309, such as an analogue to digital converter input of a micro controller 309, via an amplifier 806.

[0145] A second terminal of resistor 834 is electrically connected to a first terminal of a transistor 855. A second terminal of transistor 855 is electrically connected to a digital output of micro controller 309. A third terminal of transistor 855 is electrically connected to a negative terminal V- of a power supply, battery, capacitor or other means for supplying electrical energy 107. Finally, the micro controller 309 is also electrically connected to the negative terminal V-of the power supply by an electrically conductive means.

[0146] The amplifier 806 is used to amplify the signal of the voltage across resistor 834 of value R734, V834, if this voltage amplitude is sufficiently small. Therefore, the value *R804* of resistor 804 may be determined from the values of V+ and voltage across resistor 834, V834, according to the following equation, provided the value R834 of resistor 834 and the gain, A, of the amplifier are known:

$$R804 = R834(A\frac{V+}{VADC} - 1)$$

where VADC is the voltage at the ADC input of the micro controller 309. VADC is equal to the voltage V834 multiplied by the gain of the amplifier, A.

[0147] In use, the aerosol generating system according to this embodiment performs the following steps to determine the identifier or type of liquid storage portion 113. First, when the aerosol generating system power is switched on, the digital output of the micro controller 309

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is set to a high level. The transistor 855, which may be a complimentary metal oxide semiconductor (CMOS) transistor is activated which makes electrical current flow through resistors 804 and 832.

[0148] In some applications, the voltage amplitude of voltage V834 is sufficiently large that an amplifier 806 is not needed. In this case, the value of resistor R804 may be determined from the values of the V+ and the voltage, V834, across resistor 834 is known according to the following equation:

$$R804 = R834(\frac{V+}{V834} - 1)$$

[0149] Then, in both cases, the voltage across resistor 834 is input into an analog to digital conversion input of the microcontroller 309. The controller determines the value *R804* of resistor 804 using one of the above equations. Then, the thus determined resistance value is then compared to a set of resistance values stored in a memory such as a read only memory. The microcontroller 309 then determines if the determined resistance value corresponds to or matches a resistance value located in a memory space of the memory. If the values match, then a stored heating element profile, which is associated with the resistance value in the memory matching the determined resistance value is used to energize the heating element 119.

[0150] In other words, the aerosol generating system 100 determines the value R804 of resistor 804. It then compares this value to a database of resistor values. Each resistor value is associated with a different heating profile. The processor then selects the heating profile associated with the resistor value in the database which corresponds to, or matches the determined value of resistor 804. The heating profile may be defined by a number of different operational parameters for the heating element.

[0151] Figure 11 shows an electrical circuit diagram of an aerosol generating system 100 according yet a further embodiment of the invention. This diagram shows the case when a liquid storage portion 113 is inserted into the aerosol generating system 100.

[0152] In this embodiment, 4 separate resistors 904, 905, 906, 907 or other electrical components are located on or in the liquid storage portion 113. A first terminal of each resistor is electrically connected to electrical contact 921. When the liquid storage portion according to this embodiment is inserted into the aerosol generating system 100, electrical contact 921 comes into electrical contact with a contact 911 mounted on or in the aerosol generating system 100. Contact 911 is electrically connected both to a positive voltage V+ of a power supply means 107 and to a micro controller 309.

[0153] A second terminal of each resistor 904, 905, 906, 907 is electrically connected to connectors 924, 925, 926, 927. Each second terminal of each resistor is electrically connected to one of the connectors 924, 925, 926, 927. Each second terminal of each resistor 904, 905, 906, 907 is electrically connected to a different connector 924, 925, 926, 927. That is to say, each second terminal of each resistor 904, 905, 906, 907 is electrically connected only to one of the connectors 924, 925, 926, 927.

[0154] Further, four electrical contacts 914, 915, 916, 917 are provided on the aerosol generating system 100 embodying the circuit diagram of Figure 11. Four resistors 934 935, 936, 937, are provided in the circuitry. A first terminal of each of the resistors 934, 935, 936, 937 on the aerosol generating system is electrically connected to connectors 914, 915, 916, 917 on the aerosol generating system. Each first terminal of each resistor 934, 935, 936, 937 is electrically connected to one of the connectors 914, 915, 916, 917. Each first terminal of each resistor 934, 935, 936, 937 is electrically connected to a different connector 914, 915, 916, 917 on the aerosol generating system 100. That is to say, each first terminal of each resistor 934, 935, 936, 937 is electrically connected to only one of the connectors 914, 915, 916, 917.

[0155] Further, each first terminal of each resistor 934, 935, 936, 937 is separately electrically connected to a controller 309.

[0156] Each second terminal of each resistor 934, 935, 936, 937 is electrically connected to one terminal of transistor or switch 955 having 3 terminals. Each second resistor terminal is connected to the same transistor terminal. A second terminal of transistor 955 is electrically connected to a digital output of controller 309. A third terminal of transistor 955 is electrically connected to a negative voltage supply V-. The controller 309 is also electrically connected to the negative voltage supply V-.

[0157] When the liquid storage portion according to this embodiment is inserted into an aerosol generation system, electrical contact is made between connector 924 on the liquid storage portion 113 and connector 914 on the aerosol generating system 100. Similarly, electrical contact is made between connector 925 on the liquid storage portion 113 and connector 915 on the aerosol generating system 100, while electrical contact is made between connector 926 on the liquid storage portion and connector 916 on the aerosol generating system, and electrical contact is made between connector 927 on the liquid storage portion 113 and connector 917 on the aerosol generating system 100.

[0158] As previously described with reference to Figure 10 above, the value of the resistors 904, 905, 906, 907 can be determined using the following equation:

$$R90X = R93X(\frac{V+}{VR93X} - 1)$$

Where X = 4, 5, 6, 7.

[0159] The processor 309 determines the value of

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each of the resistors 904, 905, 906, 907 using this equation, in a similar manner as previously described with reference to Figure 10. For example, the controller may determine that the resistors (904, 905, 906, 907) have values of (1kΩ, 2kΩ, 5kΩ, 10kΩ). This is referred to a resistor network code of (1, 2, 5, 10). With this configuration, the resistor network code is used to deliver a heating profile and the consumable type to the microcontroller. Therefore it does not require comparing the determined resistor values to stored resistor values associated with a heating profile.

[0160] The analog signals present at the analog to digital conversion ports are directly used to generate the heating profile. In this way the determined value of each of the resistors 904, 905, 906, 907 is used as a direct input to calculate the appropriate heating profile characteristics. The heating profile may be defined by a number of different operational parameters for the heating element. For example, the processor 309 uses the determined value of each resistor 904, 905, 906, 907 to directly calculate the value of each operational parameter which the processor applies to the heating element. This has the advantage that a look-up table is not required to determine what heating profile should be applied to a particular liquid storage portion since the processor 309 determines the values to be applied to the heating element based on the determined resistor values.

[0161] Figure 12 shows a liquid storage portion 113 according to the embodiment of the invention described with reference to Figure 11.

[0162] In this embodiment, the electrical contacts 921, 923, 924, 925, 926, 927 on the liquid storage portion 113 are arranged in a substantially rectangular or square lattice.

[0163] Figure 12 shows that the two electrical contacts 921, 923 which are closest to the central longitudinal axis of symmetry of the liquid storage portion, shown by a dot marked 12 in Figure 12, are the electrical contacts which provide electrical energy to the heating element 119. The electrical contacts 924, 925, 926, 927, which are furthest away from the longitudinal axis of symmetry of the aerosol generating system 100 are the electrical contacts which provides the electrical signals to the liquid storage portion recognition subsystem 229.

[0164] In this embodiment, the electrical contacts mounted on the aerosol generating system are arranged in a similar arrangement to the electrical contacts mounted on the liquid storage portion, shown in Figure 12, and so will not be described again in further detail.

[0165] Figure 13 is a schematic diagram of selected components of a further aerosol generating system embodying the invention.

[0166] A radio frequency identification (RFID) chip 1301 is located on or within the liquid storage portion. The chip may comprise an antenna 1307 electrically coupled to the chip. The chip 1301 and antenna 1307 may be incorporated into a single tag which may be applied by adhesive or other means to the liquid storage portion. The chip contains a flash memory or an Electrically Erasable Programmable Read Only Memory (EEPROM) in which data such as one or more of a liquid former identification i.e. the liquid contained within the liquid storage portion 113, a cartridge serial number, and a heating profile for the liquid former.

[0167] The aerosol generating system according to this embodiment comprises an interrogator 1303 and an antenna 1305 electrically coupled to the interrogator. The interrogator 1303 and antenna 1305 may be integrated into a single processor 309 for controlling operation of the aerosol generating system 100. Alternatively the interrogator 1303 and antenna 1305 may be separate from the processor 309.

[0168] When the aerosol generating system 100 is switched on, the interrogator 1303, located on or within the aerosol generating system 100 energizes the RFID chip 1301 via antenna 1307 with a radio frequency (RF) signal emitted from the antenna 1305.

[0169] The data from the chip are then transmitted by frequency modulation emitted from the antenna 1307 located on the chip 1301 to the interrogator 1303 via the antenna 1305.

[0170] If the interrogator 1303 receives data, then the data may be stored in a memory.

[0171] The data received from the chip 1301 may comprise a liquid storage portion identifier and optionally one or more operational parameters of the heating element which the system may use to energize the heating element, or an identifier of the type of liquid contained within the liquid storage portion. The liquid storage portion identifier may be a unique identifier.

[0172] In use, the controller 309 may examine the data to determine the liquid storage portion type being used with the aerosol generating system. Therefore, the controller can distinguish between different liquid storage portions.

[0173] The controller 309 may apply a particular energy profile to heater 119 in dependence on the determined liquid storage portion type or identifier. For example, the data received by the system 100 may be optimal heating element operating parameters to deliver to the user a particular quantity of aerosol for a particular liquid formula. For example, in one embodiment, the liquid may comprise nicotine. The heat of vaporization of this particular liquid formula is different to the heat of vaporization required to vaporize a liquid not containing nicotine.

[0174] Therefore, the data encoded in a chip 1301 associated with each liquid storage portion 113 allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profile to the heating element 119 based on the data received from the chip associated with each liquid storage portion 113.

[0175] Figure 14 shows a schematic diagram of selected components of an aerosol generating system 100 embodying the invention. Data such as data identifying

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a liquid storage portion 113 is stored on a memory on or in the liquid storage portion.

[0176] In the embodiment shown in Figure 14, data is transferred between a controller 309 and memory 1401 using an 12C bus although other data transmission protocols are possible.

[0177] The memory 1401 is powered by electrically connecting the memory 1401 with an electrically conductive portion to one terminal of a power supply, such as a positive voltage, V+.The memory is also electrically connected with an electrically conductive portion to another terminal of a power supply, such as a negative voltage, V-.

[0178] The memory is also electrically connected to the controller 309 via a clock line, SCL, so synchronise data transfer over the data line. The memory is further electrically connected to the controller 309 via a data line, SDA, which allows data to be transferred between the memory 1401 and the controller 309.

[0179] The data stored on the memory 1401 may comprise information enabling the system 100 to distinguish between different liquid storage portions. The data may comprise operational parameters for the heating element of the smoking system which have been optimised for the particular liquid contained within the liquid storage portion 113. The data is encoded on a Programmable Read Only Memory or Flash Memory located on or in the liquid storage portion.

[0180] The data for a particular liquid storage portion, such as a heating profile, product identification or liquid storage portion identifier are stored in a flash or Erasable Programmable Read Only Memory (EPROM) memory 1401 located on or within the liquid storage portion 1301

[0181] When the aerosol generating system is switched on, the microcontroller 309 interrogates the memory 1401 via a serial communication bus using an 12C communication protocol or another serial data transfer protocol. If the data stored in cartridge present the correct format or the correct information is present, the data stored in the memory will then further be used when the aerosol generating device is used.

[0182] This embodiment has the advantage that only 2 physical connections with the device, shown as solid dark circles in figure 14, in addition to the two power connections shown in solid dark circles in Figure 14 are required for supplying electrical power to the memory 1401.

[0183] Therefore, the data encoded in the memory 1401 associated with each liquid storage portion allows the controller 309 to receive data from the memory 1401 and determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profile to the heating element 119 based on the data received from the memory 1401 associated with each liquid storage portion. The heating profile may be defined by a number of different operational parameters for the heating element.

[0184] In a further embodiment, not shown in the drawings, a 3-dimensional shape including one or more bumps, protuberances, hollows, or furrows may be formed in the liquid storage portion, or attached to the exterior or other surface of the liquid storage portion 113.

[0185] The aerosol generating system 100 includes one or more switches which are engaged by the 3-dimensional shape comprising one or more bumps on the liquid storage portion.

[0186] In this way, the particular position on the liquid storage of the bumps, protuberances, hollows, or furrows or hollows may determine whether one or more of the switches is activated.

[0187] The position of the bumps or hollows on the liquid storage portion therefore allows information about the liquid storage portion to be encoded into or onto the liquid storage portion in the form of a 3-dimensional shape. Therefore, the 3-dimentionsal shape associated with each liquid storage portion allows the controller 309 to determine the liquid storage portion identifier, and hence the type of liquid contained within the liquid storage portion 113. It also allows the controller 309 to deliver the appropriate heating profiled to the heating element based on the date decoded from the shape associated with each liquid storage portion 113.

[0188] A number of embodiments have been described and it should be understood that features described in relation to one embodiment may also apply to another embodiment, where appropriate. The scope of the present invention is defined with reference to the following claims.

Claims

1. A liquid storage portion (113) comprising an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) for distinguishing the storage portion (113) from other liquid storage portions, the liquid storage portion (113) being configured for use in an aerosol generating system (100) having means for determining (309) an electrical characteristic of the electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) and means for distinguishing (309) the liquid storage portion from other liquid storage portions based on the determined electrical characteristic of the electrical component.

2. A liquid storage portion (113) according to claim 1 further comprising one or more further electrical components (505, 905, 906, 907) the components preferably being connected in series or parallel with each other.

3. A liquid storage portion (113) according to any preceding claim in which the electrical component or components comprises one or more resistors (504, 505, 804, 904, 905, 906, 907) or one or more radio frequency identification microchips (1301) or one or

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more microchip memories (1401).

4. A liquid storage portion (113) according to any preceding claim further comprising one or more electrical contacts (221, 223, 225, 421, 423, 425, 921, 923, 924, 925, 926, 927) for electrical connection to one or more of the electrical component or components (504, 505, 804, 904, 905, 906, 907, 1301, 1401).

5. A liquid storage portion (113) according to claim 4 in which the electrical contacts (221, 223, 225, 421, 423, 425, 921, 923, 925, 926, 927) are arranged in a substantially straight line or in a substantially triangular array or in a substantially square array or a substantially rectangular array.

6. A liquid storage portion (113) according to any preceding claim further comprising a heating element (119), the heating element (119) preferably being integral to the liquid storage portion (113).

7. An aerosol generating system (100) for receiving a liquid storage portion (113) configured for use with the aerosol generating system (100), the system comprising:

means for determining (309) an electrical characteristic of an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) associated with the liquid storage portion (113); and
means for distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined electrical characteristic of the electrical component associated with the liquid storage portion (113).

8. An aerosol generating system according to claim 7 further comprising transmission means (201, 203, 205, 211, 213, 215, 221, 421, 223, 423, 224, 425, 230, 235, 1305,1307) arranged to transmit signals between the determining means (309) and the electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401).

9. An aerosol generating system (100) according to claim 8 in which the determining means (309) further comprises one or more further electrical components (834, 934, 935, 936, 937).

10. An aerosol generating system (100) according to any one of claims 7 to 9 further comprising a memory for storing a look-up table, the look-up table comprising data representing one or more electrical characteristics of one or more electrical components, each electrical characteristic associated with data identifying a liquid storage portion (113).

11. An aerosol generating system (100) according to claim 10 further comprising a means (309) for searching the look-up table.

12. A liquid storage portion (113) comprising a 3-dimensional object for distinguishing the storage portion (113) from other liquid storage portions, the liquid storage portion (113) being configured for use in an aerosol generating system (100) having means for determining (309) a characteristic of the 3-dimensional object and means for distinguishing (309) the liquid storage portion from other liquid storage portions based on the determined characteristic of the 3-dimensional object.

13. An aerosol generating system (100) for receiving a liquid storage portion configured for use with the aerosol generating system (100), the system comprising:

means for determining (309) a characteristic of a 3-dimensional object associated with the liquid storage portion (113); and
means for distinguishing (309) the liquid storage portion (113) from other liquid storage portions for use with the aerosol generating system (100) based on the determined characteristic of the 3-dimensinoal object associated with the liquid storage portion (113).

14. A method for distinguishing between types of liquid storage portion used with an aerosol generating system (100), the method comprising the steps of:

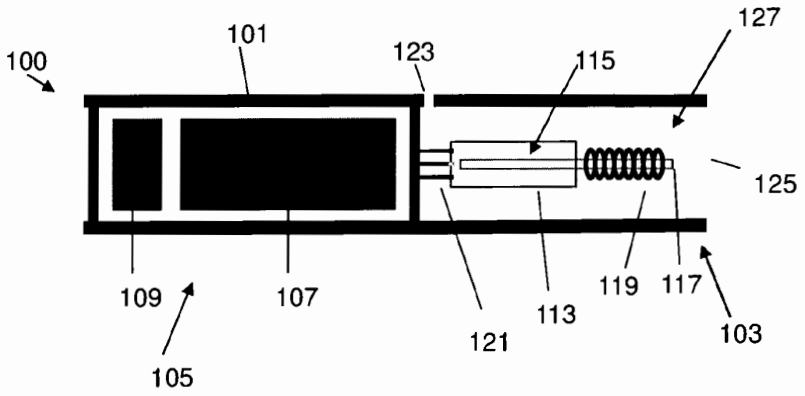
determining (309) an electrical characteristic of an electrical component (504, 505, 804, 904, 905, 906, 907, 1301, 1401) associated with the liquid storage portion (113);
distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined electrical characteristic of the electrical component associated with the liquid storage portion (113).

15. A method for distinguishing between types of liquid storage portion used with an aerosol generating system (100), the method comprising the steps of:

determining (309) a characteristic of a 3-dimensional object associated with the liquid storage portion (113);
distinguishing (309) the liquid storage portion (114) from other liquid storage portions for use with the aerosol generating system (100) based on the determined characteristic of the e3-dimensional object associated with the liquid storage portion (113).

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Figure 1



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Figure 2

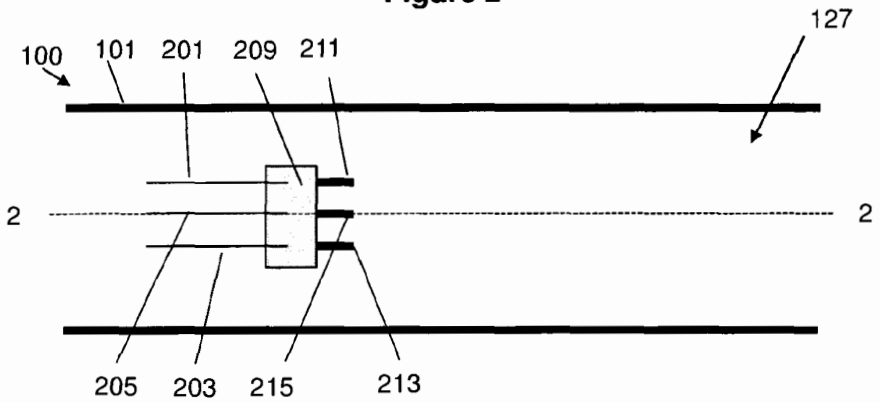
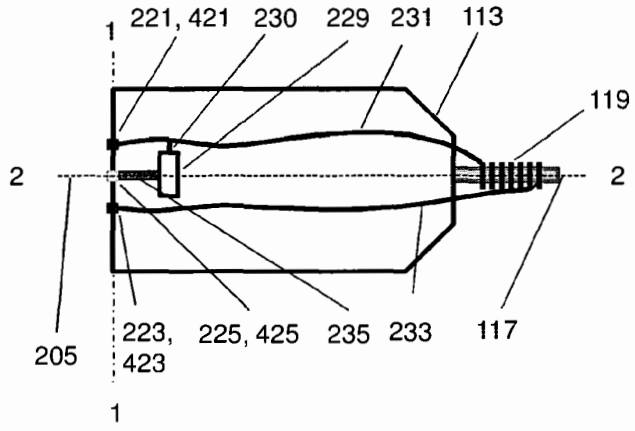


Figure 3



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Figure 4

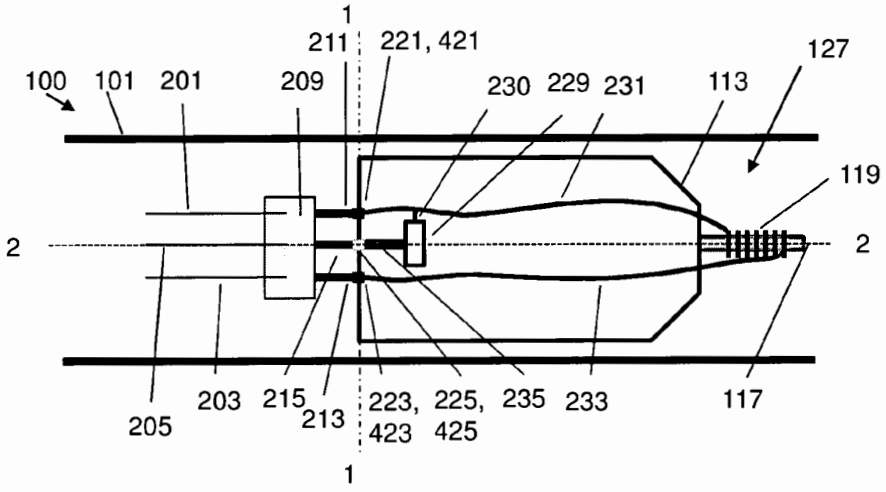


Figure 5

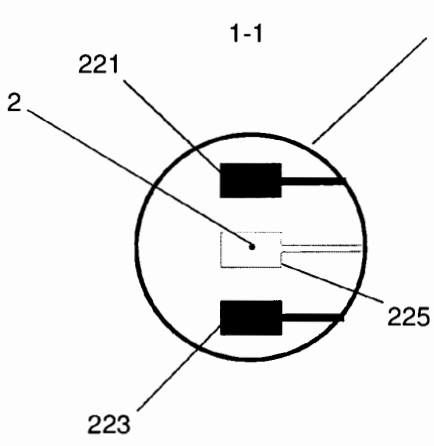
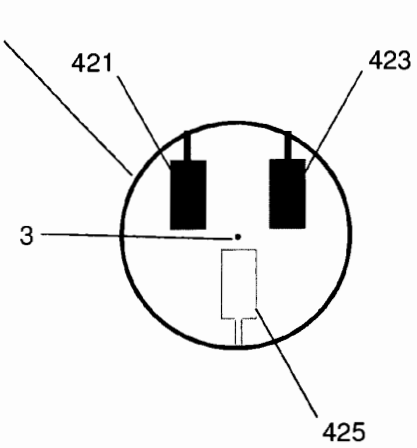
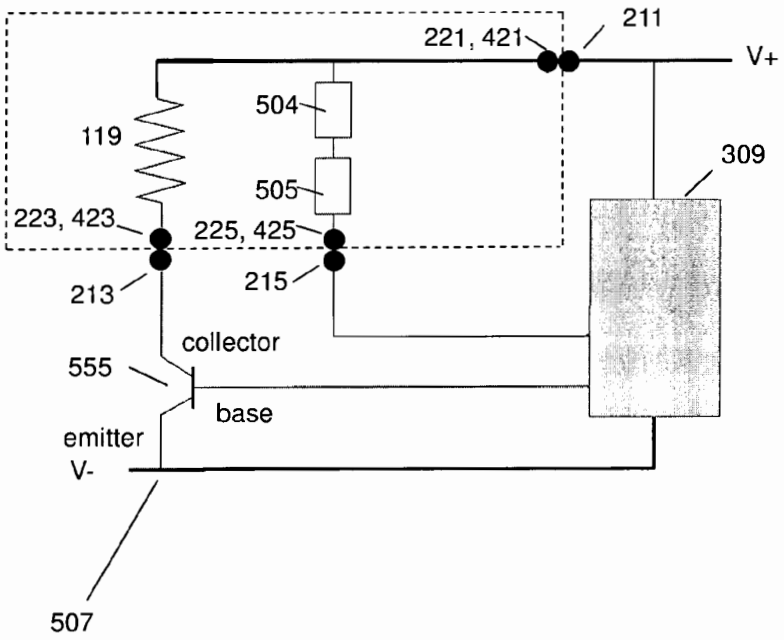


Figure 6



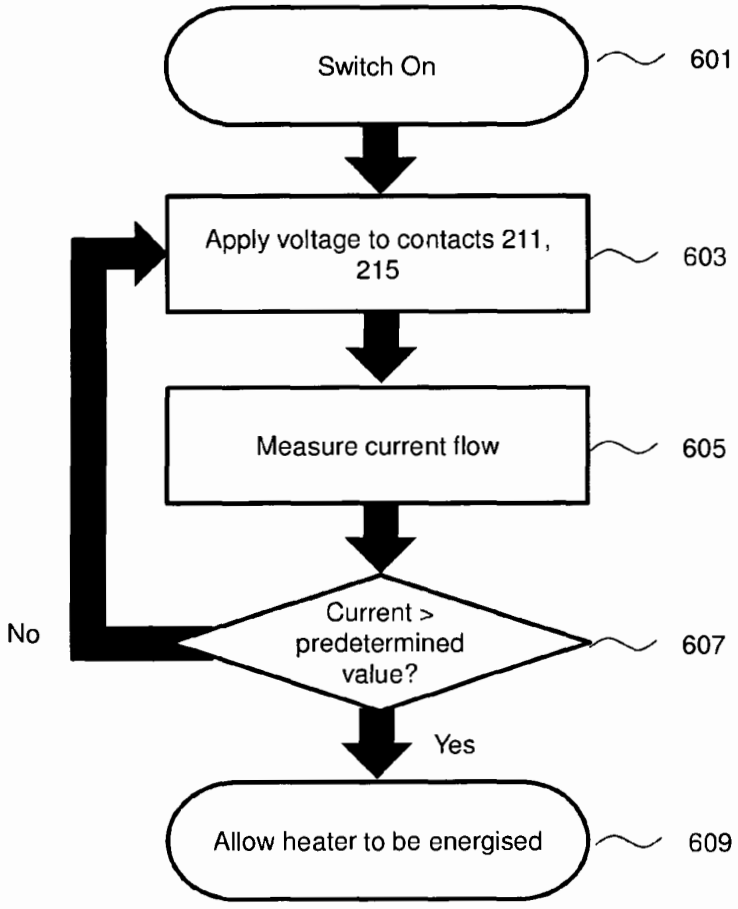
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Figure 7



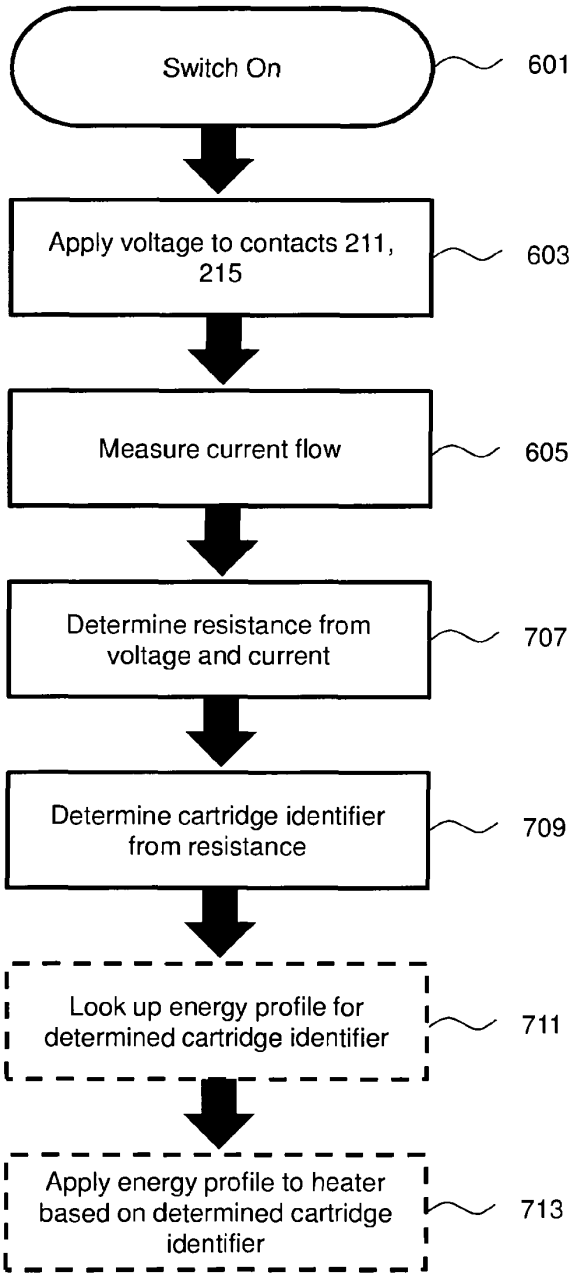
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Figure 8



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Figure 9



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Figure 10

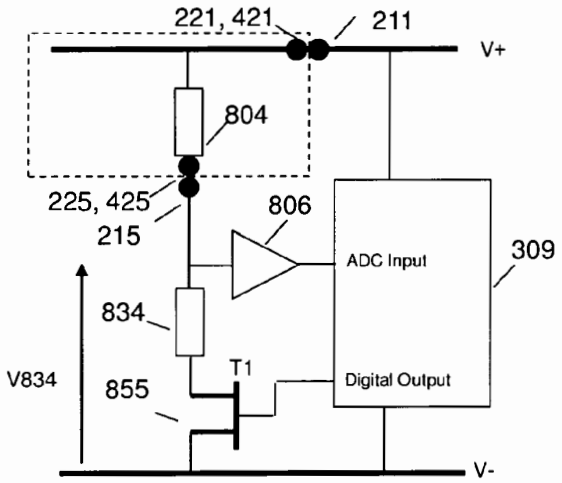
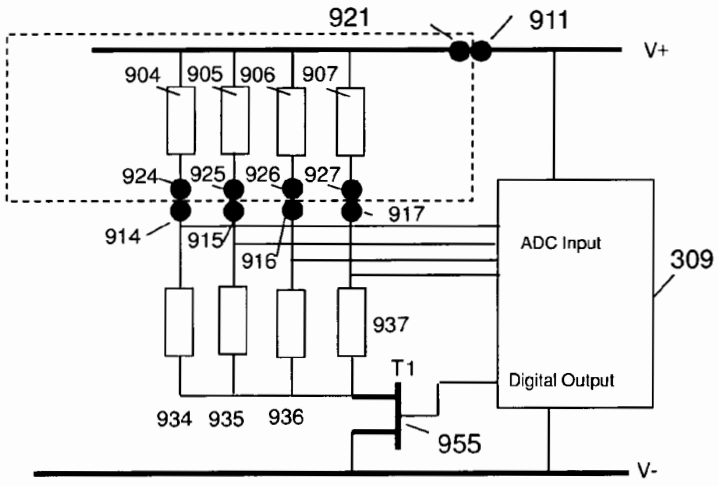


Figure 11



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Figure 12

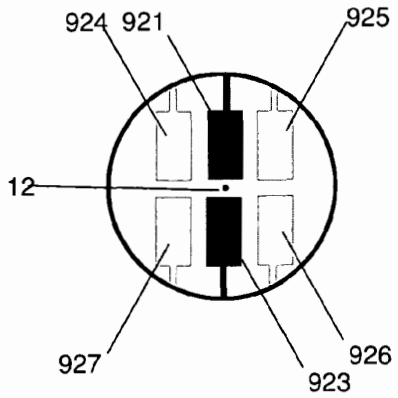
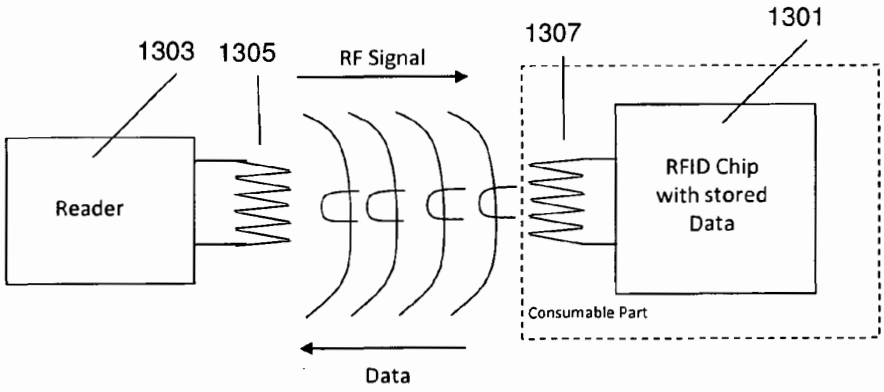
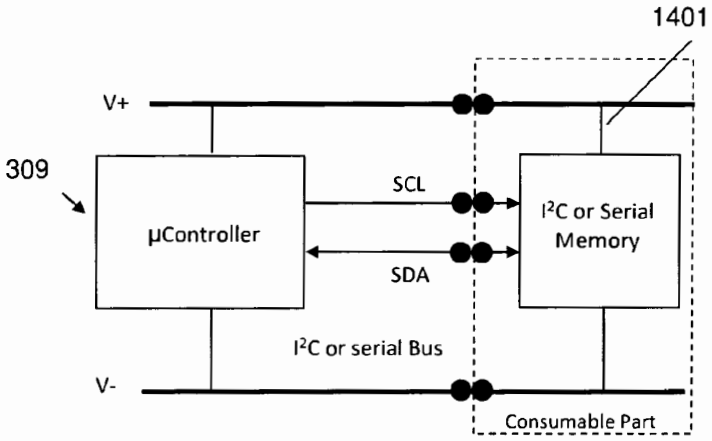


Figure 13



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Figure 14



NJOY Exhibit 1002.601

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 25 1135

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	EP 1 772 166 A1 (CANON KK [JP]) 11 April 2007 (2007-04-11) * paragraph [0040] - paragraph [0041] *	1-4,7-9, 14 5,6,10, 11	INV. A61M11/04 A61M15/06 A24F47/00
Y	US 2009/095287 A1 (EMARLOU HAMID [US]) 16 April 2009 (2009-04-16) * paragraph [0029] - paragraph [0031] *	6	
Y	WO 2005/025654 A1 (INJET DIGITAL AEROSOLS LTD [AU]; REINHOLD OLAF [US]; LACKEY ROBERT P [] 24 March 2005 (2005-03-24) * page 43, line 12 - page 43, line 18 *	10,11	
Y	US 2006/118612 A1 (CHRISTOFFERSEN LASSE W [DK] ET AL CHRISTOFFERSEN LASSE WENGEL [DK] ET) 8 June 2006 (2006-06-08) * paragraph [0025]; figures * * paragraph [0030] * * paragraph [0116] * * paragraph [0117] *	5	
			TECHNICAL FIELDS SEARCHED (IPC)
A,D	WO 2007/078273 A1 (AUGITE INC [US]; LIU ZHEN [CN]) 12 July 2007 (2007-07-12) * abstract; figures *	1-11,14	A61M A24F
X	WO 03/059424 A1 (AEROGEN INC [US]) 24 July 2003 (2003-07-24) * figures 2,5-6 * * page 14, line 1 - page 14, line 15 *	12,13,15	
A	WO 2006/084543 A1 (PARI GMBH [DE]; BORGSCHULTE MARKUS [DE]; ACHTZEHNER WOLFGANG [DE]) 17 August 2006 (2006-08-17) * figure 2 * * paragraph [0031] *	12,13,15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2011	Valfort, Cyril

CATEGORY OF CITED DOCUMENTS

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

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

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

NJOY Exhibit 1002.602

Europäisches Patentamt
European Patent Office
Office européen des brevets

Application Number
EP 10 25 1135

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

NJOY Exhibit 1002.603

Europäisches Patentamt
European Patent Office
Office européen des brevets

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 10 25 1135

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11, 14

A liquid storage portion comprising an electrical component, an aerosol generating system for receiving a liquid storage portion and the coresponding method.

---

2. claims: 12, 13, 15

A liquid storage portion comprising a 3-dimensional object for distinguishing the storage portion, an aerosol generating system and corresponding method.

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 25 1135

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

17-05-2011

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EP 1772166 A1	11-04-2007	CN 1943810 A	11-04-2007
		JP 2007097787 A	19-04-2007
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		EP 1850897 A1	07-11-2007
		US 2009120431 A1	14-05-2009

EPO FORM P0459

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

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2007078273 A **[0002]**

NJOY Exhibit 1002.606

(12) UK Patent Application (19) GB (11) 2 264 237 (13) A

(43) Date of A publication 25.08.1993

(21) Application No 9202469.4

(22) Date of filing 05.02.1992

(51) INT CL[5]
A61M 15/00

(52) UK CL (Edition L)
A5T TBD
A5B BZ

(56) Documents cited
GB 2246299 A GB 2178965 A GB 2129691 A
GB 1562732 A GB 1387954 A WO 82/01470 A1

(58) Field of search
UK CL (Edition K) A5B, A5T TBD, B8C CA
INT CL[5] A61J, A61M
Online databases: WPI

(71) Applicant
Robert Edward Newell
21 The Glen (Off Village Way), Pinner, Middlesex, HA5 5AX, United Kingdom

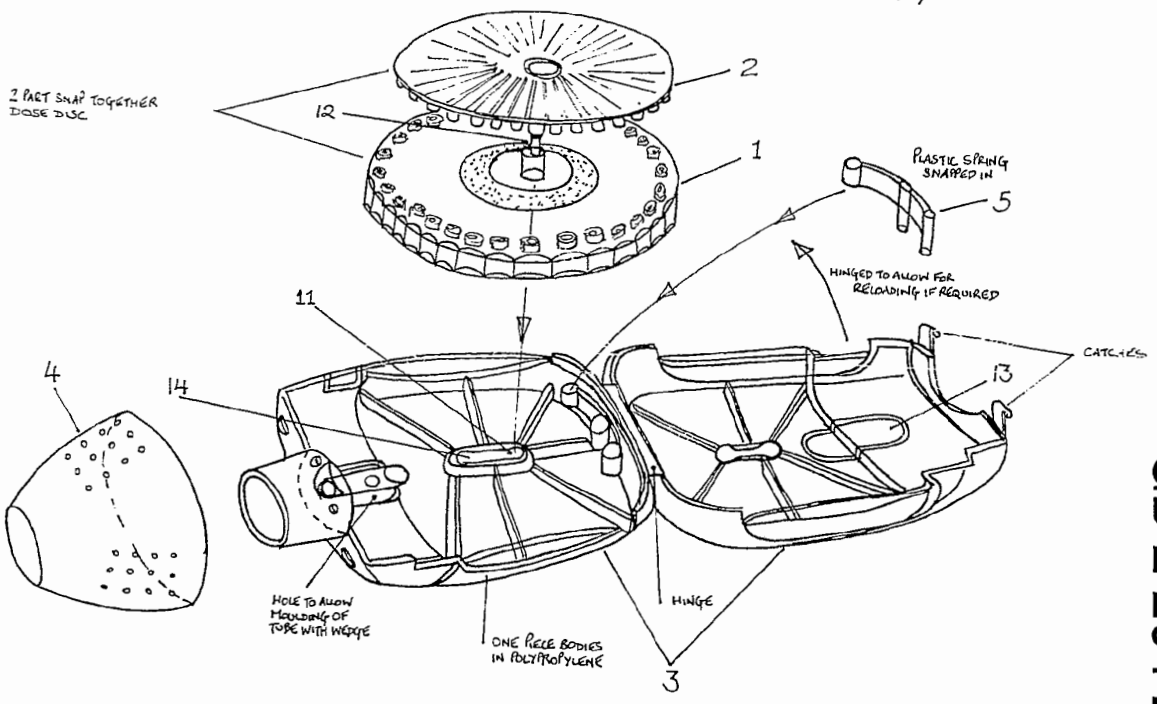
(72) Inventor
Robert Edward Newell

(74) Agent and/or Address for Service
Robert Edward Newell
21 The Glen (Off Village Way), Pinner, Middlesex, HA5 5AX, United Kingdom

(54) An inhaler

(57) A powder inhaler for use in the treatment of medical problems of the air passages, lungs or bronchial conditions, such as bronchial asthma comprises an openable casing 3 having a mouthpiece and containing a replaceable magazine disc 1, 2 provided with a plurality of recesses or cups, each holding a dose of powder and being individually closed by a discrete closure element which can be opened and then reclosed. The disc may be indexed around to present a closed cap adjacent a projection 16 at the mouthpiece and then moved in the casing transverse to its rotational axis so that the projection removes the closure element. A ring (15, Fig 4) is provided in the top casing portion to assist reclosure of the closure element after inhalation.

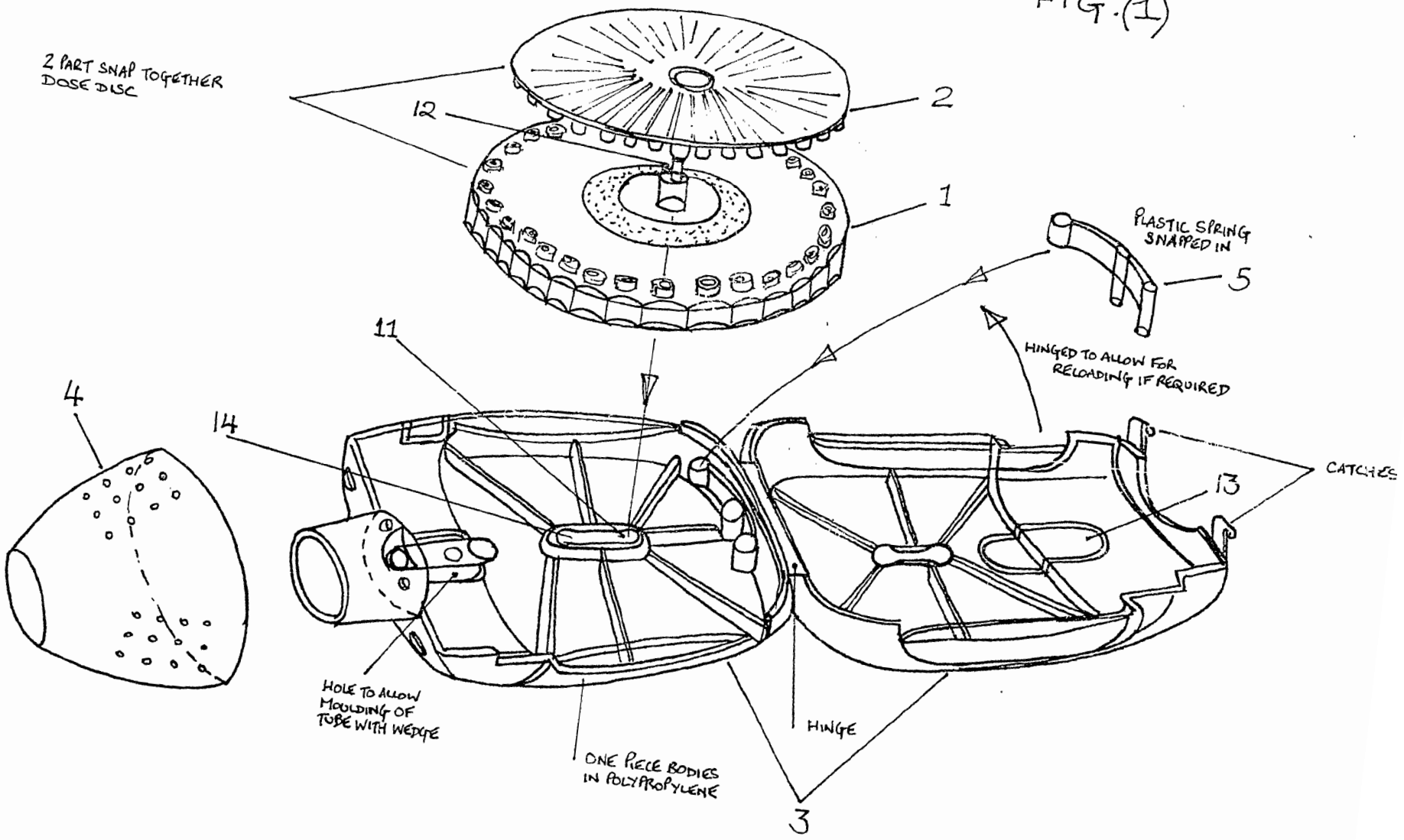
FIG.(1)



GB 2 264 237 A

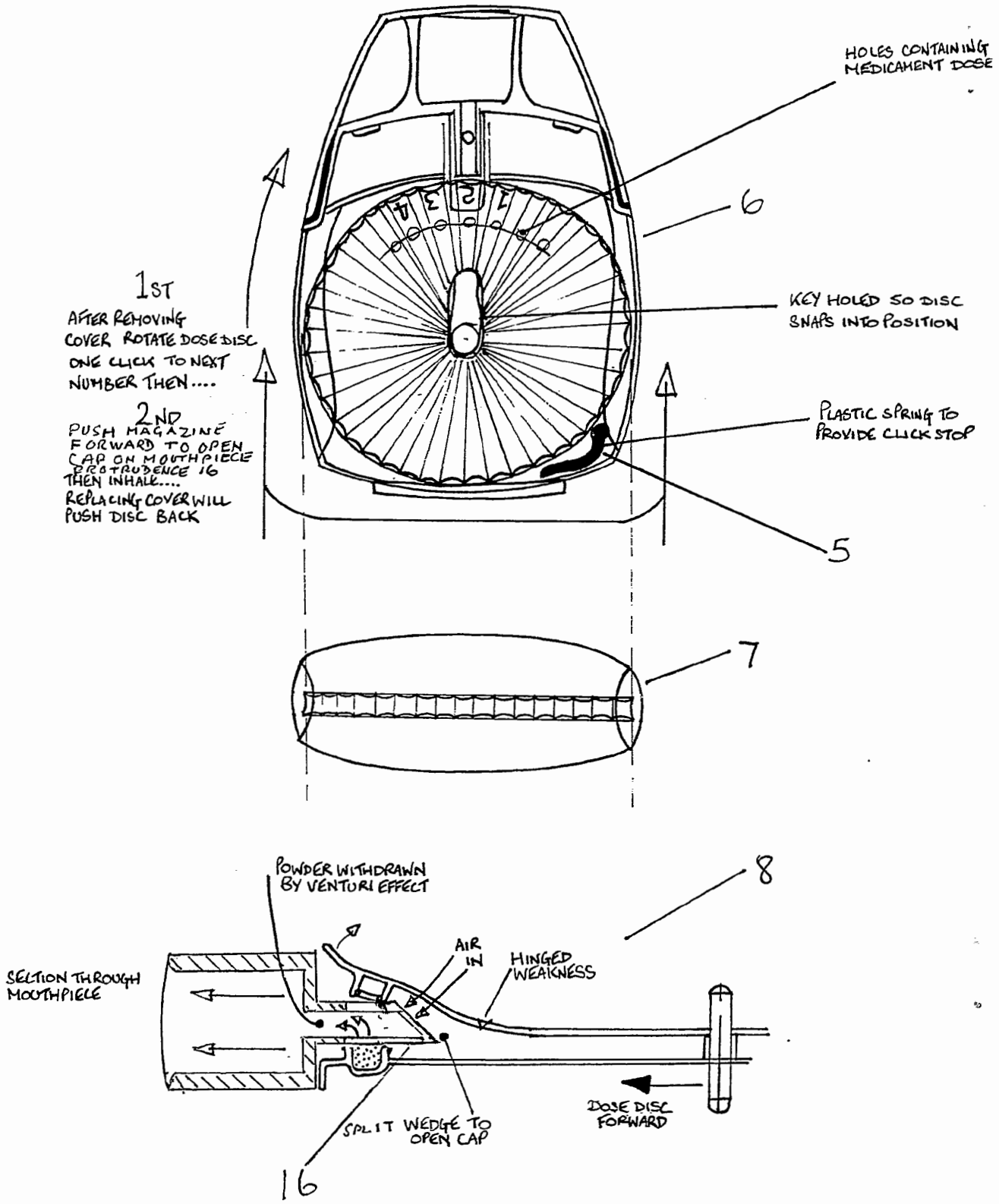
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FIG.(1)

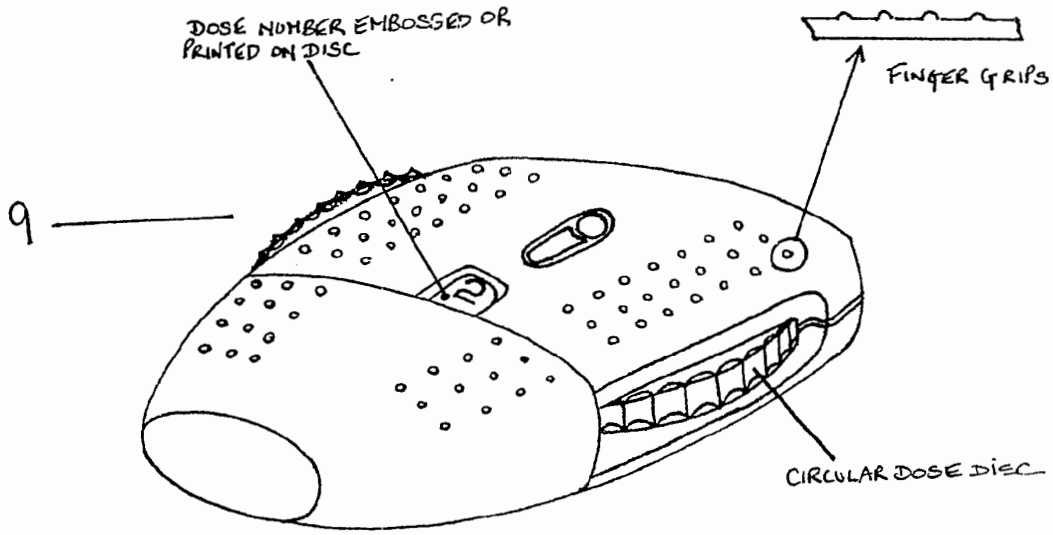


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FIG. (2)



NJOY Exhibit 1002.609


DOSE NUMBER EMBOSSED OR PRINTED ON DISC
FINGER GRIPS
9
CIRCULAR DOSE DISC

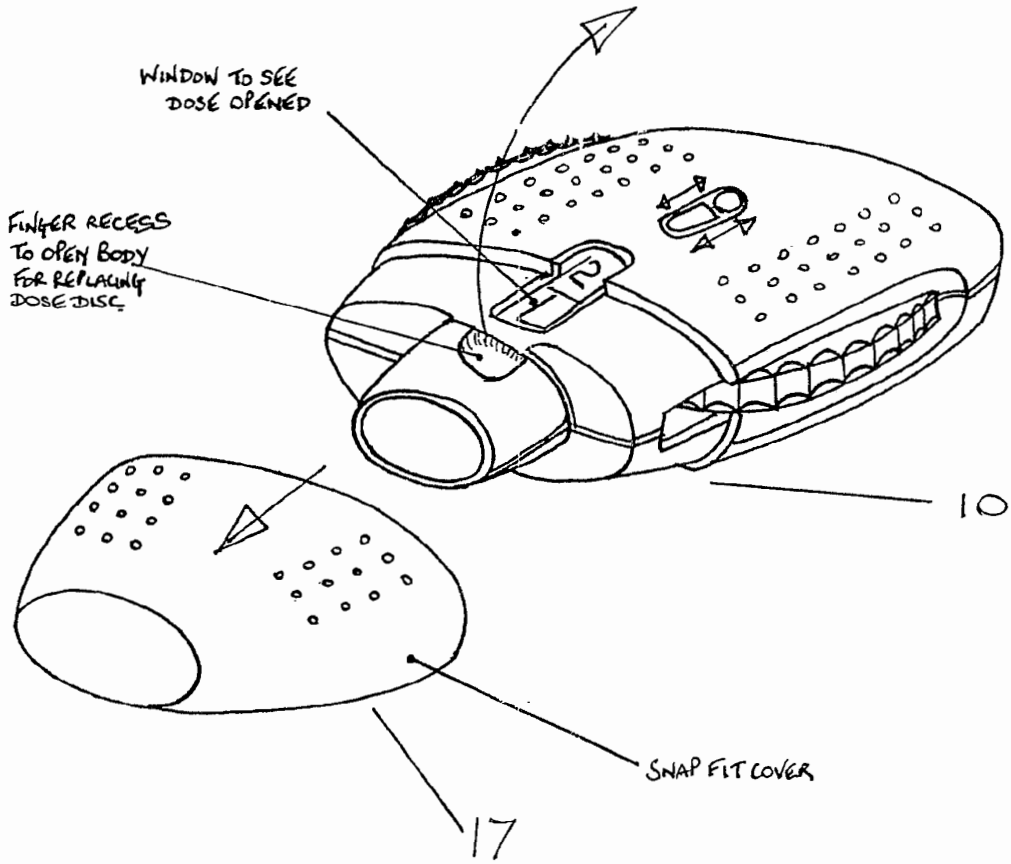
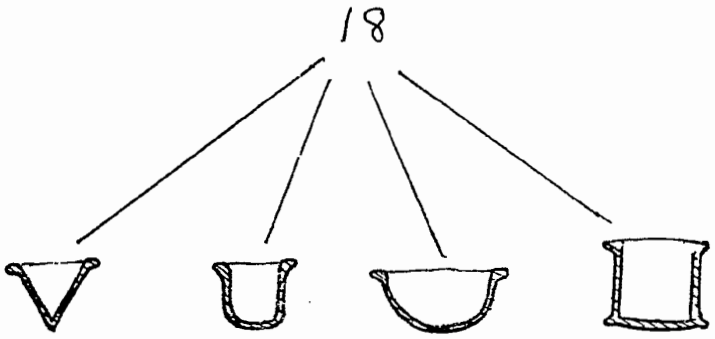
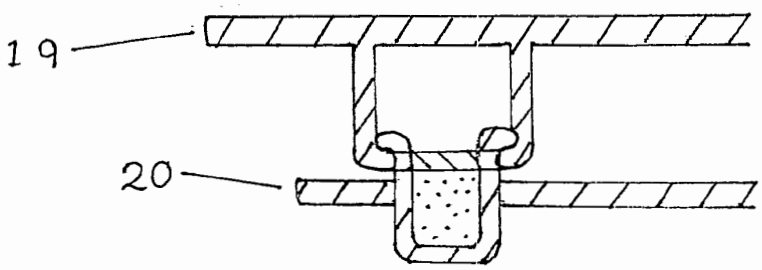

WINDOW TO SEE DOSE OPENED
FINGER RECESS TO OPEN BODY FOR REPLACING DOSE DISC
10
SNAP FIT COVER
17

FIG. (4.)

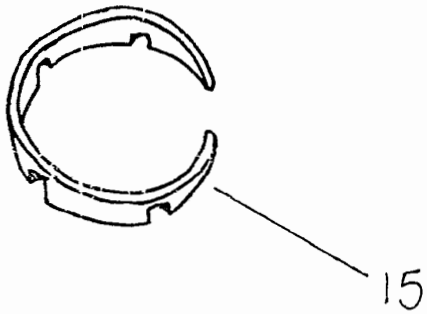


ALTERNATIVE CUP SHAPES



SECTIONAL VIEW OF DOSE DISC - REF. FIG. 1. NO'S: 1 AND 2

CAP FITTING OVER POWDERCAP.



NJOY Exhibit 1002.611

TITLE

A magazined device for inhalation of powdered medication to and by patients.

GENERAL BACKGROUND

Devices and systems exist whereby powder for inhalation is enclosed in a gelatine or metal capsule and each capsule is loaded into the device individually each time treatment is required. The capsule is usually broken, cut, pierced, or parted by the device prior to treatment.

Problems can arise with the said capsules e.g. the gelatine or metal breaking into particles which may be inhaled by the patient. Also, gelatine being relatively unstable and fragile, aluminium, also being delicate, both require further packaging for protection to avoid environmental degradation of the product. Also by the very nature of gelatine source a stability problem may also arise.

NJOY Exhibit 1002.612

TECHNICAL FEATURES

According to the present invention there is provided a plastic or metal disc with a plurality of holes or recesses, or cups, around the periphery of the disc. Each hole or recess contains one dose of the medicament. Ideally, there would be sufficient dosage for one week to one month's treatment, but it can be less or more. Each dose is capped off or sealed off to protect the product and maintain product security. The capped circular disc, also known as a magazine is thenplaced in a dispensing device which enables the doses of powder to be used individually as required by the patient. A specific embodiment will now be described by way of example and with reference to the accompanying drawings:-

FIGURE (1)

Shows in perspective the device with the circular disc 1 showing the recesses or cups to hold the medicament and the individual caps 2 joined at the centre. The case 3 which holds the filled and capped disc (magazine).

The cap 4 which covers the mouthpiece and relocates the capped disc.

The spring 5 which locates each dose when the disc is rotated.

FIGURE (2)

Illustrates rear end view of device 7.

Shows sketch of mouthpiece operation opening cap from powdered dose 8 cup or recess.

FIGURE (3)

Shows the device assembled 9.

Illustrates the cap removed 10.

Referring to the drawing as figure (1), this shows a circular plastic disc with the plurality of holes, cups or recesses each to hold a dose of powder to the exclusion of air 1. Each dose is closed by the caps shown as 2. The closed disc is then located into recess 11 located by pivot 12. The plastic spring 5 is then located in position in the base of the case and preferably located at the first dose to be used. The top of the case is then closed, sealing in the medicament magazine prior to use.

Also shown is the slot in top 13 and bottom 14 of case, which allows magazine containing the doses to be moved forward and

NJOY Exhibit 1002.613

back prior and after inhalation. Also shown is the cap 4 which is included to keep mouthpiece clean and to return dose disc after use. It should be noted that the dose disc and caps are collectively known as the magazine. The magazine is rotated by hand to the next dose prior to inhalation. The magazine is pushed forward by hand, the action of which removes the cap from the required dose. This is shown on Figure (2), as is also the principle by which the powder is inhaled by a venturi effect by the patient. Also shown is a weakness to the hinge 8 to facilitate removal of the cap from the medicament dose container.

5 shows the plastic spring which provides a click stop for each dose when the magazine is rotated. The dose numbers are either embossed or printed on the magazine to ideally decrease when rotated, e.g. 100, 99, 98 etc. This will show how many doses are left. In order to rotate the dose magazine it is shown in Figure (3). the magazine protrudes from the case 3 on both sides enabling the dose magazine to be pushed forward when required. Or rotated as required.

FIGURE (4)

Illustrates alternative cup shapes 18 which hold required doses.

19 and 20 demonstrate cap on cup principle.

15 indicates ring to be clipped into top of case 3 to assist in closing of cap onto cup after inhalation.

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CLAIMS

1. A device for administering medicaments in solid finely divided powder form to patients, comprising a magazine containing a plurality of medicament doses each dose individually closed, and an actuating case with mouthpiece to hold magazine.

2. A device according to claim 1. whereby the magazine disc is of a circular shape, individual doses being situated around the periphery of said magazine as 1. and 2. on Figure (1).

3. The magazine is rotatable mounted within case 3 being indexed to the next dose.

4. The magazine is movable in a longitudinal position to open cap against mouthpiece protrudcence 16 for required dose 8.

5. The magazine is movable in a longitudinal position to close cap, reverse of claim 4.

6. A device whereby the required dose in magazine is locked in position by plastic spring 5 on Figure (2).

7. A device whereby the magazine when located within the device is rotatable within the device 10 on Figure (3).

8. A device whereby the cap can be replaced on the device and the dose magazine is moved back by the cap 17 into its original position.

9. A device whereby the shape of the dose cup or recess is influential in promoting a venturi effect 18. Figure (4) shows shape varience.

10..A device whereby a circular separate or integral moulding 15 is included in moulding to assist closing of dose cap.

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Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number: 9202469.4

Relevant Technical fields

(i) UK Cl (Edition K) A5T TBD; A5B; B8C CA

(ii) Int CL (Edition 5) A61M ; A61J

Search Examiner: J A WALLIS

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search: 29 APRIL 1992

Documents considered relevant following a search in respect of claims: 1 AT LEAST

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2246299 A (GLAXO ETC) Whole document pertinent	1-3 at least
X	GB 2178965 A (GLAXO ETC) Whole document pertinent	1-3,6,7,9 at least
X	GB 2129691 A (GLAXO ETC) Whole document pertinent	1-3 at least
X	GB 1562732 (ALLEN ETC) Eg lines 119, page 2 - line 7 and page 3	1-3 at least
X	GB 1387954 (MILES ETC) Eg. lines 17-26, page 3	1-3 at least
X	WO 82/01470 A1 (RIKER ETC) Eg. magazines and doses 11	1-3 at least

up - c:\wp51\doc99\fil000518

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Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.

NJOY Exhibit 1002.617

(12) UK Patent Application (19) GB (11) 2 266 466 (13) A

(43) Date of A publication 03.11.1993

(21) Application No 9207690.0

(22) Date of filing 08.04.1992

(51) INT CL5
A61M 15/00

(52) UK CL (Edition L)
A5T TBE TED T102 T11X
F1R RDC

(56) Documents cited
None

(58) Field of search
UK CL (Edition K) A5T TBC TBD TBE TED
INT CL5 A61M

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Paul Barnes

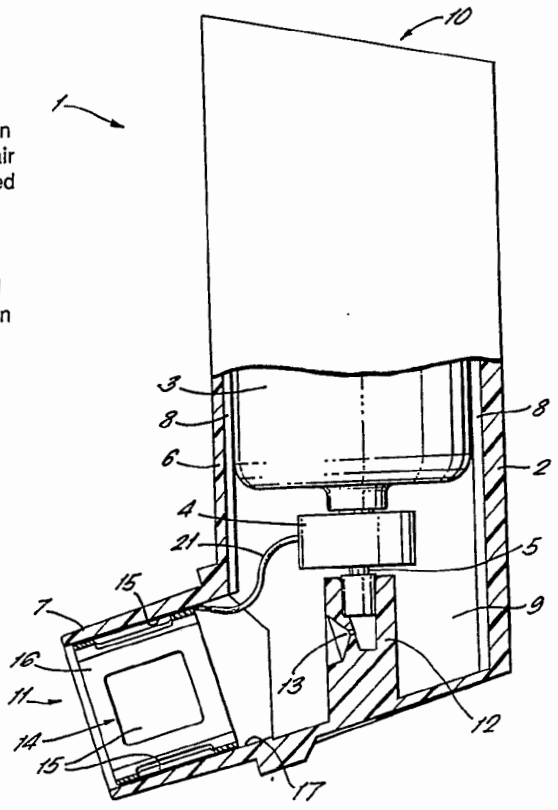
(74) Agent and/or Address for Service
Boult Wade Tennant
27 Furnival Street, London, EC4A 1PQ,
United Kingdom

(54) Inhalation apparatus

(57) An inhaler 1 has a housing 2 defining a passageway 9 for inhaled air. An aerosol dispenser 3 is arranged to be responsive to an electrical actuating signal to dispense into the passageway a substance to be inhaled. A sensor 14 produces the actuation signal in response to inhalation and comprises a membrane 15 of a polymeric piezoelectric material, such as PVDF, arranged to produce a signal voltage in response to flexure. A support member 16 holds the membrane in position relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway. The inhaler is primarily intended for medical dispensing of inhaled substances.

As shown in Fig. 1, the membrane 15 normally lies in contact with a side wall 17 defining the passageway 9. In another embodiment, (Fig. 4), the membrane (54) is bonded to and flexes with an elastomeric diaphragm (53) exposed on one side to ambient air and on the other to air within the passageway.

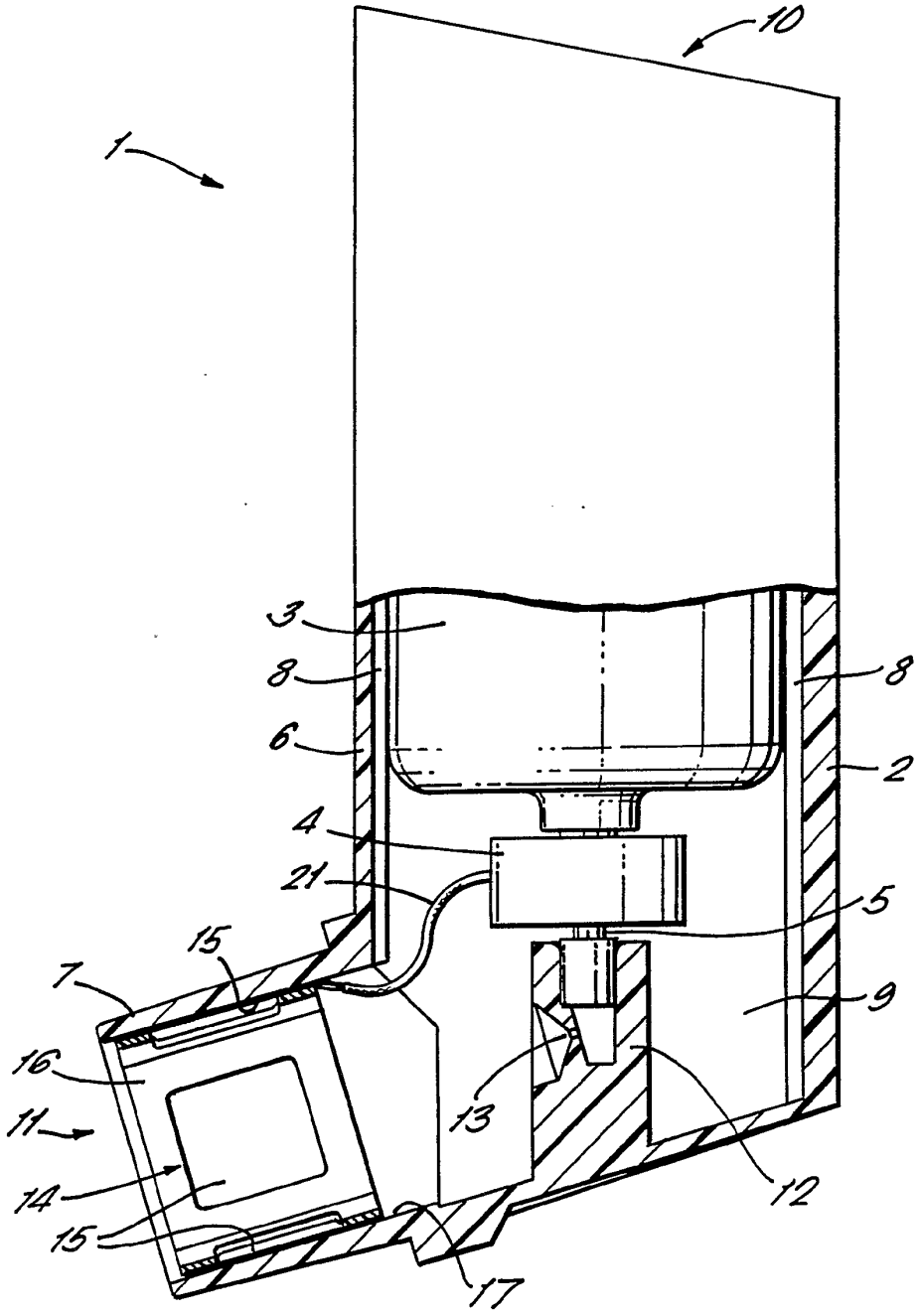
FIG. 1.



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FIG. 1.



NJOY Exhibit 1002.619

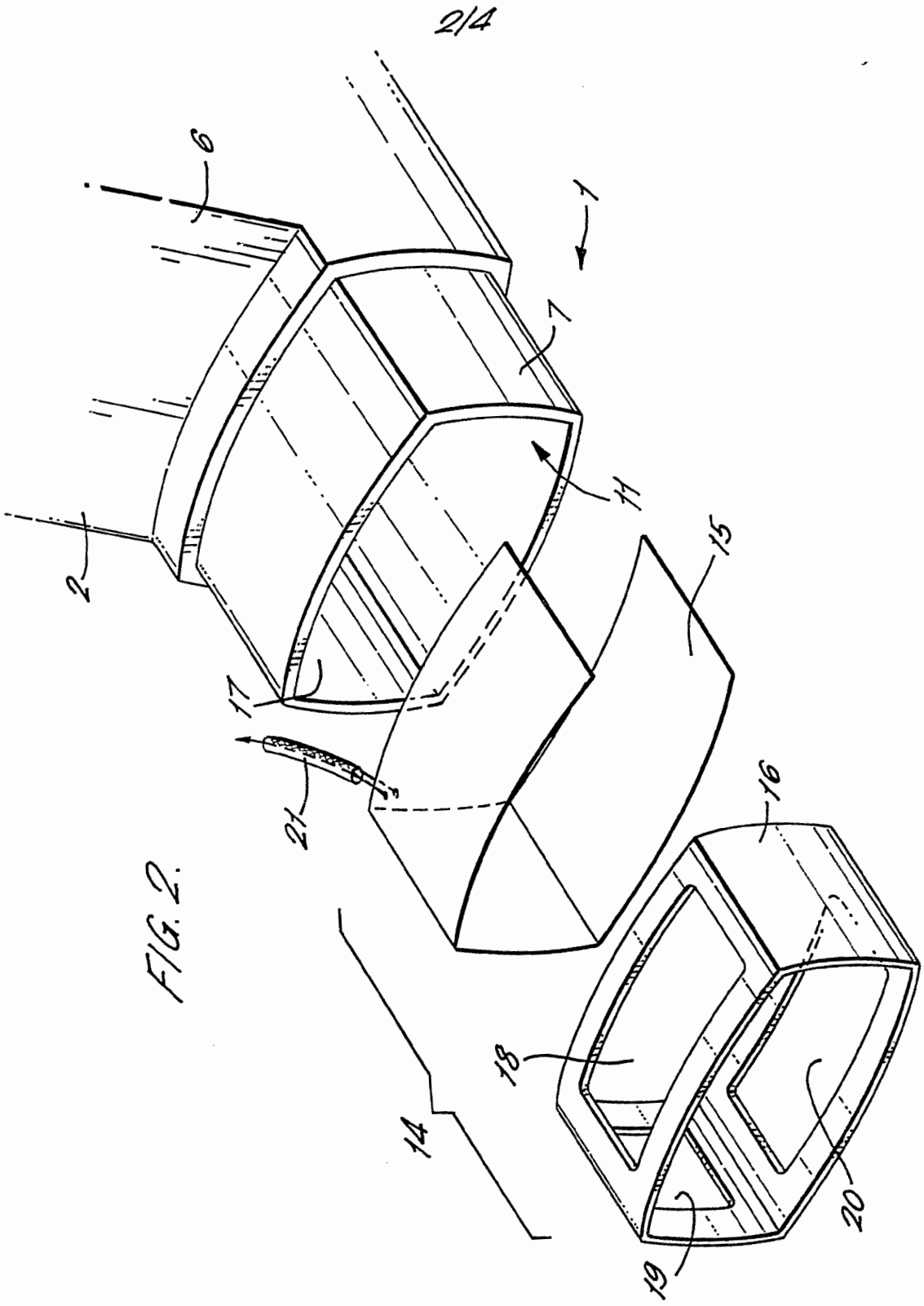
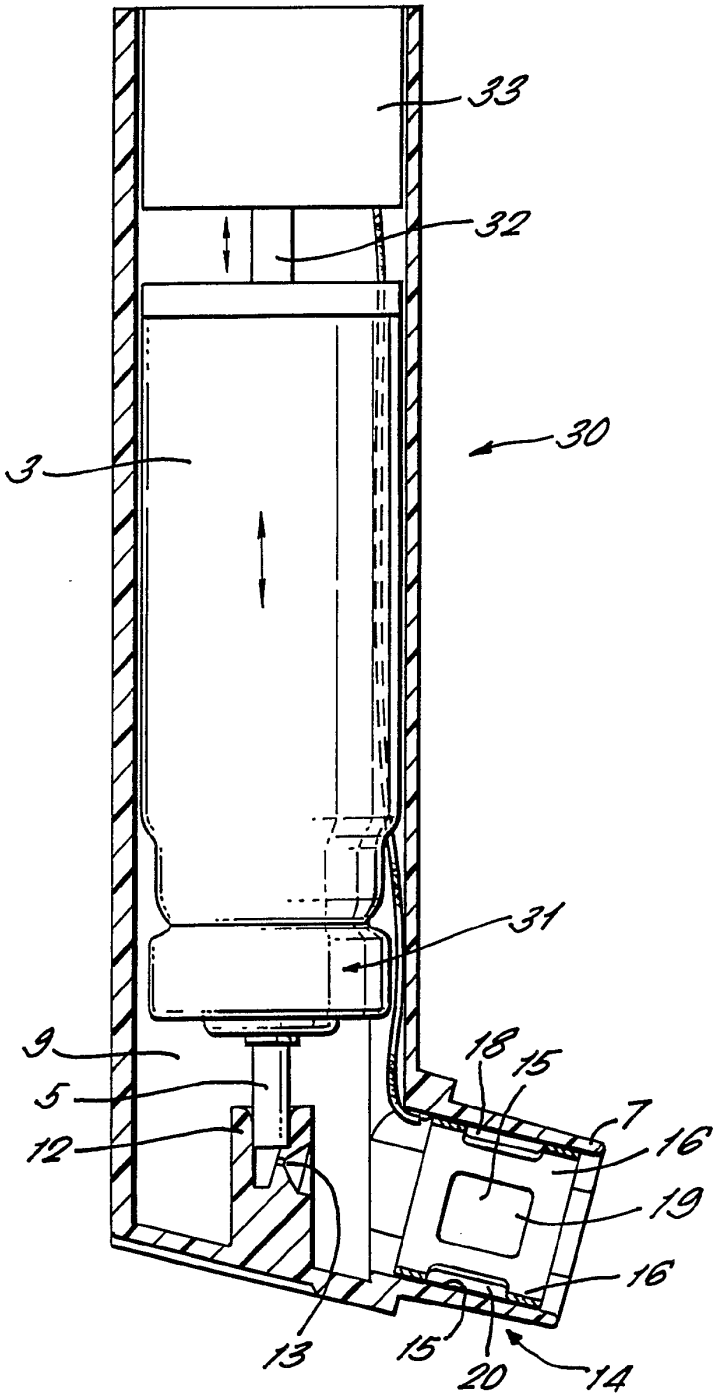


FIG. 2.

NJOY Exhibit 1002.620

FIG. 3.



NJOY Exhibit 1002.621

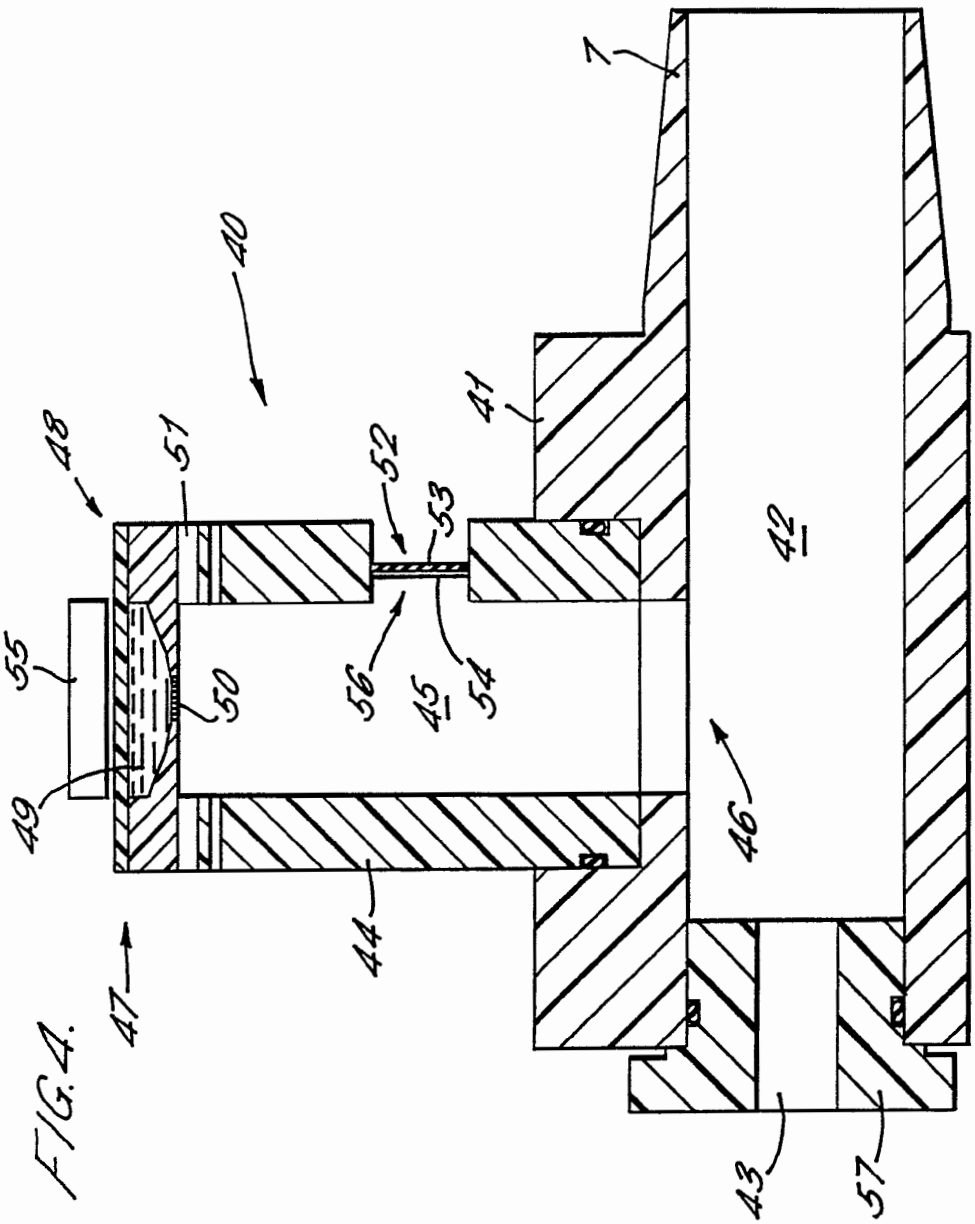


FIG. 4.

NJOY Exhibit 1002.622

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"INHALATION APPARATUS"

This invention relates to inhalation apparatus for dispensing inhaled substances and in particular but not exclusively to dispensing of medicinal products in aerosol form from a pressurised dispensing container.

It is known to provide a sensor in an inhalation apparatus to detect inhalation by a user in order to synchronise with inhalation the release into the inhaled air flow of a substance to be inhaled. It is for example important in the administration of aerosol products for the relief of asthma that the timing of the dispensing operation should be carefully controlled to ensure maximum deposition of the substance in the user's lungs.

It is known from WO87/04354 to provide an electrically operated dispensing means responsive to a signal generated by a sensor which is responsive to the flow of air through a passageway. A hinged flap cooperates with a reed contact to make electrical contact and generate an actuating signal for the dispensing means.

According to the present invention there is disclosed inhalation apparatus for dispensing inhaled substances comprising a housing defining a passageway for inhaled air, a dispensing means operable in response to an electrical actuating signal to dispense into the passageway a substance to be inhaled, and a sensor operable to produce the actuation signal in response to inhalation wherein the sensor comprises a membrane of piezoelectric material and support means supporting the membrane relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway to thereby generate the

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actuation signal.

An advantage of such apparatus is that it provides a sensor of simple construction and which is relatively easy to assemble with the housing. A further advantage is that the sensor generates an actuation signal by piezoelectric action which does not require the sensor to be energised from an external electrical source.

Preferably the membrane comprises a flexible polymeric piezoelectric material such as polyvinylidene fluoride (PVDF).

Conveniently the support means comprises a support member cooperating with the housing to clamp a clamped portion of the membrane in fixed relationship with the housing, the clamped portion being peripheral to at least one unclamped portion which is flexible in response to pressure change in the passageway.

Preferably the membrane overlays a portion of a side wall defining the passageway.

The member may alternatively be mounted on a resilient diaphragm for flexure in unison with the diaphragm, the diaphragm being located such that one side of the diaphragm is exposed to ambient air pressure and the other side of the diaphragm is exposed to air within the passageway.

Preferred embodiments of the present invention will now be described by way of example only and with reference to the accompanying drawings of which:-

Figure 1 is a part sectioned elevation of an inhalation apparatus;

Figure 2 is an exploded perspective view of the apparatus of Figure 1;

Figure 3 is a part sectioned elevation of an alternative apparatus; and

Figure 4 is a sectioned elevation of a further

NJOY Exhibit 1002.624

alternative apparatus.

Apparatus 1 of Figure 1 comprises a generally tubular housing 2 receiving a cylindrical pressurised dispensing container 3. The container 3 has an electrically operated outlet valve 4 which is operable to release a metered dose of a medicinal product through a valve stem 5 in response to an electrical actuating signal.

The housing 2 consists of a main tubular portion 6 which receives the container 3 and a mouthpiece 7 projecting laterally from the lower end of the main tubular portion. The main tubular portion 6 includes circumferentially spaced ribs 8 which project inwardly so as to space the container 3 from the housing 2 to allow air to flow around the container 3. An air passageway 9 is defined by the housing 2 and extends from an open end 10 of the housing, through the main tubular portion 6 and through the mouthpiece 7 to an outlet 11.

The valve stem 5 is received in a nozzle fitting 12 having a nozzle opening 13 arranged to direct an aerosol spray from discharge through the valve in a direction towards the outlet 11.

A sensor 14 is located in the mouthpiece 7 and comprises a piezoelectric membrane 15 which is held by a support member 16 so as to normally lie in contact with an annular side wall portion 17 of the mouthpiece 7.

As shown more clearly in Figure 2 the support member 16 is generally tubular in shape and fits snugly within the mouthpiece 7. The support member 16 is provided with cut-outs 18, 19 and 20 through which corresponding unclamped portions of the membrane 15 are exposed, each exposed portion of the membrane being surrounded by an annular clamped portion which is overlaid by the support member 16

NJOY Exhibit 1002.625

and clamped in contact with the side wall portion 17.

The membrane 15 is a film of PVDF (polyvinylidene fluoride) material upon which are formed sensor electrodes (not shown) in known manner to provide an electrical output signal responsive to flexure of the film.

An output lead 21 connects the membrane to the valve 4 which includes suitable circuitry to actuate the valve in response to an actuating signal.

In use a user inhales air through the mouthpiece 7 resulting in a drop of air pressure within the mouthpiece. Air flows through the housing 2 from the open end 10 to the outlet 11. The presence of the container 3 in the main tubular portion 6 results in the passageway 9 being constricted adjacent to the open end 10 which tends to enhance the drop in pressure of the air within the mouthpiece 7.

In response to the drop of air pressure within the mouthpiece 7 the membrane 15 flexes such that exposed portions of the membrane 15 bow into the cut-outs 18, 19 and 20 and this flexure of the membrane results in an actuating signal being generated by piezoelectric action in the membrane and transmitted via output lead 21 to the valve 4.

The valve 4 is actuated by the actuating signal and releases a measured dose of medicament into the nozzle fitting 12 from which it is dispensed as an aerosol spray through the nozzle opening 13 into the mouthpiece 7 so as to be entrained in the air flow and hence inhaled by the user.

When the inhalation ceases the membrane relaxes to its rest position in which it lies in contact with the side wall portion 17. During this relaxation of the membrane a signal of opposite polarity is generated by the membrane. The circuitry of the

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valve 4 is arranged to not respond to a signal of this reverse polarity.

An alternative apparatus 30 is shown in Figure 3 and is described using corresponding reference numerals to those of Figure 1 where appropriate for corresponding elements.

The alternative apparatus 30 has a pressurised dispensing container 3 having a conventional mechanical valve 31 which is actuated by depression of a valve stem 5 relative to the container. The valve stem 5 is received in a fixed nozzle fitting 12 and the container is moved towards and away from the nozzle fitting by a solenoid operated plunger 32. The plunger 32 is driven by an electrical actuator 33 which is connected to a sensor 14 which corresponds to the sensor 14 of the apparatus of Figures 1 and 2. Sensor 14 is similarly located in a mouthpiece 7 of housing 2.

In use a user inhales air through the mouthpiece 7 and air is drawn through a passageway 9 defined by housing 2. Air pressure within the mouthpiece is decreased by the inhalation so that the membrane 15 flexes so as to bow into the cut-outs 18, 19, and 20 of the support member 16. An actuating signal is transmitted to the actuator 33 resulting in the plunger 32 being moved by solenoid action so as to translate the container 3 towards the nozzle fitting 12. The valve 31 operates to release a medicinal product through the stem 5 which is atomised and injected into the air flow by the nozzle opening 13.

A further alternative apparatus 40 is shown in Figure 4 and will be described using corresponding reference numerals to those of previous Figures where appropriate for corresponding elements.

Apparatus 40 has a housing 41 with a mouthpiece

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7 communicating via a tubular duct 42 with an inlet opening 43 arranged such that the inlet opening and mouthpiece 7 are at opposite ends of the tubular duct.

The housing 41 includes a side arm 44 defining a second duct 45 communicating with the first duct 42 at a T-junction 46.

The side arm 44 has an outer end 47 at which is located a piezoelectric atomiser 48 of a type in which liquid from a liquid reservoir 49 is dispensed through a perforate membrane 50 in response to high frequency vibration of the membrane 50 by a piezoelectric element 51.

A side port 52 is formed in the side arm 44 intermediate the T-junction 46 and the atomiser 48 and the side port is closed by an elastomeric diaphragm 53. A piezeoelectric membrane 54 of PVDF material is bonded to the diaphragm 53 so as to flex in unison with the diaphragm. The membrane 54 is provided with suitable electrodes (not shown) for sensing piezoelectrically induced voltages resulting from flexure of the membrane and which are connected to an electronic control unit 55 which is operable to actuate the atomiser 48. The membrane 54 and diaphragm 53 constitute a sensor 56 which is responsive to pressure change in the second duct 45.

The inlet opening 43 is defined by an annular formation 57 which provides a constriction to the flow of air through the duct 42.

In use a user inhales air through the mouthpiece 7 and an air flow is established through the duct 42 from the restricted inlet opening 43. A pressure drop established within the duct 42 is communicated to the second duct 45 resulting in inward flexure of the diaphragm 53 and with it the membrane 54. The sensor 56 produces by piezoelectric action an actuating signal transmitted

NJOY Exhibit 1002.628

to the control unit 55 resulting in the atomiser 48 being actuated. A mist of liquid is dispensed from the reservoir 49 through the perforate membrane 50 into the second duct 45 and is drawn into the duct 42 from whence it is inhaled through the mouthpiece 7.

On completion of inhalation the pressure within the ducts 42 and 45 is restored to atmospheric pressure and the diaphragm 53 relaxes to its rest position. During this relaxation a signal of opposite polarity is generated by the sensor 56. The control unit 55 is arranged not to respond to reverse polarity signals.

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CLAIMS:

1. Inhalation apparatus for dispensing inhaled substances comprising a housing defining a passageway for inhaled air, a dispensing means operable in response to an electrical actuating signal to dispense into the passageway a substance to be inhaled, and a sensor operable to produce the actuation signal in response to inhalation wherein the sensor comprises a membrane of piezoelectric material and support means supporting the membrane relative to the housing at a location such that the membrane flexes in response to a change of air pressure in the passageway to thereby generate the actuation signal.

2. Inhalation apparatus as claimed in claim 1 wherein the membrane comprises a polymeric piezoelectric material.

3. Inhalation apparatus as claimed in claim 2 wherein the piezoelectric material is polyvinylidene fluoride.

4. Inhalation apparatus as claimed in any preceding claim wherein the support means comprises a support member cooperating with the housing to clamp a clamped portion of the membrane in fixed relationship with the housing, the clamped portion being peripheral to at least one unclamped portion which is flexible in response to pressure change in the passageway.

5. Inhalation apparatus as claimed in claim 4 wherein the membrane overlays a portion of a side wall defining the passageway.

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6. Inhalation apparatus as claimed in any of claims 1 to 4 wherein the member is mounted on a resilient diaphragm for flexure in unison with the diaphragm, the diaphragm being located such that one side of the diaphragm is exposed to ambient air pressure and the other side of the diaphragm is exposed to air within the passageway.

7. Inhalation apparatus substantially as hereinbefore described with reference to and as shown in any of the accompanying drawings.

NJOY Exhibit 1002.631

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

9207690.0

Relevant Technical fields

(i) UK Cl (Edition K) A5T TBE, TBC, TBD, TED

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Search Examiner

J A WALLIS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

22 MAY 1992

Documents considered relevant following a search in respect of claims ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

SF2(p)

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Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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Espacenet

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ELECTRONIC CIGARETTE

Inventor(s): SJN JONG SU [KR] ± (SJN, JONG SU)

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Classification: **- international:** ***A24D1/14; A24F47/00; A61M15/06***
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Priority number (s): KR20100093061 20100927

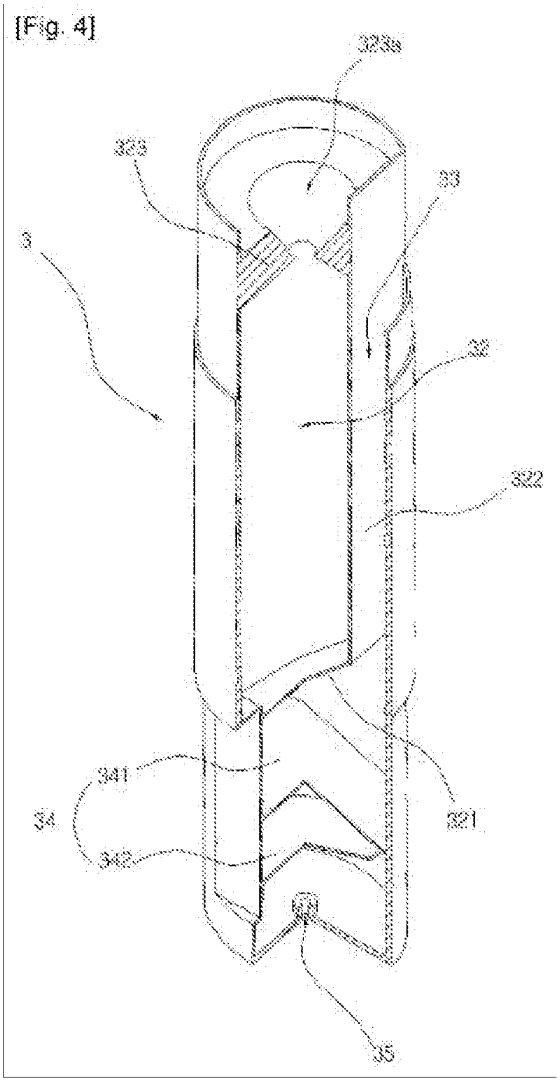
Also published as: WO2012043941 (A1)

Abstract of KR101011453 (B1)

PURPOSE: An electronic cigarette is provided, which prevents an electronic cigarette user from feeling unpleasant by separating liquid component from smoke. CONSTITUTION: An electronic cigarette comprises a cartridge which stores solution and discharges smoke to the outside. The cartridge includes: a solution storage unit (32) which is formed in the inner surface and stores solution; a flow path(33) in which smoke flows; a liquid separation unit(34) eliminating liquid component contained in the smoke flown through the flow path; and an exhaust groove(35) which discharges the smoke in which the liquid component is removed from the liquid separation unit to the outside.

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[Fig. 4]



NJOY Exhibit 1002.635

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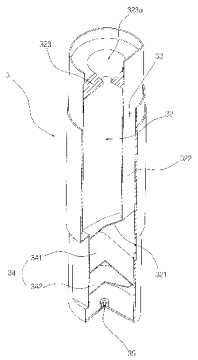
전체 청구항 수 : 총 8 항 심사관 : 조성호

(54) 전자담배

(57) 요 약

본 발명은 전자담배에 대한 것으로, 더욱 상세하게는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하여, 비산되는 연기와 함께 흡입된 액체성분을 효과적으로 분리하여 배출되는 연기에는 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌감을 느끼지 않도록 할 수 있는 전자담배를 제공하고자 한다.

대 표 도 - 도4



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NJOY Exhibit 1002.637

특허청구의 범위

청구항 1

용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서,

상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와, 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와, 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와, 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기통을 포함하며,

상기 액체분리부는 상기 유입로의 하측에 위치하며 상기 카트리지 내면 일측에서 돌출되어 대향되는 방향으로 일정 길이 연장되는 상부판과, 상기 상부판의 하측에 위치하며 상기 상부판이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판이 돌출되는 일측 방향으로 일정 길이 연장되는 하부판을 포함하며,

상기 액체분리부는 상기 유입로를 통해 유입된 연기와 액체성분과 부딪혀 와류를 생성하고 속도를 감소시켜 액체성분이 상기 액체분리부에 맺히게 되어 포집되는 것을 특징으로 하는 전자담배.

청구항 2

삭제

청구항 3

제1항에 있어서,

상기 상부판과 하부판은 각각 말단으로 갈수록 상측 방향을 향해 경사지는 형태를 가지는 것을 특징으로 하는 전자담배.

청구항 4

제3항에 있어서, 상기 용액저장부는

하면이 상기 카트리지 내면에 접촉하는 일측에서 대향되는 타측으로 갈수록 상측 방향을 향해 경사지는 형태를 가지는 것을 특징으로 하는 전자담배.

청구항 5

제1항에 있어서,

상기 용액저장부는 상면을 덮는 덮개를 추가로 포함하며, 상기 덮개는 상하관통되어 형성되며 상면의 직경이 하면의 직경보다 큰 절두원추형상을 가지는 수용홈을 포함하는 것을 특징으로 하는 전자담배.

청구항 6

제1항에 있어서,

상기 액체분리부는 상기 하부판의 말단에 연결되는 포집체를 추가로 포함하며, 상기 포집체는 그 내부에 하나 이상의 다면부재를 포함하는 것을 특징으로 하는 전자담배.

청구항 7

제6항에 있어서, 상기 다면부재는

망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있는 것을 특징으로 하는 전자담배.

청구항 8

제1항에 있어서,

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상기 상부판과 하부판은 각각 파형 형상으로 형성됨으로써 연기와의 접촉면적을 넓힐 수 있는 것을 특징으로 하는 전자담배.

청구항 9

제1항에 있어서, 상기 상부판은

상기 상부판의 말단에 위치하며 다소의 공극을 포함하는 다공부재를 포함하는 것을 특징으로 하는 전자담배.

명 세 서

기 술 분 야

[0001] 본 발명은 전자담배에 대한 것으로, 더욱 상세하게는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하여, 비산되는 연기와 함께 흡입된 액체성분을 효과적으로 분리하여 배출되는 연기에는 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌감을 느끼지 않도록 할 수 있는 전자담배를 제공하고자 한다.

배 경 기 술

[0002] 전자담배란 궐련, 엽궐련, 파이프 담배 등의 흡연식 담배의 대안으로 개발된 제품으로, 일반 흡연식 담배와 유사한 형태를 가지고 상기 전자담배의 흡입시 내부에 저장된 용액이 가열되거나 초음파 진동 등의 방식을 통해 기화되어 연기 형태로 외부로 배출되게 된다. 상기 전자담배는 흡연식 담배를 피우는 것과 유사한 효과를 내기 위해 상기 전자담배의 흡입시 담배가 타는 듯한 모습을 형상화한 불빛이 발생하기도 한다.

[0003] 상기 흡연식 담배의 연기에는 타르, 니트로아민, 탄화수소, 일산화탄소 등의 인체에 유해한 성분들이 많이 포함되어 있어, 흡연자의 건강을 해칠 뿐만 아니라 주변 사람들에도 간접흡연으로 인해 피해를 주게 된다. 또한, 상기 흡연식 담배의 연기는 특유의 냄새가 나서 흡연자나 주변 사람들에게 불쾌감을 주기도 한다. 따라서, 전 세계적으로 행정규제상 흡연을 할 수 있는 장소가 제한되고, 금연을 촉진시키기 위한 각종 정책이 시행되고 있다.

[0004] 하지만, 흡연자들은 담배에 포함된 니코틴에 중독되어 쉽게 담배를 끊을 수 없는 것이 현실이다. 또한, 종래의 금연 또는 담배 대용품들은 흡연자의 욕구를 충족시키지 못하고 있는 실정이다. 이에 따라 개발된 것이 전자담배인데, 상기 전자담배는 니코틴 등을 포함한 용액을 기화시켜 연기를 생성하므로 흡연욕구를 충족시킬 수 있을 뿐만 아니라, 일반 흡연식 담배와 달리 타르 등의 유해물질을 배출하지 않고 불쾌한 냄새가 나지 않는 장점이 있다.

[0005] 그러나, 상기 전자담배는 많은 장점에도 불구하고, 전자담배의 흡입시 충분히 기화되지 않은 액체상태의 용액이 함께 배출되어, 흡연자의 입 안에 유입되어 흡연자에게 불쾌감을 주는 문제점이 있다.

[0006] 따라서, 전자담배의 장점을 살리면서도 배출되는 연기에 액체상태의 용액이 함께 배출되지 않도록 하는 전자담배의 필요성이 증대되고 있다.

발명의 내용

해결하려는 과제

[0007] 본 발명은 상기와 같은 문제점을 해결하기 위해 안출된 것으로,

[0008] 본 발명은 전자담배에서 배출되는 연기에 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌함을 느끼지 않도록 할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0009] 또한, 본 발명은 카트리지 내로 유입된 연기가 액체분리부를 거친 후에 외부로 배출되도록 하여 상기 연기에서 효과적으로 액체성분을 제거할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0010] 또한, 본 발명은 용액저장부의 하면이 경사지도록 형성되어 상기 액체분리부에서 분리된 액체성분을 효과적으로 기화장치로 배출할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0011] 또한, 본 발명은 용액저장부를 덮는 덮개는 절두원추형상을 가지는 수용홈을 포함하여, 용액저장부에 저장된 용액이 쉽게 외부로 흘러내리는 것을 방지할 수 있는 전자담배를 제공하는데 그 목적이 있다.

[0012] 또한, 본 발명은 유입되는 연기와의 접촉면적을 최대화하여 비산되는 연기에 포함되어 작은 크기의 액체성분까지도 효과적으로 분리할 수 있는 전자담배를 제공하는데 그 목적이 있다.

과제의 해결 수단

[0013] 본 발명은 앞서 본 목적을 달성하기 위해서 다음과 같은 구성을 가진 실시예에 의해서 구현된다.

[0014] 본 발명의 일 실시예에 따르면, 본 발명에 따른 전자담배는 용액을 저장하며 연기를 외부로 배출하는 카트리지를 포함하는 전자담배에 있어서, 상기 카트리지는 내면 일측에 형성되어 용액을 저장하는 용액저장부와, 상기 용액저장부에 저장된 용액이 기화장치를 거치면서 형성된 연기가 유입되는 유입로와, 상기 유입로를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부와, 상기 액체분리부에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈을 포함하며, 상기 액체분리부는 상기 유입로를 통해 유입된 연기와 액체성분과 부딪혀 와류를 생성하고 속도를 감소시켜 액체성분이 상기 액체분리부에 맺히게 되어 포집되는 것을 특징으로 한다.

[0015] 본 발명의 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 액체분리부는 상기 유입로의 하측에 위치하며 상기 카트리지 내면 일측에서 돌출되어 대향되는 방향으로 일정 길이 연장되는 상부판과, 상기 상부판의 하측에 위치하며 상기 상부판이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판이 돌출되는 일측 방향으로 일정 길이 연장되는 하부판을 포함하는 것을 특징으로 한다.

[0016] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판과 하부판은 각각 말단으로 갈수록 상측을 향해 경사지는 형태를 가지는 것을 특징으로 한다.

[0017] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 용액저장부는 하면이 상기 카트리지 내면에 접촉하는 일측에서 대향되는 타측으로 갈수록 상측을 향해 경사지는 형태를 가지는 것을 특징으로 한다.

[0018] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 용액저장부는 상면을 덮는 덮개를 추가로 포함하며, 상기 덮개는 상하관통되어 형성되며 상측의 직경이 하측의 직경보다 큰 절두원추형상을 가지는 수용홈을 포함하는 것을 특징으로 한다.

[0019] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 액체분리부는 상기 하부판의 말단에 연결되는 포집체를 추가로 포함하며, 상기 포집체는 그 내부에 하나 이상의 다면부재를 포함하는 것을 특징으로 한다.

[0020] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 다면부재는 망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있는 것을 특징으로 한다.

[0021] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판과 하부판은 각각 파형 형상으로 형성됨으로써 연기와의 접촉면적을 넓힐 수 있는 것을 특징으로 한다.

[0022] 본 발명의 또 다른 실시예에 따르면, 본 발명에 따른 전자담배에 있어서 상기 상부판은 상기 상부판의 말단에 위치하며 다소의 공극을 포함하는 다공부재를 포함하는 것을 특징으로 한다.

발명의 효과

[0023] 본 발명은 앞서 본 실시예와 하기에 설명할 구성과 결합, 사용관계에 의해 다음과 같은 효과를 얻을 수 있다.

[0024] 본 발명은 전자담배에서 배출되는 연기에 액체성분이 포함되지 않도록 하여 전자담배의 사용자가 불쾌함을 느끼지 않도록 할 수 있는 특징이 있다.

[0025] 또한, 본 발명은 카트리지 내로 유입된 연기가 액체분리부를 거친 후에 외부로 배출되도록 하여 상기 연기에서 효과적으로 액체성분을 제거할 수 있는 효과가 있다.

[0026] 또한, 본 발명은 용액저장부의 하면이 경사지도록 형성되어 상기 액체분리부에서 분리된 액체성분을 효과적으로 기화장치로 배출할 수 있는 효과가 있다.

[0027] 또한, 본 발명은 용액저장부를 덮는 덮개는 절두원추형상을 가지는 수용홈을 포함하여, 용액저장부에 저장된 용

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액이 쉽게 외부로 흘러내리는 것을 방지할 수 있는 효과가 있다.

[0028] 또한, 본 발명은 유입되는 연기와의 접촉면적을 최대화하여 비산되는 연기에 포함되어 작은 크기의 액체성분까지도 효과적으로 분리할 수 있는 전자담배를 제공하는데 그 목적이 있다.

도면의 간단한 설명

[0029] 도 1은 본 발명의 일 실시예에 따른 전자담배의 사시도.

도 2는 본 발명의 일 실시예에 따른 전자담배의 분해사시도.

도 3은 본 발명의 일 실시예에 따른 전자담배를 개략적으로 표현한 단면도.

도 4는 본 발명의 일 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도.

도 5는 본 발명의 일 실시예에 따른 전자담배의 요부를 표현한 단면도.

도 6은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도.

도 7은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 다면부재의 사시도.

도 8은 본 발명의 다른 실시예에 따른 전자담배의 요부를 표현한 단면도.

발명을 실시하기 위한 구체적인 내용

[0030] 이하에서는 본 발명에 따른 전자담배를 첨부된 도면을 참조하여 상세히 설명한다. 도면들 중 동일한 구성요소들은 가능한 한 어느 곳에서든지 동일한 부호들로 나타내고 있음에 유의해야 한다. 또한 본 발명의 요지를 불필요하게 흐릴 수 있는 공지 기능 및 구성에 대한 상세한 설명은 생략한다. 특별한 정의가 없는 한 본 명세서의 모든 용어는 본 발명이 속하는 기술분야의 통상의 지식을 가진 기술자가 이해하는 당해 용어의 일반적 의미와 동일하고 만약 본 명세서에 사용된 용어의 의미와 충돌하는 경우에는 본 명세서에 사용된 정의에 따른다.

[0031] 도 1은 본 발명의 일 실시예에 따른 전자담배의 사시도이고, 도 2는 본 발명의 일 실시예에 따른 전자담배의 분해사시도이고, 도 3은 본 발명의 일 실시예에 따른 전자담배를 개략적으로 표현한 단면도이고, 도 4는 본 발명의 일 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도이고, 도 5는 본 발명의 일 실시예에 따른 전자담배의 요부를 표현한 단면도이고, 도 6은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지의 부분절단 사시도이고, 도 7은 본 발명의 다른 실시예에 따른 전자담배에 사용되는 다면부재의 사시도이고, 도 8은 본 발명의 다른 실시예에 따른 전자담배의 요부를 표현한 단면도이다.

[0032] 도 1 내지 5를 참조하면, 본 발명의 일 실시예에 따른 전자담배는 상기 전자담배에 전원을 공급하며 빛을 발생시키는 전원장치(1)와, 상기 전원장치(1) 하단에 결합하여 카트리지(3)에 저장된 용액을 공급받아 기화시켜 연기를 생성하는 기화장치(2)와, 상기 기화장치(2) 하단에 결합하여 용액을 저장하며 상기 기화장치(2)에서 생성된 연기를 외부로 배출하는 카트리지(3) 등의 구성을 포함한다.

[0033] 먼저 본 발명의 일 실시예에 따른 전자담배의 전체적인 구성 간의 결합관계를 살펴보면, 상기 전원장치(1)의 외측면 하단에는 나사선(11)이 형성되고, 상기 기화장치(2)의 내측면 상단에는 전원장치(1)의 나사선(11)에 대응되는 나사선(21)이 형성되어, 상기 전원장치(1)와 기화장치(2)는 나사결합한다. 상기 전원장치(1)와 기화장치(2)에 형성된 나사선(11, 21)은 도체로 이루어져 상기 전원장치(1)와 기화장치(2)를 전기적으로도 연결시킨다. 상기 카트리지(3)의 외측면 상단이 상기 기화장치(2)의 내측면 하단에 삽입되어, 상기 기화장치(2)와 카트리지(3)는 결합하며, 상기 기화장치(2)의 용액수집부(221)는 끝단은 상기 카트리지(3)의 수용홈(323a)에 위치하여 섬유부재(36)와 접촉하게 된다.

[0034] 상기 전원장치(1)는 상기 전자담배에 전원을 공급하며 빛을 발생시키는 구성으로, 일정형상을 가지며 바람직하게는 내부가 관통된 원통형의 형상을 가진다. 상기 전원장치(1)는 투광창(12), 발광소자(13), 전지(14), 회로부

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(15), 스위치(16), 공기유입공(17) 등의 구성을 포함한다.

[0035] 상기 투광창(12)은 상기 전원장치(1)의 상단에 부착되어 상기 발광소재에서 발산되는 빛을 외부로 배출하는 창으로, 예컨대, 폴리카보네이트 수지로 이루어진 판이 사용될 수 있다. 상기 발광소자(13)는 상기 전원장치(1)의 내부에 위치하여 후술할 전지(14)로부터 전원을 공급받아 빛을 생성하는 구성으로, 예컨대, 엘이디 소자가 사용될 수 있다. 상기 전자담배 사용시 발광소재에서 생성된 담배가 타는 듯한 모습을 형상화한 빛이 상기 투광창(12)을 통해 외부로 발산되므로, 상기 전자담배의 사용자는 실제 담배를 흡연할 때와 같은 느낌을 가지게 된다. 상기 전지(14)는 상기 전원장치(1)의 내부에 위치하여 상기 전자담배에 전원을 공급하는 구성으로, 상기 발광소자(13) 및 기화장치(2)의 기화부(22)에 전원을 공급한다. 상기 전지(14)는 충전이 가능한 리튬폴리머 전지 등이 사용될 수 있다. 상기 회로부(15)는 전원장치(1)의 내부에 위치하여 상기 전자담배의 전기적인 작동을 제어하는 부분으로, 상기 발광소자(13) 및 기화부(22)를 작동시킨다. 상기 스위치(16)는 상기 전원장치(1)의 내부에 위치하여 공기의 유동에 따라 온/오프되며, 예컨대, 유압스위치가 사용될 수 있다. 상기 전원장치(1) 내로 공기가 유입되면 상기 스위치(16)는 온되어 전원이 회로부(15)에 전달되고, 상기 회로부(15)는 상기 발광소자(13)와 기화부(22)를 구동시킨다. 상기 공기유입공(17)은 일측면에 형성된 통공으로, 상기 전자담배의 사용자가 흡입시 외부공기가 상기 공기유입공(17)을 통해 내부로 유입되게 된다.

[0036] 상기 기화장치(2)는 상기 전원장치(1)의 작동지시에 의해 상기 카트리지(3)에 저장된 용액을 공급받아 기화시켜 연기를 생성하는 구성으로, 일정형상을 가지며 바람직하게는 내부가 관통된 원통형상을 가지며, 기화부(22) 등의 구성을 포함한다.

[0037] 상기 기화부(22)는 상기 기화장치(2) 내에 위치하여 상기 카트리지(3)에 저장된 용액을 공급받아 연기를 생성하는 구성으로, 용액수집부(221)와 가열코일(222) 등의 구성을 포함한다. 상기 용액수집부(221)는 끝단이 상기 카트리지(3) 수용홈(323a)에 위치하여 수용홈(323a)에 놓여 진 섬유부재(36)와 접촉하여 용액을 흡입하는 구성으로, 예컨대, 폴리에스터 포말, 스테인레스 섬유 포말 등으로 제조될 수 있다. 상기 가열코일(222)은 상기 용액수집부(221)에 일측에 연결되어 상기 용액수집부(221)를 통에 스며든 용액을 가열하여 기상상태로 변환하여 연기를 발생시킨다.

[0038] 상기 카트리지(3)를 설명함에 있어, 본 발명에서는 배기홈(35)이 위치하는 방향을 상기 카트리지(3)의 하측 방향으로 표현하고, 덮개(323)가 위치하는 방향을 상기 카트리지(3)의 상측 방향으로 표현하기로 한다.

[0039] 상기 카트리지(3)는 용액을 저장하며 상기 기화장치(2)에서 생성된 연기를 외부로 배출하는 구성으로, 일정형상을 가지며 바람직하게는 하면이 막혀진 원통형의 형상을 가진다. 상기 카트리지(3)는 하단에는 상하로 압착된 형태를 가지는 압착부(31)가 형성되어, 흡연자가 상기 전자담배를 입에 물기 쉽게 하도록 할 수 있다. 상기 카트리지(3)는 내면 일측에 형성되어 용액을 저장하는 용액저장부(32)와, 상기 용액저장부(32)에 저장된 용액이 기화장치(2)를 거치면서 형성된 연기가 유입되는 유입로(33)와, 상기 유입로(33)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 액체분리부(34)와, 상기 액체분리부(34)에서 액체성분이 제거된 연기를 외부로 배출하는 배기홈(35) 등의 구성을 포함한다.

[0040] 상기 용액저장부(32)는 상기 카트리지(3) 내면 일측에 형성되어 전자담배에 사용되는 용액을 저장하는 구성으로, 일정한 입체적 형상을 가지며 바람직하게는 상기 카트리지(3)의 내면 일측에서 돌출되어 하면(321)을 형성하고 상기 하면(321)의 끝단에서 상측 방향으로 절곡되어 측면(322)을 형성하는 입체적 형상을 가질 수 있다. 상기 하면(321)은 끝단으로 갈수록 상측 방향으로 경사지는 형태를 가지도록 형성되어, 후술할 수용공간(S)에 분리되어 있는 액체성분을 기화장치(2)로 손쉽게 배출할 수 있도록 한다. 상기 수용공간(S)에 액체성분이 분리되는 원리 및 분리된 액체성분은 기화장치(2) 및 용액저장부(32)로 배출되는 원리는 하기에서 자세히 설명하기로 한다.

[0041] 상기 용액저장부(32)는 상면을 덮는 덮개(323)를 포함하며, 상기 덮개(323)는 후술할 섬유부재(36)가 놓여지는 수용홈(323a)이 형성된다. 상기 수용홈(323a)은 상기 덮개(323)를 상하관통하여 형성되며, 절두원추 형상을 가지며 상면이 하면보다 직경이 넓은 형상이다. 유체 역학 기본 방정식 중에 연속 방정식에 의하면 단면적과 속도의 곱은 일정하므로 상면보다 직경이 작은 하면의 속도는 상면보다 크게 된다. 또한, 베르누이 방정식에 의해 상면이 하면보다 속도가 느리므로 압력은 상면이 하면보다 크며, 유체는 고압에서 저압으로 흐르는 성질을 가지

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고 있기 때문에 상기 수용홈(323a)에 위치하는 솜 등으로 이루어진 섬유부재(36)에 적셔진 용액은 압력차에 의해 수용홈(323a) 외부로 쉽게 배출되지 않는다. 상기 용액저장부(32)에 저장되는 용액은 니코틴 액 등을 포함하여 다양한 맛과 향이 나는 기호성 용액이 사용될 수 있다.

[0042] 상기 유입로(33)는 상기 용액저장부(32)에 저장된 용액이 기화장치(2)를 거치면서 형성된 연기가 유입되는 통로로, 상기 용액저장부(32)가 카트리지(3) 내면 일측에 형성됨에 따라 상기 용액저장부(32)의 측면(332)과 상기 카트리지(3) 내면에 사이에 형성된다.

[0043] 상기 액체분리부(34)는 상기 유입로(33)의 하측에 위치하여 상기 유입로(33)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 구성으로, 상부판(341)과 하부판(342)을 포함한다. 상기 유입로(33)에는 연기뿐만 아니라 상기 용액저장부(32)에 저장된 용액의 일부가 기화되지 않은 상태로 흡입압력에 의해 함께 유입될 수 있고, 상기 용액저장부(32)에 저장된 용액이 상기 기화부(22)로 이동하여 기화되는 과정에서 완전히 기화되지 않은 작은 크기의 액체 상태의 용액이 함께 유입될 수 있다. 본원 발명 전체에 걸쳐 상기 연기에 포함되어 있는 액체상태의 용액들을 액체성분이라 칭하기로 한다.

[0044] 상기 상부판(341)은 상기 유입로(33)의 하측에 위치하며 상기 유입로(33)를 둘러쌓는 카트리지(3) 내면에서 돌출되어 대향되는 방향으로 일정 길이 연장되며, 끝단으로 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 상부판(341)에는 상기 유입로(33)로부터 유입되는 연기가 부딪히게 된다. 상기 유입로(33)로부터 유입된 연기는 상기 상부판(341)에 부딪혀 상기 카트리지(3) 내면과 상기 상부판(341) 사이에 형성되는 제1이격틈(h1) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다.

[0045] 상기 하부판(342)은 상기 상부판(341)의 하측에 위치하며 상기 상부판(341)이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판(341)이 돌출되는 일측 방향으로 일정 길이 연장되며, 끝단을 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 제1이격틈(h1)을 통해 유입된 연기와 부딪히게 된다. 상기 제1이격틈(h1)으로부터 유입된 연기는 상기 하부판(342)에 부딪혀 상기 카트리지(3) 내면과 상기 하부판(342) 사이에 형성되는 제2이격틈(h2)방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다. 상기 액체분리부(34)에서 유입되는 연기에 포함되어 있는 액체성분을 제거하는 원리는 하기에서 자세히 설명하기로 한다.

[0046] 상기 배기홈(35)은 상기 카트리지(3) 하면에 천공되어 형성되는 구멍으로, 상기 전자담배의 사용자가 흡입하는 경우 상기 액체분리부(34)를 거쳐 액체성분이 제거된 연기를 외부로 배출하게 된다.

[0047] 상기와 같은 구성을 포함하는 전자담배에 있어서 작동원리를 도 1 내지 5를 참조하여 설명하면, 사용자가 도 1과 같이 결합된 전자담배를 입에 물고 흡입하면 상기 전자담배의 내부의 압력은 급속히 낮아지게 되고 공기유입공(17)을 통해 외부공기가 유입되어 공기 유동을 발생시켜 스위치(16)를 온시키게 된다. 상기 스위치(16)가 연결되므로 상기 발광소자(13)와 가열부는 회로부(15)의 작동지시에 의해 구동하게 된다. 상기 가열부가 구동하므로 용액저장부(32), 섬유부재(36), 용액수집부(221)를 차례로 거친 용액은 가열코일(222)에 의해 가열되어 기체상태로 변환되어 연기가 생성되게 된다.

[0048] 상기 기화장치(2)에 생성된 연기는 흡입압력에 의해 상기 유입로(33)를 통해 유입되어 액체분리부(34)와 배기홈(35)을 차례로 거쳐 외부로 배출되게 된다. 다만, 상기 유입로(33)를 통해 유입되는 연기에는 상기에서 살펴본 바와 같이 액체성분이 포함되어 있는 데, 상기 액체분리부(34)를 거치는 과정에서 액체성분이 제거되어 기체 상태의 연기만이 배기홈(35)을 통해 배출되게 된다. 상기 액체분리부(34)가 연기에 포함되어 있는 액체성분을 제거하는 원리를 살펴보면, 먼저 상기 유입로(33)를 통해 유입된 연기는 상부판(341)에 부딪힌 후 제1이격틈(h1)을 통해 배출되게 되는데, 상기 연기가 상부판(341)에 부딪히게 되면서 와류가 발생하고 압력과 속도가 감소하게 된다. 상기 연기는 와류가 발생하여 상기 상부판(341)과 여러 번 부딪혀 접촉면적이 크게 되고, 압력과 속도가 감소하여 상기 상부판(341)에 접촉하는 시간이 길게 되어, 이때 연기에 포함되어 있는 액체성분의 일부는 상기 상부판(341)에 맺히게 되고 중력에 의해 상부판(341)을 타고 내려 제1이격틈(h1)을 통과하여 상기 카트리지(3) 내면과 상기 하부판(342)의 상면에 의해 형성되는 수용공간(S)에 위치하게 된다. 상기 제1이격틈(h1)을 통해 유입된 연기는 하부판(342)에 부딪힌 후 제2이격틈(h2)을 통해 배출되게 되는데, 상기 연기가 하부판(342)에 부딪히게 되면서 와류가 발생하고 압력과 속도가 감소하게 된다. 상기 연기는 와류가 발생하여 상기 하부판(342)과 여러 번 부딪혀 접촉면적이 크게 되고, 압력과 속도가 감소하여 상기 하부판(342)에 접촉하는 시간이 길게 되어, 이때 연기에 포함되어 있는 작은 크기의 액체성분은 상기 하부판(342)에 맺히게 되고 중력에 의해 하측으로 떨어져 수용공간(S)에 모이게 된다. 상기 액체분리부(34)로 유입된 연기는 상기 상부판(341)과 하부판

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(342)을 차례로 거치면서 이중으로 액체성분이 분리되어, 상기 배기홈(35)을 통해 배출되는 연기에 포함되는 액체성분을 최소화할 수 있다. 따라서, 상기 전자담배의 사용자는 기체상태의 연기만 흡입할 수 있어, 쾌적한 사용감을 느끼게 된다.

[0049] 상기 수용공간(S)에 분리된 액체성분은 상기 전자담배의 사용 후 상기 카트리지(3) 말단 부분을 들면 상기 제1이격틈(h1)을 통과하고 경사진 하면(321)을 따라 상기 유입로(33)를 통해 상기 액체수집부와 섬유부재(36) 방향으로 흘러 내려 분리된 액체성분을 효과적으로 제거하고 재활용할 수 있다.

[0050] 본 발명의 다른 실시예에 따른 전자담배에 사용되는 카트리지(4)를 도 6 내지 8을 참조하여 설명하면, 상기 카트리지(4)는 용액저장부(42), 유입로(43), 액체분리부(44), 배기홈(45) 등의 구성을 포함한다. 이하에서는 도 1 내지 5를 참조하여 설명한 카트리지(3)와 차이가 있는 액체분리분에 대해서 설명하기로 한다.

[0051]

[0052] 상기 액체분리부(44)는 상기 유입로(43)의 하측에 위치하여 상기 유입로(43)를 통해 유입된 연기에 포함되어 있는 액체성분을 제거하는 구성으로, 상부판(441), 하부판(442), 포집체(443) 등을 포함한다.

[0053] 상기 상부판(441)은 상기 유입로(43)의 하측에 위치하며 상기 유입로(43)를 둘러쌓는 카트리지(4) 내면에서 돌출되어 대향되는 방향으로 일정 길이 연장되며, 끝단으로 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 상부판(441)에는 상기 유입로(43)로부터 유입되는 연기가 부딪히게 된다. 상기 상부판(441)은 유입되는 연기와의 접촉면적을 최대한 확보하도록 하고, 연기의 흐름을 원활하게 유도하기 위하여 파형 형태를 가지는 것이 바람직하다. 상기 연기는 상기 상부판(441)에 부딪혀 상기 카트리지(4) 내면과 상기 상부판(441) 사이에 형성되는 제1이격틈(h3) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다. 상기 상부판(441)은 그 말단에 다수의 공극을 포함하는 다공부재(4411)를 포함할 수 있다.

[0054] 상기 다공부재(4411)는 상기 상부판(441)의 말단에 위치하며, 다수의 공극을 포함하는 형태로 이들 공극이 서로 연통되어 망 형태를 가지며 액체성분이 이들 공극 사이로 스며들 수 있게 액체성분의 흡수율을 높인 것으로, 상기 다공부재(4411)를 통과하는 연기에 포함된 액체성분과 상기 상부판(441)에 맺힌 액체성분이 상기 상부판(441)을 타고 흐르게 되면서 상기 다공부재(4411)에 흡수된다. 상기 다공부재(4411)에 흡수된 액체성분은 점점 응집되고 액체 방울이 되어 하중이 증가함에 따라 자유낙하게 한다. 다수의 공극을 가진 재료라면 모두 상기 다공부재(4411)로 사용될 수 있으며, 상기 다공부재(4411)의 바람직한 실시예로는 액체성분을 흡수할 수 있는 스폰지 등과 같은 것이 사용될 수 있다.

[0055] 상기 하부판(442)은 상기 상부판(441)의 하측에 위치하며 상기 상부판(441)이 돌출되는 일측과 대향되는 타측에서 돌출되어 상기 상부판(441)이 돌출되는 일측 방향으로 일정 길이 연장되며, 끝단을 갈수록 상측 방향으로 기울어지는 형태를 가진 판으로, 상기 제1이격틈(h3)을 통해 유입된 연기와 부딪히게 된다. 상기 하부판(442)은 유입되는 연기와의 접촉면적을 최대한 확보하도록 하고, 연기의 흐름을 원활하게 유도하기 위하여 파형 형태를 가지는 것이 바람직하다. 상기 연기는 상기 하부판(442)에 부딪혀 상기 카트리지(4) 내면과 상기 하부판(442) 사이에 형성되는 제2이격틈(h4) 방향으로 향하게 되면서 와류가 발생하고 압력과 속도의 손실이 발생하게 된다.

[0056] 상기 포집체(443)는 상기 하부판(442)의 말단에 위치하여 연기에 포함되어 있는 액체성분을 최종적으로 분리하기 위한 부분으로, 상기 하부판(442)의 말단에서 상기 상부판(441)의 하면까지 연장되어 형성되며, 그 형상은 연기가 통과할 수 있도록 망 형상으로 형성되는 것이 바람직하다. 상기 포집체(443) 내부에는 통과하는 연기와의 접촉되는 면적을 증가시키기 위해 하나 이상의 다면부재(4431)가 포함될 수 있다.

[0057] 상기 다면부재(4431)는 상기 포집체(443) 내를 통과하는 연기와의 접촉면적을 증가시키기 위해 상기 포집체(443) 사이에 포함되는 부재로, 바람직하게는 망으로 이루어진 입체형상으로 형성됨으로써 연기가 내부로 통과하면서 접촉되는 면적을 최대화할 수 있다. 도 7을 참조하면, 상기 다면부재(4431)는 겉면과 내부가 망으로 형성되고 내부가 채워지지 않은 구 형상의 입체로 형성될 수 있는데, 이 경우 상기 다면부재(4431)를 통과하는 연기는 상기 다면부재(4431)의 겉면의 망을 지나 내부를 통과하여 다시 겉면의 망을 지나게 되므로 그만큼 접촉되는 면적이 증가하게 되고 압력과 속도가 감소하게 되어 연기에 포함된 액체성분이 상기 다면부재(4431) 내지는 포집체(443)에 맺히게 되고 이것이 응집되면 자유 낙하하여 수용공간(S)에 모이게 된다.

[0058] 상기와 같은 구성을 포함하는 액체분리부(44)는 상부판(441)과 하부판(442)에 의해서 연기에 포함되어 있는 액체성분을 분리할 수 있을 뿐만 아니라, 다공부재(4411)와 접촉부재를 통해서도 연기에 포함되어 있는 액체성분

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을 분리할 수 있어 연기 포함되어 있는 액체성분의 제거효율을 극대화할 수 있는 특징이 있다.

[0059] 이상에서, 출원인은 본 발명의 바람직한 실시예들을 설명하였지만, 이와 같은 실시예들은 본 발명의 기술적 사상을 구현하는 일 실시예일 뿐이며 본 발명에 속하는 것으로 해석되어야 한다.

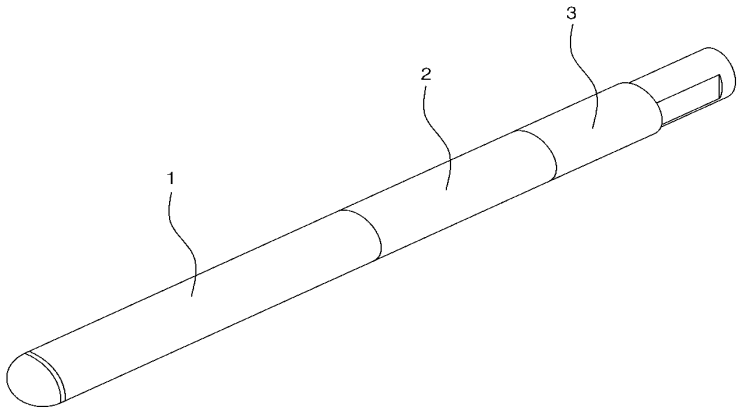
부호의 설명

[0060]

1: 전원장치	11: 나사선	12: 투광창
13: 발광소자	14: 전지	15: 회로부
16: 스위치	17: 공기유입공	
2: 기화장치	21: 나사선	22: 기화부
221: 용액수집부	222: 가열코일	
3,4: 카트리지	31, 41: 압착부	32, 42: 용액저장부
33,43: 유입로	34, 44: 액체분리부	35, 45: 배기홈
36, 46: 섬유부재	321, 421: 하면	322, 422: 측면
323, 423: 덮개	323a, 423a: 수용홈	341,441: 상부판
342,442: 하부판	443: 포집체	4411: 다공부재
4431: 다면부재		

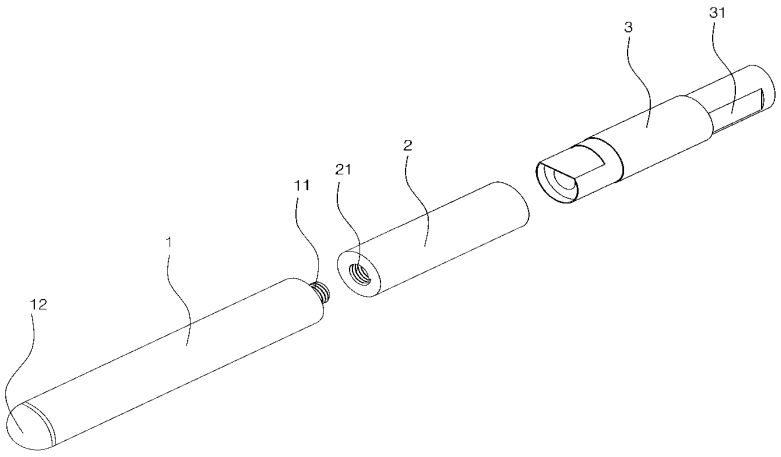
도면

도면1

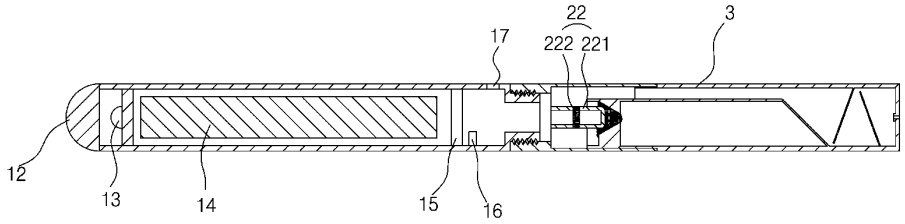


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도면2

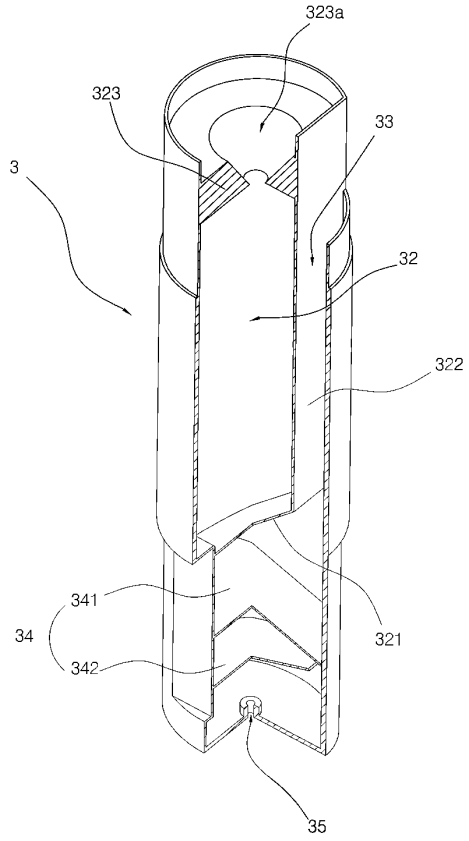


도면3

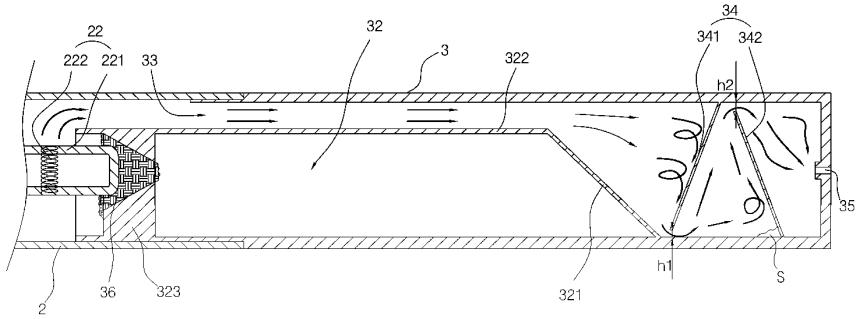


NJOY Exhibit 1002.645

도면4

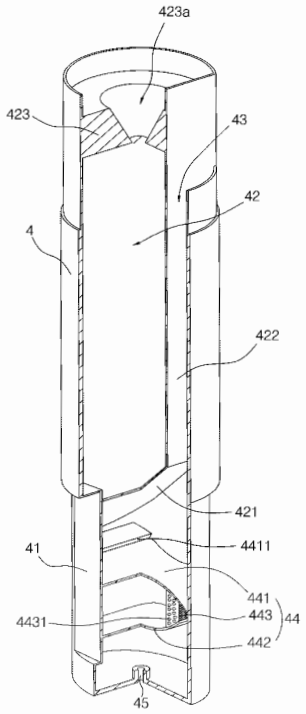


도면5

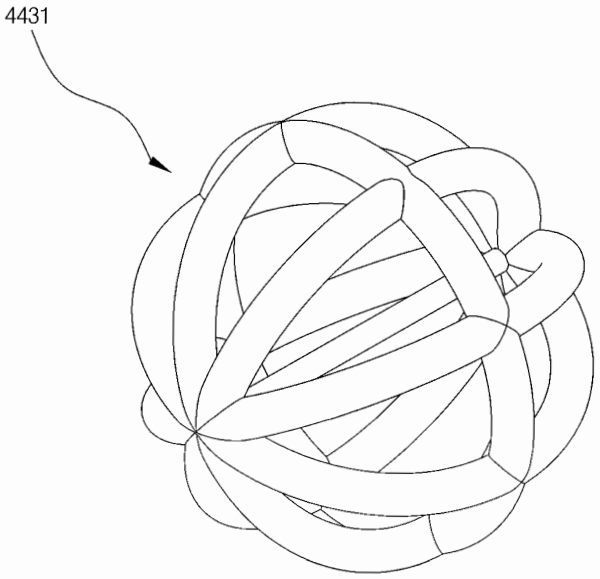


NJOY Exhibit 1002.646

도면6

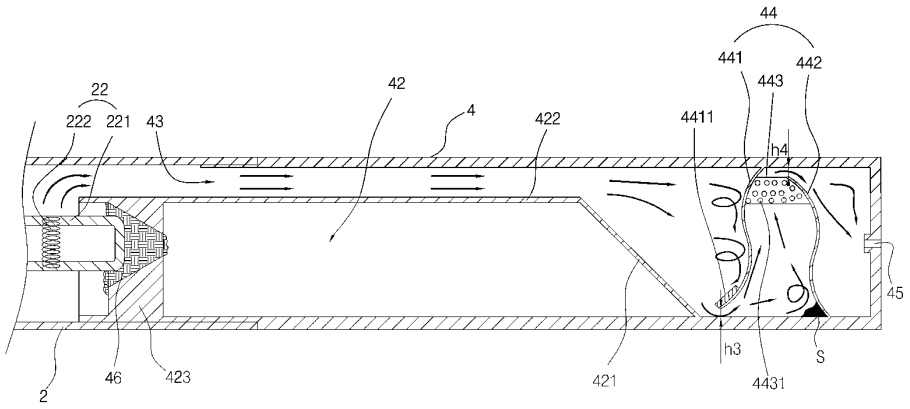


도면7



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도면8



NJOY Exhibit 1002.648

KR20110006928U - AN ELECTRONIC CIGARETTE

Translated: 4-2-2020 17:41 **Family-Id:** 45568554 **Doc-Number:** KR.20110006928.U

Abstract

No abstract found

Description

[0001] Electronic cigarette

[0001] The present invention relates to an e-cigarette, and relates to an improved e-cigarette in which the supply of tobacco liquid to the heating member is quick and always a sufficient amount of tobacco liquid is supplied regardless of the amount of tobacco liquid stored in the cartridge.

[0002] An electronic cigarette is a product that removes tar and harmful ingredients and inhales smoke after heating tobacco liquid containing nicotine and various flavors.

[0003] The conventional electronic cigarette includes a battery unit for supplying electricity to the heating element installed in the atomizer, the atomizer for burning the smoke by burning the liquid, and a method of manually dropping a few drops of tobacco liquid to the cotton or sponge and to the cartridge There is a cartridge method that stores the tobacco liquid and the tobacco liquid falls.

[0004] The way in which the user drops the tobacco liquid on the cotton or sponge is that the amount of tobacco liquid absorbed by the cotton varies depending on the amount of cotton or the density of the cotton, and there is also a problem of contamination caused by the cotton or sponge.

[0005] In the cartridge method, the tobacco liquid is supplied to the cotton or sponge from the cartridge by gravity or glass fiber. However, according to the user's habit or the amount of stored tobacco liquid inside the cartridge, or the contamination of the tobacco liquid discharge hole formed in the cartridge, the phenomenon that the tobacco liquid is not supplied smoothly to the heating coil often occurred. However, when insufficient amount of tobacco liquid is supplied to the heating coil, the heating coil burns or becomes contaminated. In addition, the tobacco liquid is dropped into the glass fiber and the heating coil of the atomizer directly through the tobacco liquid outlet formed in the cartridge. Fiber may be supplied, and in this case, a phenomenon in which the tobacco liquid leaks into the air hole in the lower portion overflows the glass fiber.

[0007] An object of the present invention is to solve the above-mentioned problems, and to provide an electronic cigarette that is always supplied with sufficient and proper tobacco liquid from the cartridge to the heat generating member and that there is no fear of leakage of tobacco liquid through the air hole.In addition, another object of the present invention is to provide an electronic cigarette that can adjust the amount of air that is conveniently inhaled from time to time while inhaling cigarette smoke.

[0008] E-cigarette of the present invention for achieving the above object, the suction cap for the user to inhale tobacco smoke, connected to the suction cap and the cartridge to store the tobacco liquid, connected to the lower portion of the tobacco liquid cartridge And an atomizer having an absorbing member and a heat generating member in contact with the absorbing member, and a battery unit connected to a lower end of the atomizer to supply electricity to the heat generating member, wherein the atomizer has an opening at a side of the body. And an absorbing member protrudes through the opening, and when the cartridge and the atomizer are combined, at least a part of the absorbing member is immersed in the tobacco liquid stored in the cartridge.The upper protrusion tube of the battery unit is formed with an air hole in communication with the internal space of the atomizer, it is preferable to further include an air adjusting member for controlling the opening and closing of the air hole.The air control member may include a ring-shaped ring body, a control plate for adjusting the air hole and a control knob protruding to one side of the control plate.The cartridge has a shape in which the upper part is sealed and the lower part is open, and a central pipe for discharging tobacco smoke is installed at the center.The cartridge is preferably a transparent window formed on one side so that the amount of tobacco liquid stored in the cartridge.

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[0009] In the electronic cigarette of the present invention, since the absorbent member is always dipped in the tobacco liquid stored in the cartridge, the absorbent member is always sufficiently filled with the tobacco liquid, and sufficient tobacco smoke can be generated and the user's satisfaction can be enhanced.In addition, the present invention is a structure that absorbs the tobacco liquid by the osmotic pressure of the absorbing member immersed in the tobacco liquid, rather than the structure in which the tobacco liquid falls from the cartridge as in the prior art, the tobacco more than the tobacco liquid that the absorbing member may contain The liquid is not absorbed, so even if the e-cigarette is not used for a long time, the leakage of the tobacco liquid into the air hole does not occur.In addition, the present invention is because the absorbent member immersed in the tobacco liquid absorbs the tobacco liquid, the tobacco liquid is always sufficiently supplied to the heating coil surrounding it, the cartridge discharged in the structure in which the tobacco liquid falls into the cartridge discharge hole of the prior art If the hole is contaminated, there is no fear of burning or contaminating the generated heating coil.In addition, the electronic cigarette of the present invention, since the air inlet air can be adjusted using the air control member, the suction force can be adjusted according to the user's taste, because the air control member is disposed in the battery unit Even while smoking, there is an advantage in that the adjustment knob can be easily adjusted by adjusting the suction force.

[0017] 1 is a perspective view of an electronic cigarette according to an embodiment of the present invention, Figure 2 is an exploded perspective view of the electronic cigarette shown in Figure 1, Figure 3 is a cross-sectional view of the electronic cigarette shown in FIG.

[0018] Hereinafter, with reference to the accompanying drawings will be described in detail the electronic cigarette 10 according to an embodiment of the present invention.

[0019] 1 to 3, the electronic cigarette 10 according to an embodiment of the present invention, the suction cap 20, the cartridge 30, the atomizer 50, the battery unit 90 and the air conditioning member And 70.

[0020] The suction cap 20 has a passage 25 formed therein, and can be coupled to and separated from the upper portion of the cartridge 30.

[0021] The cartridge 30 has a central pipe 34 vertically disposed at the center thereof and stores the tobacco liquid 33. The upper end of the cartridge 30 is sealed and the lower end is an open structure. Accordingly, when the atomizer 50 is to be separated, the stored tobacco liquid 33 does not pour when the cartridge 30 is upside down.

[0022] The atomizer 50 is detachably screwed to the lower end of the cartridge 30, and includes a body 57, an absorbing member 51 and a heat generating member 52. The outer peripheral surface of the body 57 is formed with a screw thread 58 for screwing the cartridge 30, it can be divided into a lower body 56 and the upper body 55 on the basis of the thread (58). The opening 59 is formed in the consultation of the upper body 55, and the opening 53 is formed symmetrically on the side surface. The opening 59 is connected to the lower end of the center pipe 34. Absorbing member 51 is composed of glass fibers in the present embodiment and is protruded out of both sides of the opening 53 in the interior space of the atomizer 50, the absorbing member 51 is an opening (so that both openings 51 are sealed) 53) is installed to fill up. Therefore, the tobacco liquid cannot enter the internal space of the atomizer 50 through the opening 53, but is absorbed only by the absorption force due to the osmotic pressure of the glass fiber 53. The heating member 52 is composed of a heating coil, the structure surrounding the glass fiber 51 and is capable of transferring sufficient heat to the glass fiber.

[0023] The battery unit 90 is connected to the lower end of the atomizer 50 and includes a battery 92 (not shown) and a switch 92 for supplying or blocking the battery to the atomizer 50. The upper part is provided with a protruding tube 94 and a thread 95. The protrusion tube 94 has an air hole 93 formed in a long hole shape in the horizontal direction, and the air hole 93 communicates with the internal space of the atomizer 50.

[0024] The air regulating member 70 includes a ring body 73, an adjusting plate 72, and an adjusting knob 71 in a ring shape. The ring body 73 may be rotated in contact with the protruding tube 94 of the battery unit 90, and the adjusting plate 73 is connected to the ring body 73 as a plate blocking the air hole 93. The adjusting knob 71 is protruded in a rectangular shape so that the user can hold and rotate by hand, and a fine anti-slip groove 75 is formed at the top.

[0025] Hereinafter, an operation relationship of the electronic cigarette 10 according to an embodiment of the present invention described above with reference to the accompanying Figures 1 to 3 will be described.

[0026] 1 and 3, when the cartridge 30 and the atomizer 50 are connected, the glass fiber 51 protruding to the side of the atomizer 50 is the tobacco liquid 33 stored in the cartridge 30. Dipped) The tobacco liquid 33 is naturally absorbed into the glass fiber 51 by the absorption force of the glass fiber 51 by osmotic pressure, and the glass fiber always contains a sufficient amount of tobacco liquid that it can absorb. When the concentration of the tobacco liquid is parallel, the

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tobacco liquid is no longer absorbed into the glass fiber 51. Therefore, the glass fiber 51 always contains an appropriate amount of tobacco liquid and the tobacco liquid 33 does not flow down even if it is not used for a long time.

[0027] When the user presses the switch 92, electricity is supplied to the heating coil 52 of the atomizer 50 instantaneously, and the glass fiber 51 wrapped in the heating coil 52 is heated, and the glass fiber 51 is The tobacco liquid contained is vaporized to generate sufficient tobacco smoke 54 in the atomizer internal space 61. The generated tobacco smoke 54 passes through the passage 25 and the double filter 27 of the central pipe 34 and the suction cap 20 in the internal space 61 of the atomizer 50 when the user inhales. Enters the mouth. 2Heavy filter 27 removes impurities that come up with the smoke.

[0028] Since part of the glass fiber 51 is always immersed in the tobacco liquid 33, the glass fiber 51 always absorbs the tobacco liquid regardless of the amount of the tobacco liquid 33 stored in the cartridge 30. The fiberglass can always contain enough tobacco liquid. Therefore, the heating coil 52 is also always in contact with the tobacco liquid, and contamination and burning of the heating coil 52 due to insufficient supply of the tobacco liquid do not occur.

[0029] In addition, since the tobacco liquid falls freely onto the glass fiber 51, the tobacco liquid is absorbed and contained only as much as the glass fiber can contain by the osmotic pressure of the glass fiber 51. There is no phenomenon that the liquid is dropped and spilled over the glass fiber and the tobacco liquid leaks into the air hole.

[0030] When the user wants to adjust the amount of air sucked in, the adjusting knob 71 of the air adjusting member 70 may be rotated left and right. In FIG. 1, when the adjusting knob 71 is rotated to the left side, the air hole 93 is further blocked to reduce the amount of air sucked, and when rotating to the right side, the air hole 93 is opened by the cutting portion 77. As the size increases, the amount of intake air increases. Therefore, the amount of air can be easily adjusted according to the suction force desired by the user. In particular, since the air control member 70 is mounted on the battery unit, the user has an essential advantage while adjusting the suction force to suit himself while smoking the electronic cigarette (10).

[0031] As described above and illustrated in connection with a preferred embodiment for illustrating the principle of the present invention, the present invention is not limited to the configuration and operation as shown and described. Rather, those skilled in the art will appreciate that many variations and modifications of the present invention are possible without departing from the spirit and scope of the appended claims. Accordingly, all such suitable changes, modifications, and equivalents should be considered to be within the scope of the present invention.

[0032] 10: Electronic cigarette 20: Suction cap 30; cartridge 34: central pipe 50: atomizer 51: absorbing member (glass fiber) 52; heat generating member (heating coil) 70: air adjusting member 90: battery unit 93: air hole

Claims

[0001] A suction cap that a user sucks tobacco smoke into the mouth; an ink cartridge connected to the suction cap and storing tobacco liquid; and connected to a lower portion of the tobacco liquid cartridge, and having an absorbing member and a heating member in contact with the absorbing member. One atomizer; And a battery unit connected to a lower end of the atomizer to supply electricity to the heat generating member, wherein the atomizer has an opening formed at a side of the body and an absorbing member protrudes through the opening, And at least a portion of the absorbing member is immersed in the tobacco liquid stored in the cartridge when the atomizer is combined.

[0002] According to claim 1, The upper protrusion tube of the battery unit is formed with an air hole in communication with the internal space of the atomizer, characterized in that it further comprises an air conditioning member for controlling the opening and closing of the air hole Electronic cigarette.

[0003] The electronic cigarette of claim 2, wherein the air control member includes a ring-shaped ring body, a control plate for adjusting the air hole, and a control knob protruding to one side of the control plate.

[0004] The electronic cigarette of claim 1, wherein the cartridge has a shape in which an upper part is sealed and an lower part is opened, and a central pipe for discharging tobacco smoke is installed at the center.

[0005] The electronic cigarette of any one of claims 1 to 4, wherein the cartridge has a transparent window formed on one side thereof so as to check the amount of tobacco liquid stored in the cartridge.

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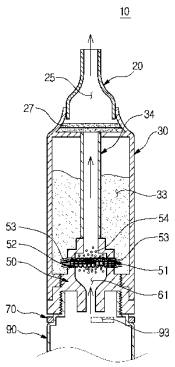
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(54) 전자담배

(57) 요 약

전자담배가 개시된다. 개시된 전자담배는 사용자가 입에 대고 담배연기를 흡입하는 흡입캡, 상기 흡입캡과 연결되며 담배액을 저장하는 액카트리지, 상기 담배액 카트리지의 하부에 연결되며, 흡수부재 및 상기 흡수부재와 접촉된 발열부재를 구비한 무화기 및, 상기 무화기의 하단에 연결되어 상기 발열부재에 전기를 공급하는 배터리유닛을 포함하며, 상기 무화기는 몸체의 측면에 개구가 형성되고 상기 개구를 통해 흡수부재가 돌출되어 있으며, 상기 카트리지와 상기 무화기를 결합 시 상기 흡수부재의 적어도 일부가 상기 카트리지에 저장된 담배액에 담궈지는 것을 특징으로 한다.

대 표 도 - 도3



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실용신안 등록청구의 범위

청구항 1

사용자가 입에 대고 담배연기를 흡입하는 흡입캡;

상기 흡입캡과 연결되며 담배액을 저장하는 액카트리지;

상기 담배액 카트리지의 하부에 연결되며, 흡수부재 및 상기 흡수부재와 접촉된 발열부재를 구비한 무화기; 및,

상기 무화기의 하단에 연결되어 상기 발열부재에 전기를 공급하는 배터리유닛;을 포함하며,

상기 무화기는 몸체의 측면에 개구가 형성되고 상기 개구를 통해 흡수부재가 들출되어 있으며, 상기 카트리지와 상기 무화기를 결합 시 상기 흡수부재의 적어도 일부가 상기 카트리지에 저장된 담배액에 담궈지는 것을 특징으로 하는 전자담배.

청구항 2

제 1 항에 있어서,

상기 배터리유닛의 상부 돌출관에는 상기 무화기의 내부공간과 연통된 공기구멍이 형성되어 있으며, 상기 공기구멍을 개폐정도를 조절하는 공기조절부재를 더 포함하는 것을 특징으로 하는 전자담배.

청구항 3

제 2 항에 있어서,

상기 공기조절부재는 링형상의 링몸체, 상기 공기구멍을 조절하는 조절판 및 상기 조절판의 일측으로 돌출된 조절노브를 포함하는 것을 특징으로 하는 전자담배.

청구항 4

제 1 항에 있어서,

상기 카트리지는 상부가 밀폐되고 하부가 개방된 형상이며, 중앙에 담배연기가 배출되는 중앙파이프가 설치된 것을 특징으로 하는 전자담배.

청구항 5

제 1항 내지 제 4항 중 어느 한 항에 있어서,

상기 카트리지에 저장된 담배액의 양을 확인할 수 있도록 상기 카트리지는 일측에 투명창이 형성된 것을 전자담배.

명 세 서

기 술 분 야

[0001] 본 고안은 전자담배에 대한 것으로서, 카트리지에 저장된 담배액의 양에 관계없이 발열부재로의 담배액 공급이 빠르고 항상 충분한 양의 담배액이 공급되는, 개선된 전자담배에 관한 것이다.

배 경 기 술

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